Leica DISTO™ D510

The original laser distance meter

- when it has to be **right**

Leica Geosystems

Introduction

The safety instructions and the user manual should be read through carefully before the product is used for the first time.

The person responsible for the product must ensure that all users understand these directions and adhere to them.

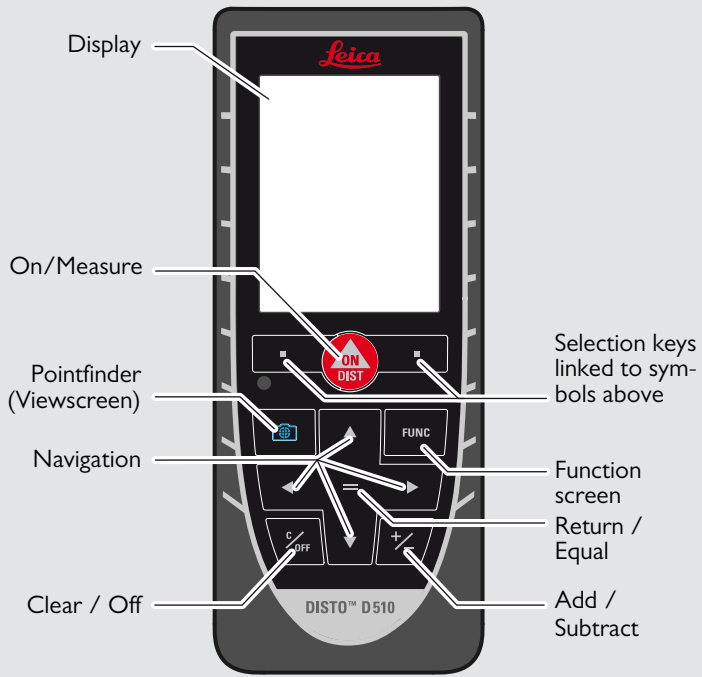
The symbols used have the following meanings:

WARNING
Indicates a potentially hazardous situation or an unintended use which, if not avoided, will result in death or serious injury.

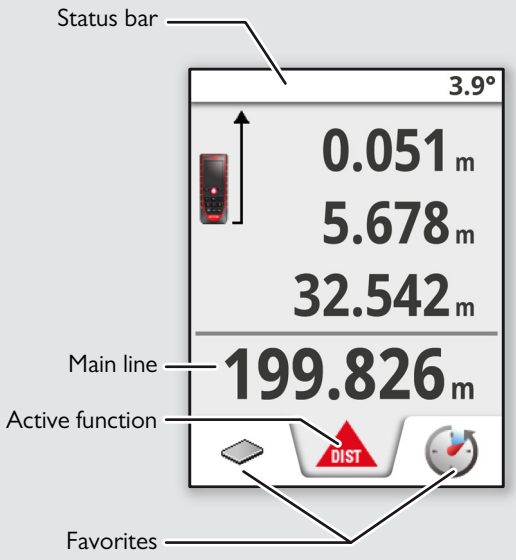
CAUTION
Indicates a potentially hazardous situation or an unintended use which, if not avoided, may result in minor injury and/or appreciable material, financial and environmental damage.

Important paragraphs which must be adhered to in practice as they enable the product to be used in a technically correct and efficient manner.

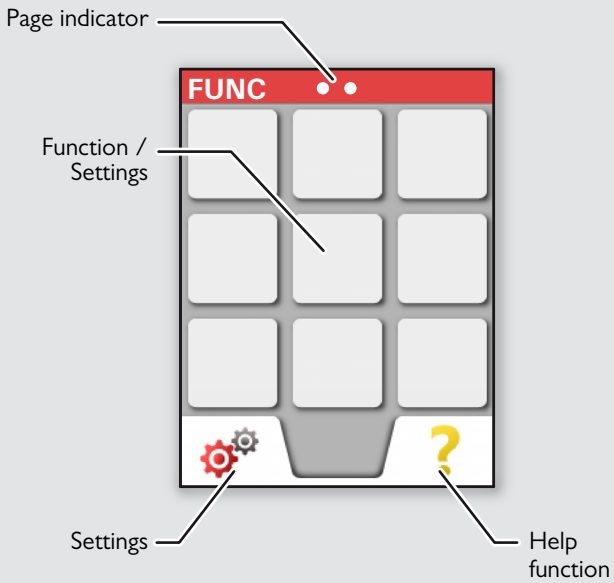
Overview



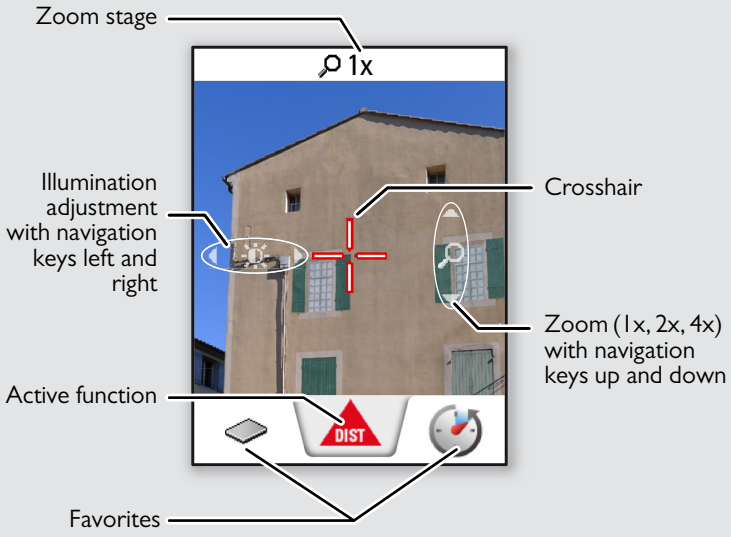
Basic measuring screen



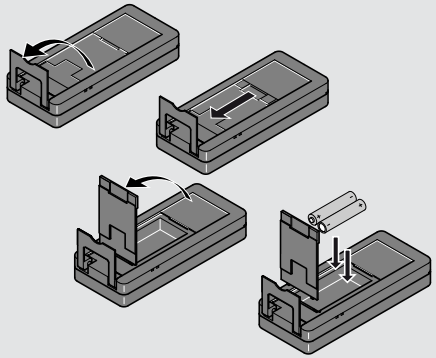
Selection screen



Pointfinder (Viewscreen)

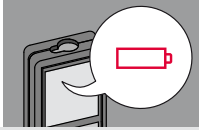


Insert batteries

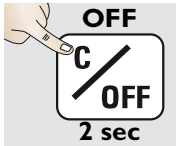


To ensure a reliable use, do not use zinc-carbon batteries. We recommend using high quality batteries.

Change batteries when battery symbol is flashing.



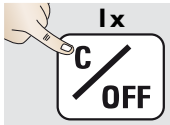
Switching ON/OFF



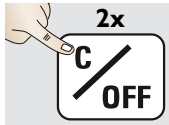
Device is turned OFF.

If no key is pressed for 180 sec, the device switches off automatically.

Clear



Undo last action.

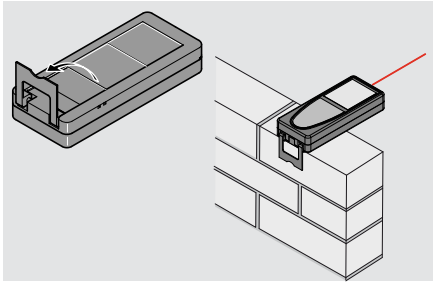


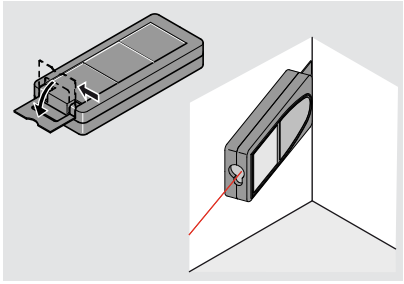
Leave actual function, go to default operation mode.

Message Codes

If the info icon appears with a number, observe the instructions in section "Message Codes".
Example:

Multifunctional endpiece



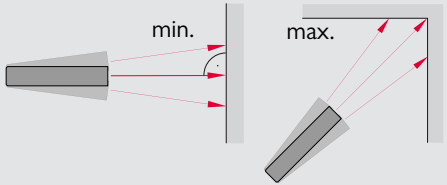


The orientation of the endpiece is automatically detected and the zero point is accordingly adjusted.

Permament / Minimum-Maximum measuring

1

2



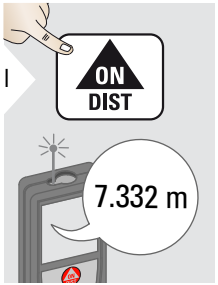
Used to measure room diagonals (maximum values) or horizontal distance (minimum values)

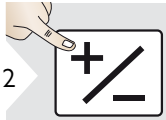
The minimum and maximum distance measured is displayed (min, max.). The last value measured is displayed in the main line.

3

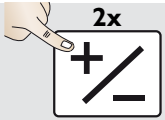
Stops permanent / minimum-maximum measuring.

Add / Subtract

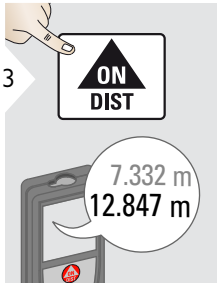


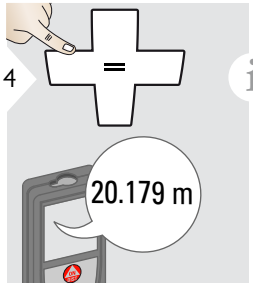


The next measurement is **added** to the previous one.



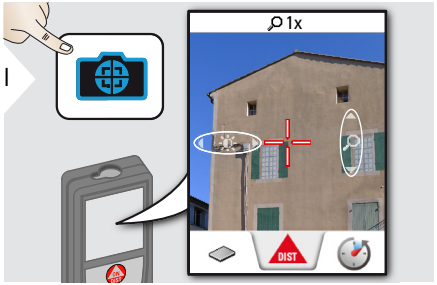
The next measurement is **subtracted** from the previous one.

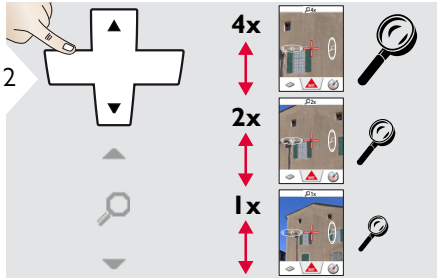


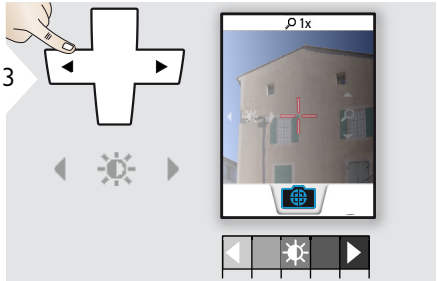


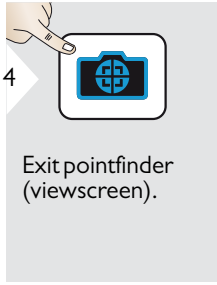
This process can be repeated as required. The same process can be used for adding or subtracting areas or volumes.

Pointfinder (Viewscreen)







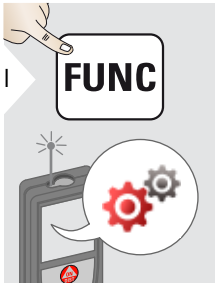


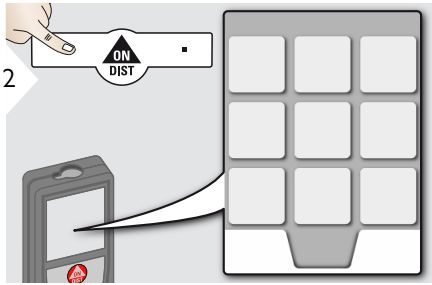
Exit pointfinder (viewscreen).

This is a great help for outdoor measuring. The integrated pointfinder (viewscreen) shows the target on the display. The device measures in the middle of the cross hair, even if the laser dot is not visible.

Parallax errors occur when the pointfinder camera is used on close targets, with the effect that the laser appears displaced in the crosshair. In this case rely on the real laser dot.

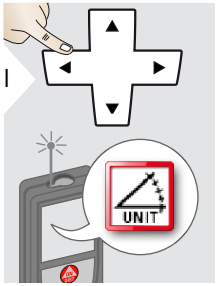
Overview

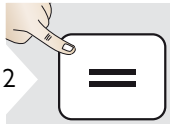


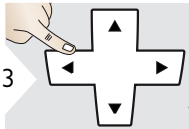


UNIT	Tilt units
UNIT	Distance units
	Beep
	Digital level
	Keypad lock
	Bluethooth®
	Tilt calibration
	Favorites
	Illumination
	Offset
RESET	Reset
	Information

Tilt units

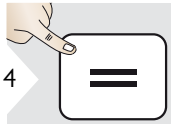






Switch between the following units:

360.0°	0.00 %
± 180.0°	0.0 mm/m
± 90.0°	0.00 in/ft

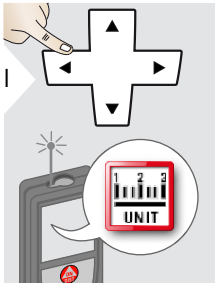


Confirm setting.

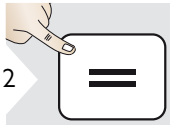
Exit settings.

Distance units

1



2



3 Switch between the following units:

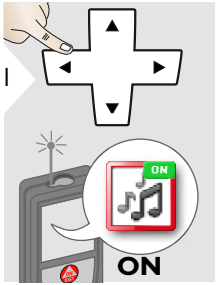
0.00 m	0.00 ft
0.000 m	0.00 in
0.0000 m	0 1/32 in
0.0 mm	0'00" 1/32

4 Confirm setting.

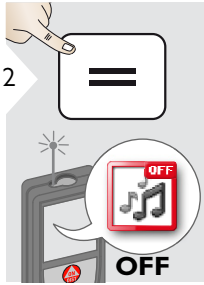
5 Exit settings.

Beep ON/OFF

1



2



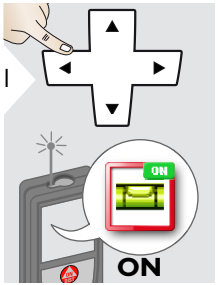
To switch ON, repeat procedure.

3

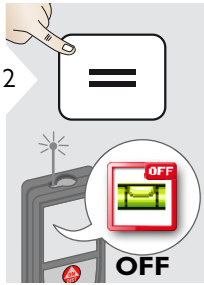
Exit settings.

Digital level ON/OFF

1



2



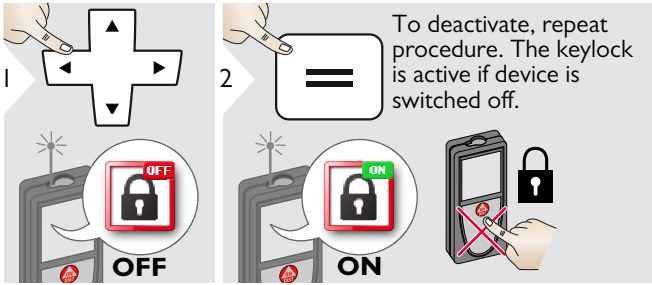
To switch ON, repeat procedure.

3

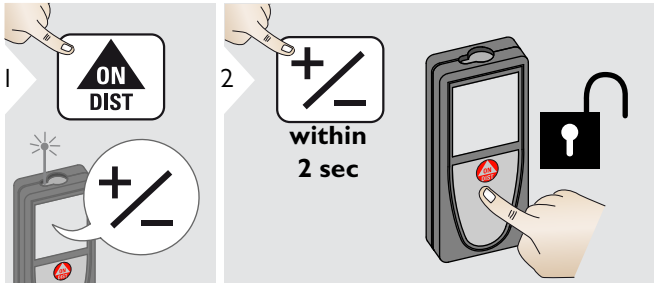
Exit settings.

i The digital level is displayed in the status bar.

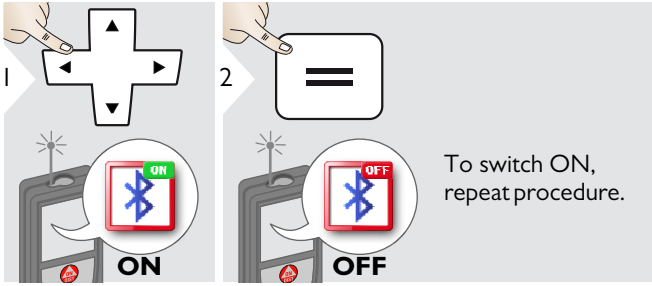
De-/Activate keylock



Switch on with keylock



De-/Activate Bluetooth® Smart



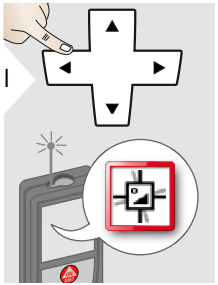
Default mode:
Bluetooth® is switched on.
Bluetooth® icon in status line is displayed if device is connected with Bluetooth®.

Switch on Bluetooth® Smart in Settings.
Connect the device with your smart phone, pad, laptop,…
The actual measurement is transferred automatically if Bluetooth® connection is established. To transfer a result from the main line, press =.
Bluetooth® switches off as soon as the laser distance meter is switched off.
The efficient and innovative Bluetooth® Smart module (with the new Bluetooth® standard V4.0) works together with all Bluetooth® Smart Ready devices. All other Bluetooth® devices do not support the energy saving Bluetooth® Smart Module, which is integrated in the device.

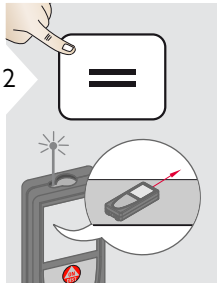
We provide no warranty for free DISTO™ software and offer no support for it. We accept no liability whatsoever arising from the use of the free software and we are not obliged to provide corrections nor to develop upgrades. A wide range of commercial software can be found on our homepage. Apps for Android® or Mac iOS can be found in special internet shops.
For more details, see our homepage.

Calibration of tilt sensor (Tilt Calibration)

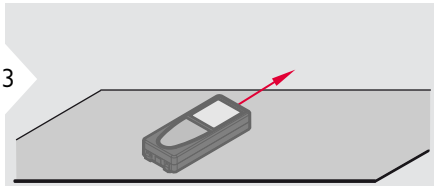
1



2

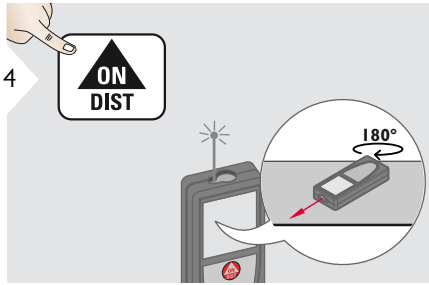


3

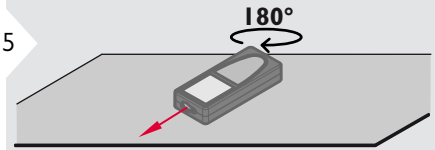


Place device on absolutely flat surface.

4



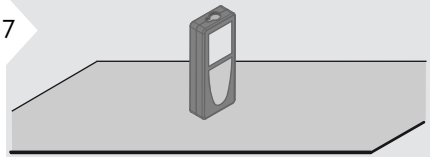
5



Turn the device horizontally by 180° and place it again on absolutely flat surface.

6

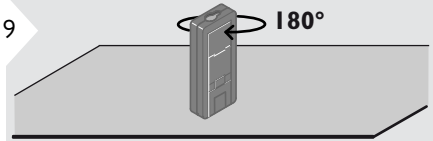
7



Place device on absolutely flat surface.

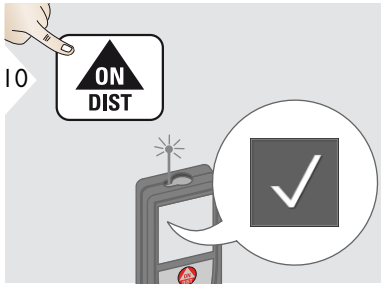
8

9



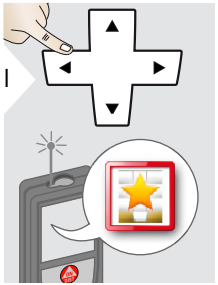
Turn the device horizontally by 180° and place it again on absolutely flat surface.

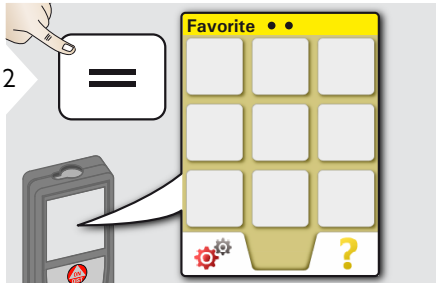
10

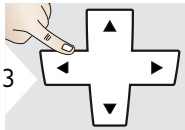


After 2 sec the device goes back to the basic mode.

Personalized favorites







Select favorite function.

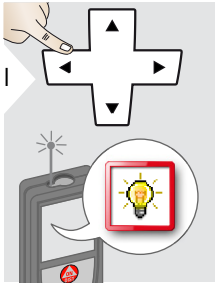
Press selection key left or right. Function is set as favorite above the corresponding selection key.

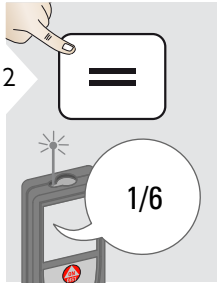
Exit settings.

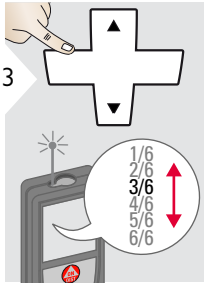
Select your favorite functions for quick access.

Short cut: Press 2 sec on a selection-key in the measuring mode.

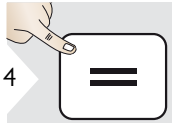
Illumination







Select brightness.



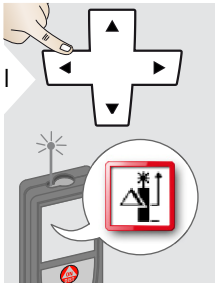
Confirm setting.

Exit settings.

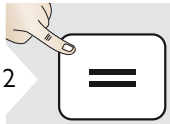
To save power reduce brightness if not necessary.

Offset

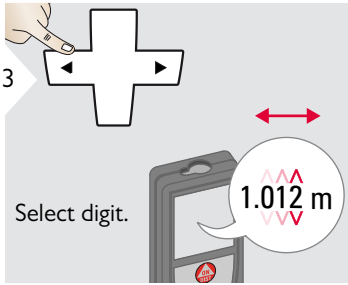
1



2

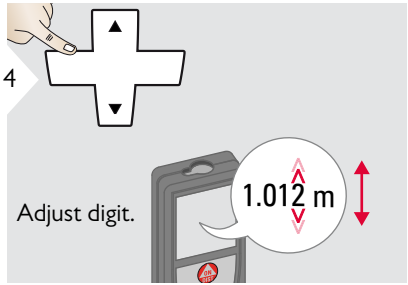


3



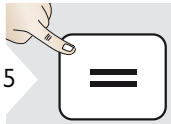
Select digit.

4



Adjust digit.

5



Approve value.

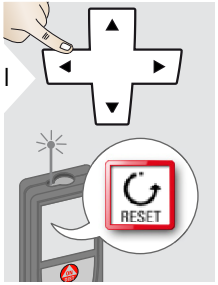
6

Exit settings.

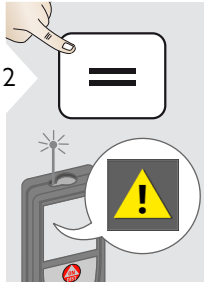
An offset adds or subtracts a specified value automatically to or from all measurements. This function allows tolerances to be taken into account. The offset icon is displayed.

Reset

1



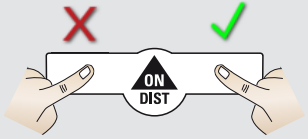
2



3

Second confirmation with selection keys:

Refuse: Confirm:

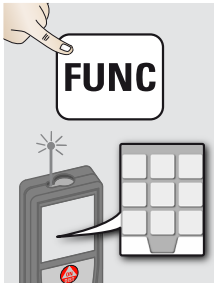


4

Exit settings.

Reset returns the instrument to the factory settings. All customized settings and memories are lost.

Overview

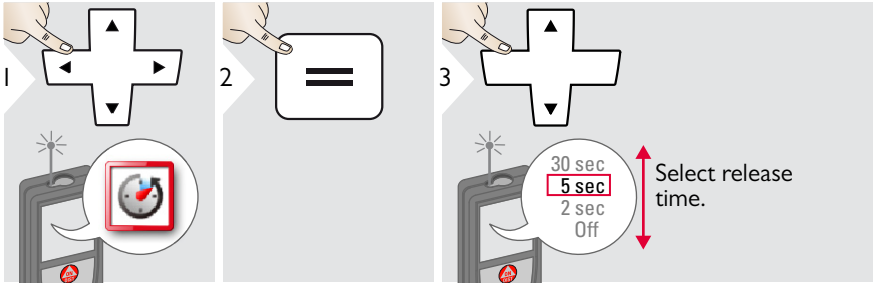


	Timer
	Calculator
	Adjusting measuring reference
	Memory
DIST	Single Distance Measurement
	Smart Horizontal Mode

	Inclination Tracking
	Area
	Volume
	Triangle area
LR	Long Range Mode
	Height-profile Measurement

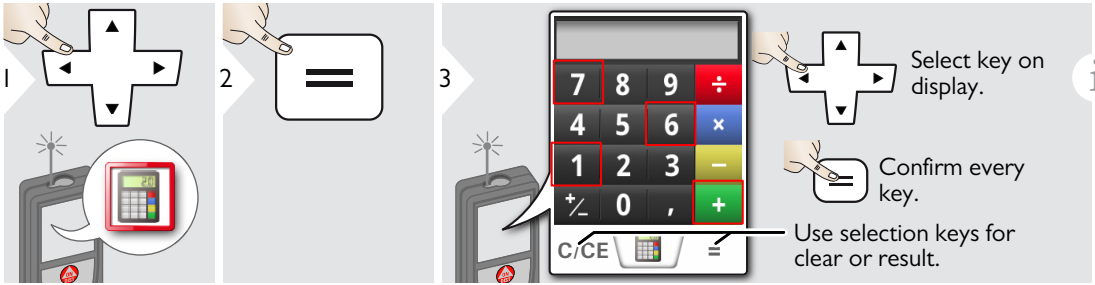
	Measuring on sloped objects
	Height Tracking
	Trapezium
a b b	Stake out
	Pythagoras 1
	Pythagoras 2

Timer



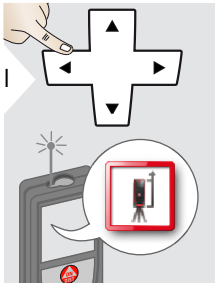
The self release starts if ON/Measure key is pressed.

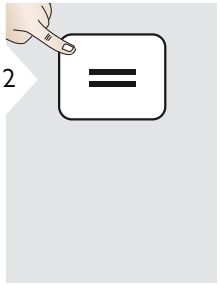
Calculator

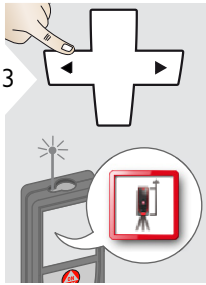


The measurement result from the main line is taken over to the calculator and can be used for further calculations.
Ft/in fractions are converted into ft/in decimal.

Adjusting measuring reference/tripod



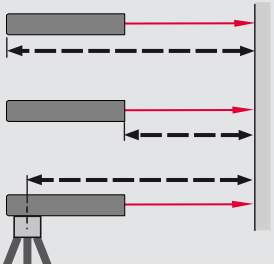


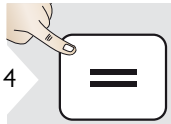


Distance is measured from the rear of the device (standard setting).

Distance is measured from the front of the device (lock symbol = permanently).

Distance is measured from the tripod thread permanently.



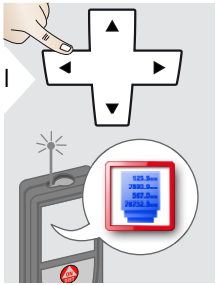


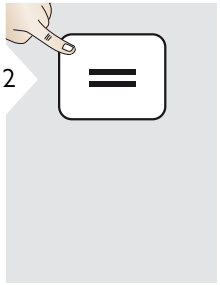
Confirm setting.

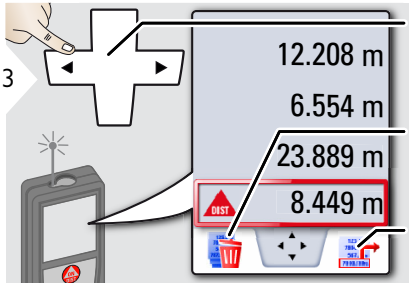
If device is switched off, reference goes back to standard setting (rear of the device).

If you use an original Leica DISTO adapter, the reference does not need to be adapted to tripod thread!

Memory



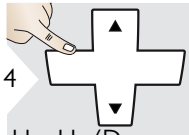




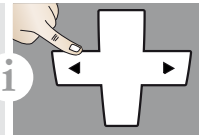
Switch between measurements.

Delete memory.

Take over value for further actions.

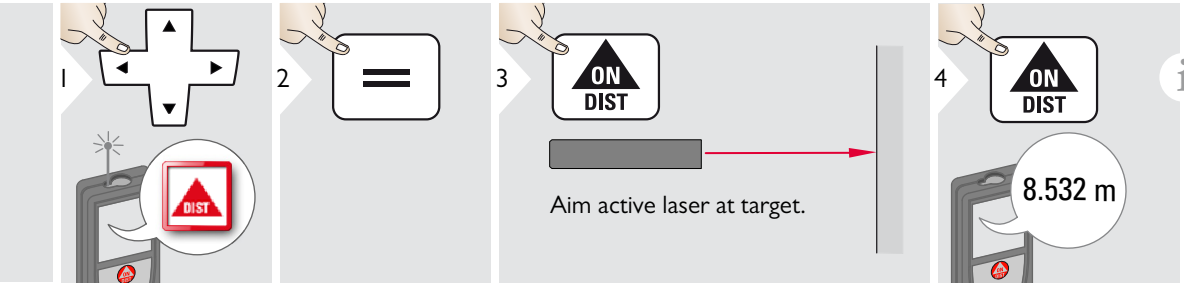


Use Up/Down navigation keys to show more detailed results of the specific measurement.



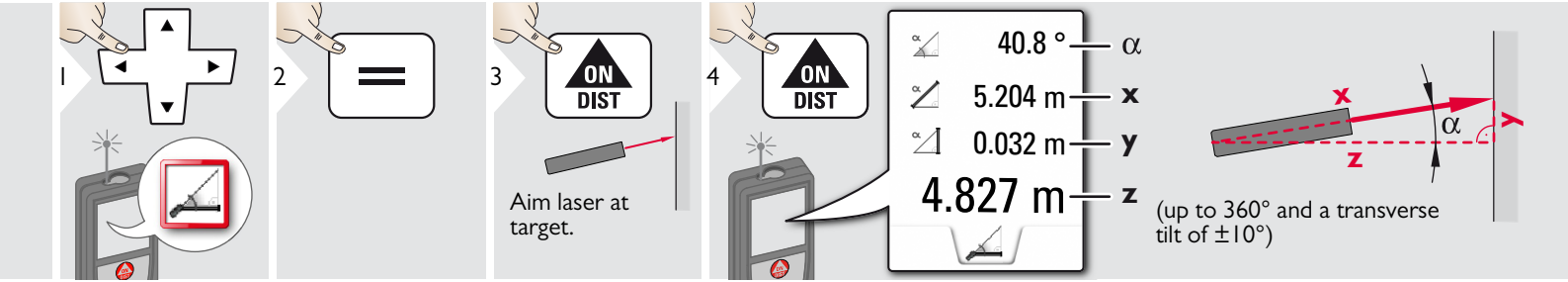
Short cut

Measuring single distance

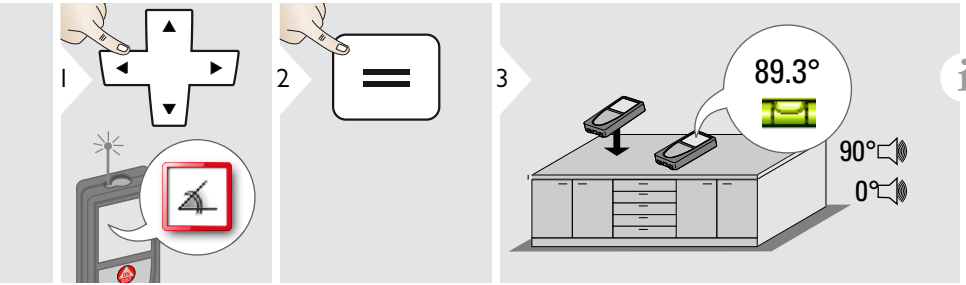


Target surfaces:
Measuring errors can occur when measuring to colourless liquids, glass, styrofoam or semi-permeable surfaces or when aiming at high gloss surfaces. Against dark surfaces the measuring time increases.

Smart Horizontal Mode

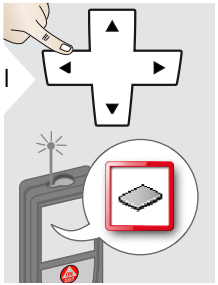


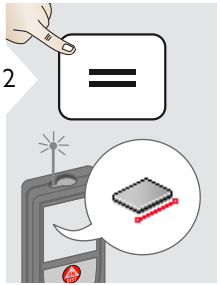
Inclination tracking

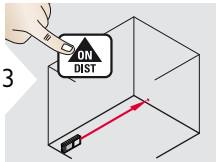


Inclination is permanently displayed. Instrument beeps at 0° and 90°. Ideal for horizontal or vertical adjustments.

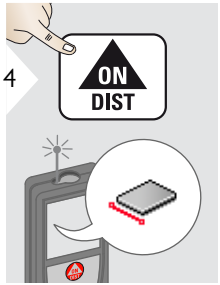
Area

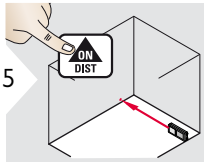




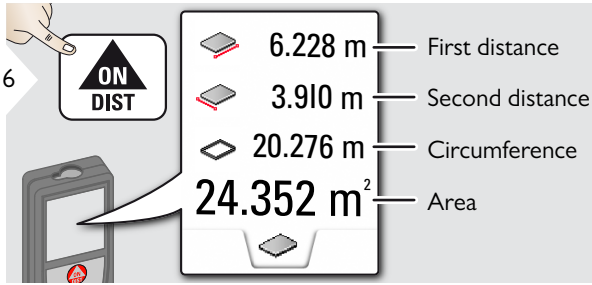


Aim laser at first target point.



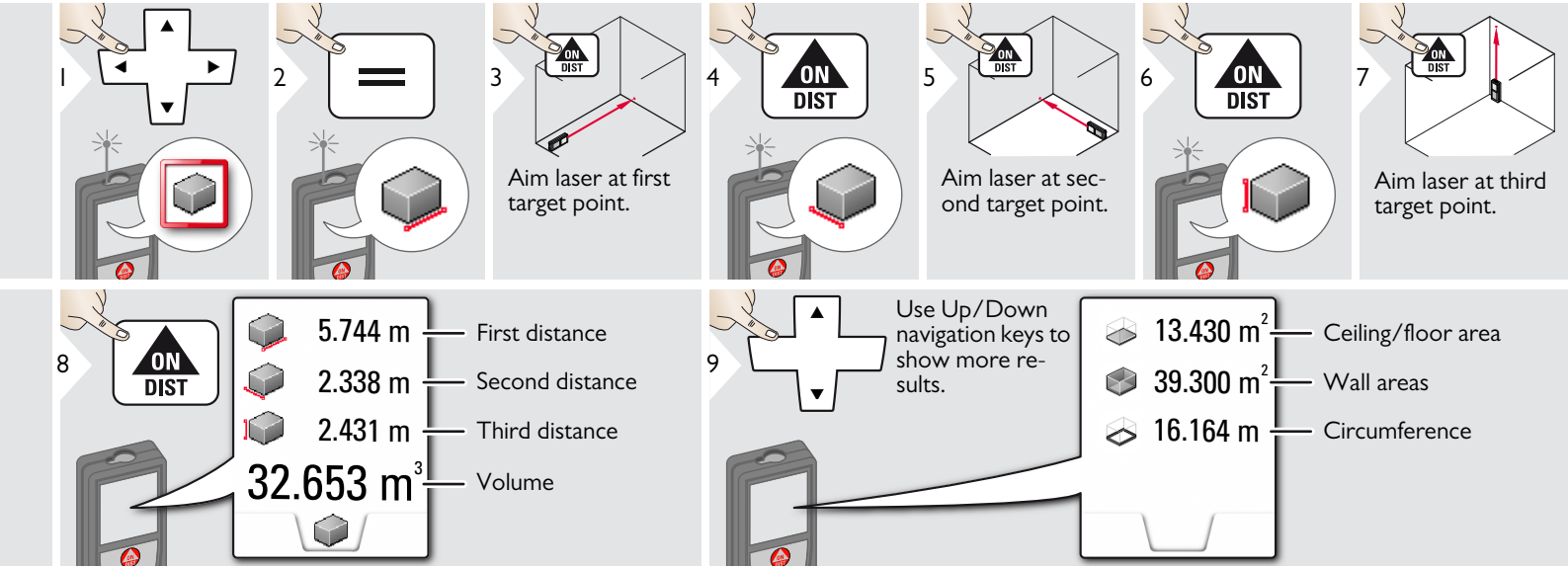


Aim laser at second target point.

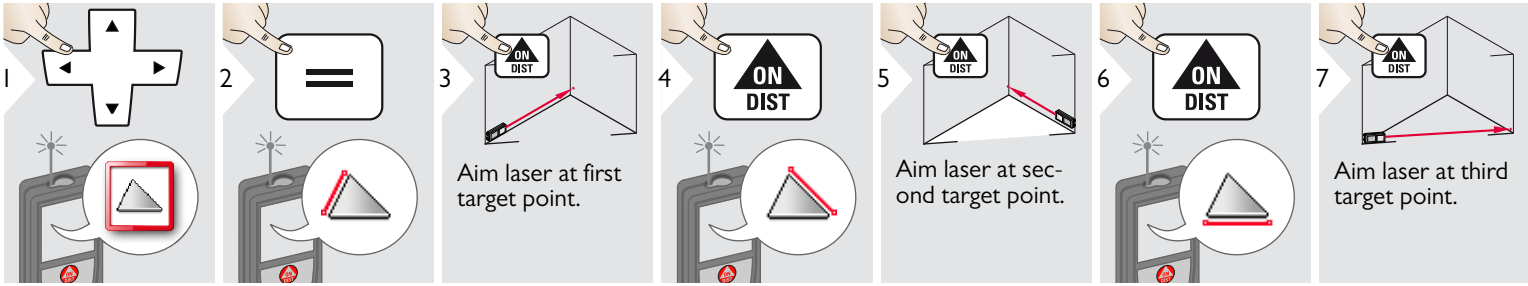


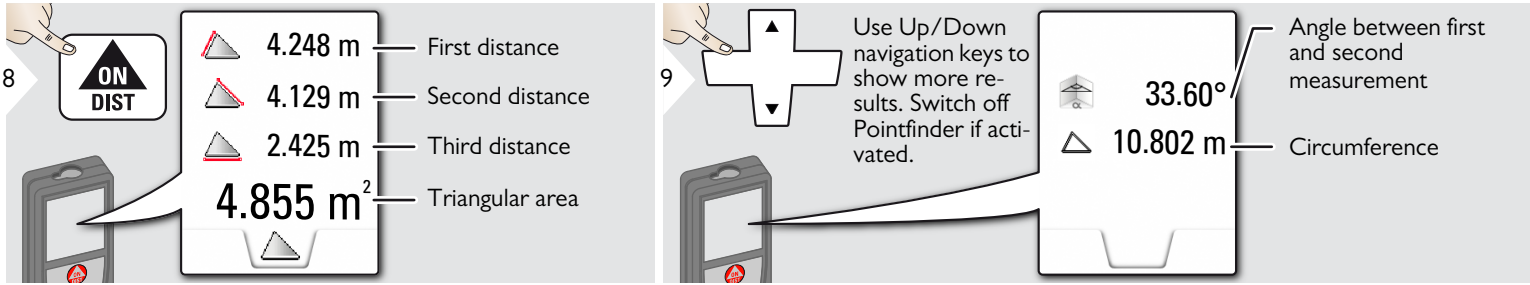
The result is shown in the main line and the measured value above.
Partial Measurements / Painter function: Press + or - before starting the first measurement. Measure and add or subtract distances. Finish with =. Measure 2nd length.

Volume

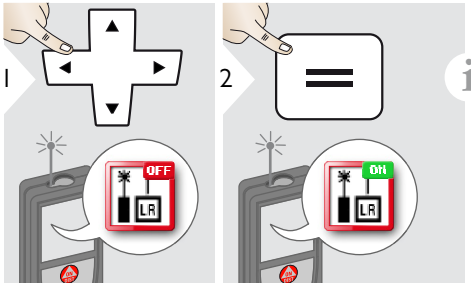

1
2
3
ON DIST
Aim laser at first target point.
4
ON DIST
5
ON DIST
Aim laser at second target point.
6
ON DIST
7
ON DIST
Aim laser at third target point.
8
ON DIST
5.744 m
First distance
2.338 m
Second distance
2.431 m
Third distance
32.653 m³
Volume
9
Use Up/Down navigation keys to show more results.
13.430 m²
Ceiling/floor area
39.300 m²
Wall areas
16.164 m
Circumference

Triangular area





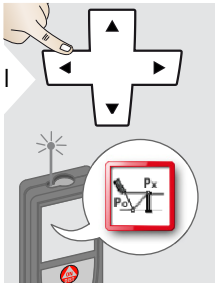
Long range mode



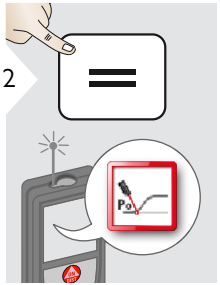
The long range mode allows measuring of difficult targets in unfavorable conditions e.g. bright ambient light or bad target reflectivity. The measuring time is increased.
An icon in the status line shows if the function is active.

Height-profile measurement

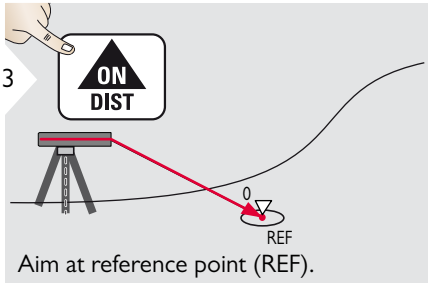
1



2

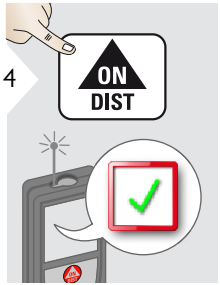


3

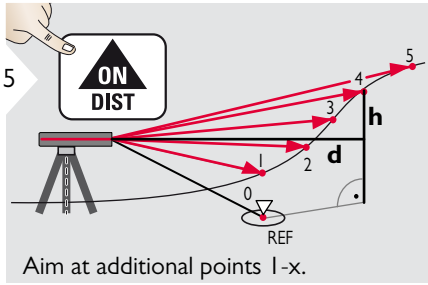


Aim at reference point (REF).

4

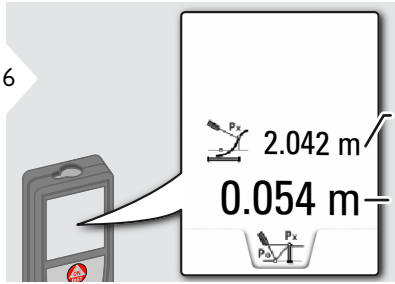


5



Aim at additional points 1-x.

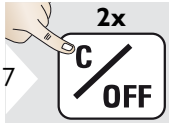
6



d Horizontal distance to device

h Height difference to reference point (REF).

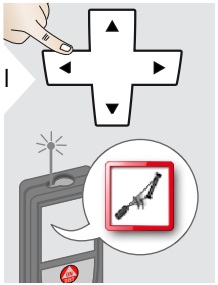
7

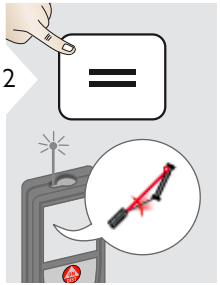


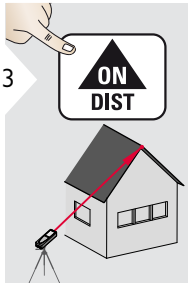
Exit function.

Ideal for measuring of height differences to a reference point. Can be also used to measure profiles and terrain sections. After measuring the reference point, the horizontal distance and height is displayed for each following point.

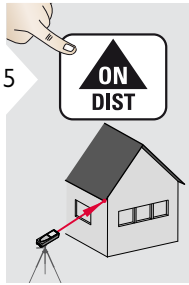
Sloped objects



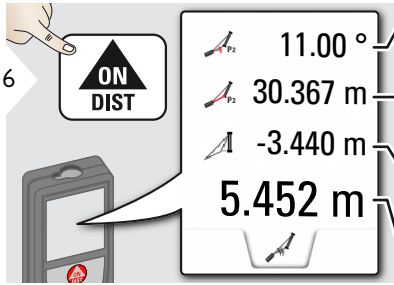




Aim laser at upper target point.



Aim laser at lower target point.

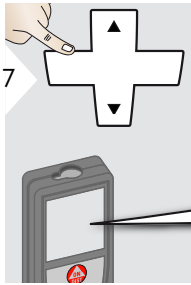


P2 angle

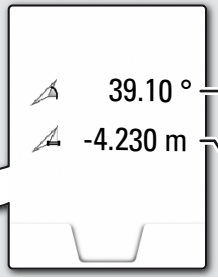
P2 distance

Vertical height between both points

Distance between both points



Use Up/Down navigation keys to show more results. Switch off Pointfinder if activated.



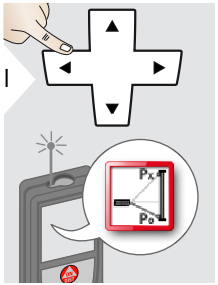
Included angle between both points

Horizontal distance between both points

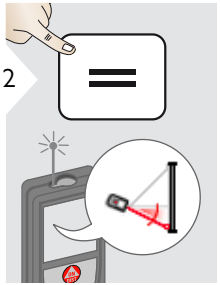
Indirect distance measuring between 2 points with additional results. Ideal for applications such as length and slope of roof, height of chimneys,…
It is important, that the instrument is positioned in the same vertical plane as the 2 measured points. The plane is defined of the line between the 2 points.

Height tracking

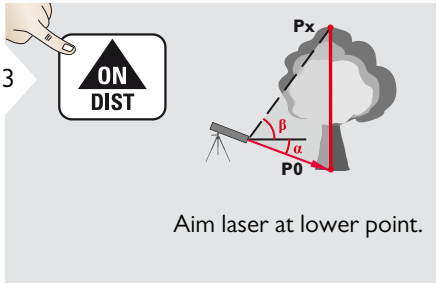
1



2



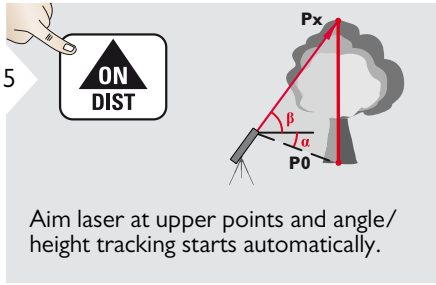
3



Aim laser at lower point.

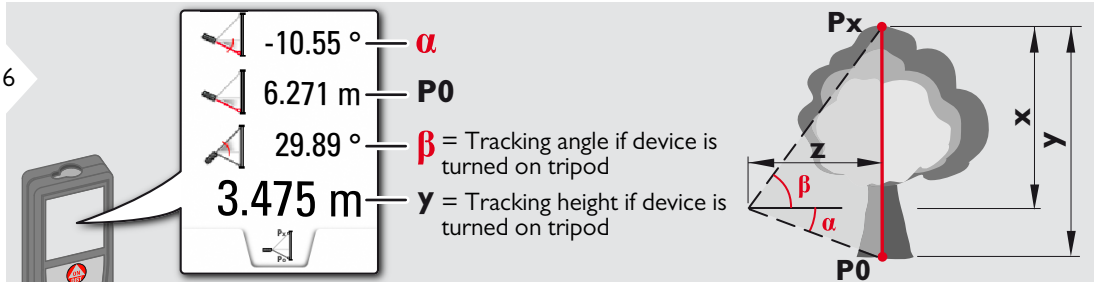
4

5

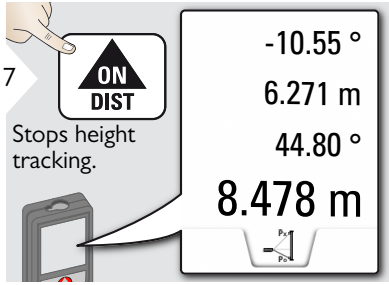


Aim laser at upper points and angle/ height tracking starts automatically.

6

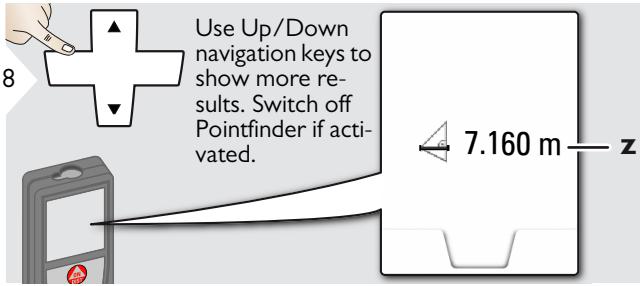


7



Stops height tracking.

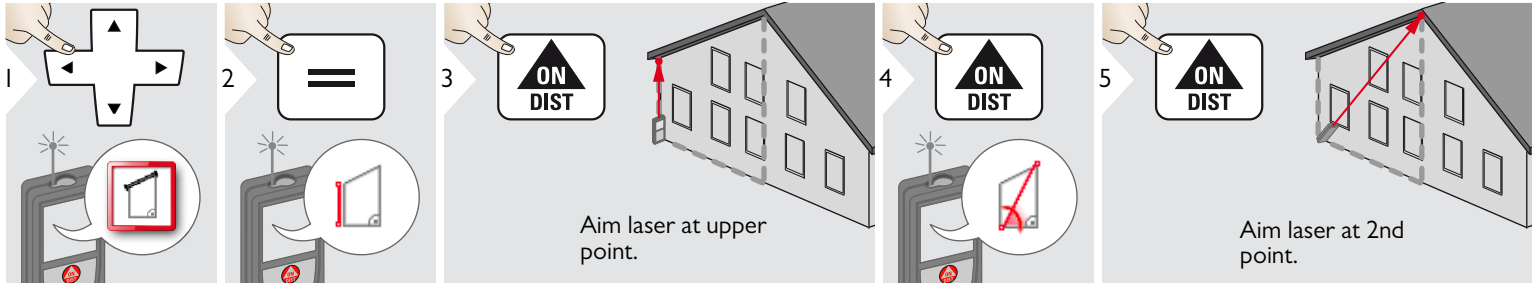
8

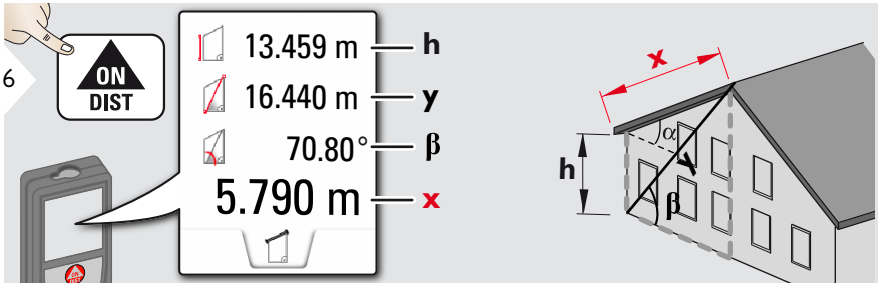


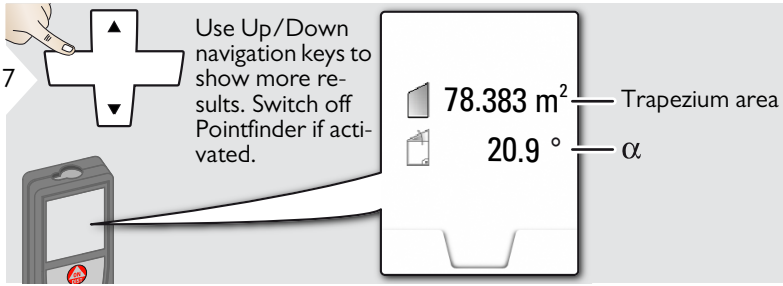
Use Up/Down navigation keys to show more results. Switch off Pointfinder if activated.

Heights of buildings or trees without suitable reflective points can be determined. At the bottom point, distance and tilt is measured - which needs a reflective laser target. The upper point can be targeted with the pointfinder / crosshair and does not need a reflective laser target as only the inclination is measured.

Trapezium

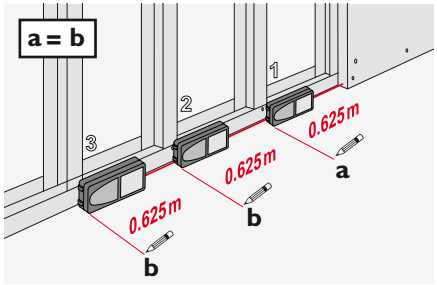

1
2
3
ON
DIST
Aim laser at upper point.
4
ON
DIST
5
ON
DIST
Aim laser at 2nd point.

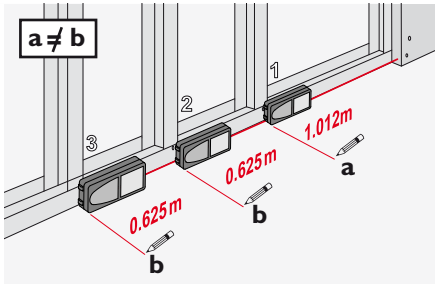

6
ON
DIST
13.459 m
h
16.440 m
y
70.80°
β
5.790 m
x
x
h
α
β

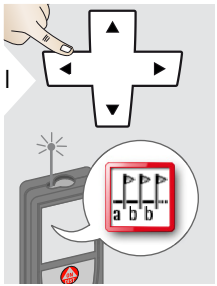

7
Use Up/Down navigation keys to show more results. Switch off Pointfinder if activated.
78.383 m²
Trapezium area
20.9 °
α

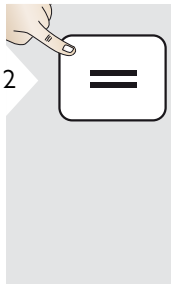
Stake out

Two different distances (a and b) can be entered to mark off defined measured lengths.

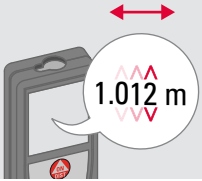








3 Select digit.



4 Adjust digit.

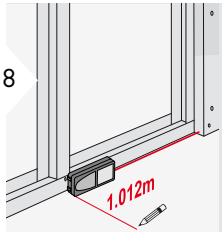
5 Approve value "a".

6 Adjust value "b".

7 ON DIST

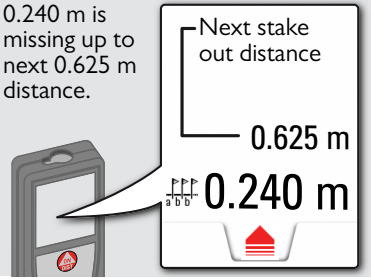
Approve value "b" and start measurement.

8



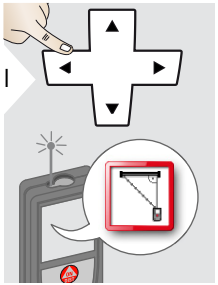
Move device slowly along the stake-out line. The distance to the next stake out point is displayed.

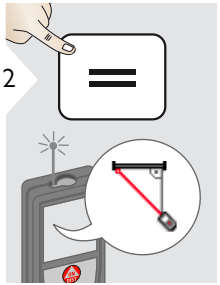
0.240 m is missing up to next 0.625 m distance.

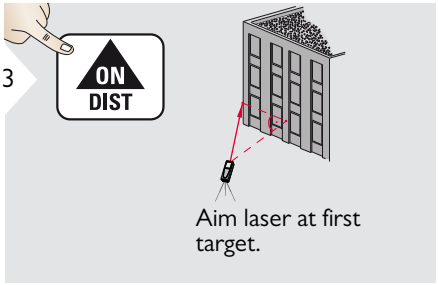


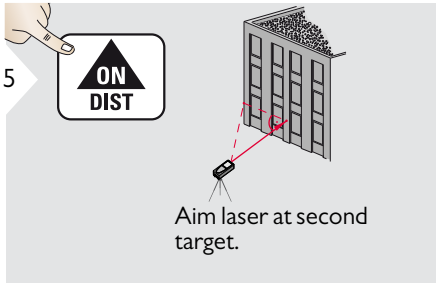
When approaching a stake out point to less than 0.1 m the instrument starts to beep. The function can be stopped by pressing the CLEAR/OFF button.

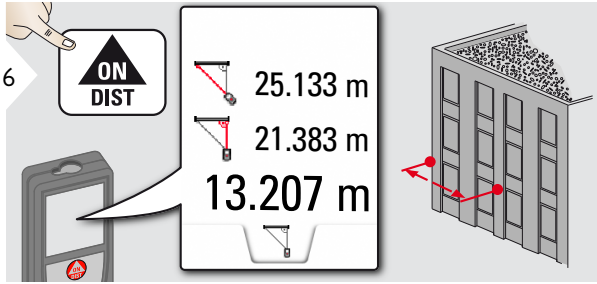
Pythagoras (2-point)









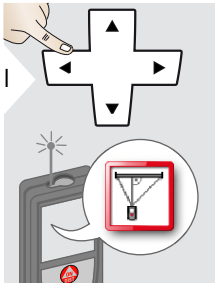


The result is shown in the main line.
Pressing the measuring key for 2 sec in the function activates automatically Minimum or Maximum measurement.

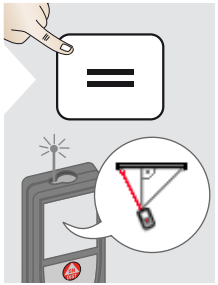
We recommend to use the pythagoras only for indirect horizontal measuring.
For height measuring (vertical) it is more precise to use a function with the inclination measuring.

Pythagoras (3-point)

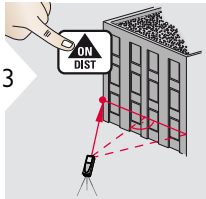
1



2

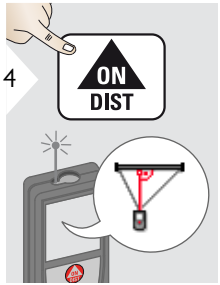


3

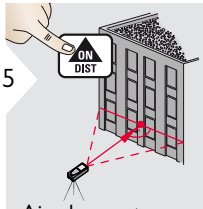


Aim laser at first target.

4

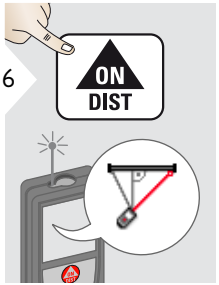


5

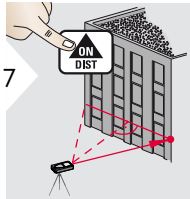


Aim laser at second target.

6

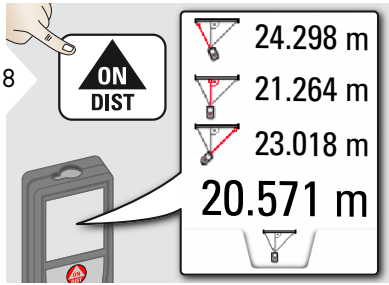


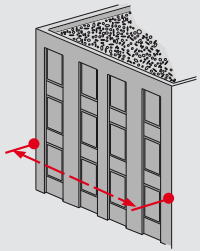
7



Aim laser at third target.

8





The result is shown in the main line.
Pressing the measuring key for 2 sec in the function activates automatically Minimum or Maximum measurement.

We recommend to use the pythagoras only for indirect horizontal measuring.
For height measuring (vertical) it is more precise to use a function with inclination measurement.

Distance measurement	
Typical Measuring Tolerance*	± 1.0 mm / ~1/16" ***
Maximum Measuring Tolerance**	± 2.0 mm / 0.08 in ***
Typical Range*	200 m / 660 ft
Range at unfavourable condition ******	80 m / 260 ft
Smallest unit displayed	0.1 mm / 1/32 in
Power Range Technology™	yes
Ø laser point at distances	6 /30 / 60 mm (10 / 50 / 100 m)
Tilt measurement	
Measuring tolerance to laser beam*********	± 0.2°
Measuring tolerance to housing*********	± 0.2°
Range	360°
General	
Laser class	2
Laser type	635 nm, < 1 mW
Protection class	IP65 (dust tight and jet water protected)
Autom. laser switch off	after 90 s
Autom. power switch-off	after 180 s
Bluethooth® Smart	Bluethooth v4.0
Range of Bluethooth®	10 m
Battery durability (2 x AA)	up to 5000 measurements
Dimension (H x D x W)	143 x 58 x 29 mm 5.6 x 2.28 x 1.14 in
Weight (with batteries)	198 g / 6.37 oz
Temperature range:	
- Storage	-25 to 70 °C -13 to 158 °F
- Operation	-10 to 50 °C 14 to 122 °F

* applies for 100 % target reflectivity (white painted wall), low background illumination, 25 °C

** applies for 10 to 100 % target reflectivity, high background illumination, - 10 °C to + 50 °C

*** Tolerances apply from 0.05 m to 10 m with a confidence level of 95%. The maximum tolerance may deteriorate to 0.1 mm/m between 10 m to 30 m, to 0.20 mm/m between 30 m to 100 m and to 0.30 mm/m for distances above 100 m

**** applies for 100 % target reflectivity, background illumination of approximately 30'000 lux

***** after user calibration. Additional angle related deviation of +/- 0.01° per degree up to +/-45° in each quadrant. Applies at room temperature. For the whole operating temperature range the maximum deviation increases by +/-0.1°.

i For accurate indirect results, the use of a tripod is recommended. For accurate tilt measurements a transverse tilt should be avoided.

Functions	
Distance measuring	yes
Min/Max measuring	yes
Permanent measuring	yes
Stake-out	yes
Addition/Subtraction	yes
Area	yes
Triangle area	yes
Volume	yes
Trapezium	yes
Painter function (area with partial measurem.)	yes
Pythagoras	2-point, 3-point
Smart Horizontal Mode / Indirect height	yes
Height-profile measurement	yes
Inclination tracking	yes
Sloped objects	yes
Height tracking	yes
Memory	30 displays
Beep	yes
Illuminated colour display	yes
Multifunctional endpiece	yes
Pointfinder (Viewscreen)	4xZoom
Digital Level	yes
Bluetooth® Smart	yes
Personalized Favorites	yes
Timer	yes
Long Range Mode	yes
Calculator	yes

If the message **Error** does not disappear after switching on the device repeatedly, contact the dealer.

If the message **InFo** appears with a number, press the Clear button and observe the following instructions:

No.	Cause	Correction
156	Transverse tilt greater than 10°	Hold the instrument without any transverse tilt.
162	Calibration mistake	Make sure, the device is placed on a absolutely horizontal and flat surface. Repeat the calibration procedure. If the mistake still occurs, contact your dealer.
204	Calculation error	Perform measurement again.
240	Data transfer error	Repeat procedure.
252	Temperature too high	Let device cool down.
253	Temperature too low	Warm device up.
255	Received signal too weak, measuring time too long	Change target surface (e.g. white paper).
256	Received signal too high	Change target surface (e.g. white paper).
257	Too much back-ground light	Shadow target area.
258	Measurement outside of measuring range	Correct range.
260	Laser beam inter-rupted	Repeat measurement.

- Clean the device with a damp, soft cloth.
- Never immerse the device in water.
- Never use aggressive cleaning agents or solvents.

Warranty

Lifetime Manufacturer's Warranty

Warranty coverage for the entire usage time of the product according to Leica Geosystems International Limited Warranty. Free of charge repair or replacement for all products that suffer defects as a result of faults in materials or manufacturing, for the entire life of the product.

3 Years no Cost

Guaranteed service should the product become defective and require servicing under normal conditions of use, as described in the user manual, at no additional charge.

To receive the "3 years no cost" period, the product must be registered at www.leica-geosystems.com/registration within 8 weeks of the purchase date. If the product is not registered, a "2 years no cost" period applies.

The person responsible for the instrument must ensure that all users understand these directions and adhere to them.

Areas of responsibility

Responsibilities of the manufacturer of the original equipment:

Leica Geosystems AG

Heinrich-Wild-Strasse

CH-9435 Heerbrugg

Internet: www.disto.com

The company above is responsible for supplying the product, including the User Manual in a completely safe condition.

The company above is not responsible for third party accessories.

Responsibilities of the person in charge of the instrument:

- To understand the safety instructions on the product and the instructions in the User Manual.
- To be familiar with local safety regulations relating to accident prevention.
- Always prevent access to the product by unauthorised personnel.

Permitted use

- Measuring distances
- Tilt measurement
- Data transfer with Bluetooth®

Prohibited use

- Using the product without instruction
- Using outside the stated limits
- Deactivation of safety systems and removal of explanatory and hazard labels
- Opening of the equipment by using tools (screwdrivers, etc.)
- Carrying out modification or conversion of the product
- Use of accessories from other manufacturers without express approval
- Deliberate dazzling of third parties; also in the dark
- Inadequate safeguards at the surveying site (e.g. when measuring on roads, construction sites, etc.)
- Deliberate or irresponsible behaviour on scaffolding, when using ladders, when measuring near machines which are running or near parts of machines or installations which are unprotected
- Aiming directly in the sun

Hazards in use

⚠ WARNING

Watch out for erroneous measurements if the instrument is defective or if it has been dropped or has been misused or modified. Carry out periodic test measurements.

Particularly after the instrument has been subject to abnormal use, and before, during and after important measurements.

⚠ CAUTION

Never attempt to repair the product yourself. In case of damage, contact a local dealer.

⚠ WARNING

Changes or modifications not expressly approved could void the user's authority to operate the equipment.

Limits of use

ⓘ Refer to section "Technical data".

The device is designed for use in areas permanently habitable by humans. Do not use the product in explosion hazardous areas or in aggressive environments.

Disposal

⚠ CAUTION

Flat batteries must not be disposed of with household waste. Care for the environment and take them to the collection points provided in accordance with national or local regulations.

The product must not be disposed with household waste.

Dispose of the product appropriately in accordance with the national regulations in force in your country.

Adhere to the national and country specific regulations.

Product specific treatment and waste management can be downloaded from our homepage.

Electromagnetic Compatibility (EMC)

⚠ WARNING
The device conforms to the most stringent requirements of the relevant standards and regulations.

Yet, the possibility of causing interference in other devices cannot be totally excluded.

Use of the product with Bluetooth®

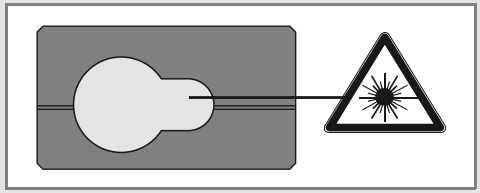
⚠ WARNING
Electromagnetic radiation can cause disturbances in other equipment, in installations (e.g. medical ones such as pacemakers or hearing aids) and in aircraft. It can also affect humans and animals.

Precautions:

Athough this product conforms to the most stringent standards and regulations, the possibility of harm to people and animals cannot totally excluded.

- Do not use the product near petrol stations, chemical plants, in areas with a potentially explosive atmosphere and where blasting takes place.
- Do not use the product near medical equipment.
- Do not use the product in airplanes.
- Do not use the product near your body for extended periods.

Laser classification



The device produces visible laser beams, which are emitted from the instrument:

It is a Class 2 laser product in accordance with:

- IEC60825-1 : 2014 „Radiation safety of laser products“

Laser Class 2 products:

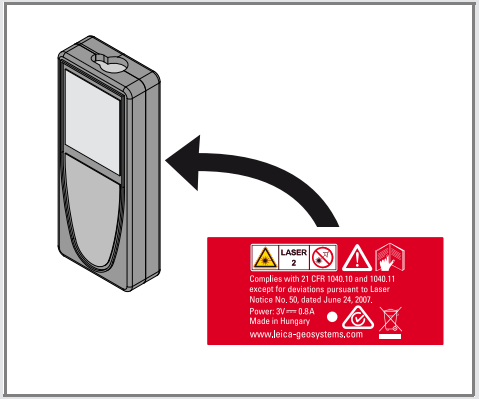
Do not stare into the laser beam or direct it towards other people unnecessarily. Eye protection is normally afforded by aversion responses including the blink reflex.

⚠ WARNING
Looking directly into the beam with optical aids (e.g. binoculars, telescopes) can be hazardous.

⚠ CAUTION
Looking into the laser beam may be hazardous to the eyes.

Description	Value
Wavelength	620 - 690 nm
Maximum radiant output power for classification	< 1mW
Pulse repetition frequency	320 MHz
Pulse duration	> 400 ps
Beam divergence	0.16 x 0.6 mrad

Labelling



Subject to change (drawings, descriptions and technical data) without prior notice.

Leica Geosystems AG, Heerbrugg, Switzerland has been certified as being equipped with a quality system which meets the International Standards of Quality Management and Quality Systems (ISO standard 9001) and Environmental Management Systems (ISO standard 14001).

Total Quality Management - Our commitment to total customer satisfaction. Ask your local Leica Geosystems agent for more information about our TQM program.

Original text (792312b EN)

Pat. No.: WO 9427164, WO 9818019, WO 0244754, WO 0216964, US 5949531, EP 1195617, US 7030969, US 8279421 B2, Patents pending

Leica Geosystems AG
CH-9435 Heerbrugg
(Switzerland)
www.disto.com

- when it has to be **right**

Leica Geosystems