Leica 3D Disto
User Manual

- 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 through the User Manual carefully 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.

Table of Contents

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1 How to Use this Manual

☞ It is recommended to set up 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 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 at 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:
• Leica 3D Disto CD
• https://myworld.leica-geosystems.com

my world
@Leica Geosystems

myWorld@Leica Geosystems (https://myworld.leica-geosystems.com) offers a wide range of services, information and training material.
In myWorld, you are able to access all relevant services at your convenience, 24 hours a day, 7 days a week. This increases your efficiency and keeps you and your equipment updated with the latest information from Leica Geosystems.

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. See the complete history of your support cases and view detailed information on each request if 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
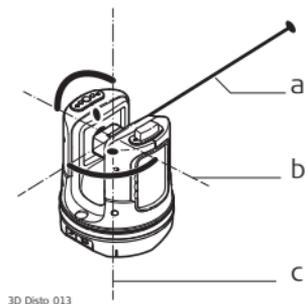
a) Line of sight
b) Tilting axis, horizontal rotation axis of the instrument
c) Standing axis, vertical rotation axis of the instrument

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

Horizontal angle
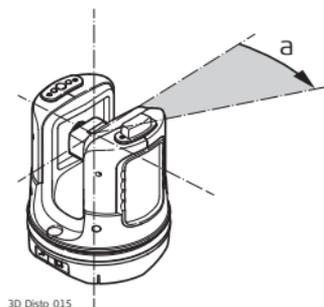
3D Disto_015

a) Horizontal angle: [°] or [gon]

Vertical angle
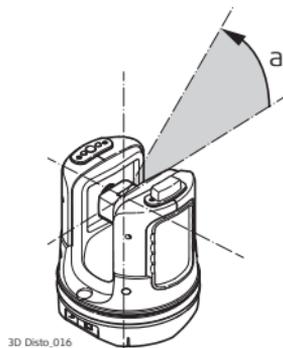
Setting: Horizon = 0

a) Vertical angle: [°], [gon], [1:n] or [%]
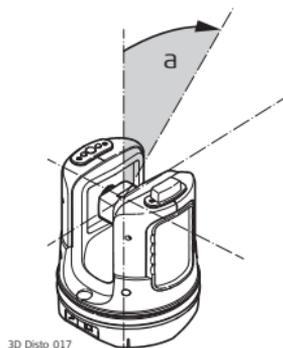
Setting: Horizon = 90°/100gon

a) Vertical angle: [°] or [gon]

Distances
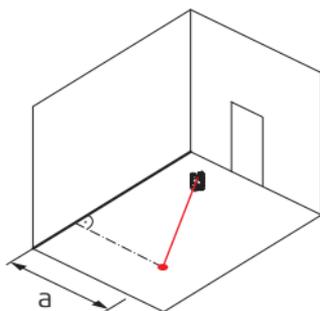
3D Disto_018

a) Perpendicular distance
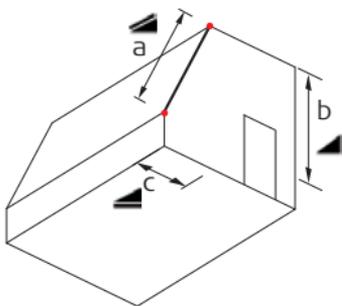
3D Disto_019

a) Tie distance

b) Vertical distance ◢| = height difference

c) Horizontal distance ◢

Areas
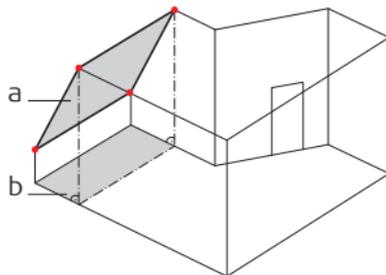
3D Disto_020

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

Zenith and horizon
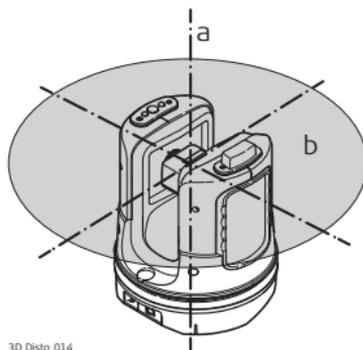
3D Disto_014

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

References
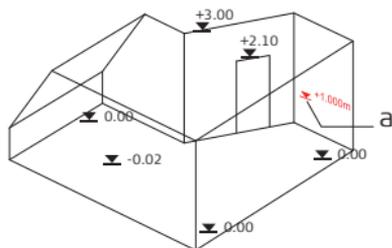
3D Disto_021

a) **Reference height**:
A level that all heights refer to.
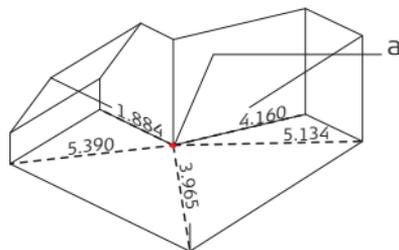
3D Disto_022

a) **Reference point**:
A point that all dimensions refer to.
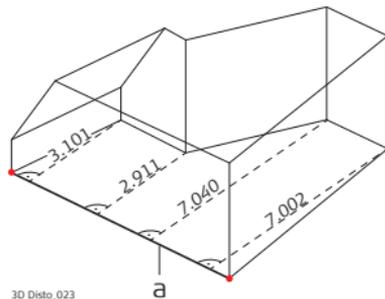
3D Disto_023

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

Tilt sensor   The tilt sensor guarantees correct results even if the 3D Disto is not set up horizontally.
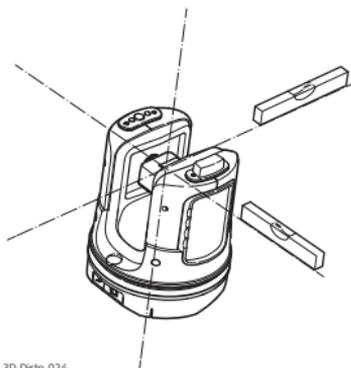
3D Disto_024
Tilt sensor off = disabled
All measurement results relate to the **tilted axis and horizon** of the 3D Disto.
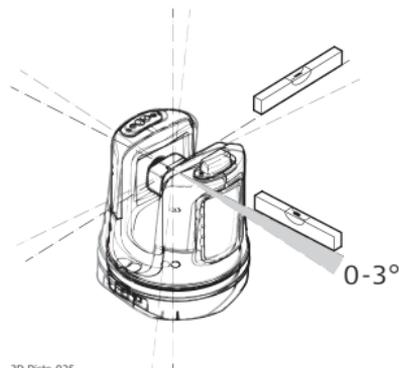
3D Disto_025
Tilt sensor on = enabled
All measurement results relate to the **horizontal axis and horizon** if the 3D Disto is set up between 0° and 3°.

| **Viewfinder and crosshairs** | • **Viewfinder** is an integrated camera which shows the target on the Control Unit display. |
| | • **Crosshairs** is an aiming guide displayed on the Control Unit. |
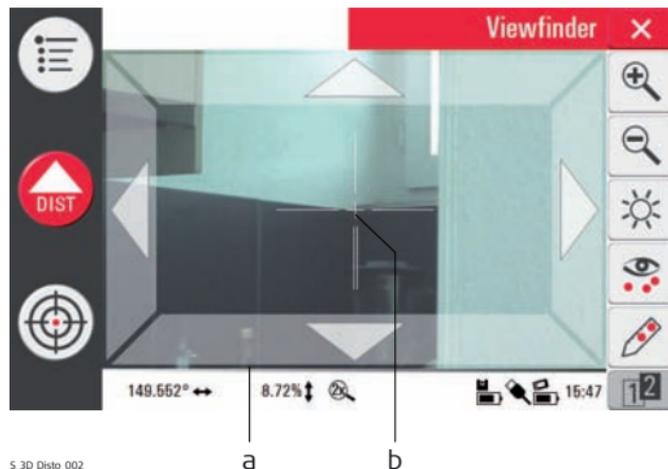
a) Viewfinder
b) Crosshairs

Secure Points   Secure Points **links measurements to a coordinate system**. These reference points allow changing the 3D Disto's location or continuing measurements at a later time, so that all measurements fit together perfectly.
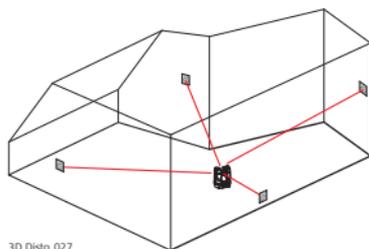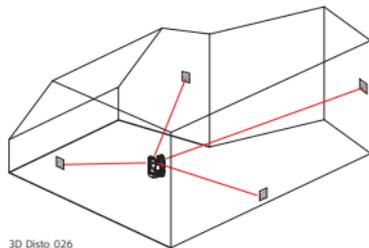
1. Name and place three to five self-adhesive target marks on walls, ceiling or floor **around your working area**.
2. Measure these target marks and save them as Secure Points.

3D Disto_026

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

3D Disto_027

☞   Refer to "7.3 Location" for more information.

Coordinates   Coordinates describe the position of a point in two- and three-dimensional space.
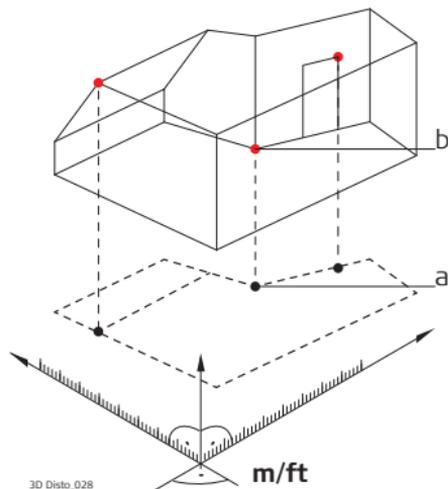
a) Two-dimensional coordinates
b) Three-dimensional coordinates

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

3D Disto_045
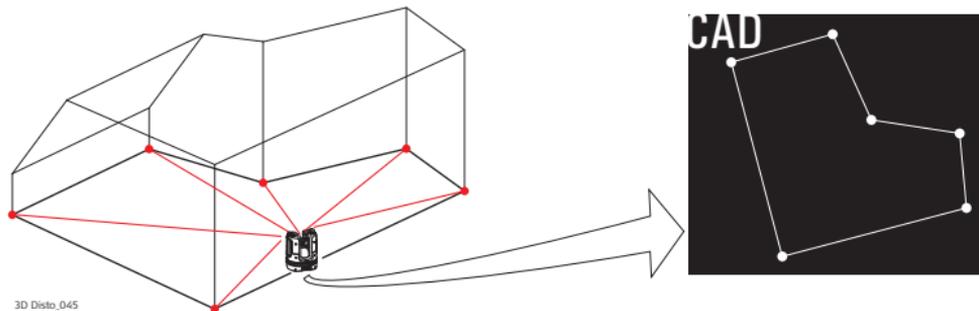
Layout or projection	Design data in DXF format can be imported and used to lay out the corresponding points or grids.

3D Disto_046
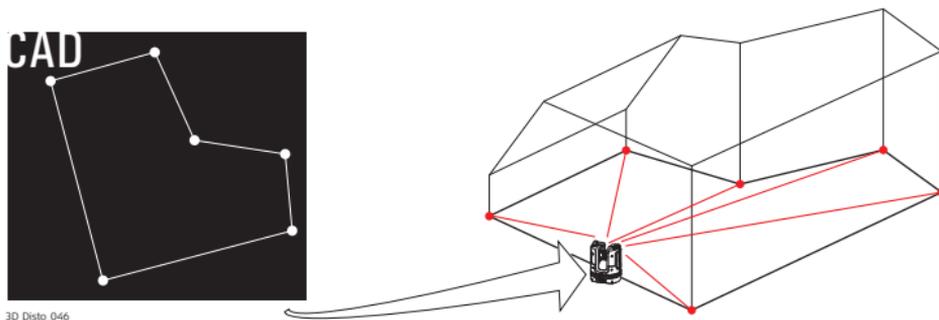
Laser distance metre (LDM)	The laser distance metre (LDM) determines distances using a visible red laser beam.
Calibration	Calibration is a workflow to check and adjust the accuracy of the instrument. Refer to "9 Check & Adjust" for more information.

Ruler for offset points   The ruler for offset points is an accessory to measure inaccessible or hidden points.
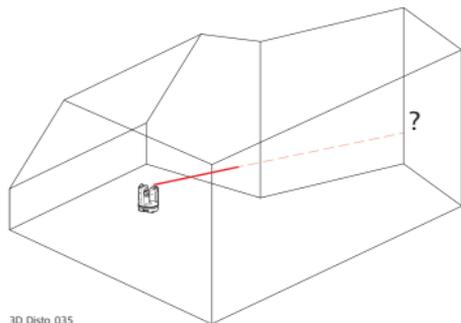
3D Disto_035
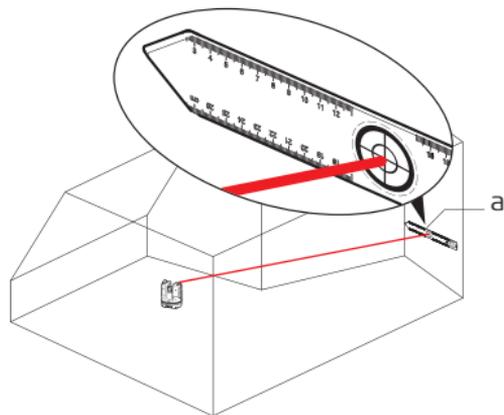
a)   Ruler for offset points

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 to measure points in a room from one setup position and that generates 3D data – ready to use or for post-processing.

3D Disto_001

a) 3D Disto
b) USB cable
c) Control Unit
d) RM100 Remote Control
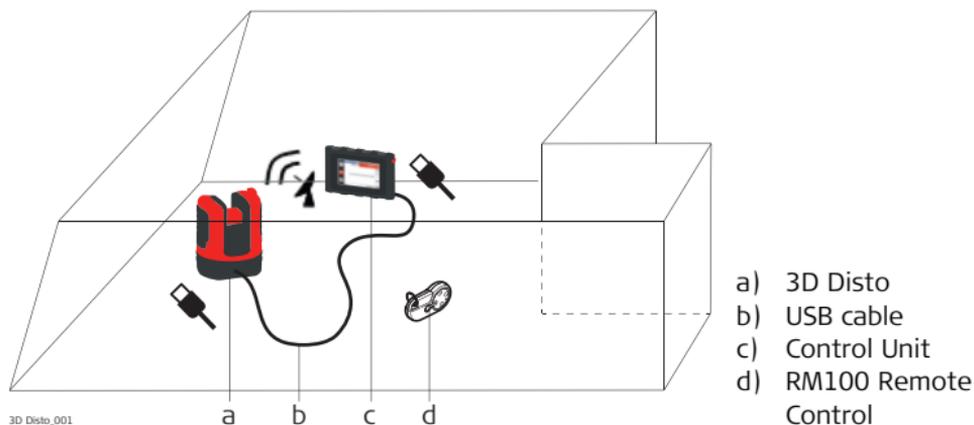
3D Disto is operated by the Control Unit. Certain functions can also be executed using the RM100 Remote Control.

3.2 Container Contents

Container contents, part 1 of 2
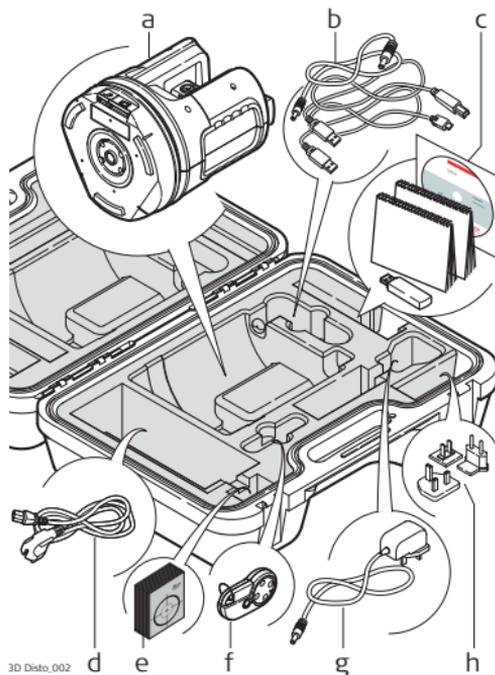
a) 3D Disto with built-in SD WLAN card
b) USB connection cable 3D Disto to the Control Unit
   Power cable 3D Disto to the Control Unit
   Micro-USB cable for PC
c) Data CD
   Safety Instructions Manual,
   3D Disto Quick Start,
   CE & Producer Certificate,
   USB Stick
d) Four country-specific cables for 3D Disto power supply
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

3D Disto_002

Container contents, part 2 of 2
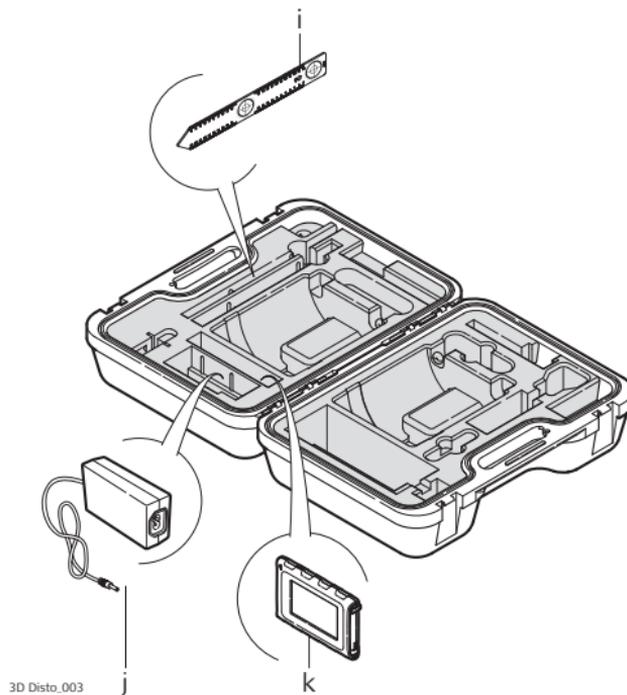
3D Disto_003

i) Ruler for offset points
j) 3D Disto power supply
k) Control Unit with stylus, tripod clamp and hand strap

3.3 Instrument Components

3.3.1 3D Disto

Instrument components, motor-driven part
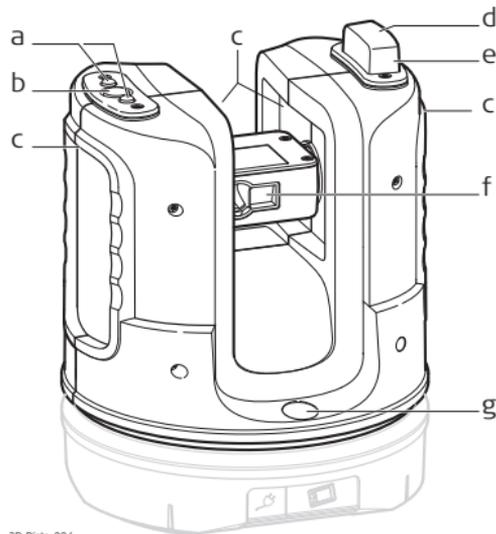
a) LEDs for 3D Disto status
b) ON/OFF button
c) Grips to hold the instrument
d) Infrared (IR) interface
e) WLAN interface
f) Laser distance metre with Viewfinder
g) Circular bubble

3D Disto_004

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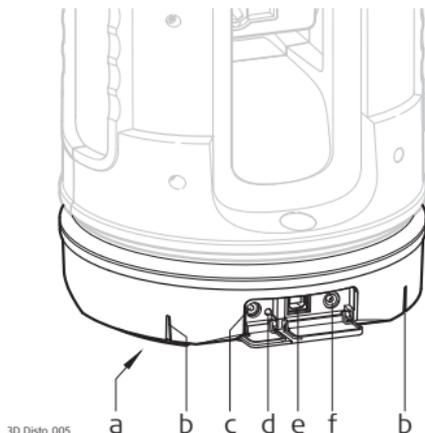
a) Tripod thread 5/8"
b) 90° marking
c) Power supply connector for 3D Disto
d) LED for battery status
e) Data cable connector
f) Power supply connector to Control Unit

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
LEDs for 3D Disto status	• Green and orange LEDs flashing: 3D Disto is turned ON. • Orange LED flashes fast: Booting and self-levelling procedure is running. • Green LED flashes slowly: tilt ≤ 3° after self-levelling check. 3D Disto is ready for measurement. Tilt sensor is on. • Orange LED flashes fast: tilt › 3° after self-levelling check. • Green LED off, orange LED flashes continuously: An error occurred. Refer to "8 Error Messages" for more information. **For experts only: Tilt sensor off** • Green LED flashes slowly, followed by orange LED flashing three times while green LED is off.
LED for battery status	If instrument is on and connected to the charger: • Green LED flashes 1x: Battery is charged to 25 %. • Green LED flashes 2x: Battery is charged to 50 %. • Green LED flashes 3x: Battery is charged to 75 %. • Green LED is on: Battery is fully charged.
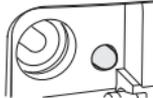
Button/LEDs	Description
LDM Laser	• **OFF**: Viewfinder is OFF or 3D Disto targets automatically. • **ON**: Viewfinder is ON; user is targeting manually. • **Flashing**: to indicate the precise position of a projected point.

3.3.2 Control Unit

Control Unit components
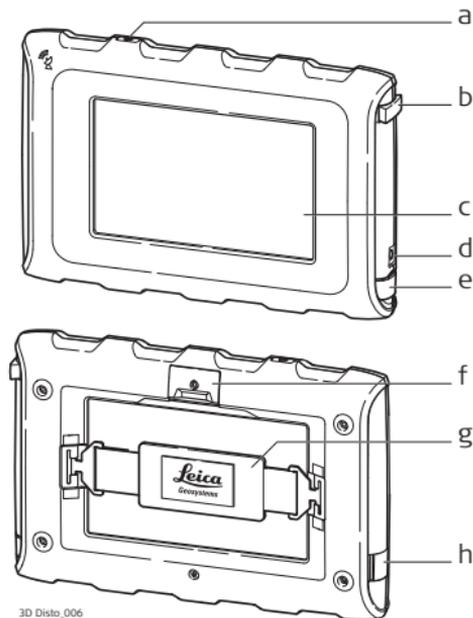
3D Disto_006

a) ON/OFF button
b) Stylus
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
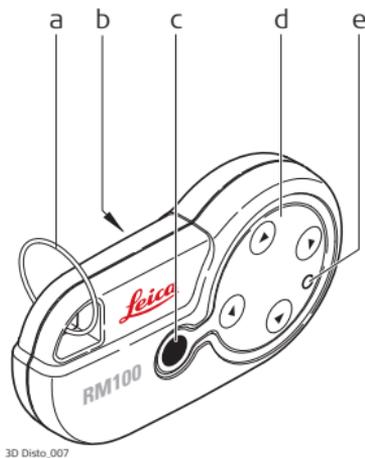
3D Disto_007

a) Key ring
b) Battery compartment
c) Dist 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**: by battery socket, with non-removable Li-Ion batteries, 14.4 V, 63 Wh.
- **External**:
  Power supply for 3D Disto connected by 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.
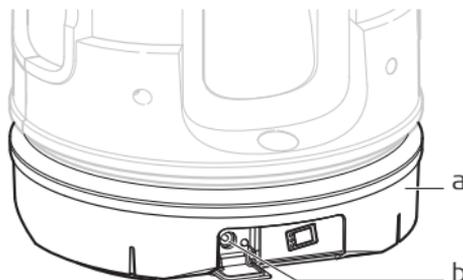
3D Disto_008

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**:

3D Disto_009
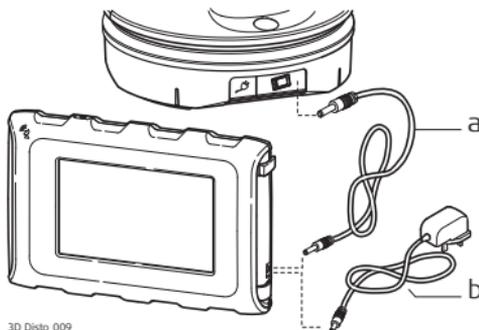
a) Power supply cable from 3D Disto
b) Power supply from mains supply with AC/DC adapter

- 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 by 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%.

3.4.3   RM100 Remote Control

RM100 Remote Control power supply

The RM100 is equipped with one AA alkaline battery, 1.5 V.
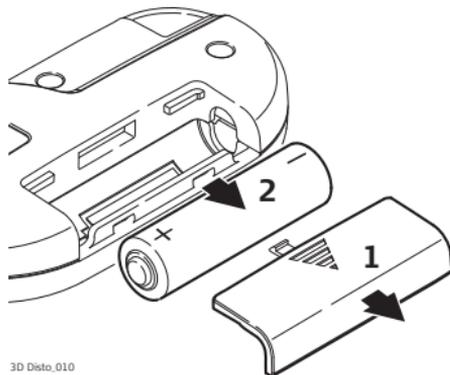
3D Disto_010

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 includes the central functions of the instrument:
- Several languages are integrated into this software. The preferred operating language can be chosen during 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 activated with license keys.

Demo mode

The available application programs can be tested by activating the Demo mode. This provides full software performance for 40 working hours. A pop-up reminds the user when the Demo mode expires.

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 ⧖ until Demo mode runs out.

Customised application programs	Customised software, specific to user requirements, can be developed using the third-party software development environment. Further information 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 by entering the license key using one of the following methods:

• **Synchronisation with the MyWorld homepage on www.leica-geosystems.com:**

1. Press ![power icon] and connect the Control Unit to the PC by Micro-USB cable. The Control Unit is available as a removable drive on your PC.

   3D Disto_011

2. If the Control Unit does not recognise the PC connection automatically, press ![sync icon].

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 metre. Refer to "Labelling 3D Disto", page 179.

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

Variations 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 in the directory My Documents\Leica Geosystems\3D Disto.

- **Entering the licence key manually:**

1. Press ⬚ and go to **Menu » Device » Software » License**.

2. **Enter the key**, which you can get on the MyWorld webpage, and press **OK**.
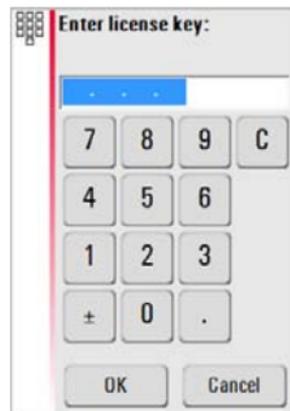
☞ Activated application programs are available in the **Applications** menu.

Software update

1. Press ⏻ and connect the Control Unit to the PC by Micro-USB cable.
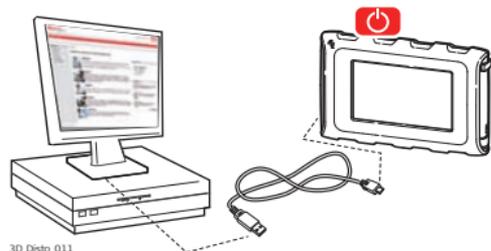
☞ Ensure the Control Unit battery is fully charged before starting the software update to avoid data loss. Do not disconnect from PC before download has finished. Please save and export your measurement data before starting the software update.

2. If the Control Unit does not recognise 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 you 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 the installation in **Menu** » **Device** » **Software** » **Update**.

Variations 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 in the directory My Documents\Leica Geosystems\3D Disto.

4 User Interface

4.1 Control Unit

User input

The 4.8" touch screen display is the main control device for the 3D Disto. It is used to navigate within the different applications and menus as well to control the 3D Disto.

Certain functions can also be executed using the RM100 Remote Control.

☞ Leica Geosystems recommends using the supplied stylus on the touch screen.

4.1.1 Screen

☞ All shown screens are examples. It is possible that local software versions vary from the standard version.

Screen

S_3D Disto_001

a) Results window with result choice key
b) Title bar
c) Toolbar
d) 3D Disto position
e) Sketch area/Viewfinder
f) Status bar
g) Main operation bar
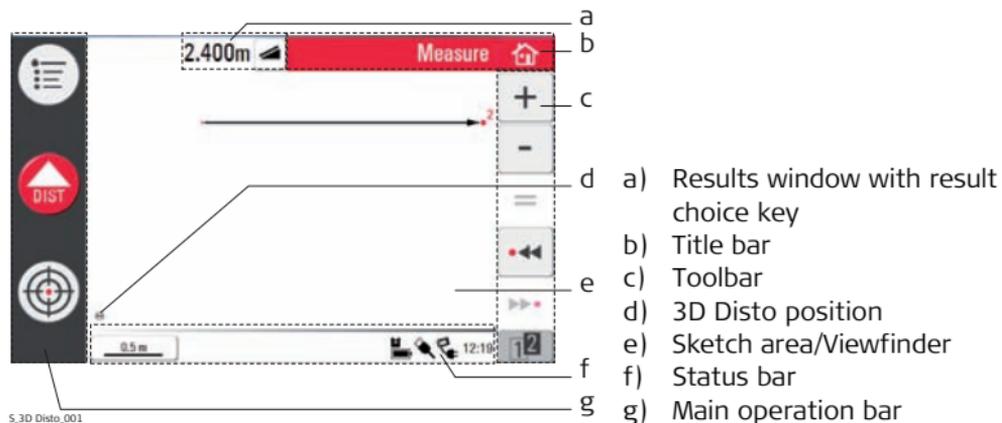
Description

Element	Description
Title bar	Shows the open application.
	🏠 save and close files or running applications.
	⏻ shut down the Control Unit.
Main operation bar	Contains the keys **Menu** ☰ , **Dist** 🔺, and
	Viewfinder ⊕.
	These keys displayed during all applications.
Sketch area, alternating with Viewfinder	Displays measured points, lines and areas and correct position of 3D Disto in relation to measured points - either in foot print or face mode.
Viewfinder, alternating with sketch area	Shows 3D Disto's live video stream used to target points over longer distances, up to 50 m, exactly and to take pictures.
Results window	Displays all results such as distances, heights, slopes, areas, angles together with the corresponding result choice key, for example ◢ . Use this key to switch between the result types. Tapping on the results opens the calculator.

Element	Description
Toolbar	Contains application-specific tool keys.
Status bar	Displays status of scale/zoom, connections, batteries, time, running function mode, assistant support.
Hourglass	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.
DIST	Starts measurement.
⊕	Opens, closes and locks Viewfinder.

4.1.3   Toolbar

Toolbar description

Key	Description		Key	Description
+	Add		1² 1²	Switch between the Toolbars
–	Subtract		◈	Start area or volume mode
=	Generate result or close polygons		↶ ↷	Undo or redo last command
•◀◀	Go one point backward		🗑	Clear functions
▶▶•	Go one point forward			

4.1.4　Icons & Symbols

Common symbols in status bar

Icon	Description
	Indicates remaining battery capacity for the Control Unit.
	Indicates remaining battery capacity for the 3D Disto.
	Indicates USB connection between Control Unit and 3D Disto.
0.5 m	Scale of sketch area and key to change zoom level.
2x	Indicates zoom level/magnification of Viewfinder.
	Indicates Control Unit is connected to power supply or powered by 3D Disto.
	Indicates 3D Disto is connected to power supply.
	Indicates WLAN connection is working.
	Indicates tilt sensor is turned off.
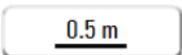
Various symbols in results window

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 symbol

Icon	Description
◇	Distance between point and plane.

Tool Kit result symbols

Icon	Description
↔	Perpendicular distance of a point to the reference line. 3D Disto_052
↕	Distance from the reference line base point to the foot of perpendicular. 3D Disto_053
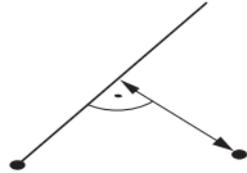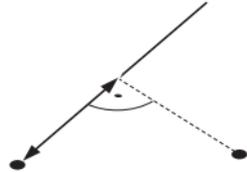
4.2   RM100 Remote Control

Description

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

☞ The RM100 Remote Control does not support the Tool Kit applications.

Targeting procedure

1. **Rough targeting**: hold ▲ / ▼ / ◄ / ► to turn the 3D Disto as long as key is pressed.

2. **Fine targeting**: short tap on ▲ / ▼ / ◄ / ► to turn the 3D Disto by small single steps.

3. **Measure**: Press ●.

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

5 Instrument Setup

5.1 Start-up Procedure

☞ **Charging / first-time use**
- **For all batteries**
  - The battery must be charged prior to first use because it is delivered with as low an energy content as possible.
  - The permissible temperature range for charging is between 0°C and +40°C/+32°F and +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. When 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 effective to complete only one charge/discharge cycle.
  - 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
- Batteries can operate 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.

Inserting and removing the batteries

⚠ **Warning**

Using another type of battery or removing the battery socket on the 3D Disto or Control Unit is not permitted. To exchange please contact your distributor or Leica Geosystems representative.

☞ It is always recommended to shield the instrument from direct sunlight and avoid high temperature variations around the instrument.

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

3D Disto_012
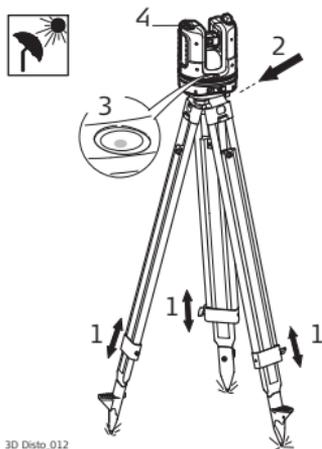
1. Set up the tripod in a suitable place where the points to be measured can be targeted well and extend the tripod legs to a comfortable working height.
2. Place 3D Disto onto the tripod head. Tighten the central tripod fixing screw.
3. Centre the circular bubble on the 3D Disto by adjusting the tripod legs.
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°.
Refer to "Description of buttons and LEDs", page 30 ff, for information about tilt status.

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

6. Turn the Control Unit ON by pressing 🔴.

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

☞ Press 🔴 to shut down the Control Unit.
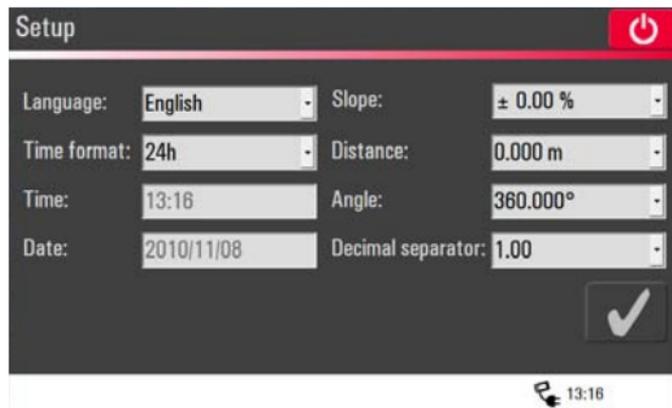
Setup				🔴
Language:	English	Slope:	± 0.00 %	
Time format:	24h	Distance:	0.000 m	
Time:	13:16	Angle:	360.000°	
Date:	2010/11/08	Decimal separator:	1.00	

🔋 13:16

8. Choose language.
   Choose time format (23:59/11:59 am-pm).
   Enter date and time.
   Choose units for slope, distance, and angle.
   Choose decimal separator.

9. Press ✓ to continue.

10. The following screen opens:

11. Choose a connection option:
   • connect to 3D Disto with USB cable,
   • WLAN to 3D Disto,

   ☞ When using WLAN connection the first time, first choose the USB connection and choose the WLAN connection manually in the menu settings. If it does not work change the WLAN channel.

   • continue 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 ![icon].

   ☞ 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.

   To work with WLAN press ![icon].

   To transfer data to or from a PC press ![icon]. 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 ![icon] to continue.

   ☞ If the setup screen indicates tilt > 3° adjust the tripod legs to level the circular bubble or change 3D Disto position to a more suitable and flat surface. Wait for green LED, then press ![icon].

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

⚠ **Caution**   **For advanced users only:**
If the tilt sensor is OFF the system does not compensate the tilt of the 3D Disto. 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 construction sites or in unstable or moving environments such as on boats. Almost all measurements can still be completed and exported data can be "levelled" afterwards by 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**.
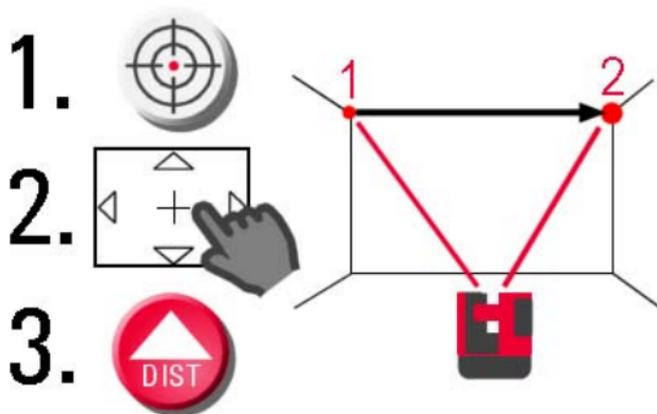
Assistant and supporting icons

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

175.892° ↔   4.70% ↕   ⑴⊗   ⬜   💾 🔋 🔌 08:10   [1²]

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: tip of ruler calculated

*   Not all supporting icons are listed here.

5.3 Device Configuration and Menu Settings

Device configuration
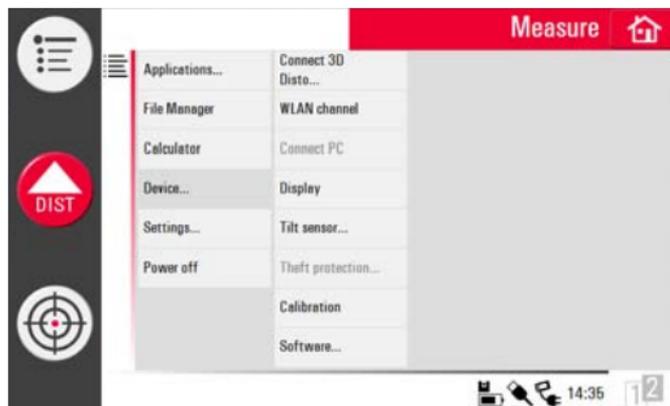
All settings on the setup screen can also be changed through the menu:
Choose **Menu** » **Device**.
- **Connect 3D Disto** to connect by WLAN, USB cable, or disconnect Control Unit.
- **WLAN channel** to switch between different channels if connection does not work.
- **Connect PC** to allow data transfer.
- **Display** to change display settings.

- **Tilt sensor** to activate/deactivate the tilt sensor.

  ☞ Choose **ON** when working in harsh construction environment with many shocks and vibrations, apart from that choose **ON (sensitive)**.

- **Theft protection** to protect instrument with security 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** 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 to change format and list separator.
- The instrument has a **Reset** function.
  If you select the menu function **Reset to default** 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 handles the entire data administration of measurement files, photos, Secure Points, and data transfer.
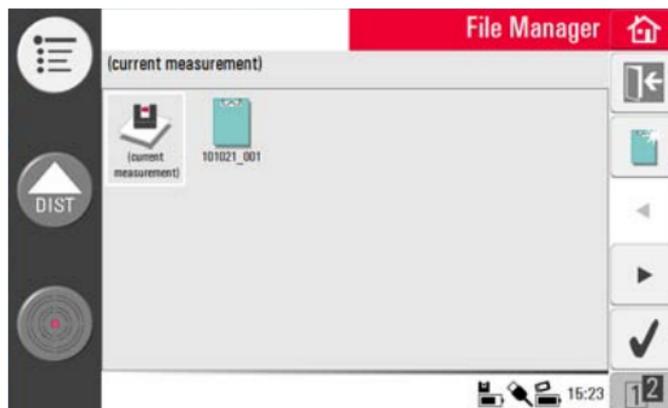
Description of keys

Key	Description	Key	Description
🏠	Close folder/File Manager	👁	View the selected element. Inactive at project folder level.
📄	Create a folder and enter a folder name with maximum 15 characters. Date and ID are default name.		Data import
◀	Scroll back		Data export
▶	Scroll forward		Rename file or folder
✔	Open a selected file or folder	🗑	Clear a selected file or folder
1² 1²	Switch between the Tool-bars	◁	Go to higher 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.

All files are displayed with separate 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 taken and the measurement stored.

☞ If you would like to delete a folder that contains Secure Points there will be the message **Secure Points enclosed! Delete anyway? Yes/Cancel**.
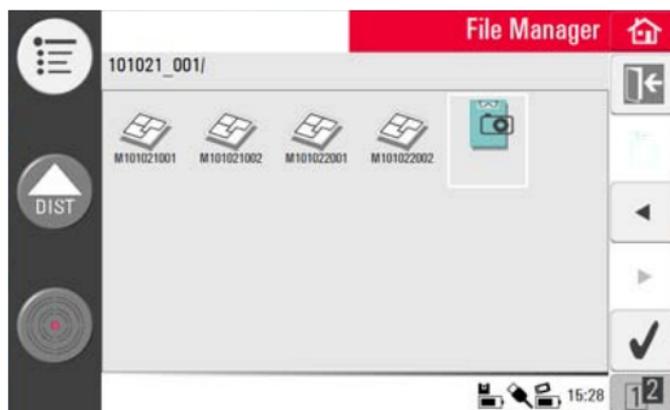
- Press 📷 to select function and press ✓ to open the folder.

- Press ◀ / ▶ to choose a photo, press ✓ to open the file.

- Press 👁 to view a photo.

- Press 🗑 to clear the selected or all photos.

- Press ◀ to close gallery.

5.4.4 Data Transfer

☞ Other USB memory sticks may be used, but 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   It is possible to import DXF files for some applications. Data should be prepared on the PC before importing. Only points are imported, no lines. The data source can be a PC or a USB stick plugged into the Control Unit.

☞ Remove irrelevant 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 Micro-USB cable.

3D Disto_011
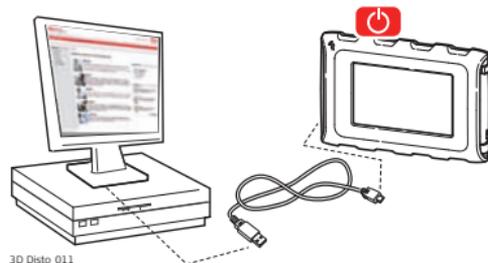
2. Press in the setup screen to activate PC connection. The Control Unit is now entirely controlled by the connected PC.
3. If connection is not working go to **Menu** and select **Connect to PC**.
4. After successful connection, a pop-up window with the **Import** folder appears at your PC screen.
5. Copy the files from the PC to the **Import** folder on 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 import 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.
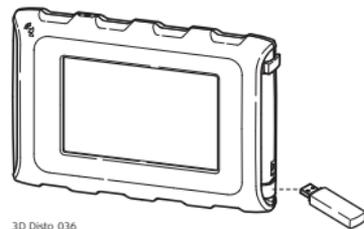
3. Pop-up **Import from mass storage device? Yes/Cancel** appears on Control Unit screen.

4. If **Yes**: File Manager opens. Press ⬆. Choose the file and press ✓.

5. When finished, unplug USB stick.

Variations in 3D Disto Windows Software

1. Save the DXF file in the **Import** folder in the directory My Documents\Leica Geosystems\3D Disto.

2. Open File Manager. Press ⬆. Choose the file and press ✓

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

The following data formats are supported and available for export:
- **CSV**: Measurement. List separator is **;** (semicolon).
- **TXT**: Measurement. List separator is a **tabulator sign**.
- **DXF**: Drawing
- **JPG**: Photos, single pictures (*.)

1. To export files or folders choose a folder or file, press 👉.

    ☞ Select only files you really need to keep export time short.

2. Export data is 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 Micro-USB cable.

3D Disto_011
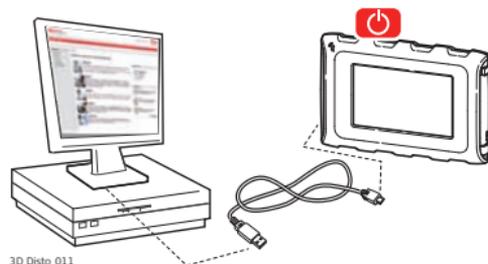
2. Press in the setup screen to activate PC connection.

3. If connection is not working go to **Menu** and select **Connect to PC**.

4. After successful connection, a pop-up window with the **Export** folder appears at 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 or by key press in the pop-up of the Control Unit.

USB Stick

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

3D Disto_036
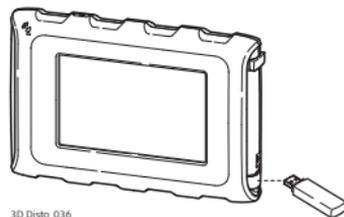
2. Open File Manager, choose a folder or file and press .

3. Pop-up **Export to mass storage device? Yes/Cancel** appears on Control Unit screen.

4. If **Yes**: export data is transferred to USB stick.

5. When finished, unplug USB stick.

☞ If you execute an 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.

Variations in 3D Disto Windows Software

1. Open File Manager, choose a file and press 🔁.
2. Export data is transferred to the **Export** folder in the directory My Documents\Leica Geosystems\3D Disto on your PC.

5.5 Calculator

Using calculator

1. Tap on the result in the results window to work with this value.
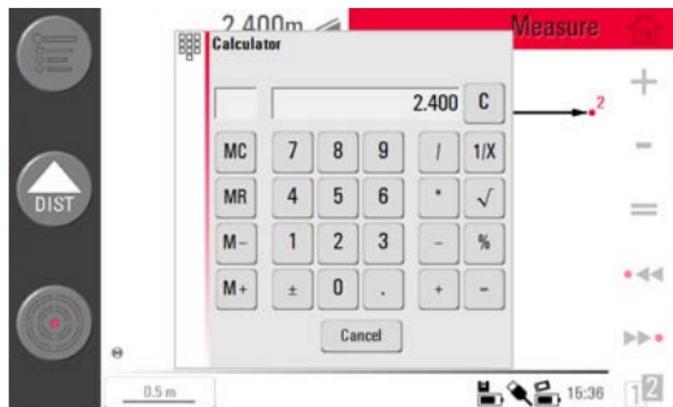
2. Another option is to press **Menu** » **Calculator**.

3. A pop-up opens with the following keypad:

Calculator					
				0	C
MC	7	8	9	/	1/X
MR	4	5	6	*	√
M–	1	2	3	–	%
M+	±	0	.	+	=
			Cancel		
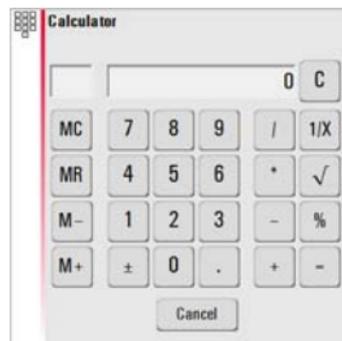
4. The memory function allows to add or subtract area, volumes or other results.
   • Click **MC** to clear memory.
   • Click **MR** to retrieve a value stored in memory.
   • Click **M-** to subtract the displayed value from the value in memory.
   • Click **M+** to add the displayed value to the value in memory.

   ☞ To save a certain value to the memory: Click **MC** to clear memory, enter value and press **M+**. To save the value as a negative value press **M-**.

5. 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 metre (LDM) and angle encoders. Targeting with the visible red laser beam allows measurement of the distance between the 3D Disto and the target and of horizontal and vertical directions towards the target. Measurements are used to establish the relation between different targets, such as horizontal distances, tie distances, height differences, for example to determine room dimensions, height differences, angles from wall to wall, areas, volumes, plumb points, or other features.

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

6.2 Viewfinder

Description

The 3D Disto has an integrated camera. It is accessible by and it shows the camera image directly on the Control Unit display. The crosshairs in the Viewfinder image allow precise targeting and measuring even if the laser beam is not visible, for example over long distances or because of bright backlight conditions. The integrated digital zoom allows the image to be magnified by up to eight times its original size. This is particularly useful when measuring detailed surfaces in sunlight.

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 measurement point:
   • Press the arrow keys on the screen for targeting, hold for fast 3D Disto turns and short taps for single step turns.
   • **Tap & Measure Targeting**: tap on a position on the screen. Laser point turns to this point automatically.
   • **Joystick Targeting**: is activated by long tap on the centre of the crosshairs. A red dot appears in the centre. Slide stylus on the screen to turn 3D Disto in this direction in real-time until red arrow is released. The longer the red arrow is, the faster the 3D Disto turns.
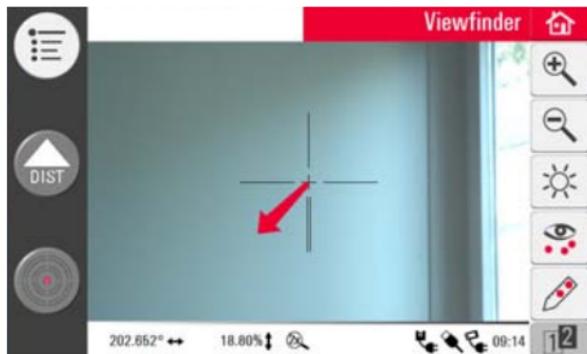
3. Press ⊕ or ⊖ to zoom in and out. There are four magnifications available. The current setting is shown in the status bar.

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 hidden points. Place the tip of the ruler on the hidden point to measure offset points.
   • 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 ✔ 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 conditions to change Viewfinder picture to negative mode. Edges and corners will be highlighted in black. Only available in Microsoft Windows version.

9. Press ![icon] to choose between different turn commands:

- Turn 90° right
- Turn 90° left
- Turn ?°: Enter the horizontal angle by which the 3D Disto should turn.
- 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 at exactly 90° to each other and long enough to be seen when setting up the instrument above. Use the 90° markings on the 3D Disto 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 determination of horizontal distances, tie distances, height differences, heights, angles, areas, volumes, slopes, or the perimeter of points indoors but also outdoors on buildings and sites.

Measurements step-by-step

3D Disto_050
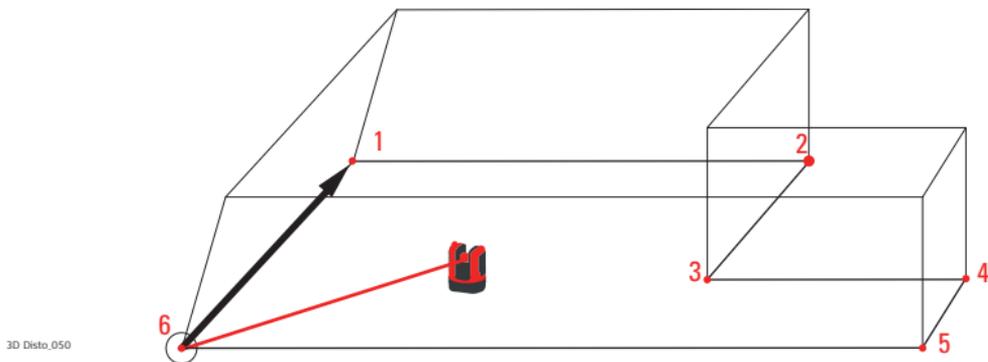
To measure for example a rooms' dimension, carry out the following steps:
1. Start-up the system as described in "5.1 Start-up Procedure".

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 along 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.

☞ Measurement errors can occur when measuring toward clear liquids, for example water, or dust free glass, Styrofoam, or similar semi-permeable surfaces. Measurement time may increase when measuring to non-reflective and dark surfaces.

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. The first measured point is always displayed on the left side of the sketch area.

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

6. After the third point is measured a proposed "closing line" appears between the first and last measured point. The selected line is always highlighted with a bold line and an arrow in the direction of measurement.
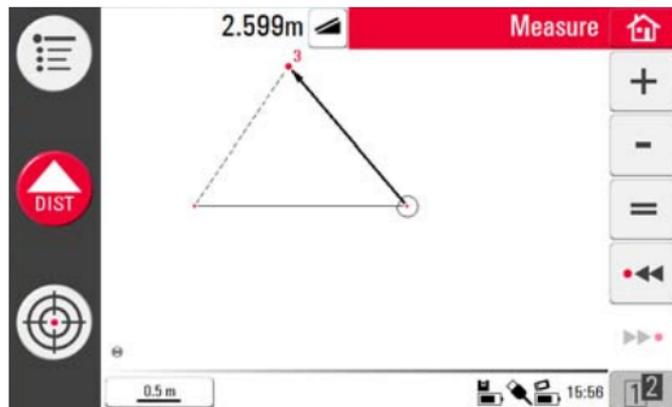
7. Proceed as described for measuring further points or use = to close/finish the polygon.

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

8. To measure the room height select a floor point in the sketch area. Then target and measure the ceiling corner above it.
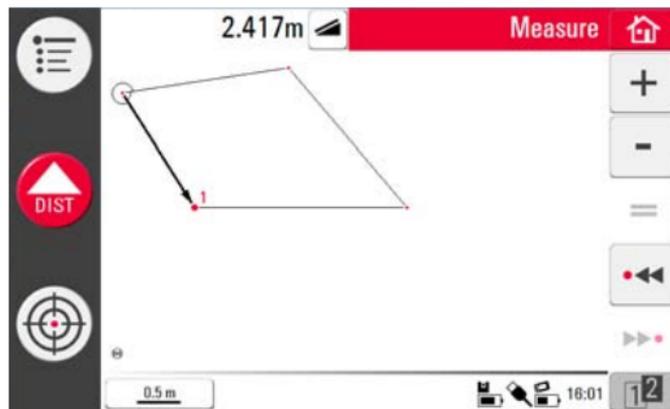
☞ Please note that the sketch shows a foot print view. Measured floor and ceiling points may cover each other. Use •◄◄ or ►►• to select points and get the height result.

9. Proceed as described previously to measure the ceiling dimensions.

10. Press ⌒ to undo the last command.

11. Press ⌒ to redo the last command.

12. Press •◄◄ or ►►• and 🗑 to clear measurements and results.

13. Press 🏠 to choose between save, save as, clear screen, or cancel.

☞ It might be better to organise the measurements in different folders to keep the amount of data in one folder at a meaningful limit for both working and for export.

6.4   Touch Screen in Sketch Area

Selection of elements

Any element can be selected by fingertip or by stylus. Polygons that consist of added or subtracted lines cannot be selected by direct touch.

Line drawing between arbitrary points

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

The ═ key of the Toolbar only accepts a line proposed by the system. 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**.
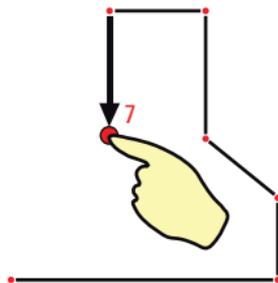
3D Disto_047
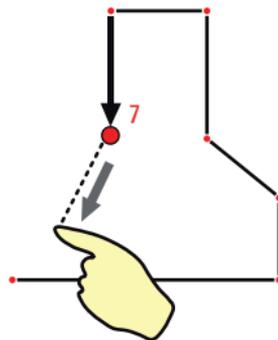
1. Select point.	2. Keep finger or stylus on screen and slide to desired point.	3. Release touch screen when dotted line changes to dashed line. Results between these two points are displayed in the results window.
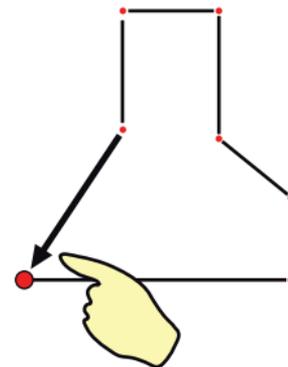
6.5 Addition and Subtraction

☞ During and after measuring you can 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 measurement step-by-step

1. Select element by fingertip, stylus or •◀◀ / ▶▶•.

2. Press ➕ or ➖ for addition or subtraction. The corresponding symbol appears in the status bar. The first 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.

4. The added/subtracted elements get a ⊕ or ⊖ icon.
5. The sum is displayed in the results window.
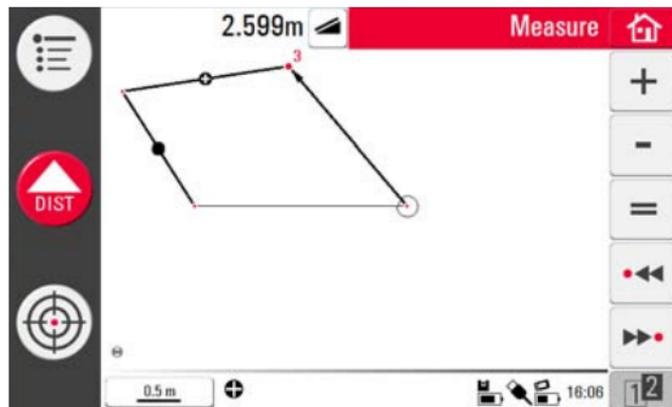
Addition and subtraction during measurement step-by-step

1. Press ⊕, target and measure the first two points with [DIST].

   ☞ You have to measure two points before ➕ or ➖ is active as points cannot be added or subtracted.

2. Two points with a line connection appear in sketch area.

3. Press ➕ or ➖ for addition or subtraction. The corresponding symbol appears in the status bar. The first selected line is highlighted with black bullet symbol.

4. Press ⊕, target to measure a further point. Press [DIST].

5. Press **+** or **–** to add/subtract next distance (line) or continue measuring if you would like to skip a point distance to be added/subtracted.
6. Proceed until ready to close the sum and/or finish the adding/subtracting function. Then press **=** .

6.6 Area & Volume Calculations

Description

The 3D Disto can also help determine areas and volumes. Both can be determined during or after measuring.

1. Press 1️⃣2️⃣ and choose 🔷.

2. A pop-up offers the choices **horizontal area/volume**, **tilted area/volume**, or **quit the application**. The sketch areas' content is retained but the Toolbar changes.
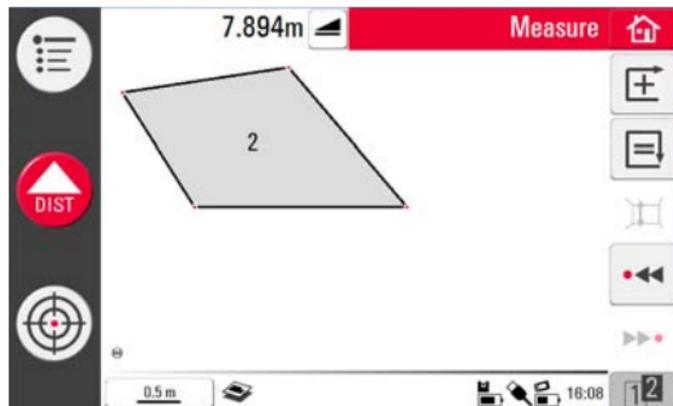
☞ Each area can be managed in both the **Horizontal Area** or **Tilted Area** application.

6.6.1 Horizontal Areas/Volumes

Calculation during measurement 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 ![DIST]. Viewfinder is closed and point displayed in sketch.

3. Press ![target] and measure next point with ![DIST].

4. Press ![line] to define line as part of the area. Proceed with measurement and line selection. The polygon can be closed by pressing ![close]. The area is highlighted in grey.

5. Pop-up appears to choose between the different options to define the height: **Enter height for volume, Measure height, Cancel**.

6. **Measure height**:

   Viewfinder opens, target and measure point on floor with ![DIST], followed by point on ceiling. The height appears in the results window.

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

   OR:

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

OR:

8. **Cancel**: the result is an area.

9. To change the height or to calculate the volume with a selected area press ⊅
   and proceed as described in steps 3. to 4.

Calculation after measurement 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 9., page 99.

4. Quit application by pressing ◖.

6.6.2   Tilted Areas

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

☞   Volume calculation is also possible for tilted areas.

7 Software Applications

7.1 Overview

Description   There are a variety of software application programs available addressing a wide spectrum of construction tasks and facilitating daily work.

- **Tools**:
  Software license protected application featuring a **Tool Kit** with smart measuring and set-out tools and **Location** routine to easily and correctly 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**:
  Enables layout of grids and other designs on floor, ceiling, or walls.

7.2 Tool Kit

General

In addition to the standard applications this program features:

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

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

7.2.1	Comfort Plumbing

Description   **Comfort plumbing** allows plumbing any point up or down without standing above it.

This tool can be very helpful for installation of drywall.

3D Disto_038
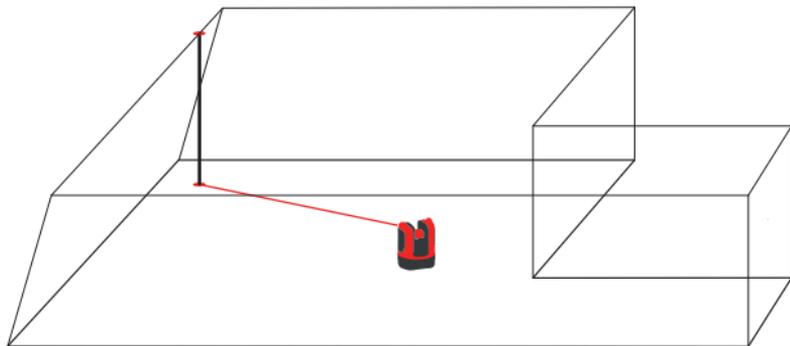
Comfort plumbing step-by-step

1. Start application in **Menu** » **Applications** » **Tool Kit**.
2. An empty sketch opens. The running applications stays open in the background.
3. Press ⬛Ⅱ on the Toolbar.
4. Viewfinder opens. Target and measure the point to be plumbed. Press 🔺.

5. Viewfinder stays open. Roughly target expected plumb and press ![DIST button].

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

☞ Refer to "8 Error Messages" for information about possible error messages.

7. Press ![home button] to close Tool Kit.

7.2.2	**Comfort Targeting**

Description   **Comfort targeting** allows laying out a point relative to a reference point on vertical surfaces.

This tool can be very helpful to install lights or pictures at regular distances on walls.

3D Disto_039
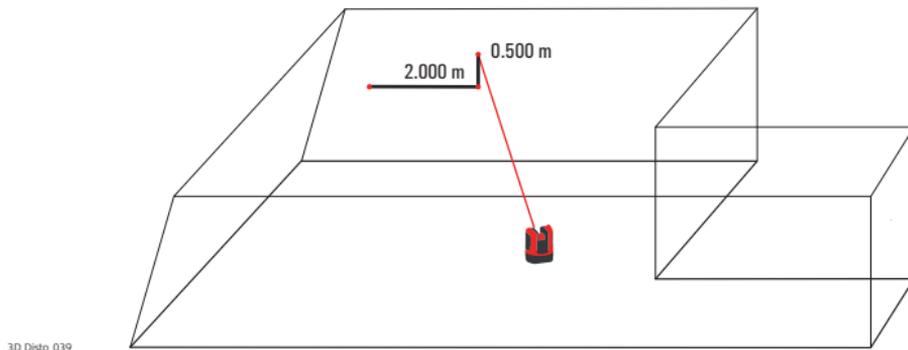
☞   Use this feature only on vertical surfaces. On tilted surfaces the layout position will not be correct.

Comfort targeting step-by-step

1. Start application in **Menu** » **Applications** » **Tool Kit**.
2. The running applications stays open in the background.
3. Press 🔲 on the Toolbar.
4. Viewfinder opens. Target and measure reference point on the wall. Press 🔺.
5. Pop-up prompts to enter value for left or right distance to reference point. For left turn set a negative value. Press **OK** to confirm the value.

   ☞ Enter 0 to lay out points with only vertical offsets to the reference point.

6. Laser point flashes 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 possible error messages.

7. 3D Disto turns and lays out the correct position.
8. Laser point flashes to indicate exact position.
9. Press 🏠 to close Tool Kit.

7.2.3	**Comfort Level**

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

This tool can be very helpful for the installation of suspended ceilings or to mount pictures at the same height on walls.
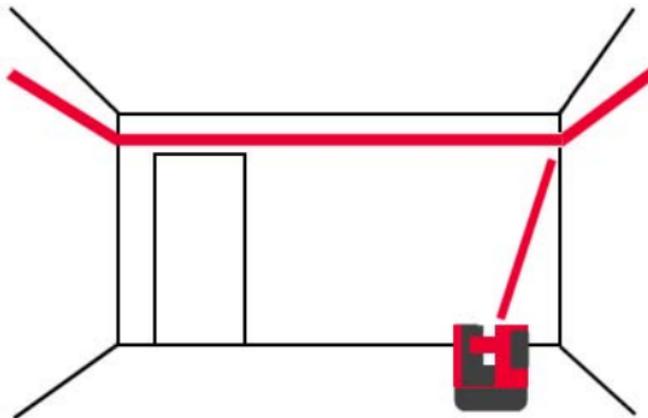
Comfort levelling step-by-step

1. Start application in **Menu** » **Applications** » **Tool Kit**.

2. The running applications stays open in the background.

3. Press ⌐ᵣⓣ on the Toolbar.

4. Viewfinder opens. Target and measure reference height on the wall. Press DIST.

5. Viewfinder stays open. Roughly target the assumed layout point and press DIST.

   Laser point flashes to indicate the exact height position.

   ☞ Refer to "8 Error Messages" for information about possible error messages.

6. Press 🏠 to close Tool Kit.

7.2.4 **Metre Mark**

Description

The **Metre Mark** tool refers to a metre mark or reference height and allows laying out any desired height.

This tool can be very helpful to mark the metre mark at several places in a room or lay out heights on several building levels.
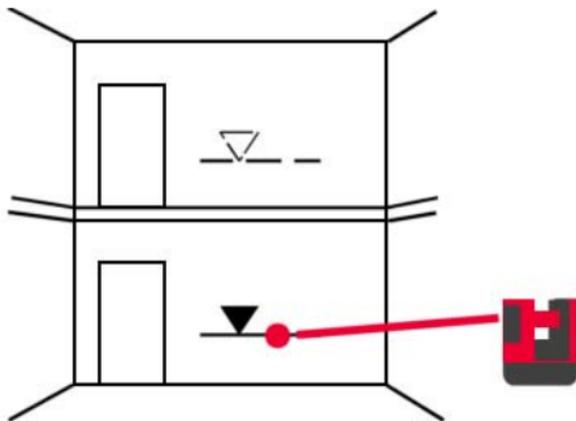
Metre mark step-by-step

1. Start application in **Menu** » **Applications** » **Tool Kit**.
2. The running applications stays open in the background.
3. Press ⤓ on the Toolbar.
4. Pop-up prompts to enter the height and measure that reference height.
5. Viewfinder opens. Target and measure reference point on the wall. Press 🔺.
6. Pop-up prompts to enter an absolute height to be laid out.
7. Viewfinder opens. Roughly target close to expected absolute height on the wall.

   Press 🔺.
8. Laser point flashes to indicate the exact position of the absolute height.

   ☞ Refer to "8 Error Messages" for information about possible error messages.

9. Press 🏠 to close Tool Kit.

7.2.5 Height Tracking

Description **Height Tracking** allows determination of the height of a target that cannot be measured directly.

This tool can be very helpful for measuring the height of a tree or power lines.

3D Disto_035
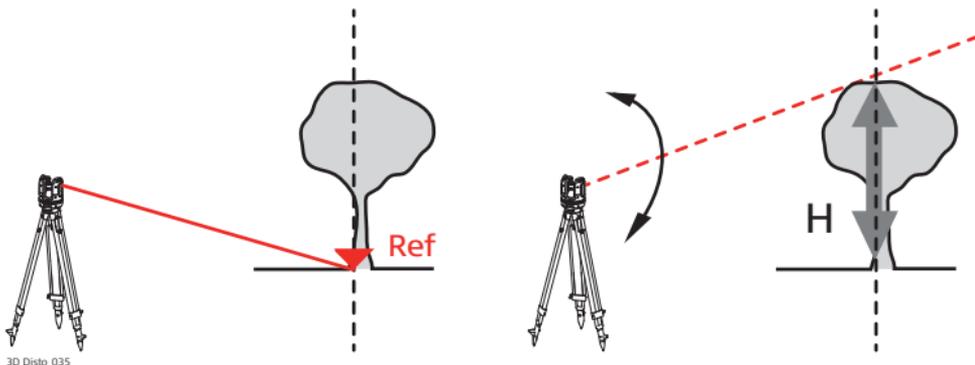
Height tracking step-by-step

1. Start application in **Menu** » **Applications** » **Tool Kit**.

2. Press ◢ on the Toolbar.

3. Viewfinder opens. Target and measure a reference point at the same horizontal distance as the point you would like to measure indirectly.

   ☞ Do not move the 3D Disto horizontally too much after reference point has been measured, otherwise the result will be incorrect.

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 results window.

6. Close the Viewfinder to finish the application.

7.2.6 **Parallel Line**

Description **Parallel line** allows laying out lines parallel to a reference line on level surfaces like walls or floors.

This tool can be very helpful to align tiles or drywall profiles.
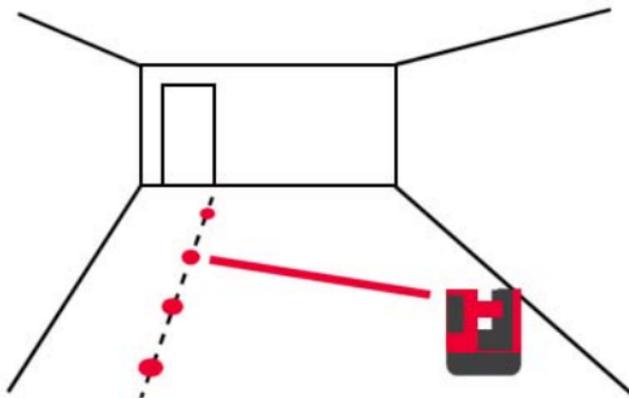
Parallel Line step-by-step

1. Start application in **Menu** » **Applications** » **Tool Kit**.

2. Press ▮|||| on the Toolbar.

3. Viewfinder opens. Target and measure start 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. Press **OK** to confirm the value.

5. Viewfinder opens to roughly target layout point. Press 🔺. Laser point flashes to indicate the exact position on the parallel.

6. Press 🏠 to close Tool Kit.

7.3	**Location**

Description

The **Location** function determines the 3D Disto's position in a pre-defined coordinate system or room geometry. **Secure Points** are placed by the user and make the positioning procedure easy.

Secure Location step-by-step

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

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

1. Label and affix three to five self-adhesive target marks on walls, ceiling or floor around your working area. Ensure that the target marks are spread out.
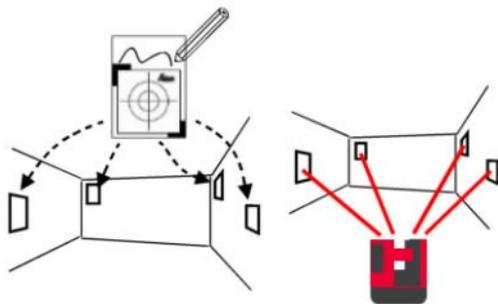
☞ Instead of target marks you can use any other point that is well fixed: draw a cross on the wall or hang the ruler for offset points on a nail and use one of its marks.

2. Press **Menu** » **Applications** » **Location** » **Secure Location**.
3. Viewfinder opens. Target the **Target marks** as precisely as possible and press 🔴 DIST to measure.
4. 3D Disto takes a photo and saves it with coordinates, labelled 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 more Secure Points at any time.
☞ Ensure you have enough well-measured Secure Points around your working area. Even if one is lost there must be at least three for a successful relocation.

Relocation step-by-step

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

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

1. Press **Menu** » **Applications** » **Location** » **Relocation**.

2. A pop-up prompts you to define the tolerance.
   Press **OK** to confirm the value.

   ☞ A lower tolerance increases the accuracy of your measurements and requires precise aiming at and visibility of the Secure Points.
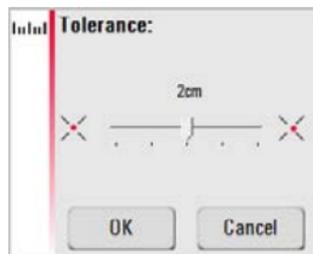
3. If there are no Secure Points in the memory, pop-up prompts **Not enough Secure Points in the memory**.

   ☞ 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. These are the first two points of a measurement.

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

Select Secure Point:
SecurePoints/100812_SP_0001

100812_SP_0001
100812_SP_0002
100812_SP_0003
100812_SP_0004
100812_SP_0005
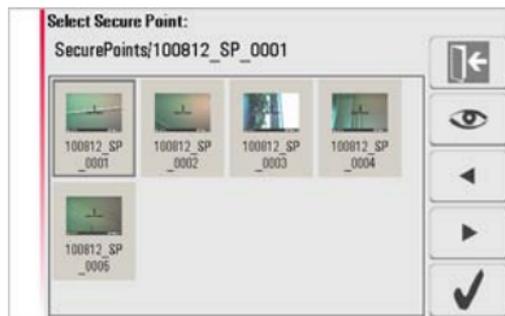
5. Press ✔ to confirm point.
6. Viewfinder opens. Target the target mark shown in the photo as precisely as possible and press 🔴.
7. If successful, pop-up appears **Measure next Secure Point? Yes/Cancel**.

8. If **Yes**: Folder opens to choose next Secure Point. Proceed as described in 4. to 7. for 2nd and 3rd 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 shows **OK. Measure more Secure Points? Yes/No/Cancel**.

10. Press **Yes** to continue and proceed as described in 4. to 7.

11. Press **No** to finish. 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 was unintentionally moved, for example got bumped, the geometry of the measured points will no longer fit with that of the previously measured points. Start a Location Check to sustain the current accuracy/geometry.

1. To initiate a Location Check press **Menu** » **Applications** » **Location** » **Location Check**.

    ☞ If there are no Secure Points in the memory, no Location Check is possible.

2. 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. Proceed that way for checking further points.

3. Press to close **Secure Point** gallery.

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

☞ All Location applications can be cancelled by pressing .

7.4	**Room Scan**

General

This application program measures room dimensions, 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 non-square corners or curved walls, inaccessible points, slopes or areas, and to measure the position of details like sockets or pipes.

3D Disto_040
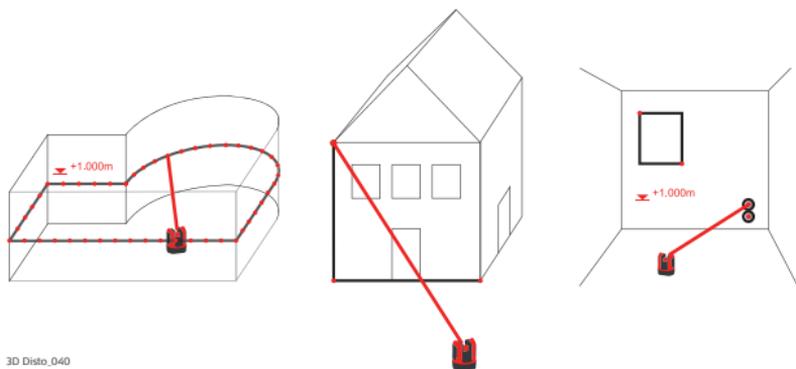
7.4.1 **Manual Measurement**

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**.

7	8	9	C
4	5	6	
1	2	3	
±	0	.	

Enter and measure height reference [m]:

OK   Cancel

3. Viewfinder opens. Target the reference height* and press ![DIST].

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

4. Reference height is displayed in the sketch area.

2.417m — **Room Scan**
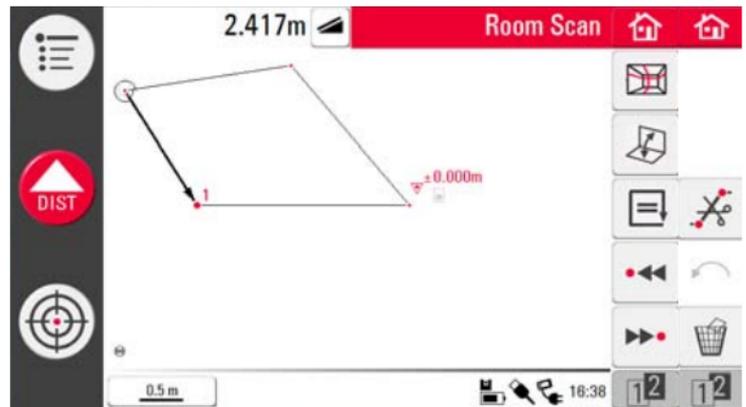
5. For further measurements proceed as described in "6.3 Measurement Workflow".

Please note that Toolbar changed: ⊞ for scan functions, ⬚ to switch between footprint and face views, ⊟ to close polygon, and ⊁ to clear lines between points.

☞ Unlike in standard measuring mode, single points without line connections can be measured and cleared.

7.4.2 Unfold Mode

Description

Room Scan allows switching the view in the sketch area from foot print to face mode. This option is active when a line is selected.

Unfold mode step-by-step

1. Select a horizontal line between two points.

2. Press ![icon]. Sketch area changes from foot print to face view.
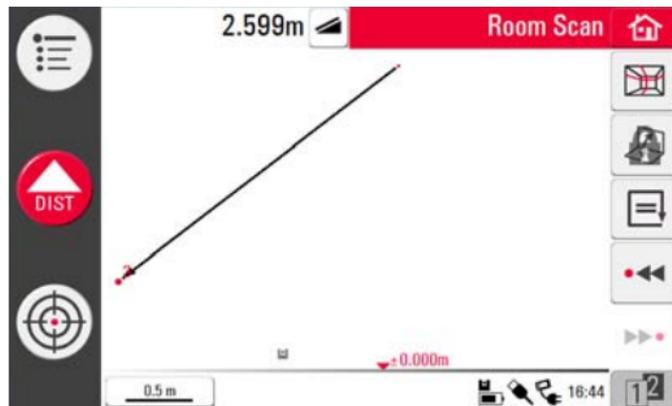
3. All measured points on the vertical plane are displayed.
4. To measure details or wall dimensions proceed as described in "6.3 Measurement Workflow".

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

☞ 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 sockets or holes.

1. Target and measure a point and activate circle function by a long tap 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.
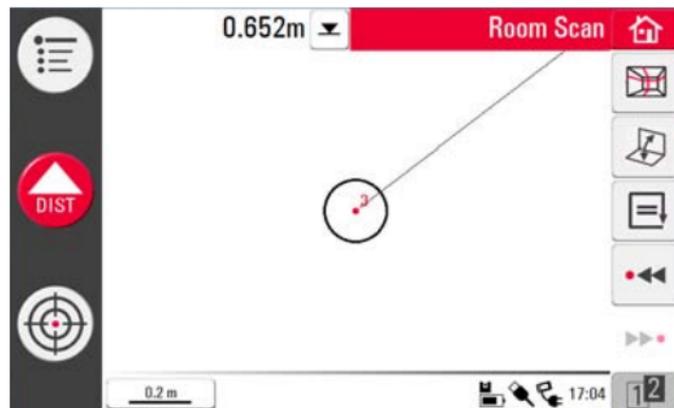
3. To clear the circle, enter 0 as value for diameter or press 🗑.
4. The results window contains radius, circumference and size of the circle.

Rectangle tool   This tool only works when changing the perspective to face mode and allows measurement of a diagonal and generation of a rectangle, for example to measure windows.

1. Press ⟁ to change perspective to face view.

2. Measure 1st and 2nd point of the diagonal of a rectangle, for example a window, and activate the Rectangle Tool by long tap on the line. Pop-up prompts **Transform into rectangle? Yes/No**.

3. Diagonal changes to a levelled rectangle.

7.4.4 Automated Profile Room Scan

Description   This tool executes automated horizontal or vertical measurements on any surfaces.

Room Scan,   1. Press **Menu** » **Applications** » **Room Scan**.
Start step-by-step
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 [DIST].

4. Press [⊞] to start scan.

5. Pop-up prompts to select horizontal or vertical scan.
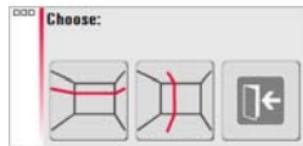
* Except when continuing existing measurements, for example **Relocation** where reference height is neglected.

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 a defined interval, left for 360° scan counter clockwise. Choose one of these options to continue.
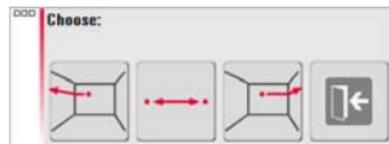
3. If you choose **from ... to** Viewfinder opens to measure scan end point.

   Press 🔺.

4. Pop-up prompts to define spacing of the measurement. Choose an interval and press **OK**.
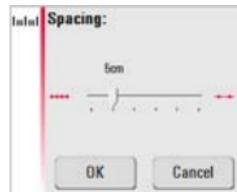
☞ For best scan results do not choose small intervals at long distances.

5. Press **OK**. Scan starts. Toolbar 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.
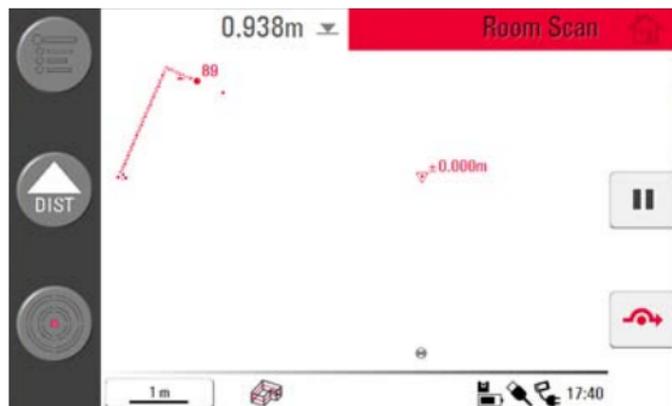
8. If scan is finished pop-up prompts **Ready. Edit Scan? Yes/No**.
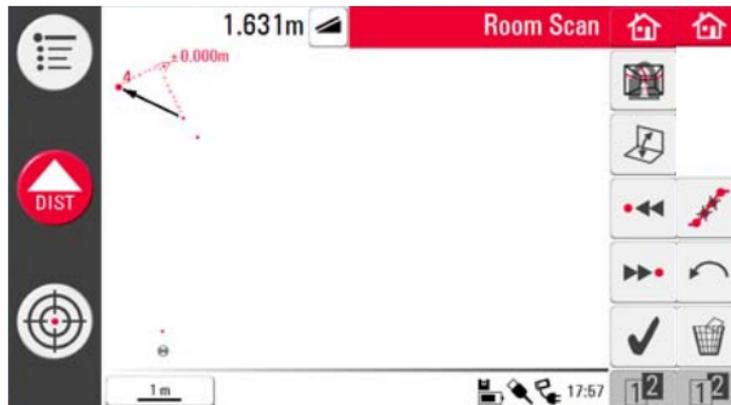
9. If **Yes**: New Toolbar appears.

   Press •◄◄ or ►►• to select points.

   Press 📷 to start another scan in this measurement file.

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

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

   Press ✓ to finish the scan.

10. 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: **Perpendicular to Wall** or **Free**.
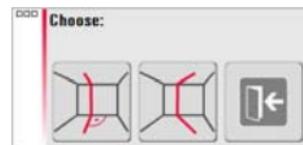
- **Perpendicular to Wall**
  1. 3D Disto measures the surface around the measured start point automatically. Await the next pop-up.

  2. Pop-up prompts to define measurement direction **up**/**from ... to**/**down** followed by spacing of measurement points.
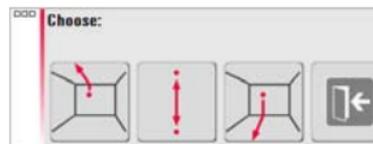
  3. If you choose **from ... to**, Viewfinder opens to measure end point before spacing can be defined. Press 🔻.

  4. 3D Disto starts scan at the start point. Proceed as described in "Room Scan, Horizontal scan step-by-step", page 132 ff.

- **Free Profile**
  1. 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.
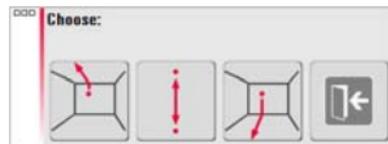
  3. Proceed as described in "Room Scan, Horizontal scan step-by-step", page 132 ff.

7.5 Projector

General

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

Projecting grid points is ideal when installing suspended ceilings.

3D Disto_049
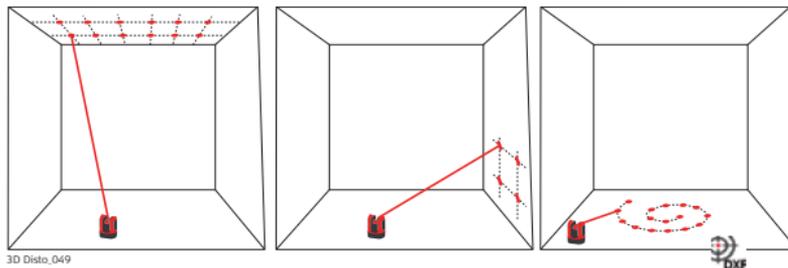
7.5.1	Workflow

**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 other details the grid will be projected on to.

   ☞ 3D Disto assumes the measured reference area as a flat surface. Bent or uneven faces will 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 bumping. Otherwise all following measurement or grid points will no longer fit with the geometry of the previous points. Start a Location Check to sustain the actual accuracy/geometry.

5. When all points are measured, continue with ✓.

6. Pop-up prompts to choose between **Grid** or **DXF** mode.
   Grid mode: Manual definition of grid to be laid out.
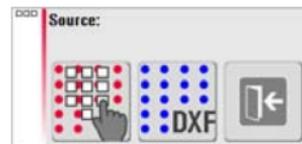
Projector, Grid mode step-by-step	1. Pop-up appears to choose between **Define new**, **Use last**, **Measure** a grid, or **Cancel**.
	2. For a **new grid** pop-up prompts to enter column and row spacing and then to choose if horizontal or vertical shift of row or column is needed.
	☞ Column and row spacing must be > 10 cm.
	3. **Use last**: last grid is used for projection.
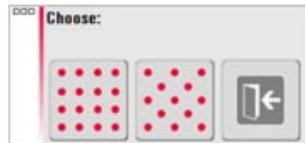
Projector, Aligner step-by-step

1. **Aligner** opens with measured reference area including grid points. The Toolbar changes. The level icon in the results window shows the tilt of the projection plane.
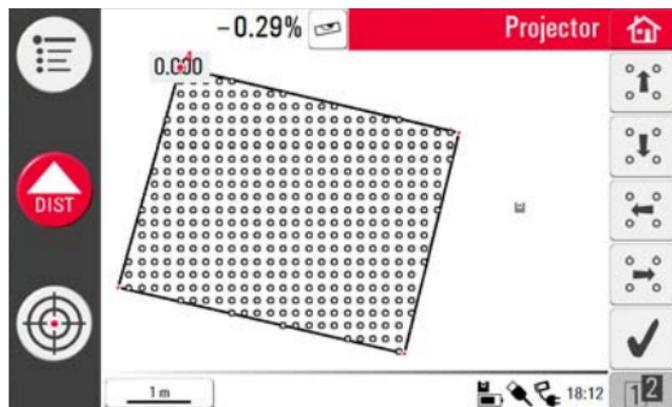
2. Each point and line can be selected by fingertip or stylus.

3. The grid can be moved up, down, left, and right on the screen in small steps using $\overset{\circ}{\underset{\circ}{\uparrow}} \overset{\circ}{\overset{}{\circ}} / \overset{\circ}{\underset{\circ}{\downarrow}} \overset{\circ}{\overset{}{\circ}} / \overset{\circ}{\underset{\circ}{\leftarrow}} \overset{\circ}{\overset{}{\circ}} / \overset{\circ}{\underset{\circ}{\rightarrow}} \overset{\circ}{\overset{}{\circ}}$. The perpendicular distance from a selected grid point to a reference line is displayed. Tap on this distance to enter a value.

4. Press 12 for 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 ![icon] to turn the grid by 90°.

8. Press ![icon] to place the grid exactly on a reference point.

9. Press ![icon] to measure further reference points or to go back to the **Aligner** tool. Proceed as described in 1. to 3.

10. Press ![icon] to confirm the grid and close the **Aligner**.

To lock onto existing grid:

1. Viewfinder opens to measure 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**.
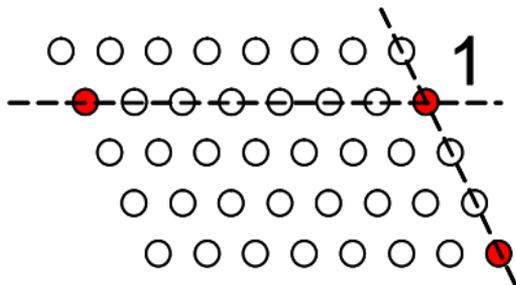
4. Pop-up prompts to define 2nd axis. Choose between **measuring** P3 or **enter** space for a right-angle axis.

   If **measuring** P3, Viewfinder opens to target and measure with ![icon].

☞ P3 must be in line with P1 and far apart, as shown in illustration.

5. If you select **enter**, pop-up prompts to enter grid points spacing.

6. The grid geometry is displayed in a pop-up.

7. If grid is ok, choose yes and layout mode starts.
   If grid is not ok, proceed as described in 2. to 7.

8. In layout mode the Toolbar changes and you can start to project the grid. Use the arrow keys to select a point and press ![DIST].
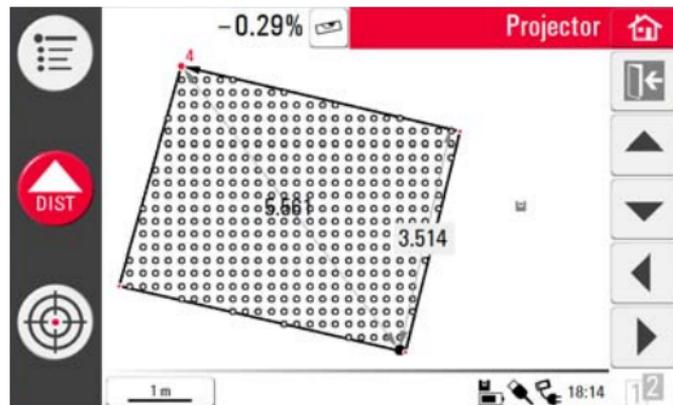
☞ Porous, structured or rough surfaces cause problems if the laser beam cannot reflect off the exact position of the layout point.

☞ You can also select points by tapping on a point on the screen or by using the Remote Control.

9. Laser point flashes 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 to export data.

Projector, DXF mode step-by-step

Import a drawing, select a point and lay it out on an area.

1. Measure reference area and points as described previously and choose **DXF** option.
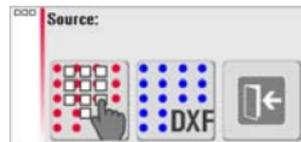
2. File Manager opens. Select file and press .

   ☞ You can check the import file by pressing before import.

3. 3D Disto checks and prepares the file.

   ☞ Avoid unnecessary data in the DXF file to be imported. There is no layer selection and only points of lines are imported (not the lines). Only 2D-information is imported.

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 have the additional option of connecting two points by a line to use for parallel alignment.

7.5.2 Targeting and Layout with RM100 Remote Control

Description

The functionality of the RM100 Remote Control is the same as in the other applications. The RM100 Remote Control only works if the Control Unit is ON - otherwise measurement errors cannot be displayed and avoided.

Functionality of the keys in Projector application

Red key ●:

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

Short key press on ⊿ / ▽ / ◁ / ▷:

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

8 Error Messages

Error messages and advice

Error no.	Advice
150	Working range was exceeded.
151	Invalid measurement.
152	Change 3D Disto's position or use ruler for offset points.
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. Contact your distributor or Leica Geosystems representative.
241	Too much drift. Repeat calibration precisely.
242	3D Disto must be levelled precisely. Ensure stable setup. Repeat calibration.
243	Set up instrument stably. 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.	Advice
755	Point cannot be measured. Try different position. Tool does not work on horizontal planes.
760	Point cannot be measured. Enter different values. Tool does not work on horizontal planes.
765	Point cannot be measured. Try different position or enter different 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.
803	Check file condition and content.
900	Sensor error. Contact your distributor or Leica Geosystems representative if the error repeats.
901	The reflected laser signal is too low.
902	The reflected laser signal is too high.
903	Too much background light.
950	Execute Location Check to retain accuracy!
951	Sensor tilt is over 3°. Set up horizontally!

Error no.	Advice
952	Check sensor, check for obstacles interrupting WLAN connection, or move towards sensor.
953	Check connection and cable.
954	Plug in cable or choose "Wireless Connection" in the menu.
955	Sensor temperature out of working range.
998	Contact your distributor or Leica Geosystems representative.
999	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 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:
• Crosshairs offset
• V-index
• Tilt sensor

☞ All calibration settings can also be reset to factory default.

Every angle measured during 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 previously, these errors can change and it is highly recommended to redetermine them in the following situations:
- After rough or long transportation
- After long storage periods
- If the temperature difference between the current environment and at the last calibration is more than 20°C

9.2 Crosshairs Offset

Problem

The laser point and the crosshairs in the Viewfinder do not coincide.

Before calibration: **After calibration:**

3D Disto_029   3D Disto_030
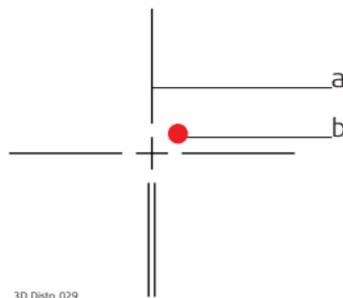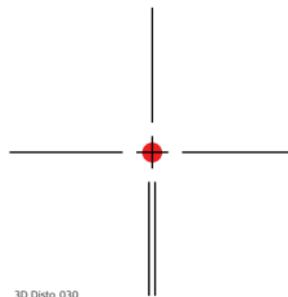
a) Crosshairs
b) Laser spot

Adjustment step-by-step

1. Calibration is started in **Menu** » **Device** » **Calibration**.

2. Press ⊹.

3. Viewfinder opens. Place a target mark at a distance > 25 m. Now aim at the target mark as precisely as possible. Press 🔺 when the red laser spot is exactly on the target.

4. Viewfinder stays open and red crosshairs are displayed. Move crosshairs to the centre of target mark as precisely as possible with the arrow keys. Press ![DIST] again.

5. If in tolerance, pop-up appears with **Set new: x=...px; y=...px**, **Reset to factory default**, or **Cancel calibration**.

6. Choose **Set...** or **Reset...** to adjust crosshairs. Final pop-up asks **Are you sure? Yes/Cancel**.

7. If **Yes**, checkmark is displayed to confirm parameters were set successfully.

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 appear incorrect, for example Tool Kit measurements do not work properly.

☞ Tilt sensor calibration followed by crosshairs calibration is recommended before starting V-Index calibration! Refer to "9.4 Tilt Sensor Calibration" and "9.2 Crosshairs Offset".

Before calibration: **After calibration:**
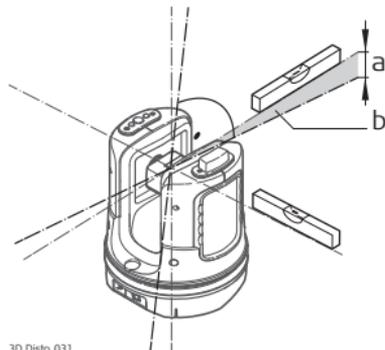
a) Height error
b) Vertical angle offset
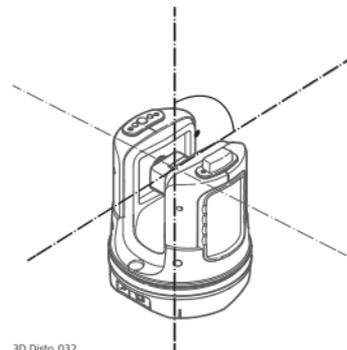
Adjustment step-by-step

1. Set up 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 🔺(DIST).

4. 3D Disto turns to second face automatically.

5. Target a second time. Press 🔺(DIST).

3D Disto_051

6. If both measurements were successful, a pop-up appears with **Set new: XXX gon**, **Reset to factory default**, or **Cancel calibration**.

7. Choose **Set...** or **Reset...** to adjust V-index. Final pop-up asks **Are you sure? Yes/Cancel**.

8. If **Yes**, checkmark is displayed to confirm parameters were set successfully.
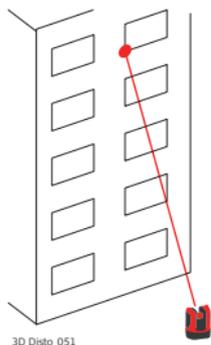
9.4 Tilt Sensor Calibration

Problem

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

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

Before calibration: **After calibration:**

3D Disto_033   3D Disto_034
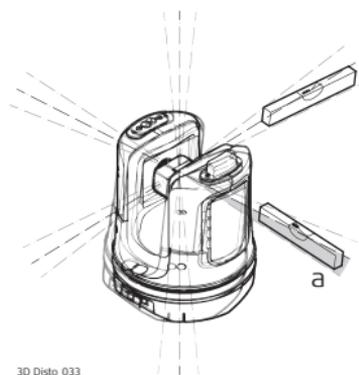
a) Tilt sensor offset
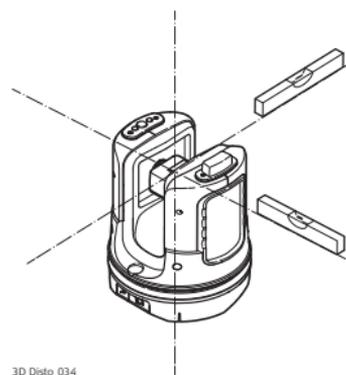
☞ This calibration is done automatically. You must only ensure that the 3D Disto is set up horizontally.

Adjustment step-by-step

1. Press ▬▬.
2. 3D Disto starts self-levelling: the tilt is checked and the instrument levels itself if the tilt is ‹ 3°. Pop-up prompts **Don't touch 3D Disto about 1 minute!**
3. If **ok**, pop-up prompts **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**.
3. If **Yes**: all user-defined calibration settings are reset to factory default without further request.

10 Instrument Protection (Theft Protection)

Description

The instrument can be protected by a **P**ersonal **I**dentification **N**umber. If the PIN protection is activated, the Control Unit will always prompt for a PIN code entry after starting up. If the wrong PIN was entered 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. Contact your Leica Geosystems representative should you need a replacement PUK.

Activate PIN code step-by-step

1. Start-up Control Unit as described in "5 Instrument Setup".
2. Go to **Menu** » **Device** » **Theft Protection**. Default setting is **Off**.
3. Press **On** to activate.
4. Enter your desired PIN code (3 to 8 character numeric or alpha).
5. Accept with **Ok**.

☞ Now the instrument is protected against unauthorised use. The PIN code is required now after switching on the instrument, de-activating standby, or re-entering the PIN settings.

Deactivate PIN code step-by-step	1. Start-up Control Unit as described in "5 Instrument Setup".
	2. Go to **Menu** » **Device** » **Theft Protection**.
	3. Enter your PIN code and press **OK** to accept.
	4. Press **Off** to deactivate.

☞ The instrument is no longer protected 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 minimise 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 recognisable 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.

⚠ **Warning**   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.

⚠ **Warning**

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.

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 distance metre

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.
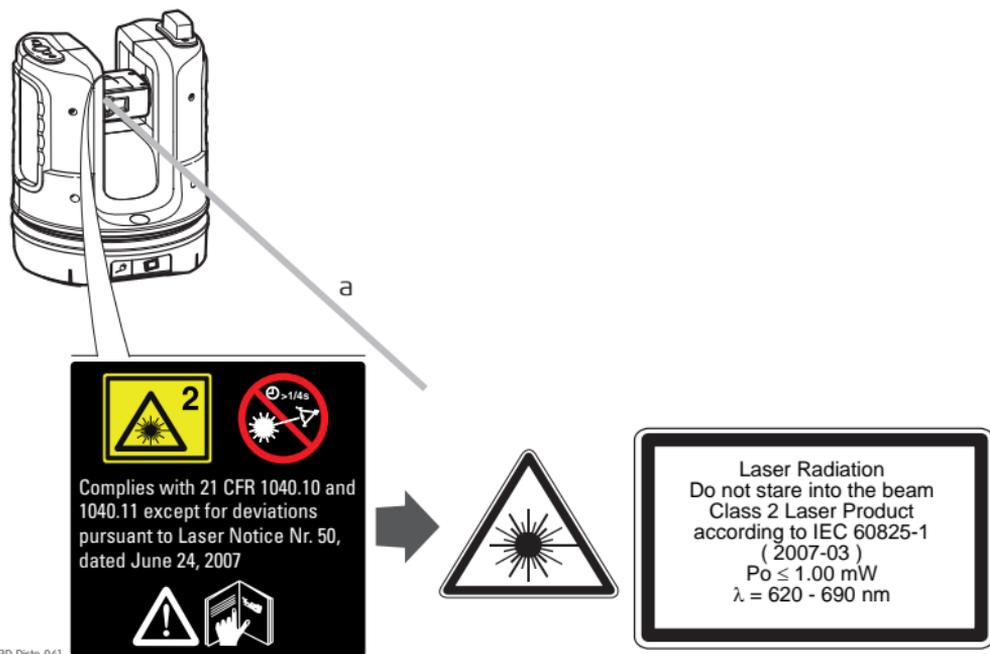
⚠ **Caution**

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

Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice Nr. 50, dated June 24, 2007

3D Disto_041

Laser Radiation
Do not stare into the beam
Class 2 Laser Product
according to IEC 60825-1
(2007-03)
Po ≤ 1.00 mW
λ = 620 - 690 nm

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 to 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
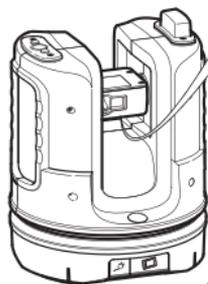
Equi.No.:
123456789012
S/N:
12345678

Type: **Leica 3D Disto**
Art.No.: 772171   Power: 24V ⎓2.5A
IC: 3177A-3DDISTO   FCC ID: RFF-3DDISTO
Patents: WO 9427164, WO 0216964,
WO 03008909, WO 0244754, EP 1195617, WO 9818019
This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) this device must accept any interference received,
including inteference that may cause undesired operation.

SWISS Technology
by Leica Geosystems

Made in Singapore
www.leica-geosystems.com

3D Disto_042

Labelling Control Unit

Art.No.: 123456

S.No.: PC102302494

3D Disto_044

Labelling RM100 Remote Control

Type: **RM100**
Art.No.: 780994

Power: 1.5V ⎓ / 0.4A
Leica Geosystems AG
CH-9435 Heerbrugg
Manufactured:

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 tie distance (3D)

	@ 10 m	@ 30 m	@ 50 m
Combination of angle and distance measurement	ca. 1 mm	ca. 2 mm	ca. 4 mm

Angle measurement (Hz/V)

Working range:	Horizontal 360°, Vertical 250°
Accuracy:	5" (1.2 mm @ 50 m)

Characteristics laser distance metre

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

Tilt sensor

Self-levelling range:	± 3°
Accuracy:	10" (2.5 mm @ 50 m)

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

Circular bubble sensitivity

1°/mm

Operation

Type	Description
Display	High-resolution screen, 800 x 480 Pixel, 4.8'' TFT LCD, 16 mil colour
Buttons/User interface	**3D Disto**: ON/OFF button **Control Unit**: Touchscreen, ON/OFF button
Memory capacity	**Internal memory**: 500 GB **Flash memory**: 32 GB
Ports	**3D Disto**: USB Type B, power supply plug-in, power supply plug-in for Control Unit **Control Unit**: USB Type A, Micro-B, power supply plug-in

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: 186.6 x 215.5 mm (diameter x height)
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

14 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.

TQM
ISO 9001 / ISO 14001

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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