Leica
ScanStation P20
System Field Manual

Version 2.0
English

- when it has to be **right**

Leica
Geosystems

Introduction

☞ To use the product in a permitted manner, please refer to the detailed safety directions in the User Manual.

Purchase Congratulations on the purchase of a Leica ScanStation P20 instrument.

Product identification The type and the serial number of your product are indicated on the type plate. Enter the model and serial number in your manual and always refer to this information when you need to contact your agency or Leica Geosystems authorised service workshop.

Type: _____

Serial No.: _____

Symbols

The symbols used in this manual have the following meanings:

Type	Description
☞	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.

Validity of this manual

This manual applies to the Leica ScanStation P20 instruments.

Available documentation

Name	Description/Format	📖	📄
Leica ScanStation P20 User Manual	All instructions required in order to operate the product to a basic level are contained in the User Manual. Provides an overview of the product together with technical data and safety directions.	✓	✓

Name	Description/Format	📄	📕 Adobe
Leica ScanStation P20 System Field Manual	Describes the general operation of the product in standard use. Intended as a quick reference field guide.	✓	✓
Leica Geosystems HDS Training Manual	Training manual provided in the Leica HDS training course by the local Leica HDS training and support team.		

Refer to the following resources for all Leica ScanStation P20 documentation and software
- Leica ScanStation P20 System USB Stick
- http://www.leica-geosystems.com/downloads
- http://www.leica-geosystems.com/en/HDS-Laser-Scanners-SW_5570.htm
- https://myworld.leica-geosystems.com

Table of Contents

1 Description of the System

1.1 Packing / Unpacking

Unpacking

When in its transport container, the ScanStation P20 can sit in either a face-up or face-down position.

004236_001
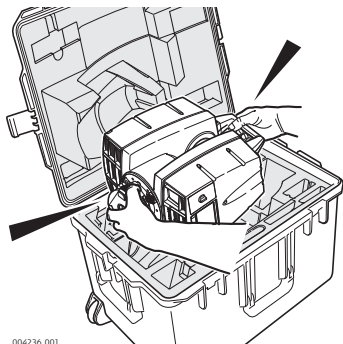
To take the instrument out of its container, grasp the handle and the base of the instrument, and lift.

Use caution due to the weight of the instrument (12 kg).

☞ Pack the instrument the same way it is delivered.

2   Setting Up the Instrument

2.1   General Information

Use the tripod   The instrument should always be set up on its tripod. Using the tripod specified for the scanning system guarantees maximum stability during scanning operations.

☞   Always set up the instrument on its tripod. Do not set up the instrument directly on the ground for scanning operations.

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

2.2 Scanner Setup on Tripod

ScanStation P20 setup step-by-step
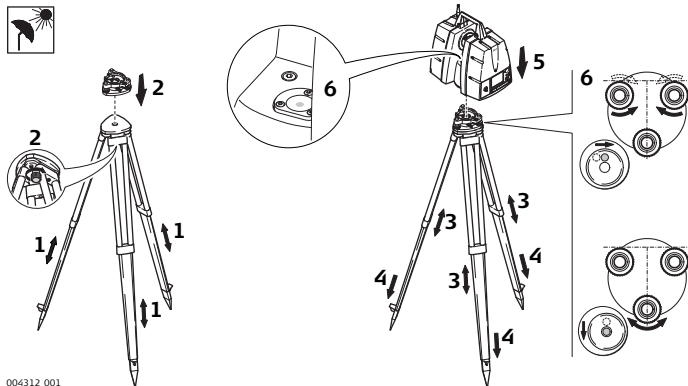
004312_001

☞ Shield the instrument from direct sunlight and avoid uneven temperatures around the instrument.

1. Extend the tripod legs to allow for a comfortable working posture. Tighten the screws at the bottom of the legs.
2. Place the tribrach on the tripod and secure it with the central fixing screw.
3. Set up the tripod so that the tripod plate is as horizontal as possible.
4. Push the tripod legs firmly into the ground.
5. Place the instrument on the tribrach and secure it with the locking knob of the tribrach.
6. Level up the instrument using the instrument's circular level. Turn two of the foot screws together in opposite directions. The index finger of your right hand indicates the direction in which the bubble should move. Now use the third foot screw to centre the bubble.

2.3	Setup Over a Benchmark with the Internal Laser Plummet

Description This topic describes an instrument setup over a marked ground point using the laser plummet. Geo-referencing of the Leica ScanStation P20 is established by setting up over a known or assumed control point, with optional reference target measurement to set the azimuth direction, and establishing a local or global coordinate system. The Leica ScanStation P20 allows you to traverse, resect or free-station. Known azimuth or known backsight measurements can be observed.

☞ It is always possible to set up the instrument without the need for a marked ground point.

☞ With the dual-axis compensator enabled, the data scanned with ScanStation P20 is corrected automatically.

☞ **About the plummet:**
- The laser plummet described in this topic is built into the vertical axis of the instrument. It projects a red spot onto the ground, making it much easier to centre the instrument.
- The laser plummet cannot be used in conjunction with a tribrach equipped with an optical plummet.

Setup with Laser Plummet step-by-step
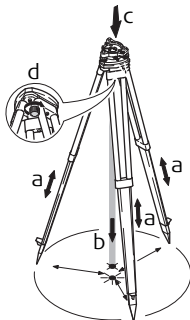
004313_001
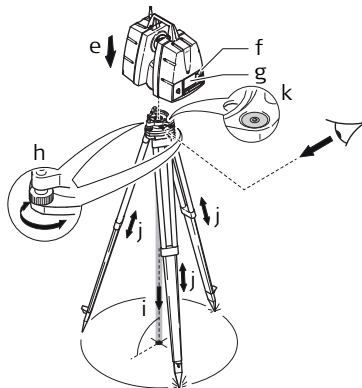
☞ Shield the instrument from direct sunlight and avoid uneven temperatures around the instrument.

1. Extend the tripod legs to allow for a comfortable working posture (**a**). Position the tripod approximately over the marked ground point, centring it as well as possible (**b**).
2. Place the tribrach on the tripod (**c**) and secure it with the central fixing screw (**d**).

3. Place the instrument on the tribrach (**e**) and secure it with the tribrach's locking knob.
4. Turn on the instrument by pressing the ON/OFF button (**f**). Go to **Status**, **Level & Laser Plummet**, **Plummet** and activate the laser plummet (**g**).
5. Move the tripod legs (**a**) and use the tribrach footscrews (**h**) to centre the plummet (**i**) over the ground point.
6. Adjust the tripod legs (**j**) to level the circular level (**k**).
7. By using the electronic level (**Status**, **Level & Laser Plummet**, **Level**) turn the tribrach footscrews (**h**) to precisely level the instrument.
8. Centre the instrument precisely over the ground point (**i**) by shifting the tribrach on the tripod plate.
9. Repeat steps 7. and 8. until the required accuracy is achieved.

2.4 Instrument Height

ScanStation P20 height setup step-by-step

To get an accurate height measurement use the GHM008 instrument height meter in conjunction with the GHT196 distance holder. Both are included with the scanner.
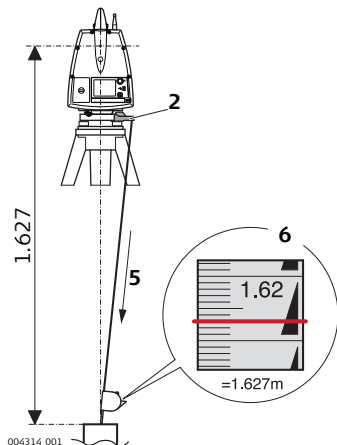
1. Place tripod centrally over the ground point, level instrument.
2. Click GHT196 distance holder to tribrach. It must "snap" onto the cover over an adjusting screw.
3. Unfold measuring tongue, pull out tape measure a little.
4. Insert GHM008 instrument height meter in the distance holder and attach.
5. Swivel measure in the direction of the ground point, pull out until the tip of the measuring tongue touches the point on the ground, keep under tension and do not allow to sag, clamp if necessary.
6. Read height of the instrument (ground - tilt axis) in the reading window at the red marking (in the example 1.627 m).

☞ • For detailed information about the GHM008 instrument height meter and GHT196 distance holder refer to the GHM008/GHT196 user manual which is delivered with these items.
• The tilt axis height of the ScanStation P20 is 250 mm. Take care to use the GHM008 which has a special scale to measure the height of instruments with a tilt axis height of 250 mm. Do not use a tape with any other scale.
• Alternatively the instrument height can be measured with a common, 1:1 scaled measuring tape from the point on the ground to the little notch under the red Leica logo at both side covers of the scanner. This distance will then be from the ground point to the tilt axis.

3 Description of the User Interface

3.1 Front Side

Overview

004255_001
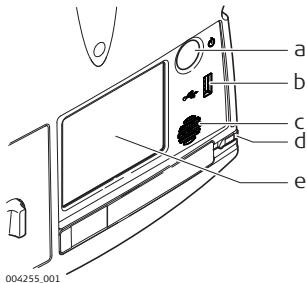
a) ON/OFF button
b) USB socket
c) Loudspeaker
d) Stylus
e) Touch screen user interface

3.2   Display

Overview

004952_001_en

a) Time
b) Caption
c) Title bar
d) Screen area
e) Message bar
f) Status bar
g) Escape button
h) Menu icon
i) SHIFT button
j) Soft keys
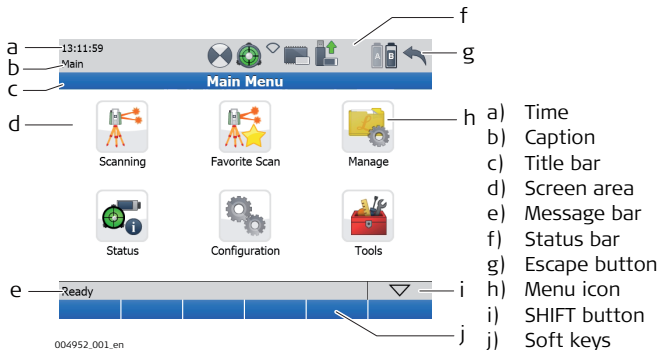
Element	Description
Time	The current local time is shown.
Caption	Shows location in menu system.
Title bar	Shows name of current screen.

Element	Description
Screen area	Working area of the screen.
Message bar	Shows messages.
Status bar	Shows current status information for the instrument.
Escape button	Returns to the previous screen.
Menu icon	Selecting menu icons opens submenus.
SHIFT button	Displays the second level of soft keys.
Soft keys	Commands can be executed with the soft keys.

3.3 Status Bar

Overview
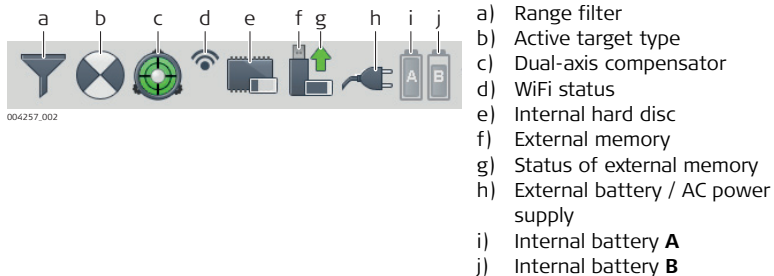The icons in the status bar display the current status information of the instrument. Clicking a status icon gives direct access to a detailed status description.

004257_002

a) Range filter
b) Active target type
c) Dual-axis compensator
d) WiFi status
e) Internal hard disc
f) External memory
g) Status of external memory
h) External battery / AC power supply
i) Internal battery **A**
j) Internal battery **B**

☞
• **Internal battery A** indicates the status of the battery in compartment **A** which is located at the same side cover as the touch screen.
• **Internal battery B** indicates the status of the battery in compartment **B** at the opposite side cover without a screen.

Icon		Description
Range filter		Range filter enabled
Active target type		HDS black/white target 6"
		HDS black/white target 3"
		HDS sphere target
		HDS black/white twin target top
		HDS black/white twin target bottom
		HDS black/white twin target top with extension
		HDS black/white twin target bottom with extension
		User defined target of type HDS black/white 6''

Icon		Description
	⬛	User defined target of type HDS black/white 3''
	⚪	User defined target of type HDS sphere
Dual-axis compensator	🎯	On and levelled
	🎯	Off
	🎯	On but out of range
WiFi	📶	Onboard WiFi adapter on and connected
	▽	Onboard WiFi adapter off
	📶	Onboard WiFi adapter on

Icon		Description
Internal hard disc		Empty
		13% memory used
		25% memory used
		38% memory used
		50% memory used
		63% memory used
		75% memory used
		88% memory used
		Full
Status of external memory		Ready to be removed
		Do not remove

Icon		Description
External memory		Empty
		17% memory used
		33% memory used
		50% memory used
		67% memory used
		83% memory used
		Full
External battery / AC power supply		External battery connected
		AC power supply connected

Icon		Description
Internal battery A/B	**Symbols for the currently used battery:**	
		Empty
		20% capacity
		40% capacity
		60% capacity
		80% capacity
		Full

Icon		Description
	Symbols for the currently unused battery:	
		Empty
		20% capacity
		40% capacity
		60% capacity
		80% capacity
		Full

3.4	**Operating Principles**

Keyboards on touchscreen

The system offers two different virtual keyboard layouts for user input:

- When an **alphanumeric input field** is selected with the stylus, the keyboard will appear in alphanumeric layout. This layout offers letters, numbers and special characters.
- When an **numeric input field** is selected with the stylus, the keyboard will appear in numeric layout. This layout offers numbers and some special characters.
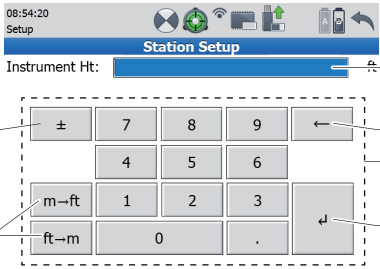
Keyboard layouts   **Alphanumeric layout:**

004942_001_en
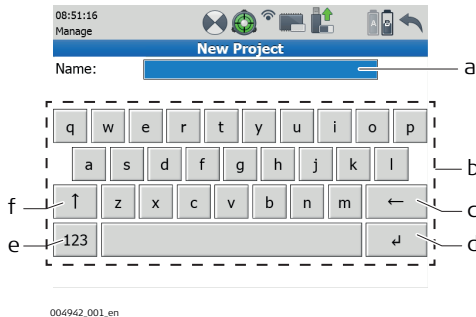
a) Input field
b) Alphanumeric keypad
c) Backspace
d) Enter
e) Toggle between letters and numbers/special characters
f) Shift - Toggle between lower case and upper case characters

Numeric layout:

004943_001_en

a) Input field
b) Backspace
c) Numeric keypad
d) Enter
e) Toggle between positive and negative number
f) Unit calculator (optional when distance units **ft** or **fi** are selected)

4 Switching the System On/Off

Switch on procedure

1. Set up the instrument as desired. Refer to chapter "2 Setting Up the Instrument" for more information.
2. Press and hold the ON/OFF button for 2 seconds until a beep is audible.
3. The instrument starts with several subsequent beeps and a short melody.
4. The **Leica Geosystems** welcome screen starts.
5. Wait until the **Main Menu** appears on the display.

Switch off procedures

Shutdown via Main Menu:

1. From the current menu return to the **Main Menu**.
2. In the **Main Menu** press the ← button.
3. In the popup window confirm the question **Do you want to shutdown?** with **Yes**.
4. Wait for the scanner to shut down.

Shutdown via On/Off button:

1. Press and hold the **On/Off button** for 2 seconds until a **single beep** is audible.
2. Wait for the scanner to shut down.

In case of a system crash (forced shutdown):
1. Press and hold the **On/Off button** for 6 seconds until a **double beep** is audible.
2. Wait for the scanner to shut down.

5 Remote Control

Overview

The ScanStation P20 can be controlled remotely by a Viva Controller via WiFi communication.

The following hardware is needed:

- Viva Controller (CS10 or CS15) equipped with a WiFi adapter. Check the sticker **This device contains...** in the battery compartment of the Viva Controller: In case a WLAN module is listed, the controller is equipped with a WiFi adapter.

Installation of the ScanStation P20 Remote Control Application on the Leica Viva Controller

1. Copy the installation file **P20_RemoteControl.CAB** onto a USB memory device.
2. Switch on the Viva Controller and connect the USB memory device to the controller.
3. In case SmartWorx Viva application is running, close this application by pressing **Fn** -> **Exit**.
4. Double-click **My Device** and navigate to the USB memory device.
5. Double-click the file **P20_RemoteControl.CAB**.
6. Confirm the suggested installation folder **Program Files** by pressing **OK** within the **Install Leica Geosystems AG P20 ...** dialog.
7. The application will be installed. A start-up menu folder as well as a desktop icon will be created.
8. Disconnect the USB memory device.

Enable the WiFi	1. Go to **Start** -› **Settings** -› **Control Panel**.
adapter of your	2. Double-click on **Network and Dial-up Connections**.
Viva Controller	3. Select the icon of the WiFi device (e. g. **NXPWLAN1**) and press **File**. If the menu lists **Disable**, the WiFi device is already enabled. In this case leave the control panel without any changes. If the menu lists **Enable**, press **Enable** and leave the control panel.
	4. Close the control panel.

ScanStation P20	1. Switch on the ScanStation P20 and wait for the boot process to finish.
Remote Control	2. Select **Status** to get to the **Status Menu**.
	3. In the **Status Menu** select **Connections** to open the **WiFi Configuration** menu.
	4. In the **WiFi Configuration** menu set:
	• WiFi Operation = Enabled
	• WiFi Connection = Ad-hoc mode
	5. Start the ScanStation P20 Remote Control application on your Viva Controller by double-clicking the desktop icon.
	6. Within the ScanStation P20 Remote Control dialog press **Find scanner** and wait for your ScanStation P20 to be listed within the list of available scanners.
	7. As soon as your ScanStation P20 is listed, select it and press **Connect**.
	8. Wait until the ScanStation P20 onboard control is displayed on your Viva Controller.

9. Close the ScanStation P20 Remote Control window as well as the ScanStation P20 Remote Control dialog by pressing the ↰ button in the respective dialog.

☞ The USB port of the Viva Controller will not replace the USB port of the ScanStation P20 while you are connected to the scanner. In order to download scanning projects, upload control point files or system files you always have to use the USB port of the ScanStation P20.

☞ Since the Viva Controller CS10 has a screen in upright format the ScanStation P20 Remote Control application offers the option to rotate the onboard control by 90° on the controller's screen. In order to activate the 90°-rotation, select **Rotate screen**. This option is not available on the Viva Controller CS15.

☞ For details about the CS10/CS15 controllers refer to the CS10/CS15 user manual.

6 Main Menu

Description The **Main Menu** will be displayed after the system boot process. **Ready** in the message bar indicates that the instrument is ready for scanning.

Main Menu screen
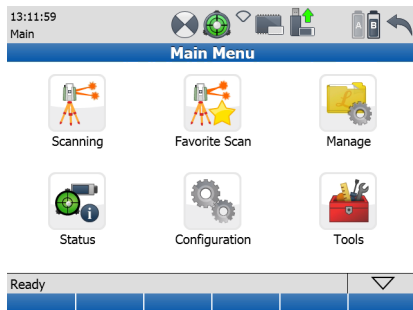
Icon		Function
Scanning		Offers access to all commands for scanner setup and operation control.
Favorite Scan		Starts scan immediately with pre-defined scan settings.
Manage		Offers access to all commands for project, target and control point management.
Status		Offers access to all commands for the scanner's status information.
Configuration		Offers access to all commands for the configuration of the system.
Tools		Offers access to all commands for disc formatting, data transfer, license management, display and instrument calibration.

Menu independent commands:

Command		Function
Escape	↩	Return to previous menu in menu hierarchy.
Shift -> Quit	▽ Quit	Return to main menu.
Page	Page	Switch between pages in a menu.

7 Scanning

Access   Select **Main Menu, Scanning** 🔺 .

Description   In the **Scanning** menu all commands for the scanner setup and operation control are available.

7.1 Scanning\Scan Begin

Access   Select **Main Menu, Scanning** 🔺 .

Description   Scan data is stored on the ScanStation P20 by projects which contain stations for each scanner position. In the **Scan Begin** screen a new project can be created or an existing project can be selected. For a chosen project a new station can be defined by various setup methods (Standard, Quick Orientation, Set Azimuth, Known Backsight or Resection) or an existing one can be used to continue.

Scan Begin screen

09:37:33
Scan

Scan Begin

Project: ProjectName ▼ ⚙

Ready

| Cont | | Setup | | StdStp | ChkBS |

Field	Description
Project	Shows the current project. Click the name field to open a list of available projects. Click the icon ⚙ to open the **Manage**, **Projects** screen for selecting another project, adding a new project, editing or deleting an existing project, and displaying project details.

Available commands:

Command	Function
Cont	Continue with the current project. Opens the **Current Station Information** window.
Setup	Opens the **Station Setup** screen for station setup via **Quick Orientation**, **Set Azimuth**, **Known Backsight** or **Resection**.
StdStp	Create a new station with standard setup parameters (Northing, Easting, Height, Instrument height = 0). Opens the **Scan Parameters** screen.
ChkBS	Open **Check Backsight** screen to define a known backsight target for current setup control.
Shift ->Conf	Open the Setup Configuration screen to define limits and attributes of the various setup methods.

7.2	**Scanning\Setup**

Access	Select **Main Menu, Scanning** .

Description	In the **Scanning, Scan Begin** screen various methods for station setup can be chosen by the commands **StdStp** and **Setup**:

      1. Standard Setup
      2. Quick Orientation
      3. Set Azimuth
      4. Known Backsight
      5. Resection (by 4 or 6 parameter transformation)

7.2.1	**Scanning\Setup\Standard Setup**

Access	Select **Main Menu, Scanning** **, StdStp**.

Description   The command **StdStp** in the **Scan Begin** screen creates a new station with standard setup parameters and proceeds to the **Scan Parameters** screen.

Station Parameter	Value for Standard Setup
Northing	0
Easting	0
Height	0
Instrument Height	0
Bearing	Current bearing of glass circle.

☞   When **Stn ID & Ht** in **Setup Configuration**, **StdStp** has been set to **Custom**, the command **StdStp** in **Scan Begin** opens the **Standard Station Setup** screen where user-defined station ID and instrument height can be entered before proceeding to the **Scan Parameter** screen.

7.2.2 Scanning\Setup\Quick Orientation
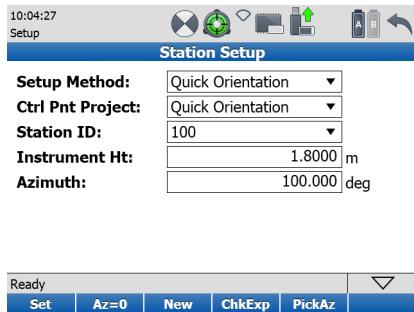
Access

Select **Main Menu, Scanning** 🔭 **, Setup**.

Description

The **Quick Orientation** setup option offers scanner setup over a known control point and azimuth definition without aiming at a target.

Station Setup: Quick Orientation screen

10:04:27
Setup

Station Setup

Setup Method:	Quick Orientation ▼
Ctrl Pnt Project:	Quick Orientation ▼
Station ID:	100 ▼
Instrument Ht:	1.8000 m
Azimuth:	100.000 deg

Ready

| Set | Az=0 | New | ChkExp | PickAz | ▽ |

Field	Description
Setup Method	Select the station setup method.
Ctrl Pnt Project	Select the project which contains the current station control point.
Station ID	Select the station ID of the current station.
Instrument Ht	Enter the instrument height (control point to tilt axis).
Azimuth	Enter the azimuth to define the orientation of the project coordinate system.

Command	Function
Set	Accept station setup and proceed to **Scan Parameters** screen.
Az=0	Set the **Azimuth** = 0.
New	Opens the **New Control Point** screen to create a new control point in the selected project.
ChkExp	Opens video camera window to check and adjust exposure time to set exposure time manually.
PickAz	Select azimuth direction from the video image.

7.2.3 Scanning\Setup\Set Azimuth
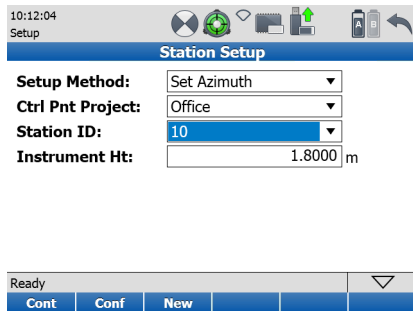
Access

Select **Main Menu, Scanning** 📡 **, Setup**.

Description

The **Set Azimuth** setup option offers scanner setup over a known control point and azimuth definition by aiming at a backsight target.

Station Setup: Set Azimuth screen


```
10:12:04
Setup
                    Station Setup
Setup Method:      Set Azimuth      ▼
Ctrl Pnt Project:  Office           ▼
Station ID:        10               ▼
Instrument Ht:            1.8000 m

Ready                               ▽
Cont    Conf    New
```

Field	Description
Setup Method	Select the station setup method.
Ctrl Pnt Project	Select the project which contains the current station control point.
Station ID	Select the station ID of the current station.
Instrument Ht	Enter the instrument height (control point to tilt axis).

Command	Function
Cont	Confirm station input and continue with **DefineBacksight: Set Azimuth.**
Conf	Opens the **General** tab in **Setup Configuration** where a reminder for the station information can be enabled/disabled and target scanning by one face or two faces can be defined.
New	Opens the **New Control Point** screen to create a new control point in the selected project.

Define Backsight: Set Azimuth screen, Target Def

10:27:22		
Setup		

Define Backsight: Set Azimuth

Target Def | Target List

Backsight ID:	11	▼
Target Type:	B/W Target 6"	▼
Target Height:	1.4710	m
Azimuth:	100.000	deg

Ready					▽
Cont		Az=0	ChkExp	PickT	Page

Field	Description
Backsight ID	Enter the target ID of a new backsight target.
Target Type	Enter the target type of the selected backsight target.
Target Height	Enter the target height of the selected backsight target.
Azimuth	Enter the azimuth to define the orientation of the project coordinate system.

Command	Function
Cont	Execute backsight target scan and setup calculation. Show results in **Set Azimuth Results** screen.
Az=0	Set the **Azimuth** = 0.
ChkExp	Open video camera window to check and adjust exposure time for manual exposure time setting.
PickT	Select target from the video image. After selection, the target is listed on the **Target List** page.
Page	Switch to the **Target List** page.

Define Backsight: Set Azimuth screen, Target List

Field	Description
Target ID	Shows the target ID of a new backsight target after **PickT** was executed.
Type	Shows the target type of the selected backsight target after **PickT** was executed.
Height	Shows the target height of the selected backsight target after **PickT** was executed.

Command	Function
Cont	Start backsight target scan to selected target and setup calculation. Show results in **Set Azimuth Results** screen.
Edit	Open the **Edit Target** menu to edit the selected target.
Del	Delete selected target from the target list.
Page	Switch to the **Target Def** page.

**Set Azimuth
Results screen,
Stn & Tgt**

10:35:00	
Setup	

Set Azimuth Results

Stn & Tgt | Tgt Coords

Station ID:	10
Instrument Ht:	1.8000 m
Backsight ID:	11
Target Height:	1.4710 m
Target Type:	B/W Target 6"
Horiz Dist:	2.0778 m

Ready

Set	Info	View			Page

Field	Description
Station ID	Station ID of current station.
Instrument Ht	Instrument height as entered by the user.
Backsight ID	Target ID of the selected backsight target.
Target Height	Target height as entered by the user.
Target Type	Target type of the selected backsight target.
Horiz Dist	Horizontal distance between station and backsight target.

Command	Function
Set	Accept the setup results for this station and proceed to **Scan Parameters** screen.
Info	Show the target information of the selected target.
View	View point cloud of selected backsight target scan.
Page	Switch to the **Tgt Coords** page.
Shift -> Redo	Repeat backsight target scan of selected target and setup calculation.

Set Azimuth Results screen, Tgt Coords

10:39:17
Setup

Set Azimuth Results

Stn & Tgt | Tgt Coords

Backsight ID: 11
Northing: 0.8725 m
Easting: 2.7141 m
Height: -1.0763 m

Ready

| Set | Info | View | | | Page |

Field	Description
Backsight ID	Target ID of the selected backsight target.
Northing	Northing of the selected backsight target calculated from scanned target data and user defined azimuth.
Easting	Easting of the selected backsight target calculated from scanned target data and user defined azimuth.
Height	Height of the selected backsight target calculated from scanned target data.

Command	Function
Set	Accept the setup results for this station and proceed to **Scan Parameters** screen.
Info	Show the target information of the selected target.
View	View point cloud of selected backsight target scan.
Page	Switch to the **Stn & Tgt** page.

7.2.4 Scanning\Setup\Known Backsight
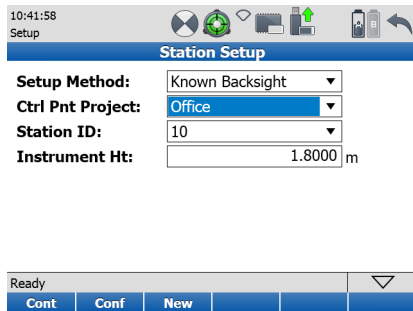
Access

Select **Main Menu, Scanning** **, Setup**.

Description

The **Known Backsight** setup option offers scanner setup over a known control point and scanner orientation by aiming at a known backsight target.

Station Setup: Known Backsight screen

Field	Description
Setup Method	Select the station setup method.
Ctrl Pnt Project	Select the project which contains the current station control point.
Station ID	Select the station ID of the current station.
Instrument Ht	Enter the instrument height (control point to tilt axis).

Command	Function
Cont	Confirm station input and continue with **Define Backsight: Known Backsight**.
Conf	Opens the **Setup Configuration** for the known backsight method.
New	Opens the **New Control Point** screen to create a new control point.

Station Setup: Known Backsight screen, Target Def

Field	Description
Ctrl Pt Project	Select the control point project which contains the backsight point.
Backsight ID	Enter the ID of the backsight point.
Target Type	Select the type of the backsight target.
Target Height	Enter the height of the backsight target.

Command	Function
Cont	Execute backsight target scan and setup calculation. Show results in **Known Backsight Results** screen.
New	Opens the **New Control Point** screen.
ChkExp	Open video camera window to check and adjust exposure time for manual exposure time setting.
PickT	Select target from the video image. After selection, the target is listed on the **Target List** page.
Page	Switch to the **Target List** page.

**Station Setup:
Known Backsight,
Target List**

10:47:11	⊗ ⊕ ◇ ▬ ⬆ 🔋 ↰
Setup	

Define Backsight: Known Backsight

Target Def / Target List

Target ID	Type	Height
11	B/W Target 6"	1.4710 m

Ready					▽
Cont		**Edit**	**Del**		**Page**

Field	Description
Target ID	Shows the point ID of the backsight point after **PickT** was executed.
Type	Shows the target type on the backsight point after **PickT** was executed.
Height	Shows the target height of the selected backsight target after **PickT** was executed.

Command	Function
Cont	Execute backsight target scan and setup calculation. Show results in **Known Backsight Results** screen.
Edit	Open the **Edit Target** menu to edit the selected target.
Del	Delete selected target from the target list.
Page	Switch to the **Target Def** page.

**Station Setup:
Known Backsight
Results screen,
Stn & Tgt**

10:52:44	
Setup	
Known Backsight Results	
Stn & Tgt Delta	
Station ID:	10
Instrument Ht:	1.8000 m
Backsight ID:	11
Target Height:	1.4710 m
Target Type:	B/W Target 6"
Horiz Dist:	2.0778 m
Ready	
Set	Info	View			Page

Field	Description
Station ID	Station ID of current station.
Instrument Ht	Instrument height as entered by the user.
Backsight ID	Point ID of the backsight point.
Target Height	Target height as entered by the user.
Target Type	Target type on the backsight point.
Horiz Dist	Horizontal distance between station and backsight point.

Command	Function
Set	Accept the setup results for this station and proceed to **Scan Parameters** screen.
Info	Show the target information of the selected target.
View	View point cloud of backsight target scan.
Page	Switch to the **Delta** page.
Shift -> Redo	Rerun backsight target scan and setup calculation.

**Station Setup:
Known Backsight
Results screen,
Delta**

10:55:49
Setup

Known Backsight Results

Stn & Tgt | Delta

Backsight ID: 11
ΔNorthing: 0.0000 m
ΔEasting: 0.0001 m
ΔHeight: -0.0001 m
ΔHoriz Dist: 0.0001 m

Ready

| Set | Info | View | | | Page |

Field	Description
Backsight ID	Point ID of the backsight point.
ΔNorthing	Difference in Northing between calculated and measured coordinate.
ΔEasting	Difference in Easting between calculated and measured coordinate.
ΔHeight	Difference in Height between calculated and measured coordinate.
ΔHoriz Dist	Difference in Horizontal Distance between calculated and measured distance.

Command	Function
Set	Accept results from Known Backsight station setup and proceed to **Scan Parameters** screen.
Info	Show the target information of the selected target.
View	View point cloud of backsight target scan.
Page	Switch to the **Stn & Tgt** page.

7.2.5	**Scanning\Setup\Resection**
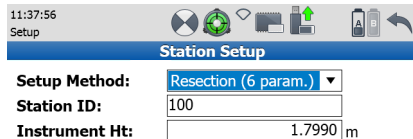
Access

Select **Main Menu, Scanning** , **Setup**.

Description

The **Resection** setup option offers scanner setup over an unknown station and station coordinate calculation by aiming at known target positions.

Station Setup: Resection screen

11:37:56 Setup	⊗ 🔄 ⬡ ▭ 📑	🔋 ↩
	Station Setup	

Setup Method:	Resection (6 param.) ▼
Station ID:	100
Instrument Ht:	1.7990 m

Ready						▽
Cont	**Conf**	**New**				

Field	Description
Setup Method	Choose resection type by 4 or 6 parameter transformation. • 4 Parameters: 3 translations and 1 rotation around z axis. Minimum two targets required. • 6 Parameters: 3 translations and 3 rotations. Minimum three targets required.
Station ID	Enter the station ID of the current station.
Instrument Ht	Enter the instrument height (control point to tilt axis).

Command	Function
Cont	Confirm station input and continue with **Define Resection Targets**.
Conf	Opens the **Setup Configuration** for the resection method.
New	Open the **New Control Point** menu to enter a new control point.

Define Resection Targets screen, Target Def

11:45:41
Setup

Define Resection Targets

Target Def | Target List

Ctrl Pnt Project: Office

Target ID: 4

Target Type: B/W Target 6"

Target Height: 0.0000 m

No of Targets: 4

Ready

| Cont | New | | ChkExp | PickT | Page |

Field	Description
Ctrl Pnt Project	Select the control point project which contains the target coordinates.
Target ID	Enter the target ID of a known control point target.
Target Type	Enter the target type of the selected control point target.
Target Height	Enter the target height of the selected control point target.
No of Targets	Number of picked targets to be scanned.

Command	Function
Cont	Start target scan to selected targets and setup calculation. Show results in **Resection Results** screen.
New	Open the **New Control Point** menu to enter a new control point.
ChkExp	Open video camera window to check and adjust exposure time for manual exposure time setting.
PickT / Add	Select target centre from the video camera image. After selection, the target is listed on the **Target List** page as a candidate for target acquisition. ☞ When an orientation has already been computed then the additional target can be added from a list by **Add** and aimed automatically without any target picking.
Page	Switch to the **Target List** page.

Define Resection Targets screen, Target List

Field	Description
Target ID	Shows the target ID of a new target after **PickT** was executed.
Type	Shows the target type of the selected target after **PickT** was executed.
Height	Shows the target height of the selected target after **PickT** was executed.

Command	Function
Cont	Start target scan to selected targets and setup calculation. Show results in **Resection Results** screen.
Edit	Open the **Edit Target** menu to edit the selected target.
Del	Delete selected target from the target list.
Page	Switch to the **Target Def** page.

Resection Results screen, Stn Coords

11:59:26
Setup

Resection Results

Stn Coords | Sigma | Target List | Plot

Station ID:	100
Instrument Ht:	1.7990 m
No of Targets:	6
Northing:	0.3984 m
Easting:	0.3304 m
Height:	-1.0708 m

Ready

| Set | | | | | Page |

Field	Description
Station ID	Station ID of current station.
Instrument Ht	Instrument height as entered by the user.
No of Targets	Number of targets used for resection calculation.
Northing	Northing of current station calculated by resection setup.
Easting	Easting of current station calculated by resection setup.
Height	Height of current station calculated by resection setup.

Command	Function
Set	Accept the setup results for this station and proceed to **Scan Parameters** screen.
Page	Switch to the **Sigma** page.

Resection Results screen, Sigma

Field	Description
Station ID	Station ID of current station.
σNorthing	Standard deviation of station northing.
σEasting	Standard deviation of station easting.
σHeight	Standard deviation of station height.
σHz Orient	Standard deviation of horizontal orientation.

Command	Function
Set	Accept the setup results for this station and proceed to **Scan Parameters** screen.
Orient / E,N,H	For a 6 parameter resection toggle between display of standard deviations for the station coordinates and the 3 rotation angles.
Page	Switch to the **Target List** page.

Resection Results screen, Target List

Field	Description
Target ID	**Target ID** of scanned target.
dN	Target residuals **dN**, **dE**, **dH**. Display can be changed by **More** soft key.
Use	Target status for resection calculation (**Yes** = used, **No** = not used).

Command	Function
Set	Accept the setup results for this station and proceed to **Scan Parameters** screen.
Add	Switch to **Define Resection Targets** and define additional targets for resection. ☞ When an orientation has already been computed then the additional target can be aimed automatically and no target picking is required.
View	View point cloud of selected target scan.
Use	Change the target status in the **Use** field from **Yes** to **No**.
More	Switch the target residuals display from **dN** to **dE** and **dH**.
Page	Switch to the **Plot** page.

Command	Function
Shift->Redo	Repeat target scan to selected target and setup calculation.

Resection Results screen, Plot
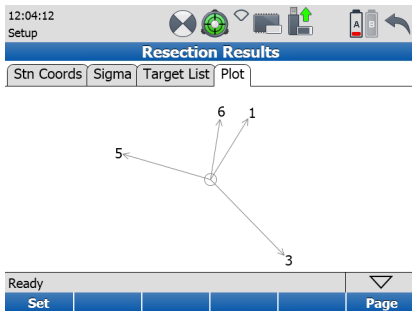
Field	Description
Set	Accept the setup results for this station and proceed to **Scan Parameters** screen.
Page	Switch to the **Stn Coords** page.

7.2.6	**Scanning\Setup\Setup Configuration**
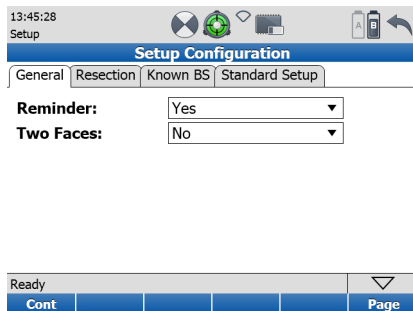
Access
Select **Main Menu**, **Scanning**, **Setup**, **Conf.**

or **Main Menu, Scanning, Shift ->Conf.**

Description
In the **Setup Configuration** menu the user can configure limits and specifications for the various setup methods.

General page

13:45:28 Setup		
Setup Configuration		
General	Resection	Known BS	Standard Setup

Reminder:	Yes ▼
Two Faces:	No ▼

Ready	▽
Cont	**Page**

Field	Options	Description
Reminder	**Yes**	Enable a reminder for the station information: **Current Setup Information** will be displayed every time the **Cont** button is pressed within the **Scan Begin** screen.
	No	Disable the reminder for the station information.
Two Faces	**Yes**	Enable target scanning in two faces.
	No	Scan targets in Face I only.

Command	Function
Cont	Confirm settings for setup configuration and continue with the **Scan Begin** screen.
Page	Switch to the **Resection** page.

Current Station Information
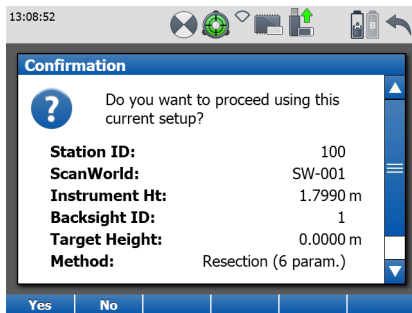
Resection page

Field	Description
Accuracy Hz Ori	Threshold for standard deviation of horizontal orientation.
Accuracy Pos Tgt	Threshold for the Easting and Northing residuals (ΔE and ΔN) of the targets used in resection.
Accuracy Ht Tgt	Threshold of height residuals (ΔH) of the targets used in resection.

Command	Function
Cont	Confirm settings for resection setup and continue with the **Scan Begin** screen.
Page	Switch to the **Known BS** page.

Known BS page

13:49:54	
Setup	

Setup Configuration

General | Resection | Known BS | Standard Setup

Pos Check:	Yes
Pos Limit:	0.0050 m
Ht Check:	Yes
Ht Limit:	0.0040 m

Ready					
Cont					**Page**

Field	Options	Description
Pos Check	**Yes**	Enable checking of horizontal coordinate difference (hz range) between existing and measured known backsight point. If defined **Pos Limit** is exceeded, the setup can be repeated, skipped or stored.
	No	Disable checking of horizontal coordinate difference between existing and measured known backsight point.
Pos Limit		Threshold of horizontal coordinate difference accepted in **Pos Check**.
Ht Check	**Yes**	Enable checking of vertical difference between existing and measured known backsight point. If defined **Ht Limit** is exceeded, the setup can be repeated, skipped or stored.
	No	Disable checking of vertical difference between existing and measured known backsight point.
Ht Limit		Threshold of vertical difference accepted in **Ht Check**.

Command	Function
Cont	Confirm settings for known backsight setup and continue with the **Scan Begin** screen.
Page	Switch to the **General** page.

Standard Setup Page

10:49:55	⊗ ⊕ ◇ ▦ ▮A▮B ↰
Setup	

Setup Configuration

General | Resection | Known BS | Standard Setup

Reminder: Yes ▼

Stn ID & Ht: Custom ▼

Ready	▽
Cont	**Page**

Field	Options	Description
Reminder	**No**	No reminder asks for a new station when scans, targets or images are added to an existing station with data in it.
	Yes	When scans, targets or images are created in an existing station with data in it, a reminder opens and asks if a new station should be created when • the current station has been created by **Stdstp** • the current **ScanWorld** is not empty
Stn ID & Ht	**Automatic**	Standard setup **StdStp** does not ask for station ID and instrument height but creates new station with standard setup parameters and proceeds to the **Scan Parameter** screen.
	Custom	Standard setup **StdStp** opens the **Standard Station Setup** screen and asks for user-defined station ID and instrument height before proceeding to the **Scan Parameter** screen.

Command	Function
Cont	Confirm settings for standard setup and continue with the **Scan Begin** screen.
Page	Switch to the **General** page.

Standard Station Setup

7.3	**Scanning\Scan Parameters**
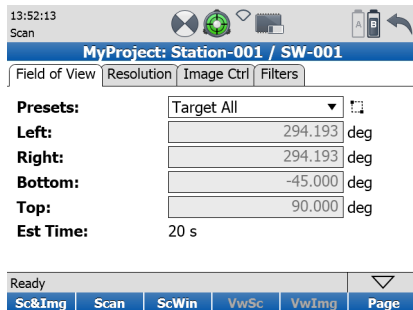
Access

Select **Main Menu, Scanning** , **Scan Parameters**.

Description

Once a project and station are chosen, the **Scan Parameters** menu offers four pages for all kinds of scan and image controls: **Field of View**, **Resolution**, **Image Ctrl** and **Filters.**

Scan Parameters screen

13:52:13 Scan		
MyProject: Station-001 / SW-001		
Field of View	Resolution	Image Ctrl	Filters

Presets:	Target All ▼	
Left:	294.193	deg
Right:	294.193	deg
Bottom:	-45.000	deg
Top:	90.000	deg
Est Time:	20 s	

Ready					▽
Sc&Img	Scan	ScWin	VwSc	VwImg	Page
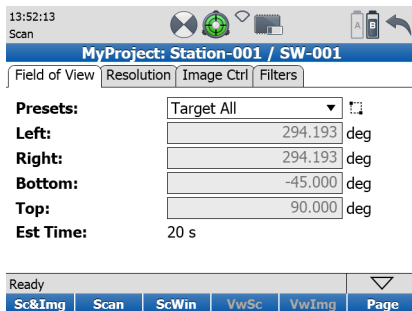
In the title bar of the **Scan Parameters** screen the current project, station and ScanWorld are constantly listed. The same information can be displayed by clicking in the message bar.

7.3.1	**Scanning\Scan Parameters\Field of View**

Access   Select **Main Menu, Scanning** , **Scan Parameters, Field of View**.

Description   In the **Field of View** page of the **Scan Parameters** screen the area to be scanned can be defined by several different methods. For detailed information about the different options and commands that can be executed from this page refer to the descriptions on the following pages.

Field of View page

13:52:13 Scan	

MyProject: Station-001 / SW-001

Field of View | Resolution | Image Ctrl | Filters

Presets:	Target All ▼	
Left:	294.193	deg
Right:	294.193	deg
Bottom:	-45.000	deg
Top:	90.000	deg
Est Time:	20 s	

Ready

| Sc&Img | Scan | ScWin | VwSc | VwImg | Page |

Field	Description
Presets	Selection of fixed or user defined area to scan or take pictures.
Left	Left limit of the area to scan or take pictures.
Right	Right limit of the area to scan or take pictures.
Bottom	Bottom limit of the area to scan or take pictures.
Top	Top limit of the area to scan or take pictures.
Est. Time	Estimated duration of the defined scan derived from the current settings in **Field of View** and **Resolution**.

Presets

In the **Presets** field the following different predefined settings for the field of view (FoV) are listed.

Preset	Horizontal FoV [°]	Vertical FoV [°]
Custom View	User defined	User defined
Quick Scan	Defined by Quick Scan aiming	User defined (default: -45 to +90)
Rectangle 60x60	60	60

Preset	Horizontal FoV [°]	Vertical FoV [°]
Rectangle 90x90	90	90
Rectangle 360x60	360	60
Rectangle 360x90	360	90
Target All	360	270

☞ All presets except **Custom View** and **Quick Scan** have fixed values for left/right and bottom/top that cannot be edited.

Available commands:

Command	Function
Sc&Img	Start scan and image acquisition with selected FoV and resolution.
Scan	Start scan only with selected FoV and resolution, no images.
ScWin	Open scan window for area selection from video stream image.
VwSc	View point cloud of last scan with zoom, pan and show previous/next functionality.
VwImg	View last image with next/previous functionality.
Page	Switch to the **Resolution** page.

Command	Function
Shift -> Target	Open the **Target Definition** screen to select target ID, target height and target type.
Shift -> Image	Start image acquisition with selected FoV, exposure time and image resolution.
Shift -> ChkBS	Open **Check Backsight** screen to define a known backsight target for current setup control.

Quick Scan

13:54:37		
Scan		

MyProject: Station-001 / SW-001

Field of View | Resolution | Image Ctrl | Filters

Presets:	Quick Scan ▼	
Left:	294.193	deg 🔒
Right:	39.939	deg
Bottom:	-45.000	deg
Top:	90.000	deg
Est Time:	14 s	

Ready					▽
Sc&Img	Scan	ScWin	VwSc	VwImg	Page

In the **Quick Scan** preset the **Left**/**Right** fields show the current scanner direction. For a quick definition of the scan or image FoV aim the scanner in the designated horizontal direction and press the **Unlocked** button 🔓 to lock the current scanner direction for the **Left** field. The button changes to the **Locked** button 🔒 and the locked value is greyed out. Repeat the procedure for the **Right** field or unlock again. Then edit the default **Bottom** and **Top** fields manually if needed.

**Scan Window
screen**

Available commands:

Command		Function
Continue	✓	Continue and return to the **Field of View** page of the **Scan Parameters** screen. The boundaries of a defined scan/image area will be copied into the corresponding fields.
Scan	◯	Return to **Field of View** page and start a scan only of the specified area.

Command		Function
Scan & Image	📷	Return to **Field of View** page and start a scan and image acquisition of the specified area.
Image	📷	Start image acquisition of the specified area.
Zoom In	⊕	Zoom in to the centre of the video camera image.
Zoom Out	⊖	Zoom out from the centre of the video camera image.
Rotate	✪ ✪	Press one of the four arrow buttons to rotate the scanner up, down, left or right. Once a button is pressed the scanner starts to move in the selected direction constantly. Press the video screen again at any position to stop the rotation. In activated mode the icon turns green.
Seek	⊕ ⊕	Select a point in the video camera window to define it as the new window centre. The scanner rotates accordingly in horizontal and vertical direction to reposition the crosshair. In activated mode the icon turns green.
Fence	⊡ ⊡	Select the scan/image area by fencing the area in the current video camera image. In activated mode the icon turns green.

Scanning screen

13:56:08
Scan

Scanning

63 %

Station:	Station-001
ScanWorld:	SW-001
Scan:	1 / 1
Est Time:	7 s
Total Est Time:	7 s

Scanning

Pause | Cancel
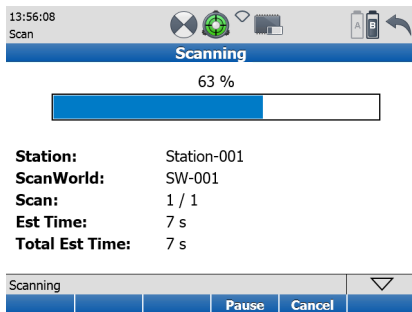
Field	Description
Progress bar	Scan progress in percent.
Station	Name of the current station.
ScanWorld	Name of the current ScanWorld.
Scan	Number of scan.
Est Time	Estimated time to finish scan.

Field	Description
Total Est Time	Total estimated time for scan and image acquisition using the current settings.

Available commands:

Command	Function
Pause	Pause current scan. Once paused the button changes to **Resume**. Press again to resume paused scan.
Cancel	Cancel current scan and return to the **Field of View** menu.

View scan screen

Available commands:

Command		Function
Colourise	🌈⬜	Switch between coloured 🌈 and black & white ⬜ intensity display.
Add Scan	✚	Add fenced scan area to **Scan List**.
View Scan List	☰	View **Scan List** of selected scan areas.

Command		Function
Pan	🖐 🖐	Pan mode to move current scan on screen. In activated mode the icon turns green.
Fence	⬚ ⬚	Select the scan area by fencing the area. In activated mode the icon turns green.
Continue	✓	Continue and return to **Field of View** menu.
Scan	⊙	Return to **Field of View** menu and start a scan only of all scan areas as listed in the **Scan List**.
Scan & Image	📷	Return to **Field of View** menu and start scan and image acquisition of all scan areas as listed in the **Scan List**.
Image	📷	Start image acquisition of all scan areas as listed in the **Scan List**.
Zoom In	🔍	Zoom in to the centre of the scan image.
Zoom Out	🔍	Zoom out from the centre of the scan image.
Zoom 1:1	🔍	Zoom back to fit complete scan to screen.
Next	>	Show next scan of current station.

Command		Function
Previous	<	Show previous scan of current station.
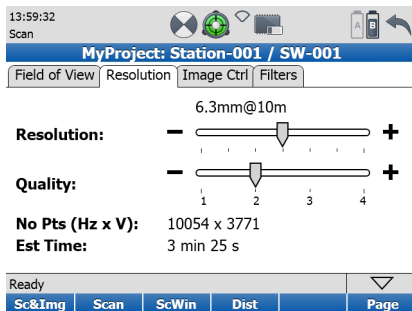
☞ Multiple scan areas can be added to the scan list. They are all scanned with the current resolution setting as defined in **Resolution** tab of the **Scan Parameters** screen.

7.3.2	**Scanning\Scan Parameters\Resolution**

Access

Select **Main Menu, Scanning** 🔺 , **Scan Parameters, Resolution**.

Description

In the **Resolution** page of the **Scan Parameters** screen the point spacing and quality can be defined. For detailed information about the different options and commands that can be executed from this page refer to the descriptions on the following pages.

Resolution page

Field	Description
Resolution	Selection of fixed resolution settings.
Quality	Selection of point cloud quality.
No Pts (Hz x V)	Number of points in horizontal and vertical direction for specified resolution.
Est Time	Estimated time for a scan using the current settings.

Scan resolution (7 pre-set resolution settings):

Resolution [mm@10 m]	Estimated scan duration [HH:MM:SS] for a full dome scan, @ Quality level			
	1	2	3	4
50	00:20	00:20	00:28	----
25	00:33	00:33	00:53	01:43
12.5	00:58	01:44	03:24	06:46
6.3	01:49	03:25	06:46	13:30
3.1	03:30	06:47	13:30	26:59
1.6	13:33	27:04	54:07	----

Resolution [mm@10 m]	Estimated scan duration [HH:MM:SS] for a full dome scan, @ Quality level			
	1	2	3	4
0.8	54:07	1:48:13	----	----

Available commands:

Command	Function
Sc&Img	Start scan and image acquisition with selected FoV and resolution.
Scan	Start scan only with selected FoV and resolution, no images.
ScWin	Open scan window for area selection from video stream image.
Dist	Open video camera window to measure the distance to the object to be scanned.
Page	Switch to the **Image Ctrl** page.
Shift -> Target	Open the **Target Definition** menu to select target ID, target height and target type.
Shift -> Image	Start image acquisition with selected FoV, exposure time and image resolution.
Shift -> ChkBS	Open **Check Backsight** screen to define a known backsight target for current setup control.

7.3.3 Scanning\Scan Parameters\Image Control

Access

Select **Main Menu, Scanning** 🏕️ **, Scan Parameters, Image Ctrl.**

Description

In the **Image Ctrl** page of the **Scan Parameters** screen the parameters of the internal camera can be defined. Please refer to the descriptions on the following pages for detailed information about the different options and commands that can be executed from this page.

Image Ctrl page

14:03:56 Scan	⊗ 🔷 ♡ 📼	🔋📄 ↩

MyProject: Station-001 / SW-001

Field of View | Resolution | Image Ctrl | Filters

Exposure:	Automatic ▼
Time:	100 ms
White Balance:	Warm light ▼
Image Resolution:	1920 x 1920 ▼
Est Time:	1 min 24 s

Ready					▽
Sc&Img	Scan	ScWin	VwImg	ChkExp	Page

Field	Option	Description
Exposure	**Automatic**	Image exposure time for each single image is calculated automatically.
	Manual	Image exposure time is set manually. See **Time** field.
Time		Exposure time in ms (milliseconds) for manual exposure.
White Balance	**Sunny**	Automatic colour adjustment for sunny outdoor environment.
	Cloudy	Automatic colour adjustment for cloudy outdoor environment.
	Cold light	Automatic colour adjustment for indoor environment with light source of cold colour temperature (e.g. neon tube).
	Warm light	Automatic colour adjustment for indoor environment with light source of warm colour temperature (e.g. halogen lamp).
	Custom	Manual colour adjustment by user.
Image Resolution	**1920x1920**	Set single image resolution to 1920 x 1920 pixels.
	960x960	Set single image resolution to 960 x 960 pixels.
	640x640	Set single image resolution to 640 x 640 pixels.

Field	Option	Description
Est Time		Estimated time for image acquisition using the current settings.

Available commands:

Command	Function
Sc&Img	Start scan and image acquisition with selected FoV and resolution.
Scan	Start scan only with selected FoV and resolution, no images.
ScWin	Open scan window for area selection from video stream image.
VwImg	View last image with next/previous functionality.
ChExp	Open video camera window to check and adjust exposure time for manual exposure time setting.
Page	Switch to the **Field of View** page.
Shift -> Target	Open the **Target Definition** screen to select target ID, target height and target type.
Shift -> Image	Start image acquisition with selected FoV, exposure time and image resolution.

Command	Function
Shift -> ChkBS	Open **Check Backsight** screen to define a known backsight target for current setup control.
Shift -> WhitBal	Open video camera window for manual colour adjustment on a white reference plane.

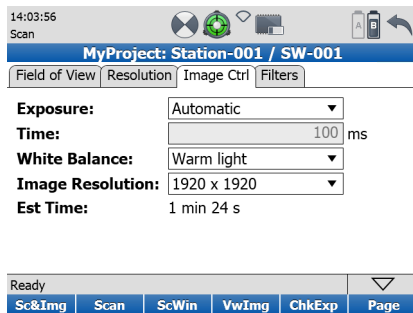| 7.3.4	**Scanning\Scan Parameters\Filters**

Access Select **Main Menu, Scanning, Scan Parameters, Filters**.

Description In the **Filters** page of the **Scan Parameters** screen filters for the minimum and maximum range of scanned points can be set.

Filters page
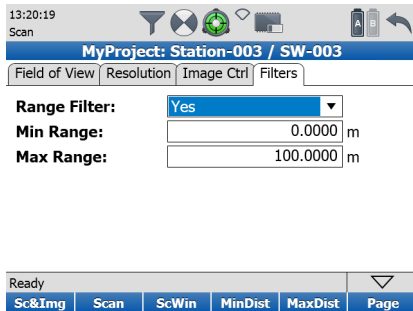
Field	Description
Range Filter	Enable or disable the range filters.

Field	Description
Min Range	Minimum range for point filtering. All points with a range lower than this limit will not be stored.
Max Range	Maxim range for filtering. All points with a range higher than this limit will not be stored.

☞ Once range filtering is enabled the icon ▼ in the status bar is visible. At system start the range filtering is disabled by default.

Command	Function
Sc&Img	Start scan and image acquisition with selected FoV and resolution.
Scan	Start scan only with selected FoV and resolution, no images.
ScWin	Open scan window for area selection from video stream image.
MinDist	Open video camera window to select a point from video stream image for a probe distance measurement which is entered in the **Min Range** field.
MaxDist	Open video camera window to select a point from video stream image for a probe distance measurement which is entered in the **Max Range** field.
Page	Switch to the **Image Ctrl** page.

Command	Function
Shift -> Target	Open the **Scan, Target Definition** menu to select target ID, target height and target type.
Shift -> Image	Start image acquisition with selected FoV, exposure time and image resolution.
Shift ->ChkBS	Open **Check Backsight** screen to define a known backsight target for current setup control.

Check Exposure screen

Available commands:

Command		Function
Slider		Move slider to adjust exposure time in the video camera window from 0 ms to 800 ms and transfer setting to the **Time** field of the **Image Ctrl** page in the **Scan Parameters** screen.
Continue	✓	Continue and return to the **Image Ctrl** page of the **Scan Parameters** screen.
Rotate		Press one of the four arrow buttons to rotate the scanner up, down, left or right. Once a button is pressed the scanner starts to move in the selected direction constantly. Press the video screen again at any position to stop the rotation. In activated mode the icon turns green.
Seek		Select a point in the video camera window to define it as the new window centre. The scanner rotates accordingly in horizontal and vertical direction to reposition the crosshair. In activated mode the icon turns green.

Capture Images screen
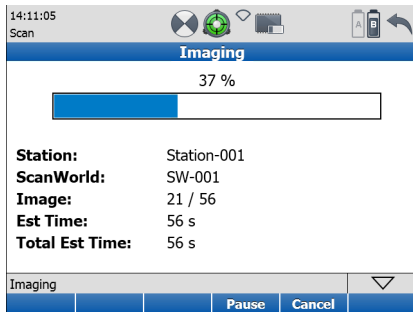
Field	Description
Progress bar	Image acquisition progress in percent.
Station	Name of the current station.
ScanWorld	Name of the current ScanWorld.
Image	Number of images already acquired / number of total images to be acquired.
Est Time	Estimated time for image acquisition using the current settings.

Field	Description
Total Est Time	Total estimated time for scan and image acquisition using the current settings.

Available commands:

Command	Function
Pause	Pause current image acquisition process. Once paused the button changes to **Resume**. Press again to resume paused image acquisition process.
Cancel	Cancel the current image acquisition process and return to the **Image Ctrl** page in the **Scan Parameters** screen.

7.3.5 Scanning\Scan Parameters\...\Target Definition

Access Select **Main Menu, Scanning** 🔺 **, Scan Parameters,**
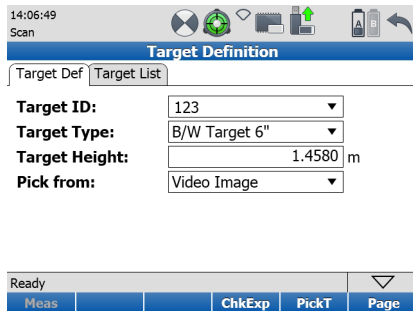
Field of View/ Resolution/ ImageCtrl, Shift -> Target or

press the active target icon ⬤ in the status bar to access the **Target Definition** screen directly.

Description In the **Target Definition** screen all options for target acquisition are available.

Target Def page

14:06:49	⬤ ⬆ ◌ ▭ ▮	▯ ↩
Scan	**Target Definition**	

Target Def	Target List

Target ID:	123 ▼
Target Type:	B/W Target 6" ▼
Target Height:	1.4580 m
Pick from:	Video Image ▼

Ready					▽
Meas			**ChkExp**	**PickT**	**Page**

Field	Description
Target ID	Target ID. May include letters such as A-Z, a-z, numbers from 0-9 and any special characters of the virtual keyboard except "[" and "]". Press the field to define a new target or the arrow icon to select existing targets from a list.
Target Type	List of target types which are supported by the scanner.
Target Height	Target height in meters from target base point to target centre.
Pick from	Select the source for target picking. With **Video Image** selected the **PickT** command opens the video camera image for target selection. With **Scan** selected the **PickT** command opens the scan viewer for target selection.

Target Type:

Type	Description
B/W Target 6''	HDS 6'' Black&White circular planar target.
B/W Target 3''	HDS 3'' x 3'' Black&White square planar target.
HDS Sphere	HDS 6'' spherical target.
B/W Twin Target Top	Top target of Twin Target Pole without extension. Target height automatically changes to **1.900 m**.

Type	Description
B/W Twin Target Bottom	Bottom target of Twin Target Pole without extension. Target height automatically changes to **0.200 m**.
B/W Twin Target Top with Ext	Top target of Twin Target Pole with extension. Target height automatically changes to **2.150 m**.
B/W Twin Target Bottom with Ext	Bottom target of Twin Target Pole with extension. Target height automatically changes to **0.450 m**.

Available commands:

Command	Function
Meas	Continue and start target acquisition process for all targets listed in the **Target List** page.
ChkExp	Open video camera window to check and adjust exposure time for manual exposure time setting.
PickT	Select target centre from the video camera image (**Video Image**) or from an existing scan (**Scan**). After selection, the target is listed on the **Target List** page as a candidate for target acquisition.
Page	Switch to the **Target List** page.

Command	Function
Shift -> 2FMeas	Continue and start target acquisition process in face 1 and 2 for all targets listed in **Target List**.

Target List page

Field	Description
Target ID	List of all defined target IDs to be acquired.
Type	Target type of the selected target ID.

Field	Description
Height	Shows the target height of the selected target after **PickT** was executed.

Available commands:

Command	Function
Meas	Continue and start target acquisition process for all targets listed in **Target List**.
Edit	Open the **Edit Target** menu to edit the selected target.
Del	Delete the selected target from the **Target List**.
Page	Switch to the **Target Def** page.
Shift -> 2FMeas	Continue and start target acquisition process in face 1 and 2 for all targets listed in **Target List**.

Pick Target from video image
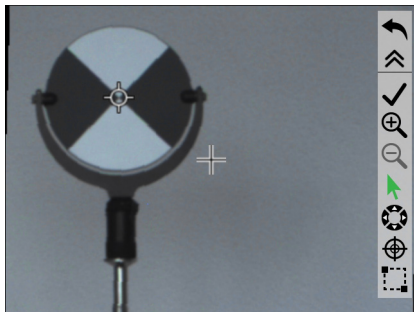
Command		Function
Continue	✓	Continue and return to **Target Def** menu.
Zoom In	⊕	Zoom in to the centre of the video image.
Zoom Out	⊖	Zoom out from the centre of the video image.
Pick	➤ ➤	Pick the target centre. In activated mode the icon turns green.

Command		Function
Navigate	⚙ ⚙	Press one of the four arrow buttons to rotate the scanner up, down, left or right. Once a button is pressed the scanner starts to move in the selected direction constantly. Press the video screen again at any position to stop the rotation. In activated mode the icon turns green.
Seek	⊕ ⊕	Select a point in the video camera window to define it as the new window centre. The scanner rotates accordingly in horizontal and vertical direction to reposition the crosshair. In activated mode the icon turns green.
Fence	⌐¬ ⌐¬	Select the target by fencing the area. By pressing ✔ the fenced area is scanned with a default resolution so that the user can pick the target centre from the point cloud of the fenced area. In activated mode the icon turns green.

Pick Target from scan viewer

Command		Function
Continue	✓	Continue and return to **Target Def** menu.
Colourise	▮▮ ▮	Switch between coloured ▮▮ and black & white ▮ intensity display.
Zoom In	⊕	Zoom in to the centre of the scan image.
Zoom Out	⊖	Zoom out from the centre of the scan image.

Command		Function
Zoom 1:1	🔍	Zoom back to fit complete scan to screen.
Pick	▲ ▲	Pick the target centre. In activated mode the icon turns green.
Pan	✋ ✋	Pan mode to move current scan on screen. In activated mode the icon turns green.
Next	>	Show next scan on current station.
Previous	<	Show previous scan on current station.

Target Scan Progress screen

14:15:02	○ ⬆ ◇ ▪▪ ▪↑	🔋 ↰
Scan		

Target Scanning

72 %

Station:	Station-002
ScanWorld:	SW-001
Target:	2 / 3
Est Time:	0 s

Scanning				▽
		Pause	**Cancel**	

Field	Description
Progress bar	Current target scan progress in percent.
Station	Name of the current station.
ScanWorld	Name of the current ScanWorld.
Target	Number of targets already scanned / number of total targets to be scanned.
Est Time	Estimated time to finish current target scan.

Available commands:

Command	Function
Pause	Pause current target scan process. Once paused the button changes to **Resume**. Press again to resume paused target scan process.
Cancel	Cancel current target scan process and continue to the **Target Results** screen.

Target Results screen

Field	Description
Target ID	Target ID of scanned target.
Target Type	Target type of scanned target.
State	Status of scanned target. **OK** indicates a successful acquisition of the target centre. A bad target centre acquisition is marked as **BAD**.

Available commands:

Command	Function
Store	Store all targets listed in the **Targets Results** list.
Dist	Open **Distance between Targets** screen to measure slope distance between two targets in a ScanWorld.
Info	Open **Info Targets Results** screen with information about the selected target.
Del	Delete selected target from the **Targets Results** list.
View	View point cloud of selected target scan.
Shift -> Redo	Repeat target scan of target which has been selected in the **Target Results** list.

View Target screen

123 - Face I
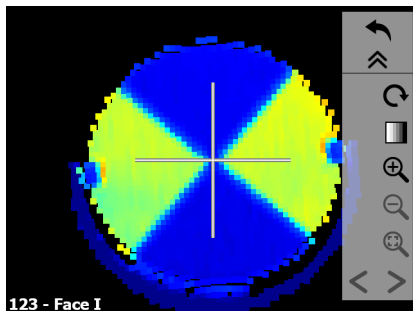
Available commands:

Command		Function
Rotate ↻		Rotate the target point cloud by increments of 30°.
Change colour 🟦 ⬜		Switch between coloured 🟦 and black & white ⬜ intensity display.
Zoom In 🔍		Zoom in to the centre of the scan image.

Command		Function
Zoom Out	⊖	Zoom out from the centre of the scan image.
Zoom 1:1	⊕	Zoom back to fit complete target scan to screen.
Next	>	Show next target.
Previous	<	Show previous target.

Confirmation message
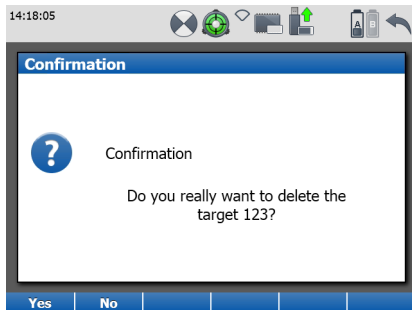
Option	Description
Yes	Confirm deletion of selected target and return to the **Targets Results** screen.
No	Cancel deletion of selected target and return to the **Targets Results** screen.

Target Information screen

14:19:16
Scan

Target Information

Target ID:	123
Target Type:	B/W Target 6"
Northing:	-1.3748 m
Easting:	1.9003 m
Height:	-1.2521 m
Distance:	2.6587 m

Ready

| Cont | Prev | Next | | | |

Field	Description
Target ID	Target ID of selected target.
Target Type	Target type of selected target.
Northing	Northing of target.
Easting	Easting of target.
Height	Height of target base point.
Distance	Slope distance from scanner base point to target base point.

Available commands:

Command	Function
Cont	Continue and return to **Target Results** screen.
Prev	Show target information of previous target.
Next	Show target information of next target.

Distance between Targets screen

Field	Description
From Target	Select first target for distance measurement.
To Target	Select second target for distance measurement.
Slope Dist	Slope distance between selected targets.
Hz Dist	Horizontal distance between selected targets.
Height Diff	Height difference between selected targets.

7.4	**Favorite Scan**

Access Select **Main Menu, Favorite Scan** .

Description The **Favorite Scan** menu starts a scan immediately with user defined settings as configured in the **Define Favorite** menu (see chapter "10.4 Configuration\Define Favorite").
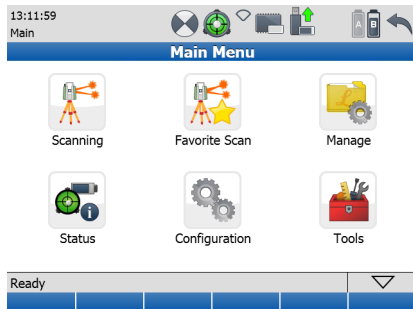
8   Manage

Access   Select **Main Menu, Manage** .

Description   In the **Manage** menu all commands for project, target and control point management on the scanner are available.

Management Menu
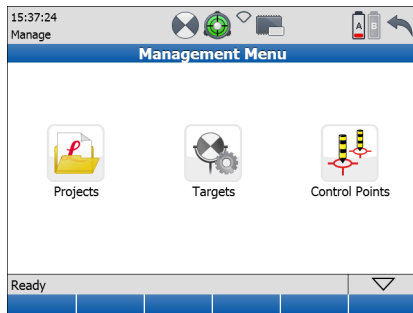
Icon		Function
Projects		Offers access to all commands for project management.
Targets		Offers access to all commands for target management.
Control Points		Offers access to all commands for control point management.

8.1	**Manage\Projects**

Access   Select **Main Menu, Manage**   , **Projects**   .

Description   In the **Manage, Projects** menu all commands for project management are available.

Manage Projects screen

Field	Description
Name	Unique name of the project.
Size	File size (in MB) of the project.
Drive	Storage device: Internal or USB device.

Available commands:

Command	Function
Cont	Confirm selection and return to previous screen.
New	Create new project with project name, description, name of creator and storage device.
Edit	Edit description and creator of selected project. Also show name, date and size of existing project.
Del	Selected project will be deleted after confirmation.
Data	Show data details of selected project such as station name, scan name, scan view, target ID, target type and target view.
Shift -> Trans	Transfer selected project or all projects to a USB memory storage device.

8.1.1 Manage\Projects\New Project
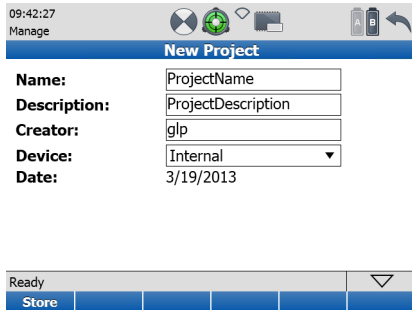
Access
Select **Main Menu, Manage** , **Projects** , **New**.

Description
In the **New Project** screen a new project with details such as name, description, creator and storage device can be created.

New Project screen

Field	Description
Name	Enter a unique project name. The name may be up to 14 characters long and may include letters such as A-Z, a-z, numbers from 0-9 and the special characters "-" and "_".
Description	Enter a short description of the project. Input is optional.
Creator	The person's name/abbreviation who is creating the scan project. Input is optional.
Device	Select the data storage device. **Internal** saves scan data on the internal SSD, **USB Device** stores scan data on an external USB storage device.
Date	Date of creation. Appears automatically and cannot be edited.

Available commands:

Command	Function
Store	Store the new project with description, creator and date and return to the **Manage Projects** screen.

8.1.2	Manage\Projects\Edit Project
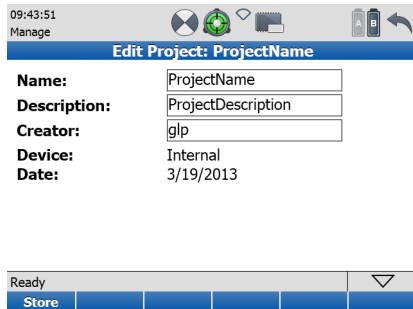
Access　　　　　Select **Main Menu, Manage** 　, **Projects** 　, **Edit**.

Description　　　In the **Edit Project** screen the name, description and creator of the selected project can be changed. Storage device and date of the selected project are listed but are not editable.

Edit Project screen

09:43:51 Manage		
Edit Project: ProjectName		
Name:	ProjectName	
Description:	ProjectDescription	
Creator:	glp	
Device:	Internal	
Date:	3/19/2013	
Ready		
Store		

Field	Description
Name	Name of selected project.
Description	Edit/add project description.
Creator	Edit/add creator details.
Device	Storage device. Not editable.
Date	Creation date of selected project. Not editable.

Available commands:

Command	Function
Store	Store new information and return to the **Manage Projects** screen.

8.1.3	Manage\Projects\Delete Project

Access Select **Main Menu, Manage**   , **Projects**   , **Del**.

Description In the **Delete Project** screen an existing project can be deleted.

Confirmation message
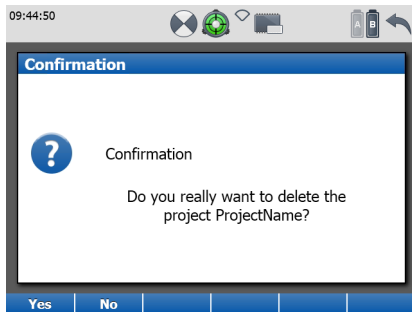
Option	Description
Yes	Confirm deletion of the selected project. ☞ **A deleted project cannot be restored.**
No	Decline deletion of the selected project.

8.1.4 Manage\Projects\Data
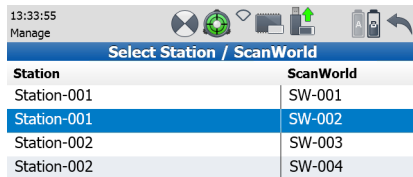
Access

Select **Main Menu, Manage** , **Projects** , **Data**.
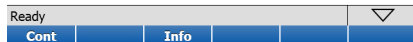
Despription

In the **Data** screen details of scan data are available such as station name, scan name, target ID, target type and target coordinates. Point clouds of scans and target scans can be viewed.

**Select Station /
ScanWorld screen**

13:33:55 Manage	
Select Station / ScanWorld	
Station	**ScanWorld**
Station-001	SW-001
Station-001	SW-002
Station-002	SW-003
Station-002	SW-004

Ready	▽
Cont	**Info**

Field	Description
Station	List of available stations in the selected project.
ScanWorld	Name of the ScanWorld. A ScanWorld is created for each new Setup. Scans and images that belong to the same coordinate system are combined in a ScanWorld. Several ScanWorlds can belong to the same station.

Available commands:

Command	Function
Cont	Confirm station selection and continue to **Manage Data** screen.
Info	Open **Station Information** for details about selected station.

Scans page

Field	Description
Scan	All scans from the selected station are listed.
Resolution	Resolution setting of selected scan.
Quality	Quality setting of selected scan.
No of Points	Number of points in the selected scan in horizontal and vertical direction.

Available commands:

Command	Function
View	View the point cloud of the selected scan.
Page	Switch to the **Images** page.

Images page

13:43:38 Manage			
Data			

All Data | Scans | Images | Targets

Name	No of Files
Image-1	85

Ready

| View | | | | | Page |

Field	Description
Name	Name of the image set.

Field	Description
No of Files	Number of images included in the image set.

Available commands:

Command	Function
View	Open image viewer to display the selected image.
Page	Switch to the **Targets** page.

Targets page

Target ID	Target Type ▲	State
1	B/W Target 3"	OK
Target200	B/W Target 6"	OK
300	HDS Sphere	OK

13:42:13
Manage

Data

All Data | Scans | Images | Targets

Ready

| View | Dist | Info | | | Page |

Field	Description
Target ID	List of all targets that have been acquired on the selected station.
Target Type	The target's associated target type.
State	Status of scanned target. **OK** indicates a successful acquisition of the target centre. A bad target centre acquisition is marked as **BAD**.

Available commands:

Command	Function
View	View point cloud of the selected target scan.
Dist	Open **Distance between Targets** screen to compute slope distance between two targets.
Info	Show target results of the selected target such as target ID, target type, northing, easting, height and distance from scanner. Coordinates and distances refer to the target base point. For details about the target results refer to chapter "7.3.5 Scanning\Scan Parameters\...\Target Definition".
Page	Switch to the **All Data** page.

8.1.5	**Manage\Projects\Transfer Project**

Access   Select **Main Menu, Manage**   , **Projects**   , **Shift -> Trans**.

Description   In the **Transfer** screen projects can be transferred from the scanner's hard disc to an external USB memory storage device.
Refer to chapter "11.2 Tools\Transfer" for more information.

8.2   Manage\Targets

Access   Select **Main Menu, Manage**   **, Targets**

Description   In the **Manage, Targets** menu all commands for target management on the scanner are available.

Manage Targets screen

Name ▲	Type
B/W Target 3"	B/W Target 3"
B/W Target 6"	B/W Target 6"
B/W Twin Target Bottom	B/W Target 3"
B/W Twin Target Bottom with Ext	B/W Target 3"
B/W Twin Target Top	B/W Target 3"
B/W Twin Target Top with Ext	B/W Target 3"
HDS Sphere	Sphere

14:46:44 Manage

Targets

Ready

| Cont | New | Edit | Del | More |

Field	Option	Description
Name	-	Unique name of the target.
Type	Sphere	Spherical target.
	B/W Target 6''	HDS 6'' Black&White circular planar target.
	B/W Target 3''	HDS 3'' x 3'' Black&White square planar target.
Class	System	Default target type provided by the system.
	User	User-defined target type.

Command	Function
Cont	Confirm selection and return to previous screen.
New	Create new target of class **User** with target name, target type, diameter, height offset and default target height.
Edit	Edit name, target type, diameter, height offset and default target height of a user-defined target. **System** targets cannot be edited.
Del	Selected target will be deleted after confirmation.
More	Shift between **Type** and **Class** in the target list.
Shift->Deflt	Restore all deleted **System** targets. **User** targets cannot be restored.

8.2.1 Manage\Targets\New Target
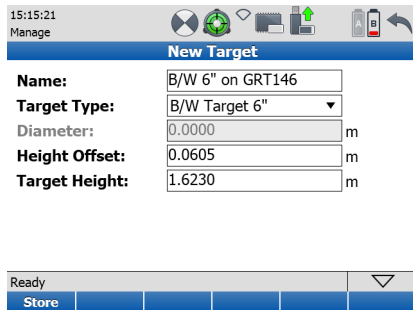
Access

Select **Main Menu, Manage** 📁 , **Targets** ⚙️ , **New**

Description

In the **New Target** menu a new target with details such as name, target type, diameter, height offset and target height can be created.

New Target page

15:15:21 Manage	⊗ 🔆 ▽ 🖥️ 📥	🔋 ↩

New Target

Name:	B/W 6" on GRT146	
Target Type:	B/W Target 6" ▼	
Diameter:	0.0000	m
Height Offset:	0.0605	m
Target Height:	1.6230	m

Ready					▽
Store					

Field	Description
Name	Enter a unique target name. The name may be up to 16 characters long and may include letters such as A-Z, a-z, numbers from 0 -9 and the special characters "-" and "_".
Target Type	Enter the target type from a drop-down list.
Diameter	Enter the target diameter for a spherical target.
Height Offset	Enter a fixed height offset which is added to the target height. Input optional.
Target Height	Enter the default target height. Input optional.

Command	Function
Store	Store new target with name, target type, diameter, height offset and default target height on the scanner's hard disk and return to the **Manage Target** menu.

8.2.2 Manage\Targets\Edit Target
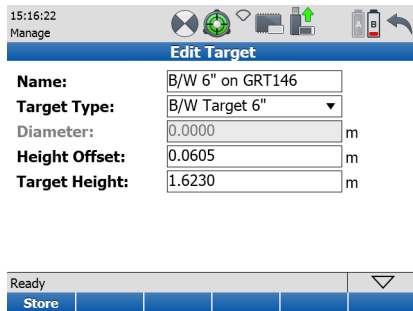
Access

Select **Main Menu, Manage** , **Targets** , **Edit**.

Description

In the **Edit Target** menu the target type, diameter, height offset and target height of an existing target can be changed.

Edit Target page

15:16:22 Manage	
Edit Target	

Name:	B/W 6" on GRT146	
Target Type:	B/W Target 6" ▼	
Diameter:	0.0000	m
Height Offset:	0.0605	m
Target Height:	1.6230	m

Ready

Store

Field	Description
Name	Name of the selected target.
Target Type	Enter the target type from a drop-down list.
Diameter	Edit/add the target diameter for a spherical target.
Height Offset	Edit/add the fixed height offset which is added to the target height.
Target Height	Edit/add the default target height.

Command	Function
Store	Store new information and return to the **Manage Targets** menu.

8.2.3 Manage\Targets\Delete Target

Access   Select **Main Menu, Manage**   , **Targets**   , **Del**.

Description   In the **Delete Target** menu an existing target can be deleted from the target list.

Confirmation message
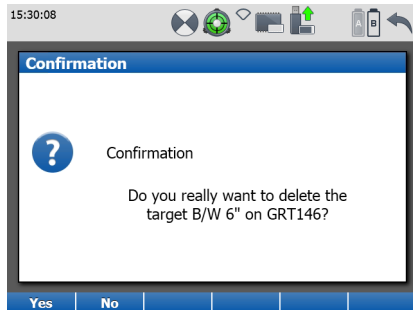
Option	Description
Yes	Confirm the deletion of the selected target. ☞ A deleted system target can be restored by **Shift->Deflt**. A deleted user target cannot be restored.
No	Decline deletion of the selected target.

8.3 Manage\Control Points

Access

Select **Main Menu, Manage** , **Control Points** .

Description

In the **Manage, Control Points** menu all commands for control points management are available.

Projects		
Name ▲	No of Points	Drive
Default	0	Internal
Office	15	Internal
ProjectName	2	Internal

15:40:56
Manage

Ready

| Cont | New | Edit | Del | Import |

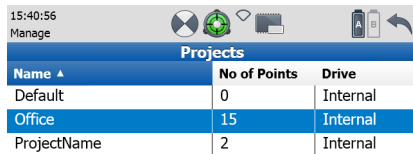| Field	Description
Name	Unique name of the project.
No of Points	Number of control points included in the project.
Drive	Storage device: Internal or USB device.

Available commands:

Command	Function
Cont	Confirm selection and return to previous screen.
New	Create new project with project name, description and name of creator.
Edit	Edit name, description and creator of selected project. Also show storage device and date of the project.
Del	Selected project will be deleted after confirmation.
Import	Open **Import Control Points** screen to import control points from ASCII file.
Shift -> Data	Open the **Control Points** list with a list of all control points of the selected project and commands to create, edit, delete or import control points.

8.3.1   Manage\Control Points\New Project

Access   Select **Main Menu, Manage**   , **Control Points**   , **New**.

Description   Refer to chapter "8.1.1 Manage\Projects\New Project".

8.3.2   Manage\Control Points\Edit Project

Access   Select **Main Menu, Manage**   , **Control Points**   , **Edit**.

Description   Refer to chapter "8.1.2 Manage\Projects\Edit Project".

8.3.3   Manage\Control Points\Delete Project

Access   Select **Main Menu, Manage**   , **Control Points**   , **Del**.

Description   Refer to chapter "8.1.3 Manage\Projects\Delete Project".

8.3.4	**Manage\Control Points\Import Control Points**

Access   Select **Main Menu, Manage** 📁 , **Control Points** 🚏 , **Import**.

Description   In the **Import Control Points** screen an external ASCII file can be selected for control point import. The import parameters can be defined in the **Define ASCII Import** screen.

15:42:06 Manage	⊗ 🧭 ♡ 🖳 📤	🔋 ↩
Import Control Points		
From File:	Control points office.t ▼	
Header Lines:	1 ▼	
Ready		▽
Cont	**Conf**	

Field	Description
From File	Select the ASCII file containing the control points to be imported.
Header Lines	Select the number of lines in the ASCII file to be skipped at import.

☞ The ASCII file must be located in the main directory of the connected USB device. No particular file extension is required.

Command	Function
Cont	Confirm and import the control points from the selected file.
Conf	Open the **Define ASCII Import** screen to adjust import settings.

**Define ACSII
Import screen**

Define ASCII Import

Delimiter:	Tab ▼
Point ID Pos:	1 ▼
Northing Pos:	3 ▼
Easting Pos:	2 ▼
Height Pos:	4 ▼
Example:	P E N H

Ready

| Cont	Deflt				

Field	Description
Delimiter	Select the delimiting character used to separate one column from the next in the ASCII file (Semicolon, Comma, Space, Tab).
Point ID Pos	Select the position of the column which contains the point ID information.
Northing Pos	Select the position of the column which contains the Northing information.

Field	Description
Easting Pos	Select the position of the column which contains the Easting information.
Height Pos	Select the position of the column which contains the Height information.
Example	Shows example of selected import settings (e.g. P;E;N;H).

Command	Function
Cont	Confirm and return to the **Import Control Points** screen.
Deflt	Reset to default import settings (P,E,N,H).

**Confirmation
message**
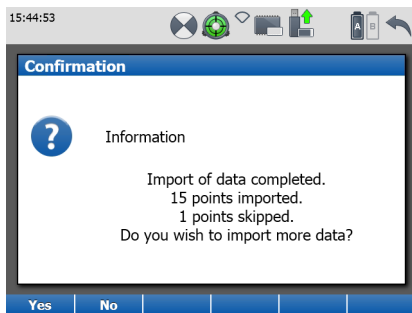
Option	Description
Yes	Confirm and return to **Import Control Points** screen to import more data.
No	Decline import of more data and return to Projects screen.

8.3.5   Manage\Control Points\Data

Access   Select **Main Menu, Manage**   , **Control Points**   , **Shift -> Data**.

Description   In the **Manage, Control Points** screen all control points of a selected project are
                    listed. For detailed information about the different options and commands that can
                    be executed from this page refer to the descriptions on the following pages.

Field	Description
Name	Point ID of control point.
Date	Date of creation of control point.

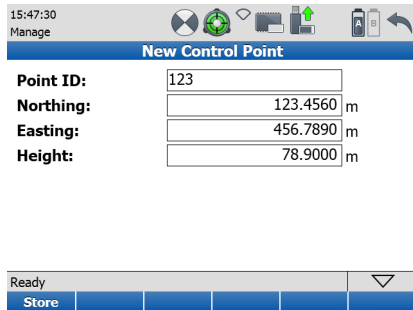| Command	Function
Cont	Continue to **Projects** screen.
New	Create new control point with Point ID, Northing, Easting and Height.
Edit	Edit Northing, Easting or Height of selected control point. Also show Point ID of existing control point.
Del	Selected control point will be deleted after confirmation.
Import	Open **Import Control Points** screen to import control points from ASCII file.
Shift -> D-all	All control points of selected project will be deleted after confirmation.

8.3.6 Manage\Control Points\Data\New Control Point

Access

Select **Main Menu, Manage**   , **Control Points**   , **Shift -> Data, New**.

Description

In the **New Control Point** screen a new control point can be created by entering Point ID, Northing, Easting and Height.

15:47:30 Manage			
New Control Point			
Point ID:	123		
Northing:	123.4560	m	
Easting:	456.7890	m	
Height:	78.9000	m	

Ready

Store

Field	Description
Point ID	Enter Point ID of new control point.
Northing	Enter Northing of new control point.
Easting	Enter Easting of new control point.
Height	Enter Height of new control point.

Command	Function
Store	Store new information and return to **Control Points** screen.

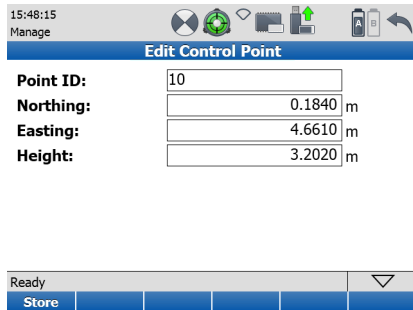## 8.3.7 Manage\Control Points\Data\Edit Control Point

Access

Select **Main Menu, Manage**   , **Control Points**   , **Shift -> Data, Edit**.

Description

In the **Edit Control Point** screen Northing, Easting and Height of the selected control point can be changed.

Field	Description
Point ID	Point ID of selected control point.
Northing	Northing of selected control point.
Easting	Easting of selected control point.
Height	Height of selected control point.

Command	Function
Store	Store new information and return to **Control Points** screen.

8.3.8   Manage\Control Points\Data\Delete Control Point
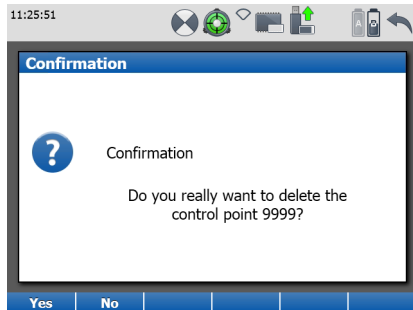
Access   Select **Main Menu, Manage**   , **Control Points**   , **Shift -> Data, Del**.

Description   In the **Delete Control Point** screen a selected control point can be deleted.

Confirmation message

Option	Description
Yes	Confirm deletion of selected control point.
	☞ **A deleted control point cannot be restored.**
No	Decline deletion of selected control point.

8.3.9 Manage\Control Points\Data\Import Control Points

Access

Select **Main Menu, Manage** 🗂️ , **Control Points** 🎯 , **Shift -> Data, Imprt**.

Description

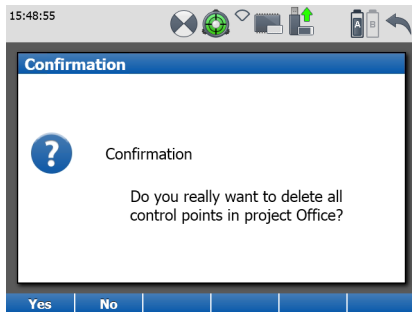Refer to chapter "8.3.4 Manage\Control Points\Import Control Points".

8.3.10 Manage\Control Points\Data\Delete All Control Points

Access

Select **Main Menu, Manage** 🗂️ , **Control Points** 🎯 , **Shift -> Data,**

Shift -> D-all.

Description

In the **Delete All Control Points** screen all control points of a project can be deleted.

Confirmation message

Option	Description
Yes	Confirm deletion of all control points in the selected project.
	☞ **Deleted control points cannot be restored.**
No	Decline deletion of all control points in the selected project.

9	**Status**

Access

Select **Main Menu, Status** 🔧 .

Description

The **Status Menu** provides general status information about different components of the scanner such as battery and memory, general system information, level and laser plummet and WiFi status information.

Status Menu screen
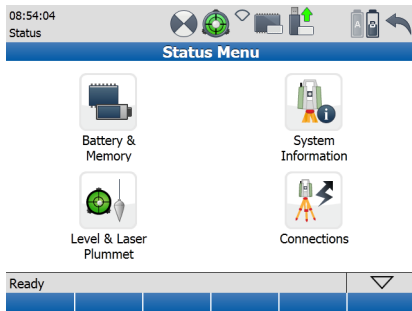
| Icon		Command	Description
Battery & Memory		**Battery**	Status information about internal battery, external battery and AC power supply.
		Memory	Status information about size and free space of internal hard disc's data partition and connected external USB device.
System Information		**Instrument**	Status information about instrument type, serial number, equipment number and system language.
		Firmware	Status information about installed firmware version and firmware maintenance expiry date.
Level & Laser Plummet		**Level**	Numerical and graphical display of instrument's tilt.
		Plummet	Switch laser plummet on/off.
		Compensator	Switch dual-axis compensator on/off. Define how scanner should react when compensator goes out of range.
Connections		**WiFi**	Status information about internal WiFi. Enable/disable the internal WiFi adaptor.

9.1	**Status\Battery & Memory**

Access
- Select **Main Menu, Status** ⊕, **Battery & Memory** .

OR

- Press one of the power icons ▭ ◄ ▯ in the status bar to access the **Battery** page directly.

OR

- Press the memory icon in the status bar to access the **Memory** page directly.

Description
In the **Status, Battery & Memory** screen detailed information about the scanner's battery and memory status can be obtained.

Battery page

11:49:05	⊗ 🧭 ◇ ▦	🔋🔋 ↩
Status		

Battery & Memory

Battery	Memory

Battery A: 99 %

Battery B: 39 %

Ext Battery: N/A

Ready	▽
Cont	**Page**

Field	Description
Battery A	Percentage of remaining power of battery A in compartment on scanner's front side (the side with touch screen).
Battery B	Percentage of remaining power of battery B in compartment on scanner's reverse side (the side without touch screen).
Ext Battery	Percentage of remaining power of external battery.

☞ The battery status is also indicated by the power icons in the status bar.
Refer to "3.3 Status Bar" for more information.

Available commands:

Command	Function
Cont	Return to previous menu.
Page	Switch to the **Memory** page.

Memory page

	Size / Free
Data:	199.22 / 190.42 GB
USB:	3.61 / 2.43 GB

Field	Option	Description
Data	**Size**	Total space for data storage on data partition of scanner's hard disc.
	Free	Free space for data storage on data partition of scanner's hard disc.
USB	**Size**	Total space for data storage on external USB device.
	Free	Free space for data storage on external USB device.

Available commands:

Command	Function
Cont	Return to previous menu.
Page	Switch to the **Battery** page.

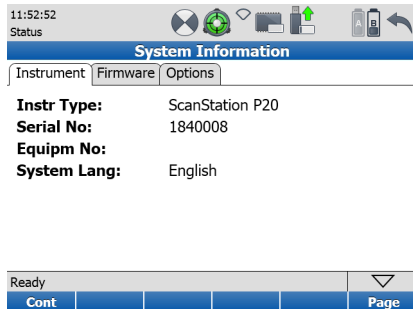|	
9.2	**Status\System Information**

Access

Select **Main Menu, Status** , **System Information** .

Description

The **System Information** screen provides detailed information about instrument type, serial number, system language and firmware version.

Instrument page

11:52:52	
Status	
System Information	

Instrument | Firmware | Options

Instr Type:	ScanStation P20
Serial No:	1840008
Equipm No:	
System Lang:	English

Ready

| Cont | | | | | Page |

Field	Description
Instr Type	Instrument type.
Serial No	Serial number of the instrument. See also serial number plate on instrument's bottom side.
Equipm No	Leica unique identification code of the instrument.
System Lang	Active system language.

Available commands:

Command	Function
Cont	Return to **Status Menu**.
Page	Switch to the **Firmware** page.

Firmware page

14:53:28
Status

System Information

Instrument [Firmware] Options

Firmware: 1.50.673
Maint End: 4/17/2014 12:00:00 AM

Ready

Cont | | | | | **Page**

Field	Description
Firmware	Firmware version of the installed onboard software.
Maint End	Expiry date of firmware maintenance period. All firmware versions with release date prior to this date can be uploaded.

Available commands:

Command	Function
Cont	Return to **Status Menu**.
Page	Switch to the **Options** page.

Options page

13:19:24 Status	⊗ ⊕ 📶 ▭	🔋📱 ↩
	System Information	

Instrument | Firmware | Options

API Data Access: Deactivated

Ready		▽
Cont		**Page**

Field	Description
API Data Access	Access to scan data via Application Programming Interface (API) activated or deactivated.

Available commands:

Command	Function
Cont	Return to **Status Menu**.
Page	Switch to the **Instrument** page.

9.3 Status\Level & Laser Plummet

Access

• Select **Main Menu, Status** 🔵 , **Level & Laser Plummet** 🔵 .
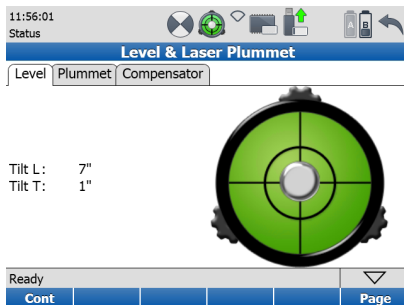
OR

• Press the compensator icon 🔵 in the status bar to access the **Level** page directly.

Description

The **Level & Laser Plummet** screen provides detailed information about the electronic level, the laser plummet and the compensator settings.

Level page

Tilt L:	7"
Tilt T:	1"

Field	Option	Description
Tilt L	-	Longitudinal tilt of the vertical axis.
Tilt T	-	Transversal tilt of the vertical axis.
Bubble Level	green	Tilt L and Tilt T < 5': level is within the high accuracy working range of the compensator. The accuracy of the compensator in the ± 5' working range is 1.5''.
	red	Tilt L or Tilt T > 5': level is out of the high accuracy working range of the compensator.

As soon as the bubble level colour changes from green (within compensator range) to red (outside of ± 5' compensator range) the compensator icon in the status bar

changes from 🧭 to 🧭.

The level moves linearly with the inclination values **Tilt L** and **Tilt T**. It moves down if the value in **Tilt L** increases and vice versa. It moves left if the value in Tilt T gets bigger and vice versa.

☞ Align the scanner side cover with the touch screen parallel to two of the tribrach footscrews. Rotating these two footscrews then causes the bubble to move only left/right. Rotating the third footscrew causes the bubble to move only up/down.
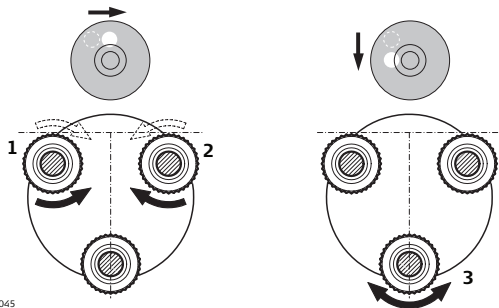
P20_045

Available commands:

Command	Function
Cont	Return to previous menu.
Page	Switch to the **Plummet** page.

Plummet page

11:57:00		
Status		

Level & Laser Plummet

Level | Plummet | Compensator

Laser Plummet: On ▼
Intensity: 100 ▼ %

Ready ▽
Cont **Page**

Field	Option	Description
Laser Plummet	**On**	Turn the red laser plummet on.
	Off	Turn the red laser plummet off.
Intensity		Set the laser plummet intensity by increments of 20%.

By default the laser plummet is **Off** after system boot.
Changing this setting to **On** turns the laser plummet on immediately. It is only visible when the **Level & Laser Plummet** screen is active.

Available commands:

Command	Function
Cont	Return to previous menu.
Page	Switch to the **Compensator** page.

Compensator page

Field	Option	Description
Compensator	**On**	Turns the compensator on.
	Off	Turns the compensator off temporarily. After system restart, the compensator will be on again.
	Always Off	Turns the compensator off. After system restart, the compensator will remain off.
Out of Range	**Cancel scan&img**	If the compensator goes out of range, cancel the current scan or image acquisition.
	flag data & cont	If the compensator goes out of range, continue current scan or image acquisition, but flag unleveled object for subsequent data import.

By default the compensator is **On** after system boot.
When changing this setting to **Off** or **Always Off** the compensator icon in the status

bar changes to ![icon].

Available commands:

Command	Function
Cont	Return to previous menu.
Page	Switch to the **Level** page.

9.4   Status\WiFi
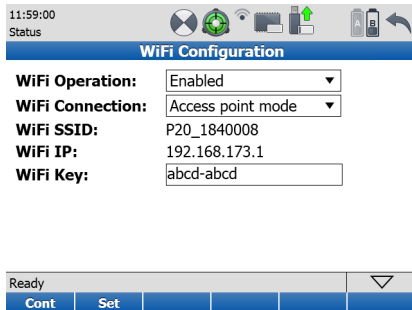
Access   Select **Main Menu, Status** , **Connections** .

Description   In the **WiFi Configuration** screen the communication parameters of the internal WiFi device can be defined. Depending on the remote control device the WiFi connection mode and a key for encryption can be set.

WiFi Configuration screen

| 11:59:00 | | | |
| Status | | | |

WiFi Configuration

WiFi Operation:	Enabled ▼
WiFi Connection:	Access point mode ▼
WiFi SSID:	P20_1840008
WiFi IP:	192.168.173.1
WiFi Key:	abcd-abcd

| Ready | | | ▽ |
| **Cont** | **Set** | | |

Field	Option	Description
WiFi Operation	**On** **Off** **Always on**	Switches the internal WiFi board on, off or always on.
WiFi Connection	**Access point mode** **Ad-hoc mode**	Select the WiFi connection mode.
WiFi SSID	-	The scanner's Service Set Identifier (SSID) shown in the list of available network connections. The name is P20_184xxxx with 184xxxx being the scanner's serial number.
WiFi IP	-	The scanner's WiFi IP address. In Access point mode the general WiFi IP address for all scanners is 192.168.173.1. In Ad-hoc mode the WiFi IP address differs for each scanner.
WiFi Key	-	Password for WiFi encryption. The default key is "abcd-abcd" and can be changed to any other password with 8 or more characters.

Available commands:

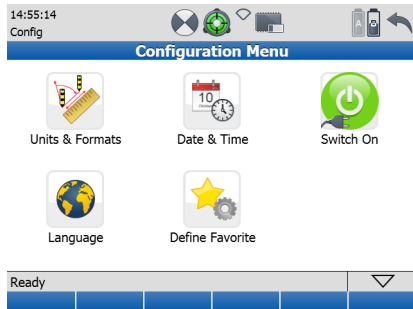| Command	Function
Cont	Return to the **Status Menu**.
Set	Apply changes of the WiFi configuration.

10 Configuration

Access

Select **Main Menu, Configuration** ⚙ .

Description

In the **Configuration Menu** the **Units & Formats**, the local **Date & Time**, the MMI **Language** and the **Define Favorite** scan settings can be configured.

Configuration Menu screen

Icon		Command	Description
Units & Formats		**Distance Unit**	Select unit for distances (Metre, Int Ft, Us Ft).
		Distance Dec	Select number of decimal digits for distance display.
Date & Time		**Local Time**	Set local time.
		Local Date	Set local date.
Switch On		**By Power**	On: Scanner boots up as soon as internal battery or external power supply is connected.
			Off: Scanner has to be started with the ON button.
Language		**Language**	Select language for the user interface or delete a language from the list.

Icon	Command	Description
Define Favorite	**Field of View**	Select area of interest and scanner action for **Favorite Scan**.
	Resolution	Define horizontal and vertical point spacing for **Favorite Scan**.
	Image Ctrl	Define parameters of internal camera for **Favorite Scan**.
	Filters	Define filter parameters for **Favorite Scan.**

10.1 Configuration\Units & Formats
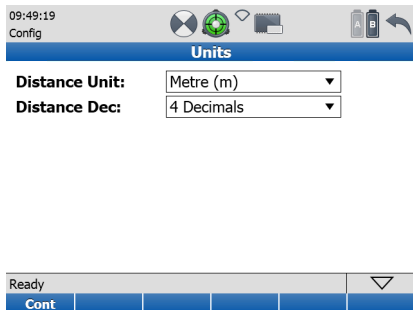
Access

Select **Main Menu, Configuration** , **Units & Formats** .

Description

In the **Units & Formats** screen linear units and the number of decimals can be defined.

Units & Formats screen

09:49:19 Config		
Units		
Distance Unit:	Metre (m) ▼	
Distance Dec:	4 Decimals ▼	

Ready ▽

Cont

Field	Option	Description
Distance Unit	**Metre (m)**	Metre: Uses SI base unit metre.
	Int Ft (fi)	International feet: Uses 1 ft = 1' = 12 in. = 1/3 yd = 30.48 cm
	US Ft (ft)	U.S. survey feet: Uses 39,37 in. = 1 m (1 U.S. survey foot = 1200/3937 m equates approximately 30.48006 cm)
Distance Dec	**0** to **4 Decimals**	Number of decimal digits for distance related fields.

Available commands:

Command	Function
Cont	Confirm and return to the **Configuration Menu**.

10.2　Configuration\Date & Time
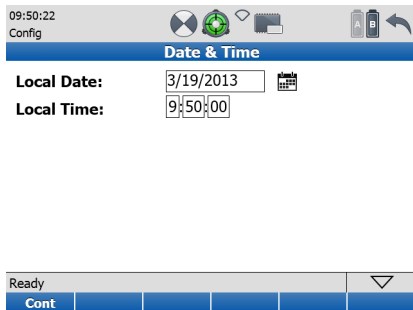
Access

Select **Main Menu, Configuration** ⚙ **, Date & Time** 📅 .

Description

In the **Date & Time** screen the system time and date can be configured.

Date & Time screen

09:50:22 Config	⊗ 🟢 ◯ ▭	🔋🔋 ↰

Date & Time

Local Date:　3/19/2013　📅
Local Time:　9:50:00

Ready	▽
Cont					

Field	Description
Local Date	Enter the local date in the format **MM/DD/YY**.
Local Time	Enter the local time in the format **hh:mm:ss**.

Available commands:

Command	Function
Cont	Confirm and return to the **Configuration Menu**.

10.3	**Configuration\Language**

Access	Select **Main Menu, Configuration** ⚙ , **Language** 🌐 .

Description	In the **Language** screen a list of available languages for the user interface is shown. A language can be selected or deleted from the list.

☞	Additional languages can be installed by uploading language files. Refer to "11.2 Tools\Transfer" for more information.

Language screen

09:51:34
Config

Language

Language:

English ▼
English
Chinese
Czech
Nederlands
Français
Deutsch
Magyar
Italiano
日本語
Polski
Russian
Español

Ready
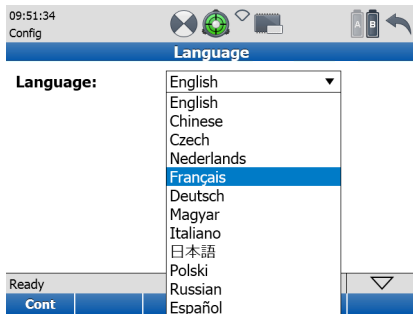
Cont

Field	Description
Language	List of installed languages on the scanner.

Available commands:

Command	Function
Cont	Activate the selected language and return to the **Main Menu**.
Del	Delete the selected language. English is part of the firmware and cannot be deleted.

10.4 Configuration\Define Favorite
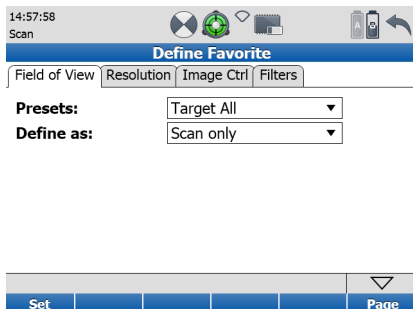
Access
Select **Main Menu**, **Configuration** , **Define Favorite** .

Description
In the **Define Favorite** menu the settings for the **Favorite Scan** can be defined.

Field of View page

14:57:58		
Scan		

Define Favorite

Field of View | Resolution | Image Ctrl | Filters

Presets: Target All ▼
Define as: Scan only ▼

| Set | | | | | | Page |

Field	Option	Description
Presets	**Rectang 60 x 60**	Set the Field of View to 60° x 60° (Hz x V).
	Rectang 90 x 90	Set the Field of View to 90° x 90° (Hz x V).
	Panorama 360 x 60	Set the Field of View to 360° x 60° (Hz x V).
	Panorama 360 x 90	Set the Field of View to 360° x 90° (Hz x V).
	Target All	Set the Field of View to 360° x 270° (Hz x V).
Define as	**Scan only**	Acquire scans only.
	Scan & Image	Acquire scans and images.
	Image only	Acquire images only.

Resolution page

Refer to chapter "7.3.2 Scanning\Scan Parameters\Resolution" for the **Resolution** settings.

Image Ctrl page

Refer to chapter "7.3.3 Scanning\Scan Parameters\Image Control" for the **Image Control** settings.

Filters page

Field	Description
Range Filter	Enable or disable the range filters.
Min Range	Minimum range for point filtering. All points with a range lower than this limit will not be stored.
Max Range	Maximum range for filtering. All points with a range higher than this limit will not be stored.

☞ Once a **Favorite Scan** with range filtering enabled is started, the icon ▼ in the status bar is visible.

Filter settings for the **Favorite Scan** do not affect the general filter settings.

Available commands in all Define Favorite tabs

Command	Function
Set	Store the selected settings for the **Favorite Scan** menu and return to the **Configuration Menu**.

11 Tools

Access Select **Main Menu, Tools** .

Description In the **Tools** menu all commands for disc formatting, data transfer, license management, display and instrument calibration are available.

Tools Menu screen

Icon		Command	Description
Format		**Confirmation**	Format the complete data partition of the internal hard disc. ☞ **All project data will be erased.**
Transfer		**Projects**	Transfer selected project or all projects to a USB memory storage device.
		System Files	Upload a new firmware or firmware languages to the instrument.
License		**Manual**	Enter license key manually.
		Upload	Upload license key file from a USB memory storage device.
Screen Calibration		**Touch Calibration**	Recalibrate the touch screen by clicking four points on the display.

| Icon		Command	Description
Check & Adjust		**Check Angular Parameters**	Determine and update angular parameters of the instrument.
		Set Range Parameters	Set the range offset of the instrument.
		Check Tilt Compensator	Check and update the tilt compensation of the instrument.
		Current Calibration	List all current instrument parameters.

11.1 Tools\Format

Access

Select **Main Menu, Tools** 🧰 , **Format** ▬.

Description

In the **Format** screen the data partition of the scanner's hard disc can be formatted.

Confirmation message
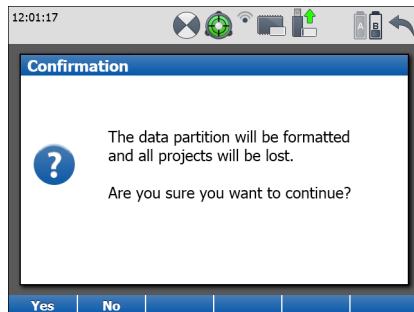
Option	Description
Yes	Starts formatting the data partition. ☞ **All project data will be erased.**
No	Cancels the formatting process and returns to the **Tools** menu.

☞
- Formatting is irreversible. It is recommended to backup any project files before starting **Format**.
- The **Format** command does not affect any system files. Only scan data will be erased.

11.2 Tools\Transfer
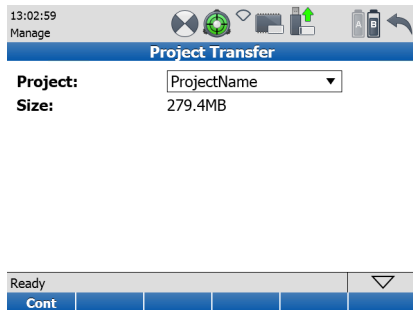
Access

Select **Main Menu, Tools** , **Transfer** .

Description

In the **Transfer** menu projects can be transferred from the scanner's hard disc to an external USB memory storage device and new firmware and languages can be uploaded from an external USB memory storage device to the scanner.

Project Transfer screen

13:02:59	
Manage	
Project Transfer	

| **Project:** | ProjectName ▼ |
| **Size:** | 279.4MB |

| Ready | ▽ |
| **Cont** | |

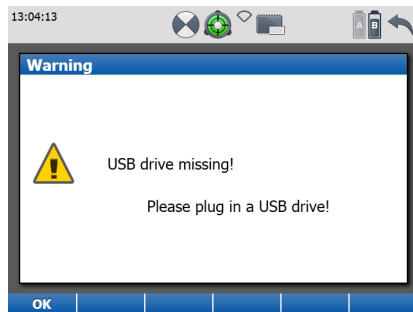| Field	Description
Project	Name of the project to be transferred. Touch the name field to open the **Manage, Projects** menu for selecting another project.
Size	File size (in MB) of the selected project.

Available commands:

Command	Function
Cont	Transfer the selected project to the connected USB memory storage device into the folder **Data**.
Logs	Transfer system log files to the connected USB memory storage device into the folder **Logs**.

☞ The file system on the USB memory storage device must be NTFS, FAT32 or FAT.

Information message

In case that no USB memory storage device has been connected, the following screen will appear:

Please check whether the USB memory storage device has been connected properly and try again.

Firmware page

15:04:07	Tools

Transfer System Files

Firmware | Language

Firmware: P20_1.50.673.fw ▼

Ready ▽

| Cont | | | | | Page |

Field	Description
Firmware	Select firmware file (*.fw) from connected USB memory storage device.

☞
- The firmware file (*.fw) must be located in the root directory of the USB memory storage device.
- Firmware files are named for example **P20_1.2.3.456.fw** with **1.2** being the firmware version in this case.

- Uploading a new firmware file can take up to 40 minutes. Ensure sufficient battery power or provide AC power and do not interrupt power supply during the upload process.
- Refer to the document **UpdateSSP20_v1.0.pdf** which is enclosed with each new firmware file for detailed instructions.

Available commands:

Command	Function
Cont	Starts the upload process of the selected firmware file.
Page	Switch to the **Language** page.

☞ After the upload process, the instrument restarts two times and then displays the **Main Menu**.

Language page

13:06:52	⊗ ⊕ ◇ ▭ ↥ ▯▮ ↰
Tools	
	Transfer System Files

Firmware | Language

Language: Chinese_P20.lng ▼

Ready	▽
Cont					**Page**

Field	Description
Language	Select language file (*.lng) from connected USB memory storage device.

☞ The language file (*.lng) must be located in the main directory of the USB memory storage device.

Available commands:

Command	Function
Cont	Starts the upload process of the selected language file.
Page	Switch to the **Firmware** page.

☞ After the upload process, the language is available as an additional entry in the **Language** page of the **Firmware Language** screen.
Refer to chapter "10.3 Configuration\Language" for more information.

11.3	Tools\License
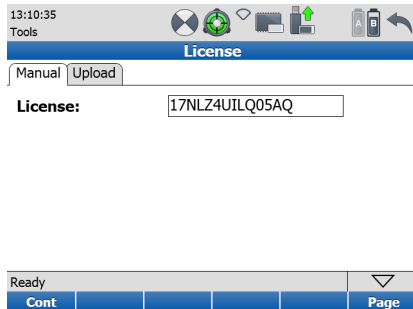
Access

Select **Main Menu, Tools** 🧰 , **License** 🔑 .

Description

In the **License** screen the firmware maintenance license key can be entered manually or uploaded via key file. A valid license key is required to be able to update the ScanStation P20 firmware.

Manual page

13:10:35		⊗ ⊕ ♡ 🖬 📥	📱📱 ↩
Tools			
		License	
Manual	Upload		
License:		17NLZ4UILQ05AQ	

Ready					▽
Cont					**Page**
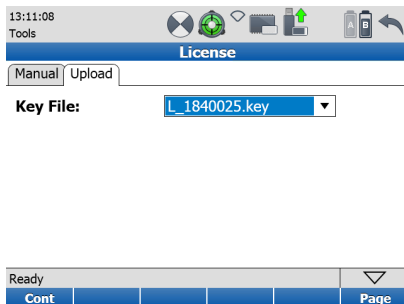
Field	Description
License	Enter the 14-digit license key manually.
	☞ The license key is not case sensitive.

Available commands:

Command	Function
Cont	Confirm the entered license key.
Page	Switch to the **Upload** page.

Upload page

13:11:08
Tools

License

Manual / Upload

Key File: L_1840025.key ▼

Ready ▽

Cont | | | | | **Page**

Field	Description
Key File	Select the license key file (*.key) from the connected USB memory storage device to load onto the scanner.

☞ • The license key file (*.key) must be located in the root directory of the USB memory storage device.
• License key files are named for example "L_184xxxx.key" with 184xxxx being the scanner's serial number.

Available commands:

Command	Function
Cont	Confirm and load the license key from the selected license key file.
Page	Switch to the **Manual** page.

11.4　　　　　　Tools\Screen Calibration

Access　　　　　Select **Main Menu, Tools** 🧰 , **Screen Calibration** 👆 .

Description　　　In the **Screen Calibration** menu the onboard touch screen can be calibrated.

Confirmation message
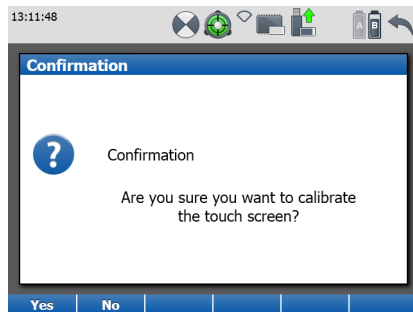
Option	Description
Yes	Start the touch screen calibration process. Then click the centres of four calibration points which appear consecutively on the display.
No	Cancel the touch screen calibration process and return to the **Tools** menu.
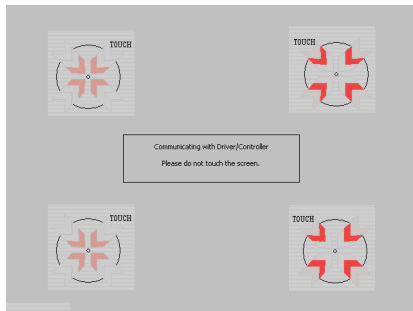
11.5 Tools\Check & Adjust

Access
Select **Main Menu, Tools** 🧰 , **Check & Adjust** 📐✓ .

Description
In the **Check & Adjust** menu all commands for checking angular parameters, setting range parameters, checking the tilt compensator, and to check the current calibration settings are available.

Check & Adjust screen
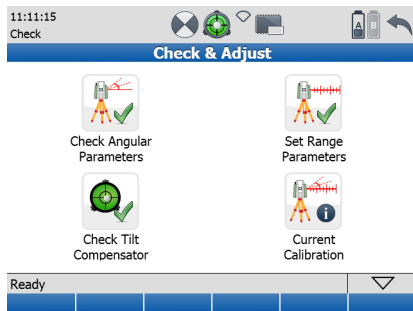
Icon		Description
Check Angular Parameters		Angular system parameters can be determined by means of a field procedure and registered in the instrument.
Set Range Parameters		The range offset parameter, which must be determined on a reference baseline, can be registered in the instrument.
Check Tilt Compensator		The tilt sensor can be checked and its parameters be updated.
Current Calibration		Current instrument parameters can be displayed and reset to factory default values.

Check Angular
Parameters screen
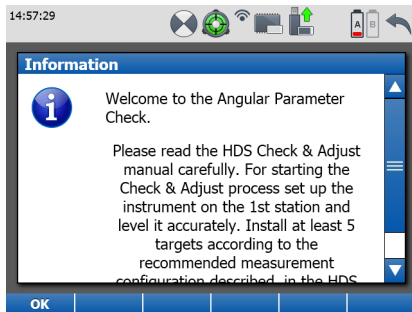
☞ Refer to the separate Leica HDS Check & Adjust User Manual for step-by-step instructions and details about the setup of a test configuration.

Set Range Offset screen

14:50:35
Check

Set Range Offset

Update the system range offset of your instrument after reliable results on a reference baseline according to:
correct dist. = offset + measured dist.
Consider the sign of your setting!

Range Offset: 0.0000 m

Ready

Set

Field	Description
Range Offset	Range offset determined on a distance reference baseline.

Available commands:

Command	Function
Set	Registers the current range offset which will be added to all future distance measurements.

Check Tilt Compensator screen

Field	Description
Parameter	List of instrument tilt parameters. • comp. L = compensator longitudinal index error. • comp. T = compensator transversal index error.
Result	Current value of the instrument tilt parameter.

Available commands:

Command	Function
Set	Registers the calculated tilt parameters. ☞ All further scans are corrected by these values.

Current Check & Adjust Parameters screen

Parameter ▲	Result ▲
λ1	0°0'0"
λ2	0°0'0"
μ	0°0'0"
ε	0°0'0"
Δel	0°0'0"
range offset	0.0000 m
comp. L	0°0'0"
comp. T	0°0'0"

Field	Description
Parameter	List of instrument parameters. • $\lambda1$, $\lambda2$ = laser alignment deviations. • μ = deviation of the line of sight. • ε = deviation of the tilting axis. • Δel = deviation of the vertical index. • range offset = range offset determined on a distance reference baseline. • comp. L = compensator longitudinal index error. • comp. T = compensator transversal index error.
Result	Current value of the instrument parameter.

Available commands:

Command	Function
Cont	Return to the Main Menu.
Reset	Reset all user-determined parameters to the default in-factory calibration.

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Leica Geosystems AG
Heinrich-Wild-Strasse
CH-9435 Heerbrugg
Switzerland
Phone +41 71 727 31 31
www.leica-geosystems.com

- when it has to be **right**

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