



Leica 3D Disto

User Manual

Version 0.9
English

- when it has to be **right**

Leica
Geosystems

Introduction

Purchase



Congratulations on the purchase of a Leica 3D Disto.

This manual contains important safety directions as well as instructions for setting up the product and operating it. Refer to "12 Safety Directions" for further information.

Read carefully through the User Manual before you switch on the product.





Product identification

The serial number of your product is indicated on the data label, refer to "12.8 FCC Statement, Applicable in U.S.". Enter the serial number in your manual and always refer to this information when you need to contact your authorised dealer or to register in the Leica MyWorld portal.

Serial No.: _____

Symbols

The symbols used in this manual have the following meanings:

Type	Description
 Danger	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
 Warning	Indicates a potentially hazardous situation or an unintended use which, if not avoided, could result in death or serious injury.
 Caution	Indicates a potentially hazardous situation or an unintended use which, if not avoided, may result in minor or moderate 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.

Trademarks

- Windows is a registered trademark of Microsoft Corporation. All other trademarks are the property of their respective owners.

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1 How to Use this Manual



It is recommended to setup the instrument while reading through this manual.

Index

The index is at the back of the manual.





Keys, fields and options on the screens which are considered as self-explanatory are not explained.

Validity of this manual

This manual applies to the 3D Disto instruments and software application.

Available documentation

Name	Description/Format		
3D Disto User Manual	All instructions required in order to operate the instrument to a basic level are contained in this User Manual. Provides an overview of the instrument together with technical data and safety directions.	-	✓
3D Disto Quick Start	Intended as a quick reference field guide.	✓	✓
Safety Manual	Provides important safety instructions for use of 3D Disto.	✓	✓

Refer to the following resources for all 3D Disto documentation/software:

- the Leica 3D Disto CD
- <https://myworld.leica-geosystems.com>



myWorld@Leica Geosystems (<https://myworld.leica-geosystems.com>) offers a wide range of services, information and training material.

With direct access to myWorld, you are able to access all relevant services whenever it is convenient for you, 24 hours a day, 7 days per week. This increases your efficiency and keeps you and your equipment instantly updated with the latest information from Leica Geosystems.

myWorld myWorld

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- mySupport
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**myProducts**

Simply add all Leica Geosystems products that you and your company own and explore your world of Leica Geosystems. View detailed information on your products, buy additional options or Customer Care Packages (CCPs), update your products with the latest software and keep up-to-date with the latest documentation.

**myService**

View the service history of your products in Leica Geosystems Service Centers and detailed information on the services performed on your products. For your products that are currently in Leica Geosystems Service Centers view the current service status and the expected end date of service.

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Create new support requests for your products that will be answered by your local Leica Geosystems Support Team. View the complete history of your Support and view detailed information on each request in case you want to refer to previous support requests.

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Enhance your product knowledge with the Leica Geosystems Campus - Information, Knowledge, Training. Study the latest online training material or download training material on your products. Keep up-to-date with the latest News on your products and register for Seminars or Courses in your country.

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Simply download the latest documentation and software to keep yourself and your products up-to-date. You can access downloads of Software, Manuals, Tools, Training Material and News for Leica Geosystems Products.

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Latest News

October 14, 2010
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with Leica Geosystems precision
-> [more](#)

October 6, 2010
Leica Geosystems announces Leica Viva
Net Rover "Turn-on & Measure" GNSS
solution
-> [more](#)

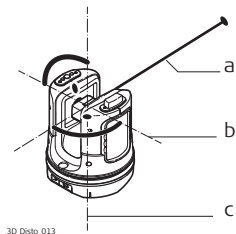
October 6, 2010
Leica Viva GS12 receiver for combined
GNSS/RTS one-person surveying
-> [more](#)

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Service	Description
myProducts	Simply add all Leica Geosystems products that you and your company own. View detailed information on your products, buy additional options, update your products with the latest software and keep up-to-date with the latest documentation.
mySupport	Create new support requests for your products that will be answered by your local Leica Geosystems Support Team. View the complete history of your Support and view detailed information on each request in case you want to refer to previous support requests.
myTraining	Enhance your product knowledge with the Leica Geosystems Campus - Information, Knowledge, Training. Study the latest online training material or download training material on your products. Keep up-to-date with the latest News on your products and register for Seminars or Courses in your country.

2 Technical Terms and Abbreviations

Line of sight



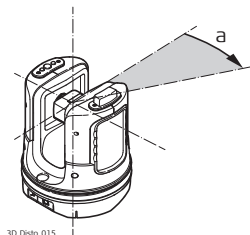
3D Disto_013

- a) Line of sight
- b) Tilting axis, horizontal rotation axis of the instrument
- c) Standing axis, vertical rotation axis of the instrument



Line of sight, laser beam and crosshair must be congruent. Refer to "9 Check & Adjust" for more information.

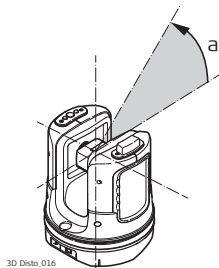
Horizontal angle



3D Disto_015

- a) Horizontal angle, in [°] or [gon]

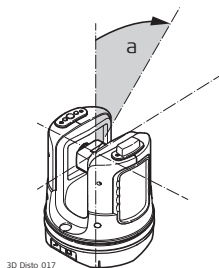
Vertical angle



3D Disto_016

Setting: Horizon = 0

a) Vertical angle, in [°], [gon], [1:n] or [%]

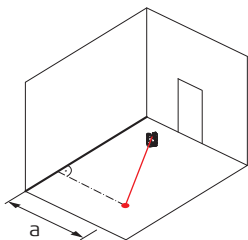


3D Disto_017

Setting: Horizon = 90° / 100gon

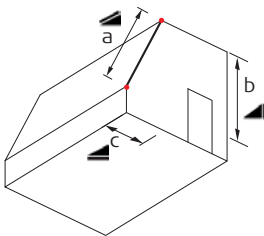
a) Vertical angle, in [°] or [gon]

Distances






3D Disto_018

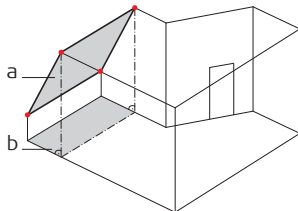
a) Orthogonal distance



3D Disto_019

- a) Tie distance 
b) Vertical distance  = height difference
c) Horizontal distance 

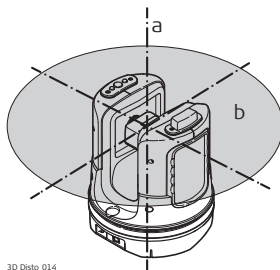
Areas



3D Disto_020

- a) Tilted area, as measured
- b) Horizontal area, calculated by 3D Disto

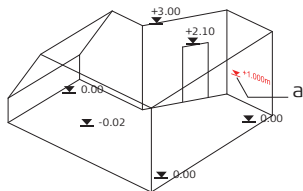
Zenith and horizon



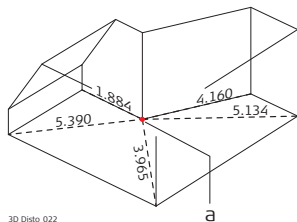
3D Disto_014

- a) **Zenith:**
Point on the plumb line above/below the observer.
- b) **Horizon:**
Plane/Line 90° to the plumb line.

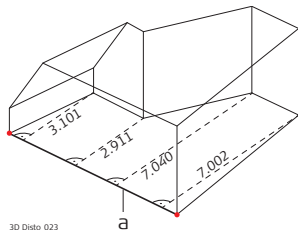
References



- a) **Reference height:**
A level that all heights refer to.



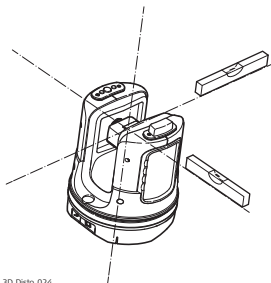
- a) **Reference point:**
A point that all dimensions refer to.



- a) **Reference line:**
A line that all dimensions refer to.
-

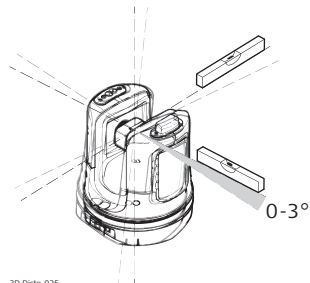
Tilt sensor

The tilt sensor guarantees correct results even if you do not set up the 3D Disto exactly horizontal.



3D Disto_024

Tilt sensor off = disabled
All measurement results relate to the tilted axis and horizon of the 3D Disto.

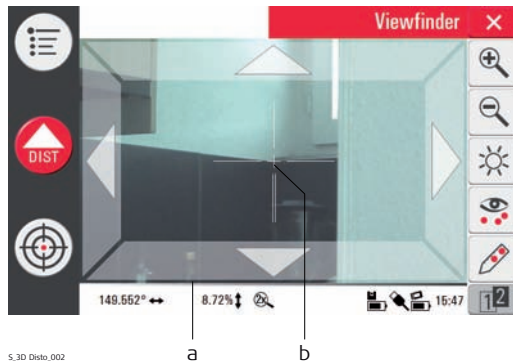


3D Disto_025

Tilt sensor on = enabled
Measurement results are correctly horizontal if the 3D Disto is set up between 0° and 3° .

Viewfinder and Crosshair

- The so called **Viewfinder** is an integrated camera which shows the target on the Control Unit display.
- The **crosshair** is an aiming guide displayed on the Control Unit.

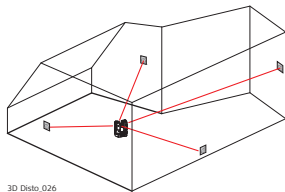


S_3D Disto_002

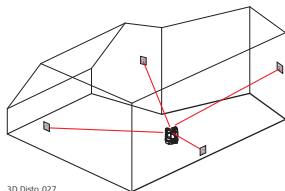
- a) Viewfinder
b) Crosshair

Secure Points

Secure Points **lock a measurement to a coordinate system**. These reference points allow to change the 3D Disto's location or to continue a measurement at a later time, so that all measurements fit together perfectly.



1. Name and place three to five self-adhesive target marks on walls, ceiling or floor **around your working area**.
2. Measure these target marks and save them as Secure Points.



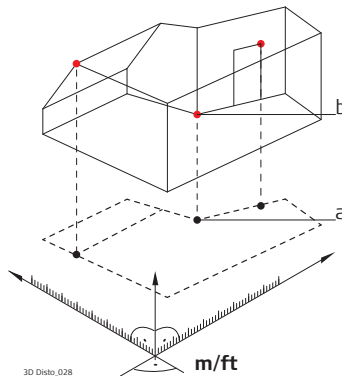
3. Relocate the 3D Disto or set it up "anywhere" at a later time.
4. Measure the Secure Points again. 3D Disto relocates itself and measurement works can be continued.



Refer to "7.3 Location" for more information.

Coordinates

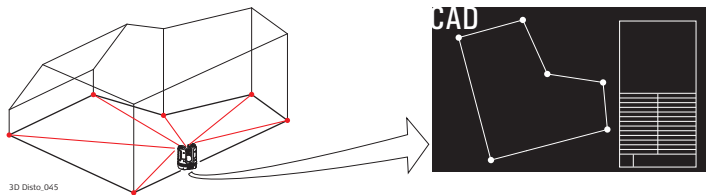
Coordinates describe the position of a point in the two or three dimensional room.



- a) Two dimensional coordinates
- b) Three dimensional coordinates

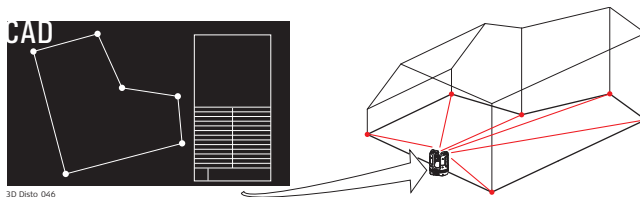
Measure

Measurement results can be transferred to a connected PC or USB stick for post-processing.



Layout or projection

Design data in DXF format can be imported and used to lay out the according points or grids.



Laser distance meter (LDM)

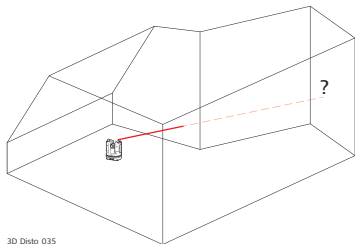
The laser distance meter (LDM) allows to determine the distance by using a visible red laser beam.

Calibration

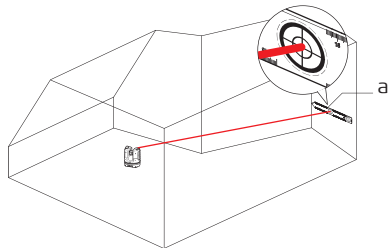
Calibration is a workflow to check and adjust the accuracy of the instrument. Refer to "9 Check & Adjust" for more information.

Ruler for offset points

Ruler for offset points is an accessory that allows to measure inaccessible or hidden points.



3D Disto_035



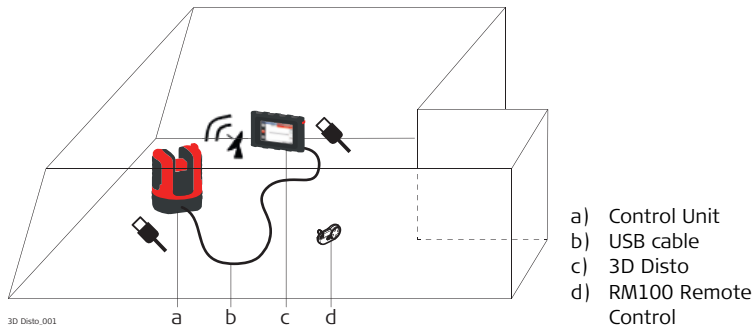
a) Ruler for offset points

3 Description of the System

3.1 General 3D Disto System Information

General information

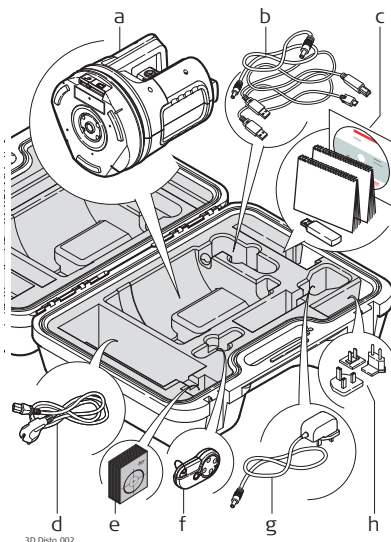
Leica Geosystems' 3D Disto is a three dimensional measuring and projection system that allows to measure points in a room from one setup position and generates 3D data – ready to use or for post-processing.



3D Disto is operated via the Control Unit. Certain functions can also be managed by the RM100 Remote Control.

3.2 Container Contents

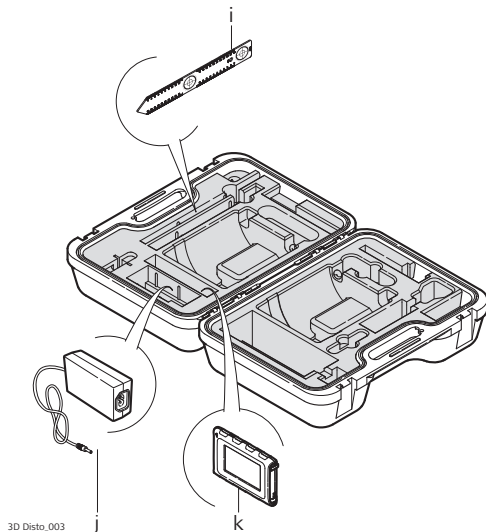
Container contents, part 1 of 2



3D Disto_002

- a) 3D Disto with inbuilt SD WLAN Card
- b) USB Connection Cable 3D Disto to the Control Unit
Power Cable 3D Disto to the Control Unit
Mini-USB Cable for PC
- c) Data CD
Safety Instructions Manual, 3D Disto Getting Started Guide, CE & Producer Certificate, USB Stick
- d) Four country-specific cables for Power Supply 3D Disto
- e) Target Marks, self-adhesive, 50 units in one bag
- f) RM100 Remote Control
- g) Control Unit power supply
- h) Country-specific adapter plug-ins for Control Unit power supply

**Container
contents,
part 2 of 2**

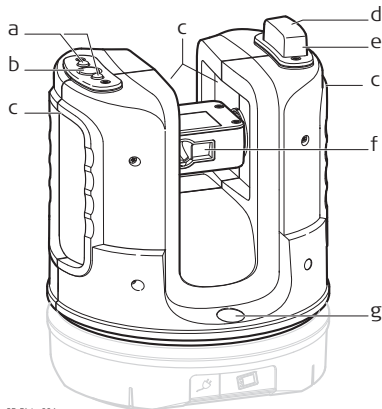


- i) Ruler for offset points
- j) Power Supply 3D Disto
- k) Control Unit with Pen,
Tripod Clamp and Hand
strap

3.3 Instrument Components

3.3.1 3D Disto

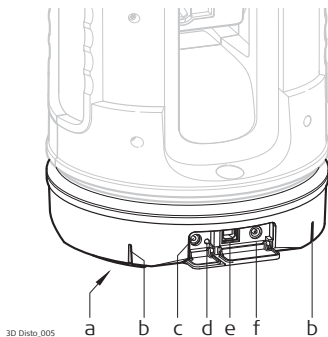
Instrument components, motor-driven part



3D Disto_004


- a) LEDs for 3D Disto status
- b) ON/OFF button
- c) Trays to hold the instrument
- d) Infrared (IR) interface
- e) WLAN interface
- f) Laser distance meter with Viewfinder
- g) Circular bubble



Instrument component, battery socket

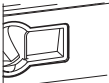


- a) Tripod thread 5/8"
- b) 90° marking
- c) Power supply connector for 3D Disto
- d) LED for battery status
- e) Data cable connector
- f) Power supply connector to Control Unit

Description of buttons and LEDs

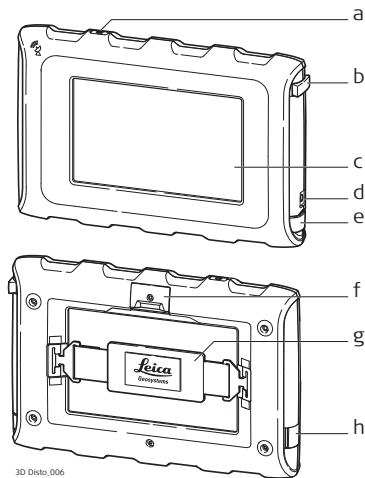
Button/LEDs	Description
ON/OFF button 	Button to turn instrument ON or OFF. Instrument turns OFF after 15 minutes if not connected to the Control Unit.

Button/LEDs	Description
<p data-bbox="368 163 591 218">LEDs for 3D Disto status</p> 	<ul data-bbox="608 163 1365 467" style="list-style-type: none">• Green and orange LEDs flash: If 3D Disto is turned ON.• Orange LED flashes fast: Booting and Self-Levelling Procedure is running.• Green LED flashes slowly: tilt $\leq 3^\circ$ after Self-Levelling check. 3D Disto is ready for measurement. Tilt sensor is on.• Orange LED flashes fast: tilt $>3^\circ$ after Self-Levelling check.• Green LED off, orange LED flashes continuously: An error happened. Refer to "8 Error Messages" for more information. <p data-bbox="608 487 1030 513">For experts only: Tilt sensor off</p> <ul data-bbox="608 519 1365 576" style="list-style-type: none">• Green LED flashes slowly, followed by orange LED flashing three times while green LED is off.
<p data-bbox="368 598 554 653">LED for battery status</p> 	<p data-bbox="608 598 1209 624">If instrument is on and connected to the charger:</p> <ul data-bbox="608 629 1268 767" style="list-style-type: none">• Green LED 1x flashing: Battery is charged to 25 %.• Green LED 2x flashing: Battery is charged to 50 %.• Green LED 3x flashing: Battery is charged to 75 %.• Green LED flashes: Battery is fully charged.

Button/LEDs	Description
<p data-bbox="368 182 496 205">LDM Laser</p> 	<ul data-bbox="608 182 1355 311" style="list-style-type: none">• OFF: Viewfinder is OFF or 3D Disto targets automatically.• ON: Viewfinder is ON; user is targeting manually.• Flashing: to indicate the precise position of a projected point.

3.3.2

Control Unit

Control Unit
components

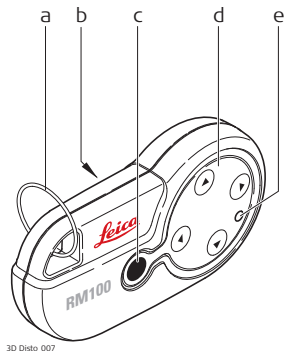
3D Disto_006

- a) ON/OFF button
- b) Pen
- c) Display, 4.8" touch screen
- d) Power supply connector
- e) USB Port, Type A
- f) Tripod clamp, extendable
- g) Hand strap
- h) Micro-USB Port, Type Micro-B

3.3.3

RM100 Remote Control

Remote Control components



- a) Key ring
- b) Battery compartment
- c) Distance button
- d) Navigation buttons:
Up/down/right/left
- e) Control LED

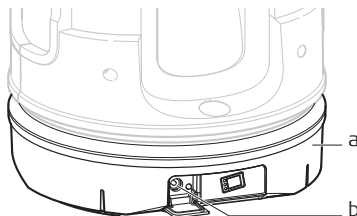
3.4 Power Supply

3.4.1 3D Disto

3D Disto power supply

Power for the instrument can be supplied either internally or externally:

- **Internal:** via battery socket, with non-removable Li-Ion batteries, 14.4 V, 63 Wh.
- **External:**
Power supply for 3D Disto connected via cable with country-specific plugs for worldwide use. Input: 100 - 240 V AC, 50/60 Hz, Output: 24 V DC, 2.5 A, length 1.80 m.



3D Disto_008

- a) Battery socket
- b) Power supply connector



Only Leica Geosystems authorised service workshops are entitled to replace the battery socket.

3.4.2

Control Unit

Control Unit power supply

Power for the Control Unit can be supplied either internally or externally:

- **Internal:** non-removable Lithium polymer battery, 2500 mAh, 3.7 V DC.



The display of the Control Unit turns off after 15 minutes to save power during periods of inactivity.

- **External:**

- Power supply with AC/DC adapter. EU, US, UK and AUS adapter plug-ins available. Input: 100 - 240 V AC, 50/60 Hz, Output: 5.2 V DC, 2000 mA, cable length 1.50 m.

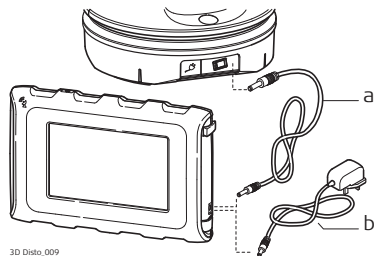


The Control Unit powers on when plugging in the power supply adapter.

- Power supply from 3D Disto via cable. >5 V, 2.5 A, length 2.00 m.



The Control Unit can only be charged if the 3D Disto is charged more than 25%.



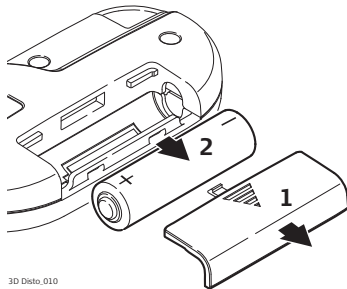
- a) Power supply cable from 3D Disto
- b) Power supply from mains supply with AC/DC adapter

3.4.3

RM100 Remote Control

RM100 Remote Control power supply

The RM100 is equipped with one AA alkaline battery, 1.5 V.




3D Disto_010

1. Push the battery cover in the direction of the arrow to open the battery compartment.
2. Replace the battery and refit the battery cover.

3.5 Software Concept

3D Disto system software

The 3D Disto software comprises the central functions of the instrument:

- Several languages are integrated into this software. The preferred operating language can be chosen at the **first setup** or in the **Setting** menu.
 - The instrument has a restart function in case the Control Unit is not responding. To restart the instrument press  for ten seconds.
 - To reset the software to the factory settings go to **Menu**, press **Settings** and **Reset to default**.
-

Application programs

Several application programs are available for the instrument, supported by assistant pop-ups that guide through the workflow. These applications can be tested in a Demo mode or by activation through license keys.

Demo mode

There is an option to test the available application programs by activating the Demo mode first. This provides full software performance for 40 working hours. A pop-up reminds when Demo mode runs out.

To enable the application programs in Demo mode, carry out the following steps:

1. Press **Menu » Applications » Demo**.
 2. All application programs are listed in the Menu and marked with a sandglass symbol until Demo mode runs out.
-


Customised application programs

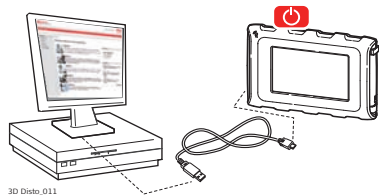
Customised software, specific to user requirements, can be developed using the third party software. Information on the development environment is available on request from a Leica Geosystems representative.

Software application licensing and activation

The application programs can be activated by starting the Demo mode or entering the license key by using one of the following methods:

- **By synchronisation with the MyWorld homepage on www.leica-geosystems.com:**

1. Press  and connect the Control Unit to the PC via USB cable. The Control Unit is available as removable disc at your PC.




2. If the Control Unit does not recognize the PC connection automatically

press .

3. If the connection works, start your internet browser and go to the **MyWorld** homepage. Register your product by entering the equipment number that can be found on the label below the laser distance meter. Refer to "Labelling 3D Disto", page 179.

4. Choose the **MyProduct** page and press the **activation key** for licenses.
5. A standard Windows pop-up prompts to save the license key file. Save the file in the **Licence** folder on your Control Unit.

Deviations in 3D Disto Windows Software


1. Install 3D Disto Software on your PC.
 2. Start your internet browser and go to the **MyWorld** homepage. Register your product by entering the equipment number.
 3. Choose the **MyProduct** page and press the activation key for licenses.
 4. Save the license key file in the **Licence** folder that you can find in directory C:\Program Files\Leica Geosystems\3D Disto.
- **By entering the licence key manually:**
 1. Press  and go to **Menu » Device » Software » License**.

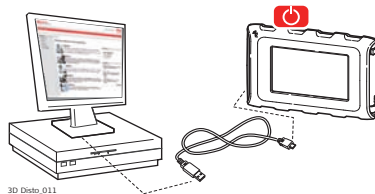
2. **Enter the key**, which you can find on the MyWorld webpage, and press **OK**.



The activated application programs are available in the application menu.

Software update

1. Press  and connect the Control Unit to the PC via USB cable.



Ensure the Control Unit battery is fully charged before starting the software update. Otherwise it can happen the data get lost and you have to restart the download. Do not disconnect from PC before download has finished. Please save and export your measurement data before starting the software update.

2. If the Control Unit does not recognize the PC connection automatically

press  .

3. If the connection works, start the internet browser and go to the **MyWorld** homepage. Register your product by entering the equipment number.
4. Go to the **MyProduct** page, choose the latest software version and press the **Save** key.
5. A standard Windows pop-up prompts to open or save the file. Save the file in the **Update** folder on your Control Unit.

6. Disconnect the Control Unit from the PC and start installation in **Menu » Device » Software » Update**.

Deviations in 3D Disto Windows Software

1. Start your internet browser and go to the **MyWorld** homepage. Register your product by entering the equipment number.
 2. Choose the **MyProduct** page, choose the latest software version and press the Save key.
 3. Save the file in the **Update** folder that you can find in directory C:\Program Files\Leica Geosystems\3D Disto.
-

4 User Interface

4.1 Control Unit

User input

The 4.8" touch screen display is the main operation tool for the 3D Disto. It is used for navigations within the different applications and menus as well to steer the 3D Disto.

Certain functions can also be managed via RM100 Remote Control.



Leica Geosystems recommends to use the supplied pen on the touch screen.

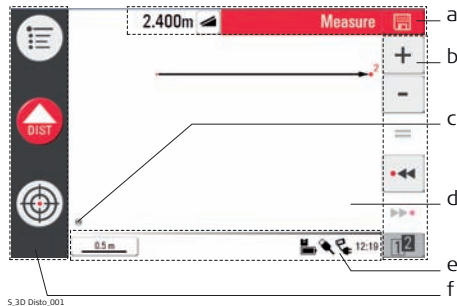
4.1.1

Screen









All shown screens are examples. It is possible that local software versions are different to the basic version.



Screen



- a) Head line with result window
- b) Tool bar
- c) 3D Disto position
- d) Sketch area / Viewfinder
- e) Status bar
- f) Main operation bar

Description




Element	Description
Head line	<p>Shows the running application.</p> <p> allows to save and close files.</p> <p> closes applications.</p> <p> shuts down the Control Unit.</p>
Main operation bar	<p>Contains the keys Menu , Dist , and Viewfinder .</p> <p>These keys are displayed during all applications.</p>
Sketch area, alternating with Viewfinder	<p>Displays measured points, lines and areas and correct position of 3D Disto in relation to measured points - either in foot print or face mode.</p>
Viewfinder, alternating with sketch area	<p>Shows the 3D Disto's live video stream that is used to target points over longer distances up to 50 m exactly and to take pictures.</p>

Element	Description
Result window	Displays all results like distances, heights, slopes, areas, angles. With the result choice key  you can switch between the result types. With tip on the results calculator opens.
Tool bar	Contains application specific tool keys.
Status bar	Displays status of scale/zoom, connections, batteries, time, running function mode, assistant support.
Hour Glass 	Appears in case the software is in the middle of a task. For example while self-levelling, measurement, saving or exporting data. No key command is possible.

4.1.2

Main Operation Bar






Main operation bar description





Key	Description
	Opens the menu to start applications or to define settings.
	Starts measurement.
	Opens, closes and locks Viewfinder.

4.1.3

Tool Bar










Tool bar
description

Key	Description
	Add
	Subtract
	Generate result or close polygons
	Go one point backward
	Go one point forward











Key	Description
	Switch between the tool bars
	Start area or volume mode
	Undo or redo last command
	Clear functions

4.1.4 Icons & Symbols







Common symbols in status bar

Icon	Description
	Indicates the level of the remaining battery capacity for the Control Unit.
	Indicates the level of the remaining battery capacity for the 3D Disto.
	Indicates USB connection between Control Unit and 3D Disto.
	Scale of Sketch Area.
	Indicates zoom level/magnification.
	Indicates that Control Unit is connected to power supply or 3D Disto powers Control Unit.
	Indicates that 3D Disto is connected to power supply.
	Indicates that WLAN connection is working and shows signal strength.
	Indicates that tilt sensor is turned off in the settings.


Various symbols in
result window

Icon	Description
	Horizontal distance
	Tie distance
	Height, height difference
	Left angle
	Right angle
	Tilt
	Horizontal/tilted area
	Horizontal/tilted area perimeter
	Volume Height/tilted volume height
	Volume/tilted volume


Room Scan result symbols

Icon	Description
	Circle size
	Point height
	Circumference
	Diameter
	Scan area
	Scan perimeter

Projector result symbols

Icon	Description
	Distance between point and plane

Tool Kit result symbols

Icon	Description
	Orthogonal distance of a point to the reference line

4.2

RM100 Remote Control

Description

The RM100 Remote Control (IR) has five buttons that allow to turn the 3D Disto and to execute a distance measurement or point projection, depending on the running application program.



The RM100 Remote Control does not support the tool kit applications.

Targeting procedure

1. Rough targeting: long tip on  /  /  /  to turn the 3D Disto as long as pressed.
2. Fine targeting: short tip on  /  /  /  to turn the 3D Disto in small single steps.
3. Measure: Press .



The red LED at the top of the RM100 Remote Control will blink each time a button is pressed, indicating that the remote is transmitting to the 3D Disto.

5 Instrument Setup

5.1 Startup Procedure



Charging / first-time use

- **For all batteries**
 - The battery must be charged prior to using it for the first time because it is delivered with an energy content as low as possible.
 - The permissible temperature range for charging is between 0°C to +40°C/+32°F to +104°F. For optimal charging we recommend charging the batteries at a low ambient temperature of +10°C to +20°C/+50°F to +68°F if possible.
 - It is normal for the battery to become warm during charging. Using the chargers recommended by Leica Geosystems, it is not possible to charge the battery if the temperature is too high.
- **For Li-Ion batteries**
 - For new batteries or batteries that have been stored for a long time (> three months), it is effectual to make only one charge/discharge cycles.
 - For Li-Ion batteries, a single discharging and charging cycle is sufficient. We recommend carrying out the process when the battery capacity indicated on the charger or on a Leica Geosystems product deviates significantly from the actual battery capacity available.

Operation / discharging

- The batteries can be operated from -10°C to +50°C/14°F to +122°F.
- Low operating temperatures reduce the capacity that can be drawn; very high operating temperatures reduce the service life of the battery.
- Discharge temperature is from -10°C to +50°C/14°F to +122°F.

Warning

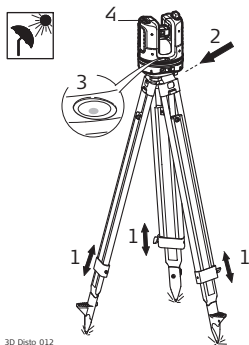
Inserting and removing the batteries

It is not allowed to use another type of battery or to remove the battery socket on the 3D Disto or Control Unit. For exchange please contact your distributor or Leica Geosystems representative.




It is always recommended to shield the instrument from direct sunlight and avoid uneven temperatures around the instrument.

Setup step-by-step The following setup assumes the setup on a tripod but it is also possible to place the 3D Disto on flat surfaces such as floor or boards.



3D Disto_012

1. Setup the tripod on a suitable place where the points to be measured are good to target and extend the tripod legs to a comfortable working posture.
2. Place 3D Disto onto tripod head. Tighten central fixing screw of tripod.
3. Centre the circular bubble on the 3D Disto by adjusting the tripod legs. This is not necessary with dome-head tripods.
4. Press  to turn on the instrument.

5. 3D Disto starts self-levelling: the tilt is checked by a tilt sensor and the instrument levels itself if the tilt is $< 3^\circ$.

Refer to "Description of buttons and LEDs", page 29, for information about tilt status.




Do not move the sensor while self-levelling procedure is working.


6. Turn ON the Control Unit by pressing .

7. If the Control Unit is started for the first time the following screen opens:



With  you can shut down the Control Unit.

Language:	English	Slope:	± 0.00 %
Time format:	24h	Distance:	0.000 m
Time:	13:16	Angle:	360.000°
Date:	2010/11/08	Decimal separator:	1.00

8. Choose a language.
Choose time format (23:59/11:59 am-pm).
Enter date and time.
Choose the units for slope, distance and angle.
Choose decimal separator.
9. Press  to go on.

10. Following screen opens:




11. Choose one of the following connection options:

- Connect to 3D Disto with USB cable,
- WLAN to 3D Disto,



Using WLAN connection the first time, you have to choose the USB connection and install the WLAN connection manually in the menu settings. If it does not work change the WLAN channel.

- to go ahead without connection or
- connect Control Unit to a PC.

12. To work with a cable connection to 3D Disto plug in USB cable and press .



It is recommended to plug in the USB cable before turning on the 3D Disto, otherwise the instrument starts self-levelling procedure again.




Do not extend the USB cable with an adapter and only use the Leica Geosystems cable delivered in the container.

OR:


To work with WLAN press .

OR:


To transfer data from or to a PC press . Refer to "5.4.4 Data Transfer" for more information.



If connections do not work press **Menu » Device » Connect 3D Disto** and activate connection manually, either to PC or to Control Unit by WLAN or cable.

13. Next screen appears to check correct setup and tilt of the 3D Disto. Press  to go on.



If the setup screen indicates tilt $> 3^\circ$ adjust the tripod legs to level the circular bubble or change 3D Disto position to a more suitable and flat surface. Await green LED, then press .

14. If 3D Disto can not be levelled a pop-up prompts to deactivate the tilt sensor. If not needed, press **OFF**. A symbol in the status bar reminds you that the tilt sensor is off.



 **Caution**

For experts only:

If the tilt sensor is OFF the system does not compensate the tilt of the 3D Disto. In consequence all results that refer to a physically horizontal plane, for example tilt, height differences, horizontal distances, angles, areas, or volumes, now refer to the tilted horizon of the laser unit. Only the tie distance between two measured points is independent of the Tilt Sensor's setting.

It can be useful to disable the Tilt Sensor in case of vibrations, for example on the construction sites, or under instable or moving environments like on boats. Almost all measurements can be done nevertheless; exported data can be "levelled" afterwards via CAD software.

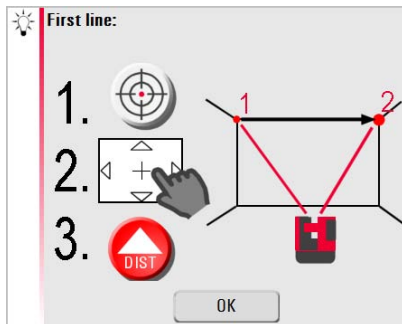
15. Sketch area appears. System is ready for measurement.

5.2

Assistant

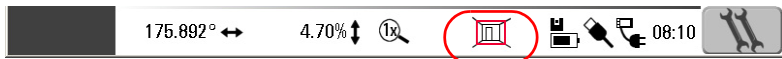


There is an assistant available that will guide you through all measurement tasks with illustrated pop-ups. If not needed, it can be deactivated in **Menu » Settings » Assistant**.



Assistant and supporting icons

If assistant is deactivated there are still supporting icons in the status bar, showing which application is running and what user action is required.



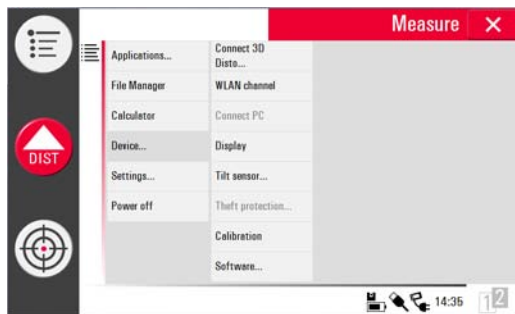
Examples* of supporting icons:

Icon	Description
	Measuring height activated.
	Measuring "First Line" first point.
	Measuring "First Line" second point.
	Hidden Point Mode: measure first point.
	Hidden Point Mode: measure second point.
	Hidden Point Mode: peak of ruler calculated.

* Not all supporting icons are listed here.

5.3 Device Configuration and Menu Settings

Device configuration



All settings of the setup screen can also be edited and changed in the menu: Choose **Menu » Device**.

- **Connect 3D Disto** to connect by WLAN, USB cable, or disconnect Control Unit.
- **WLAN channel** to switch between different channels if connection does not work.
- **Connect to PC** to allow data transfer.
- **Display** to improve display settings.
- **Tilt sensor** to activate/deactivate.

- **Theft protection** to protect instrument by safety pin.
- **Calibration** to check and adjust. Refer to "9 Check & Adjust" for more information.
- **Software** to update software, to check software version on the Control Unit and the 3D Disto or to enter the software license key.

Menu settings

Press **Menu** » **Settings**, the following options appear:



- **Snap Radius** is an option to define the area around a point/line. This setting offers a list of points that are very close to each other to simplify their selection.
- **Assistant** to activate/ deactivate the assistant.

- **Units** to change the unit settings.
- **Welcome text** to enter for example company name.
- **Date & Time** to change date and time settings.
- **Language** to choose your preferred software language.
- **Import/Export** settings are only available with particular application programs. Refer to the detailed description in "5.4.2 File Manager".
- The instrument has a **Reset** function.
If you select the menu function **Reset** and confirm, the device returns to the factory settings and stack and memory are cleared.



All customised settings and stored values are also lost.

5.4

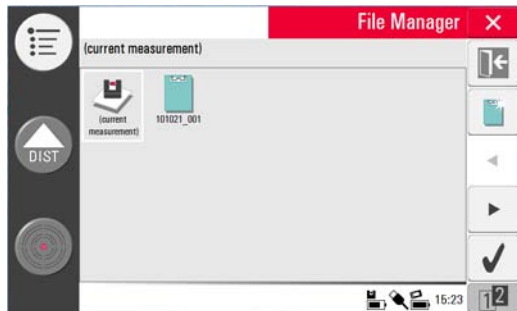
Data Management

5.4.1







General







File manager

The File Manager covers the entire data administration of measurement files, photos, Secure Points and data transfer.



Description of keys

Key	Description
	Close folder/File Manager
	Create folder
	Scroll back
	Scroll forward
	Select function
	Switch between the tool bars

Key	Description
	Viewer. Inactive in Project Folder level
	Data import
	Data export
	Rename folder/edit file info
	Clear
	Lead to upper folder level or close file manager

5.4.2

File Manager

Description

To start, press **Menu » File Manager**.









For some applications the File Manager will be started automatically.

Description of keys

Key	Description
A blue folder icon with a white document inside.	To create a folder and enter folder name with maximum 15 characters. Date and ID are default name.
A blue notepad icon with a pencil.	To rename a folder or to edit file information.
A grey trash can icon.	To clear a selected file or folder.
Two grey arrow icons, one pointing left and one pointing right.	To to choose a file or folder.
A grey checkmark icon.	To open a selected file or folder.
A grey square icon with a white left-pointing arrow.	Exit Icon... to go back a level.
A grey eye icon.	To view a Secure Point or photo file.

All files are displayed with different icons to differentiate the type of measurement files:

Key	Description	Key	Description
	Standard Measurement files		Open File / temporary file
	Area Measurement		Room Scan file
	Volume Measurement		Projector file

5.4.3

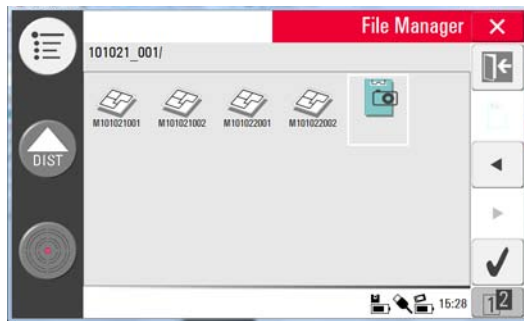
Photo and Secure Points Administration



Description

A folder for photos and Secure Points is created if a photo was made and the measurement was stored.



In case a folder contains Secure Points there will be an advice **Folder contains Secure Points. Continue? Yes/Cancel?**



- Press  to select, and press  to open the folder.

- Press arrow keys ◀ / ▶ to choose a photo, press ✓ to open the file.
 - Press 👁 to view a photo.
 - Press 🗑 to clear a selected or all photos.
 - Press 🏠 to close gallery.
-

5.4.4

Data Transfer



Whilst other USB memory sticks may be used, Leica Geosystems recommends Leica industrial grade USB memory sticks and cannot be held responsible for data loss or any other error that may occur when using a non-Leica USB memory stick.

Data Import

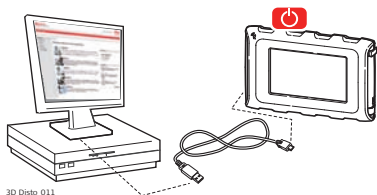
For some application it is possible to import DXF files. Data should be prepared on the PC before. Only points are imported, no lines. Optional the data source can be a PC or USB stick that is plugged into the Control Unit.





Remove unneeded data such as frames, logos, coordinates, or orientation arrows, in the DXF files before importing them.

USB Cable

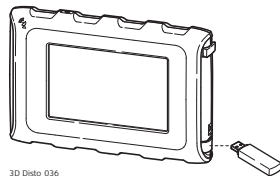
1. For import from PC, connect powered Control Unit and PC by USB cable.





2. Pop-up **PC connection active** appears on Control Unit screen. The Control Unit is now out of work and entirely controlled by the connected PC.
3. If connection is not working go to **Menu** and select **Connect to PC**.
4. After successful connection, a pop-up window with Import folder appears.
5. Copy the files from PC to the Import folder of the Control Unit and close the window.
6. Disconnect Control Unit by choosing **Disconnect Hardware** at your PC or by key press in the pop-up of the Control Unit.
7. Open File Manager and press . Available DXF files are listed. Choose a file and press .

USB Stick



1. For transfer from USB stick, plug stick into your PC and save DXF files in the **Import** folder on the USB stick. Disconnect USB stick from your PC.
2. Plug USB stick into Control Unit.



3D Disto.036

3. Pop-up **Import from mass storage device? Yes/Cancel** appears on Control Unit screen.
4. If **Yes**: File Manager opens. Press . Choose the file and press .
5. If finished, USB stick just needs to be unplugged.





Deviations in 3D Disto Windows Software


1. Save the DXF file in the **Import** folder that you can find in directory C:\Program Files\Leica Geosystems\3D Disto.
2. Open File Manager and press , select a DXF file and press  to open it.

Data export


Data Export is started in the **File Manager**.

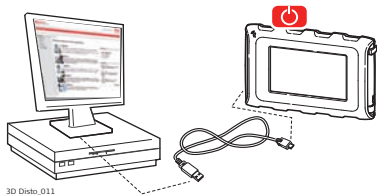
The following data formats are supported and available for export:

- : Measurement (*.CSV). List separator is ; (semicolon).
- : Measurement (*.TXT). List separator is a **tabulator sign**.
- : Drawing (*.DXF)
- : Photos, single pictures (*.JPG)

1. To export files or folders choose a folder or file, press .
2. Export data are generated and can be transferred to a connected PC or USB stick.

USB Cable

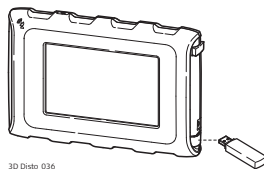
1. Open File Manager, choose a folder or file and press . Connect powered Control Unit and PC by USB cable.




2. Pop-up **PC connection active** appears on Control Unit screen.
3. If connection is not working go to **Menu** and select **Connect to PC**.
4. For a successful connection, a pop-up window with **EXPORT** folder appears on your PC screen.
5. Copy the files to the PC and close the window.
6. Disconnect Control Unit by choosing **Disconnect Hardware** at your PC.

USB Stick

1. For transfer to USB Stick plug stick into Control Unit.



2. Open File Manager, choose a folder or file and press .
3. Pop-up **Export to mass storage device? Yes/Cancel** appears on Control Unit screen.
4. If **Yes**: export data are transferred to USB stick.
5. If finished, USB stick just needs to be unplugged.



If you execute export in File Manager and plug in the USB stick afterwards, no data will be copied to the USB stick unless you repeat the export function.

Deviations in 3D Disto Windows Software

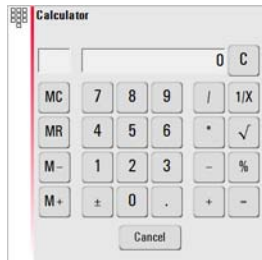
1. Open File Manager, choose a file and press 
Save the DXF file in the **Import** folder that you can find in directory C:\Program Files\Leica Geosystems\3D Disto.
 2. You can find the export data in the **Export** folder that you can find in directory C:\Program Files\Leica Geosystems\3D Disto on your PC.
-

5.5

Calculator

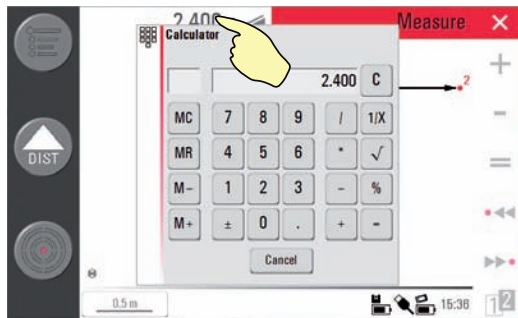
Using calculator

1. Press **Menu** » **Calculator**.
2. A pop-up opens with the following keypad:



3. The memory function allows among other things to add or subtract, for example area, volumes or other results.
 - Click MC to clear memory.
 - Click MR to retrieve a number that is stored in memory.
 - Click M- to subtract the displayed number to the number that is already in memory.
 - Click M+ to add the displayed number to the number that is already in memory.
- 4.

Another option is to tip on the result in the result window in order to calculate with this value.



Press **Cancel** to close the window again.



Calculation will not be saved in the running measurement file after closing.

6

Operation

6.1

Measurements

Description

The 3D Disto is a combination of a precise laser distance meter (LDM) and angle encoders. Targeting with the visible red laser beam allows to measure the distance between the 3D Disto and the target and horizontal and vertical directions towards the target. Basic usage of the measurements is the determination of the relations between different targets, such as horizontal distances, tie distances, height differences, for example for identifying room dimensions, height differences, angles from wall to wall, area sizes, volumes, plumb points or other measures.

The 3D Disto supports the measuring and targeting even in difficult situations such as targeting over long distances, at targets difficult to reach or at bright light conditions. An inbuilt tilt sensor ensures measurements following true horizon or true plumb line, defined by gravity.

6.2 Viewfinder


Description

The 3D Disto has an integrated camera. The camera is accessible via the Viewfinder, it shows the camera image directly on the Control Unit display. The crosshair in the Viewfinder image allows precise targeting and measurements even if the laser beam is not visible, for example over long distances or because of bright backlight conditions. The integrated digital zoom allow the image to be magnified up to eight times of its original size. This is a great help because precise measurements on detailed surfaces can even be accomplished in sunlight without any problem.

Example of a Viewfinder screen, first and second toolbar shown:



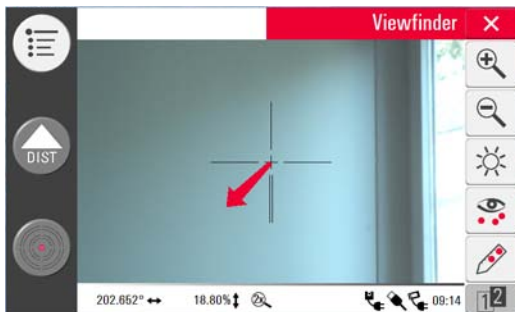
Using Viewfinder step-by-step







-
1. Press  to start the Viewfinder. A second key press activates the lock mode, a third one unlocks and closes the Viewfinder.








A lock symbol on a key indicates the lock mode.

2. Targeting: There are different options to target a measure point:
 - Press the arrow keys in the screen for targeting, long press for fast 3D Disto turns and short press for single step turns.
 - **PinPoint Targeting:** tip on a position on the screen. Laser point turns to this point automatically.
 - **Joystick Targeting:** is activated by long tip in the centre of the crosshair. A red dot in the centre appears. With finger or pen sliding on the screen 3D Disto turns real-time in this direction until red arrow is released. The longer the red arrow is the faster the 3D Disto turns.



3. Press  or  to zoom in and out. There are four magnifications available. The running setting is shown in the status bar.
4. Press  to adjust the brightness of the camera.
5. Press  to display/hide all measured points. Last measured point is always displayed.
6. Press  to measure covered points. Place the peak of the ruler for offset points to the point.
 - Target laser point on the mark at the opposite end of the ruler. Do not move ruler from now on.

- Press .
 - Target second mark.
 - Press .
 - A pop-up with checkmark confirms successful measurement.
7. Press  to take pictures for documentation purposes. They are stored with name, point ID, date and time information.
 8. Press  in dark environmental conditions to change Viewfinder picture in negative mode. Edges and corners will be highlighted in black. Only available in windows version.
 9. Press  to choose between different turn commands:
 - Turn 90° right
 - Turn 90° left
 - Turn ?°: Enter the horizontal angle through which the 3D Disto shall be turned.
 - Horizon: 3D Disto goes to 0% slope/horizontal position.
 - Plumb up: This option can be used to plumb up a point by setting up the 3D Disto exactly over it. Just mark a cross on the floor. Ensure that the lines of the cross are exactly 90° to each and long enough to be seen when setting up the instrument above. Use the 90° markings on the socket for centering.



Please note that there are vertical and horizontal deviations in the movements. Do not use the turn commands for stake-out or alignment. Please work with tools from the Tool Kit instead.

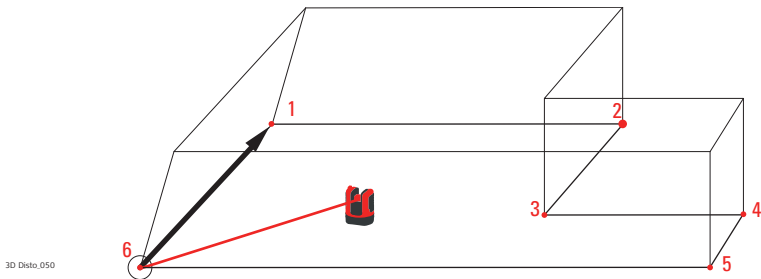
6.3

Measurement Workflow

Description

The Measure application allows to measure horizontal distances, tie distances, height differences, heights, angles, areas, volumes, slopes, or perimeter of points indoors but also outdoors on buildings and sites.


Measurements step-by-step



To measure for example a rooms' dimension, carry out the following steps:

1. Start up the system as described in "5.1 Startup Procedure".
2. The following screen appears:



3. To target the first point, for example a corner, press  and use the arrow keys or another method as described in "6.2 Viewfinder" to move the laser point to the desired position.



While targeting ensure the laser beam is not split for example by corners or edges. Otherwise this could lead to wrong measurements.



If laser point becomes a line due to an acute target angle to a wall the system measures with the centre of the line.



Measuring errors can occur when measuring toward colourless liquids, for example water, or dust free glass, Styrofoam or similar semi-permeable surfaces.



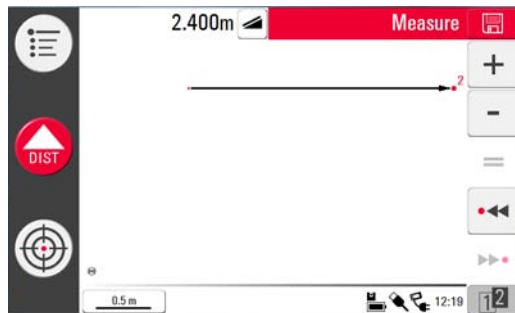
Aiming at high gloss surfaces may deflect the laser beam and lead to measurement errors. Against non-reflective and dark surfaces the measuring time may increase.

4. Press  to measure. Measured point appears in the sketch area.



The position of the 3D Disto symbol in the sketch changes in correct relation to the measured point. First measured point is always displayed on the left side of the sketch area.

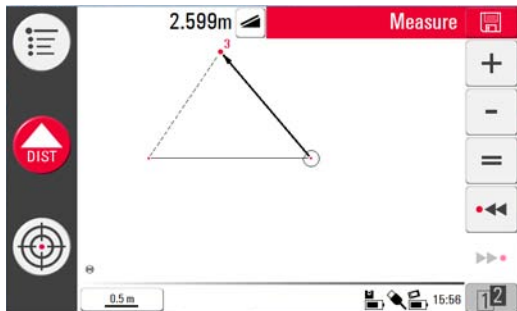
5. Target the second point and proceed as described in 3. to 4. A line is displayed from first to second measured point.





First two points define the measuring geometry, the so called Base Line, and must be measured in horizontal distance of at least 10 cm. The Base Line is always displayed horizontally in the sketch area.

6. After the third point was measured a proposed "closing line" appears between first and latest measured point. The selected line is always highlighted with a bold line and arrow in measurement direction.

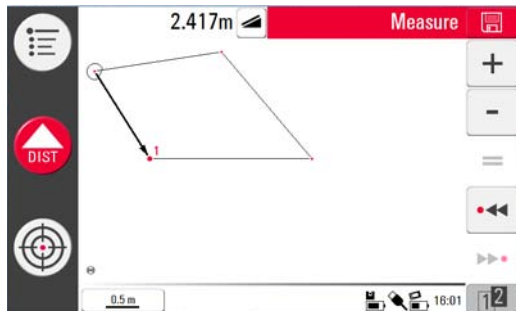




7. Proceed as described for measuring further points or use = to close/finish the polygon.









In special situations the proposed line is not available. Polygons can also be closed and result created by drawing a line with the pen between the two points to be connected.

8. To measure the room height select a floor point in sketch area and target and measure ceiling corner above.



Please note that the sketch shows a foot print view. Measured floor point and ceiling point may cover each other. Use  or  to select points and get the height result.

9. Proceed as described before to measure the ceiling dimensions.
10. Press  to undo the latest command.
11. Press  to redo the latest command.
12. Press  or  and  to clear measurements and results.
13. Press  to choose between save, save as, clear screen or cancel.


6.4 Touch Screen in Sketch Area

Selection of elements

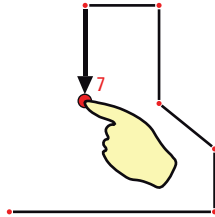
Any element can be selected by finger tip or with pen, too. Polygons that consist of added or subtracted lines can not be selected by direct tip.

Line drawing between arbitrary points

This is a feature to determine results, not to draw the line.

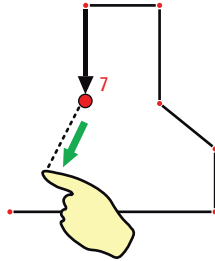
The  key of the toolbar only accepts a line which is proposed by the system. And these proposed lines are always connected to the last measured point.

With the **Line drawing between arbitrary points** feature two points can be connected that were **not measured in sequence**.

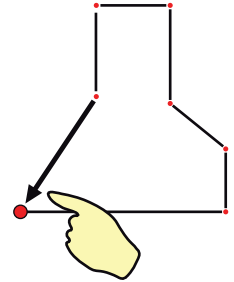


3D Disto_047

Select point.



Keep finger or pen on screen and slide to desired point.



Release touch screen when dotted line changes to dashed line. Results between these two points are displayed in the result window.

6.5

Addition and Subtraction



During and after the measurement you have the option to add or subtract selected elements.

The following values can be added:

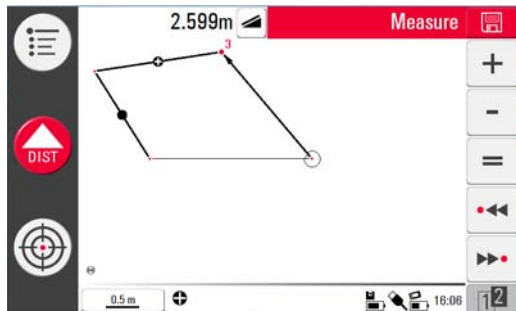
- Horizontal distances
- Tie distances

Area and Volume results can be added or subtracted by using the memory function in the calculator.





Addition and subtraction after measurements step-by-step

1. Select element by fingertip, pen or **◀◀/▶▶**.
2. Press **+** or **-** for addition or subtraction. The corresponding symbol appears in the status bar. Selected line or area is highlighted with black bullet symbol.
3. Select next element and press **+** or **-** for addition/subtraction again or **=** to close the sum and/or finish the adding/subtracting function.

- The added/subtracted elements get a \oplus or \ominus icon.
- The sum is displayed in the result window.



Addition and subtraction during measurements step-by-step

- Press , target and measure the first two points with .
 You have to measure two points before \oplus or \ominus is active as points can not be added or subtracted.
- Two points with line connection appear in sketch area.
- Press \oplus or \ominus for addition or subtraction. The corresponding symbol appears in the status bar. Selected line is highlighted with black bullet symbol.
- Press , target to measure a further point. Press .



-
5. Press **+** or **-** to add/subtract next distance (line) or continue to measure if you would like to skip a point distance to be added/subtracted.
 6. Proceed that way until you would like to close the sum and/or finish the adding/subtracting function. To do so press **=**.
-

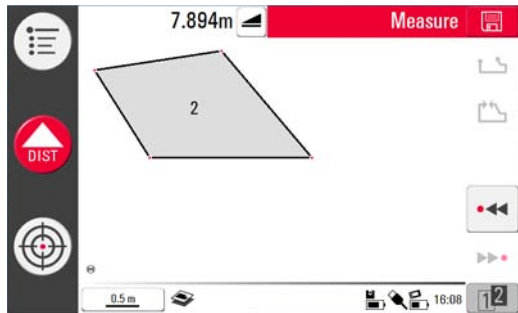
6.6

Area & Volume Calculations

Description

The 3D Disto also features to measure areas and volume. Both can be determined while measuring or after measurements.

1. Press  and choose .
2. A pop-up prompts to decide between **horizontal area/volume**, **tilted area/volume** or **quit the application**. The sketch areas' content is kept but the toolbar changes.









Each area can be managed in both applications, Horizontal Area or Tilted Area application.

6.6.1

Horizontal Areas/Volumes

Calculation during measurements step-by-step

1. Either select start point in sketch area or open Viewfinder if sketch is empty.
2. Target and measure a point with . Viewfinder is closed and point displayed in sketch.
3. Press  and measure next point with .
4. Press  to define line as part of the area. Proceed with measurement and line selection. The polygon can be closed by pressing . The area is highlighted in grey colour.
5. Pop-up asks **Measure Volume?Yes/No?**
6. If **Yes** pop-up appears to choose between the different options to define the height: **Enter height for volume, measure height, Cancel.**
7. Measure height:

Viewfinder opens, target and measure point on floor with  followed by point on ceiling. The height appears in the result window.





You can measure the points anywhere on the floor or ceiling area.




OR:

8. Enter height: Default for the entry is 0.000 m. Enter a desired value and press **OK** or **Cancel**.

OR:

9. **Cancel:** the result is an area.
 10. To change the height or to calculate the volume with a selected area press  or  and proceed as described in steps 3. to 4.
-

Calculation after measurements step-by-step

1. Select line to be added to area and press .
 2. Proceed that way for all lines and press .
 3. For volume calculations go on as described from 5. to 10., page 98.
 4. Quit application pressing .
-

6.6.2

Tilted Areas

Description

- This option offers the same functionality as the Horizontal Area application but the results differ.
- The result window shows the tilted area, tie distances, tilt perimeter and tilt of the plane.
- A arrow in the tilted area shows the tilt direction.



Volume calculation with tilted areas is also possible.

7

Software Applications

7.1

Overview

Description

There is a variety of software application programs available that cover a wide spectrum of construction tasks and facilitate daily work.

Following application programs are available:

- **Comfort Tools:**
Software license that features a Tool Kit with smart measuring and set-out tools and stationing for secure, check and relocate the position of the 3D Disto.
 - **Room Scan:**
Provides practical features to measure room dimension, walls, windows, stairs and other details with reference height, manually or automatically.
 - **Projector:**
Features layout of grids and other designs on floor, ceiling or walls.
-

7.2 Tool Kit

General

In addition to the standard application this program features:

- Comfort Plumbing,
- Comfort Targeting,
- Comfort Level,
- Meter Mark,
- Height Tracking and
- Parallel Line.



The Tool Kit applications offer quick, precise and easy-to-use tools for plumbing, meter marks, heights and parallels. After each layout task the respective tool has to be restarted. A pop-up prompts to go on with same reference or to measure a new one. Data are not stored and can not be imported or exported. Remote Control functionality is not supported in these applications.

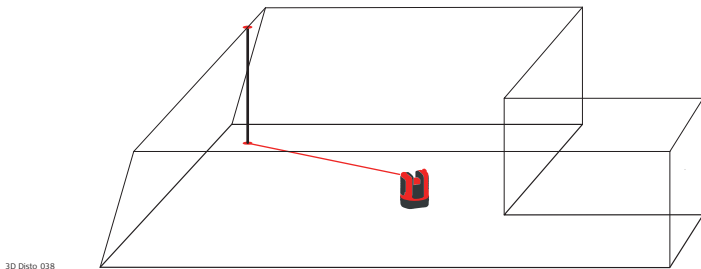
7.2.1

Comfort Plumbing


Description

Comfort plumbing allows to plumb any point up or down without standing above it.

For example, this tool can be very helpful for installation of dry walls.



Comfort plumbing step-by-step

1. Start application in **Menu » Applications » Tool Kit**.
2. An empty sketch opens. The running applications stays in the background.
3. Press  in Tool bar.
4. Viewfinder opens. Target and measure the point that shall be plumbed.

5. Viewfinder stays open. Roughly target expected plumb and press .

6. If plumb is found the laser blinks to indicate the exact position.



Refer to "8 Error Messages" for information about possibly appearing error messages.

7. Press  to close Tool Kit.

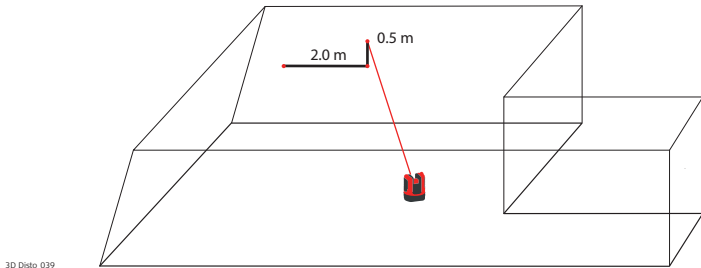
7.2.2

Comfort Targeting

Description






Comfort targeting allows to lay out a point relative to a reference point on vertical surfaces.

For example, this tool can be very helpful to install lights or pictures in regular distances on walls.



Use this feature only on vertical surfaces. On tilted surfaces the layout position is not correct.

**Comfort targeting
step-by-step**

1. Start application in **Menu » Applications » Tool Kit.**
 2. The running applications stays in the background.
 3. Press  in Tool bar.
 4. Viewfinder opens. Target and measure reference point on the wall. Press .
 5. Pop-up prompts to enter value for right or left distance to reference point. For left turn set a negative value. Press **OK** to confirm the value.
 Enter 0 to only lay out points vertical to the reference point.
 6. Laser point blinks to indicate exact position. Pop-up appears to enter vertical value (= distance above/below layout point). Default value = 0. Set a negative value for down turn. Press **OK** to confirm the value.
 Refer to "8 Error Messages" for information about possibly appearing error messages.
 7. 3D Disto turns and layouts the correct position.
 8. Laser point blinks to indicate exact position.
 9. Press  to close Tool Kit.
-

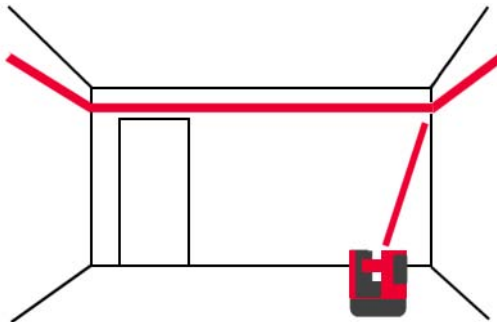
7.2.3

Comfort Level






Description

Comfort levelling keeps the laser point on the same level when you turn the 3D Disto horizontally.

For example, this tool can be very helpful for installation of suspended ceilings or to mount pictures at the same height on walls.



**Comfort levelling
step-by-step**

1. Start application in **Menu » Applications » Tool Kit.**
 2. The running applications stays in the background.
 3. Press  in Tool bar.
 4. Viewfinder opens. Target and measure reference height on the wall. Press .
 5. Viewfinder stays open. Roughly target the assumed layout point and press .
Laser point blinks to indicate the exact height position.
 Refer to "8 Error Messages" for information about possibly appearing error messages.
 6. Press  to close Tool Kit.
-

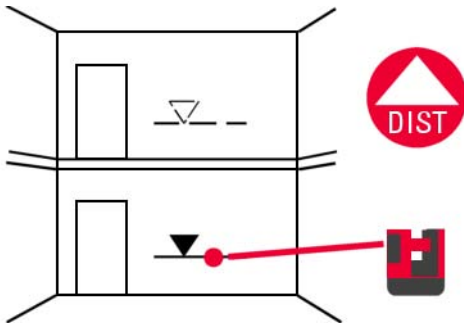
7.2.4

Meter Mark






Description

The Meter Mark tool refers to a meter mark or reference height and allows to layout any desired height.

For example, this tool can be very helpful to mark the meter mark at several places in a room or layout heights over several building levels.



Meter mark step-by-step

1. Start application in **Menu » Applications » Tool Kit.**
 2. The running applications stays in the background.
 3. Press  in Tool bar.
 4. Pop-up prompts to enter the height and measure that reference height.
 5. Viewfinder opens to target and measure reference point on the wall. Press .
 6. Pop-up prompts to enter an absolute height that is intended to be laid out.
Default = reference height.
 7. Viewfinder opens. Roughly target to a wall close to expected absolute height.
Press .
 8. Laser point blinks to indicate the exact position of the absolute height.
 Refer to "8 Error Messages" for information about possibly appearing error messages.
 9. Press  to close Tool Kit.
-

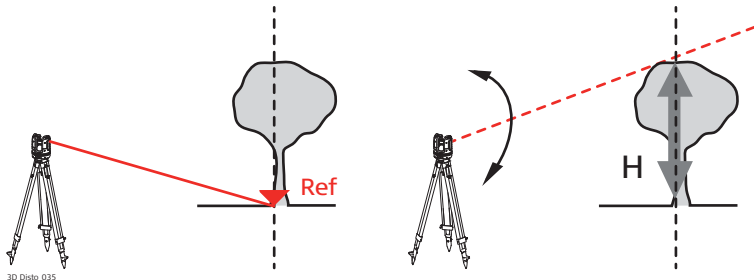
7.2.5

Height Tracking



Description

Height Tracking allows to determine the height of a target that can not be measured directly.

For example, this tool can be very helpful for measuring the height of a tree or power lines.



**Height tracking
step-by-step**

1. Start application in **Menu » Applications » Tool Kit.**
 2. Press  in Tool bar.
 3. Viewfinder opens. Target and measure a reference point of the same horizontal distance as the point that you would like to measure indirectly.
 Do not move too much the 3D Disto horizontally after reference point has been measured, otherwise result is not correct.
 4. Viewfinder stays open and measured point is displayed.
 5. Target the point you would like to measure indirectly as exact as possible. The height difference to the reference point is displayed and updated in real-time in the result window.
 6. Close the Viewfinder to finish the application.
-

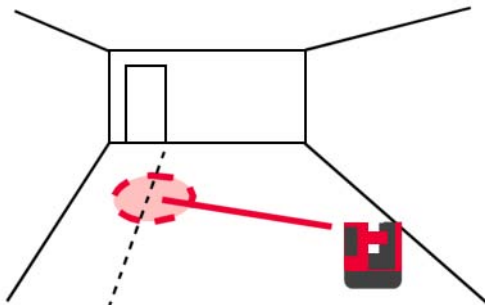
7.2.6

Parallel Line





Description

Parallel line allows to lay out parallels to a reference line on plane surfaces like walls or floors.

For example, this tool can be very helpful to align tilings or panels to a wall.



**Height tracking
step-by-step**

1. Start application in **Menu » Applications » Tool Kit**.
 2. Press  in Tool bar.
 3. Viewfinder opens. Target and measure start point and end point of the reference line.
 End point is the upper point in the sketch.
 4. A pop-up prompts to enter parallel distance to the left or right of the reference line. Enter negative values for left distance. Press **OK** to confirm the value.
 5. Viewfinder opens to roughly target layout point. Press . Laser point blinks to indicate the exact position on the parallel.
 6. Press  to close Tool Kit.
-

7.3

Location

Description

The **Location** function allows to determine the 3D Disto's position in a pre-defined coordinate system or room geometry. Reference points or **Secure Points** are placed by the user and allow a comfortable handling of the positioning procedure.

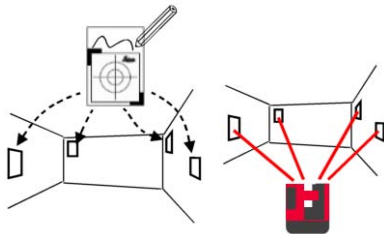
Secure Location step-by-step

If you want to continue a measurement in the same room at a later time and secure the actual position of the 3D Disto and the measuring geometry, you can measure and save **Secure Points**.



You have to measure two points first before Secure Points can be saved.


1. Name and place three to five self-adhesive target marks on walls, ceiling or floor around your working area. Ensure that the target marks are arranged all-over.





Instead of target marks you can use any other point that is well fixed: draw a cross on the wall or hang the ruler for offset points on a nail and use one of it's marks.

2. Press **Menu » Applications » Location » Secure Location.**

3. Viewfinder opens. Target the **Target marks** as precise as possible and press  to measure.

4. 3D Disto takes a photo and saves it with coordinates, named with ID and date.

5. Pop-up prompts **Measure more Secure Points? Yes/No?**

6. Proceed as before and measure at least three Secure Points. After saving a minimum of three points you may leave the application by choosing No.



You can add further Secure Points later at any time.



Ensure you have enough well-measured Secure Points around your working area. Even if one is lost there must be three at least for a successful Relocation.

Relocation step-by-step

This feature allows the relocation of the 3D Disto into a defined coordinate system that previously was fixed by the Secure Location procedure, for example to complete a previous measurement.

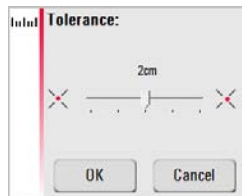


Use a 3D Disto position that allows to measure at least three Secure Points around your working area.

1. Press **Menu » Applications » Location » Relocation**.
2. A pop-up prompts to define the tolerance.
Press **OK** to confirm the value.



A lower tolerance increases the precision of your measurement and requires excellent accuracy and visibility of the Secure Points.



3. If there are no Secure Points in the memory, pop-up prompts **No secure point in this folder**.

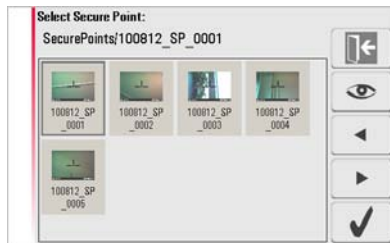



If there are no Secure Points available but your measurement must fit to the geometry of a previous one, just start your measurement with the same Base Line points, which are the first two points of a measurement.

4. If Secure Points are available folder opens. Choose a Secure Point by pressing the arrow keys ◀ / ▶ or by tip on screen. Press 👁 to enlarge.




Tip on 👁 to view Secure Points before selecting it.




5. Press ✓ to confirm point.
6. Viewfinder opens. Target as precise as possible the target mark shown in the photo and press .
7. If successful, pop-up appears **Measure next Secure Point? Yes/Cancel**.
8. If **Yes**: Folder opens to choose next Secure Point. Proceed as described in 4. to 7. for 2nd and 3rd measuring point.




If the first two Secure Points were measured successfully the 3D Disto roughly turns to the next chosen Secure Point. You just have to do the fine targeting and press .


9. When you have measured three points successfully a pop-up requests **OK. Measure more Secure Points? Yes/No/Cancel?**

10. To continue press **Yes** and proceed as described in 4. to 7.
 11. If finished press **No**, pop-up prompts **3D Disto shift ok; Position: XXXm; Height: XXXm; OK/Cancel**? Accept with **OK** or **Cancel** to measure further points.
 12. If Relocation was not successful pop-up prompts **Out of tolerance! Measure more Secure Points? Yes/No/Cancel**. Go on as described in 4. to 11.
 13. Press  to close the application.
-

Location Check step-by-step

If the 3D Disto's socket was moved unintentionally, for example by a bump, all following measuring points do not fit any more to the geometry of the previous ones. Start a Location Check to sustain the actual accuracy/geometry.


1. To initiate a Location Check press **Menu » Applications » Location » Location Check**.
2. If there are no Secure Points in the memory, pop-up prompts **No Secure Point in this folder**. Press **OK**. **Location Check** is closed.
3. If Secure Points are available, select Secure Point and press . The 3D Disto will target the Secure Point automatically. Check laser point position with target mark.

4. Press  to close Secure Point gallery.



If laser point does not target the centre of the target mark Relocation is recommended.



All Location application can be cancelled by  key press.

7.4

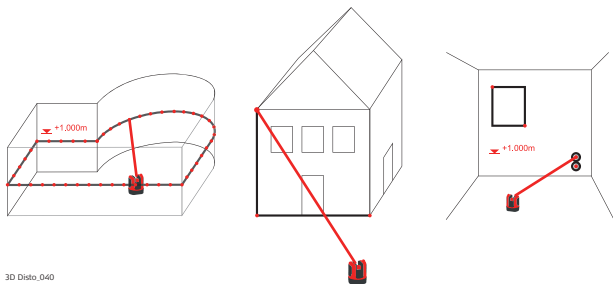
Room Scan

General

With this application program you can measure room dimensions and including details. For these measurements several additional features are available:

- Reference Height
- Automated room profile scan
- Single point measurement (position and height)
- Coordinate export
- Unfold tool to switch between view perspectives and measure
- Auto shapes: Circle and Rectangle Tool

Ideal for measuring rooms with room corners unlike 90°, curved walls or to measure position of details like plugs or pipes.




7.4.1

Manual Measurement

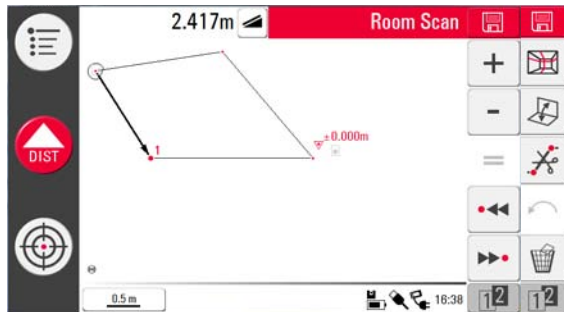
Manual measurement step-by-step

1. Press **Menu » Applications » Room Scan**.
2. Pop-up prompts to enter and measure reference height. Enter the value and press **OK**.






3. Viewfinder opens. Target the reference height* and press .
- * Except for continuing existing measurements, for example relocation where reference height is neglected.

4. Reference height is displayed in the sketch area.



5. For further measurements proceed as described in "6.3 Measurement Workflow". Please note that Tool bar changed.

Please note that three keys in the Tool Bar changed:  for scan functions,  to switch between view and measuring perspectives and  to clear lines between points.



Different to the standard measuring mode single points without line connection can be measured and cleared.


7.4.2

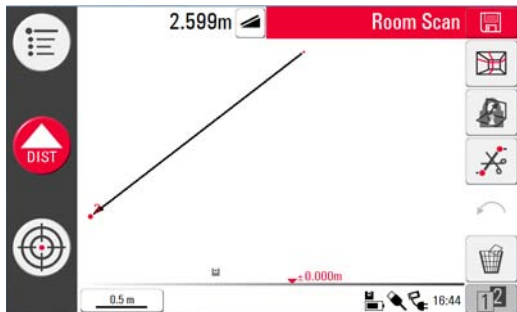
Unfold Mode

Description


The Room Scan allows to switch the view of the sketch area from foot print to face mode. This option is active when a line connection is available.

Unfold mode step-by-step

1. Select a horizontal line between two points.
2. Press . Sketch area changes from foot print to face view.



3. All measured points of the vertical plane are displayed.
4. To measure details or wall dimension proceed as described in "6.3 Measurement Workflow".

5. When measurements are finished, switch to foot print view by pressing  again to unlock.

A line of an automatically generated scan line can be unfolded as well.



7.4.3

Auto Shapes

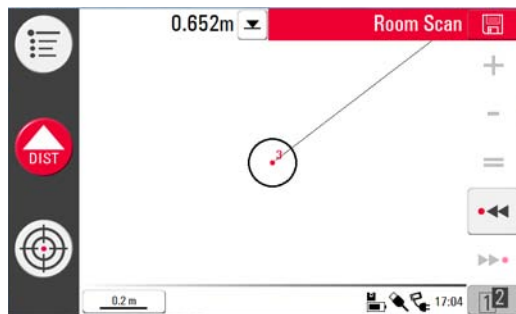
Circle tool


The circle tool's purpose is mainly to draw a circle on points like plugs or holes.

1. Target and measure a point and activate circle function by long tip on the point in the sketch area. Pop-up opens **Enter diameter. OK/Cancel.**




2. Enter the value and press **OK**. Circle is drawn around the chosen point.



3. To clear the circle, enter 0 as value for diameter or press .
4. The result window contains radius, circumference and area of the circle.

Rectangle tool

This tool only works when changing the perspective to face mode and allows to measure a diagonal and change it to a rectangle, for example to measure windows.

1. Go to 2nd tool bar, press  to change perspective to face view.
2. Measure a diagonal of a rectangle, for example a window, and activate the Rectangle Tool by long click on the line. Pop-up prompts **Change line to rectangle? Yes/No.**



3. Diagonal changes to a levelled rectangle.





7.4.4

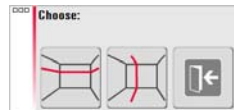
Automated Profile Room Scan

Description

This tool allows automated horizontal or vertical measurements on any surfaces.

Room Scan, Start step-by-step

1. Press **Menu » Applications » Room Scan**.
2. Pop-up prompts to enter and measure reference height. Enter the value and press **OK**.
3. Viewfinder opens. Target the reference height* and press .
4. Press  in 2nd tool bar to start scan.
5. Pop-up prompts to select horizontal or vertical scan.



- * Except for continuing existing measurements, for example relocation where reference height is neglected.

Room Scan, Horizontal Scan step-by-step

1. Viewfinder opens to target and measure start point.

2. Pop-up prompts to define scan direction right / from ... to / left. Right for 360° clockwise, between for a defined interval, left for 360° scan counter clockwise. Choose one of these options to go on.



3. If you choose **from ... to** Viewfinder opens to measure scan end point.

Press .

4. Pop-up prompts to define spacing of the measurement. Choose an interval and press **OK**.

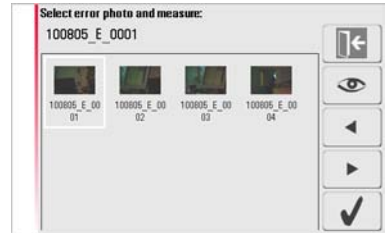




To reach best scan results do not choose small intervals at long distances.

5. Press **OK**. Scan starts.
Tool bar changes.
6. Press **||** to change scan spacing, skip the rest of the scan, continue scan or cancel scan.
7. Press **↶** to skip a scan point that you do not need or that causes problems.

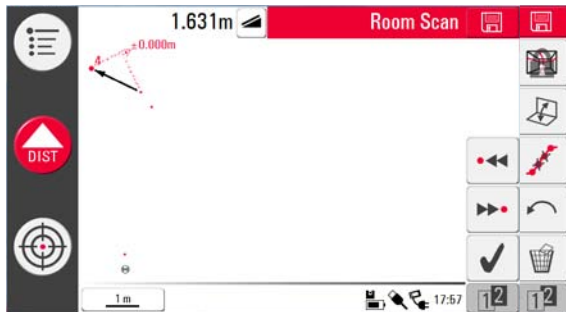


8. If any points could not be measured: pop-up prompts **Scan not complete. View report? Yes/No.**
9. If **Yes**: photo gallery with error points opens.



10. Select photo and press  to view error point. Press  to exit the gallery.
11. If **No**: pop-up prompts **Scan completed.**


12. If gallery is closed or scan finished and all points are measured without any error: pop-up prompts **Ready. Edit Scan? Yes/No?**





13. If **Yes**: New tool bar appears.


Press  or  to select points.

Press  to start another scan in this measurement file.

Press  to change view and measure for example some wall details.

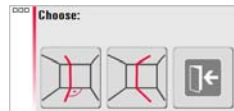
Press  to start a scan simplification that clears aligned points automatically.

Press  to finish the scan.

14. Press  to save and close measurement file.

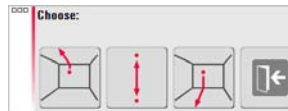
Room Scan, Vertical scan step- by-step


1. Viewfinder opens to target and measure start point.
2. Pop-up prompts to choose scan orientation:
orthogonal to wall or **free**.




- **Orthogonal to Wall**

1. If you choose **orthogonal to wall** 3D Disto measures the surface around the measured start point automatically. Await the next pop-up.
2. Pop-up prompts to define measurement direction **up / from ... to / down** followed by spacing of measurement points.



3. If you choose **from ... to** Viewfinder opens to measure end point before spacing can be defined. Press .
4. 3D Disto starts scan at the start point. Proceed as described in "Room Scan, Horizontal Scan step-by-step", page 131 ff.

- **Free Profile**

1. For a **free** profile Viewfinder opens to target and measure a point on the opposite wall. Press .
2. Pop-up prompts to define measurement direction **up / from ... to / down** followed by spacing of measurement points. If you choose **from ... to** 3D Disto starts scan at the start point.
3. Proceed as described in "Room Scan, Horizontal Scan step-by-step", page 131 ff.



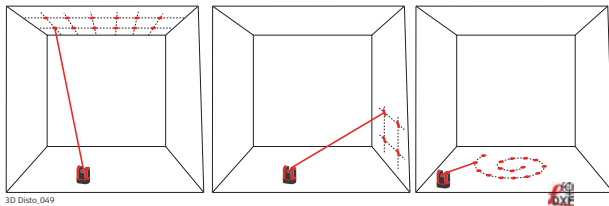
7.5

Projector

General

The application projects points or geometrical grids onto a horizontal, vertical or slope (= "free") plane. Design data in DXF format can be imported or a grid's geometry can be entered manually.






It is ideal to project grid points to install suspended ceilings.



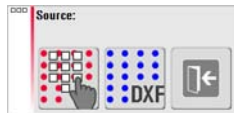
7.5.1

Workflow

Projector, Start step-by-step

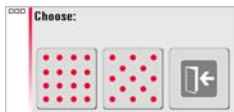
1. Press **Menu » Applications » Projector**.
2. Pop-up appears **Sketch is cleared! OK/Cancel?**
 -  Pop-up will only appear if a measurement file is still open.
3. Viewfinder opens to measure the reference area and details on which the grid shall be projected.
 -  The 3D Disto assumes the measured reference area as a flat surface. Bending or male faces lead to wrong measurements and layouts.
4. Measure your reference area and press  to finish measurement.
 -  Ensure the 3D Disto will not be moved unintentionally, for example by a bump. Otherwise all following measuring or grid points will not fit any more to the geometry of the previous ones. Start a Location Check to sustain the actual accuracy/geometry.
5. Pop-up prompts to **Measure further reference points? Yes/No?**
6. If **Yes**: Viewfinder opens to measure other points of interest inside or beyond the working area. When all points are measured go on with  .

7. If **No**: pop-up prompts to choose between **Grid** or **DXF mode**.
Grid Mode: Manual definition of grids to be laid out.



Projector, Grid Mode step-by- step

1. Pop-up appears to choose between **Define new grid**, **Use last grid** or **Lock onto existing grid**.
2. For a **new grid** pop-up prompts to enter column and row spacing and then to choose if horizontal or vertical shift of row or column is needed.

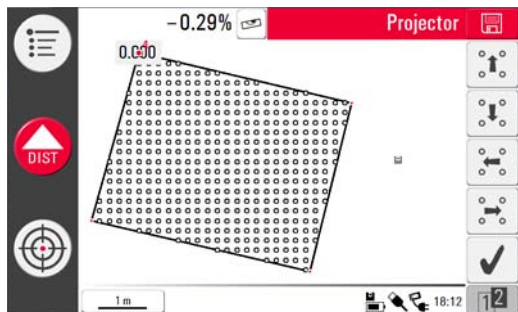










Column and row spacing must be at least >10 cm.





3. For **using last grid**: last grid is used for projection.

Projector, Aligner step-by- step




1. **Aligner** opens with measured reference area including grid points. Tool Bar changes. The water level icon in the Result Bar stands for the tilt of the projection plane.

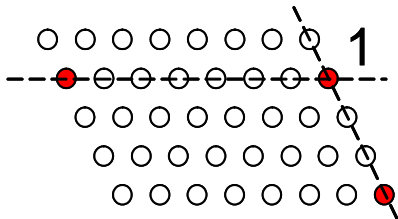


2. Each point and line can be selected by fingertip or pen.
 3. With  /  /  /  the grid can be moved up, down, left and right on the screen in small steps. The orthogonal distance of a selected grid point to a reference line is displayed. Tip on this distance to enter a value.
 4. Press  to find further grid alignment tools.
 5. Press  to adjust the grid horizontally.
-  This tool is only offered on walls and if the Tilt Sensor is enabled.
6. Press  to align grid parallel to a selected line.

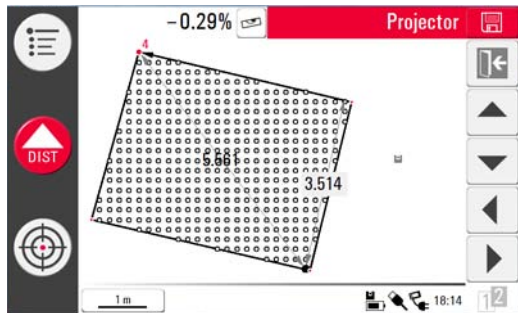
7. Press  to turn the grid 90°.
8. Press  to place the grid exactly on a reference point.
9. To measure further reference points or to go back to the Aligner tool press . Proceed as described in 1. to 3.
10. Press  to confirm the grid and close the aligner.


To lock onto existing grid:

1. Viewfinder opens to measure and enter for grid and stationing:
2. Target and measure P1 and P2 of the main axis.
 Both points must be in one line and far apart.
3. Pop-up appears to enter the number of grid points between P1 and P2. Confirm with **OK**.
4. Pop-up prompts to define 2nd axis. Choose between **measuring** P3 or **enter space** for an orthogonal axis.
 If **measuring** P3 Viewfinder opens to target and measure with .
 P3 must be in column with P1 and far apart, as shown in illustration.



5. If you choose **enter space** pop-up prompts to enter the number of grid points between P1 and P3.
6. The grid geometry is displayed in a pop-up.
7. If grid ok, choose yes and layout mode starts.
If grid not ok proceed as described in 2. to 7.



8. Being in layout mode the tool bar changes and you can start to project the grid.
Use the arrow keys to select a point and press .





Perforated, structured or rough surfaces cause problems if the laser beam can not reach the exact position of the layout point.




You can also select points by fingertip on point in screen or using the Remote Control.

9. Laser point blinks if the exact position is found. Point is highlighted in red in sketch area.

To layout further points select another point and press .

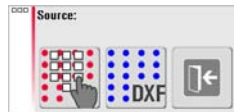
10. Press  to go back to the Aligner tool.


11. Press  to save file, for example for export data.

Projector, DXF Mode step-by- step

Allows to import a drawing, select a point and lays it out on an area.


1. Measure reference area and points as described before and choose **DXF** option.



2. File Manager opens, select file and press .

 You can check the import file by pressing  before import.

3. 3D Disto checks and prepares the file.

 Avoid unnecessary data in the imported DXF file. There will be no layer selection and only points of lines are imported (not the lines). Only 2D-information is imported (+X/+Y is read as +Y/+X (+EAST/+NORTH)).

4. After successful import aligner opens and reference area and DXF data are displayed.

-
5. For Alignment and layout of points proceed as described from 4., page 140. In DXF mode you additionally have the option to connect two points by a line to use it for parallel alignment.
-

7.5.2

Targeting and Layout with RM100 Remote Control

Description

The functionality of the RM100 Remote Control is like in standard measurement during the whole projector application. The RM100 Remote Control only works if the Control Unit is ON - otherwise measurement errors could not be displayed and avoided.

Functionality of the keys

Red key ●:

- Press ● to measure a point within the reference area. The 3D Disto searches the closest grid point and projects it.

Short key press (<1sec.) on ▲ / ▼ / ◀ / ▶:

- Each arrow key selects the neighbouring point, turns the 3D Disto and starts the iterative measurement 1 second after key press.
 - Several key presses on the same arrow key allow to skip neighbouring points. The 3D Disto starts to turn 1 second after the last key press.
-

8 Error Messages

Error messages and their meanings

Error no.	Meaning
150	Working range was exceeded.
151	Invalid measurement.
160	Repeat and do not move the ruler between both measurements.
170	Restart 3D Disto if the problem persists.
171	Check all devices, for example power supply, or cables, and try again.
240	Tilt sensor calibration was not successful. System accuracy is at risk. Please contact your dealer.
241	Too much drift. Repeat calibration precisely.
242	3D Disto must be levelled precisely. Make stable setup. Repeat calibration.
243	Make stable setup. Do not touch or rotate the sensor. Repeat calibration.
300	Select a horizontal line.
350	Check projection surface. Laser could not reach the correct position.

Error no.	Meaning
755	Point can not be measured. Try other position. Tool does not work on horizontal planes.
760	Point can not be measured. Enter other values. Tool does not work on horizontal planes.
765	Point can not be measured. Try other position or enter other value. Tool does not work on horizontal planes.
800	Data import or export is not possible.
801	Not enough memory on USB stick.
802	Storage device does not work properly.
900	Sensor error. Contact your distributor or Leica Geosystems representative if the error repeats.
950	Execute Station Check to keep accuracy!
952	Check sensor and blockings or move towards sensor.
953	Check connection and cable.
954	Plug in cable or choose "Wireless Connection" in the menu.
999	Please contact your distributor or Leica Geosystems representative.

9 Check & Adjust

9.1 Overview

Description

Leica Geosystems instruments are manufactured, assembled and adjusted to the best possible quality and precision. Quick temperature changes, shock or stress can cause deviations and decrease the instrument accuracy. It is therefore recommended to check and adjust the instrument from time to time. This can be done on the site by running through specific measurement procedures. The procedures are guided and have to be followed carefully and precisely as described in the following chapters.

Electronic adjustment

The following instrument errors can be checked and adjusted electronically:

- Crosshair offset
- V-index and
- Tilt sensor.



All calibration settings can also be reset to factory default.

Every angle measured in the daily work is corrected automatically if the tilt sensor is activated and the 3D Disto is set up between 0° and 3°.



During the manufacturing process, the instrument errors are carefully determined and set to zero. As mentioned above, these errors can change and it is highly recommended to redetermine them in the following situations:

- After rough or long transportations
 - After long storage periods
 - If the temperature difference between current environment and the temperature at the last calibration is more than 20°C.
-



Tilt Sensor must be ON to detect unintended movements while the calibration is running. After the calibration the tilt sensor is set to the previous state. Previously running application must be closed.

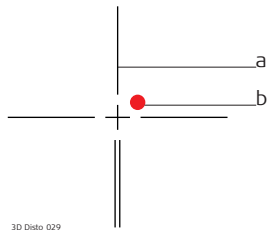
9.2

Cross Hair Offset

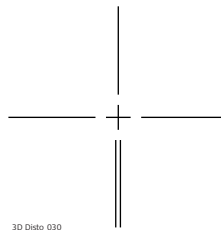
Problem

The laser point and the cross hair in the Viewfinder do not coincide.

Before calibration:






After calibration:



- a) Cross hair
- b) Laser spot

Adjustment step-by-step

1. Calibration is started in **Menu » Device » Calibration**.
2. Press .
3. Viewfinder opens. Place a target mark in >25 m distance. Now aim the target mark as precisely as possible. Press  if the red laser spot is exactly on the target.

4. Viewfinder stays open and red blinking cross hair is displayed. Move cross hair by arrow keys to meet centre of target mark as precisely as possible. Press  again.
 5. If in tolerance, pop-up appears with **Correction = XXX gon. Set/Reset** to factory default or **Cancel**.
 6. Choose **Set** or **Reset** to adjust cross hair. Final pop-up asks **Are you sure? Yes/Cancel**.
 7. If **Yes** checkmark is displayed in screen and confirms successful set of parameters.
-

9.3

V-Index Error

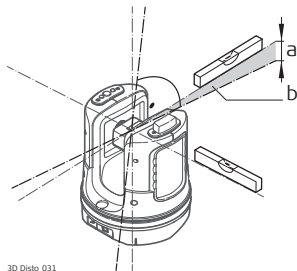
Problem

The vertical index does not coincide with the standing axis. This can be detected when the heights or height differences of measured points seem not to be correct; for example Tool Kit measurements do not work properly.



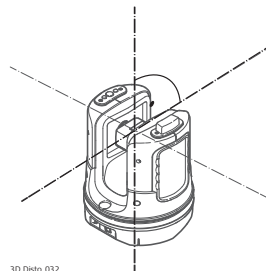
Tilt Sensor calibration is recommended before starting V-Index calibration! Refer to "9.4 Tilt Sensor Calibration".

Before calibration:






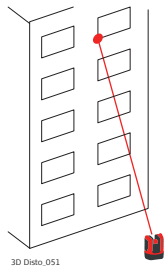
- a) Height error
- b) Vertical angle offset

After calibration:



Adjustment step-by-step

1. Setup the 3D Disto close to a wall with a steep target of good visibility that is at least 15 m above the sensor.
2. Press .
3. Viewfinder opens. Target as precisely as possible. Press .
4. 3D Disto turns to second face automatically.
5. Target a second time. Press .



6. If both measurements were successful a pop-up appears with **Correction = XXX gon. Set/Reset** to factory default or **Cancel**.
7. Choose **Set** or **Reset** to adjust V-index. Final pop-up asks **Are you sure? Yes/Cancel**.
8. If **Yes** checkmark is displayed. This confirms successful set of parameters.

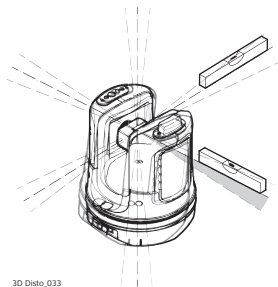
9.4 Tilt Sensor Calibration

Problem

A tilt sensor error has the same impact as the V-index error but is depending on the orientation.

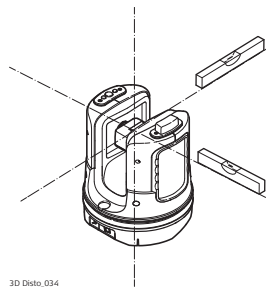
This can be detected when the heights or height differences of measured points seem not to be correct; for example **Go to Horizon** turn command does not work properly.

Before calibration:



a) Tilt sensor offset


After calibration:





Adjustment step- by-step

This calibration is done automatically. You just have to ensure that the 3D Disto is set up horizontally.

1. Press .
 2. 3D Disto starts self-levelling: the tilt is checked and the instrument levels itself if the tilt is $< 3^\circ$. Pop-up prompts **Setup OK. Don't touch 3D Disto about 1 minute!**
 3. If **ok** pop-up appears **Calibration successful.**
-

9.5

Reset to Factory Settings

Reset to factory settings step-by-step

1. Press .
 2. Pop-up appears **Reset all calibration settings to factory default? Yes/No.**
-

10 Instrument Protection (Theft Protection)

Description

The instrument can be protected by a PIN. If the PIN protection is activated, the Control Unit will always prompt for a PIN code entry after starting up. If a wrong PIN has been typed in three times, a PUK is required which can be found on the instrument delivery papers. If the PUK code was entered correctly, the PIN code is set to default value "0" and the PIN protection is deactivated.

In case you lost the PUK code please contact your Leica Geosystems representative.

Activate PIN code step-by-step

1. Startup Control Unit as described in "5 Instrument Setup".
2. Go to **Menu » Device » Theft Protection**. Default setting is **Off**.
3. Press **On** for activation.
4. Enter your desired personal PIN Code (3 to 8 character numeric or letters).
5. Accept with **Ok**.



Now the instrument is protected against unauthorised use. After switching on the instrument, de-activate standby or re-enter in the PIN settings the PIN code entry is necessary.

Deactivate PIN code step-by-step

1. Startup Control Unit as described in "5 Instrument Setup".
2. Go to **Menu » Device » Theft Protection**.
3. Enter your personal PIN and press **OK** to accept.
4. Press **Off** for deactivation.



Now the instrument is not protected anymore against unauthorised use.

11

Care and Transport

11.1

Transport

Transport in the field

When transporting the equipment in the field, always make sure that you

- either carry the product in its original transport container,
 - or carry the tripod with its legs splayed across your shoulder, keeping the attached product upright.
-

Transport in a road vehicle

Never carry the product loose in a road vehicle, as it can be affected by shock and vibration. Always carry the product in its transport container and secure it.

Shipping

When transporting the product by rail, air or sea, always use the complete original Leica Geosystems packaging, transport container and cardboard box, or its equivalent, to protect against shock and vibration.

Shipping, transport of batteries

When transporting or shipping batteries, the person in charge of the product must ensure that the applicable national and international rules and regulations are observed. Before transportation or shipping, contact your local passenger or freight transport company.

Field adjustment

After transport inspect the field adjustment parameters given in this user manual before using the product.

11.2**Storage**

Product

Respect the temperature limits when storing the equipment, particularly in summer if the equipment is inside a vehicle. Refer to "13 Technical Data" for information about temperature limits.

Field adjustment

After long periods of storage inspect the field adjustment parameters given in this user manual before using the product.

Batteries

- **Alkaline and Li-Ion batteries**
 - Refer to "13 Technical Data" for information about storage temperature range.
 - A storage temperature range of 0°C to +20°C / +32°F to +68°F in dry environment is recommended to minimize self-discharging of the battery.
 - At the recommended storage temperature range, batteries containing a 70% to 100% charge can be stored for up to one year. After this storage period the batteries must be recharged.
 - After storage recharge batteries (Li-Ion) before using.
 - Protect batteries from damp and wetness. Wet or damp batteries must be dried before storing or use.
-

11.3

Cleaning and Drying

Lens and housing of 3D Disto

- Blow dust off lens and housing.
 - Never touch the glass with your fingers.
 - Use only a clean, soft, lint-free cloth for cleaning. If necessary, moisten the cloth with water or pure alcohol. Do not use other liquids; these may attack the polymer components.
-

Damp products

- Dry the product, the transport container, the foam inserts and the accessories at a temperature not greater than 40°C / 104°F and clean them.
 - Do not repack until everything is completely dry.
 - Always close the transport container when using in the field.
-

Cables and plugs

Keep plugs clean and dry. Blow away any dirt lodged in the plugs of the connecting cables.

12 Safety Directions

12.1 General

Description

The following directions should enable the person responsible for the product, and the person who actually uses the equipment, to anticipate and avoid operational hazards.

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

12.2

Intended Use

Permitted use

- 3D measuring of distance, heights, grades, angles, area and volume.
 - Manual and automatic measurement of room dimensions.
 - Automatic measurement of profiles.
 - Laying out points and designs, for example from blueprint.
 - Generation of drawings.
 - Camera functionality.
 - Import/Export of data.
 - Administration of data.
-

Adverse use

- Use of the product without instruction.
- Use outside of the intended limits.
- Disabling safety systems.
- Removal of hazard notices.
- Opening the product using tools, for example screwdriver, unless this is specifically permitted for certain functions.
- Modification or conversion of the product.
- Use of products with obviously recognizable damages or defects.
- Use with accessories from other manufacturers without the prior explicit approval of Leica Geosystems.

- Inadequate safeguards at the working site, for example when measuring on roads or sites.
- Deliberate dazzling of third parties.
- Controlling of machines, moving objects or similar monitoring application without additional control- and safety installations.



Adverse use can lead to injury, malfunction and damage.

It is the task of the person responsible for the equipment to inform the user about hazards and how to counteract them. The product is not to be operated until the user has been instructed on how to work with it.

12.3

Limits of Use

Environment

Suitable for use in an atmosphere appropriate for permanent human habitation: not suitable for use in aggressive or explosive environments.



Danger

Local safety authorities and safety experts must be contacted before working in hazardous areas, or in close proximity to electrical installations or similar situations by the person in charge of the product.

12.4

Responsibilities

Manufacturer of the product

Leica Geosystems AG, CH-9435 Heerbrugg, hereinafter referred to as Leica Geosystems, is responsible for supplying the product, including the user manual and original accessories, in a completely safe condition.

Manufacturers of non Leica Geosystems accessories

The manufacturers of non Leica Geosystems accessories for the product are responsible for developing, implementing and communicating safety concepts for their products, and are also responsible for the effectiveness of those safety concepts in combination with the Leica Geosystems product.

Person in charge of the product

The person in charge of the product has the following duties:

- To understand the safety instructions on the product and the instructions in the user manual.
- To be familiar with local regulations relating to safety and accident prevention.
- To inform Leica Geosystems immediately if the product and the application becomes unsafe.



The person responsible for the product must ensure that it is used in accordance with the instructions. This person is also accountable for the training and the deployment of personnel who use the product and for the safety of the equipment in use.

12.5

Hazards of Use

Warning

The absence of instruction, or the inadequate imparting of instruction, can lead to incorrect or adverse use, and can give rise to accidents with far-reaching human, material, financial and environmental consequences.

Precautions:

All users must follow the safety directions given by the manufacturer and the directions of the person responsible for the product.

Caution

Watch out for erroneous measurement results if the product has been dropped or has been misused, modified, stored for long periods or transported.

Precautions:




Periodically carry out test measurements and perform the field adjustments indicated in the user manual, particularly after the product has been subjected to abnormal use and before and after important measurements.

Warning

During dynamic applications, for example layout procedures there is a danger of accidents occurring if the user does not pay attention to the environmental conditions around, for example obstacles such as cables.

Precautions:

The person responsible for the product must make all users fully aware of the existing dangers.

-
-  **Warning** Inadequate securing of the working site can lead to dangerous situations, for example in traffic, on building sites, and at industrial installations.
Precautions:
Always ensure that the working site is adequately secured. Adhere to the regulations governing safety and accident prevention and road traffic.
-
-  **Caution** If the accessories used with the product are not properly secured and the product is subjected to mechanical shock, for example blows or falling, the product may be damaged or people may sustain injury.
Precautions:
When setting-up the product, make sure that the accessories are correctly adapted, fitted, secured, and locked in position.
Avoid subjecting the product to mechanical stress.
-
-  **Caution** During the transport, shipping or disposal of batteries it is possible for inappropriate mechanical influences to constitute a fire hazard.
Precautions:
Before shipping the product or disposing of it, discharge the batteries by running the product until they are flat.
When transporting or shipping batteries, the person in charge of the product must ensure that the applicable national and international rules and regulations are observed. Before transportation or shipping contact your local passenger or freight transport company.
-

 **Warning**

Using a battery charger not recommended by Leica Geosystems can destroy the batteries. This can cause fire or explosions.

Precautions:

Only use chargers recommended by Leica Geosystems to charge the batteries.

 **Warning**

High mechanical stress, high ambient temperatures or immersion into fluids can cause leakage, fire or explosions of the batteries.

Precautions:

Protect the batteries from mechanical influences and high ambient temperatures. Do not drop or immerse batteries into fluids.

 **Warning**

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.

If the product is improperly disposed of, the following can happen:

- If polymer parts are burnt, poisonous gases are produced which may impair health.
- If batteries are damaged or are heated strongly, they can explode and cause poisoning, burning, corrosion or environmental contamination.
- By disposing of the product irresponsibly you may enable unauthorised persons to use it in contravention of the regulations, exposing themselves and third parties to the risk of severe injury and rendering the environment liable to contamination.
- Improper disposal of silicone oil may cause environmental contamination.

Precautions:

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.

Always prevent access to the product by unauthorised personnel.

Product specific treatment and waste management information can be downloaded from the Leica Geosystems home page at <http://www.leica-geosystems.com/treatment> or received from your Leica Geosystems dealer.

 **Warning**

Only Leica Geosystems authorised service workshops are entitled to repair these products.

12.6

Laser Classification

Integrated distancemeter

The Leica 3D Disto produces a visible laser beam which emerges from the front of the instrument.

It is a Class 2 laser product in accordance with:

- IEC60825-1 : 2007 "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.

Precautions:

Do not look directly into the beam with optical aids.



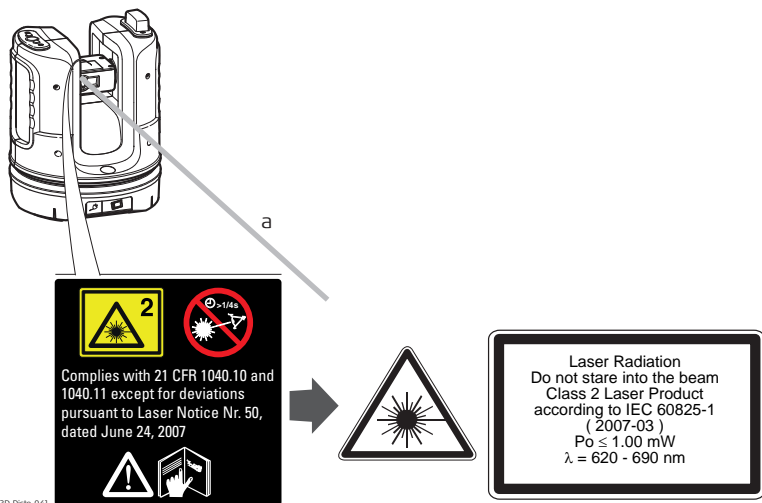
Caution

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

Precautions:

Do not look into the laser beam. Make sure the laser is aimed above or below eye level. (particularly with fixed installations, in machines, etc.)

Labelling



a) Laser beam

12.7

Electromagnetic Compatibility EMC

Description

The term Electromagnetic Compatibility is taken to mean the capability of the product to function smoothly in an environment where electromagnetic radiation and electrostatic discharges are present, and without causing electromagnetic disturbances to other equipment.



Warning

The 3D Disto conforms to the most stringent requirements of the relevant standards and regulations.
Yet, the possibility of it causing interference in other devices cannot be totally excluded.



Caution

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



Warning

Electromagnetic radiation can cause disturbances in other equipment.

Although the product meets the strict regulations and standards which are in force in this respect, Leica Geosystems cannot completely exclude the possibility that other equipment may be disturbed.



Caution

There is a risk that disturbances may be caused in other equipment if the product is used in conjunction with accessories from other manufacturers, for example field

computers, personal computers, two-way radios, non-standard cables or external batteries.

Precautions:

Use only the equipment and accessories recommended by Leica Geosystems. When combined with the product, they meet the strict requirements stipulated by the guidelines and standards. When using computers and two-way radios, pay attention to the information about electromagnetic compatibility provided by the manufacturer.

 **Caution**

Disturbances caused by electromagnetic radiation can result in erroneous measurements.

Although the product meets the strict regulations and standards which are in force in this respect, Leica Geosystems cannot completely exclude the possibility that the product may be disturbed by very intense electromagnetic radiation, for example, near radio transmitters, two-way radios or diesel generators.

Precautions:

Check the plausibility of results obtained under these conditions.

 **Warning**

If the product is operated with connecting cables attached at only one of their two ends, for example external supply cables, interface cables, the permitted level of

electromagnetic radiation may be exceeded and the correct functioning of other products may be impaired.

Precautions:

While the product is in use, connecting cables, for example product to external battery, product to computer, must be connected at both ends.

 **Warning**

Work with WLAN

Electromagnetic fields can cause disturbances in other equipment, in installations, in medical devices, for example pacemakers or hearing aids and in aircraft. It can also affect humans and animals.

Precautions:

Although the product meets in combination with radio or digital cellular phone devices recommended by Leica Geosystems the strict regulations and standards which are in force in this respect, Leica Geosystems cannot completely exclude the possibility that other equipment may be disturbed or that humans or animals may be affected.

- Do not operate the product in the vicinity of filling stations or chemical installations, or in other areas where an explosion hazard exists.
 - Do not use the product near medical equipment.
 - Do not operate the product in aircraft.
 - Do not use the product near your body for extended periods.
-

12.8

FCC Statement, Applicable in U.S.

Warning

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
 - Increase the separation between the equipment and the receiver.
 - Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
 - Consult the dealer or an experienced radio/TV technician for help.
-

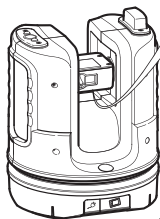
Warning

Changes or modifications not expressly approved by Leica Geosystems for compliance could void the user's authority to operate the equipment.

SAR Information**FCC Radiation Exposure Statement**

The radiated output power of the instrument is far below the FCC radio frequency exposure limits. Nevertheless, the instrument should be used in such a manner that the potential for human contact during normal operation is minimised. To avoid the possibility of exceeding the FCC radio frequency exposure limits, you should keep a distance of at least 20 cm between you (or any other person in the vicinity) and the antenna that is built into the instrument.

Labelling 3D Disto



3D Disto_042

Equi.No.:

123456789012

S/N:



12345678

Type: Leica 3D Disto

Art.No.: 772171

Power: 24V~/ 2.5A

Patents:

WO 9427164, WO0216964, US 5949531,

WO 0244754, EP 1195617, Wo 9818019

IC: 3177A-3DDISTO

FCC ID: RFF-3DDISTO

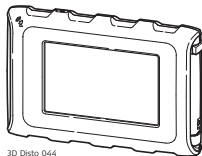
 **SWISS** Technology
by Leica Geosystems



Made in Singapore

www.leica-geosystems.com

Labelling Control Unit



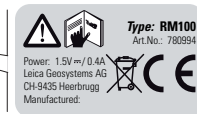
3D Disto_044



Labelling RM100 Remote Control



3D Disto_043



12.9

Conformity to National Regulations

Conformity to National Regulations



Hereby, Leica Geosystems AG, declares that the instrument is in compliance with the essential requirements and other relevant provisions of applicable European Directives. The declaration of conformity may be consulted at <http://www.leica-geosystems.com/ce>.

- France
Concerning European Economic Area: The use of this WLAN product (or the WLAN function of this product) is restricted to only indoor use in France.
 - The conformity for countries with other national regulations not covered by the FCC part 15 or European directive 1999/5/EC has to be approved prior to use and operation
-

13 Technical Data

Accuracy*

Accuracy, at 20°C	@ 10 m	@ 30 m	@ 50 m
Point Accuracy (3D)	± 1.0 mm	± 3.0 mm	± 5.0 mm

Working range angle measurement

Horizontal angle:	360°
Vertical angle:	250°

Characteristics laser distancemeter

Measuring system:	System analyser basis 100 MHz - 150 MHz
Type:	Coaxial, visible red laser
Working range:	0.5 - 50 m
Laser class:	2
Lasertype:	650 nm; < 1 mW
Ø Laser point (at distances):	@ 10 m: ~7 mm x 7 mm @ 30 m: ~9 mm x 15 mm

Viewfinder

Zoom (Magnification):	1x, 2x, 4x, 8x
Field of view (@ 10 m):	1x: 3.40 m x 2.14 m 2x: 1.70 m x 1.07 m 4x: 0.85 m x 0.54 m 8x: 0.42 m x 0.27 m

Tilt sensorSelf-levelling range: $\pm 3^\circ$

Circular bubble sensitivity1°/mm

Operation

Type	Description
Display	High resolution screen, 800 x 480 Pixel, 4.8" TFT LCD, 16 Mio Colour
Buttons/User interface	3D Disto: 1 ON/OFF button Control Unit: Touchscreen, 1 ON/OFF button
Memory capacity	Internal memory: 500 GB Flash memory: 32 GB
Ports	3D Disto: USB Type B, Power supply plugin, power supply plugin for Control Unit Control Unit: USB Type A, Micro-B, power supply plugin

Communication

Type	Description
Data transfer	USB: Type Micro-B and Type A, WLAN
Wireless technology	SD Card, Range 50 m (depending on the environment), 11 channels
Supported data formats	Import: DXF Export: DXF, TXT, CSV, JPG

Power

Instrument	Type	Typical operating time
3D Disto	Li-Ion battery, voltage: 14.4 V 63 Wh, charging time 8 h External power supply voltage: 24 VDC / 2.5 A	8 h
Control Unit	Li-Ion battery, 2500 mAh, 3.7 V External power supply voltage: 5 VDC / 2.0 A, charging time 7 h	6 h

Mounting

5/8" thread

Instrument dimensions

3D Disto: Ø 186.6 x 215.5 mm
Control Unit: 178.5 x 120 x 25.8 mm

Weight

3D Disto:	2.8 kg
Control Unit:	0.33 kg

Environmental specifications**Temperature**

Type	Operating temperature [°C]	Storage temperature [°C]
3D Disto	-10 to +50	-25 to +70
Control Unit	-10 to +50	-25 to +70

Protection against dust, sand and water

Type	Protection
3D Disto	IP54 (IEC 60529)
Control Unit	IP5X

Humidity

Type	Protection
3D Disto	Max. 85%r.h non condensing
Control Unit	Max. 85%r.h non condensing

**RM100 Remote
Control**

Range:	50 m
Communication:	Infrared (IR)
Battery	1 AA, 1.5 V

International Limited Warranty, Software License Agreement

International Limited Warranty

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GNU public license

Parts of the 3D Disto software are developed under GPL (GNU public license). The corresponding licenses can be found on the 3D Disto documentation CD in the directory GPL licenses. For obtaining more information, please search for contact at www.leica-geosystems.com.

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Total Quality Management: Our commitment to total customer satisfaction.



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).

Ask your local Leica dealer for more information about our TQM program.

Patents:

WO 9427164
WO 0216964
US 5949531
WO 0244754
EP 1195617
WO 9818019

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- when it has to be **right**

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