



# Leica ScanStation P40/P30 System Field Manual

Version 4.0  
English

- when it has to be **right**

**Leica**  
Geosystems

## Introduction

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

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### Purchase

Congratulations on the purchase of a Leica ScanStation P40/P30 instrument.

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### Product Identification

The type and serial number of your product are indicated on the type plate. Always refer to this information when you need to contact your agency or Leica Geosystems authorised service workshop.

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### 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.

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### Trademarks

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

This manual applies to the Leica ScanStation P40/P30 instruments.

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## Available documentation

Name	Description/Format		
Leica ScanStation P40/P30 Quick Guide	Provides an overview of the product together with technical data and safety directions. Intended as a quick reference guide.	✓	✓
Leica ScanStation P40/P30 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.	-	✓
Leica ScanStation P40/P30 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 P40/P30 documentation and software**

- Leica ScanStation P40/P30 System USB Swing Card
  - <http://www.leica-geosystems.com/downloads>
  - [http://www.leica-geosystems.com/en/HDS-Laser-Scanners-SW\\_5570.htm](http://www.leica-geosystems.com/en/HDS-Laser-Scanners-SW_5570.htm)
  - <https://myworld.leica-geosystems.com>
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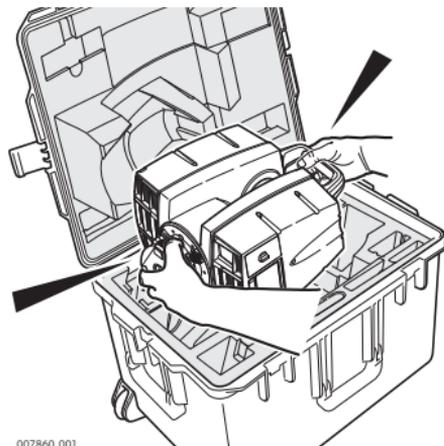
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# 1 Description of the System

## 1.1 Packing / Unpacking

### Unpacking

When in its transport container, the ScanStation P40/P30 can sit in either a face-up or face-down position.



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.



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## 2 Setting Up the Instrument

### 2.1 General Information

#### Use the tripod

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

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

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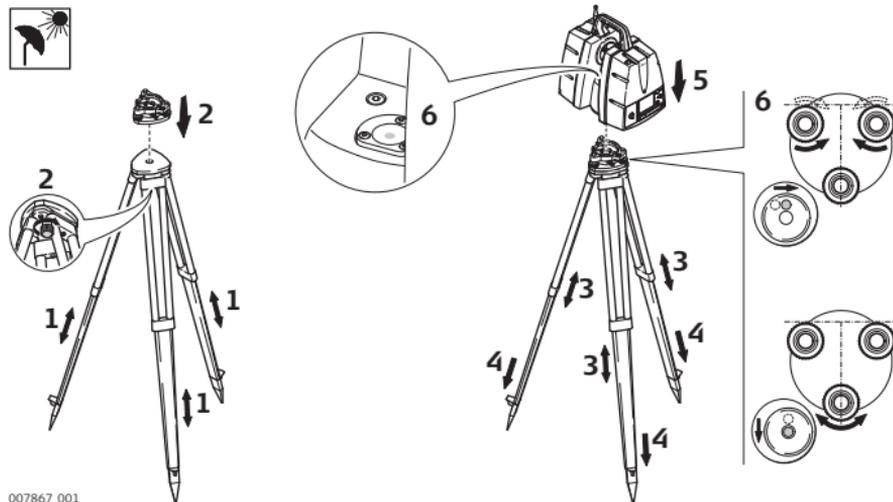
It is always recommended to shield the instrument from direct sunlight and avoid uneven temperatures around the instrument.

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## 2.2

## Scanner Setup on Tripod

### ScanStation P40/P30 setup step-by-step



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

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### Description

This topic describes an instrument setup over a marked ground point using the laser plummet. Geo-referencing of the Leica ScanStation P40/P30 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 P40/P30 allows you to traverse, resect or free-station. Known azimuth or known backsight measurements can be observed.

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

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With the dual-axis compensator enabled, the data scanned with ScanStation P40/P30 is corrected automatically.

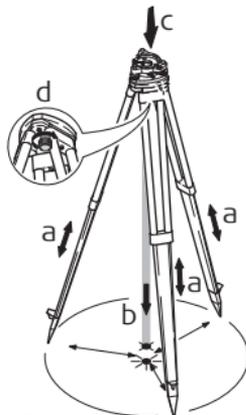
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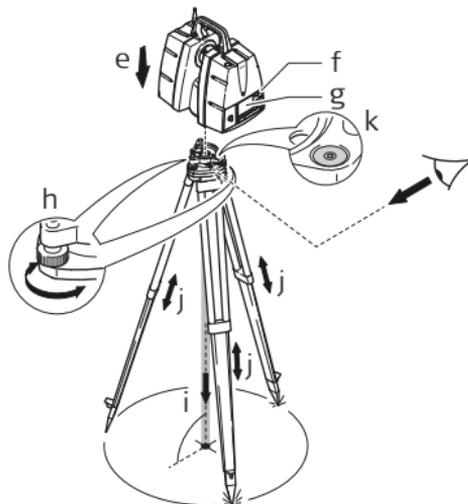
### About the plummet:

- 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



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

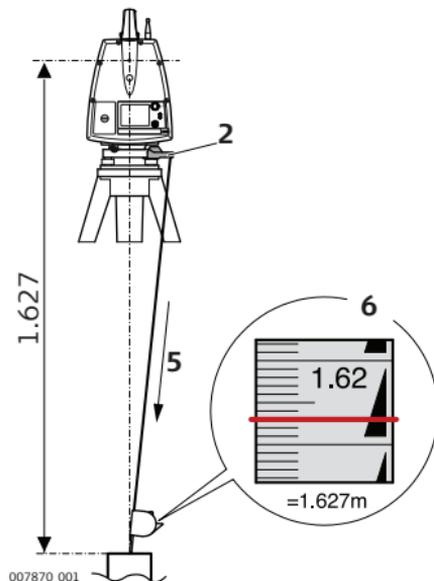
1. Extend the tripod legs to allow for a comfortable working posture (**a**). Position the tripod approximately over the marked ground point, centring it as well as possible (**b**).
2. Place the tribrach on the tripod (**c**) and secure it with the central fixing screw (**d**).

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 P40/P30 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).

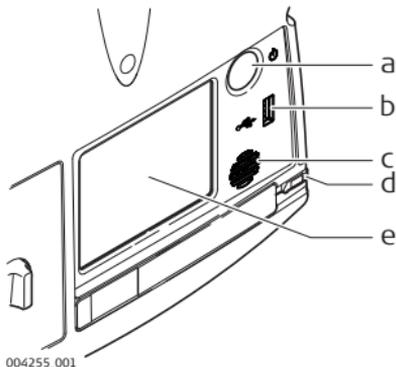


- For detailed information about the GHM008 instrument height meter and GHT196 distance holder refer to the GHM008/GHT196 user manual which is delivered with these items.
  - The tilt axis height of the ScanStation P40/P30 is 250 mm. Take care to use the GHM008 which has a special scale to measure the 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.
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## 3 Description of the User Interface

### 3.1 Front Side

#### Overview



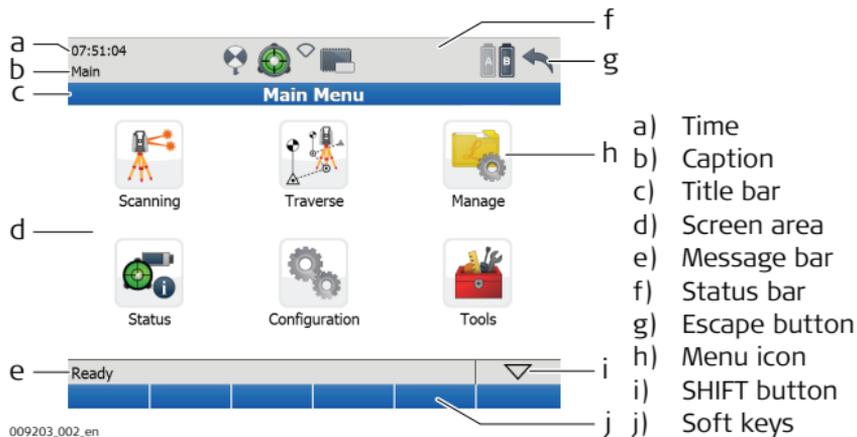
- a) ON/OFF button
- b) USB socket
- c) Loudspeaker
- d) Stylus
- e) Touch screen user interface

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## 3.2

## Display

### Overview



Element	Description
Time	The current local time is shown.
Caption	Shows location in menu system.
Title bar	Shows name of current screen.

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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.

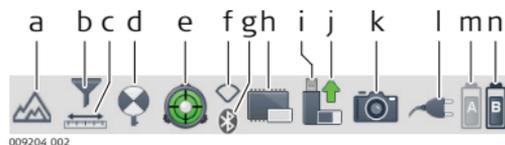
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### 3.3

## 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.



- a) Range mode
- b) Range filter
- c) Scale factor
- d) Active target type
- e) Dual-axis compensator
- f) WiFi status
- g) Bluetooth status
- h) Internal hard disc
- i) External memory
- j) Status of external memory
- k) External camera
- l) External battery / AC power supply
- m) Internal battery **A**
- n) 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 mode 	Range mode enabled
Range filter 	Range filter enabled
Scale factor 	Scale factor enabled

Icon	Description
Active target type	 Leica B/W 4.5" target
	 HDS black/white target 6"
	 HDS black/white target 3"
	 HDS sphere target
	 User defined target of type Leica B/W 4.5"
	 User defined target of type HDS black/white 6"
	 User defined target of type HDS black/white 3"
	 User defined target of type HDS sphere

Icon	Description
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.
Bluetooth	 Onboard Bluetooth adapter on and connected.
	 Onboard Bluetooth adapter off.
	 Onboard Bluetooth adapter on.
External camera	 External camera connected and selected for image acquisition.

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	<b>Symbols for the currently used battery:</b>
	 Empty
	 20% capacity
	 40% capacity
	 60% capacity
	 80% capacity
	 Full

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

## 3.4

### Keyboards on touchscreen

## Operating Principles

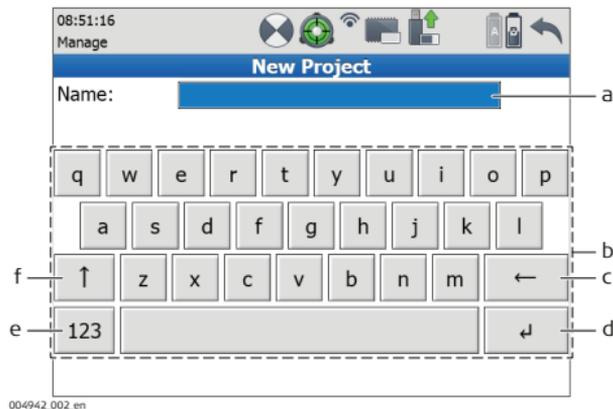
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The system offers two different virtual keyboard layouts for user input:

- 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.
-

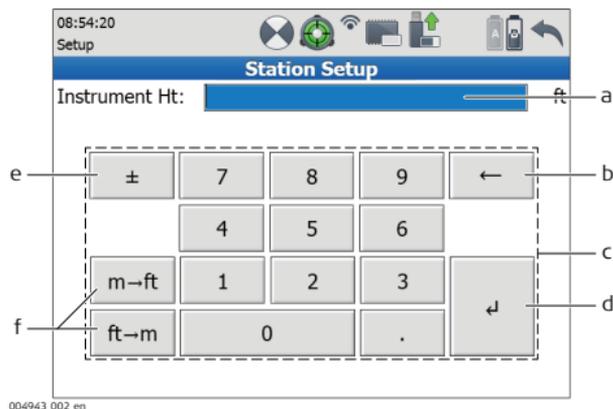
## Keyboard layouts

## Alphanumeric layout:



- 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:



- 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)

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## 4 Switching the System On/Off

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### 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 1 second 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.
-

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## 5 Remote Control

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### Overview

The ScanStation P40/P30 can be controlled remotely by a Leica handheld controller (CS10, CS15, CS20 or CS35) or by external devices (Apple iOS or Android driven) via WiFi communication.

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### Installation of the ScanStation Pxx Remote Control App on the Leica Viva Controller

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.
1. Copy the installation file **Pxx\_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 app is running, close this app by pressing **Fn** -> **Exit**.
  4. Double-click **My Device** and navigate to the USB memory device.
  5. Double-click the file **Pxx\_RemoteControl.CAB**.
  6. Confirm the suggested installation folder **Program Files** by pressing **OK** within the **Install Leica Geosystems AG Pxx ...** dialog.
  7. The app 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 adapter of your Viva Controller

1. Go to **Start** -> **Settings** -> **Control Panel**.
  2. Double-click on **Network and Dial-up Connections**.
  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 P40/P30 Remote Control

1. Switch on the ScanStation P40/P30 and wait for the boot process to finish.
2. Select **Status** to get to the **Status Menu**.
3. In the **Status Menu** select **Connections** to open the **WiFi** menu.
4. In the **WiFi** menu set:
  - WiFi Operation = Enabled
  - WiFi Connection = Ad-hoc mode
5. Start the ScanStation Pxx Remote Control app on your Viva Controller by double-clicking the desktop icon.
6. Within the ScanStation Pxx Remote Control dialog press **Find scanner** and wait for your ScanStation P40/P30 to be listed within the list of available scanners.
7. As soon as your ScanStation P40/P30 is listed, select it and press **Connect**.
8. Wait until the ScanStation P40/P30 onboard control is displayed on your Viva Controller.

9. Close the ScanStation P40/P30 Remote Control window as well as the ScanStation P40/P30 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 P40/P30 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 P40/P30.

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Since the Viva Controller CS10 has a screen in upright format the ScanStation Pxx Remote Control app 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.

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

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For details on how to control the ScanStation P40/P30 remotely via other devices (Leica CS20 or CS35, Apple iOS or Android driven) refer to the instructions provided in the HDS Laser Scanners section of Leica myWorld.

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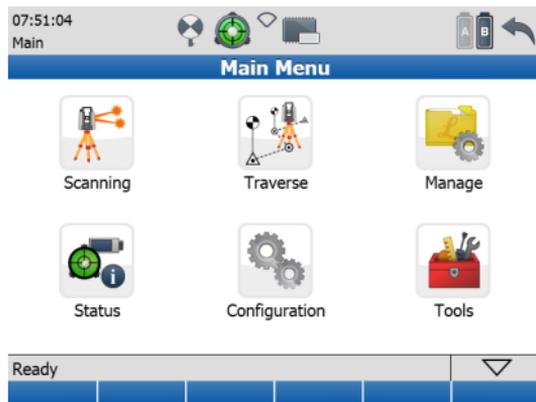


## 6 Main Menu

### 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 (Advanced User Interface)



Icon	Function
<b>Scanning</b> 	Offers access to all commands for scanner setup and operation control.

Icon		Function
<b>Traverse</b>		Offers access to the Traverse workflow to establish a polygon of control points for further scanning operations.
<b>Manage</b>		Offers access to all commands for project, target and control point management.
<b>Status</b>		Offers access to all commands for the scanner's status information.
<b>Configuration</b>		Offers access to all commands for the configuration of the system.
<b>Tools</b>		Offers access to all commands for disc formatting, data transfer, license management and display calibration.

#### Available commands:

Command		Function
<b>Shift -&gt; Std. UI</b>	 	Switch to the Standard User Interface.

## Main Menu screen (Standard User Interface)



Start Scan



Icon	Function
<b>Start Scan</b> 	Start scan and/or imaging process with settings as defined in <b>Param</b> .

### Available commands:

Command		Function
Param		Offers access to all commands for scanner control.
Project		Offers access to all commands for project management.
Status		Offers access to all commands for the scanner's status information.
Config		Offers access to all commands for the configuration of the system.
Tools		Offers access to all commands for disc formatting, data transfer, license management and display calibration.
Shift -> Scale	 	Open the <b>Scale Factor</b> screen to define atmospheric and geometric corrections.
Shift -> Adv. UI	 	Switch to the Advanced User Interface.

Command	Function
Shift -> Std.ID  	Open the <b>Station ID Configuration</b> screen to define a station ID prefix which is incremented every time a scan is started from the <b>Main Menu</b> .

### Menu independent commands

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



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## 7 Scanning

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### Access

Select **Main Menu, Scanning** .

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### Description

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

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## 7.1 Scanning\Scan Begin

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### Access

Select **Main Menu, Scanning** .

---

### Description

Scan data is stored on the ScanStation P40/P30 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 Back-sight, Resection or Auto Resection) or an existing one can be used to continue.

---

## Scan Begin screen



**Project:**  



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

**Available commands:**

<b>Command</b>	<b>Function</b>
<b>Cont</b>	Continue with the current project. Opens the <b>Current Station Information</b> window.
<b>Setup</b>	Opens the <b>Station Setup</b> screen for station setup via <b>Quick Orientation, Set Azimuth, Known Backsight, Resection</b> or <b>Auto Resection</b> ).
<b>ChkBS</b>	Open <b>Check Backsight</b> screen to define a known backsight target for current setup control.
<b>Shift -&gt; Scale</b>	Open the <b>Scale Factor</b> screen to define atmospheric and geometric corrections.
<b>Shift -&gt; New Stn</b>	Create a new station. (Only active when the current setup method is not a <b>Standard Setup</b> .)
<b>Shift -&gt; Stn.ID</b>	Open the <b>Station ID Configuration</b> screen to define <b>Station ID Generation</b> and set a <b>Station ID Prefix</b> .

## 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 command **Setup**:

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

## 7.2.1 Scanning\Setup\Quick Orientation

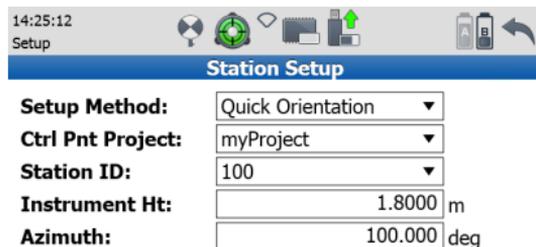
### Access

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



14:25:12	
Setup	
<b>Station Setup</b>	
<b>Setup Method:</b>	Quick Orientation ▼
<b>Ctrl Pnt Project:</b>	myProject ▼
<b>Station ID:</b>	100 ▼
<b>Instrument Ht:</b>	1.8000 m
<b>Azimuth:</b>	100.000 deg

Ready					▼
Set	Az=0	New	PickAz		

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

**Available commands:**

Command	Function
<b>Set</b>	Accept station setup and proceed to <b>Scan Parameters</b> screen.
<b>Az=0</b>	Set the <b>Azimuth</b> = 0.
<b>New</b>	Open the <b>New Control Point</b> screen to create a new control point in the selected project.
<b>PickAz</b>	Select azimuth direction from the video image.

## 7.2.2 Scanning\Setup\Set Azimuth

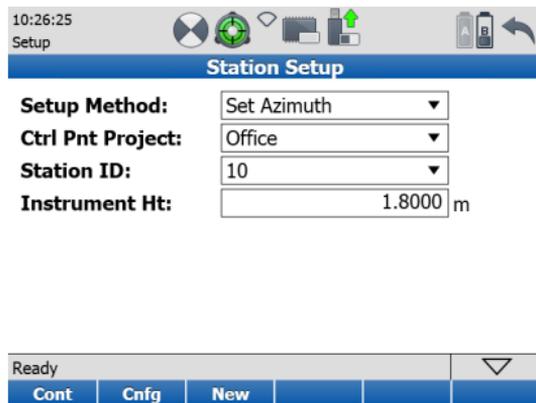
### Access

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



The screenshot shows the 'Station Setup' screen with the following configuration:

10:26:25 Setup					
<b>Station Setup</b>					
<b>Setup Method:</b>	Set Azimuth ▼				
<b>Ctrl Pnt Project:</b>	Office ▼				
<b>Station ID:</b>	10 ▼				
<b>Instrument Ht:</b>	1.8000 m				
Ready	▼				
Cont	Cnfg	New			

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

**Available commands:**

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

## Define Backsight: Set Azimuth screen, Target Def

14:31:01  
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 PickT Page

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

### Available commands:

Command	Function
<b>Cont</b>	Execute backsight target scan and setup calculation. Show results in <b>Set Azimuth Results</b> screen.
<b>Az=0</b>	Set the <b>Azimuth</b> = 0.
<b>PickT</b>	Select target from the video image. After selection, the target is listed on the <b>Target List</b> page.
<b>Page</b>	Switch to the <b>Target List</b> page.

### Define Backsight: Set Azimuth screen, Target List

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

Ready					▽
<b>Cont</b>		<b>Az=0</b>		<b>ScanT</b>	<b>Page</b>

Field	Description
<b>Target ID</b>	Shows the target ID of a new backsight target after <b>PickT</b> was executed.
<b>Type</b>	Shows the target type of the selected backsight target after <b>PickT</b> was executed.
<b>Height</b>	Shows the target height of the selected backsight target after <b>PickT</b> was executed.
<b>State</b>	Status of scanned target. <b>OK</b> indicates a successful acquisition of the target centre. A bad target centre acquisition is marked as <b>BAD</b> .

**Available commands:**

Command	Function
<b>Cont</b>	Start backsight target scan to selected target and setup calculation. Show results in <b>Set Azimuth Results</b> screen.
<b>Az=0</b>	Set the Azimuth = 0.
<b>ScanT</b>	Scan selected target and return to the <b>Target List</b> .

Command	Function
Page	Switch to the <b>Target Def</b> page.
Shift -> View	View point cloud of selected target scan.

### 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.

---

Field	Description
<b>Backsight ID</b>	Target ID of the selected backsight target.
<b>Target Height</b>	Target height as entered by the user.
<b>Target Type</b>	Target type of the selected backsight target.
<b>Horiz Dist</b>	Horizontal distance between station and backsight target.

**Available commands:**

Command	Function
<b>Set</b>	Accept the setup results for this station and proceed to <b>Scan Parameters</b> screen.
<b>Info</b>	Show the target information of the selected target.
<b>View</b>	View point cloud of selected backsight target scan.
<b>Page</b>	Switch to the <b>Tgt Coords</b> page.
<b>Shift -&gt; Redo</b>	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
<b>Backsight ID</b>	Target ID of the selected backsight target.
<b>Northing</b>	Northing of the selected backsight target calculated from scanned target data and user defined azimuth.
<b>Easting</b>	Easting of the selected backsight target calculated from scanned target data and user defined azimuth.
<b>Height</b>	Height of the selected backsight target calculated from scanned target data.

**Available commands:**

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

## 7.2.3

# Scanning\Setup\Known Backsight

### Access

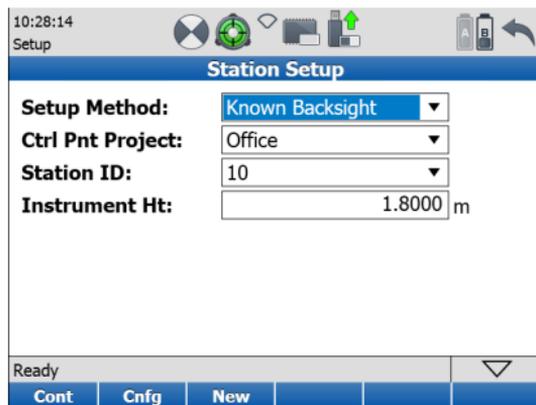
Select **Main Menu, Scanning**  , **Setup**.



### 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



10:28:14  
Setup

**Station Setup**

**Setup Method:** Known Backsight

**Ctrl Pnt Project:** Office

**Station ID:** 10

**Instrument Ht:** 1.8000 m

Ready

Cont Cnfg New

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

**Available commands:**

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

## Station Setup: Known Backsight screen, Target Def

14:33:49  
Setup

**Define Backsight: Known Backsight**

Target Def Target List

**Ctrl Pnt Project:** office coordinates ▼

**Backsight ID:** 11 ▼

**Target Type:** B/W Target 6" ▼

**Target Height:** 1.4710 m

Ready

Cont New PickT Page

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

## Available commands:

Command	Function
<b>Cont</b>	Execute backsight target scan and setup calculation. Show results in <b>Known Backsight Results</b> screen.
<b>New</b>	Opens the <b>New Control Point</b> screen.
<b>PickT</b>	Select target from the video image. After selection, the target is listed on the <b>Target List</b> page.
<b>Page</b>	Switch to the <b>Target List</b> page.

### Station Setup: Known Backsight, Target List

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

Ready					▽
<b>Cont</b>	<b>New</b>		<b>ScanT</b>	<b>Page</b>	

Field	Description
<b>Target ID</b>	Shows the point ID of the backsight point after <b>PickT</b> was executed.
<b>Type</b>	Shows the target type on the backsight point after <b>PickT</b> was executed.
<b>Height</b>	Shows the target height of the selected backsight target after <b>PickT</b> was executed.
<b>State</b>	Status of scanned target. <b>OK</b> indicates a successful acquisition of the target centre. A bad target centre acquisition is marked as <b>BAD</b> .

**Available commands:**

Command	Function
<b>Cont</b>	Execute backsight target scan and setup calculation. Show results in <b>Known Backsight Results</b> screen.
<b>New</b>	Open the <b>New Control Point</b> menu to enter a new control point.
<b>ScanT</b>	Scan selected target and return to the <b>Target List</b> .

Command	Function
<b>Page</b>	Switch to the <b>Target Def</b> page.
<b>Shift -&gt; View</b>	View point cloud of selected target scan.

**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
<b>Station ID</b>	Station ID of current station.
<b>Instrument Ht</b>	Instrument height as entered by the user.

Field	Description
<b>Backsight ID</b>	Point ID of the backsight point.
<b>Target Height</b>	Target height as entered by the user.
<b>Target Type</b>	Target type on the backsight point.
<b>Horiz Dist</b>	Horizontal distance between station and backsight point.

**Available commands:**

Command	Function
<b>Set</b>	Accept the setup results for this station and proceed to <b>Scan Parameters</b> screen.
<b>Info</b>	Show the target information of the selected target.
<b>View</b>	View point cloud of backsight target scan.
<b>Page</b>	Switch to the <b>Delta</b> page.
<b>Shift -&gt; Redo</b>	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  
 **$\Delta$ Northing:** 0.0000 m  
 **$\Delta$ Easting:** 0.0001 m  
 **$\Delta$ Height:** -0.0001 m  
 **$\Delta$ Horiz Dist:** 0.0001 m

Ready

Set Info View Page

Field	Description
<b>Backsight ID</b>	Point ID of the backsight point.
<b><math>\Delta</math>Northing</b>	Difference in Northing between calculated and measured coordinate.
<b><math>\Delta</math>Easting</b>	Difference in Easting between calculated and measured coordinate.
<b><math>\Delta</math>Height</b>	Difference in Height between calculated and measured coordinate.

Field	Description
<b>ΔHoriz Dist</b>	Difference in Horizontal Distance between calculated and measured distance.

**Available commands:**

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

## 7.2.4 Scanning\Setup\Resection

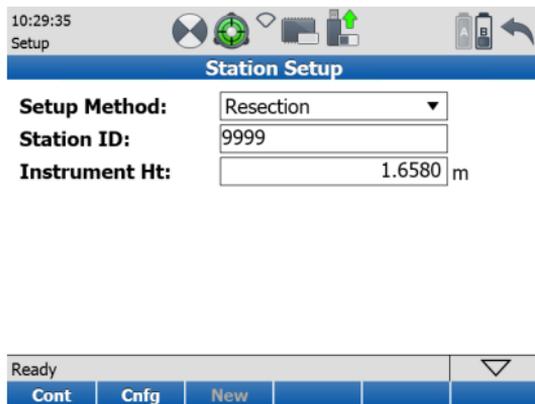
### Access

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



10:29:35  
Setup

**Station Setup**

**Setup Method:**

**Station ID:**

**Instrument Ht:**  m

Ready

Cont Cnfg New

Field	Description
<b>Setup Method</b>	Select the station setup method.
<b>Station ID</b>	Enter the station ID of the current station.
<b>Instrument Ht</b>	Enter the instrument height (control point to tilt axis).

**Available commands:**

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

## Define Resection Targets screen, Target Def

14:39:23  
Setup

**Define Resection Targets**

Target Def Target List

**Ctrl Pnt Project:** office coordinates ▼

**Target ID:** 106 ▼

**Target Type:** B/W Target 6" ▼

**Target Height:** 0.0000 m

**No of Targets:** 3

Ready

Calc 4P Calc 6P PickT Page

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

### Available commands:

Command	Function
<b>Calc 4P</b>	Start target scan to selected targets and setup calculation by a 4 parameters transformation: 3 translations and 1 rotation around z axis. Requires at least 2 targets. Show results in <b>Resection Results</b> screen.
<b>Calc 6P</b>	Start target scan to selected targets and setup calculation by a 6 parameters transformation: 3 translations and 3 rotations. Requires at least 3 targets. Show results in <b>Resection Results</b> screen.
<b>PickT / Add</b>	Select target centre from the video camera image. After selection, the target is listed on the <b>Target List</b> 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 <b>Add</b> and aimed automatically without any target picking.
<b>Page</b>	Switch to the <b>Target List</b> page.

## Define Resection Targets screen, Target List

14:28:12  
Setup

**Define Resection Targets**

Target Def Target List

Target ID	Target Type	Height	State
101	Leica B/W 4.5"	0.0000 m	-----
102	Leica B/W 4.5"	0.0000 m	-----
103	Leica B/W 4.5"	0.0000 m	-----
104	Leica B/W 4.5"	0.0000 m	-----
105	Leica B/W 4.5"	0.0000 m	-----
106	Leica B/W 4.5"	0.0000 m	-----

Ready

Calc 4P Calc 6P Edit Del ScanT Page

Field	Description
<b>Target ID</b>	Shows the target ID of a new target after <b>PickT</b> was executed.
<b>Type</b>	Shows the target type of the selected target after <b>PickT</b> was executed.
<b>Height</b>	Shows the target height of the selected target after <b>PickT</b> was executed.
<b>State</b>	Status of scanned target. <b>OK</b> indicates a successful acquisition of the target centre. A bad target centre acquisition is marked as <b>BAD</b> .

**Available commands:**

<b>Command</b>	<b>Function</b>
<b>Calc 4P</b>	Start target scan to selected targets and setup calculation by a 4 parameters transformation: 3 translations and 1 rotation around z axis. Requires at least 2 targets. Show results in <b>Resection Results</b> screen.
<b>Calc 6P</b>	Start target scan to selected targets and setup calculation by a 6 parameters transformation: 3 translations and 3 rotations. Requires at least 3 targets. Show results in <b>Resection Results</b> screen.
<b>Edit</b>	Open the <b>Edit Target</b> menu to edit the selected target.
<b>Del</b>	Delete selected target from the target list.
<b>ScanT</b>	Scan selected target and return to the <b>Target List</b> .
<b>Page</b>	Switch to the <b>Target Def</b> page.

## Resection Results screen, Stn Coords

14:59:28  
Setup

**Resection Results**

Stn Coords | Sigma | Target List | Plot

**Station ID:** 9998  
**Instrument Ht:** 1.6580 m  
**No of Targets:** 6  
**Northing:** 1.8516 m  
**Easting:** 0.9558 m  
**Height:** -1.6940 m

Ready

Set | | | | | Page

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

### Available commands:

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

### Resection Results screen, Sigma

14:40:46  
Setup

**Resection Results**

Stn Coords Sigma Target List Plot

**Station ID:** 9999  
 **$\sigma$ Northing:** 0.0011 m  
 **$\sigma$ Easting:** 0.0024 m  
 **$\sigma$ Height:** 0.0014 m  
 **$\sigma$ Hz Orient:** 53"

Ready

Set Orient Page

Field	Description
<b>Station ID</b>	Station ID of current station.
<b><math>\sigma</math>Northing</b>	Standard deviation of station northing.
<b><math>\sigma</math>Easting</b>	Standard deviation of station easting.
<b><math>\sigma</math>Height</b>	Standard deviation of station height.
<b><math>\sigma</math>Hz Orient</b>	Standard deviation of horizontal orientation.

**Available commands:**

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

---

## Resection Results screen, Target List

14:42:56  
Setup

Resection Results

Stn Coords Sigma Target List Plot

Target ID	dN	dE	dH	Use
101	0.0015	0.0003	0.0005	Yes
102	0.0010	0.0013	-0.0005	No
103	0.0014	0.0033	-0.0005	Yes
104	-0.0011	-0.0039	0.0001	Yes
105				No
106	-0.0028	0.0030	-0.0001	Yes

Ready

Set Add View Use Page

Field	Description
Target ID	Target ID of scanned target.
dN, dE, dH	Target residuals dN, dE, dH.
Use	Target status for resection calculation ( <b>Yes</b> = used, <b>No</b> = not used).

**Available commands:**

<b>Command</b>	<b>Function</b>
<b>Set</b>	Accept the setup results for this station and proceed to <b>Scan Parameters</b> screen.
<b>Add</b>	Switch to <b>Define Resection Targets</b> 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.
<b>View</b>	View point cloud of selected target scan.
<b>Use</b>	Change the target status in the <b>Use</b> field from <b>Yes</b> to <b>No</b> .
<b>Page</b>	Switch to the <b>Plot</b> page.
<b>Shift -&gt; Redo</b>	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 <b>Scan Parameters</b> screen.
Page	Switch to the <b>Stn Coords</b> page.

## 7.2.5 Scanning\Setup\Auto Resection

### Access

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

### Description

The **Auto Resection** setup option offers scanner setup over an unknown station and station coordinate calculation by aiming at known target positions without using target IDs.

### Station Setup: Auto Resection screen



The screenshot shows the 'Station Setup' screen with the following fields:

10:30:33 Setup	      
<b>Station Setup</b>	
<b>Setup Method:</b>	Auto Resection ▼
<b>Station ID:</b>	9998
<b>Instrument Ht:</b>	1.6580 m



The screenshot shows the bottom navigation bar with the following elements:

Ready					▽
Cont	Cnfg	New			

Field	Description
<b>Setup Method</b>	Choose <b>Auto Resection</b> as setup method.
<b>Station ID</b>	Enter the station ID of the current station.
<b>Instrument Ht</b>	Enter the instrument height (control point to tilt axis).

**Available commands:**

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

## Define Resection Targets screen, Target Def

14:42:46  
Setup

**Define Resection Targets**

Target Def Target List

**Ctrl Pnt Project:** office coordinates ▼

**Target Type:** Leica B/W 4.5" ▼

**Target Height:** 0.0000 m

**No of Targets:** 5

Ready

Calc 4P Calc 6P PickT Page

Field	Description
<b>Ctrl Pt Project</b>	Select the control point project which contains the target coordinates.
<b>Target Height</b>	Enter the target height of the selected control point target.
<b>Target Type</b>	Enter the target type of the selected control point target.
<b>No of Targets</b>	Number of picked targets to be scanned.

**Available commands:**

<b>Command</b>	<b>Function</b>
<b>Calc 4P</b>	Start target scan to selected targets and setup calculation by a 4 parameters transformation: 3 translations and 1 rotation around z axis. Requires at least 2 targets. Show results in <b>Resection Results</b> screen.
<b>Calc 6P</b>	Start target scan to selected targets and setup calculation by a 6 parameters transformation: 3 translations and 3 rotations. Requires at least 3 targets. Show results in <b>Resection Results</b> screen.
<b>PickT</b>	Select target centre from the video camera image. After selection, the target is listed on the <b>Target List</b> page as a candidate for target acquisition.
<b>Page</b>	Switch to the <b>Target List</b> page.

## Define Resection Targets screen, Target\_List

14:53:35  
Setup

**Define Resection Targets**

Target Def Target List

Target ID	Target Type	Height	State
----	Leica B/W 4.5"	0.0000 m	----
----	Leica B/W 4.5"	0.0000 m	----
----	Leica B/W 4.5"	0.0000 m	----
----	Leica B/W 4.5"	0.0000 m	----
----	Leica B/W 4.5"	0.0000 m	----
----	Leica B/W 4.5"	0.0000 m	----
----	Leica B/W 4.5"	0.0000 m	----

Ready

Calc 4P Calc 6P Edit Del ScanT Page

Field	Description
<b>Target ID</b>	Not used for Auto Resection.
<b>Target Type</b>	Shows the target type of the selected target after <b>PickT</b> was executed.
<b>Height</b>	Shows the target height of the selected target after <b>PickT</b> was executed.
<b>State</b>	Status of scanned target. <b>OK</b> indicates a successful acquisition of the target centre. A bad target centre acquisition is marked as <b>BAD</b> .

**Available commands:**

<b>Command</b>	<b>Function</b>
<b>Calc 4P</b>	Start target scan to selected targets and setup calculation by a 4 parameters transformation: 3 translations and 1 rotation around z axis. Requires at least 2 targets. Show results in <b>Resection Results</b> screen.
<b>Calc 6P</b>	Start target scan to selected targets and setup calculation by a 6 parameters transformation: 3 translations and 3 rotations. Requires at least 3 targets. Show results in <b>Resection Results</b> screen.
<b>Edit</b>	Open the <b>Edit Target</b> menu to edit the selected target.
<b>Del</b>	Delete selected target from the target list.
<b>ScanT</b>	Scan selected target and return to the <b>Target List</b> .
<b>Page</b>	Switch to the <b>Target Def</b> page.

## Resection Results screen, Stn Coords

14:59:28  
Setup

**Resection Results**

Stn Coords | Sigma | Target List | Plot

**Station ID:** 9998  
**Instrument Ht:** 1.6580 m  
**No of Targets:** 6  
**Northing:** 1.8516 m  
**Easting:** 0.9558 m  
**Height:** -1.6940 m

Ready

Set | | | | | Page

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

### Available commands:

Command	Function
<b>Set</b>	Accept the setup results for this station and proceed to <b>Scan Parameter</b> screen.
<b>Page</b>	Switch to the <b>Sigma</b> page.

### Resection Results screen, Sigma

15:00:17  
Setup

**Resection Results**

Stn Coords | **Sigma** | Target List | Plot

**Station ID:** 9998  
 **$\sigma$ Northing:** 0.0009 m  
 **$\sigma$ Easting:** 0.0019 m  
 **$\sigma$ Height:** 0.0009 m  
 **$\sigma$ Hz Orient:** 39"

Ready

Set | | Orient | Page

Field	Description
<b>Station ID</b>	Station ID off current station.
<b><math>\sigma</math>Northing</b>	Standard deviation of station northing.
<b><math>\sigma</math>Easting</b>	Standard deviation of station easting.
<b><math>\sigma</math>Height</b>	Standard deviation of station height.
<b><math>\sigma</math>Hz Orient</b>	Standard deviation of horizontal orientation.

**Available commands:**

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

---

## Resection Results screen, Target\_List

15:01:22  
Setup

**Resection Results**

Stn Coords | Sigma | Target List | Plot

Target ID ▾	dN	dE	dH	Use
107	-0.0025	-0.0003	0.0003	Yes
106	-0.0028	0.0001	-0.0004	Yes
104	-0.0015	-0.0061	0.0017	No
103	0.0009	0.0018	0.0003	Yes
102	0.0009	-0.0001	-0.0003	Yes
101	0.0017	-0.0009	0.0001	Yes

Ready

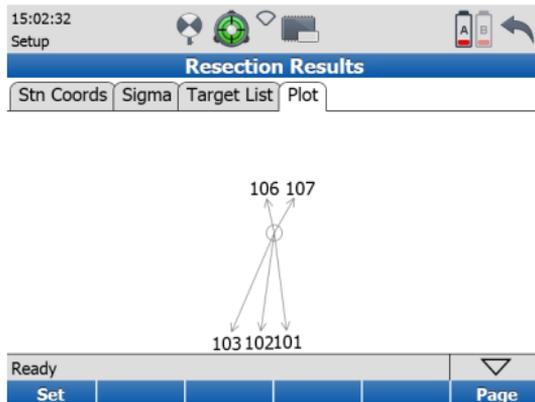
Set | Add | View | Use | Page

Field	Description
Target ID	Target ID of scanned target.
dN, dE, dH	Target residuals dN,dE,dH.
Use	Target status for resection calculation (Yes = used, No = not used).

**Available commands:**

<b>Command</b>	<b>Function</b>
<b>Set</b>	Accept the setup results for this station and proceed to <b>Scan Parameter</b> screen.
<b>Add</b>	Switch to <b>Define Resection Targets</b> and define additional targets for resection.
<b>View</b>	View point cloud of selected target scan.
<b>Use</b>	Change the target status in the <b>Use</b> field from <b>Yes</b> to <b>No</b> .
<b>Page</b>	Switch to the <b>Plot</b> page.
<b>Shift -&gt; Redo</b>	Repeat target scan to selected target and setup calculation.

## Resection Results screen



### Available commands:

Command	Function
Set	Accept the setup results for this station and proceed to <b>Scan Parameter</b> screen.
Page	Switch to the <b>StnCoords</b> page.

## 7.2.6 Scanning\Setup\Setup Configuration

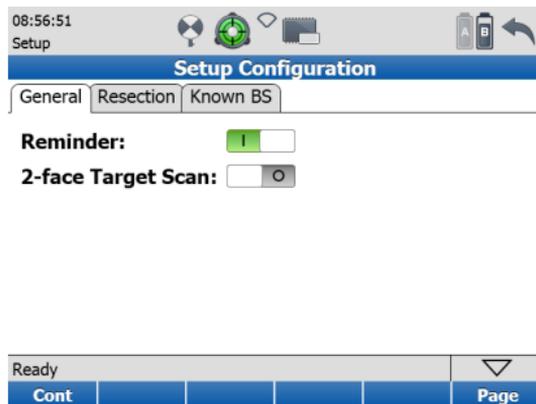
### Access

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

### Description

The **Setup Configuration** menu allows for configuring limits and specifications for the various setup methods.

### General page

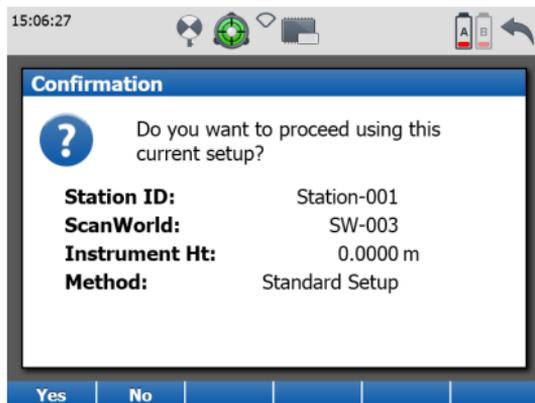


The screenshot shows the 'Setup Configuration' screen on a handheld device. At the top, the time is 08:56:51 and the word 'Setup' is displayed. The title bar is blue and contains the text 'Setup Configuration'. Below the title bar are three tabs: 'General', 'Resection', and 'Known BS'. The 'General' tab is selected. Underneath, there are two settings: 'Reminder:' with a green toggle switch that is turned on, and '2-face Target Scan:' with a grey toggle switch that is turned off. At the bottom of the screen, there is a status bar with the word 'Ready' on the left and a blue button labeled 'Page' on the right, which has a downward-pointing triangle icon above it.

Field	Options	Description
<b>Reminder</b>	<b>On</b>	Enable a reminder for the station information: <b>Current Setup Information</b> will be displayed every time the <b>Cont</b> button is pressed within the <b>Scan Begin</b> screen.
	<b>Off</b>	Disable the reminder for the station information.
<b>2-face Target Scan</b>	<b>On</b>	Enable target scanning in two faces.
	<b>Off</b>	Scan targets in Face I only.

**Available commands:**

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

Current Station  
Information

## Available commands:

Command	Function
Yes	Proceed with the current setup to the <b>Scan Parameters</b> screen.
No	Return to the <b>Scan Begin</b> screen.

## Resection page

09:00:40  
Setup

Setup Configuration

General Resection Known BS

**Accuracy Hz Ori:**  deg

**Accuracy Pos Tgt:**  m

**Accuracy Ht Tgt:**  m

Ready

Cont Page

Field	Description
<b>Accuracy Hz Ori</b>	Threshold for standard deviation of horizontal orientation.
<b>Accuracy Pos Tgt</b>	Threshold for the Easting and Northing residuals ( $\Delta E$ and $\Delta N$ ) of the targets used in resection.
<b>Accuracy Ht Tgt</b>	Threshold of height residuals ( $\Delta H$ ) of the targets used in resection.

## Available commands:

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

## Known BS page

09:02:40  
Setup









**Setup Configuration**

General | Resection | **Known BS**

**Position Limit:**   0.0150 m

**Height Limit:**   0.0150 m

Ready

Field	Options	Description
<b>Position Limit</b>	<b>On</b>	Enable checking of horizontal coordinate difference (hz range) between existing and measured known backsight point. If defined <b>Position Limit</b> is exceeded, the setup can be repeated, skipped or stored.
	<b>Off</b>	Disable checking of horizontal coordinate difference between existing and measured known backsight point.
<b>Height Limit</b>	<b>On</b>	Enable checking of vertical difference between existing and measured known backsight point. If defined <b>Height Limit</b> is exceeded, the setup can be repeated, skipped or stored.
	<b>Off</b>	Disable checking of vertical difference between existing and measured known backsight point.

**Available commands:**

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

## 7.2.7

## Scanning\Setup\Station ID Configuration

---

### Access

Select **Main Menu, Scanning**  , **Shift->Stn.ID.**

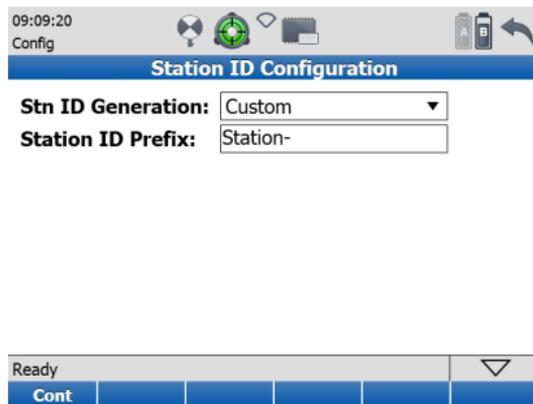
---

### Description

The **Station ID Configuration** menu allows for defining the naming configurations when a new station is created.

---

### Station ID Configuration page



09:09:20  
Config

**Station ID Configuration**

**Stn ID Generation:** Custom

**Station ID Prefix:** Station-

Ready

Cont

Field	Options	Description
<b>Stn ID Generation</b>	<b>Automatic</b>	Standard setup does not ask for station ID prefix and station ID but creates new station with standard setup parameters and proceeds to the <b>Scan Parameter</b> screen.
	<b>Custom</b>	Standard setup opens the <b>Standard Station Setup</b> screen and asks for user-defined station ID prefix and station ID before proceeding to the <b>Scan Parameter</b> screen.
<b>Station ID Prefix</b>	-	Define a station ID prefix which is incremented by one for each standard setup.

**Available commands:**

Command	Function
<b>Cont</b>	Confirm settings for standard setup and continue with the <b>Scan Begin</b> screen.

## Standard Station Setup

12:36:15  
Setup

Standard Station Setup



**Station ID Prefix:**

**Station ID:**

Ready

Set



---

## 7.2.8 Scanning\Setup\Scale Factor

---

### Access

Select **Scan Begin, Shift -> Scale** or **Traverse, Traverse Begin, Shift -> Scale** or **Scan Parameters, Shift -> Scale**.

---

### Description

In the **Scale Factor** menu atmospheric and geometric corrections can be defined. The corrections are given as PPM (parts per million).

In the **Atmospheric PPM** page of the **Scale Factor** screen the dry air temperature and air pressure can be entered to calculate the atmospheric PPM for the atmospheric distance correction. The atmospheric correction is applied to every measured slope distance and its scale factor  $S$  can be calculated by

$$S = 1 + (\text{Atmospheric PPM} * 10^{-6}).$$

In the **Geometric PPM** page of the **Scale Factor** screen the geometric PPM for the geometric distance correction can be calculated from the instrument height above a reference datum (Height PPM) and an individual correction (User entered PPM). The geometric correction is applied only to the horizontal distance for targets and its scale factor  $S$  can be calculated by

$$S = 1 + (\text{Geometric PPM} * 10^{-6}).$$

---

Once a scale factor is enabled the  icon in the status bar is visible.

---



## Atmospheric PPM page

12:56:55  
Setup

Scale Factor

Atmospheric PPM Geometric PPM

**Temperature:**  °C

**Pressure:**  mbar

**Atmospheric PPM:** 0.0000

Ready

Cont PPM=0 Page

Field	Description
<b>Temperature</b>	Enter the temperature in °Celsius from -20 °C to +50 °C or in °Fahrenheit from -4 °F to +122 °F.
<b>Pressure</b>	Enter the atmospheric pressure in Millibar from 600 mbar to 1030 mbar or in Inch of Mercury from 17.72 inHg to 30.42 inHg.
<b>Atmospheric PPM</b>	The <b>Atmospheric PPM</b> is calculated from the values in the <b>Temperature</b> and <b>Pressure</b> fields.

**Available commands:**

---

<b>Command</b>	<b>Function</b>
<b>Cont</b>	Accept values for <b>Atmospheric PPM</b> and return to previous menu.
<b>PPM=0</b>	Set the <b>Atmospheric PPM</b> to <b>0.0</b> and the parameters to default values of standard atmosphere (Temperature = 12.0 °C or 53.6 °F, Pressure = 1013.25 mbar or 29.92 inHg).
<b>Page</b>	Switch to the <b>Geometric PPM</b> page.

---

## Geometric PPM page

13:28:25  
Setup

**Scale Factor**

Atmospheric PPM   Geometric PPM

**Ground Height:**  --- m

**Height PPM:** 0.0000

**User entered PPM:**  ---

**Geometric PPM:** 0.0000

---

Ready

Cont
PPM=0
Page

Field	Description
<b>Ground Height</b>	Enter the height of the instrument station above reference datum (from 0 m to 4000 m).
<b>Height PPM</b>	<p>The <b>Height PPM</b> is calculated from the input in the <b>Height PPM</b> field with the formula:</p> $\text{Height PPM} = -H/R * 10^6$ <p>With H = user entered ground height [m]; R = earth radius <math>6.378 * 10^6</math> [m]</p>

---

Field	Description
User entered PPM	Enter a value from -1000 to +1000.
Geometric PPM	Sum of the <b>Height PPM</b> and <b>User entered PPM</b> .

**Available commands:**

Command	Function
Cont	Accept values for <b>Geometric PPM</b> and return to previous menu.
PPM=0	Set the <b>Height PPM</b> and <b>Geometric PPM</b> to <b>0.0</b> and display "---" in the fields for <b>Ground Height</b> and <b>User Entered PPM</b> .
Page	Switch to the <b>Atmospheric PPM</b> page.

---

## 7.3

## Scanning\Scan Parameters

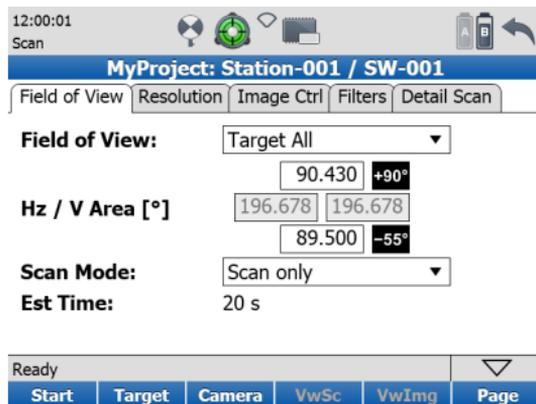
### Access

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

### Description

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

### Scan Parameters screen

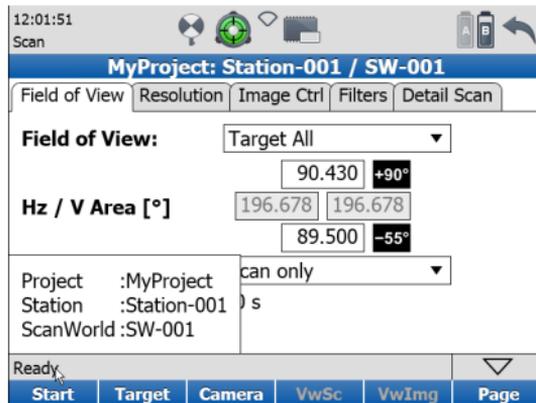


The screenshot shows the Scan Parameters screen with the following elements:

- Top status bar: 12:00:01, Scan, and various system icons.
- Project/Station header: MyProject: Station-001 / SW-001
- Navigation tabs: Field of View (selected), Resolution, Image Ctrl, Filters, Detail Scan.
- Field of View: Target All (dropdown)
- Hz / V Area [°]: 90.430 +90° (top row), 196.678 196.678 (middle row), 89.500 -55° (bottom row)
- Scan Mode: Scan only (dropdown)
- Est Time: 20 s
- Bottom bar: Ready, Start, Target, Camera, VwSc, VwImg, Page (dropdown)



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

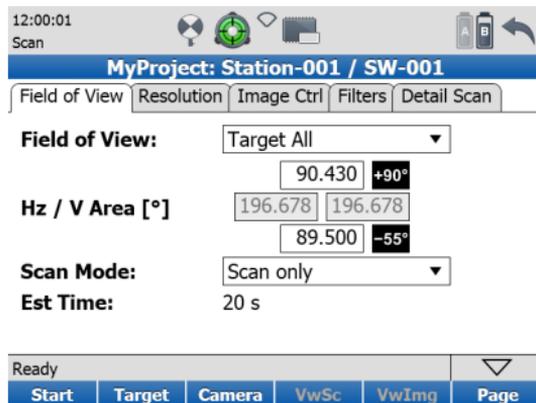
### Access

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



12:00:01  
Scan

**MyProject: Station-001 / SW-001**

Field of View Resolution Image Ctrl Filters Detail Scan

**Field of View:** Target All

90.430 +90°

**Hz / V Area [°]** 196.678 196.678

89.500 -55°

**Scan Mode:** Scan only

**Est Time:** 20 s

Ready

Start Target Camera VwSc VwImg Page

Field	Description
<b>Field of View</b>	Selection of <b>Target All</b> for a 360° x 290° area or <b>Custom</b> for a user defined area to scan and/or take pictures.
<b>Hz/V Area: Left</b>	Left limit of the area to scan or take pictures.
<b>Hz/V Area: Right</b>	Right limit of the area to scan or take pictures.
<b>Hz/V Area: Top</b>	Top limit of the area to scan or take pictures. All points with an elevation angle higher than the entered limit will not be stored.
<b>Hz/V Area: +90 °</b>	Set the top value to its maximum limit of +90 °.
<b>Hz/V Area: Bottom</b>	Bottom limit of the area to scan or take pictures. All points with an elevation angle lower than the entered limit will not be stored.
<b>Hz/V Area: -55 °</b>	Set the bottom value to its minimum limit of -55 °.
<b>Scan Mode</b>	<ul style="list-style-type: none"><li>• <b>Scan only:</b> Take a scan only, no images are acquired.</li><li>• <b>Images only:</b> Acquire images only, no scan is started.</li><li>• <b>Scan &amp; Image:</b> Acquire scan and images.</li></ul>
<b>Est. Time</b>	Estimated duration of the defined scan and/or image process derived from the current settings in <b>Field of View</b> , <b>Resolution</b> and <b>ImageCtrl</b> .

**Available commands:**

<b>Command</b>	<b>Function</b>
<b>Start</b>	Start scan and/or image acquisition with selected FoV and resolution.
<b>Target</b>	Open the <b>Target Definition</b> screen to select target ID, target height and target type.
<b>Camera</b>	Open scan window for area selection from video stream image.
<b>VwSc</b>	View point cloud of last scan with zoom, pan and show previous/next functionality.
<b>VwImg</b>	View last image with next/previous functionality.
<b>Page</b>	Switch to the <b>Resolution</b> page.
<b>Shift -&gt; Scale</b>	Open the <b>Scale Factor</b> screen to define atmospheric and geometric corrections.
<b>Shift -&gt; ChkBS</b>	Open <b>Check Backsight</b> screen to define a known backsight target for current setup control.

## Custom Field of View

09:37:45  
Scan

**MyProject: Station-001 / SW-001**

Field of View | Resolution | Image Ctrl | Filters | Detail Scan

**Field of View:** Custom

4.830 **+90°**

**Hz / V Area [°]**  270.336 | 332.871 

-3.321 **-55°**

**Scan Mode:** Scan only

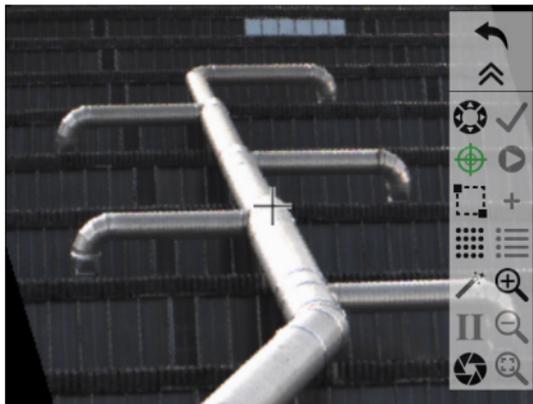
**Est Time:** 1 min 18 s

Ready

Start	Target	Camera	VwSc	VwImg	Page
-------	--------	--------	------	-------	------

With **Field of View** set to **Custom** the **Left/Right** fields show the current scanner direction. To quickly define the left and right boundary of the scan/image area turn the scanner in the desired direction and set this direction by pressing the **Unlock** symbol  next to the corresponding field. The symbol changes to the **Lock** symbol  and the output field becomes an editable input field. Then edit the default **Bottom** and **Top** fields manually if needed. The **Bottom** and **Top** fields for the vertical field of view can be set to the maximum values by clicking on the **-55°** and **+90°** icons.

## Camera screen



### Available commands:

Command	Function
<b>Rotate</b>  	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.

Command	Function
Continue 	Continue and return to the <b>Field of View</b> page of the <b>Scan Parameters</b> screen. The boundaries of a defined scan/image area will be copied into the corresponding fields of Hz / V Area.
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.
Scan 	Return to <b>Field of View</b> page and start a scan only of the specified area.
Fence 	Select the scan/image area by fencing the area in the current video camera image. In activated mode the icon turns green.
Add Scan 	Add fenced scan area to <b>Scan List</b> .
Detail Scan Parameters 	Open the <b>Detail Scan Parameters</b> panel and define settings for fenced sub-scans.
View Scan List 	Open the <b>Scan List</b> to see the list of defined sub-scans.

Command	Function
<b>Camera Wizard</b> 	Open the <b>Camera Wizard</b> to define the upper left and the lower right corner points of an area to be scanned.
<b>Zoom In</b> 	Zoom in to the centre of the video camera image.
<b>Face I/II</b> 	Switch the internal camera between face I and face II.
<b>Zoom Out</b> 	Zoom out from the centre of the video camera image.
<b>Check Exposure</b> 	Open slider to adjust exposure time manually in the video camera window from 0 ms to 800 ms and transfer setting to the <b>Time</b> field of the <b>Image Ctrl</b> page in the <b>Scan Parameters</b> screen.
<b>Zoom All</b> 	Zoom back to the camera's full field of view.

## Scanning screen



Field	Description
<b>Real Time Scan Viewer</b>	Display of current scan in progress.
<b>Est Time</b>	Estimated time to finish scan.

**Available commands:**

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

---

## View scan screen



## Available commands:

Command	Function
<b>Colourise</b>  	Switch between coloured  and black & white  intensity display.
<b>Continue</b> 	Continue and return to <b>Field of View</b> menu.
<b>Target</b> 	Open the <b>Target Definition</b> screen to select target ID, target height and target type.

Command		Function
Scan		Return to <b>Field of View</b> menu and start a scan only of all scan areas as listed in the <b>Scan List</b> .
Fence		Select the scan area by fencing the area. In activated mode the icon turns green.
Add Scan		Add fenced scan area to <b>Scan List</b> .
Detail Scan Parameters		Open the <b>Detail Scan Parameters</b> panel and define settings for fenced sub-scans.
View Scan List		Open the <b>Scan List</b> to see the list of defined sub-scans.
Pan		Pan mode to move current scan on screen. In activated mode the icon turns green.
Zoom In		Zoom in to the centre of the scan image.
Seek		Select a point in the scan viewer to define it as the new centre. The entire point cloud is moved in horizontal and vertical direction accordingly. In activated mode the icon turns green.
Zoom Out		Zoom out from the centre of the scan image.

Command		Function
<b>Move to Next Station</b>		Move to the next traverse station after data collection on current station has been completed. Proceeds to the <b>Define Backsight</b> screen of the next traverse station. (Only available in <b>Traverse</b> workflow.)
<b>View</b>		Switch between 2D planar view  and 3D view  .
<b>Zoom 1:1</b>		Zoom back to fit complete scan to screen.
<b>Previous</b>		Show previous scan of current station.
<b>Next</b>		Show next scan of current station.



Multiple scan areas can be added to the scan list. They are all scanned with the settings defined in the **Detail Scan Parameters** screen. The resolution of each sub-scan can be different.

## 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 sensitivity 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

14:36:38  
Scan

myProject: Station-001 / SW-001

Field of View Resolution Image Ctrl Filters Detail Scan

EDM Mode: Speed

Resolution: 6.3mm@10m

Sensitivity: High

Est Time: 12 s

Ready

Start Target Camera Dist Custom Page

Field	Description
EDM Mode	Selection of <b>Speed</b> or <b>Range</b> mode (ScanStation P40 only).  With <b>Range</b> mode enabled the maximum scanning range is 270 m at a maximum sample rate of 500.000 pts/sec. With <b>Speed</b> mode enabled the maximum scanning range is 120 m at a maximum sample rate of 1.000.000 pts/sec.
Resolution	Selection of fixed resolution settings.

Field	Description
<b>Sensitivity</b>	Selection of scan sensitivity (ScanStation P40 only).  With <b>Normal</b> sensitivity the instrument receives less valid measurements of low return signals (e.g far away objects, low reflective surfaces) but at a higher sample rate. With <b>High</b> sensitivity the instrument gets more sufficient return signals but with a reduced sample rate.
<b>Est Time</b>	Estimated time for a scan using the current settings.

## Scan duration (ScanStation P40, Speed mode):

Resolution [mm @ 10 m]	Estimated scan duration [HH:MM:SS] for a full dome scan @ sensitivity level	
	Normal	High
<b>50</b>	00:00:20	00:00:20
<b>25</b>	00:00:33	00:00:33
<b>12.5</b>	00:00:58	00:00:58
<b>6.3</b>	00:01:49	00:03:25
<b>3.1</b>	00:03:30	00:13:30
<b>1.6</b>	00:13:33	00:54:06
<b>0.8</b>	00:54:06	03:36:21

**Scan duration (ScanStation P40, Range mode):**

<b>Resolution [mm @ 10 m]</b>	<b>Estimated scan duration [HH:MM:SS] for a full dome scan @ sensitivity level</b>	
	<b>Normal</b>	<b>High</b>
<b>50</b>	00:00:20	00:00:28
<b>25</b>	00:00:33	00:00:53
<b>12.5</b>	00:00:58	00:01:44
<b>6.3</b>	00:01:49	00:06:47
<b>3.1</b>	00:06:47	00:26:59
<b>1.6</b>	00:27:04	01:48:12
<b>0.8</b>	01:48:12	03:36:21

**Scan duration (ScanStation P30):**

<b>Resolution [mm @ 10 m]</b>	<b>Estimated scan duration [HH:MM:SS] for a full dome scan</b>
<b>50</b>	00:00:20
<b>25</b>	00:00:33
<b>12.5</b>	00:00:58
<b>6.3</b>	00:01:49
<b>3.1</b>	00:03:30
<b>1.6</b>	00:13:33
<b>0.8</b>	00:54:07

**Available commands:**

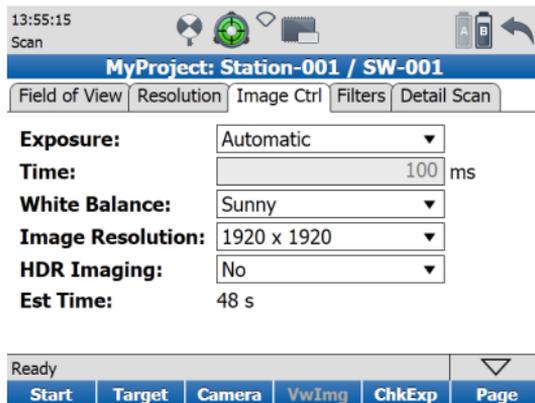
<b>Command</b>	<b>Function</b>
<b>Start</b>	Start scan and/or image acquisition with selected FoV and resolution.
<b>Target</b>	Open the <b>Target Definition</b> screen to select target ID, target height and target type.
<b>Camera</b>	Open scan window for area selection from video stream image.
<b>Dist</b>	Open video camera window to measure the distance to the object to be scanned.
<b>Custom/Default</b>	Switch between default screen with fixed resolution settings and custom screen with flexible resolution settings for Hz and V (ScanStation P40 only).
<b>Page</b>	Switch to the <b>Image Ctrl</b> page.
<b>Shift -&gt; Scale</b>	Open the <b>Scale Factor</b> screen to define atmospheric and geometric corrections.
<b>Shift -&gt; ChkBS</b>	Open <b>Check Backsight</b> screen to define a known backsight target for current setup control.

## 7.3.3 Scanning\Scan Parameters\Image Control\Internal Camera

**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



The screenshot shows the 'Image Ctrl' page of the ScanStation software. At the top, there is a status bar with the time '13:55:15', the word 'Scan', and several icons. Below this is a blue header bar with the text 'MyProject: Station-001 / SW-001'. Underneath the header is a navigation bar with tabs for 'Field of View', 'Resolution', 'Image Ctrl', 'Filters', and 'Detail Scan'. The 'Image Ctrl' tab is currently selected. The main area contains several settings:

- Exposure:** Automatic (dropdown menu)
- Time:** 100 ms (input field)
- White Balance:** Sunny (dropdown menu)
- Image Resolution:** 1920 x 1920 (dropdown menu)
- HDR Imaging:** No (dropdown menu)
- Est Time:** 48 s

At the bottom, there is a status bar with the word 'Ready' and a dropdown arrow. Below this is a navigation bar with buttons for 'Start', 'Target', 'Camera', 'VwImg', 'ChkExp', and 'Page'.

Field	Option	Description
<b>Exposure</b>	<b>Automatic</b>	Image exposure time for each single image is calculated automatically.
	<b>Manual</b>	Image exposure time is set manually. See <b>Time</b> field.
<b>Time</b>	-	Exposure time in ms (milliseconds) for manual exposure.
<b>White Balance</b>	<b>Sunny</b>	Automatic colour adjustment for sunny outdoor environment.
	<b>Cloudy</b>	Automatic colour adjustment for cloudy outdoor environment.
	<b>Cold light</b>	Automatic colour adjustment for indoor environment with light source of cold colour temperature (e.g. neon tube).
	<b>Warm light</b>	Automatic colour adjustment for indoor environment with light source of warm colour temperature (e.g. halogen lamp).
	<b>Custom</b>	Manual colour adjustment by user.

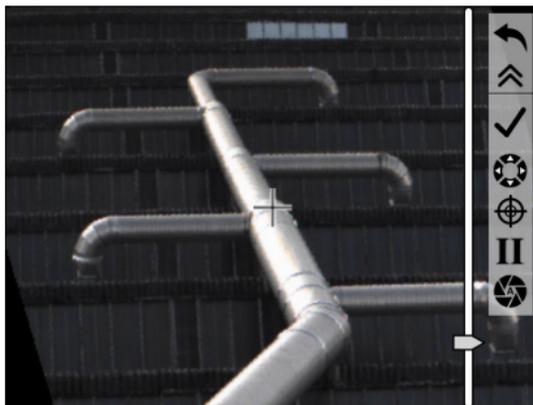
Field	Option	Description
Image Resolution	1920x1920	Set single image resolution to 1920 x 1920 pixels.
	960x960	Set single image resolution to 960 x 960 pixels.
	640x640	Set single image resolution to 640 x 640 pixels.
HDR Imaging	Yes	Enables HDR imaging for internal camera.
	No	Disables HDR imaging for internal camera.
Est Time	-	Estimated time for image acquisition using the current settings.

**Available commands:**

Command	Function
Start	Start scan and/or image acquisition with selected FoV and resolution.
Target	Open the <b>Target Definition</b> screen to select target ID, target height and target type.
Camera	Open scan window for area selection from video stream image.
VwImg	View last image with next/previous functionality.

<b>Command</b>	<b>Function</b>
<b>ChExp</b>	Open video camera window to allow for checking and adjusting exposure time for manual exposure time setting.
<b>Page</b>	Switch to the <b>Filters</b> page.
<b>Shift -&gt; Scale</b>	Open the <b>Scale Factor</b> screen to define atmospheric and geometric corrections.
<b>Shift -&gt; CamOri</b>	Start camera orientation process for external camera.
<b>Shift -&gt; ChkBS</b>	Open <b>Check Backsight</b> screen to define a known backsight target for current setup control.
<b>Shift -&gt; WhitBal</b>	Open video camera window for manual colour adjustment on a white reference plane.

### Check Exposure screen

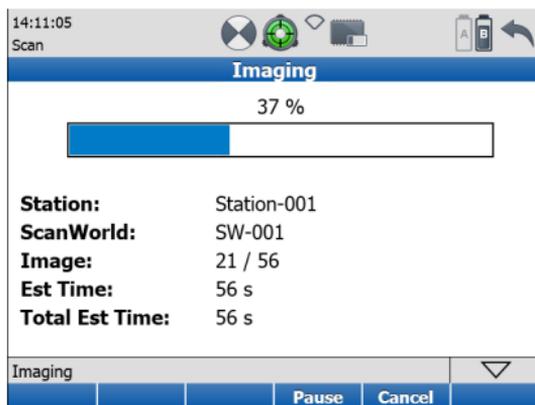


#### Available commands:

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 <b>Time</b> field of the <b>Image Ctrl</b> page in the <b>Scan Parameters</b> screen.
Continue		Continue and return to the <b>Image Ctrl</b> page of the <b>Scan Parameters</b> screen.

Command	Function
<b>Rotate</b> 	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.
<b>Seek</b> 	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.
<b>Face I/II</b> 	Switch the internal camera between face I and face II.
<b>Auto Check Exposure</b> 	Set exposure time automatically in the video camera window and transfer setting to the <b>Exposure</b> field of the <b>Image Ctrl</b> page in the <b>Scan Parameters</b> screen.

## Capture Images screen



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

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

**Available commands:**

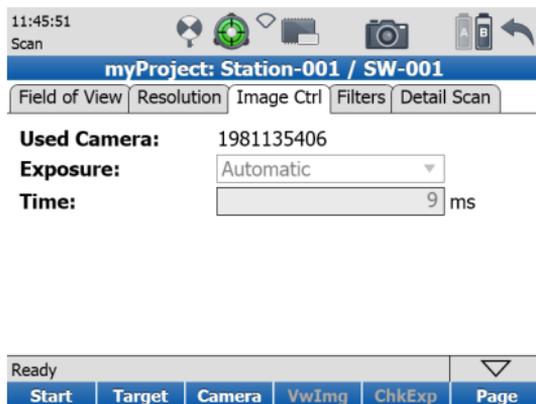
Command	Function
<b>Pause</b>	Pause current image acquisition process. Once paused the button changes to <b>Resume</b> . Press again to resume paused image acquisition process.
<b>Cancel</b>	Cancel the current image acquisition process and return to the <b>Image Ctrl</b> page in the <b>Scan Parameters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

## 7.3.4 Scanning\Scan Parameters\Image Control\External Camera

**Access** Select **Main Menu, Scanning**  , **Scan Parameters, Image Ctrl, External Camera.**

**Description** In the **Image Ctrl** page for the external camera the parameters of the exterior camera orientation can be determined and the external camera can be controlled for image acquisition.

**External Camera page**



11:45:51  
Scan

myProject: Station-001 / SW-001

Field of View Resolution Image Ctrl Filters Detail Scan

**Used Camera:** 1981135406

**Exposure:** Automatic

**Time:** 9 ms

Ready

Start Target Camera VwImg ChkExp Page



For details about the external camera setup, the wizard for the initial calculation of interior and exterior camera parameters and the calibration process refer to the External Camera Calibration Wizard Manual.



To be able to use the external camera a valid external camera license must be available (refer to "12.3 Tools\License").

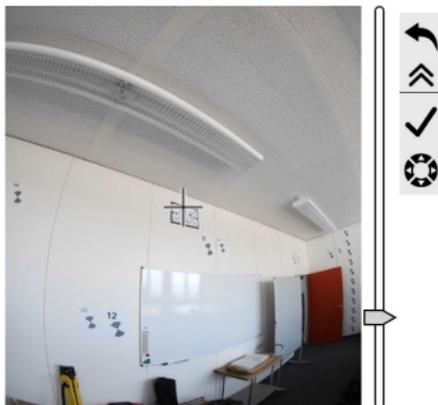
Field	Option	Description
<b>Used Camera</b>	<b>Name of external camera</b>	Serial number of external camera or camera name as entered in the camera calibration process. Reads the camera parameters of the selected camera.
<b>Exposure</b>	<b>Automatic</b>	Image exposure time for each single image is calculated automatically (mode dial on camera is set to Av = Aperture value).
	<b>Manual</b>	Image exposure time is set manually (mode dial on camera is set to M = Manual). See <b>Time</b> field.
<b>Time</b>	-	Exposure time in ms (milliseconds) for manual exposure.

## Available commands:

Command	Function
<b>Start</b>	Start scan and/or external camera image acquisition with selected FoV and resolution.
<b>Target</b>	Open the <b>Target Definition</b> screen to select target ID, target height and target type.
<b>Camera</b>	Open scan window for area selection from video stream image.
<b>VwImg</b>	View last image of external camera with next/previous functionality.
<b>ChExp</b>	With exposure time set to <b>Manual</b> (setting M on the mode dial) the <b>Check Exposure</b> screen opens to allow for checking and adjusting exposure time.
<b>Page</b>	Switch to the <b>Filters</b> page.
<b>Shift -&gt; Scale</b>	Open the <b>Scale Factor</b> screen to define atmospheric and geometric corrections.
<b>Shift -&gt; CamOri</b>	Start camera orientation process for external camera.
<b>Shift -&gt; ChkBS</b>	Open <b>Check Backsight</b> screen to define a known backsight target for current setup control.

Command	Function
Shift -> WhitBal	Open video camera window for manual colour adjustment on white reference plane.

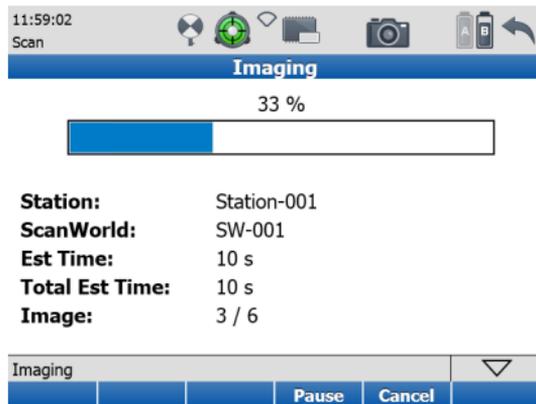
Check Exposure  
screen



**Available commands:**

Command	Function
<b>Slider</b> 	Move slider to adjust exposure time in the external camera LCD screen and transfer setting to the <b>Time</b> field of the <b>Image Ctrl</b> page in the <b>Scan Parameters</b> screen.
<b>Continue</b> 	Continue and return to the <b>Image Ctrl</b> page of the <b>Scan Parameters</b> screen.
<b>Rotate</b> 	Press one of the two arrow buttons to rotate the scanner 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.

## Capture Images screen



Field	Description
<b>Progress bar</b>	Image acquisition progress of external camera in percent.
<b>Station</b>	Name of the current station.
<b>ScanWorld</b>	Name of the current ScanWorld.
<b>Est Time</b>	Estimated time to finish imaging.
<b>Total Est Time</b>	Total estimated time for scan and image acquisition using the current settings.

---

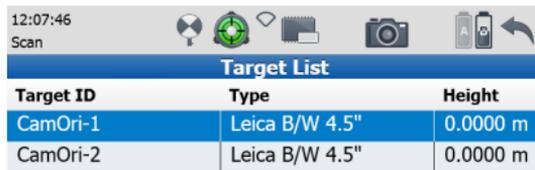
Field	Description
<b>Image</b>	Number of images already acquired / number of total images to be acquired.

**Available commands:**

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

---

## Define External Camera Orientation Target List screen



Target ID	Type	Height
CamOri-1	Leica B/W 4.5"	0.0000 m
CamOri-2	Leica B/W 4.5"	0.0000 m



Ready	▽		
Cont		Del	

Field	Description
<b>Target ID</b>	List of all defined target IDs to be acquired for camera orientation. These targets will be used for the calculation of the camera orientation.
<b>Type</b>	Target type of the selected target ID.
<b>Height</b>	Target height of the selected target ID.

**Available commands:**

Command	Function
<b>Cont</b>	Continue and start target acquisition process for all targets listed in <b>Target List</b> .
<b>Del</b>	Delete the selected target from the <b>Target List</b> .



The external camera orientation process (**CamOri**) calculates the orientation parameters (3 rotations) of the external camera for each Station/ScanWorld. It should be executed every time the external camera has been taken off the instrument. The target(s) should be placed within a recommended distance of 2 m to 8 m and an elevation angle of about 0° (same height as instrument). When the external camera orientation process is skipped in the field then the Pose Editor will open during import in Cyclone for image alignment.

---

## Define External Camera Orientation Target Results screen

12:13:37  
Setup



Target Results			
Target ID	Image	ΔPixel	Use
CamOri-1	1	2.45	Yes
CamOri-1	2	2.94	Yes
CamOri-2	3	2.12	Yes
CamOri-2	4	2.86	Yes

Ready



Store	VwImg	VwTgt	Use		▽
-------	-------	-------	-----	--	---

Field	Description
Target ID	Target ID of scanned target.
Image	Image number.
ΔPixel	Target residuals to image (in pixels).
Use	Target status for calculation of camera orientation ( <b>Yes</b> = used, <b>No</b> = not used).

**Available commands:**

<b>Command</b>	<b>Function</b>
<b>Store</b>	Store external camera orientation results and return to <b>Scan Parameters</b> screen.
<b>VwImg</b>	View selected image with next/previous functionality.
<b>VwTgt</b>	View selected target.
<b>Use</b>	Change the target status in the <b>Use</b> field from <b>Yes</b> to <b>No</b> .

## 7.3.5

## Scanning\Scan Parameters\Filters

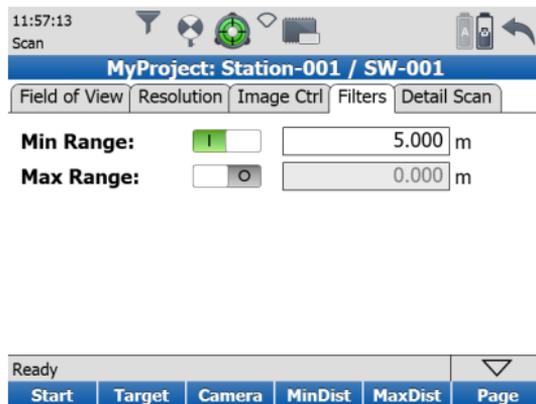
### Access

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



The screenshot shows the 'Filters' page of the ScanStation software. At the top, there is a status bar with the time '11:57:13' and the word 'Scan'. Below this is a blue header bar with the text 'MyProject: Station-001 / SW-001'. The main interface has several tabs: 'Field of View', 'Resolution', 'Image Ctrl', 'Filters' (which is selected), and 'Detail Scan'. Under the 'Filters' tab, there are two settings: 'Min Range:' with a green indicator and a value of '5.000 m', and 'Max Range:' with a grey indicator and a value of '0.000 m'. At the bottom of the screen, there is a 'Ready' status bar with a dropdown arrow and a row of buttons: 'Start', 'Target', 'Camera', 'MinDist', 'MaxDist', and 'Page'.

Field	Description
<b>Min Range</b>	Enable or disable range filtering for minimum range. All points with a range lower than the entered limit will not be stored.
<b>Max Range</b>	Enable or disable range filtering for maximum range. All points with a range higher than the entered 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.

#### Available commands:

Command	Function
<b>Start</b>	Start scan and/or image acquisition with selected FoV and resolution.
<b>Target</b>	Open the <b>Target Definition</b> screen to select target ID, target height and target type.
<b>Camera</b>	Open scan window for area selection from video stream image.
<b>MinDist</b>	Open video camera window to select a point from video stream image for a probe distance measurement which is entered in the <b>Min Range</b> field.

<b>Command</b>	<b>Function</b>
<b>MaxDist</b>	Open video camera window to select a point from video stream image for a probe distance measurement which is entered in the <b>Max Range</b> field.
<b>Page</b>	Switch to the <b>Detail Scan</b> page.
<b>Shift -&gt; Scale</b>	Open the <b>Scale Factor</b> screen to define atmospheric and geometric corrections.
<b>Shift -&gt; ChkBS</b>	Open <b>Check Backsight</b> screen to define a known backsight target for current setup control.

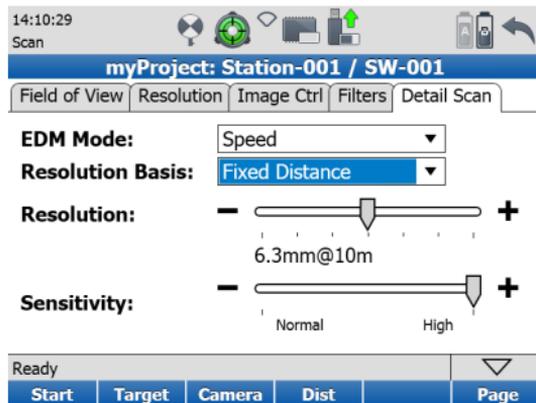
---

## 7.3.6 Scanning\Scan Parameters\Detail Scan

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

**Description** In the **Detail Scan** page of the **Scan Parameters** screen the point spacing and sensitivity for fenced sub-scans 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.

### Detail Scan page



14:10:29  
Scan

myProject: Station-001 / SW-001

Field of View Resolution Image Ctrl Filters Detail Scan

**EDM Mode:** Speed

**Resolution Basis:** Fixed Distance

**Resolution:** 6.3mm@10m

**Sensitivity:** Normal High

Ready

Start Target Camera Dist Page

Field	Description
<b>EDM Mode</b>	Selection of <b>Speed</b> or <b>Range</b> mode (ScanStation P40 only).
<b>Resolution Basis</b>	With <b>Fixed Distance</b> the horizontal and vertical resolution apply to objects at a distance of 10 m from the instrument. With <b>Distance to Object</b> all objects are scanned with the same resolution regardless of the distance.
<b>Resolution</b>	Selection of fixed resolution settings.
<b>Sensitivity</b>	Selection of point cloud sensitivity (ScanStation P40 only).

**Available commands:**

Command	Function
<b>Start</b>	Start scan and/or image acquisition with selected FoV and resolution.
<b>Target</b>	Open the <b>Target Definition</b> screen to select target ID, target height and target type.
<b>Camera</b>	Open scan window for area selection from video stream image.
<b>Dist</b>	Open video camera window to measure the distance to the object to be scanned.

---

Command	Function
Page	Switch to the <b>Field of View</b> page.
Shift -> Scale	Open the <b>Scale Factor</b> screen to define atmospheric and geometric corrections.
Shift -> ChkBS	Open <b>Check Backsight</b> screen to define a known backsight target for current setup control.

---

## 7.3.7

# Scanning\Scan Parameters\...\Target Definition

### Access

Select **Main Menu, Scanning** , **Scan Parameters, Target** or

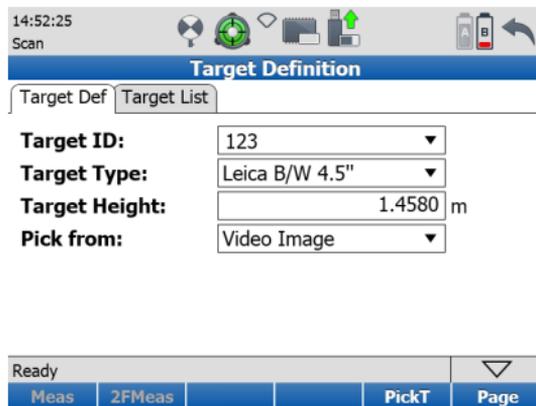
press the active target icon  in the status bar to access the **Target Definition** screen directly or

press the target icon  in the scan viewer.

### Description

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

### Target Def page



14:52:25 Scan						
<b>Target Definition</b>						
Target Def Target List						
<b>Target ID:</b>	123 ▼					
<b>Target Type:</b>	Leica B/W 4.5" ▼					
<b>Target Height:</b>	1.4580 m					
<b>Pick from:</b>	Video Image ▼					
Ready					▼	
Meas	2FMeas			PickT	Page	

Field	Description
<b>Target ID</b>	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.
<b>Target Type</b>	List of target types which are supported by the scanner.
<b>Target Height</b>	Target height in meters from target base point to target centre.
<b>Pick from</b>	Select the source for target picking. With <b>Video Image</b> selected the <b>PickT</b> command opens the video camera image for target selection. With <b>Scan</b> selected the <b>PickT</b> command opens the scan viewer for target selection.

**Target Type:**

Type	Description
<b>B/W Target 6"</b>	HDS 6" Black&White circular planar target.
<b>Leica B/W 4.5"</b>	Leica 4.5" Black&White circular target.
<b>B/W Target 3"</b>	HDS 3" Black&White target.

Type	Description
HDS Sphere	HDS 6" spherical target.

**Available commands:**

Command	Function
<b>Meas</b>	Continue and start target acquisition process for all targets listed in the <b>Target List</b> page.
<b>2FMeas</b>	Continue and start target acquisition process in face 1 and 2 for all targets listed in <b>Target List</b> .
<b>PickT</b>	Select target centre from the video camera image ( <b>Video Image</b> ) or from an existing scan ( <b>Scan</b> ). After selection, the target is listed on the <b>Target List</b> page as a candidate for target acquisition.
<b>Page</b>	Switch to the <b>Target List</b> page.
<b>Shift -&gt; Cnfg</b>	Open the <b>Target ID Configuration</b> screen to define a target ID prefix which is incremented by one for each new target. The defined prefix is the default entry in the <b>Target ID</b> field.

## Target List page

12:26:47  
Scan

**Target Definition**

Target Def Target List

Target ID	Type	Height
123	Leica B/W 4.5"	0.0000 m
t45	B/W Target 6"	0.0000 m
T-1	B/W Target 3"	0.0000 m
S1	HDS Sphere	0.0000 m

Ready

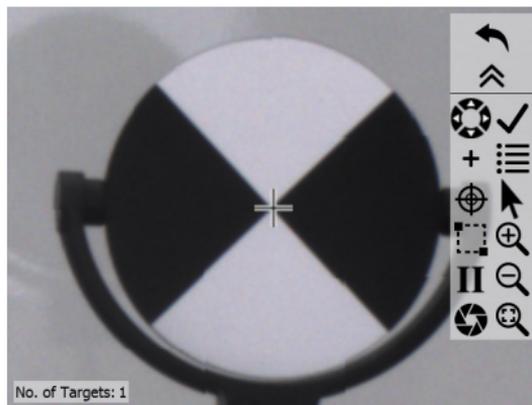
Meas	2FMeas		Edit	Del	Page
------	--------	--	------	-----	------

Field	Description
<b>Target ID</b>	List of all defined target IDs to be acquired.
<b>Type</b>	Target type of the selected target ID.
<b>Height</b>	Shows the target height of the selected target after <b>PickT</b> was executed.

**Available commands:**

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

Pick Target from  
video image



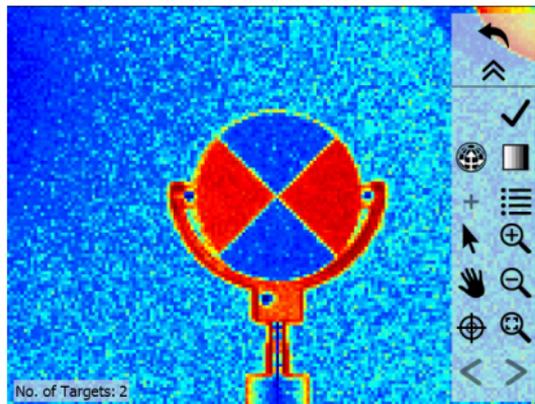
Field	Description
No. of Targets	Number of selected targets in the <b>Target List</b> .

### Available commands:

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.
Continue		Continue and return to <b>Target Def</b> menu.
Add Target		Add selected target to the <b>Target List</b> .
View Target List		Open the <b>Target List</b> to see the list of defined targets.
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.
Pick		Pick the target centre. In activated mode the icon turns green.

Command	Function
<b>Fence</b> 	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.
<b>Zoom In</b> 	Zoom in to the centre of the video image.
<b>Face I/II</b> 	Switch the internal camera between face I and face II.
<b>Zoom Out</b> 	Zoom out from the centre of the video image.
<b>Check Exposure</b> 	Open slider to adjust exposure time manually in the video camera window from 0 ms to 800 ms and transfer setting to the <b>Time</b> field of the <b>Image Ctrl</b> page in the <b>Scan Parameters</b> screen.
<b>Zoom All</b> 	Zoom back to the camera's full field of view.

Pick Target from  
scan viewer



Field	Description
No. of Targets	Number of selected targets in the <b>Target List</b> .

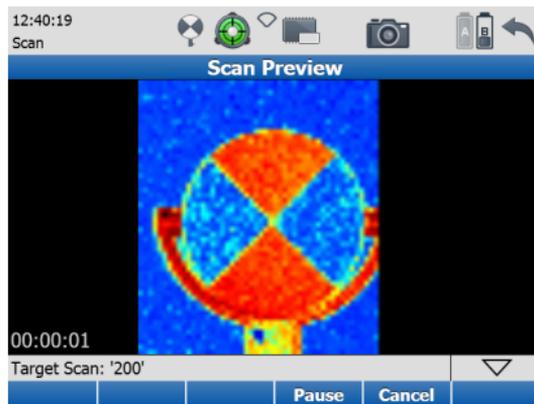
Available commands:

Command	Function
Continue	Continue and return to <b>Target Def</b> menu.

Command	Function
<b>View</b>  	Switch between 2D planar view  and 3D view  .
<b>Colourise</b>  	Switch between coloured  and black & white  intensity display.
<b>Add Target</b> 	Add selected target to the <b>Target List</b> .
<b>View Target List</b> 	Open the <b>Target List</b> to see the list of defined targets.
<b>Pick</b>  	Pick the target centre. In activated mode the icon turns green.
<b>Zoom In</b> 	Zoom in to the centre of the scan image.
<b>Pan</b>  	Pan mode to move current scan on screen. In activated mode the icon turns green.
<b>Zoom Out</b> 	Zoom out from the centre of the scan image.
<b>Seek</b>  	Select a point in the scan viewer to define it as the new centre. The entire point cloud is moved in horizontal and vertical direction to reposition the selected point. In activated mode the icon turns green.

Command		Function
Zoom 1:1		Zoom back to fit complete scan to screen.
Previous		Show previous scan on current station.
Next		Show next scan on current station.

### Target Scan Scan Progress screen



---

Field	Description
<b>Real Time Scan Viewer</b>	Display of current target scan in progress.
<b>Est Time</b>	Estimated time to finish current target scan.

**Available commands:**

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

---

## Target Results screen



Target ID	Target Type	State
123	Leica B/W 4.5"	OK
S1	HDS Sphere	OK
T-1	B/W Target 3"	OK
t45	B/W Target 6"	OK



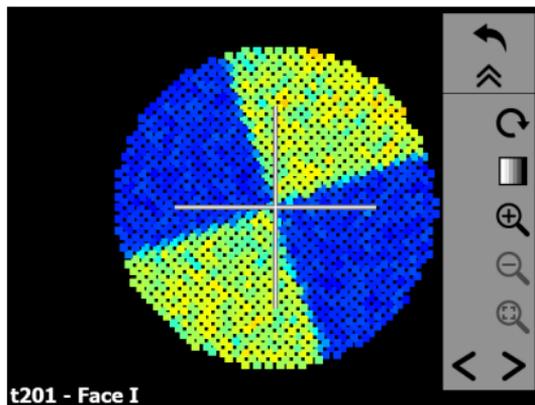
Ready	▽			
Store	Dist	Info	Del	View

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

**Available commands:**

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

## View Target screen

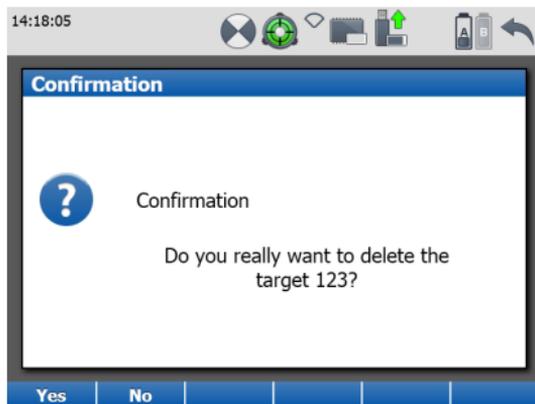


### Available commands:

Command	Function
<b>Rotate</b> 	Rotate the target point cloud by increments of 30°.
<b>Change colour</b>  	Switch between coloured  and black & white  intensity display.
<b>Zoom In</b> 	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.
Previous		Show previous target.
Next		Show next target.

### Confirmation message



Option	Description
Yes	Confirm deletion of selected target and return to the <b>Targets Results</b> screen.
No	Cancel deletion of selected target and return to the <b>Targets Results</b> 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
<b>Target ID</b>	Target ID of selected target.
<b>Target Type</b>	Target type of selected target.
<b>Northing</b>	Northing of target.
<b>Easting</b>	Easting of target.
<b>Height</b>	Height of target base point.
<b>Distance</b>	Slope distance from scanner base point to target base point.

**Available commands:**

Command	Function
<b>Cont</b>	Continue and return to <b>Target Results</b> screen.
<b>Prev</b>	Show target information of previous target.
<b>Next</b>	Show target information of next target.

---

## Distance between Targets screen



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

## 8 Traverse

---

### Access

Select **Main Menu, Traverse**



### Description

In the **Traverse** menu a chain of new stations can be generated to be used as the foundation for further scanning and imaging. All new stations and their elements are registered to a common coordinate reference with no office registration required. The workflow supports the calculation of closed loop traverses and linear traverses with or without measurement of the closing angle.

---

## 8.1

## Traverse Begin

### Description

In the **Traverse Begin** screen new projects and traverses can be created. **Traverse Management** and **Traverse Configuration** can be accessed from here and once defined a traverse can be started.

### Traverse Begin screen



**Project:**  

**Traverse ID:**  



Field	Description
<b>Project</b>	Shows the current project. Click the name field to open a list of available projects. Click the  icon to open the <b>Manage Projects</b> screen for selecting another project, adding a new project, editing or deleting an existing project and displaying project details.
<b>Traverse ID</b>	Shows the current traverse. Click the name field to open a list of available traverses. Click the  icon to open the <b>Traverse Management</b> screen for selecting another traverse, adding a new traverse, editing or deleting an existing traverse and displaying traverse details.

### Available commands:

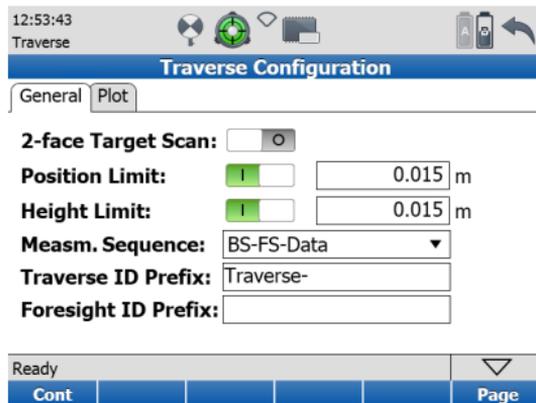
Command	Function
<b>Cont</b>	Continue with the current traverse. Depending on the traverse status a different screen will open: <ul style="list-style-type: none"><li>• New traverse: Opens the <b>Station Setup</b> screen.</li><li>• Open traverse: Opens the <b>Backsight Definition</b> screen.</li><li>• Closed traverse: Opens the <b>Traverse Results</b> screen.</li><li>• Adjusted traverse: Opens the <b>Adjustment Results</b> screen.</li></ul>
<b>Cnfg</b>	Open the <b>Traverse Configuration</b> screen to define limits and specifications for the traverse workflow.
<b>Close</b>	Becomes active when the selected traverse can be closed (fore-sight measurement to a known point has been performed) and opens the <b>Traverse Results</b> screen.
<b>Shift -&gt; Scale</b>	Open the <b>Scale Factor</b> screen to define atmospheric and geometric corrections.

## 8.2 Traverse Configuration

### Description

In the **Traverse Configuration** screen limits and specifications for the whole traverse workflow can be set.

### General page



The screenshot shows the 'Traverse Configuration' screen with a status bar at the top displaying '12:53:43' and 'Traverse'. Below the status bar are icons for a signal tower, a green target, a Wi-Fi symbol, a document, and a mobile device with a return arrow. The main title 'Traverse Configuration' is in a blue bar. Below it are two tabs: 'General' (selected) and 'Plot'. The settings are as follows:

- 2-face Target Scan:** A toggle switch is currently turned off.
- Position Limit:** A green indicator bar is shown next to a text input field containing '0.015' and the unit 'm'.
- Height Limit:** A green indicator bar is shown next to a text input field containing '0.015' and the unit 'm'.
- Measm. Sequence:** A dropdown menu is set to 'BS-FS-Data'.
- Traverse ID Prefix:** A text input field containing 'Traverse-'.
- Foresight ID Prefix:** An empty text input field.

At the bottom, there is a 'Ready' status bar with a dropdown arrow on the right. Below this are five blue buttons: 'Cont' followed by four empty buttons, and a 'Page' button on the far right.

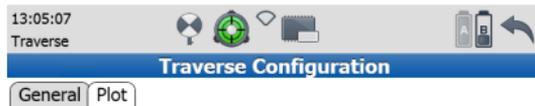
Field	Options	Description
<b>2-face Target Scan</b>	<b>Off</b>	Enable target scanning for traversing in one face only.
	<b>On</b>	Enable target scanning for traversing in two faces.
<b>Position Limit</b>	<b>On</b>	Enable checking of horizontal coordinate difference (hz range) between existing and measured known backsight point. If defined <b>Position Limit</b> is exceeded, the setup can be repeated, skipped or stored.
	<b>Off</b>	Disable checking of horizontal coordinate difference (hz range) between existing and measured known backsight point.
<b>Height Limit</b>	<b>On</b>	Enable checking of vertical difference between existing and measured known backsight point. If defined <b>Height Limit</b> is exceeded, the setup can be repeated, skipped or stored.
	<b>Off</b>	Disable checking of vertical difference between existing and measured known backsight point.

Field	Options	Description
<b>Measm. Sequence</b>	<b>BS-FS-Data</b>	Define the measurement sequence in the traverse workflow as Backsight-Foresight-Data.
	<b>BS-Data-FS</b>	Define the measurement sequence in the traverse workflow as Backsight-Data-Foresight.
<b>Traverse ID Prefix</b>	-	Enter a prefix for the traverse ID. Default setting is <b>Traverse-</b> . The increment is <b>001, 002, 003</b> , etc.
<b>Foresight ID Prefix</b>	-	Enter a prefix for the foresight ID. The increment is <b>001, 002, 003</b> , etc.

**Available commands:**

Command	Function
<b>Cont</b>	Confirm settings for <b>Traverse Configuration</b> and continue with the <b>Traverse Begin</b> screen.
<b>Page</b>	Switch to the <b>Plot</b> page.

## Plot page



Field	Options	Description
Show Station ID	On	Display <b>Station IDs</b> in the <b>Plot</b> of the <b>Traverse Data</b> .
	Off	Hide <b>Station IDs</b> in the <b>Plot</b> of the <b>Traverse Data</b> .

---

Field	Options	Description
Show Side Shot	On	Display <b>Side Shots</b> in the <b>Plot</b> of the <b>Traverse Data</b> .
	Off	Hide <b>Side Shots</b> in the <b>Plot</b> of the <b>Traverse Data</b> .

**Available commands:**

Command	Function
Cont	Confirm settings for <b>Traverse Configuration</b> and continue with the <b>Traverse Begin</b> screen.
Page	Switch to the <b>General</b> page.

---

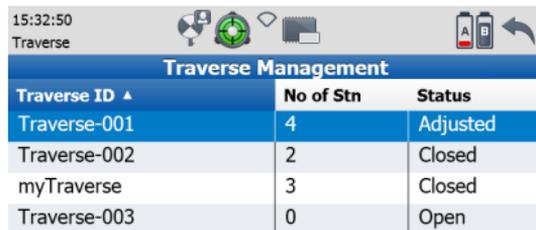
## 8.3

## Traverse Management

### Description

In the **Traverse Management** a list of all existing traverses in a project is provided for managing new and existing traverses.

### Traverse Management screen



The screenshot shows the Traverse Management screen with a status bar at the top displaying the time 15:32:50 and the word 'Traverse'. Below the status bar are several icons: a refresh icon, a green circular arrow icon, a folder icon, and a mobile phone icon with a refresh arrow. The main content is a table with the following data:

Traverse Management		
Traverse ID ▲	No of Stn	Status
Traverse-001	4	Adjusted
Traverse-002	2	Closed
myTraverse	3	Closed
Traverse-003	0	Open



The screenshot shows the bottom navigation bar with the text 'Ready' on the left and a dropdown arrow on the right. Below this are six buttons: 'Cont', 'New', 'Edit', 'Del', 'Data', and 'Results'.

Ready	▼				
Cont	New	Edit	Del	Data	Results

Field	Options	Description
Traverse ID	-	List of available traverses in the project.
No of Stn	-	Number of stations of a traverse.

Field	Options	Description
Status	Open	A new traverse always has the status <b>Open</b> .
	Closed	A traverse can be <b>Closed</b> when a foresight measurement to a control point has been performed.
	Adjusted	An <b>Adjusted</b> traverse is a closed traverse with angular and coordinate misclosures equally distributed over the stations of the traverse.

**Available commands:**

Command	Function
Cont	Confirm selection and return to the <b>Traverse Begin</b> screen.
New	Create a new traverse with traverse ID, description and creator.
Edit	Edit traverse ID, description and creator of an existing traverse.
Del	Delete selected traverse (after confirmation).
Data	Show details of selected traverse such as station IDs, backsight IDs, foresight IDs and plot of the traverse elements.

Command	Function
<b>Results / Close</b>	<b>Results</b> is active when the status of the selected traverse is <b>Closed</b> or <b>Adjusted</b> . Opens the <b>Traverse Results</b> screen or the <b>Adjustment Results</b> screen. <b>Close</b> is active when the status of the selected traverse is Open. <b>Opens</b> the <b>Traverse Results</b> screen.

---

## 8.3.1 New Traverse

### Description

In the **New Traverse** screen a new traverse can be created with details such as name, description and creator.

### New Traverse screen

14:41:24  
Traverse

**New Traverse**

**Traverse ID:**

**Description:**

**Creator:**

**Date:**

Ready

Store

Field	Description
<b>Traverse ID</b>	Enter a unique traverse ID. Input is mandatory.
<b>Description</b>	Enter a short description of the traverse. Input is optional.

Field	Description
Creator	The person's name/abbreviation who is creating the traverse. Input is optional.
Date	Date of creation. Appears automatically and cannot be edited.

**Available commands:**

Command	Function
Store	Store the new traverse with description, creator and date and return to the <b>Traverse Management</b> screen.

---

## 8.3.2 Edit Traverse

### Description

In the **Edit Traverse** screen the name, description and creator of an existing traverse can be altered.

### Edit Traverse screen

14:47:23  
Traverse

**Edit Traverse**

**Traverse ID:**

**Description:**

**Creator:**

**Date:**

Ready

Store

Field	Description
<b>Traverse ID</b>	Edit name of selected traverse.
<b>Description</b>	Add or edit traverse description.

Field	Description
Creator	Add or edit creator details.
Date	Creation date of selected traverse (not editable).

**Available commands:**

Command	Function
Store	Store new information and return to the <b>Traverse Management</b> screen.

---

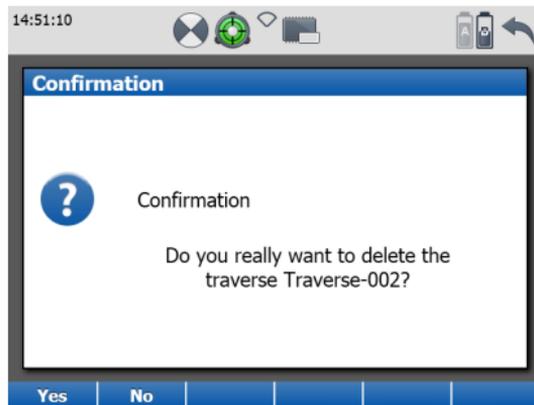
### 8.3.3

## Delete Traverse

### Description

In the **Delete Traverse** screen an existing traverse can be deleted.

### Delete Traverse screen



**Available commands:**

Command	Function
<b>Yes</b>	Confirm deletion of selected traverse.  <b>A deleted traverse cannot be restored!</b> <b>Only the information about the traverse structure will be deleted. Stations, scans, images and target scans will not be deleted.</b>
<b>No</b>	Decline deletion of selected traverse.

## 8.3.4 Traverse Data

### Description

In the **Traverse Data** screen details of a traverse are available such as stations, backsights and foresights. A plot of the traverse with its elements can be displayed.

### Points page

Station ID	Backsight ID	Foresight ID
1	A	2
2	1	3
3	2	A
A	3	1

Field	Description
<b>Station ID</b>	List of all available stations in the selected traverse.
<b>Backsight ID</b>	Corresponding backsight ID of a traverse station.

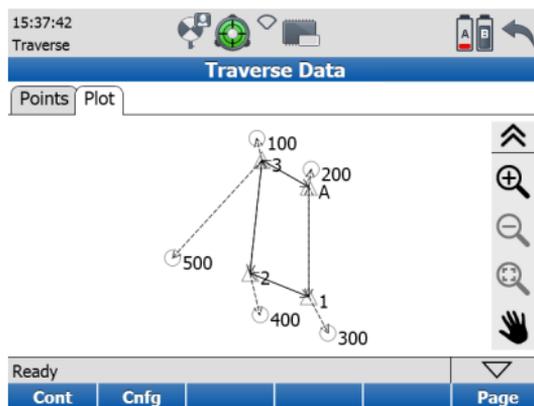
Field	Description
Foresight ID	Corresponding foresight ID of a traverse station.

**Available commands:**

Command	Function
Cont	Return to the previous screen.
Edit	Open the <b>Edit Station Data</b> screen. (Deactivated for traverses with status <b>Adjusted</b> .)
Page	Switch to the <b>Plot</b> page.

---

## Plot page



## Available commands:

Command		Function
Zoom In		Zoom in to the centre of the plot.
Zoom Out		Zoom out from the centre of the plot.
Zoom 1:1		Zoom back to fit complete plot to screen.

Command	Function
Pan  	Pan mode to move current traverse plot on screen. In activated mode the icon turns green.
Cont	Return to the previous screen.
Cnfg	Open the <b>Traverse Configuration</b> screen to define the visibility of plot elements.
Page	Switch to the <b>Points</b> page.



Traverse stations with known coordinates are represented by a **▲** icon, sideshot stations and traverse stations with unknown coordinates are represented by a **○** icon. Measurements from a traverse station to another traverse station are represented by a solid line with an arrow end style, measurements from a traverse station to a sideshot station are represented by a dashed line with an arrow end style.

## 8.4 Starting a Traverse

### Description

A traverse requires a start station and orientation which can be setup by any of the existing setup methods (refer to chapter "7.2 Scanning\Setup"). After successful setup of the start station the **Define Foresight** screen will be shown.

### Station Setup screen

08:38:20  
Setup

**Station Setup**

Setup Method: Set Azimuth

Ctrl Pnt Project: Traverse

Station ID: 1

Instrument Ht: 1.7200 m

Ready

Cont Cnfg New

Field	Description
Setup Method	Select the station setup. <b>Known Backsight</b> is set as the default method.

Field	Description
<b>Ctrl Pnt Project</b>	Select the project which contains the current station control point.
<b>Station ID</b>	Select the station ID of the current station.
<b>Instrument Ht</b>	Enter the instrument height (control point to tilt axis).

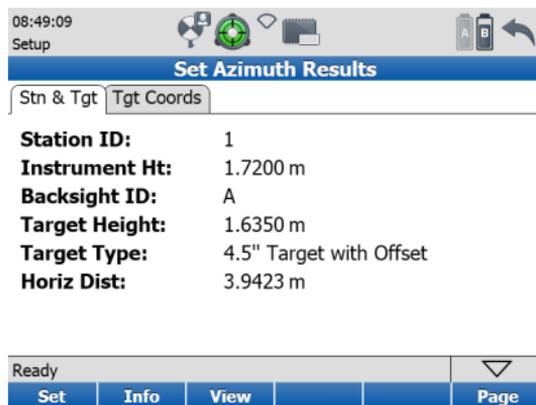
**Available commands:**

Command	Function
<b>Cont</b>	Confirm station input and continue with the selected setup method.
<b>Cnfg</b>	Open the <b>Setup Configuration</b> screen to define limits and attributes of the various setup methods.
<b>New</b>	Open the <b>New Control Point</b> screen to create a new control point in the selected project.



The following pages show **Set Azimuth** as an example of how to setup the first traverse station and its orientation. Other setup methods as described in chapter "7.2 Scanning\Setup" can also be used.

### Set Azimuth Results screen, Stn & Tgt



08:49:09  
Setup

**Set Azimuth Results**

Stn & Tgt | Tgt Coords

**Station ID:** 1  
**Instrument Ht:** 1.7200 m  
**Backsight ID:** A  
**Target Height:** 1.6350 m  
**Target Type:** 4.5" Target with Offset  
**Horiz Dist:** 3.9423 m

Ready

Set | Info | View | Page

Field	Description
<b>Station ID</b>	Station ID of current station.
<b>Instrument Ht</b>	Instrument height as entered.
<b>Backsight ID</b>	Target ID of the selected backsight target.

Field	Description
Target Height	Target height as entered.
Target Type	Target type of the selected backsight target.
Horiz Dist	Horizontal distance between station and backsight target.

**Available commands:**

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

## Set Azimuth Results screen, Tgt Coords

08:49:52  
Setup

**Set Azimuth Results**

Stn & Tgt | Tgt Coords

**Backsight ID:** A

**Northing:** 1003.9423 m

**Easting:** 5000.0000 m

**Height:** 9.9853 m

---

Ready

Set | Info | View | Page

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

**Available commands:**

<b>Command</b>	<b>Function</b>
<b>Set</b>	Accept the setup results for this station and proceed to <b>Define Foresight</b> screen.
<b>Info</b>	Show the target information of the selected target.
<b>View</b>	View point cloud of selected backsight target scan.
<b>Shift -&gt; Redo</b>	Repeat backsight target scan of selected target and setup calculation.
<b>Page</b>	Switch to the <b>Stn &amp; Tgt</b> page.

## 8.5 Traverse Foresight

### Description

The **Define Foresight** screen is used to define the next station of a traverse. It allows for input of necessary foresight station details such as foresight ID, target type and target height.

### Define Foresight screen, Target Def

08:52:59				
Setup				
Define Foresight				
Target Def		Target List		
Foresight ID:	2			
Target Type:	4.5" Target with Offse ▼			
Target Height:	1.7260 m			
Ready				
Cont			PickT	Page

Field	Description
<b>Ctrl Pnt Project</b>	Select the project which contains the current station control point.  Only visible when foresight station is a point with known coordinates (closing point).
<b>Foresight ID</b>	Enter the target ID of a new foresight target. A <b>Foresight ID</b> will be generated automatically when a <b>Foresight ID prefix</b> has been defined.
<b>Target Type</b>	Enter the target type of the foresight target.
<b>Target Height</b>	Enter the target height of the foresight target.

**Available commands:**

Command	Function
<b>Cont</b>	Start foresight target scan. Show results in <b>Foresight Results</b> screen.
<b>PickT</b>	Select target from the video image. After selection, the target is listed on the <b>Target List</b> page.
<b>Shift -&gt; Skip FS</b>	Skip foresight and proceed to the <b>Scan Parameters</b> screen.

Command	Function
Page	Switch to the <b>Target List</b> page.

### Define Foresight screen, Target List

08:57:05  
Setup



**Define Foresight**

Target Def Target List

Target ID	Type	Height	State
2	4.5" Target with	1.7260 m	----

Ready

Cont	Page

Field	Description
<b>Target ID</b>	Shows the target ID of a new foresight target after <b>PickT</b> was executed.
<b>Type</b>	Shows the target type of the foresight target.

Field	Description
Height	Shows the target height of the foresight target.

**Available commands:**

Command	Function
Cont	Start foresight target scan. Show results in <b>Foresight Results</b> screen.
Page	Switch to the <b>Target Def</b> page.

---

## Foresight Results screen, Stn &Tgt

09:06:06  
Setup

**Foresight Results**

Stn & Tgt | Coordinates

**Station ID:** 1

**Instrument Ht:**  m

**Foresight ID:** 2

**Target Height:**  m

**Target Type:** 4.5" Target with Offset

**Horiz Dist:** 2.2825 m

Ready

Cont | Info | View | Page

Field	Description
<b>Station ID</b>	Station ID of current station.
<b>Instrument Ht</b>	Instrument height as entered.
<b>Foresight ID</b>	Target ID of the foresight target.
<b>Target Height</b>	Target height as entered.
<b>Target Type</b>	Target type of the foresight target.
<b>Horiz Dist</b>	Horizontal distance between station and foresight target.

**Available commands:**

<b>Command</b>	<b>Function</b>
<b>Cont</b>	Store the foresight results and proceed to the <b>Scan Parameters</b> screen.
<b>Info</b>	Show the target information of the foresight target.
<b>View</b>	View point cloud of foresight target scan.
<b>Shift -&gt; Redo</b>	Repeat foresight target scan.
<b>Page</b>	Switch to the <b>Coordinates</b> page.

## Foresight Results screen, Coordinates

09:07:25  
Setup

**Foresight Results**

Stn & Tgt Coordinates

**Foresight ID:** 2  
**Northing:** 1000.8500 m  
**Easting:** 4997.8816 m  
**Height:** 9.9903 m  
**Horiz Dist:** 2.2825 m  
**Slope Dist:** 2.2826 m  
**Azimuth:** 291.864 deg

Ready

Cont Info View Page

Field	Description
<b>Foresight ID</b>	Target ID of the foresight target.
<b>Northing</b>	Northing coordinate of the foresight target.
<b>Easting</b>	Easting coordinate of the foresight target.
<b>Height</b>	Height of the foresight target.
<b>Horiz Dist</b>	Horizontal distance between station and foresight target.
<b>Slope Dist</b>	Slope distance between station and foresight target.

Field	Description
<b>Azimuth</b>	Azimuth from current station to foresight target.

**Available commands:**

Command	Function
<b>Cont</b>	Store the foresight results and proceed to the <b>Scan Parameters</b> screen.
<b>Info</b>	Show the target information of the foresight target.
<b>View</b>	View point cloud of foresight target scan.
<b>Shift -&gt; Redo</b>	Repeat foresight target scan.
<b>Page</b>	Switch to the <b>Stn &amp;Tgt</b> page.

## 8.6 Scanning and Imaging from a Traverse Station

### Description

Once the foresight to the next station has been stored, the **Scan Parameters** screen for the current station will be accessed. Scanning, imaging and targeting can be executed as described in chapter "7.3 Scanning\Scan Parameters". Once data collection is completed, the instrument can be moved to the next station or the traverse can be closed.

### Scan Parameters screen within Traverse workflow

10:56:46  
Scan

Traverse: 1 / SW-001

Field of View Resolution Image Ctrl Filters Detail Scan

Field of View: Target All

90.430 +90°

Hz / V Area [°] 196.678 196.678

89.500 -55°

Scan Mode: Scan only

Est Time: 20 s

Ready

Start Target Camera Move Close Page

**Available commands:**

Command	Function
<b>Move / FS</b>	Move to the next station after data collection on current station has been completed. Proceeds to the <b>Define Backsight</b> screen. Switches to <b>FS</b> in case the foresight measurement has been skipped or when the defined measurement sequence is <b>BS-Data-FS</b> . <b>FS</b> opens the <b>Define Foresight</b> screen.
<b>Close / Abort</b>	<b>Close</b> is active when last foresight target ID was a point with known coordinates. Opens the <b>Closing Error</b> page of the <b>Traverse Results</b> screen. <b>Abort</b> is shown as long as no foresight measurement has been done on the current station. <b>Abort</b> opens the <b>Traverse Results</b> screen.

## 8.7 Traverse Backsight

Define Backsight  
screen, Target Def

11:12:20  
Setup





**Define Backsight**

Target Def

Target List

**Station ID:**

**Instrument Ht:**  m

**Backsight ID:**

**Target Type:**  ▼

**Target Height:**  m

Ready
▼

Cont

PickT

Page

Field	Description
<b>Station ID</b>	Station ID of current station.
<b>Instrument Ht</b>	Instrument height as entered.
<b>Backsight ID</b>	Target ID of the backsight target.
<b>Target Type</b>	Target type of the backsight target.

Field	Description
Target Height	Target height as entered.

**Available commands:**

Command	Function
Cont	Start backsight target scan. Show results in <b>Known Backsight Results</b> screen.
PickT	Select target from the video image. After selection, the target is listed on the <b>Target List</b> page.
Page	Switch to the <b>Target List</b> page.

---

## Define Backsight screen, Target List

11:13:41  
Setup

Define Backsight

Target Def Target List

Target ID	Type	Height	State
1	4.5" Target with	1.7200 m	-----

Ready

Cont					Page
------	--	--	--	--	------

Field	Description
<b>Target ID</b>	Shows the target ID of the backsight target.
<b>Type</b>	Shows the target type of the backsight target.
<b>Height</b>	Shows the target height of the backsight target.

### Available commands:

Command	Function
Cont	Start backsight target scan. Show results in <b>Known Backsight Results</b> screen.
Page	Switch to the <b>Target Def</b> page.

### Known Backsight Results screen, Stn & Tgt

11:22:51  
Setup

**Known Backsight Results**

Stn & Tgt Delta Coordinates

**Station ID:** 2

**Instrument Ht:** 1.7260 m

**Backsight ID:** 1

**Target Height:** 1.7200 m

**Target Type:** 4.5" Target with Offset

**Horiz Dist:** 2.2816 m

Ready

Cont Info View Page

Field	Description
<b>Station ID</b>	Station ID of current station.
<b>Instrument Ht</b>	Instrument height as entered.
<b>Backsight ID</b>	Target ID of the backsight target.
<b>Target Height</b>	Target height as entered.
<b>Target Type</b>	Target type of the backsight target.
<b>Horiz Dist</b>	Horizontal distance between station and backsight target.

**Available commands:**

Command	Function
<b>Cont</b>	Store the backsight results and proceed to the <b>Define Foresight</b> screen.
<b>Info</b>	Show the target information of the backsight target.
<b>View</b>	View point cloud of backsight target scan.
<b>Shift -&gt; Redo</b>	Repeat backsight target scan.
<b>Page</b>	Switch to the <b>Delta</b> page.

**Known Backsight  
Results screen,  
Delta**



**Backsight ID:** 1  
**ΔNorthing:** 0.0000 m  
**ΔEasting:** -0.0001 m  
**ΔHeight:** -0.0182 m  
**ΔHoriz Dist:** -0.0001 m



Field	Description
<b>Backsight ID</b>	Target ID of the backsight target.
<b>ΔNorthing</b>	Difference in northing between calculated and measured coordinate.
<b>ΔEasting</b>	Difference in easting between calculated and measured coordinate.
<b>ΔHeight</b>	Difference in height between calculated and measured coordinate.

---

Field	Description
<b>ΔHoriz Dist</b>	Difference in horizontal distance between calculated and measured distance.

**Available commands:**

Command	Function
<b>Cont</b>	Store the backsight results and proceed to the <b>Define Foresight</b> screen.
<b>Info</b>	Show the target information of the backsight target.
<b>View</b>	View point cloud of backsight target scan.
<b>Shift -&gt; Redo</b>	Repeat backsight target scan.
<b>Page</b>	Switch to the <b>Coordinates</b> page.

---

## Known Backsight Results screen, Coordinates

11:26:08  
Setup

**Known Backsight Results**

Stn & Tgt Delta Coordinates

**Backsight ID:** 1  
**Northing:** 1000.0000 m  
**Easting:** 4999.9999 m  
**Height:** 9.9818 m  
**Horiz Dist:** 2.2816 m  
**Slope Dist:** 2.2816 m  
**Azimuth:** 111.858 deg

Ready

Cont Info View Page

Field	Description
<b>Backsight ID</b>	Target ID of the backsight target.
<b>Northing</b>	Northing coordinate of the backsight target.
<b>Easting</b>	Easting coordinate of the backsight target.
<b>Height</b>	Height of the backsight target.
<b>Horiz Dist</b>	Horizontal distance between station and backsight target.
<b>Slope Dist</b>	Slope distance between station and backsight target.

---

Field	Description
<b>Azimuth</b>	Azimuth from current station to backsight target.

**Available commands:**

Command	Function
<b>Cont</b>	Store the backsight results and proceed to the <b>Define Foresight</b> screen.
<b>Info</b>	Show the target information of the backsight target.
<b>View</b>	View point cloud of backsight target scan.
<b>Shift -&gt; Redo</b>	Repeat backsight target scan.
<b>Page</b>	Switch to the <b>Stn &amp; Tgt</b> page.

---

## 8.8

## Traverse Results

### Description

In the **Traverse Results** screen the misclosure of a closed traverse is shown. Unadjusted coordinates of all stations and a graphical plot are provided.

### Closing Error page

The screenshot shows the 'Traverse-001: Traverse Results' screen. At the top, there is a status bar with the time '13:41:23' and the word 'Traverse'. Below this is a navigation bar with icons for a signal tower, a green circle with a white cross, a Wi-Fi symbol, a battery icon, and a back arrow. The main title is 'Traverse-001: Traverse Results'. Below the title is a tabbed interface with 'Closing Error' selected, and 'Points' and 'Plot' as other options. The data displayed is as follows:

<b>Status:</b>	Closed
<b>Start Station:</b>	1
<b>Close Station:</b>	A
<b>ΔNorthing:</b>	-0.0024 m
<b>ΔEasting:</b>	0.0009 m
<b>ΔHeight:</b>	0.0362 m
<b>Angular Misclosure:</b>	0.011 deg

At the bottom of the screen, there is a status bar with the word 'Ready' and a dropdown arrow. Below this is a navigation bar with buttons for 'Cont', 'L + H', 'Data', 'Adjust', 'Export', and 'Page'.

Field	Description
<b>Status</b>	The traverse status must be <b>Closed</b> to show its results.
<b>Start Station</b>	Name of the traverse start station.

Field	Description
<b>Close Station</b>	Name of the traverse close station.
<b><math>\Delta</math>Northing</b>	Difference in northing between known and measured coordinate.
<b><math>\Delta</math>Easting</b>	Difference in easting between known and measured coordinate.
<b><math>\Delta</math>Height</b>	Difference in height between known and measured coordinate.
<b>Angular Misclosure</b>	Angular misclosure of the closed traverse. Angular difference between calculated and measured closing angle.

**Available commands:**

Command	Function
<b>Cont</b>	Return to the <b>Traverse Management</b> screen.
<b>L + H / N &amp; E</b>	Toggle between two modes of traverse misclosure display: <ul style="list-style-type: none"><li>• <b>L + H</b>: traverse misclosure display in length and height.</li><li>• <b>N &amp; E</b>: traverse misclosure display in northing and easting.</li></ul>
<b>Data</b>	Open the <b>Traverse Data</b> screen to see a summary of all traverse station IDs, backsight IDs, foresight IDs and a plot of the traverse.

Command	Function
<b>Adjust / UnAdj</b>	Toggle between the display of unadjusted and adjusted results of the traverse ( <b>Traverse Results</b> screen and <b>Adjustment Results</b> screen).
<b>Export</b>	Export the traverse stations and side shots to CSV file. Only active when USB memory device is attached.
<b>Page</b>	Switch to the <b>Points</b> page.

## Points page

13:43:14  
Traverse









**Traverse-001: Traverse Results**

Closing Error Points Plot

Point ID	Northing	Easting	Height
1	1000.0000	5000.0000	10.0000 ▲
2	1000.8495	4997.8823	9.9903
3	1004.9046	4998.3152	9.9773
A	1003.9416	5000.0000	9.9854
300	998.6930	5000.6970	12.2982
400	999.3408	4998.2407	11.5930
500	1001.3908	4995.0870	11.6720 ▼

Ready

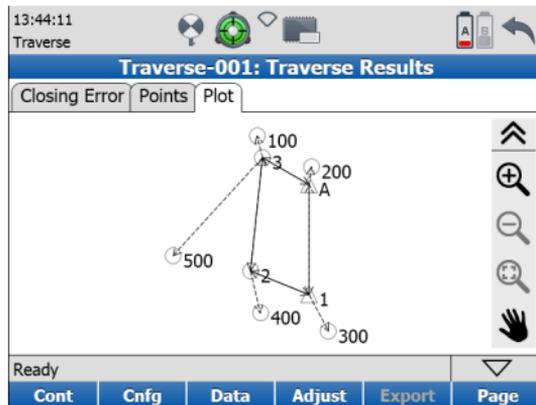
Cont Data Adjust Export Page

Field	Description
Point ID	Name of the traverse station.
Northing	Northing of the traverse station.
Easting	Easting of the traverse station.
Height	Height of the traverse station.

**Available commands:**

Command	Function
Cont	Return to the <b>Traverse Management</b> screen.
Data	Open the <b>Traverse Data</b> screen to see a summary of all traverse station IDs, backsight IDs, foresight IDs and a plot of the traverse.
Adjust	Proceed to the <b>Closure</b> page of the <b>Adjustment Results</b> screen to see adjusted results of the traverse.
Export	Export the traverse stations and side shots to CSV file. Only active when USB memory device is attached.
Page	Switch to the <b>Plot</b> page.

## Plot page



### Available commands:

Command		Function
Zoom In		Zoom in to the centre of the plot.
Zoom Out		Zoom out from the centre of the plot.
Zoom 1:1		Zoom back to fit complete plot to screen.

Command	Function
Pan  	Pan mode to move current traverse plot on screen. In activated mode the icon turns green.
Cont	Return to the <b>Traverse Management</b> screen.
Cnfg	Open the <b>Plot</b> page of the <b>Traverse Configuration</b> screen to define the visibility of plot elements.
Data	Open the <b>Traverse Data</b> screen to see a summary of all traverse station IDs, backsight IDs, foresight IDs and a plot of the traverse.
Adjust	Proceed to the <b>Closure</b> page of the <b>Adjustment Results</b> screen to see adjusted results of the traverse.
Export	Export the traverse stations and side shots to CSV file. Only active when USB memory device is attached.
Page	Switch to the <b>Closing Error</b> page.

## 8.9

## Adjustment Results

### Description

In the **Adjustment Results** screen the results of an adjusted traverse are shown. Adjusted coordinates of all stations and a graphical plot are provided.

### Closure page

14:20:18  
Traverse

**Traverse-001: Adjustment Results**

Closure Points Plot

**Status:** Adjusted  
**Start Station:** 1  
**Close Station:** A  
**ΔNorthing:** 0.0000 m  
**ΔEasting:** 0.0000 m  
**ΔHeight:** 0.0000 m

Ready

Cont L + H UnAdj Export Page

Field	Description
<b>Status</b>	The traverse status must be <b>Adjusted</b> to show adjusted results.
<b>Start Station</b>	Name of the traverse start station.

Field	Description
Close Station	Name of the traverse close station.
$\Delta$ Northing	$\Delta$ Northing must be <b>0</b> for an adjusted traverse.
$\Delta$ Easting	$\Delta$ Easting must be <b>0</b> for an adjusted traverse.
$\Delta$ Height	$\Delta$ Height must be <b>0</b> for an adjusted traverse.

**Available commands:**

Command	Function
Cont	Return to the <b>Main Menu</b> .
L + H / N & E	Toggle between two modes of traverse misclosure display: <ul style="list-style-type: none"> <li>• <b>L + H</b>: traverse misclosure display in length and height.</li> <li>• <b>N &amp; E</b>: traverse misclosure display in northing and easting.</li> </ul>  The misclosure must be 0 for an adjusted traverse.
UnAdj	Toggle between the display of unadjusted and adjusted results of the traverse ( <b>Traverse Results</b> screen and <b>Adjustment Results</b> screen).
Export	Export the adjusted traverse stations and side shots to CSV file. Only active when USB memory device is attached.

<b>Command</b>	<b>Function</b>
<b>Page</b>	Switch to the <b>Points</b> page.

## Points page

14:27:23  
Traverse

Traverse-001: Adjustment Results

Closure Points Plot

Point ID	Northing	Easting	Height
1	1000.0000	5000.0000	10.0000
2	1000.8494	4997.8826	9.9937
3	1004.9039	4998.3161	9.9866
A	1003.9422	4999.9997	9.9791
300	998.6930	5000.6970	12.2982
400	999.3407	4998.2410	11.5963
500	1001.3901	4995.0879	11.6813

Ready

Cont UnAdj Export Page

Field	Description
<b>Point ID</b>	Name of the traverse station.
<b>Northing</b>	Adjusted northing of the traverse station.
<b>Easting</b>	Adjusted easting of the traverse station.

---

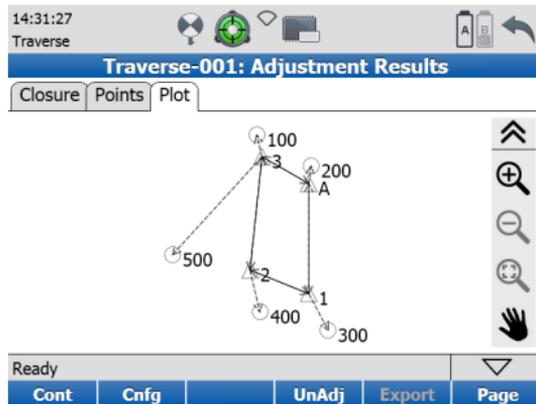
Field	Description
Height	Adjusted height of the traverse station.

**Available commands:**

Command	Function
Cont	Return to the <b>Main Menu</b> .
UnAdj	Open the <b>Closing Error</b> page of the <b>Traverse Results</b> screen to see unadjusted results of the traverse.
Export	Export the adjusted traverse stations and side shots to CSV file. Only active when USB memory device is attached.
Page	Switch to the <b>Plot</b> page.

---

## Plot page



### Available commands:

Command		Function
Zoom In		Zoom in to the centre of the plot.
Zoom Out		Zoom out from the centre of the plot.
Zoom 1:1		Zoom back to fit complete plot to screen.

Command	Function
Pan  	Pan mode to move current traverse plot on screen. In activated mode the icon turns green.
Cont	Return to the <b>Main Menu</b> .
Cnfg	Open the <b>Plot</b> page of the <b>Traverse Configuration</b> screen to define the visibility of plot elements.
UnAdj	Open the <b>Closing Error</b> page of the <b>Traverse Results</b> screen to see unadjusted results of the traverse.
Export	Export the adjusted traverse stations and side shots to CSV file. Only active when USB memory device is attached.
Page	Switch to the <b>Closure</b> page.



## 9 Manage

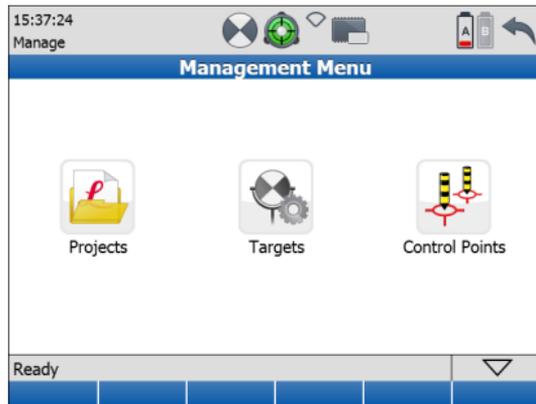
### Access

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
<b>Projects</b> 	Offers access to all commands for project management.
<b>Targets</b> 	Offers access to all commands for target management.
<b>Control Points</b> 	Offers access to all commands for control point management.

---

## 9.1 Manage\Projects

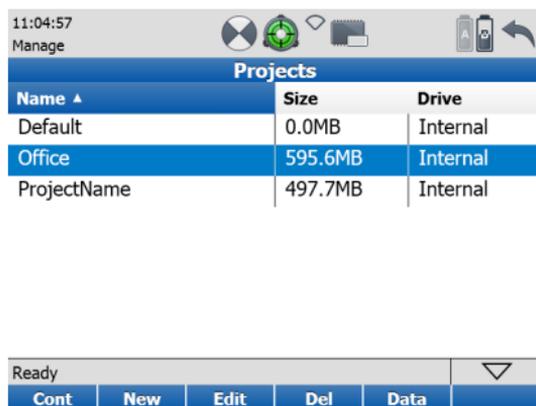
### Access

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

### Description

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

### Manage Projects screen



Name ▲	Size	Drive
Default	0.0MB	Internal
Office	595.6MB	Internal
ProjectName	497.7MB	Internal

Ready

Cont	New	Edit	Del	Data	▼
------	-----	------	-----	------	---

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

**Available commands:**

Command	Function
<b>Cont</b>	Confirm selection and return to previous screen.
<b>New</b>	Create new project with project name, description, name of creator and storage device.
<b>Edit</b>	Edit description and creator of selected project. Also show name, date and size of existing project.
<b>Del</b>	Selected project will be deleted after confirmation.
<b>Data</b>	Show data details of selected project such as station name, scan name, scan view, target ID, target type and target view.
<b>Shift -&gt; Scale</b>	Open the <b>Scale Factor</b> screen to define atmospheric and geometric corrections.

---

Command	Function
<b>Shift -&gt; Trans</b>	Transfer selected project or all projects to a USB memory storage device or to scanner's hard disk.

---

## 9.1.1

## Manage\Projects\New Project

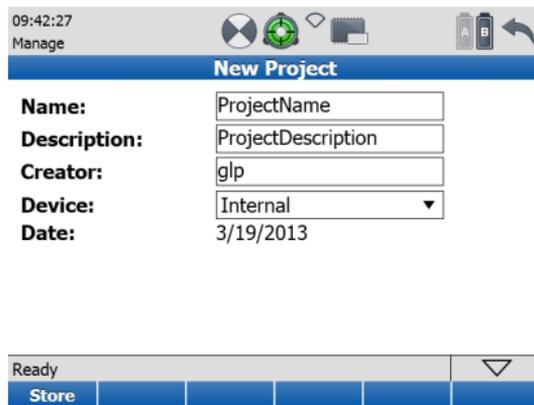
### Access

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



09:42:27  
Manage

**New Project**

**Name:**

**Description:**

**Creator:**

**Device:**

**Date:**

Ready

Store



For new projects the atmospheric and the geometric PPM are always set to **0.0000**.

Field	Description
<b>Name</b>	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 "_".
<b>Description</b>	Enter a short description of the project. Input is optional.
<b>Creator</b>	The person's name/abbreviation who is creating the scan project. Input is optional.
<b>Device</b>	Select the data storage device. <b>Internal</b> saves scan data on the internal SSD, <b>USB Device</b> stores scan data on an external USB storage device.
<b>Date</b>	Date of creation. Appears automatically and cannot be edited.

**Available commands:**

Command	Function
<b>Store</b>	Store the new project with description, creator and date and return to the <b>Manage Projects</b> screen.

---

## 9.1.2

## Manage\Projects\Edit Project

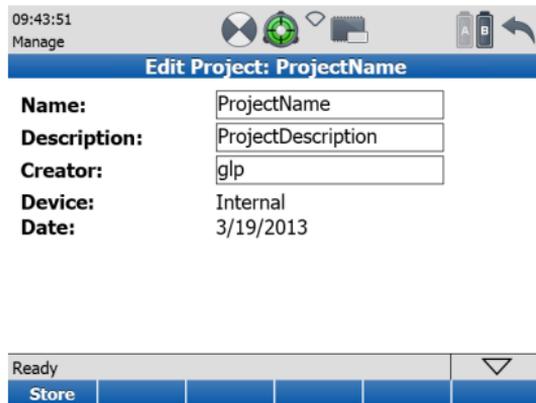
### Access

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:**

**Description:**

**Creator:**

**Device:** Internal

**Date:** 3/19/2013

Ready

Store

---

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

**Available commands:**

Command	Function
<b>Store</b>	Store new information and return to the <b>Manage Projects</b> screen.

---

### 9.1.3

## Manage\Projects\Delete Project

---

#### Access

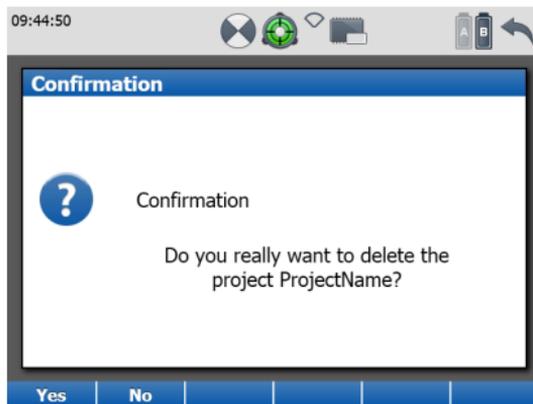
Select **Main Menu**, **Manage**  , **Projects**  , **Del.**

---

#### Description

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

---

Confirmation  
message

Option	Description
Yes	Confirm deletion of the selected project.  <b>A deleted project cannot be restored.</b>
No	Decline deletion of the selected project.

## 9.1.4

## Manage\Projects\Data

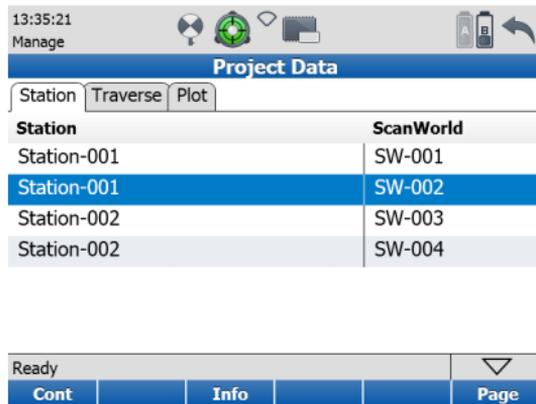
### Access

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

### Description

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

### Station / ScanWorld page



13:35:21  
Manage

**Project Data**

Station Traverse Plot

Station	ScanWorld
Station-001	SW-001
Station-001	SW-002
Station-002	SW-003
Station-002	SW-004

Ready

Cont Info Page

---

Field	Description
<b>Station</b>	List of available stations in the selected project.
<b>ScanWorld</b>	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
<b>Cont</b>	Confirm station selection and continue to <b>Manage Data</b> screen.
<b>Info</b>	Open <b>Station Information</b> for details about selected station.
<b>Page</b>	Switch to the <b>Traverse</b> page.

---

## Traverse page

14:09:19  
Manage

Project Data

Station Traverse Plot

Traverse ID ▲	No of Stn	Status
Traverse-001	0	Open
Traverse-002	5	Adjusted
Traverse-003	4	Closed

Ready

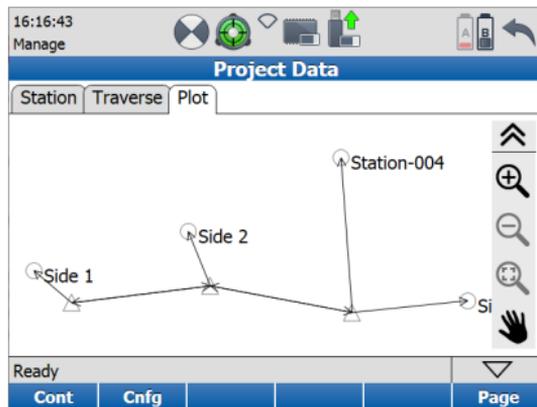
Cont			Results	Page
------	--	--	---------	------

Field	Description
<b>Traverse ID</b>	List of all traverses stored in the project.
<b>No of Stn</b>	Number of stations in a traverse.
<b>Status</b>	Status of a traverse: <b>Open</b> , <b>Closed</b> or <b>Adjusted</b> .

**Available commands:**

<b>Command</b>	<b>Function</b>
<b>Cont</b>	Open the <b>Traverse Data</b> menu.
<b>Results</b>	<b>Results</b> is active when the status of the selected traverse is <b>Closed</b> or <b>Adjusted</b> . Opens the <b>Traverse Results</b> screen or the <b>Adjustment Results</b> screen. <b>Close</b> is active when the status of the selected traverse is <b>Open</b> . Opens the <b>Traverse Results</b> screen.
<b>Page</b>	Switch to the <b>Plot</b> page.

## Plot page

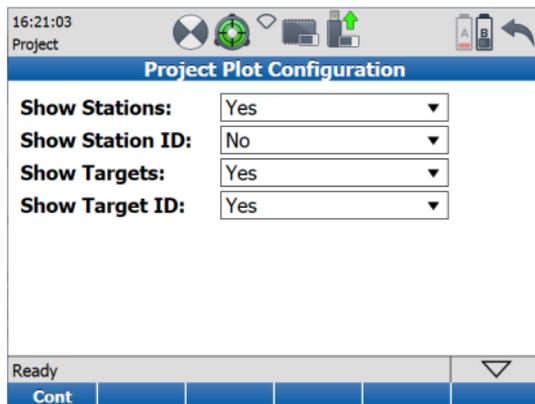


### Available commands:

Command		Function
Zoom In		Zoom in to the centre of the plot.
Zoom Out		Zoom out from the centre of the plot.
Zoom 1:1		Zoom back to fit complete plot to screen.

Command	Function
Pan  	Pan mode to move current traverse plot on screen. In activated mode the icon turns green.
Cont	Return to the <b>Manage Projects</b> screen.
Cnfg	Open the <b>Project Plot Configuration</b> screen to define the visibility of plot elements.
Page	Switch to the <b>Station</b> page.

### Project Plot Configuration screen



16:21:03  
Project

**Project Plot Configuration**

Show Stations: Yes ▾

Show Station ID: No ▾

Show Targets: Yes ▾

Show Target ID: Yes ▾

Ready ▾

Cont

<b>Field</b>	<b>Description</b>
<b>Show Station</b>	Display or hide all station symbols on the <b>Plot</b> page.
<b>Show Station ID</b>	Display or hide all station IDs on the <b>Plot</b> page.
<b>Show Targets</b>	Display or hide all target symbols on the <b>Plot</b> page.
<b>Show Target ID</b>	Display or hide all target IDs on the <b>Plot</b> page.

**Available commands:**

<b>Command</b>	<b>Function</b>
<b>Cont</b>	Return to the <b>Plot</b> page in the <b>Project Data</b> screen.

---

## Scans page

14:19:21  
Manage

**Data**

All Data Scans Images Targets

Scan ▲	Resolution	Sensitivity	No of Point
Scan-1	50.0mm@10m	Normal	1276 x 47.
Scan-2	25.0mm@10m	High	199 x 227
Scan-3	12.5mm@10m	High	180 x 211
Scan-4	5.0mm@1.6m	Normal	124 x 117
Scan-5	2.0mm@5.7m	High	562 x 507

Ready

View Page

Field	Description
<b>Scan</b>	All scans from the selected station are listed.
<b>Resolution</b>	Resolution setting of selected scan.
<b>Sensitivity</b>	Sensitivity setting of selected scan (ScanStation P40 only).
<b>No of Points</b>	Number of points in the selected scan in horizontal and vertical direction.

### Available commands:

Command	Function
<b>View</b>	View the point cloud of the selected scan.
<b>Page</b>	Switch to the <b>Images</b> 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
<b>Name</b>	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 <b>Targets</b> page.

---

## Targets page

12:34:17  
Manage

**Data**

All Data Scans Images **Targets**

Target ID	Target Type	State
S1	HDS Sphere	OK
T-1	B/W Target 3"	OK
t45	B/W Target 6"	OK
123	Leica B/W 4.5"	OK

Ready

View Dist Info Edit Page

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

**Available commands:**

<b>Command</b>	<b>Function</b>
<b>View</b>	View point cloud of the selected target scan.
<b>Dist</b>	Open <b>Distance between Targets</b> screen to compute slope distance between two targets.
<b>Info</b>	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 "7.3.7 Scanning\Scan Parameters\...\Target Definition".
<b>Edit</b>	Open the <b>Edit Target Results</b> screen to alter <b>Target ID</b> and <b>Target Height</b> .
<b>Page</b>	Switch to the <b>All Data</b> page.

## 9.1.5

### 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 and vice versa.  
Refer to chapter "12.2 Tools\Transfer" for more information.

---

## 9.2 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



Targets	
Name ▲	Type
Leica B/W 4.5"	B/W Target 4.5"
B/W Target 6"	B/W Target 6"
B/W Target 3"	B/W Target 3"
HDS Sphere	Sphere

Ready	▼				
Cont	New	Edit	Del	More	

Field	Option	Description
<b>Name</b>	-	Unique name of the target.
<b>Type</b>	<b>Sphere</b>	Spherical target.
	<b>B/W Target 6"</b>	HDS 6" Black&White circular planar target.
	<b>Leica B/W 4.5"</b>	Leica 4.5" Black&White circular target.
	<b>B/W Target 3"</b>	HDS 3" Black&White target.
<b>Class</b>	<b>System</b>	Default target type provided by the system.
	<b>User</b>	User-defined target type.

**Available commands:**

Command	Function
<b>Cont</b>	Confirm selection and return to previous screen.
<b>New</b>	Create new target of class <b>User</b> with target name, target type, diameter, height offset and default target height.

---

Command	Function
Edit	Edit name, target type, diameter, height offset and default target height of a user-defined target. <b>System</b> targets cannot be edited.
Del	Selected target will be deleted after confirmation.
More	Shift between <b>Type</b> and <b>Class</b> in the target list.
Shift -> Deflt	Restore all deleted <b>System</b> targets. <b>User</b> targets cannot be restored.

---

## 9.2.1

## 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



08:19:45  
Manage

**New Target**

**Name:** Leica B/W 4.5" on GRT14

**Target Type:** B/W Target 4.5" ▼

**Diameter:** 0.1143 m

**Height Offset:** 0.0155 m

**Target Height:** 1.6540 m

Ready

Store

Field	Description
<b>Name</b>	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 "_".
<b>Target Type</b>	Enter the target type from a drop-down list.
<b>Diameter</b>	Enter the target diameter for a spherical target.
<b>Height Offset</b>	Enter a fixed height offset which is added to the target height. Input optional.
<b>Target Height</b>	Enter the default target height. Input optional.

**Available commands:**

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

---

## 9.2.2

## 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

08:20:57  
Manage

**Edit Target**

<b>Name:</b>	<input grt14"="" on="" type="text" value="Leica B/W 4.5"/>
<b>Target Type:</b>	<input data-bbox="567 502 793 533" type="text" value="B/W Target 4.5"/>
<b>Diameter:</b>	<input type="text" value="0.1143"/> m
<b>Height Offset:</b>	<input type="text" value="0.0155"/> m
<b>Target Height:</b>	<input type="text" value="1.6540"/> m

Ready

Store 

---

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

**Available commands:**

Command	Function
<b>Store</b>	Store new information and return to the <b>Manage Targets</b> menu.

---

## 9.2.3

## Manage\Targets\Delete Target

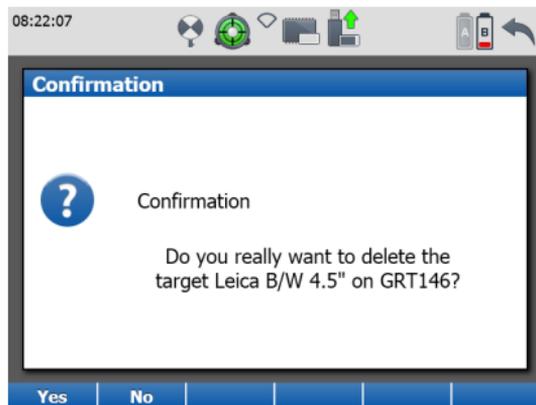
### Access

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
<b>Yes</b>	Confirm the deletion of the selected target.  A deleted system target can be restored by <b>Shift -&gt; Deflt</b> . A deleted user target cannot be restored.
<b>No</b>	Decline deletion of the selected target.

---

## 9.3

# 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 screen

15:40:56  
Manage



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

Ready

Cont	New	Edit	Del	Import	▼
------	-----	------	-----	--------	---

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

**Available commands:**

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

### 9.3.1 Manage\Control Points\New Project

---

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

---

**Description** Refer to chapter "9.1.1 Manage\Projects\New Project".

---

### 9.3.2 Manage\Control Points>Edit Project

---

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

---

**Description** Refer to chapter "9.1.2 Manage\Projects>Edit Project".

---

### 9.3.3 Manage\Control Points>Delete Project

---

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

---

**Description** Refer to chapter "9.1.3 Manage\Projects>Delete Project".

---

## 9.3.4 Manage\Control Points\Import Control Points

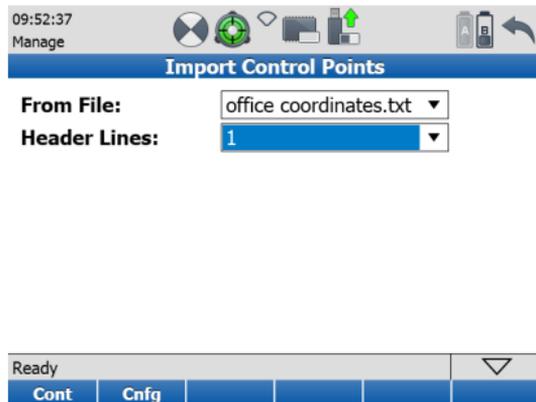
### Access

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.

### Import Control Points screen



09:52:37  
Manage

**Import Control Points**

**From File:** office coordinates.txt ▼

**Header Lines:** 1 ▼

Ready

Cont Cnfg

Field	Description
<b>From File</b>	Select the ASCII file containing the control points to be imported.
<b>Header Lines</b>	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.

**Available commands:**

Command	Function
<b>Cont</b>	Confirm and import the control points from the selected file.
<b>Cnfg</b>	Open the <b>Define ASCII Import</b> screen to adjust import settings.

## Define ASCII Import screen

15:42:41  
Manage

Define ASCII Import

**Delimiter:** Tab ▼

**Point ID Pos:** 1 ▼

**Northing Pos:** 3 ▼

**Easting Pos:** 2 ▼

**Height Pos:** 4 ▼

**Example:** P E N H

Ready

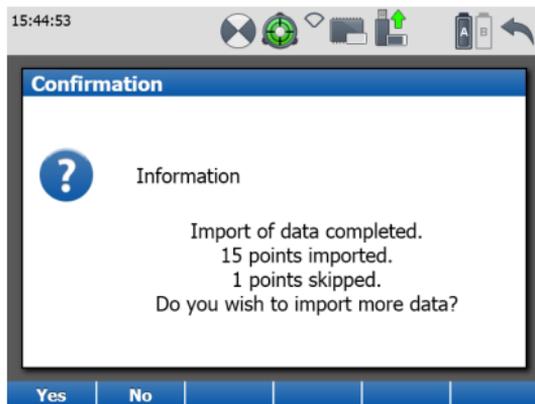
Cont Defit

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

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

**Available commands:**

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

Confirmation  
message

Option	Description
Yes	Confirm and return to <b>Import Control Points</b> screen to import more data.
No	Decline import of more data and return to Projects screen.

## 9.3.5

## 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.



Name ▲	Date
10	3/19/2013
11	3/19/2013
12	3/19/2013
13	3/19/2013
14	3/19/2013
15	3/19/2013
20	3/19/2013
21	3/19/2013

Ready

Cont New Edit Del Import

---

Field	Description
<b>Name</b>	Point ID of control point.
<b>Date</b>	Date of creation of control point.

**Available commands:**

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

---

## 9.3.6

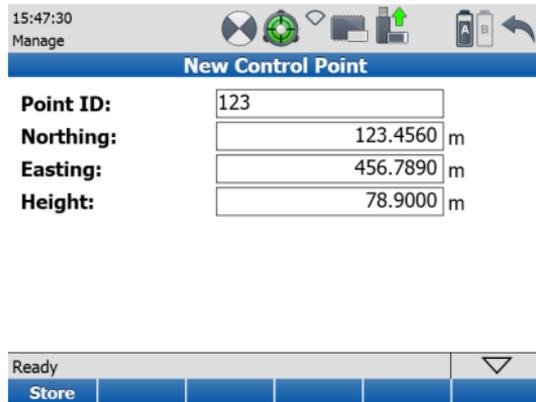
# Manage\Control Points\Data\New Control Point

### 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							
<b>New Control Point</b>							
<b>Point ID:</b>	<input type="text" value="123"/>						
<b>Northing:</b>	<input type="text" value="123.4560"/> m						
<b>Easting:</b>	<input type="text" value="456.7890"/> m						
<b>Height:</b>	<input type="text" value="78.9000"/> m						
Ready							
<b>Store</b>							

---

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.

**Available commands:**

Command	Function
Store	Store new information and return to <b>Control Points</b> screen.

---

## 9.3.7

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

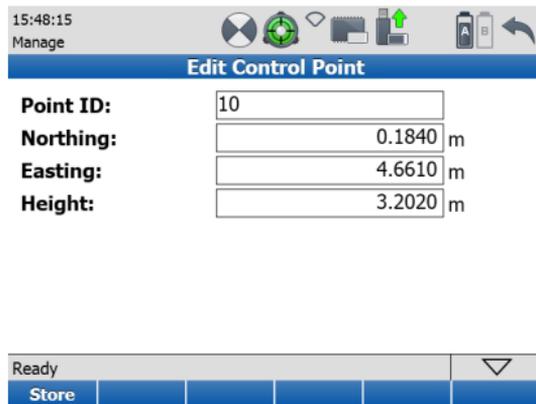
### Access

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.

### Edit Control Point screen



15:48:15 Manage								
<b>Edit Control Point</b>								
<b>Point ID:</b>	<input type="text" value="10"/>							
<b>Northing:</b>	<input type="text" value="0.1840"/>	m						
<b>Easting:</b>	<input type="text" value="4.6610"/>	m						
<b>Height:</b>	<input type="text" value="3.2020"/>	m						
Ready								
<b>Store</b>								

---

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.

**Available commands:**

Command	Function
Store	Store new information and return to <b>Control Points</b> screen.

---

## 9.3.8

## Manage\Control Points\Data\Delete Control Point

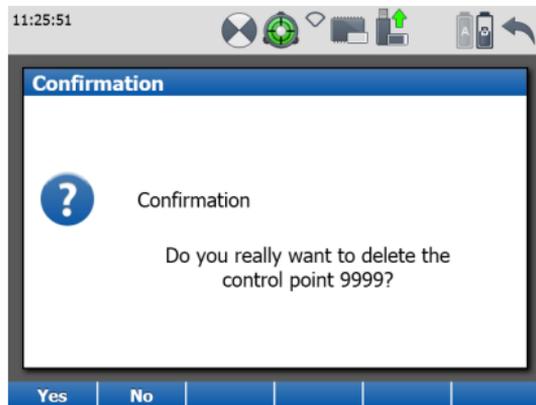
### Access

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.  <b>A deleted control point cannot be restored.</b>
No	Decline deletion of selected control point.

### 9.3.9 Manage\Control Points\Data\Import Control Points

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

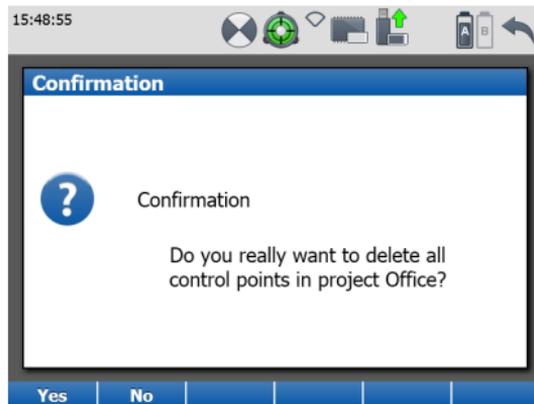
**Description** Refer to chapter "9.3.4 Manage\Control Points\Import Control Points".

### 9.3.10 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.  <b>Deleted control points cannot be restored.</b>
No	Decline deletion of all control points in the selected project.

# 10 Status

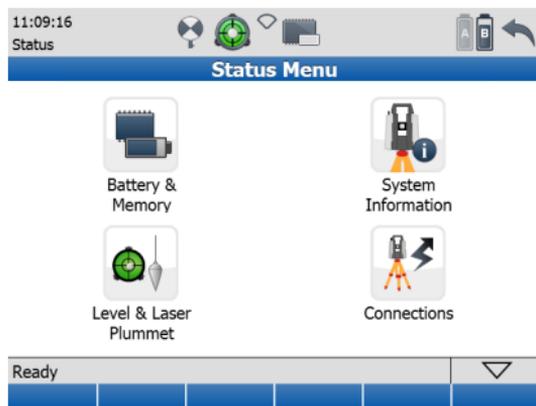
## Access

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 and Bluetooth status information.

## Status Menu screen



Icon	Command	Description
<b>Battery &amp; Memory</b> 	<b>Battery</b>	Status information about internal battery, external battery and AC power supply.
	<b>Memory</b>	Status information about size and free space of internal hard disc's data partition and connected external USB device.
<b>System Information</b> 	<b>Instrument</b>	Status information about instrument type, serial number, equipment number and system language.
	<b>Firmware</b>	Status information about installed firmware version and firmware maintenance expiry date.
	<b>Options</b>	Status information about the installed data access option and the installed external camera option.
	<b>Legal information</b>	Copyright information about installed software.

Icon	Command	Description
<b>Level &amp; Laser Plummet</b> 	<b>Level</b>	Numerical and graphical display of instrument's tilt.
	<b>Plummet</b>	Switch laser plummet on/off.
	<b>Compensator</b>	Switch dual-axis compensator on/off. Define how scanner should react when compensator goes out of range.
<b>Connections</b> 	<b>WiFi</b>	Status information about internal WiFi. Enable/disable the internal WiFi adaptor.
	<b>Bluetooth</b>	Status information about internal Bluetooth. Enable/disable the internal Bluetooth adaptor.

## 10.1

## 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
<b>Battery A</b>	Percentage of remaining power of battery A in compartment on scanner's front side (the side with touch screen).
<b>Battery B</b>	Percentage of remaining power of battery B in compartment on scanner's reverse side (the side without touch screen).
<b>Ext Battery</b>	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 <b>Memory</b> page.

### Memory page

The screenshot displays the 'Battery & Memory' status page. At the top, the time is 11:51:05 and the status is 'Status'. Below this are icons for network, power, and storage. The 'Battery & Memory' title is centered in a blue bar. Below the title, there are two tabs: 'Battery' and 'Memory'. The 'Memory' tab is active, showing the following data:

	Size / Free
<b>Data:</b>	199.22 / 190.42 GB
<b>USB:</b>	3.61 / 2.43 GB

At the bottom of the page, there is a 'Ready' status bar with a dropdown arrow on the right. Below this bar are two buttons: 'Cont' and 'Page'.

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

**Available commands:**

Command	Function
<b>Cont</b>	Return to previous menu.
<b>Page</b>	Switch to the <b>Battery</b> page.

---

## 10.2

## Status\System Information

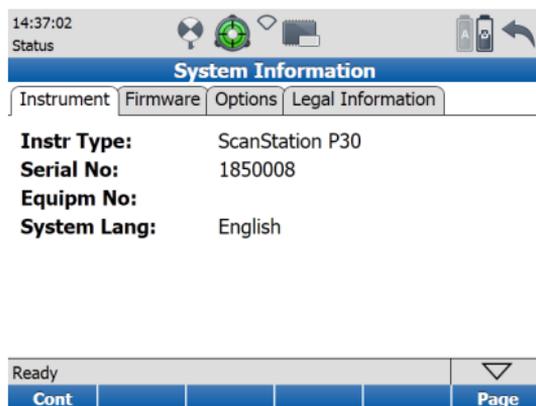
### Access

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



14:37:02  
Status

**System Information**

Instrument Firmware Options Legal Information

**Instr Type:** ScanStation P30  
**Serial No:** 1850008  
**Equipm No:**  
**System Lang:** English

Ready

Cont Page

---

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

**Available commands:**

Command	Function
<b>Cont</b>	Return to <b>Status Menu</b> .
<b>Page</b>	Switch to the <b>Firmware</b> page.

---

## Firmware page

10:28:42  
Status



**System Information**

Instrument Firmware Options Legal Information

**Firmware:** 2.60.841  
**Maint End:** 9/23/2016 12:00:00 AM

Ready 

Cont **Page**

Field	Description
<b>Firmware</b>	Firmware version of the installed onboard software.
<b>Maint End</b>	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 <b>Status Menu</b> .
Page	Switch to the <b>Options</b> page.

## Options page

14:40:05  
Status



**System Information**

Instrument Firmware Options Legal Information

**API Data Access:** Activated  
**Ext. Camera:** Activated

Ready

Cont					Page
------	--	--	--	--	------

Field	Description
<b>API Data Access</b>	Access to scan data via Application Programming Interface (API) activated or deactivated.
<b>Ext. Camera</b>	Status of the external camera option: activated or deactivated.

**Available commands:**

Command	Function
<b>Cont</b>	Return to <b>Status Menu</b> .
<b>Page</b>	Switch to the <b>Legal Information</b> page.
<b>Shift -&gt; Del</b>	Delete installed options.

## Legal Information page



### Available commands:

Command	Function
<b>Cont</b>	Return to <b>Status Menu</b> .
<b>Details</b>	List copyright statements.
<b>Page</b>	Switch to the <b>Instrument</b> page.

## 10.3

## Status\Level & Laser Plummet

### Access

- Select **Main Menu, Status** , **Level & Laser Plummet** .

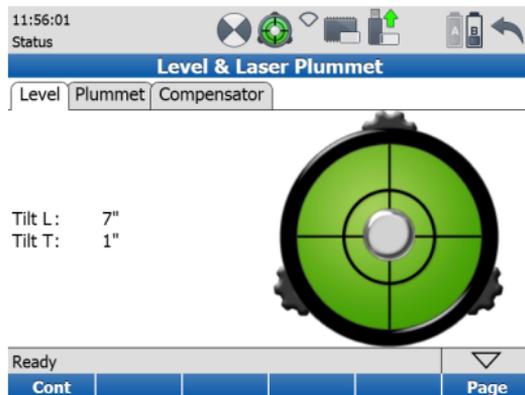
OR

- 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



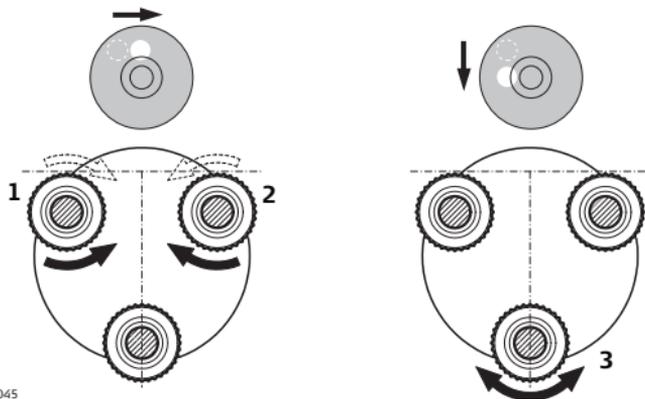
Field	Option	Description
<b>Tilt L</b>	-	Longitudinal tilt of the vertical axis.
<b>Tilt T</b>	-	Transversal tilt of the vertical axis.
<b>Bubble Level</b>	<b>green</b>	Tilt L and Tilt T < 5': level is within the high accuracy working range of the compensator. The accuracy of the compensator in the $\pm 5'$ working range is 1.5".
	<b>red</b>	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  $\pm 5'$  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
<b>Cont</b>	Return to previous menu.
<b>Page</b>	Switch to the <b>Plummet</b> page.

## Plummet page

11:57:00  
Status



**Level & Laser Plummet**

Level Plummet Compensator

**Laser Plummet:** On ▾  
**Intensity:** 100 ▾ %

Ready ▾

Cont Page

Field	Option	Description
<b>Laser Plummet</b>	<b>On</b>	Turn the red laser plummet on.
	<b>Off</b>	Turn the red laser plummet off.
<b>Intensity</b>	-	Set the laser plummet intensity by increments of 20%.

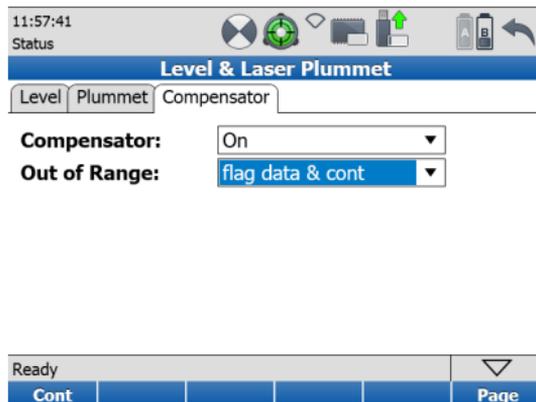
By default the laser plummet is **Off** after system boot.

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 <b>Compensator</b> page.

**Compensator page**



Field	Option	Description
<b>Compensator</b>	<b>On</b>	Turns the compensator on.
	<b>Off</b>	Turns the compensator off temporarily. After system restart, the compensator will be on again.
	<b>Always Off</b>	Turns the compensator off. After system restart, the compensator will remain off.
<b>Out of Range</b>	<b>Cancel scan&amp;img</b>	If the compensator goes out of range, cancel the current scan or image acquisition.
	<b>flag data &amp; cont</b>	If the compensator goes out of range, continue current scan or image acquisition, but flag unlevelled 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 .

#### Available commands:

Command	Function
<b>Cont</b>	Return to previous menu.

Command	Function
Page	Switch to the <b>Level</b> page.

---

## 10.4

## Status\WiFi

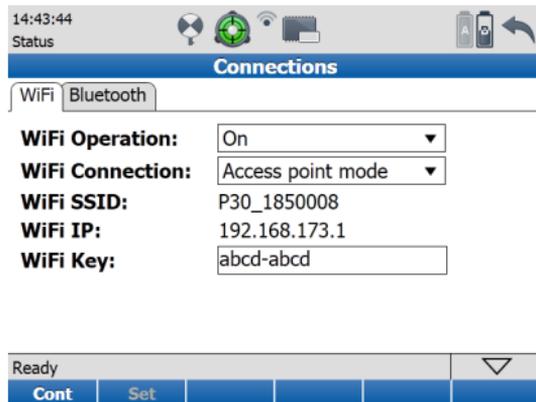
### Access

Select **Main Menu**, **Status** , **Connections**  .

### Description

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

### WiFi page



14:43:44  
Status

**Connections**

WiFi Bluetooth

**WiFi Operation:** On

**WiFi Connection:** Access point mode

**WiFi SSID:** P30\_1850008

**WiFi IP:** 192.168.173.1

**WiFi Key:** abcd-abcd

Ready

Cont Set

Field	Option	Description
<b>WiFi Operation</b>	<b>On</b>	Switches the internal WiFi board on, off or always on.
	<b>Off</b>	
	<b>Always on</b>	
<b>WiFi Connection</b>	<b>Access point mode</b>	Select the WiFi connection mode.
	<b>Ad-hoc mode</b>	
<b>WiFi SSID</b>	-	The scanner's Service Set Identifier (SSID) shown in the list of available network connections. The name is P30_185xxx with 185xxx being the scanner's serial number.
<b>WiFi IP</b>	-	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.
<b>WiFi Key</b>	-	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 <b>Status Menu</b> .
Set	Apply changes of the WiFi or Bluetooth configuration.

## Bluetooth page

14:54:59  
Status

**Connections**

WiFi Bluetooth

**Bluetooth:** Off

**Bluetooth Name:** P30\_1850008

Ready

Cont Set

Field	Option	Description
<b>Bluetooth</b>	<b>On</b>	Switches the onboard Bluetooth on, off or always on.
	<b>Off</b>	
	<b>Always on</b>	
<b>Bluetooth Name</b>	-	The name is P30_185xxxx with 185xxxx being the scanner's serial number.

**Available commands:**

Command	Function
<b>Cont</b>	Return to the <b>Status Menu</b> .
<b>Set</b>	Apply changes of the WiFi or Bluetooth configuration.

# 11 Configuration

## Access

Select **Main Menu, Configuration**  .

## Description

In the **Configuration Menu** the **Units & Formats**, the local **Date & Time**, the general **Settings** and the **MMI Language** can be configured.

## Configuration Menu screen



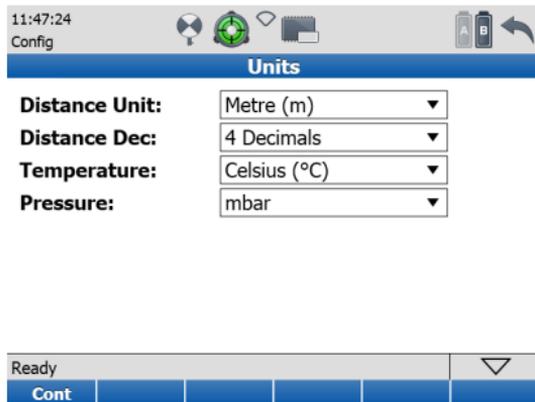
Icon	Command	Description
<b>Units &amp; Formats</b> 	<b>Distance Unit</b>	Select unit for distances (Metre, Int Ft, Us Ft).
	<b>Distance Dec</b>	Select number of decimal digits for distance display.
	<b>Temperature</b>	Select unit for temperature (°C, °F).
	<b>Pressure</b>	Select unit for pressure (mbar, Inch Hg).
<b>Date &amp; Time</b> 	<b>Local Time</b>	Set local time.
	<b>Local Date</b>	Set local date.
<b>Settings</b> 	-	Define settings for handle check, scan viewer behaviour, fan cooling, guiding beam and boot-up behaviour.
<b>Language</b> 	<b>Language</b>	Select language for the user interface or delete a language from the list.

## 11.1 Configuration\Units & Formats

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

**Description** In the **Units & Formats** screen linear units, the number of decimals and the units for temperature and pressure can be defined.

**Units & Formats screen**



11:47:24  
Config

**Units**

<b>Distance Unit:</b>	Metre (m) ▼
<b>Distance Dec:</b>	4 Decimals ▼
<b>Temperature:</b>	Celsius (°C) ▼
<b>Pressure:</b>	mbar ▼

Ready

Cont

Field	Option	Description
<b>Distance Unit</b>	<b>Metre (m)</b>	Metre: Uses SI base unit metre.
	<b>Int Ft (fi)</b>	International feet: Uses 1 ft = 1' = 12 in. = 1/3 yd = 30.48 cm
	<b>US Ft (ft)</b>	U.S. survey feet: Uses 39,37 in. = 1 m (1 U.S. survey foot = 1200/3937 m equates approximately 30.48006 cm)
<b>Distance Dec</b>	<b>0 to 4 Decimals</b>	Number of decimal digits for distance related fields.
<b>Temperature</b>	<b>Celsius (°C)</b>	Uses °Celsius: $^{\circ}\text{C} = (^{\circ}\text{F} - 32) \times 5/9$
	<b>Fahrenheit (°F)</b>	Uses °Fahrenheit: $^{\circ}\text{F} = ^{\circ}\text{C} \times 1.8 + 32$
<b>Pressure</b>	<b>mbar</b>	Uses Millibar: 1000 mbar = 1 bar = 29.5299801647 inHg
	<b>Inch Hg (inHg)</b>	Uses Inch of Mercury: 1 inHg = 33.86389 mbar

---

**Available commands:**

Command	Function
Cont	Confirm and return to the <b>Configuration Menu</b> .

---

## 11.2

## Configuration\Date & Time

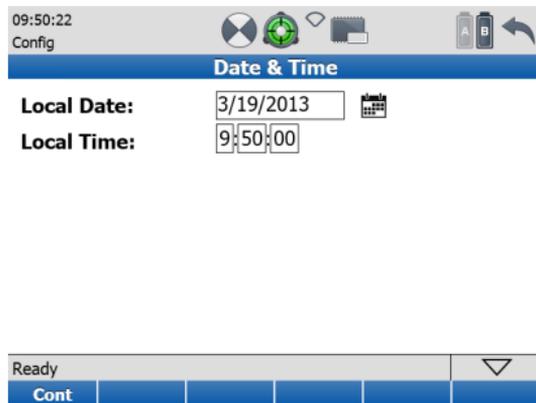
### Access

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
<b>Local Date</b>	Enter the local date in the format <b>MM/DD/YY</b> .
<b>Local Time</b>	Enter the local time in the format <b>hh:mm:ss</b> .

**Available commands:**

Command	Function
<b>Cont</b>	Confirm and return to the <b>Configuration Menu</b> .

---

## 11.3

## Configuration\Settings

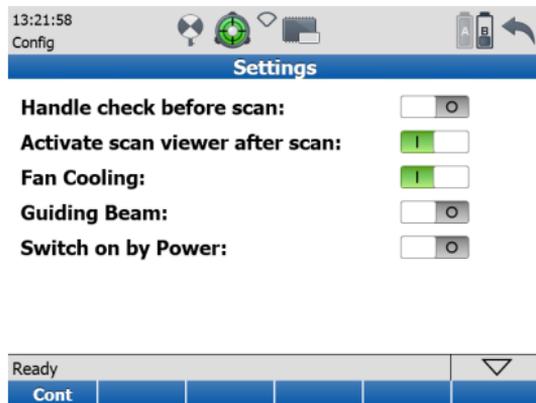
### Access

Select **Main Menu, Configuration**  , **Settings**  .

### Description

In the **Settings** screen the instrument's general settings can be defined.

### Settings screen



Field	Description
<b>Handle check before scan</b>	Switch on/off a quick distance measurement to the zenith direction prior to a scan or image acquisition. When handle is detected a warning message informs to remove the handle.
<b>Activate scan viewer after scan</b>	Switch on/off the display of the <b>Scan Viewer</b> at the end of a scan. When disabled the <b>Scan Parameters</b> screen opens after a scan has been finished.
<b>Fan Cooling</b>	Switch on/off the cooling ventilator. Default after each scanner start is on.
<b>Guiding Beam</b>	Switch on/off the red laser as a guiding beam. Default after each scanner start is off.
<b>Switch on by Power</b>	Enable/disable automatic booting when connected to power.

**Available commands:**

Command	Function
<b>Cont</b>	Confirm and return to the <b>Configuration Menu</b> .
<b>Shift -&gt; Reset</b>	Delete the View.config file to reset the instrument.

## 11.4

## Configuration\Language

### Access

Select **Main Menu, Configuration** , **Language**  .

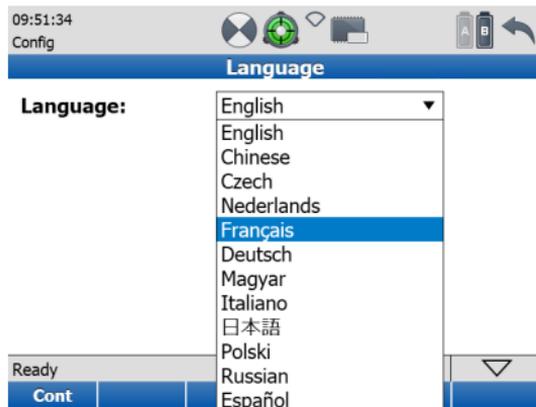
### Description

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 "12.2 Tools\Transfer" for more information.

### Language screen



---

Field	Description
Language	List of installed languages on the scanner.

**Available commands:**

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

---



## 12 Tools

### Access

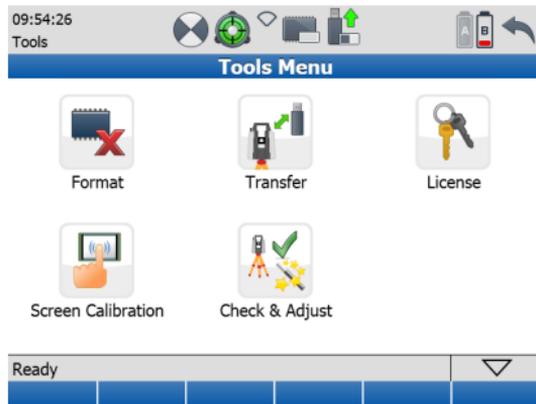
Select **Main Menu, Tools** .



### 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
	<b>Confirmation</b>	Format the complete data partition of the internal hard disc.  <b>All project data will be erased.</b>
	<b>Projects</b>	Transfer selected project or all projects to a USB memory storage device or to scanner's hard disk.
	<b>System Files</b>	Upload a new firmware or firmware languages to the instrument.
	<b>Manual</b>	Enter license key manually.
	<b>Upload</b>	Upload license key file from a USB memory storage device.
	<b>Touch Calibration</b>	Recalibrate the touch screen by clicking four points on the display.

Icon	Command	Description
<b>Check &amp; Adjust</b> 	<b>Check Angular Parameters</b>	Determine and update angular parameters of the instrument.
	<b>Set Range Parameters</b>	Set the range offset of the instrument.
	<b>Check Tilt Compensator</b>	Check and update the tilt compensation of the instrument.
	<b>Current Calibration</b>	List all current instrument parameters.

**Available commands:**

Command	Function
<b>Shift -&gt; Warm Up</b>	Start run-in procedure for elevation axis at low temperatures.

## 12.1

## Tools\Format

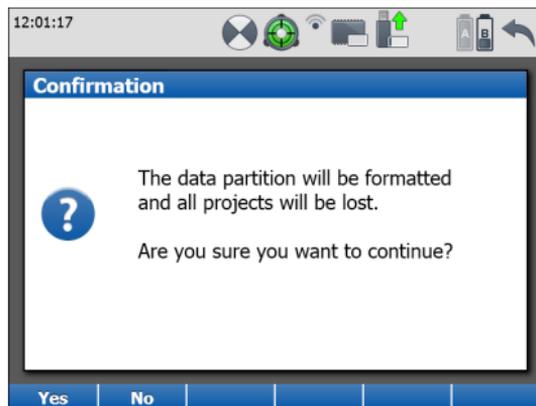
### Access

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
<b>Yes</b>	Starts formatting the data partition.  <b>All project data will be erased.</b>
<b>No</b>	Cancels the formatting process and returns to the <b>Tools</b> 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.
-

## 12.2

## Tools\Transfer

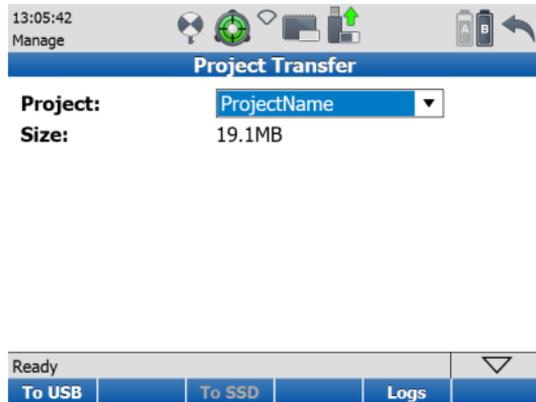
### Access

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 vice versa. New firmware and languages can be uploaded from an external USB memory storage device to the scanner.

### Project Transfer screen



The screenshot shows the 'Project Transfer' screen. At the top, there is a status bar with the time '13:05:42' and the word 'Manage'. Below this is a navigation bar with several icons: a globe, a green circular arrow, a Wi-Fi symbol, a USB drive, and a scanner. The main title 'Project Transfer' is displayed in a blue bar. Below the title, there are two fields: 'Project:' with a dropdown menu showing 'ProjectName' and 'Size:' with the value '19.1MB'. At the bottom, there is a status bar with the word 'Ready' and a dropdown arrow. Below the status bar, there are four buttons: 'To USB', 'To SSD', 'Logs', and a dropdown arrow.

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

**Available commands:**

Command	Function
<b>To USB</b>	Transfer the selected project to the connected USB memory storage device into the folder <b>\Data</b> .
<b>To SSD</b>	Transfer the selected project from the connected USB memory storage device to the scanner's project list. The command is available when selecting a project on the USB memory storage device.
<b>Logs</b>	Transfer system log files to the connected USB memory storage device into the folder <b>\Logs</b> .
<b>Shift -&gt; All to USB</b>	Transfer all projects from the scanner's internal project list to the connected USB memory storage device into the folder <b>\Data</b> .

Command	Function
<b>Shift -&gt; All to SSD</b>	Transfer all projects from the connected USB memory storage device to the scanner's project list.



### Information message

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

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

10:27:13  
Tools

**Transfer System Files**

Firmware Language

**Firmware:** Pxx\_2.60.841.fw

Ready

Cont Page

Field	Description
<b>Firmware</b>	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 **Pxx\_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 **UpdateSSPxx\_v2.0.pdf** which is enclosed with each new firmware file for detailed instructions.

**Available commands:**

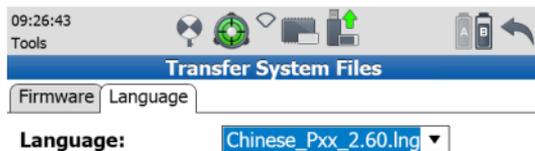
Command	Function
Cont	Starts the upload process of the selected firmware file.
Page	Switch to the <b>Language</b> page.



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

---

## Language page



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



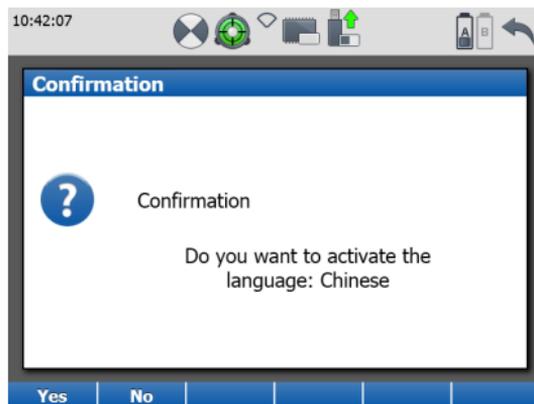
The language file (\*.Ing) must be located in the main directory of the USB memory storage device.

### Available commands:

Command	Function
Cont	Starts the upload process of the selected language file.
Page	Switch to the <b>Firmware</b> page.



The selected language can be activated directly after a language file transfer.



**Available commands:**

Command	Function
<b>Yes</b>	Return to the <b>Language</b> page of the <b>Transfer System Files</b> screen with the selected language activated.
<b>No</b>	Return to the <b>Language</b> page of the <b>Transfer System Files</b> screen without activating the selected language.



After the upload process, the language is available as an additional entry in the **Language** page of the **Firmware Language** screen. Refer to chapter "11.4 Configuration\Language" for more information.

---

## 12.3

## Tools\License

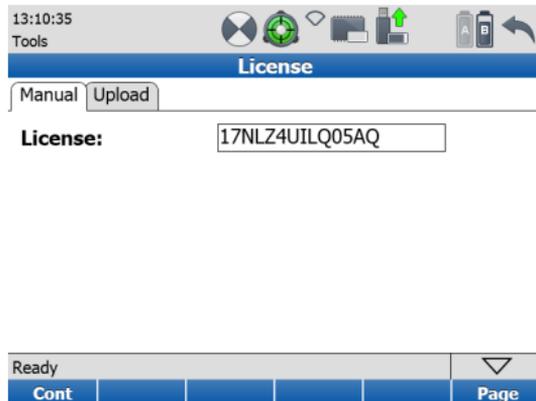
### Access

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 P40/P30 firmware.

### Manual page



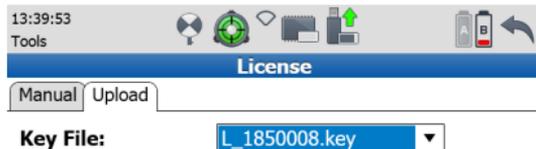
The screenshot shows the 'License' screen in the ScanStation P40/P30 interface. At the top, the time is 13:10:35 and the menu path 'Tools' is shown. The 'License' title is centered in a blue bar. Below the title, there are two buttons: 'Manual' and 'Upload'. The 'License:' label is followed by a text input field containing the license key '17NLZ4UILQ05AQ'. At the bottom, there is a 'Ready' status bar with a 'Cont' button, a dropdown arrow, and a 'Page' button.

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 <b>Upload</b> page.

## Upload 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\_185xxxx.key" with 185xxxx being the scanner's serial number.

**Available commands:**

<b>Command</b>	<b>Function</b>
<b>Cont</b>	Confirm and load the license key from the selected license key file.
<b>Page</b>	Switch to the <b>Manual</b> page.

---

## 12.4

## Tools\Screen Calibration

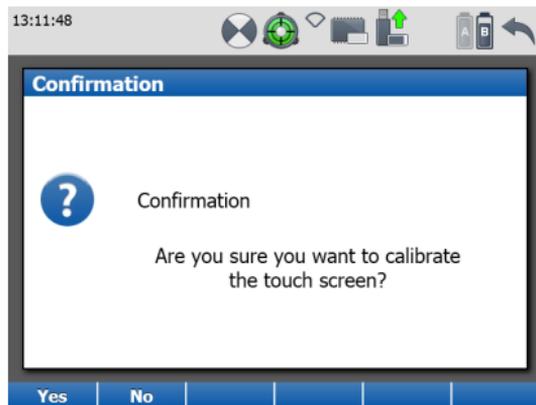
### Access

Select **Main Menu, Tools** , **Screen Calibration**  .

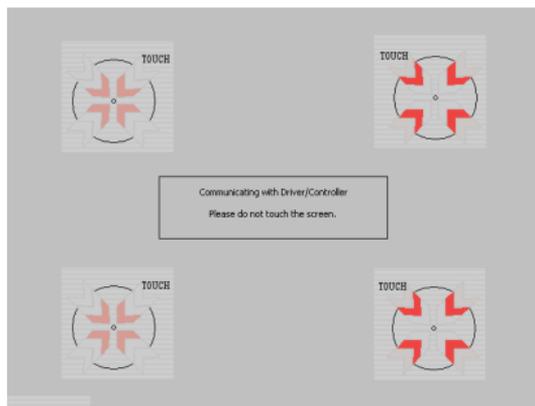
### Description

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

### Confirmation message



Option	Description
<b>Yes</b>	Start the touch screen calibration process. Then click the centres of four calibration points which appear consecutively on the display.
<b>No</b>	Cancel the touch screen calibration process and return to the <b>Tools</b> menu.



## 12.5

## Check & Adjust

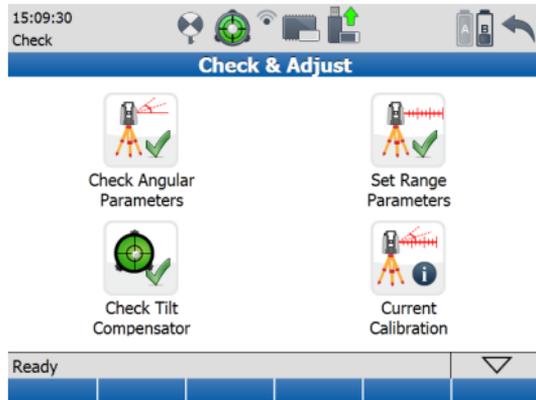
### Access

Select **Main Menu, Check & Adjust**  .

### Description

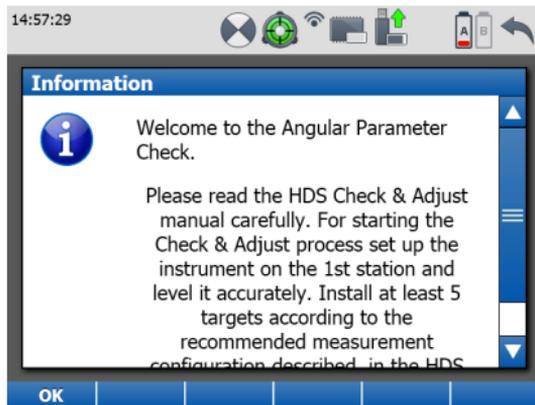
In the **Check & Adjust** menu all commands for checking angular parameters, setting range parameters, checking the tilt compensator, and to check the current calibration settings are available.

### Check & Adjust screen



Icon	Description
<b>Check Angular Parameters</b> 	Angular system parameters can be determined by means of a field procedure and registered in the instrument.
<b>Set Range Parameters</b> 	The range offset parameter, which must be determined on a reference baseline, can be registered in the instrument.
<b>Check Tilt Compensator</b> 	The tilt sensor can be checked and its parameters be updated.
<b>Current Calibration</b> 	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



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:**  m



Field	Description
<b>Range Offset</b>	Range offset determined on a distance reference baseline.

### Available commands:

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

## Check Tilt Compensator screen

Parameter ▲	Result ▲
comp. L	11"
comp. T	-2"

Ready					▼
Set					

Field	Description
<b>Parameter</b>	List of instrument tilt parameters. <ul style="list-style-type: none"><li>• comp. L = compensator longitudinal index error.</li><li>• comp. T = compensator transversal index error.</li></ul>
<b>Result</b>	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

14:31:26  
Check



**Current Check & Adjust Parameters**

Parameter ▲	Result ▲
$\lambda 1$	0°0'0" ▲
$\lambda 2$	0°0'0"
$\mu$	0°0'0"
$\epsilon$	0°0'0" ≡
$\Delta e l$	0°0'0"
range offset	0.0000 m
comp. L	0°0'0"
comp. T	0°0'0" ▼
Ready	▽
Cont	Reset

Field	Description
<b>Parameter</b>	List of instrument parameters. <ul style="list-style-type: none"> <li>• <math>\lambda 1, \lambda 2</math> = laser alignment deviations.</li> <li>• <math>\mu</math> = deviation of the line of sight.</li> <li>• <math>\varepsilon</math> = deviation of the tilting axis.</li> <li>• <math>\Delta e l</math> = deviation of the vertical index.</li> <li>• range offset = range offset determined on a distance reference baseline.</li> <li>• comp. L = compensator longitudinal index error.</li> <li>• comp. T = compensator transversal index error.</li> </ul>
<b>Result</b>	Current value of the instrument parameter.

**Available commands:**

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

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- when it has to be **right**

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