# PD-C

English en

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# 1 Information about the documentation

## 1.1 Explanation of signs used

### 1.1.1 Warnings

Warnings alert persons to hazards that occur when handling or using the product. The following signal words are used in combination with a symbol:

| | |
|---|---|
| ⚠ | **DANGER!** Draws attention to imminent danger that will lead to serious personal 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. |

### 1.1.2 Symbols

The following symbols are used:

| | |
|---|---|
| | Read the operating instructions before use. |
| ⚠ | General warning |
| 2 | Laser radiation. Do not stare into the beam. Class 2 laser in accordance with IEC/EN 60825-1:2007 |

### 1.1.3 Characters used in illustrations

The illustrations in these operating instructions are intended to promote a better understanding and may deviate from the actual version of the product.

| | |
|---|---|
| **2** | These numbers refer to the corresponding illustrations found at the beginning of these operating instructions. |
| 3 | The numbering in the illustrations reflects the order of the work steps in the illustration and may deviate from the numbering of work steps in the text. |
| 11 | Item reference numbers are used in the **overview illustration** and refer to the numbers used in the **product overview** section. In the product overview section, the numbers shown in the legend relate to these item reference numbers. |

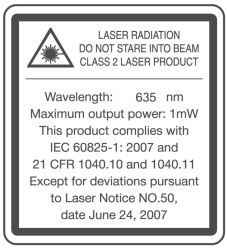
## 1.2 About this documentation

- Read these operating instructions before the product is used or operated for the first time. This is a prerequisite for safe, trouble-free handling and use of the product.
- **The information provided in the detailed operating instructions installed in the tool** as well as the supplements and updates provided at **www.hilti.com** must also be observed.
- Observe the safety instructions and warnings in this documentation and on the product.

- This document forms a permanent, integral part of the product described and must always be with the product when it is handed over to other persons.

### 1.3 Laser information on the product

**Laser information**

| | |
|---|---|
|  | Laser radiation. Do not stare into the beam. Class 2 laser. |

### 1.4 Product information

**Hilti** products are designed for professional use and may be operated, serviced and maintained only by trained, authorized personnel. This personnel must be informed of any particular hazards that may be encountered. The product and its ancillary equipment may present hazards when used incorrectly by untrained personnel or when used not as directed.

- Write down the serial number in the table below. You will be required to state the product details when contacting Hilti Service or your local Hilti organization to enquire about the product.

**Product information**

| | |
|---|---|
| Type: | PD-C |
| Generation: | 01 |
| Serial number: | |

## 2 Safety

### 2.1 Basic information concerning safety

**CAUTION**

**Possible hazard or risk of electric shock or burning injuries!** Attempting to remove the battery presents a risk of electrical hazards, e.g. short circuiting, burning injuries and leakage of harmful substances.

- Do not attempt to open the product. Have the battery replaced only by **Hilti** Service.

**CAUTION**

**Possible hazard or risk of electric shock or burning injuries!** Ingress of liquids such as rainwater, dew or condensation, etc. into the product presents a risk of electrical hazards, e.g. short circuiting, burning injuries and explosion.

- Keep the product clean and dry at all times.
- Keep the hinged cover cap closed to prevent dampness entering the interior of the product.

**CAUTION**

**Possible hazards as result of short circuiting, overload and fire.** Possible hazards due to heat radiation, ejection of molten material or chemical reactions caused by short circuiting, overloading or through resulting fire.

- Do not expose the product to high temperatures or fire. The battery contained in the tool could explode or release toxic substances.
- Use only the approved USB AC adapter with standard micro-USB cable.
- Under abusive conditions, liquid may be ejected from the battery. Avoid contact with this liquid. Rinse with water if contact occurs. In the event of eye contact with the liquid, a doctor should also be consulted. The liquid that leaks from a battery may cause skin irritation or burns.

**WARNING**

**Warning: hazardous high-frequency or low-frequency electromagnetic radiation!** Electromagnetic radiation may cause spontaneous activation/starting. The emission of radiation may cause interference to other devices.

- Do not use the product in the proximity of persons who have a cardiac pacemaker.
- Do not use the product in the proximity of medical instruments and appliances.
- Operation of the product in the proximity of military installations, airports, radio astronomy facilities or in aircraft is not permissible unless prior permission has been obtained.

**CAUTION**

**Visible and invisible laser radiation present hazards.** Looking into the laser beam causes eye damage.

- Secure the area in which you will be taking measurements. Take care to avoid directing the laser beam toward other persons or toward yourself when setting up the product.
- Do not look directly into the light source. In the event of direct eye contact with the laser beam, close your eyes and move your head out of the path of the laser beam.
- Keep laser tools out of reach of children.

**CAUTION**

**Unintentional activation of the laser beam presents a hazard.** The laser beam may be switched on by inadvertently pressing a measure command button or by a software error.

- Avoid unintentional activation of the laser beam.
- When handling the product, always bear in mind that the laser beam could be switched on inadvertently. Before looking toward the path of the laser beam, make sure that the laser beam is switched off or that the product is switched off completely.

**WARNING**

**Risk of explosion!** Operation in the vicinity of flammable liquids, gases or dusts is hazardous.

- Pay attention to the ambient conditions. Do not use the product where there is a risk of fire or explosion.

**Possible measurement errors** Measurement errors are possible when the operating temperature range is not observed, when there is a high concentration of particles in the air, when the lens is dirty, when measurements are taken from unsuitable surfaces or when the product is used incorrectly.

- After switching on and while using the product, always pay attention to the information and warnings displayed on the touchscreen.
- Check the accuracy of the product before using it for measuring.
- When the product is brought into a warm environment from very cold conditions, or vice-versa, allow it to become acclimatized before use.

**Incorrect settings may have damaging consequences.** Incorrect settings, e.g. due to use of a measuring extension of a different length, may lead to incorrect results and consequential damage.

- Always pay attention to the information and warnings displayed on the touchscreen.
- Make sure that you use the correct settings when taking measurements.

**In addition to the safety rules listed in the individual sections of these operating instructions, the following rules must be strictly observed at all times.** The product and its ancillary equipment may present hazards when used incorrectly by untrained personnel or when used not as directed.

- Keep all safety instructions and information for future reference.
- Stay alert, watch what you are doing and use common sense when working with the product. Do not use the product while you are tired or under the influence of drugs, alcohol or medication. A moment of inattention while operating the product may result in serious personal injury.
- Do not render safety devices ineffective and do not remove information and warning notices.
- If the product is opened improperly, laser radiation in excess of Class 2 may be emitted. **Have the product repaired only by Hilti Service.**
- Tampering with or modification of the product is not permitted.
- Check that the product functions correctly each time before use.
- Measurements taken from surfaces with low reflectivity in highly reflective surroundings may be inaccurate.
- Measurements taken through panes of glass or other objects may be inaccurate.
- The measurement may be incorrect if the conditions under which the measurement is taken change rapidly, e.g. due to people walking through the path of the laser beam.
- Do not point the product toward the sun or other powerful light sources.
- The product and its ancillary equipment may present hazards when used incorrectly by untrained personnel or when used not as directed.
- To avoid the risk of injury, use only genuine **Hilti** accessories and additional equipment.
- Observe the information printed in the operating instructions concerning operation, care and maintenance.
- Never use the product without having received the appropriate instruction on its use or without having read this documentation.
- Due to the principle employed, the results of measurements may be negatively affected by the surrounding conditions. This includes, e.g. close proximity to equipment that generates powerful magnetic or electromagnetic fields, taking measurements from unsuitable surfaces and use of unsuitable reflectors.
- Measurements to plastic foam surfaces, e.g. polystyrene foam, to snow or to highly reflective surfaces, etc. may result in incorrect readings.

## 2.2 Proper preparation of the working area

- Avoid unfavorable body positions when working from ladders. Make sure you have a safe stance and that you stay in balance at all times.
- Secure the site at which you are taking measurements and take care to avoid directing the laser beam toward other persons or toward yourself.
- Use the product only within its specified limits. Do not direct the laser beam toward mirrors, stainless steel, polished stone or similar surfaces.
- Keep the laser exit window clean in order to avoid measurement errors.
- Observe the accident prevention regulations applicable in your country.

## 2.3 Electromagnetic compatibility

Although the laser range meter complies with the strict requirements of the applicable directives, **Hilti** cannot entirely rule out the possibility of interference to the laser range meter caused by powerful electromagnetic radiation, possibly leading to incorrect operation. Accuracy must be checked 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 laser range meter complies with the requirements of class A: The possibility of interference occurring in a domestic environment cannot be excluded.

## 2.4 Working safely with laser tools

- Laser Class 2 tools may be operated only by appropriately trained persons.
- Laser beams should not be projected at eye height.

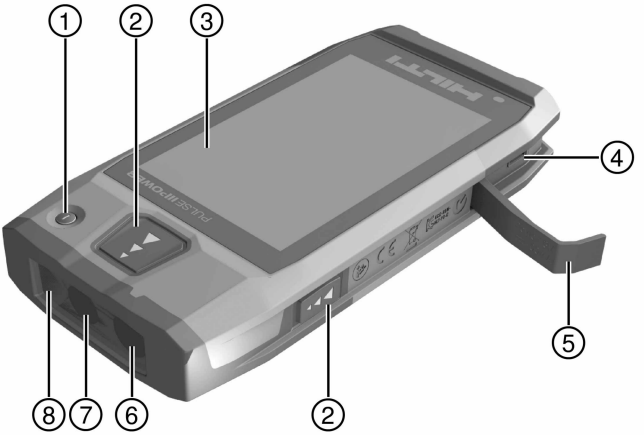
- Precautions must be taken to ensure that the laser beam does not unintentionally strike highly reflective surfaces.
- Precautions must be taken to ensure that persons do not stare directly into the beam.
- The laser beam must not be allowed to project beyond the controlled area.
- Switch the laser tool off when it is not in use.
- Activate the locking function in the tool settings in order to prevent unauthorized persons, especially children, from activating the laser beam.
- Store laser tools, when not in use, in places to which unauthorized persons have no access.

## 2.5 General safety rules

- Check the product for damage before use. Have the damage repaired by **Hilti** Service.
- Before using the product, just to be sure, check the product's preset settings and any settings you have made yourself.
- Do not use the product while you are driving a vehicle or operating a machine.
- Check the accuracy of the product after it has been dropped or subjected to other mechanical stresses.
- Although the product is designed for the tough conditions of jobsite use, as with other measuring instruments it should be treated with care.
- Although the product is protected against the entry of moisture, it should be wiped dry before being put away in its transport container.
- Store tools and appliances out of reach of children when not in use. Do not allow persons who are unfamiliar with the product, or with these instructions, to operate the product. Tools or appliances are dangerous in the hands of untrained, inexperienced persons.

## 3 Introduction to the tool

### 3.1 Overview of the product



① On/off switch

② Measure command buttons

③ Touchscreen
④ Micro-USB socket, type B
⑤ Hinged cover
⑥ Laser exit
⑦ Camera lens
⑧ Glass cover
⑨ Tripod thread

## 3.2 Intended use

The product described is a laser range meter. It is designed to be used for measuring distances. The measured distances can be used in conjunction with a wide range of calculation functions, e.g. areas, volumes, minimum/maximum distances, Pythagoras calculations, laying out, etc.

## 3.3 Items supplied

Laser range meter, wrist strap, soft pouch, short measuring extension, AC adapter with micro-USB cable.

You can find other system products approved for your product at your local **Hilti** Center or online at: **www.hilti.com**.

## 3.4 Integrated battery

The product comes with a permanently integrated 3220 mAh Li-ion battery.

The Li-ion battery will typically last for 500 full charging cycles or at least two years of moderate to heavy use.

When the battery is discharged, the charging operation lasts for roughly three hours – provided that the USB cable and plug adapter supplied by **Hilti** are used.

**Note**
If, at the start of the charging operation, the battery was completely or almost completely discharged, the charging signal may only appear after roughly 30 minutes.

At temperatures over 30 °C (86 °F), the time required to charge the battery will increase considerably. Optimal battery charging times are achieved at normal interior temperatures, away from direct sunlight.

In the case of very high exterior temperatures, i.e. 32 °C (90 °F) and over, the charging operation will take longer. The charging operation may even be automatically interrupted in order to maintain a safe battery temperature.

The charging operation may take longer if the USB cable supplied by **Hilti** is connected to a PC for charging.

We do not recommend using micro-USB cables from other manufacturers. If this cannot be avoided, you should first ensure that the cable in question is suitable for use with 5.0 V/2.1 A power sources. The time required to charge the tool may be significantly increased if a different make of micro-USB cable is used. If a micro-USB cable from another manufacturer is regularly used in place of the one supplied by **Hilti**, this may impair the battery life.

- When starting the tool for the first time, ensure that the battery is completely charged before putting the tool into operation.
- Do not charge the tool in direct sunlight.
- If the charging operation stops or is taking a very long time, try to find a cooler environment in which to charge the battery.
- If there is anything unusual about the battery charging operation or if the battery life falls below two hours, contact your **Hilti** Service team.
- The tool should only be charged using the micro-USB cable supplied by **Hilti**. Connect the cable to a USB port on a PC or, using the plug adapter supplied, a power outlet.
- If you lose the micro-USB cable or the plug adapter supplied with the tool, contact your **Hilti** Service team for a replacement.

**WARNING**
**Risk of injury caused by the laser beam.** Failure to follow the correct procedures when opening may cause uncontrolled emission of laser radiation.

- Always have repairs carried out by **Hilti** Service.

- The Li-ion battery must be replaced by **Hilti** Service as the tool has to be reconfigured once the battery has been replaced.

## 3.5 Technical data

### 3.5.1 Distance measurement

**Note**

**Distance and inclination measurement accuracy:** Influences such as high temperature fluctuations, dampness, shock, dropping, etc. can affect the accuracy of the tool. Unless stated otherwise, the tool was adjusted or calibrated under standard ambient conditions (MIL-STD-810G). As a basic principle, when taking distance measurements an additional distance-dependent error of 0.02 mm per meter is to be taken into account. The reference for inclination measurements is the underside of the tool.

| | |
|---|---|
| **Operating modes** | • Single measurements<br>• Range (multiple) measurements |
| **Distance measurement accuracy (2σ, standard deviation)** | ±10 mm |
| **Inclination measurement accuracy (2σ, standard deviation)** | ±0.3° |
| **Beam divergence** | 0.20 mrad ...0.45 mrad |
| **Measuring range with target plate** | 0 m ...200 m<br>(0 ft ...656 ft) |
| **Minimum distance for aiming with the laser point and cross hairs without use of the zoom function** | > 2 m<br>(> 6 ft - 10 in) |
| **Minimum distance for aiming with the laser point and cross hairs at the maximum zoom setting** | > 5 m<br>(> 16 ft) |

### 3.5.2 Touchscreen

| | |
|---|---|
| **Indicators** | Continuous display of distance, operating status and battery charge status |
| **Touchscreen diagonal size** | 10.16 cm<br>(4.00 in) |

### 3.5.3 Power source

| | |
|---|---|
| **Li-ion battery** | Built-in |
| **Rated voltage** | 3.7 V |
| **Capacity** | 3,220 mAh |
| **Standby time** | > 200 h |
| **Length of time until the automatic sleep mode is activated** | 20 min |
| **Battery life under normal operating conditions, display switched on** | ≈ 10 h |
| **Charging time (depending on battery charger and charging cable)** | ≈ 3 h |
| **Battery charger input voltage** | 100 V ...240 V |
| **Battery charger input frequency** | 50 Hz ...60 Hz |
| **Battery charger rated current** | 0.5 A |
| **Battery charger output voltage** | 5 V |
| **Charging current** | 10 mA ...2,100 mA |
| **Charging cable plug standard** | Micro-USB |

### 3.5.4 Laser

| | |
|---|---|
| **Laser class** | Visible, laser class 2, IEC/EN 60825-1:2007;<br>Class 2 CFR 21 § 1040 (FDA) |
| **Wavelength** | 635 nm |
| **Output power** | < 1 mW |
| **Time until activation of power-saving mode** | 20 s |

### 3.5.5 Other characteristics of the product

| | |
|---|---|
| **Internal flash memory capacity for saving measurements** | ≈ 3,000<br>**Note**<br>The value given is based on typical direct measurements with target photo. The actual maximum depends on the type of measurements and the resolution of the photos. |
| **Target camera maximum resolution [megapixels]** | 5.0 |
| **Bluetooth version** | 2.1 + EDR (3 Mbit/s) |
| **Weight** | 260 g<br>(9.2 oz) |
| **Dimensions** | 154 mm × 75 mm × 24 mm<br>(6.1 in × 3.0 in × 0.9 in) |
| **Protection class** | IP54 |
| **Operating temperature** | −15 °C ...50 °C<br>(5 °F ...122 °F) |
| **Storage temperature** | −25 °C ...63 °C<br>(−13 °F ...145 °F) |

## 3.6 Basic principle

The tool determines the distance along a laser beam emitted by the tool to the point at which the beam strikes a reflective surface. The red laser spot ensures that the target is clearly identifiable. The range is dependent on ambient light levels as well as the reflectance and structure of the target surface from which measurements are taken.

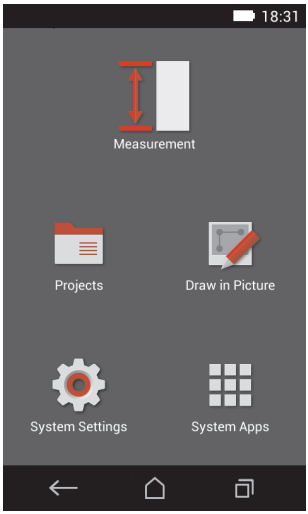
## 3.7 Navigating on the display

### 3.7.1 Start page

The tool's start page contains links to the following pages:

- Measuring application
- Project folder list within the measuring application
- **'Draw in Picture'** function within the measuring application
- Tool settings

  (Please note: The settings for the measuring application can be found in the **'Application Settings'** menu, in the **'Functions'** drop-down list within the measuring application)
- System apps, including the camera for photos and videos, a gallery in which photos and videos can be viewed and a pocket calculator.

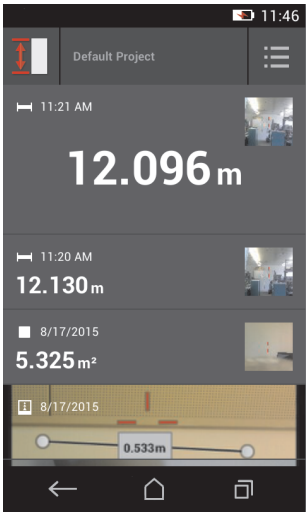



### 3.7.2 Measuring application

The measuring application is the main application for taking measurements. It offers a range of measuring functions, some of which are supported by assistants. The measuring application saves measurements in project folders, which you can export and send to other devices via Bluetooth.

The measuring application's main page contains the following:

- The project folder list; this is displayed by tapping the active project shown at the top, in the center of the menu bar.
- The **results list for the active project**; starting with the most recent result, this shows all of the measurements in chronological order, with the oldest result at the end of the list. Details relating to a specific result can be displayed by tapping on it.
- The icon for the **'Functions'** drop-down menu; this is located in the upper-right corner of the display. The drop-down menu contains all of the measuring functions (see the overview of functions, → page 17), and the **'Application Settings'** menu with the settings for the measuring application can be found at the end of the list.



### 3.7.3 Toolbar

The toolbar is displayed during the measurement. It allows you to activate assistants, switch between the permanent laser and the standard laser, switch on the aiming camera and change the reference position.

### 3.7.4 Navigation bar

The navigation bar is always found at the lower edge of the display, and includes the following elements:

- ←: End a function and return to the previous view or the last menu displayed.
- ⌂: Return to the start page.
- ⧉: Display all active applications and end or select individual ones.

## 3.8 Buttons and icons for triggering and ending measurements

After switching on the laser, a measurement can always be taken using one of the three rubber measure buttons. For the majority of the functions, you can also take measurements using the measure button icon on the display once the tool is in position and ready to measure.

If you take a measurement when the range is shown before the measurement is triggered, you can take the measurement by tapping on the displayed range. In the case of range (multiple) measurements, you can also end the measurement by tapping on the displayed distance.

**Note**
Pressing one of the three measure buttons will take you directly to the **'Direct'** function.

### 3.8.1 Ending measurements and functions

You can end any measurement or function using ←.

## 3.9 Inclination sensor

The inclination sensor integrated in the PD-C assists calculations in indirect measurements. The integrated inclination sensor measures the horizontal incline. In order to achieve greatest possible accuracy when making inclination measurements, the inclination sensor must be adjusted at regular intervals. Observe the instructions in the tool software relating to regular adjustment. You must also adjust the tool after it has been exposed to a change of temperature or if it has been subjected to an impact.

The tool is not intended for taking precise angle measurements. We recommend you use a spirit level or a suitable precision tool for this purpose.

## 3.10 Measuring aids

### 3.10.1 Measuring extension PDA 72

The PDA 72 measuring extension is made from aluminum and is equipped with a non-conductive synthetic rubber grip. If the PDA 72 measuring extension (optional accessory) is screwed onto the base of the tool, a dialog appears in which you have to confirm selection of the measuring extension. The PDA 72 measuring extension can also be screwed to the rear of the tool.

### 3.10.2 Short measuring extension

The product package contains a short measuring extension (folding spike). This folding spike is designed to allow you to work with points of reference in places otherwise inaccessible to the flat base of the tool.

The folding spike is helpful when measuring diagonally across rooms or when points of reference are hard to access. Observe the notes on optimizing measuring accuracy → page 29.

- ▸ The folding spike should be regularly used in certain indirect and Pythagoras measurements to retain the same point of reference for all partial measurements.
- ▸ Insert the folding spike into the holder on the tool cover for safe storage.

In its original condition, the folding spike has a rounded end. Long-term use of the folding spike may result in abrasion of this point.

- ▸ If the folding spike has been flattened by use, or if you have lost the folding spike, please contact **Hilti** Service.

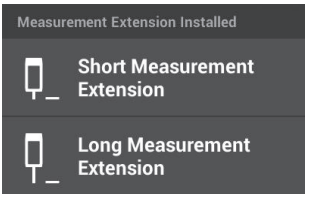
### 3.10.3 Fitting a measuring extension to the base of the tool

**Note**

Automatic recognition of measuring extensions should only appear and be noted if the original **Hilti** PDA 74 measuring extension (short version for the PD-C, supplied) or the original **Hilti** PDA 72 measuring extension (long version for the PD-I, PD-E and PD-C, available separately) is screwed to the base of the tool.

Other tripods may be used as well. If you screw one of these to the base of the tool, you must then carefully determine the offset and manually enter this value in the tool.

1. Switch the tool on and unlock the display.
2. Screw the measuring extension to the base of the tool.
   - ◁ You will be asked to make a selection.
3. Select the matching measuring extension or enter the offset.




### 3.10.4 Target plates

For larger ranges and in unfavorable light conditions, we recommend use of the PDA 50, PDA 51 or PDA 52 target plates.

For reliable 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 PDA 50 and PDA 52 target plates are used and very high accuracy is required, add a value of 2 mm (0.1 inches) to the measurement obtained.

This distance value can be entered manually. Select the reference setting before or after the measurement and enter a numerical offset of 0.0025 m or $^{1}/_{16}$ inches.

#### 3.10.4.1 Target plate PDA 50

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.

#### 3.10.4.2 Target plate PDA 51

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

#### 3.10.4.3 Target plate PDA 52

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.

### 3.11 Measuring very short distances

The shortest distance that the tool can reliably measure under typical operating conditions is 15 cm (US: 6 inches). However, the minimum spacing for a reliable surface can be up to 1.5 m if the target has a non-reflective color or surface, such as dark black, or a smooth, velvety surface structure. If the measurement is not reliable, the tool will not display a result.

### 3.12 Measuring accuracy

The accuracy of the laser distance measurement, from the tool's reference position to the laser spot, is determined with a maximum deviation of 1.0 mm. If a target cannot be reached or bright sunlight does not permit this level of precision, no result is displayed.

Measuring accuracy when using the **‘Indirect’**, **‘Pythagoras’** and **‘Measure from picture’** functions may, under typical operating conditions and without careful use of a tripod, lie significantly beyond ±1.0 mm. The deviation depends on how exactly you retain the reference position for each of the measurements required to calculate the end result. Continuous use of the short measuring extension makes it easier to swivel the tool

around a single, unchanged starting point. On the other hand, rotating the tool without using a measuring extension or a tripod will often cause slight deviation from the exact reference position.

The measuring accuracy when using the **'Measure from picture'** function depends on whether the tool is positioned at an exact angle of 90° to the target (at both horizontal and vertical right angles) and on whether the whole surface surveyed in the target picture is genuinely level, such as a façade or a ceiling. The following table shows the typical deviations for measurements in photos when the photo was not taken from a 90° angle.

**Errors caused by surveying from a position not at right angles to the wall**

The following table presupposes that the vertical 90° angle against the wall is maintained using the inclination indicator on the range meter.

The data on error percentages in the table estimates the deviation of the measurement in relation to the corresponding real distance.

**Limitations**

- Individual adjustment of tools is not taken into account.
- Values apply to freehand measurements.
- If a tripod is used, the accuracy is increased by approximately 0.5%.

| **•/•** | **Length of the line drawn on the screen in relation to the width of the screen (without zoom)** | | |
|---|---|---|---|
| **Deviation from the horizontal 90° angle against the wall** | **< 30%** | **30% to 50%** | **> 50% to 100%** |
| 0° | ±4.5% | ±2.5% | ±2.2% |
| maximum ±3° | ±5.2% | ±3.7% | ±4.9% |

### 3.12.1 'Measure from picture' for advanced users

If the procedure is carried out with due care, aiming the laser at a horizontal or vertical line at a 90° angle allows advanced users to use the **'Measure from picture'** function to determine a distance along the line. This method must be used with caution, as all of the distances determined in the picture that do not lie along a line surveyed at a 90° angle will be significantly less accurate.

### 3.12.2 The influence of surfaces on the measurement

The **Hilti** laser module, developed on the basis of PulsePower (millions of pulses per second), offers the best conditions for reception of an ample number of distinct samples of reflected laser light, which are used to calculate precise measurements.

However, there are situations in which the tool will not receive a sufficient amount of reflected light from the target. Understanding this principle means that certain remedies are possible, such as the use of target plates from **Hilti**, available as an accessory. Use of target plates allows a substantially larger amount of light to be reflected from the target to the tool.

Examples of situations where an insufficient amount of light is reflected include missed targets (e.g. a laser beam that misses the ceiling and is instead aimed at the sky), luminous, non-reflective surfaces, obstructions such as mist, rain or dust between the tool and the target, non-reflective dark surfaces or surfaces with a velvety structure, materials that absorb light, such as foam, or rough surfaces.

#### 3.12.2.1 Rough surfaces

When measuring to rough surfaces, such as rough plaster, an average distance value is established with the center of the laser spot weighted higher than the edges of the laser spot.

#### 3.12.2.2 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 a target plate (PDA 50, PDA 51 or PDA 52) in both of these situations.

#### 3.12.2.3 Wet or shiny surfaces

A still, calm pond reflects both the clouds and light from the sky. A shiny, wet surface reflects the laser light in a similar way. If the targeted surface is wet and shiny, it is important that the measurement is taken at right angles, as far as possible, as otherwise the light will be reflected in a different direction and too little light will return to the tool to calculate a measurement.

Curved surfaces can also make it more difficult to reflect enough light in the direction of the tool for a measurement to be taken.

#### 3.12.2.4 Transparent surfaces or surfaces that absorb light

It is generally possible to measure distances to transparent or semi-transparent materials, e.g. liquids, polystyrene foam, etc.. However, as light penetrates these materials, measuring errors may occur.

#### 3.12.2.5 Disruption between the tool and the measuring target

Measuring errors can occur if, for example, measurements are taken through glass panes or other objects such as dust or aerosols are located between the laser source and the measuring target.

# 4 Introduction to the measuring application

## 4.1 Measuring application functions and assistants

### 4.1.1 Functions

Functions can be selected from the following function groups in the measuring application's **‘Functions’** drop-down menu:

**Function groups and functions**

| Function group | Functions |
|---|---|
| **‘Direct’** | **‘Direct’** |
| **'Foto'** | • **‘Draw in picture’**<br>• **‘Measure from picture’** |
| **‘Area and Volume’** | • **‘Rectangle’**<br>• **‘Volume Room’**<br>• **‘Volume Cylinder’** |
| **‘Indirect’** | • **‘Horizontal’**<br>• **‘Vertical’**<br>• **‘Overhead’**<br>• **‘Not reflecting’**<br>• **‘Min/Max/Delta’** |
| **‘Pythagoras’** | • **‘Pythagoras I’**<br>• **‘Pythagoras II’**<br>• **‘Pythagoras III’** |
| **‘Trapezoid’** | • **‘Trapezoid’**<br>• **‘Trapezoid I’** |
| **‘System Settings’** | Settings for the measuring application |

### 4.1.2 Measuring with the help of the trigger, timer and aiming camera

Before taking a measurement, you can activate the following assistants to provide support for distance measurements using the icon on the (→ page 14) toolbar:

- **Triggers** provide support by automatically taking a measurement when distance measurements have to be taken at an angle which is exactly horizontal or vertical, or when the longest or shortest distance within a continuous measurement sequence has to be determined.
- **Timers** provide the option of taking a measurement 3, 5, 10 or 15 seconds after the measure button is pressed.
- Measuring target tracking using the **aiming camera** provides support when aiming at measuring targets that are difficult to see.

**Possible combinations of assistants and functions**

| Function | Assistant | | |
|---|---|---|---|
| | Trigger | Timer | Aiming camera |
| **'Direct'** | ✓ | ✓ | ✓ |
| **'Measure from picture'** | ✓ | ✓ | ✓ |
| **'Draw in picture'** | ✓ | ✓ | ✓ |
| **'Area and Volume'** | ✓ | ✓ | ✓ |
| **'Indirect'** | ✓ | ✓ | ✓ |
| **'Not reflecting'** | Yes, for the first measurement. Not for the second measurement (angle measurement only) | Yes, for the first measurement. Not for the second measurement (angle measurement only) | ✓ |
| **'Min/Max/Delta'** | Not applicable | Not applicable | ✓ |
| **'Pythagoras'** | ✓ | ✓ | ✓ |
| **'Trapezoid'** | ✓ | ✓ | ✓ |

### 4.1.3 Standard laser (single measurement)

In **'Standard Laser'**mode, after a measure button is pressed and the measurement is taken, the laser is switched off.

The current mode – **'Standard Laser'** or **'Permanent Laser'** – is displayed as an icon on the status bar on the main screen.

### 4.1.4 Permanent laser (multiple measurement)

In **'Permanent Laser'** mode, the laser is not switched off after a measure button is pressed and the measurement is taken, instead remaining on. This means that measurements can be carried out in quick succession without having to repeatedly switch the tool on.

The current mode – **'Standard Laser'** or **'Permanent Laser'** – is displayed as an icon on the status bar on the main screen.

### 4.1.5 Using the aiming camera

Aiming with the help of the camera facilitates accurate orientation of the laser range meter, even at longer distances.

**Minimum spacing required for use of the aiming camera's cross hairs**

The aiming camera makes it easier to accurately position the laser spot. This is useful both outside in daylight and in the case of larger interior distances, i.e. whenever it is difficult or impossible to distinguish the laser spot.

The aiming camera and the laser are located next to each other, two to three centimeters (roughly an inch) apart. As a result, when measuring short distances, the laser spot and the center of the cross hairs cannot be aligned. This behavior is normal and is caused by the same parallax error that allows you to see two fingers if you hold a single finger against the tip of your nose. The laser spot and the cross hairs can be aligned from two meters away (roughly 6.5 feet) when the zoom is switched off or from five meters away (roughly 16 feet) when the zoom is set to maximum.

**Note**

The measurement is always calculated from the laser spot, regardless of the center of the cross hairs.

**Zoom and brightness**

When the aiming camera is activated, the zoom and brightness can be adjusted by tapping and swiping.

**Zoom**

Tapping on the lower edge of the screen activates the zoom setting. A bar on the upper edge of the screen shows the current magnification as a percentage. Swiping left or right on the lower edge of the screen allows you to adjust the magnification.

**Brightness**

Tapping on the right edge of the screen activates the brightness setting. A bar on the right edge of the screen shows the current brightness as a percentage. Swiping up or down on the right edge of the screen allows you to adjust the brightness of the aiming camera picture.

### 4.1.6 Measuring references

**Reference positions**

| | |
|---|---|
| | The reference position is the laser exit window, i.e. the front edge of the tool. |
| | The reference position is the tripod thread on the back of the tool. |
| | The reference position is the tripod thread on the base of the tool. |

The laser range meter can measure distances from three different points of contact or measuring references. You can switch between the laser exit window, base of the tool and thread on the underside of the tool using the **‘Measuring references’** menu on the toolbar.

When screwing a measuring extension or a tripod to the base of the tool (position **(9)** on the product overview), the tool will query whether a short or long measuring extension is being used or whether a different value has to be entered. The tool automatically sets the appropriate measuring reference for the selected measuring extension. For other purposes, such as a value for a tripod, the result from a new measurement, a saved result or a numerical input can be used.

**Offset settings**

The **‘Offset Value’** function automatically increases or reduces all measurements by a defined value. The offset value is set using the following options:

- **‘New measurement’**: Measure a distance.
- **‘Data’**: Select a saved measurement.
- **‘Numerical input’**: Numerical input, e.g. a distance measured elsewhere.

## 4.2 Measuring with the help of triggers and timers

### 4.2.1 Activation and deactivation

The icon is used to activate the trigger and the timer, which provide assistance during the measuring process. The trigger and timer can be combined with various measuring functions (→ page 17).

The **‘Default mode’** option can be used to deactivate the trigger and the timer.

### 4.2.2 Trigger‘Minimal’

The tool records the shortest distance registered during continuous measurement.

**Note**

This measuring program is particularly helpful if a measurement to a target position has to be taken completely plumb.

### 4.2.3 Measuring minimum distance

1. Press the "Measure" button once.
   - ◁ Continuous measurement begins.
2. Press the "Measure" button again.

- ◁ Continuous measurement ends and the shortest distance determined during continuous measurement is displayed.

### 4.2.4 Trigger‘Maximal’

The tool records the greatest distance registered during continuous measurement.

**Note**
This measuring program is particularly helpful if a measurement has to be taken in a hard-to-reach area, such as in the corner of a ceiling.

### 4.2.5 Measuring maximum distance

1. Press the "Measure" button once.
   - ◁ Continuous measurement begins.
2. Press the "Measure" button again.
   - ◁ Continuous measurement ends and the longest distance determined during continuous measurement is displayed.

### 4.2.6 Trigger‘Horizontal’

During continuous measurement, the tool only records values registered at an incline of 0°.

**Note**
This measuring program is particularly helpful if a measurement has to be taken at a completely horizontal angle but you do not have a tripod to hand, by ensuring that the tool does not deviate from a horizontal orientation.

### 4.2.7 Measuring horizontal distances

1. Press the "Measure" button once.
   - ◁ Continuous measurement begins.
2. Aim the tool at approximately 0°.
   - ◁ At exactly 0° the tool takes a measurement automatically, ends continuous measurement and displays the horizontal distance.

### 4.2.8 Trigger‘Vertical’

During continuous measurement, the tool only records values registered at an incline of 90°.

**Note**
This measuring program is particularly helpful if a measurement has to be taken at a completely vertical angle but you do not have a tripod to hand, by ensuring that the tool does not deviate from a vertical orientation.

### 4.2.9 Measuring vertical distance

1. Press the "Measure" button once.
   - ◁ Continuous measurement begins.
2. Aim the tool at approximately +90° or -90°.
   - ◁ At exactly +90° or -90° the tool takes a measurement automatically, ends continuous measurement and displays the vertical distance.

### 4.2.10 Delayed measurement using ‘Timer’

When measuring using the **‘Timer’** function, the tool takes a delayed measurement after the measure button is pressed. This delay can be set to 3, 5, 10 or 15 seconds.

**Note**
The **‘Timer’** function cannot be combined with the assisted measuring methods.

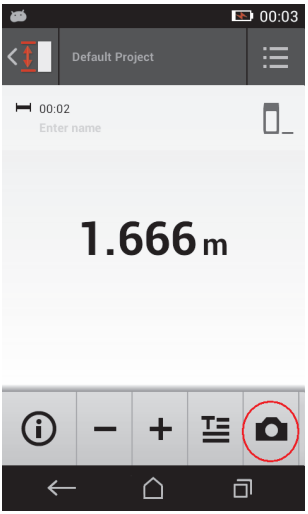
## 4.3 Measurements, managing project folders and exporting data

### 4.3.1 Measurements

The tool saves measurements, photos of the measured targets and any calculations that have been carried out. Each result can be supplemented with annotations or a photo.

With average camera settings and ordinary use, approximately 3000 results can be saved. The tool will notify you if the memory capacity is full. Further results can only be saved once space has been created in the project folders.

Each result is saved in a project folder. Results are shown in chronological order, with the most recent result at the top.




### 4.3.2 Display of measurements

Regardless of the unit of measurement selected in the **'Settings'** menu, the measuring application shows the calculated results as a numerical value to three decimal places.

**Note**

This value, shown to three decimal places, does not provide the real range in the case of either direct or indirect measurements. Rather, this value represents as accurate a calculation as possible. In the case of direct measurements, the result shown may deviate from the actual value by up to ±1 mm.

Results produced by indirect calculations do not achieve the same level of accuracy as results from direct calculations.

### 4.3.3 Managing project folders

You can add and name projects. If no project folder has been set up, measurements are saved to a folder labeled **'Default Project'**.

If you delete the **'Default Project'** folder, all of the results in this folder are deleted and the **'Default Project'** folder is recreated.

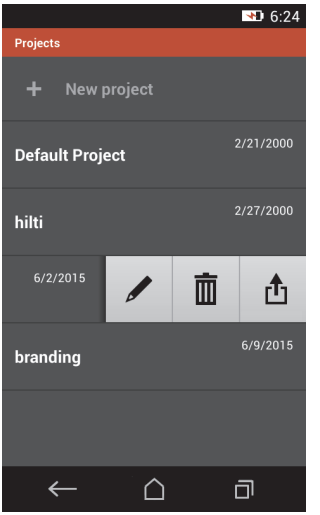
Project folders can be renamed or deleted. The last folder used is displayed when the tool is switched back on.

Measurements cannot be moved to different project folders.

- You should therefore ensure that the correct folder for the project has been either selected or created before taking any measurements.

### 4.3.4 Buttons for managing project folders

- The buttons for editing and deleting project folders and exporting files can be accessed by swiping left on the project folder entry.
- Use the pencil icon to rename the project.
- Use the trash icon to delete the project along with all of its content.
- Use the export icon to export all of the results from the current project into a file.
- Use the export icon to export individual results from the current project that were created using the **'Measure from picture'** and **'Draw in picture'** functions.




### 4.3.5 Exporting data

When exporting from project folders (PDF or CSV), or from results obtained using the picture functions (JPG), one of two options must be selected: The file is either sent to a connected device directly via Bluetooth, or saved to the flash memory on the PD-C. If you would like to use both options, simply repeat the process.

Files (e.g. PDF, CSV and JPG) can be exported via Bluetooth, e.g. to a PC that runs Microsoft Windows or a smartphone or tablet computer that runs Android. We cannot guarantee that all devices will be supported. Please note that Apple does not currently (2015) allow file transfers via Bluetooth connections with devices that do not run Apple software.

**Note**
To support file transfers from the PD-C to a Mac computer, Mac users with Mac OS X 10.5 and later versions can download the official transfer software from Android. Please visit https://www.android.com/filetransfer/ for more information.

The target device for the Bluetooth connection must already be paired with the tool in order for the file transfer to take place.

**Note**
Many Bluetooth-enabled devices with Android or PCs with various versions of Windows were successfully paired in the course of our tests. Nevertheless, **Hilti** cannot guarantee that pairing will work with every device. Apple does not allow the range meter to transfer files to Apple devices via Bluetooth connection.

Projects can be exported in PDF or CSV format, while results from the **'Measure from picture'** and **'Draw in picture'** functions are exported as a JPG file. The files can also be exported to the flash memory on the range meter. They can then be transferred from the flash memory to a PC using a micro-USB cable.

### 4.3.6 Exported data in the flash memory

**Note**
Results that are no longer required should be deleted on a regular basis to ensure that the 2 GB memory capacity on the PD-C is not filled.

However, even if the sizes of the result files vary, for example because they contain annotated pictures, typical users can store roughly 3000 results in the available memory.

Files in the flash memory cannot be viewed using the PD-C on its own – the current software does not provide for file management which can be used to view, edit or delete files in the flash memory.

Once the PD-C is connected to a PC using a micro-USB cable, the PD-C's root directory should appear in the Windows file system under "My Computer" with the name pdc_export. This directory contains subdirectories for all of the exports, chronologically ordered by the date and time of the export as well as by the name of the project or result.

- Copy the folder or specific files in the pdc_export directory to your PC.

### 4.4 Point measurements and range (multiple) measurements

Distance measurements can be carried out as point or range (multiple) measurements.

**Point measurements**

In point measurements, the range is measured for the targeted point.

**Range (multiple) measurements**

In range (multiple) measurements, either a minimum or maximum figure is determined for the scanned area. A range (multiple) measurement is used to set out given distances or lengths and can also be used where distance measurement is otherwise difficult, e.g. at corners, edges or in niches, etc..

During a range (multiple) measurement, the range is displayed virtually in real time. The speed at which the display is updated depends on the reflectivity of the target surface.

After the measurement is completed, the results page is displayed in the project folder.

### 4.5 Measuring range

The brightness of ambient light has an effect on the measuring range.

#### 4.5.1 Increase ranges

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 72 measuring extension or a tripod increases the likelihood of successful measurement at long distances by making it easier for the tool to receive reflected beams.

Use of target plates also allows you to increase the range of the tool (→ page 15).

#### 4.5.2 Reduced ranges

Measuring range may be reduced if ambient light is very bright, e.g. in bright sunlight or when working under very powerful floodlights.

Measurements taken to mat green, blue or black surfaces may reduce the range of the tool to the same extent as wet or shiny surfaces.

The range may be reduced or the result distorted if objects are located in the path of the laser beam or if measurements are taken through glass.

### 4.6 Recording measuring targets with the help of the camera

1. Tap on the "Camera" icon.
2. Record the target using the camera and align the cross hairs over it.
3. Take the measurement.
4. Tap on the "Camera" icon again if you no longer wish to work with the camera's assistance.

## 5 Preparation and settings

### 5.1 Charging the built-in battery

- Charge the internal battery completely before using the tool for the first time (see → page 10).

### 5.2 Switching on and off, standby mode and unlocking

#### 5.2.1 Switching on

1. Press the on/off switch briefly.
   - ◁ The product will be ready for use after 15–20 seconds. The locked display is shown.
2. To unlock the display, swipe the lock symbol off the screen to the right.
   - ◁ The measurements for the currently active project are displayed and ≡ can be used to select functions.

### 5.2.2 Standby mode or switching off

After normal use, the range meter can either be switched off or set to standby mode. The tool automatically switches to standby mode after a certain length of time without use.

If the battery is fully charged and Bluetooth is deactivated, the tool can remain in standby mode for between one week and one month before it has to be recharged. This means that standby mode is ideal for normal daily use.

### 5.2.3 Activating standby mode

- Press the on/off switch briefly.
  - The display switches off and the tool goes into standby mode.

**Note**
If the range meter is in standby mode, it can be reactivated using any of the four buttons.

### 5.2.4 Unlocking the tool

**Note**
If the tool has not been used for some time, it switches to sleep mode and the display is locked.

1. Press one of the four buttons on the tool.
   - The display switches on and the lock symbol is shown.
2. To unlock the display, swipe the lock symbol off the screen to the right.
   - The tool is unlocked.

**Note**
Pressing one of the three measure buttons will take you directly to the **‘Direct’** function.

### 5.2.5 Switching off

**Note**
If you will not need the tool in the next few days or if you will have to go for a long time without charging the battery, all you have to do is switch the tool off.

1. Press the on/off switch for several seconds.
2. Select **‘Switch off’** from the menu.
3. Confirm the settings by pressing **‘OK’**.
   - The tool vibrates twice and switches itself off.

## 5.3 Adjusting the inclination sensor

**Note**
Regular adjustment of the inclination sensor helps ensure high measuring accuracy. This applies to indirect measurements in particular, the results of which rely on the accuracy of the inclination sensor. (The inclination sensor does not influence the accuracy of the laser in direct measurements.)

1. Select the option **‘Settings’** and **‘Adjusting the inclination sensor’** from the **‘Functions’** menu.
2. Lay the tool on a flat surface with the display facing upwards.
3. Press the "Measure" button.
4. Rotate the tool, without lifting it off the surface, until it points in the opposite direction.
5. Press the "Measure" button.
   - The inclination sensor is adjusted.

## 5.4 Establishing a Bluetooth connection

**Note**
If you are connecting the range meter to another device via Bluetooth for the first time, ensure that Bluetooth is activated on the other device and that the counterpart device is set to be visible to other devices. Without taking these two steps, it may not be possible to connect the range meter to the other device.

1. Open the tool settings on the start page.
2. Switch on the "Bluetooth" option in the "WIRELESS & NETWORKS" section.
3. Select "More...".
   ◁ The tool searches for suitable Bluetooth devices.
4. In the settings on the device to which you want to connect the tool, ensure that the device is visible to other devices and that it is able to connect to new devices. Further information may be included in the documentation for the respective devices.
5. If no Bluetooth devices were found, select "Search for devices".
6. Select the device you wish to pair with under "Available devices" as soon as it is displayed.
7. Confirm the pairing by pressing "Yes" or "Pair".

**Note**
You can increase the battery life of the Li-ion battery if you deactivate Bluetooth after carrying out a data transfer.

## 5.5 Settings for the measuring application

| Setting | Description |
|---|---|
| **‘Length unit’** | Selecting the unit of length for distance measurement<br>**For Japan:** Tools registered in Japan are only able to work with metric units.<br>**Note**<br>After selecting a different unit, any saved measurements are converted into the new unit. |
| **‘Slope unit’** | Selecting the unit of length for inclines |
| **‘Audible signal’** | Switching the audible signal on or off |
| **‘Vibration’** | Switching the vibration on or off |
| **‘Adjusting the inclination sensor’** | Starting the adjustment process |
| **‘Target picture’** | Switching the creation of a target picture on or off. The target picture is saved and displayed together with the measurement in the results list.<br>Standard setting: On |
| Standard setting for the aiming camera for direct measurement (**‘Target picture in direct measurement’**) | Switch the use of the aiming camera on or off as the default setting for direct measurements (individual measurements). In the "Off" setting, the aiming camera can be switched on as needed. In the "On" setting, the aiming camera is always switched on automatically if a direct measurement is being prepared.<br>Standard setting: Off |
| Standard setting for the aiming camera for combined functions (**‘Target picture in indirect measurement’**) | Switch the use of the aiming camera on or off as the default setting for all measurements except direct measurements. In the "Off" setting, the aiming camera can be switched on as needed to simplify positioning the laser spot. In the "On" setting, the aiming camera is always switched on automatically if a measurement is being prepared.<br>Standard setting: Off |
| **‘Default settings’** | The "On" setting reactivates the standard settings for all measuring application settings. |

# 6 Working with the measuring application

## 6.1 Direct measurements using the ‘Direct’ function

### 6.1.1 Taking single, direct distance measurements

1. Select the project for which you wish to take the measurement.
2. Select the **‘Direct’** option from the **‘Functions’** menu.
   - ◁ The laser is switched on and a measure button icon appears on the display.
3. Position the base of the tool on the starting point of the measurement. When doing so, ensure that the tool is in a stable position.
4. Maintaining the stable position of the tool, aim the laser spot at the end point of the measurement.
5. Tap on the measure button icon or press a measure button.
   - ◁ The measurement ends and the result is displayed.
   - ◁ You can access additional information about the result by tapping on the information icon.

**Note**
You can add a picture for annotation purposes by tapping on the camera icon, or you can swipe the results list to the left to inspect the target picture for the measurement.

### 6.1.2 Continuous measuring (tracking) mode

This mode is activated by holding down the measure button for a longer time, and is particularly useful when using the **‘Horizontal’**, **‘Vertical’**, **‘Maximal’** or **‘Minimal’** triggers.

### 6.1.3 Activating continuous measuring (tracking) mode

1. To activate the continuous measuring (tracking) mode, hold down one of the measure buttons for roughly two seconds.
   - ◁ Once continuous measuring (tracking) is activated, the audible signal will sound 2–3 times per second and the distance will be shown in the middle of the display on a continuous basis.
2. To deactivate continuous measuring (tracking), tap the distance shown in the middle of the display or press one of the measure buttons.
   - ◁ The audible signal stops and the last valid measurement is displayed.

**Note**
You can switch off the audible signal in the settings for the measuring application.

## 6.2 Determining and documenting distances in pictures using the ‘Picture’ function

There are two functions that allow distances to be determined and documented directly in a picture taken using the integrated camera.

- Determine distances in pictures (**‘Measure from picture’**)
- Draw in pictures (**‘Draw in picture’**)

The integrated front camera is optimized to detect the laser spot at greater ranges and is therefore equipped with a narrow field of vision. To obtain pictures of wider areas, the distance from the object to be surveyed must be increased accordingly.

### 6.2.1 ‘Measure from picture’

This function provides approximate values for distances you plot with lines along certain elements in the picture. These lines must be drawn on a level surface (2D), such as on a wall, façade or ceiling.

**Examples of applications for the ‘Measure from picture’ function:**

- Estimation of an approximate distance, e.g. the minimum height of a ladder in relation to the height of a wall so that the top of the wall will remain within reach
- Estimation of the room available for the installation of a fascia on a façade

If the laser beam is aligned at right angles (90°) to the level surface, the estimation is accurate to ±1–2%.

The limitation of this function compared to the next function, **‘Draw in picture’**, is that when taking measurements and surveying, the right angle has to be maintained exactly. The tool is unable to ascertain whether the camera angle is correct or whether the surface in the picture is level. In this case, the deviation between the estimation and the actual measurement would be significant.

While you are drawing and extending a line, you can view the distance on the display that is automatically calculated from the picture.

#### 6.2.1.1 Determining distances in pictures

1. Select the option **‘Picture’** and **‘Measure from picture’** from the **‘Functions’** menu.
   - ◁ The laser is switched on.
2. Hold the tool at right angles to the level surface you are aiming at.
3. Press the measure button once or tap on the cross hairs.
   - ◁ The targeted area is surveyed and the measured distance is displayed.
4. Tap on the pencil icon.
   - ◁ The line icon and the icon for annotations appear and fade back out after a few seconds.

**Note**
If the icons have faded out, tap on the picture to display the icons again.

5. Tap on the line icon.
   - ◁ A line is placed in the picture.
6. Move the starting and end points of the section into the approximate positions.

**Note**
The starting and end points of the section must lie within the level surface. If the picture contains areas that are not part of the level surface, positioning the end points in these areas will lead to values that deviate significantly.

7. Touch and hold the end point to enlarge it, and then release the end point in exactly the right position.
   - ◁ The determined length of the line positioned in the picture is displayed.

#### 6.2.1.2 ‘Measure from picture’ – additional functions

- ▸ Add sections: Select the "New section" icon at the lower left.
- ▸ Extend or remove sections: Touch the sections on the display.
- ▸ Draw an area: Where you have three or more sections, connect the last section to the first section.

### 6.2.2 Documenting measured distances in pictures (‘Draw in picture’)

1. Select the option **‘Picture’** and **‘Draw in picture’** from the **‘Functions’** menu.
2. Enter the area in which you would like to document measured distances.
3. Tap on the check mark if you would like to use the picture.
   - ◁ The picture is transferred and displayed for editing.

**Note**
You can repeat the following steps at any time if you reopen the picture in the project folder.

4. Tap on the pencil icon.
   - ◁ The line icon and the icon for annotations appear and fade back out after a few seconds.

**Note**
If the icons have faded out, tap on the picture to display the icons again.

5. Tap on the line icon.
6. Select the source of the distance input: Either by taking a measurement with **‘Direct’**, by selecting a saved measurement with **‘Data’** or by entering a value with **‘Numerical input’**.
   ◁ A dimensioned line is placed in the picture.
7. Move the starting and end points of the section into the approximate positions.
8. Touch and hold the end point to enlarge it, and then release the end point in exactly the right position.
9. View or edit the photo, or export it as a JPG file.

#### 6.2.2.1 Documenting the distances measured on pictures – additional functions

- Edit the stored result: Tap on the pencil icon at the lower left.
- Add a description in text form: Tap on the text icon at the lower middle.
- Export the result as a JPG file: Tap on the icon at the lower right.
- Insert a section in the photo: Tap on the icon at the lower left.
- Insert a text box in the photo: Tap on the icon at the lower right.

## 6.3 Calculating areas and volumes

### 6.3.1 Functions‘Area and Volume’

Areas of rectangles and triangles as well as volumes of cuboids and cylinders can be calculated directly using the icons on the touchscreen.

### 6.3.2 Calculating rectangular areas

1. Select the option **‘Area and Volume’** and **‘Rectangle’** from the **‘Functions’** menu.
2. Measure the width.
3. Measure the height.
   ◁ The area is displayed.

### 6.3.3 Calculating rectangular areas – additional functions

1. Select the symbol for the "Sum" function after generating a result.
2. Continue measuring areas.
   ◁ The total area is displayed.
3. Read the result.

### 6.3.4 Calculating cubic volumes

1. Select the option **‘Area and Volume’** and **‘Volume Room’** from the **‘Functions’** menu.
2. Measure the length.
3. Measure the width.
4. Measure the height.
   ◁ The volume is displayed.

### 6.3.5 Calculating cylindrical volumes

1. Select the option **‘Area and Volume’** and **‘Volume Cylinder’** from the **‘Functions’** menu.
2. Measure the length.
3. Measure the diameter.
   ◁ The volume is displayed.

## 6.4 Indirect measurements

### 6.4.1 Using indirect measurements

**Note**

The accuracy of measurements taken using the **'Indirect'** and **'Pythagoras'** functions is primarily dependent on whether the reference position is kept constant. This is not easy to achieve if the tool is simply held by hand, without any form of support. Greater accuracy can be achieved if the tool is set down on a firm surface, such as a table or floor. If no firm surface is available, it can help to attach the tool to the center of your own body, for example by securing it to a belt.

The best solution is always to rest the measuring extension on a flat, firm surface. The most effective way to improve accuracy is to maintain the point of the measuring extension at exactly the same reference position while the measurements are taken.

Indirect measurements can be used to determine distances that cannot be measured directly. There are several methods that can be used to indirectly measure distances. A visual representation shows you which distance to measure for each partial measurement. Once all of the necessary distances and inclines have been measured, the result is calculated and shown on the display.

In principle, results obtained from indirect measurements cannot be expected to have the same accuracy as results obtained from direct measurements.

#### 6.4.1.1 Guidelines for indirect measurements

- Observe the guidelines below in order to obtain the best possible results.
- Pay attention to the geometry (i.e. right angles and triangle relationships).
- Carefully aim the tool at the corners of the object when all of the measuring points lie in the same plane and you are taking measurements from a location not too far away from the object.
- Do not tilt the tool to the side when measuring at an angle as this will cause measuring errors. If the tool is tilted to the side, a warning message will be displayed and it will not be possible to take measurements.
- When taking indirect measurements, ensure that all measurements are taken in either a vertical or horizontal plane.
- Use exactly the same point of contact and pivot axis in all measurements for the **'Indirect'** and **'Pythagoras'** functions.

#### 6.4.1.2 'Indirect' versus 'Pythagoras'

At first glance, there is little to distinguish the two functions. The main difference is that the **'Indirect'** function group relies on the tool's vertical inclination sensor, and each measurement has to be taken in the same vertical plane. In contrast, the **'Pythagoras'** function group does not use the inclination sensor, therefore allowing measurements to be taken in a direction regardless of the incline.

The **'Indirect'** function group can be used, for example, to calculate the height of a wall by measuring just two points: To the bottom, where the floor and wall meet, and to the point exactly above this where the wall and ceiling meet.

The tool is able to indirectly calculate the height because it knows the angle of both measurements.

The same result can be obtained using the Pythagoras functions. As the inclination sensor is not active, at least one plumb measurement must be taken to the analyzed object.

The advantage of taking measurements using the **'Indirect'** function group is that fewer steps are required. The advantage of taking measurements using the **'Pythagoras'** function group is that horizontal and diagonal lengths can be measured indirectly, provided that at least one plumb measurement can be taken to the section.

### 6.4.2 'Indirect','Vertical'

This function measures the vertical distance between two points on a completely vertical structure.

It is particularly suitable for when a vertical distance on a wall has to be measured without direct access (e.g. determining the story height on a building).

### 6.4.3 Measuring horizontal distances indirectly

1. Select the option **'Indirect'** and **'Horizontal'** from the **'Functions'** menu.
2. Measure the distance to the vertical axis of the 90° structure at any desired angle, but within the same vertical plane in which the distance to be measured lies.
   - ◁ The result is displayed.

**Note**
Adjust the inclination sensor at regular intervals ( → page 24). This helps ensure high measuring accuracy .

### 6.4.4 Measuring vertical distances indirectly

1. Select the option **'Indirect'** and **'Vertical'** from the **'Functions'** menu.
2. Position the tool so that the display is facing upwards or downwards. It is essential to avoid inclination to the side.

**Note**
Take care to ensure that the reference position remains unchanged during the entire measuring operation. Use of the short measuring extension is helpful.
This indirect function makes use of the angle sensor, which works only with a vertical pivot. In other words, the display can face upwards or downwards, but should not be tilted to the left or right. If it is tilted to the side by more than 5° then the inclination indication disappears from the display and angle measurement is no longer possible.

3. Measure the distance to the upper end point.
4. Keeping the reference position the same, tilt the tool in the vertical plane towards the lower end point.
5. Measure the distance to the lower end point.
   ◁ The result is displayed.

**Note**
Adjust the inclination sensor at regular intervals ( → page 24). This helps ensure high measuring accuracy .

### 6.4.5 Measuring horizontal distance overhead indirectly

1. Select the option **'Indirect'** and **'Overhead'** from the **'Functions'** menu.
2. Position the tool so that the display is facing upwards or downwards. It is essential to avoid tipping the tool to the side.

**Note**
Take care to ensure that the reference position remains unchanged during the entire measuring operation. Use of the short measuring extension is helpful.
This indirect function makes use of the angle sensor, which works only with a vertical pivot. In other words, the display can face upwards or downwards, but should not be tilted to the left or right. If it is tilted to the side by more than 5° then the inclination indication disappears from the display and angle measurement is no longer possible.

3. Measure the distance to the first end point.
4. Keeping the reference position the same, tilt the tool in the vertical plane towards the second end point.
5. Measure the distance.
   ◁ The result is displayed.

**Note**
Adjust the inclination sensor at regular intervals ( → page 24). This helps ensure high measuring accuracy .

### 6.4.6 'Indirect','Not reflecting'

This function measures the distance to the end point of an object that is barely reflective, such as the top of a crane or a tree.
It is suitable for calculating a distance if a target point is not reflective.

### 6.4.7 Measure the height of an object when only one target point is clearly visible – indirect measurement

1. Position the tool so that the display is facing upwards or downwards. It is essential to avoid tipping the tool to the side.

**Note**
Take care to ensure that the reference position remains unchanged during the entire measuring operation. Use of the short measuring extension is helpful.

This indirect function makes use of the angle sensor, which works only with a vertical pivot. In other words, the display can face upwards or downwards, but should not be tilted to the left or right. If it is tilted to the side by more than 5° then the inclination indication disappears from the display and angle measurement is no longer possible.

2. Measure the distance to the lower end point.
3. Keeping the reference position unchanged, pivot the tool vertically towards the upper end point. Switch the aiming camera on if the end point you are targeting is not reflective.
4. Take the measurement to the end point.
   ◁ The tool measures the angle to the end point and the result is displayed.

**Note**
Adjust the inclination sensor at regular intervals ( → page 24). This helps ensure high measuring accuracy .

### 6.4.8 Minimum and maximum distances and the difference between them within an area

#### 6.4.8.1 Min/Max/Delta

This function activates continuous measurement. By sliding the tool along a level reference surface during a measurement, for example, or rotating it around a point of reference, you can determine the maximum and minimum distance from the reference object, as well as the difference between the minimum and maximum values.

#### 6.4.8.2 Determining the difference between the minimum and maximum distances within an area

1. Activate the **‘Min/Max/Delta’** function.
2. Position the tool.
3. Press a measure button.
   ◁ Continuous measurement begins.
4. Move the tool along the reference line or reference plane.
5. Press a "Measure" button again.
   ◁ The measurement ends and the result is displayed.

## 6.5 Measurements using Pythagoras functions

### 6.5.1 Function group ‘Pythagoras’

**Note**
You will obtain the most accurate results for the **‘Indirect’** and **‘Pythagoras’** functions if you use exactly the same point of contact and pivot axis for every measurement.

**Note**
Pythagoras functions are particularly helpful for measuring horizontal and vertical lengths indirectly as these cannot be measured using the functions of the **‘Indirect’** group.

### 6.5.2 Function‘Pythagoras I’

This function indirectly determines the length of a section by taking a 90° measurement to the starting point of the section. This is useful for determining the lengths of horizontal sections.

### 6.5.3 Measuring using the ‘Pythagoras I’ function

1. Measure the distance to the closer section end point from a position at right angles.

**Note**
When taking the measurement at right angles it is important to adhere exactly to the 90° angle.
Take care to ensure that the reference position remains unchanged during the entire measuring operation. Use of the short measuring extension is helpful.
As the Pythagoras functions do not make use of the inclination sensor, the tool can be pivoted in any direction.

2. Measure the distance to the farthest end point of the section.
   ◁ The result is displayed.

### 6.5.4 Function‘Pythagoras II’

This function indirectly determines the length of a section by taking a 90° measurement to a point within the section.

### 6.5.5 Measuring using the ‘Pythagoras II’ function

1. Measure the distance to the first end point of the section.

**Note**
Take care to ensure that the reference position remains unchanged during the entire measuring operation. Use of the short measuring extension is helpful.
As the Pythagoras functions do not make use of the inclination sensor, the tool can be pivoted in any direction.

2. Measure a distance to the section from a position at right angles. Please note that this point must lie on the same line as the two section end points.

**Note**
When taking the measurement at right angles it is important to adhere exactly to the 90° angle.

3. Measure the distance to the other end point of the section.
   ◁ The result is displayed.

### 6.5.6 Function‘Pythagoras III’

This function indirectly determines the length of a section by taking a 90° measurement to a point along a line extending past the section.

### 6.5.7 Measuring using the ‘Pythagoras III’ function

1. From a position at right angles, measure the distance to a point that lies on a line extending past the section.

**Note**
When taking the measurement at right angles it is important to adhere exactly to the 90° angle.
Take care to ensure that the reference position remains unchanged during the entire measuring operation. Use of the short measuring extension is helpful.
As the Pythagoras functions do not make use of the inclination sensor, the tool can be pivoted in any direction.

2. Measure the distance to the first end point of the section.
3. Measure the distance to the other end point of the section.
   ◁ The result is displayed.

## 6.6 Measurements using trapezoid functions

### 6.6.1 Function group ‘Trapezoid’

To measure an inclined surface, three reference measurements must be taken.

**Note**
Measurements using the **‘Indirect’**, **‘Pythagoras’** and **‘Trapezoid’** functions typically obtain considerably less accurate results than direct measurements. This is due to the variation in positioning that usually occurs when holding the tool by hand (without a stable tripod and without accurately marked contact points and target points).

### 6.6.2 Function‘Trapezoid I’

This function determines the length of an inclined surface using three reference measurements.

### 6.6.3 Measuring using the ‘Trapezoid I’ function

1. Measure from a starting point on a level surface to a target at the upper end of the sloping surface.

**Note**
The first and the third measurements must intersect with the section measured by the second measurement at an angle of 90°. Measuring accuracy can be increased by using the horizontal and vertical measure command buttons.

2. Measure the horizontal distance between the exact reference points used for the first and third measurements.
3. Measure from a starting point on the same level surface used for the first measurement to a target at the lower end of the sloping surface.
   - ◁ The result is displayed.

### 6.6.4 Function ‘Trapezoid II’

This function determines the length of an inclined surface using two reference measurements.

### 6.6.5 Measuring using the ‘Trapezoid II’ function

1. Measure from a starting point on a level surface to a target at the upper end of the sloping surface.

**Note**
Take care to ensure that the reference position remains unchanged during the entire measuring operation. Use of the short measuring extension is helpful.

2. Tilt the tool vertically downwards and aim at the lower end point.
3. Take a measurement to the lower end of the sloping surface.
   - ◁ The result is displayed.

## 7 Care and maintenance

### 7.1 Cleaning

Your tool is designed for typical operating conditions on construction sites. Its ingress protection against dust and splashes complies with protection class IP54.
Dirt on the glass guard on the camera lens and the laser exit window can impair measuring reliability and the clarity of measuring target imaging.

- ▸ If the tool is dirty, clean it with a soft, slightly damp cloth.
- ▸ Pay particular attention to the cleanliness of the glass guard on the camera lens and the laser exit window.
- ▸ To clean the glass guard on the camera lens and the laser exit window, switch the tool off and gently and carefully clean the glass surface right into the corners.

### 7.2 Touchscreen

The tool is equipped with a resistant touchscreen designed for regular operation with work gloves. The touchscreen is not designed for use with additional protective accessories. While such accessories can be used, they have not been tested and may impair the responsiveness of the touchscreen.

- ▸ Wipe the touchscreen with a clean, non-abrasive cloth so that it is shiny and responsive to the touch.
- ▸ Stop using the tool if the touchscreen is broken and contact **Hilti** Service.

### 7.3 Adjusting the inclination sensor

- ▸ Adjust the inclination sensor at regular intervals to obtain the most accurate measurements possible.
- ▸ You should also adjust the inclination sensor if the tool has been exposed to a change in temperature or if it has been subjected to an impact.

## 8 Transport and storage

### 8.1 Transport

- To protect the PD-C while it is being carried or transported, regular use of the belt bag (PDA 66) supplied by **Hilti** is recommended. A red **Hilti** toolbox for the PD-C can also be bought as an accessory in some markets.
- For orders, please contact **Hilti** or visit **www.hilti.com**.

### 8.2 Storage

- Do not put the tool into storage when wet. Allow it to dry before putting it away.
- Observe the storage temperature limits for the equipment, which are given in the Technical Data section.
- Check the accuracy of the equipment before it is used after a long period of storage or transportation.

## 9 Troubleshooting

If the trouble you are experiencing is not listed in this table or you are unable to remedy the problem by yourself, please contact **Hilti Service**.

| Trouble or fault | Possible cause | Action to be taken |
|---|---|---|
| The tool will not start. | The battery is discharged. | ▸ Charge the built-in battery. |
| | The battery is faulty. | ▸ Contact **Hilti** Service. |

## 10 Disposal

Most of the materials from which **Hilti** tools and appliances are manufactured can be recycled. The materials must be correctly separated before they can be recycled. In many countries, your old tools, machines or appliances can be returned to **Hilti** for recycling. Ask **Hilti** Service or your Hilti representative for further information.

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

- Disposal of electric tools or appliances together with household waste is not permissible.

## 11 Manufacturer's warranty

- Please contact your local **Hilti** representative if you have questions about the warranty conditions.

## 12 FCC statement (applicable in US)/IC statement (applicable in Canada)

Changes or modifications not expressly approved by **Hilti** may restrict the user's authorization to operate the equipment.

This device complies with paragraph 15 of the FCC regulations.

This device complies with the exemptions set out by Industry Canada's RSS.

Operation is subject to the following two conditions:

(1) This device must not cause interference; and

(2) This device must accept any interference, including interference that may cause undesired operation of the device.

**FCC RF Exposure Statement**

To satisfy the FCC RF Exposure requirements for mobile transmitting devices, a separation distance of 15 mm should be maintained between the antenna of this device and persons during operation. To ensure compliance, operations at closer distances than this are not recommended.

**Note**

Please refer to the IC information on the PD-C display: **Home** / **'Settings'** / **'Tool settings'** / **'Information about the tool'** / **'Legal notes'**

## 13 EC declaration of conformity

**Manufacturer**

Hilti Aktiengesellschaft
Feldkircherstrasse 100
9494 Schaan
**Liechtenstein**

We declare, on our sole responsibility, that this product complies with the following directives and standards.

| | |
|---|---|
| Designation | Laser range meter |
| Type designation | PD-C |
| Generation | 01 |
| Year of design | 2015 |
| Applicable directives: | • 1999/5/EC |
| Applicable standards: | • EN 60950-1:2006 / A2:2013<br>• EN 60825-1, Edition 2.0 (2007-03)<br>• EN 300 328 V1.8.1<br>• EN 301 489-1 V1.9.2<br>• EN 301 489-17 V2.2.1<br>• EN 62479 |
| Technical documentation filed at: | • Hilti Entwicklungsgesellschaft mbH<br>Zulassung Elektrowerkzeuge<br>Hiltistraße 6<br>86916 Kaufering<br>**Germany** |

Schaan, 10/2015

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