Leica iCON site
How to Guide

Version 1.0
English

- when it has to be **right**

Leica Geosystems

Introduction

Purchase

Congratulations on the purchase of a Leica iCON site software.

Symbols

The symbols used in this manual have the following meanings:

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

Trademarks

- Windows is a registered trademark of Microsoft Corporation.

All other trademarks are the property of their respective owners.

Safety

To ensure safety when using the system, please also observe the directions and instructions contained in the User Manual and Safety Handbook issued by the:

- Machine manufacturer
- Controller manufacturer
- Sensor manufacturer

Table of Contents

In this manual

1 iCON site Operating Principles

This guide is intended to introduce you to the iCON site software, and explain how it connects and operates with other Leica Construction products. It can act as a quick field reference manual, whilst also providing concise information relating to configuration, data transfer, and the functionality contained within different field applications.

Some features are only accessible when using a specific instrument, for example a Total Station. In the "How to" sections of this manual, this will be indicated with special icons: **TPS** for Total Station, **GPS** for a GPS instrument, or **TPS** + **GPS** for both instrument types.

1.1 Equipment

Display formats

iCON site is available in different display formats, depending on the equipment you are using:

3.5" Portrait:

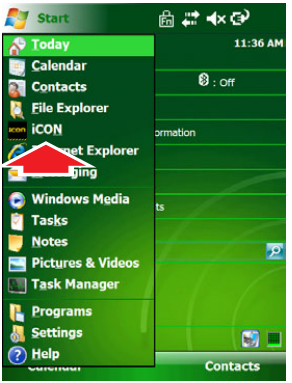
7"Landscape:

The applications used in each display format have the same functionality.
This manual shows images from the 3.5" portrait display. Reference will be made to the 7" Landscape display format if there are small differences in appearance or functionality.

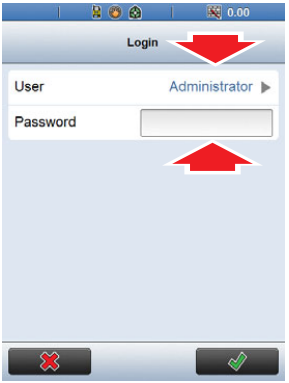
1.2 Navigation Concept

Startup & Login

1. **iCON site** software starts automatically after the device is switched on.
2. In case the iCON site software was exited, you can re-enter by selecting **iCON** from the Start menu within Windows.



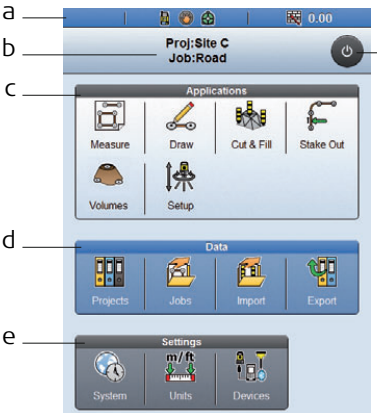
3. If you logged out after the previous session, **Login** screens opens. Select appropriate **User** and enter **Password**. Tap  to confirm.
   If you didn't logout at the end of your last use, then **iCON site Home Menu** opens directly.



Principles of operation

Upon launching iCON site and logging in, **Home Menu** is the first screen to be displayed.

Description of the Home Menu elements:

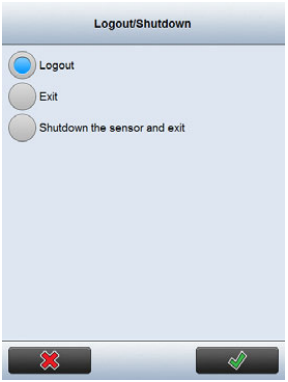


a) Status bar
b) Title bar
c) Applications container
d) Data container
e) Settings container
f) Power key

Element	Description
Status bar	Contains icons that indicate status of the controller, and the connected instrument. In the Home Menu, the Status Bar is minimized and read-only.
Title bar	Present in the Home Menu and dialogues. Displays title of current screen.
Applications container	Displays the different applications available for use.
Data container	Contains options to import and export data. Select different jobs/projects here.
Settings container	Contains options for editing user information, units and tolerances, and connected device settings. Licenses can be added here.
Power key	Gives access to logout and shutdown functions.

Logout/Shutdown

The **Power key** in the Home Menu navigates to the Logout/Shutdown screen, giving the following options:

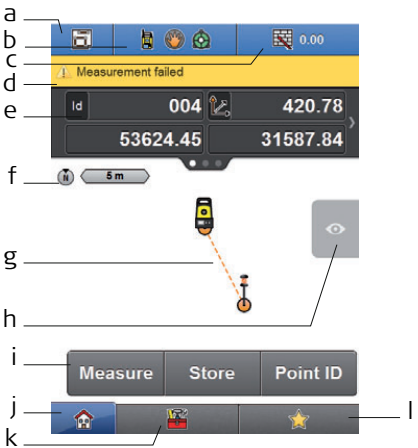


- **Logout:**
  You are logged out and directed to the login screen. From the login screen you can choose to exit the software, or login as another user.
- **Exit:**
  Closes iCON site, without logging you out. When iCON site is next launched, no login details are required, and you are immediately logged in.
- **Shutdown the sensor and exit:**
  Automatically shuts down the connected instrument, and exits to Windows.

Applications

Once an application is selected, you are directed to the Map screen, where you will go to work:

Description of the Map screen elements:



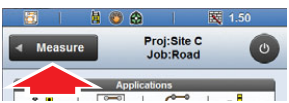
a) Application key
b) Status 1
c) Status 2
d) Warning bar
e) Information bar
f) North indicator and scale bar
g) Main map area
h) Map handler
i) Measure bar
j) Home key
k) Toolbox
l) Favourites

Element	Description
Application key	Displays name of current active project and active job.
Status 1	Displays status of connected Total Station or GPS instrument. Contains options to directly edit function/status of the instrument.
Status 2	• **For TPS**: displays status of target, for example pole and prism information, and controller. • **For GPS**: displays status of the communication devices (radio or modem). Contains options to edit relative settings.
Warning bar	Displays any issues with the operation that may compromise usability.
Information bar	Displays information about the current measurement.
North indicator and scale bar	Indicates scale and orientation of display.
Main map area	Graphically displays pre-loaded data and measured data.
Map handler	Change zoom level and view mode. Define data displayed in the main map area.
Measure bar	Displays main command keys, for example **Measure** or **Store**.

Element	Description
Home key	Navigates back to the Home Menu.
Toolbox	Contains functions relevant to the open application.
Favourites	The content of this menu can be defined according to your requirements. Refer to "Information about Favourites menu configuration", page 25, for information about configuring Favourites. It also contains a calculator and a link to Setup.

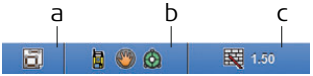
Depending on the specific application being used, slightly different functionality is present. Aspects of the Map screen appear different in different applications.

If you select the **Home** key  whilst in an application, the Home Menu is displayed. The Title bar contains a **Back** key with an option of navigating directly back to the **previous application**, for example **Measure**:



Status bar **TPS**

Status bar displays the status of the controller, the status of the connected instrument, pole and prism information, and information about the current application. It consists of three keys:

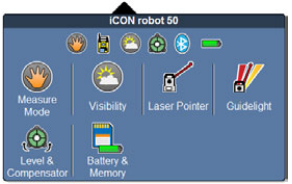


a) Application key
b) Status 1
c) Status 2

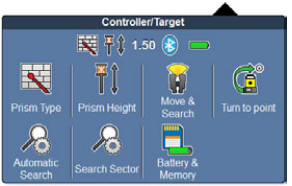
Key	Description
Application key 	Displays key information about the current job, project and application.
Status 1 	Instrument status. Displays battery and memory status. Define measure mode. Define instrument settings, for example Laser Pointer, Guide Light.
Status 2 	Pole and controller status. Displays battery and memory status. Define prism type and pole height. Prism search controls are also found here.

☞ **Status 1** and **Status 2** contain additional information/functionality once tapped, allowing the status of instrument and pole to be changed.

Status 1:



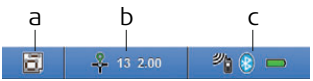
Status 2:



The content of Status 1 and Status 2 will change depending on the functionality of the connected Total Station.

Status bar GPS

Status bar displays the status of the controller, the connected instrument, position quality information, and information about the current application. It consists of three keys:



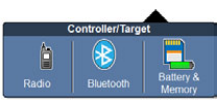
a) Application key
b) Status 1
c) Status 2

Key	Description
Application key 	Displays key information about the current job, project and application.
Status 1 	Instrument/Antenna status. Displays position and satellite information.
Status 2 	Communication status. Displays connection status of radio, modem and Bluetooth.

Status 1 and **Status 2** contain additional information/functionality once tapped, allowing the status of the antenna to be monitored and changed, and the position quality to be reviewed.

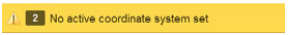
Status 1:

Status 2:



Warning bar

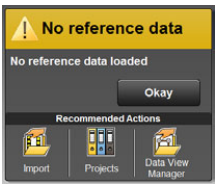
Displays any issues that are affecting operation.



The number on the Warning bar indicates the total number of warnings that are currently active.

The warning bar can be tapped to display the full message, which:

- displays further information about the problem(s),
- provides navigation to areas where the problem can be fixed.



By pressing **Okay** without fixing the problem, the warning will be ignored until it is detected again.

Information bar

Displays information that is relevant to the current action being carried out. This will be in one of three forms:

- Guidance text whilst carrying out functions.

- Data from last made measurement.

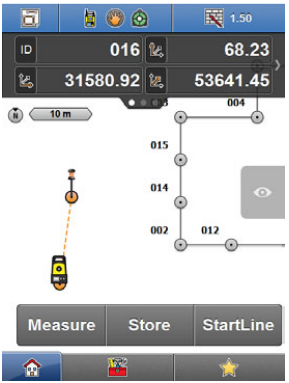
- Directional guidance whilst staking out.

The display format and content of the Information bar can be configured according to your preferences by **tapping and holding** for two seconds within the Information bar area. A menu is displayed where you can define the number of pages in the Information bar, and the amount of content on each page.

The white dots at the base of the Information bar indicate the total number of active pages, which can be scrolled through by tapping on the left hand side or right hand side of the Information bar.

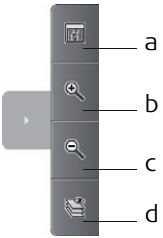
Main map area

The main area of the screen displays all points, lines, and arcs that have been measured, as well as any other data that is loaded to the active job. The map area can be panned at all times.



Map handler

The Map handler is available whenever the **Map screen** is open. When not selected, it appears as a small tab:  . When the tab is selected, it is expanded to display the full extent of the Map handler, consisting of four keys.



a) View modes
b) Zoom in
c) Zoom out
d) Map View manager

Key	Description
View modes 	Allows you to change the view mode, and configure the 7" multiview display.
Zoom in 	Zoom in.
Zoom out 	Zoom out. **Tap and hold** to display full extent of loaded data.
Map View manager 	Select which data from the active project is displayed in the Map screen. Refer to "Map View manager", page 59, for more information.

In 7″ display format, the full extent of Map handler is always visible at the bottom of the screen. The small tab, used to show and hide the Map handler, is not present.

Measure bar

The Measure bar contains the main commands you will use whilst working, for example **Measure**, **Store**, and **Code**. It consists of between one and three keys, for example:

You can configure the content of the keys according to how you want to work.

Tap and Hold on the Measure bar for two seconds to configure. A configuration menu opens, where different commands can be specified. Available commands differ slightly, depending on the open application.

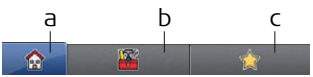
For some tasks the Measure bar will be automatically altered to allow for the operation to be completed. Once the task is finished, the Measure bar will return to the user defined state.

Information about Favourites menu configuration

- Within the Measure bar configuration screen, **Tap and Hold** any key to add it to the **Favourites** menu. This provides easy access to the functions you are likely to use regularly.
- To remove a key from Favourites, open the **Favourites** menu, and **tap and hold** the relevant key.

Function bar

The Function bar contains a link to the Home Menu, and all functionality relevant to the open application. It also contains a calculator, and in some applications it will contain a link to Setup. Depending on the open application, function and appearance of the Function bar differs slightly.



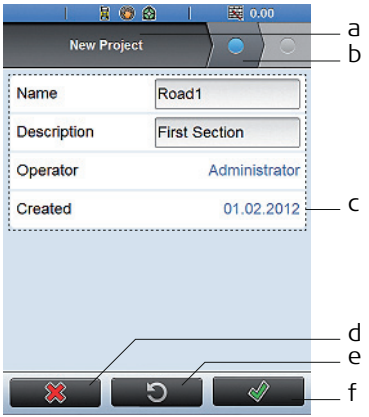
a) Home key
b) Toolbox
c) Favourites

Key	Description
Home key 	Navigates back to the Home Menu.
Toolbox 	Contains functions relevant to the open application.

Key	Description
Favourites 	Contains different functions that can be defined according your requirements. Refer to "Information about Favourites menu configuration", page 25, for information about configuring Favourites.

Wizards

A number of Wizards exist in iCON site. Each Wizard leads you through a series of steps, where settings and statuses can be changed.



As an example, the **New Project** Wizard is displayed.

a) Current Wizard step
b) Next Wizard step
c) Wizard step content
d) Cancel and exit
e) Reset to default settings
f) Accept changes and exit

Element	Description
Current Wizard step	Shows title of Wizard step that is currently displayed.

Element	Description
Next Wizard step	Move to next Wizard step by tapping this key. It is only possible to move to the next step once all required fields are defined in the current setup.
Wizard step content	Settings that can be edited by tapping each individual key.
Cancel and exit	Exits the Wizard immediately, with no changes saved.
Reset to default settings	Resets all changed settings back to default value.
Accept changes and exit	Only active once all Wizard steps have been completed.

1.3 Icons

Description

Icons provide information related to basic instrument and controller status. Displayed icons depend on which instrument is used, and the instrument configuration.

Status bar: general icons

Icon	Description
	Indicates connected instrument.
	Indicates memory or data storage device type. Displayed in the Battery & Memory screen, accessible through Status 1 or Status 2.
	Indicates battery status.

Status bar: Total Station specific icons, TPS

Icon	Description
	Indicates prism lock setting.
	Indicates the selected prism.

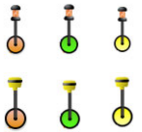
Icon	Description
	Indicates measure mode.
	Indicates compensator/level status.

Status bar: GPS specific icons, GPS

Icon	Description
	**Position status** Displays the current position solution: fixed, float, navigated, and no position.
	Number of visible satellites Displays the number of satellites used in position calculation with the current satellite settings.
	**Radio status** Displays the real-time mode of the radio.
	**Modem status** Displays the real-time mode of the modem.

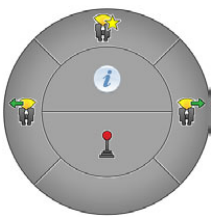
Map screen icons

Icon	Description
	User Point
	Control Point
	Point being staked
	Staked and stored within tolerance
	Staked and stored outside tolerance
	Delete point
	Reference Line
	Staked Line

Icon	Description
	Target point position. Measured; within tolerance; outside tolerance

Move & Search Pilot icons, TPS

The Move & Search Pilot is available in the **Status 2** menu.
It is only available when connected to a Robotic Total Station. It enables remote control of the vertical and horizontal rotation of the telescope on the Total Station. PowerSearch, an intelligent prism search method, can be triggered from this control.



Icon	Description
	Switch to Joystick control.
	PowerSearch left/right. Activates an intelligent prism search in the specified direction.
	Activates a PowerSearch of a predefined "window". This window can be defined in **Search Sector** in Status 2.
	Activates a local PowerSearch. If no prism is found, a full PowerSearch occurs.
	Switch to PowerSearch.
	ATR search. Instrument searches locally for a prism.
	Moves instrument in specified direction. Tap key again to increase speed. Three speeds are available.
	Cancel current search.

To close the Move & Search Pilot, tap outside the control, in the Map screen.

1.4 System Overview

Instruments and connectivity

iCON site is pre-configured to be compatible with following Leica Total Station/GPS instruments: Leica Builder, Leica iCON robot 50, Leica PowerTracker, and Leica iCON GPS 60.

Name	Function	Connectivity with controller
Leica Builder	Manual Total Station	Cable, short-range Bluetooth
Leica iCON robot 50	Robotic Total Station	Cable, short-range and long-range Bluetooth
Leica PowerTracker	Robotic Total Station	Cable, short-range and long-range Bluetooth
Leica iCON GPS 60	GPS antenna and receiver	Cable, short-range Bluetooth

For further information on the specific instrument, please refer to the associated manual provided with the product.

Data storage, connectivity of controller

Both the 3.5" and 7" controllers can record and store data internally. Data can be transferred to an Office PC using a USB connection.

Device	Internal storage
3.5"	8 GB flash drive
7"	64 GB hard drive

☞ For further information on the specific instrument, please refer to the associated manual provided with the product.

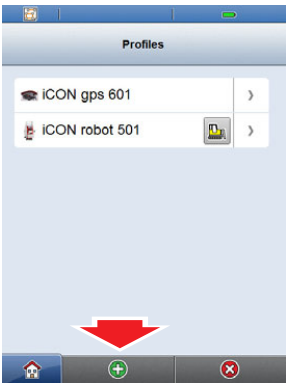
1.5 Setting up Communications and Connecting Instruments

1.5.1 Create an Instrument Profile

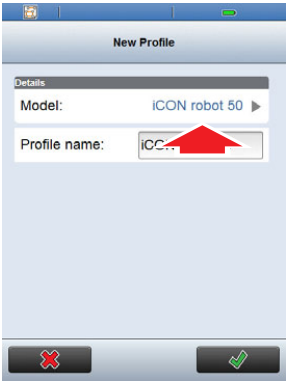
General

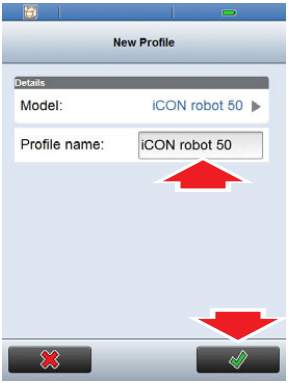
In order to connect the controller to an instrument, an instrument profile must be created.

Press **Devices** in the Home Menu. Tap  to create a new profile.



Select the **Model**, and enter a **Profile name**. Tap  .





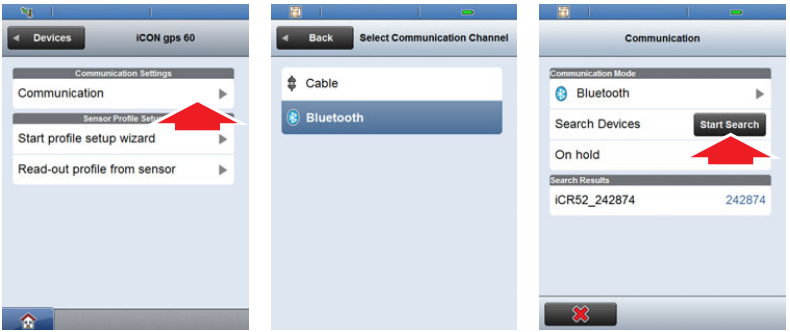
For a GPS profile proceed to chapter "1.5.2 GPS Profile Setup". For a Total Station profile proceed to chapter "1.5.3 Total Station Profile Setup".

1.5.2 GPS Profile Setup

Define communication method

In **Communication Settings**, define the Communication method between instrument and controller. Ensure the instrument is set accordingly.

- For **Cable** connection, ensure the cable is connected. The connected instrument is displayed in Search Results.
- For **Bluetooth**, press the **Start Search** key. Select the relevant instrument profile from Search Results.



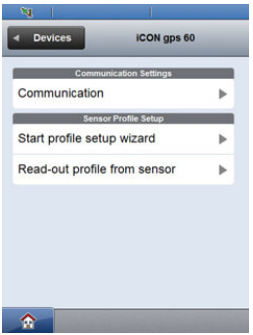
Once the instrument is connected, it changes from white to blue in the search list.

Tap  .

Sensor profile setup

To create a GPS Profile, additional settings must be defined. Select from these two Profile Setup modes:

1. **Profile Wizard**: Set up most of the common configurations for Base, Local Rover and Network Rover. Includes optional access to additional settings. It is also possible to complete a Profile Wizard before connecting to the instrument.
2. **Profile from Sensor**: Automatically creates a new profile with the settings that are currently set on the instrument. Work with the instrument can begin immediately.

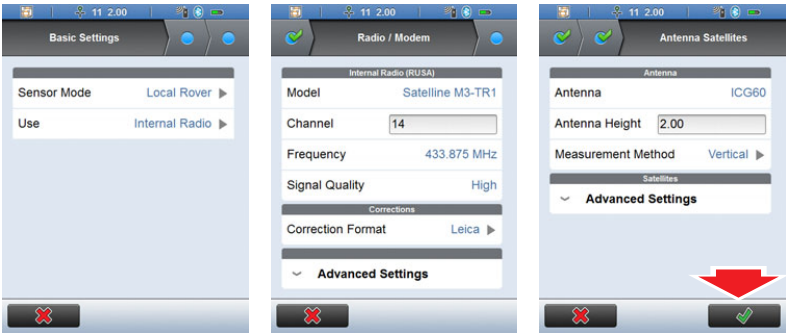


Profile Wizard

The Profile Wizard consists of three steps:

- Basic Settings: Set **Sensor Mode**, and **RTK Device Use**.
- Radio, Modem: Define **Radio / Modem** settings, and **Correction Format**.
- Antenna, Satellites: Define **Antenna** and **Satellite** settings.

Expand **Advanced Settings** to make additional selections where relevant. Tap  when step 3 is completed.

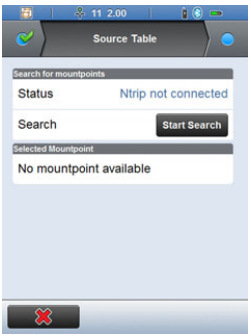


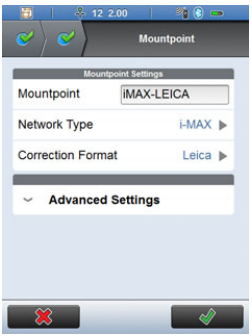
The following table describes the two different antenna height measuring methods:

Method	Description
Vertical	The vertical height reading is the height difference between the bottom end and the top end of the pole.

Method	Description
Height Hook	If setting up using a tripod, the measurement required is the vertical height from the height hook to the ground.

If setting up a Network Rover with NTRIP connection to a reference network, a further three Wizard steps will be shown:





☞ After creating a Base profile, there is an option to navigate directly to Base Station Setup. Refer to "5 How to Setup a GPS Base Station" for more information.

☞ Once a profile has been created, connection to the instrument is automatically established each time the software is launched. This is providing that the instrument is turned on with the correct communication method, and the relevant instrument profile is selected in the Devices screen.

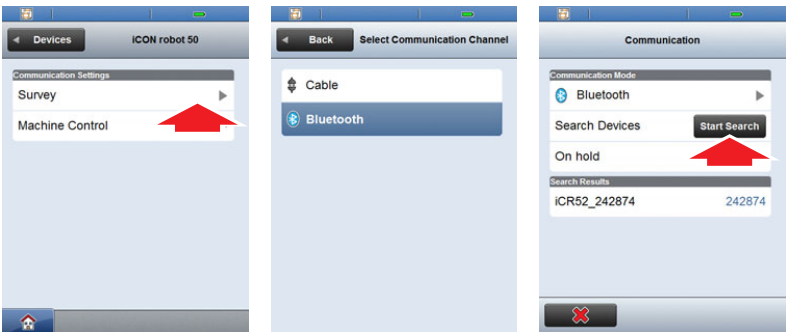
☞ To edit profile settings later, tap the arrow to the right of the profile name in the **Devices** screen.

1.5.3 Total Station Profile Setup

Define communication method

In **Communication Settings**, select **Survey**. Define the Communication method between instrument and controller. Ensure the instrument is set accordingly.

- For **Cable** connection, ensure the cable is connected. The connected instrument is displayed in Search Results.
- For **Bluetooth**, press the **Start Search** key. Select the relevant instrument profile from Search Results.



Once the instrument is connected, it changes from white to blue in the search list.

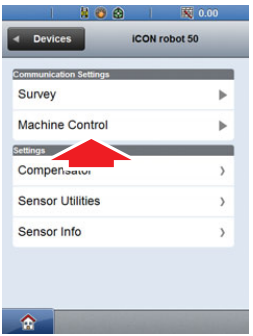
Tap .

☞ Once a profile has been created, connection to the instrument is automatically established each time the software is launched. This is providing that the instrument is turned on with the correct communication method, and the relevant instrument profile is selected in the Devices screen.

☞ To edit profile settings later, tap the arrow to the right of the profile name in the Devices screen.

Machine communication, TPS

Within a Robotic Total Station profile it is also possible to define communication settings between **Instrument** and **Machine**. Within the **Communication Settings** container, tap **Machine Control**. From here, define the **Communication Mode** and the **Prism used on machine**. Tap ✓ when finished.



To switch from Survey Mode to Machine Control Mode, tap the Machine Control key on the profile name in the main devices screen. Tap this button again to switch back to Survey Mode.

2 Projects, Jobs, Data, and Settings

2.1 Projects and Jobs

Projects and jobs overview

iCON site allows the simple location and transfer of data between **instrument**, **controller** and **office**.
Imported reference and control data is stored in iCON site, within individual **Projects**. **Jobs** can be created and carried out within these projects. **Reports**, **measured data** and **calculated results** are stored to the active job, ready for exporting.

This allows you to create a project with specific reference and control data, and then carry out multiple jobs within this project.

Projects:

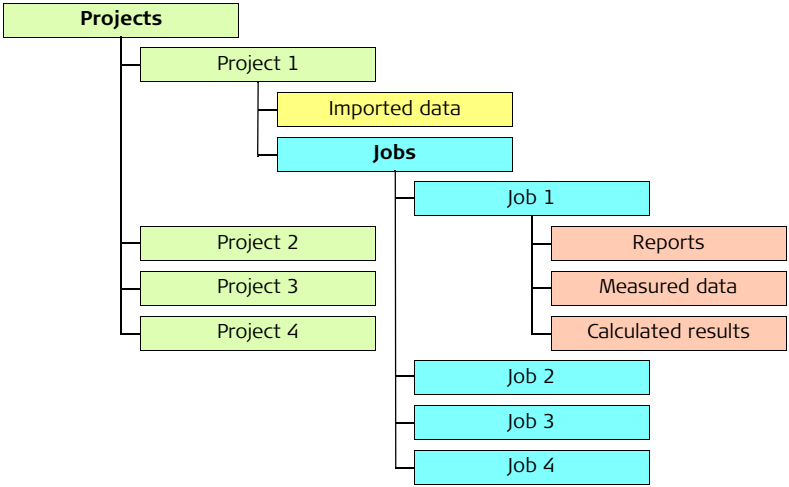
- Imported data
  - Control data
  - Reference data
  - Coordinate systems
  - Code lists

Jobs:

- Output:
  - Reports
  - Measured data
  - Calculated results

Jobs are created within projects. All the importing is done to the actual project, and then available in all jobs within that project.

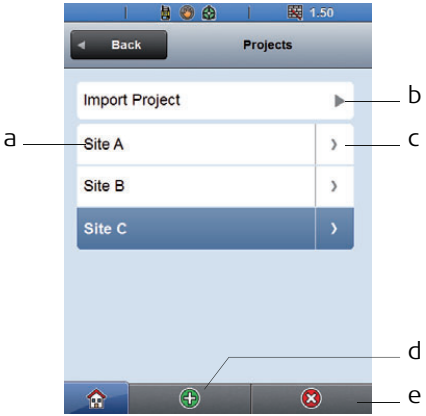
Example of a basic data flow/storage directory structure



Projects

To create, edit, select or delete a project, tap **Projects** in the Home Menu.

Projects page opens. The current active project is highlighted in blue.



a) Select project
b) Import project
c) Edit project
d) Create new project
e) Delete project

Key	Process
Select project	Selected project is automatically activated. Home screen opens automatically.
Import project	Complete projects can be imported to the current device.

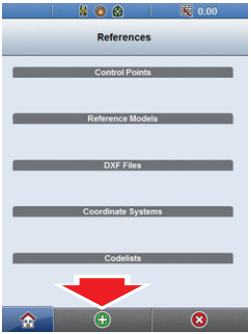
Key	Process
Edit project	Previously made settings can be edited and saved. Further data can be loaded to a project.
Create new project	Follow the Wizard steps to load reference data, control data, code lists and coordinate systems.
Delete project	Individual projects can be deleted.

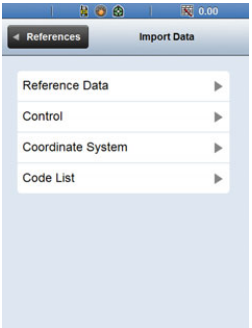
☞ Users with basic administrative rights cannot create, edit, or delete projects. Refer to "2.2 User Profiles" for more information.

☞ Data can also be loaded to the active project using **Import**, refer to page 52.

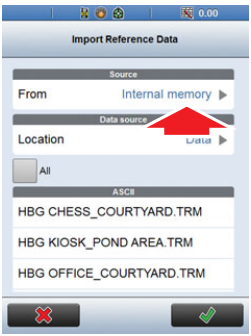
Importing data to the project

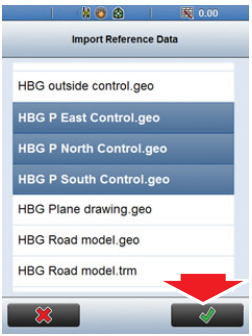
Select **Import** from the Home Menu. All data that is already loaded to the active project is displayed. Tap ⊕ to import further data. Select the type of data to import. Select from **Reference Data**, **Control**, **Coordinate System** or **Code List**.





In the next screen, define the **Source** to import data. All data that is available for import is displayed. Tap each list item to select it for Import. For certain file types, an additional screen allows you to edit the import options (see 2nd screen). Once the required data is selected, tap  to import. All selected data is imported, and available in the active project.

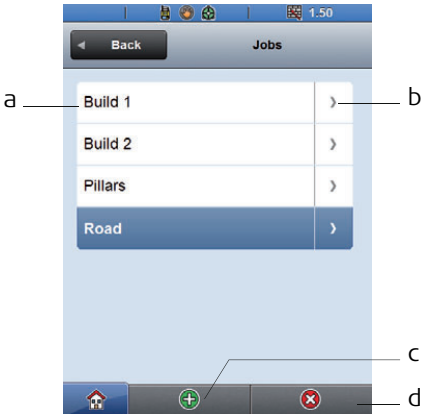




Jobs

Creating, editing, selecting and deleting jobs follows the same process as with projects. Tap **Jobs** in the Home Menu.

Jobs screen opens. The current active job is highlighted in blue.



a) Select job
b) Edit job
c) Create new job
d) Delete job

Key	Process
Select job	Selected job is automatically activated.
Edit job	Previously made settings can be edited and saved. Data can be activated.

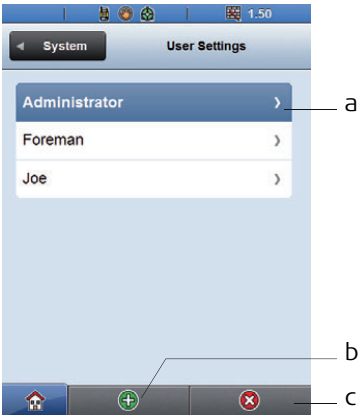
Key	Process
Create new job	Create new job Wizard. Available data can be activated here.
Delete job	Delete jobs.

Imported data can also be activated using Map View manager, refer to "2.3 Displaying Data".

2.2 User Profiles

User profiles

It is possible to create multiple users on the same device.
Tap **System** in the Home Menu. Select **Users**.



a) Edit user
b) Create new user
c) Delete user

Key	Process
Edit user	Previously made settings can be edited and saved.

Key	Process
Create new user	Create new user Wizard. ☞ New users can only be created by a user with **administrative rights**.
Delete user	Delete screen opens.

When creating a new user, the level of access can be defined. Permissions of the three user levels are as follows:

- **Administrator:**
  Complete functionality of the software. Can access all applications, and edit all data and settings.
- **Advanced:**
  Key functionality of software. Can access all applications, and edit majority of data and settings.
- **Basic:**
  Basic functionality of software. Can access major applications, and create/delete specific jobs. No other permissions.

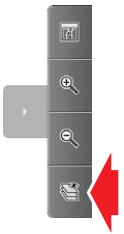
☞ To change the active user, logout using the power key in the Home Menu, then login as the relevant user.

☞ For any user profile, input the password "superagent" when logging in to enable administrator access rights for that profile.

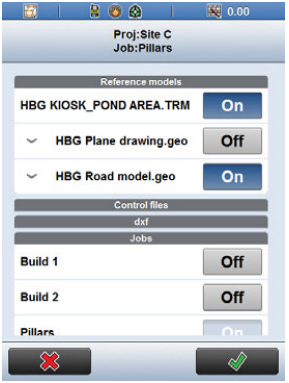
2.3 Displaying Data

Map View manager

Select **Map View manager** from the **Map handler**. The Map handler is displayed in all applications. All data loaded to the active project can be activated and displayed using Map View manager.



To select which data you would like displayed, toggle the **On/Off** key relevant to each data set.



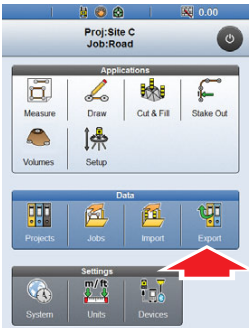
Map View manager only contains data loaded to the current active project. If further data is required, it must first be loaded to the active project.

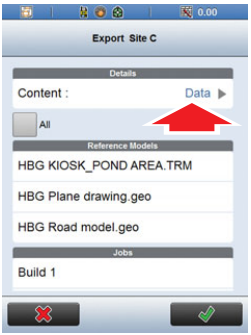
If codes are included in the imported data file, they can be accessed using a drop down arrow, and individually turned On/Off.

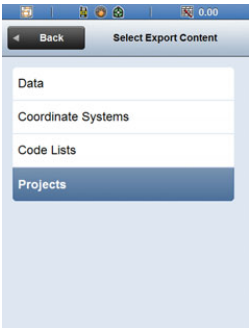
Exporting data

It is possible to export content to the internal memory, or to a connected storage device.

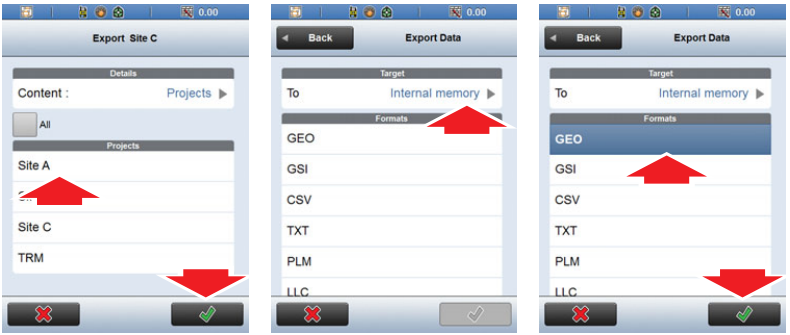
Select **Export** from the Home Menu. The Export screen is displayed. Define the content to be exported by tapping **Details**. Select from **Data**, **Coordinate Systems**, **Code Lists**, **Projects**.







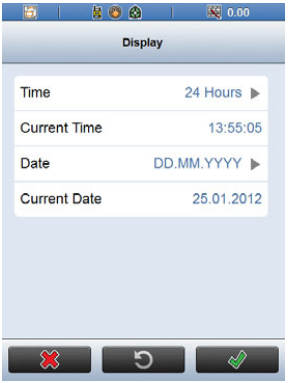
The relevant content available to be exported is then displayed in the screen. Tap each individual list item to select, then tap . It is possible to select multiple list items. In the following screen, define the destination of the exported content in **Target**. Select the file format to export, then tap . The content is exported as specified.



2.4 Settings

Date and time settings

To configure the date and time settings and basic display settings select **System** from the Home Menu. Then select **Display**.



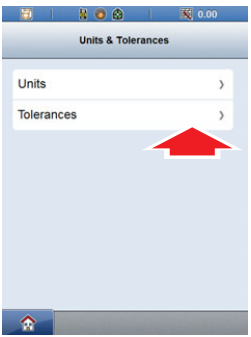
Element	Options	Description
Time format	24 Hours, 12 Hours	Selected format will be adopted throughout the application.

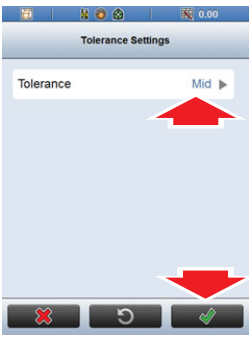
Element	Options	Description
Date format	DD.MM.YYYY, MM.DD.YYYY, YYYY.MM.DD	Selected format will be adopted throughout the application.

Tolerance settings

Tolerance settings can be altered in **Units**. Select **Tolerances**. In the Tolerance Settings screen, define the Tolerance level. Select from **Low**, **Mid**, or **High**.

Tap ✓ to save changes.



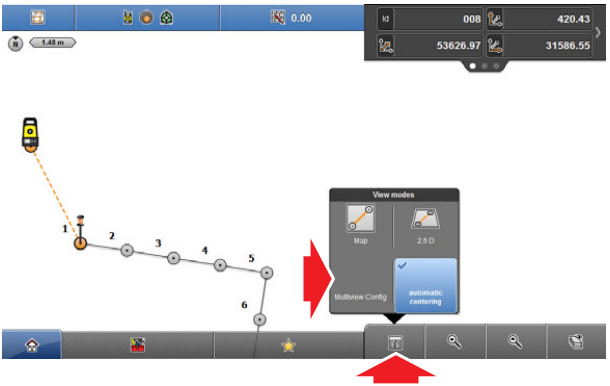


Adopted tolerance values differ according to the connected instrument, and the active application:

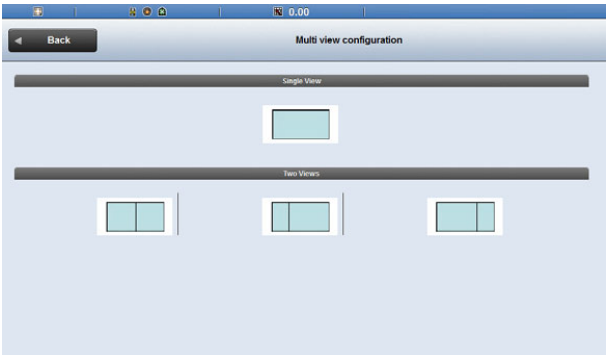
Tolerance level	GPS	Total Station Setup	Total Station Stake Out
Low	0.1 m	0.05 m	0.1 m
Mid	0.05 m	0.02 m	0.02 m
High	0.025 m	0.005 m	0.01 m

Multiview

In 7“ display mode, **multiview** is available in **View modes** in the Map Handler.



In the **Multiview configuration** screen, select the required View. The Map screen is then divided into separate screens.
To change the **active section**, tap in the relevant section. The Map handler zoom controls are effective in the active section.



3 Applications

Available applications

The following applications are available within iCON site:

- **Setup**
  Determine Total Station instrument orientation and station coordinates using Total Station measurements.
  Refer to "4 How to Setup a Total Station" for more information.
- **Base Setup**
  Establish a Base station to transmit position corrections to a rover.
  Refer to "5 How to Setup a GPS Base Station" for more information.
- **Coordinate System**
  Create a coordinate system for GPS measurements.
  Refer to "6 Create New Coordinate System" for more information.
- **Measure**
  Collect and display point and line information using the connected instrument.
  Refer to "7 How to Measure and Record Data" for more information.
- **Draw**
  Draw and display points, lines and arcs without a connected instrument.
  Refer to "8 How to Sketch a Plan" for more information.
- **Stake Out**
  Place marks in the field at predetermined points.
  Refer to "9 How to Stake Out" for more information.

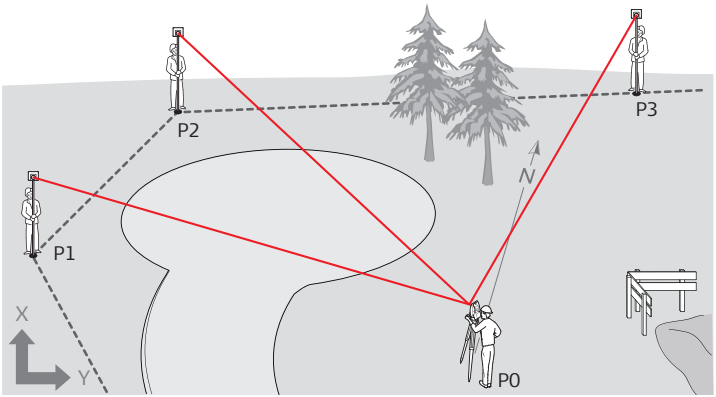
- **Cut & Fill**
  The heights of measured points are compared against the heights of a Terrain Model.
  Refer to "10 How to Stake Out Surfaces" for more information.
- **Volumes**
  Allows surfaces to be measured and volumes to be calculated from these surfaces.
  Refer to "11 How to Handle Volumes" for more information.

The following chapters explain how to use the different application programs.

4 How to Setup a Total Station

TPS

4.1 Setup Anywhere with Given Coordinates

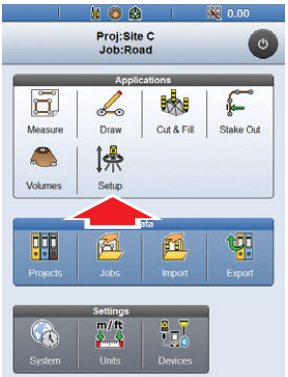


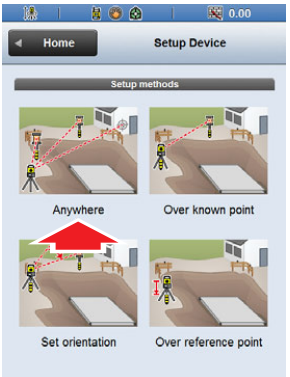
P0 Station (sought)
P1... Known points

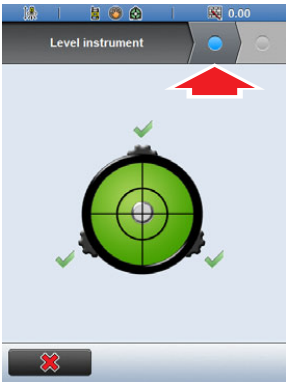
Given:

- Control points are active within the current job. Refer to "Importing data to the project", page 52.
- Instrument positioned anywhere on site.

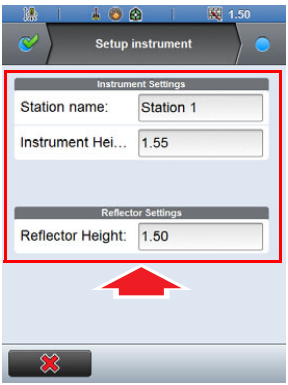
1 Select **Setup** from the Home Menu. Select **Anywhere**. Level instrument, then tap the next Wizard step to proceed.

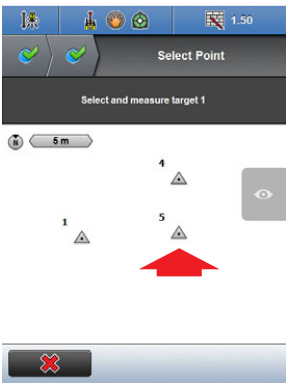


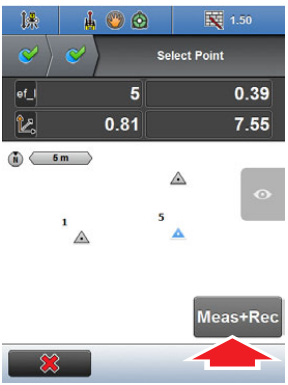




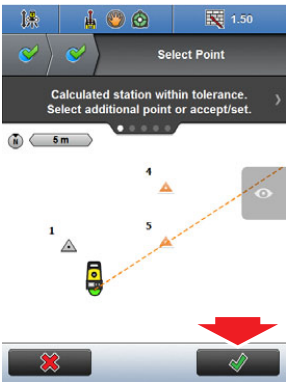
2 Enter **Station name**, **Instrument Height**, and **Reflector Height**. Proceed to the next step where the Map screen is displayed. Tap a point to select it as the first point to measure. Aim telescope to target point, then press **Measure**, then **Store**, or press **Meas+Rec**, if configured. Repeat for a second point.

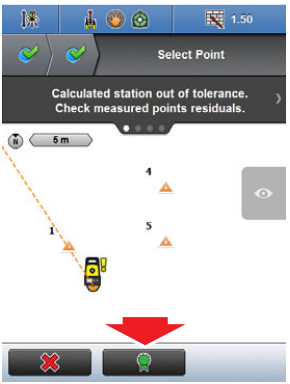


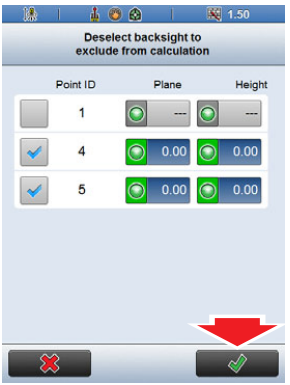




3 If the station is within tolerance, tap  to accept. To measure further points, tap the relevant point, then **Measure** and **Store**. When more than two points have been measured, the **Residuals** screen can be accessed, where inaccurate measurements can be removed. Tap  to accept station position.

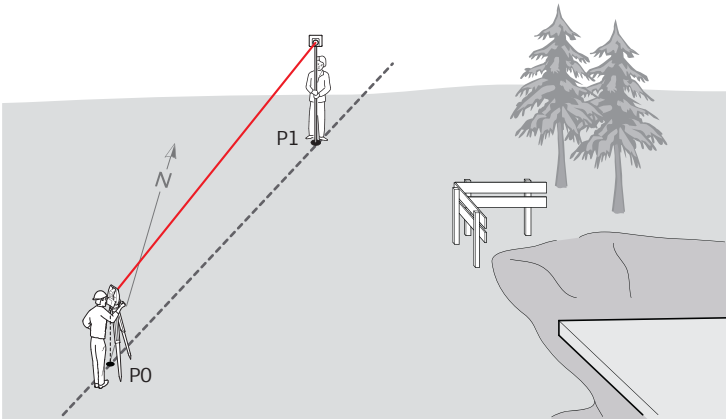






4.2 Setup over One Known Point with Second Known Point

TPS

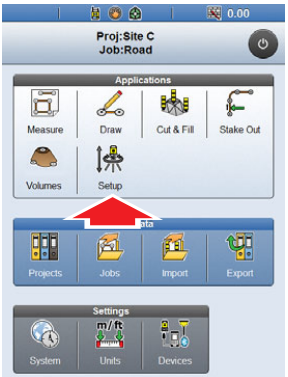


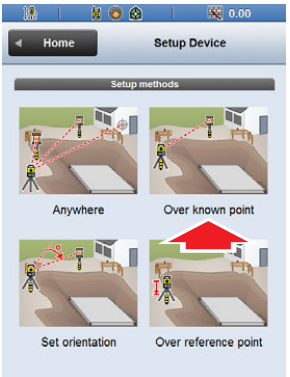
P0	Station (sought)
P1	Known point

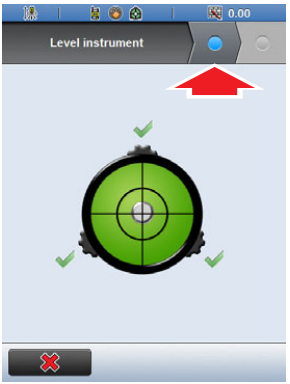
Given:

- Control points are active within the current job. Refer to "Importing data to the project", page 52.
- Instrument positioned over a known point.

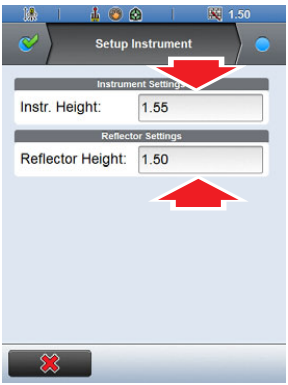
1 Select **Setup** from the Home Menu. Select **Over known point**. Level instrument, then tap the next Wizard step to proceed.

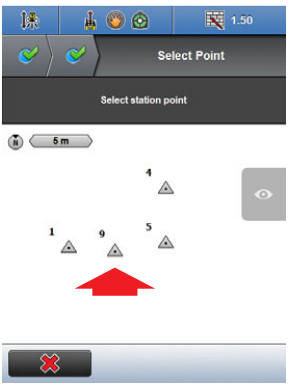


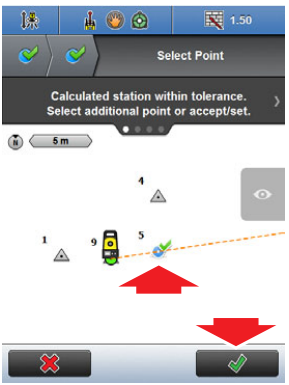




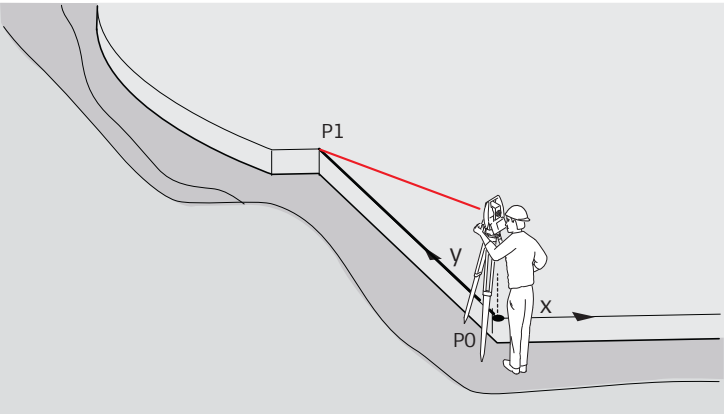
2 Enter **Instrument Height** and **Reflector Height**. Proceed to the next step, where the Map screen is displayed. Select the **Station Point**, and select a **Target Point**. Aim telescope to target point, then press **Measure**, then **Store**. If the station is within tolerance, tap  to accept. If out of tolerance, re-measure to the target point, or to a new target point.







4.3 Set Station Orientation

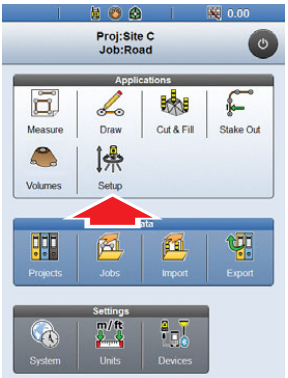


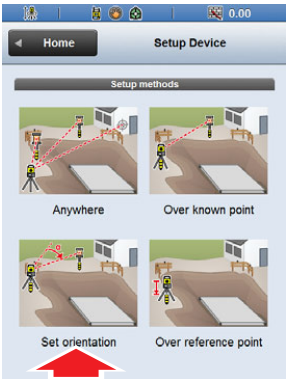
P0 Station
P1 Direction point

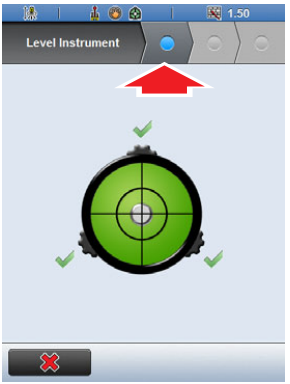
Given:

- Control points are active within the current job. Refer to "Importing data to the project", page 52.
- Instrument setup over a known point.

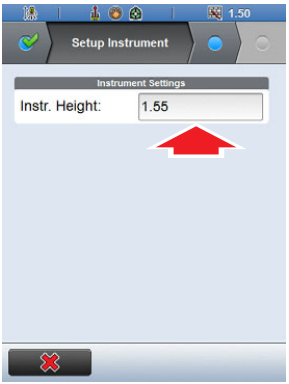
1 Select **Setup** from the Home Menu. Select **Set orientation**. Level instrument, then tap the next Wizard step to proceed.

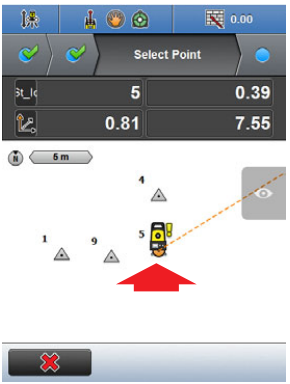


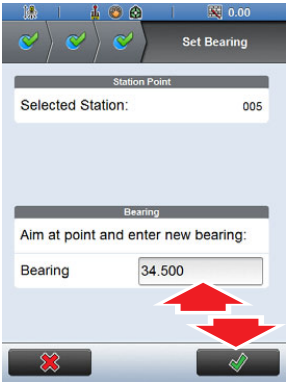




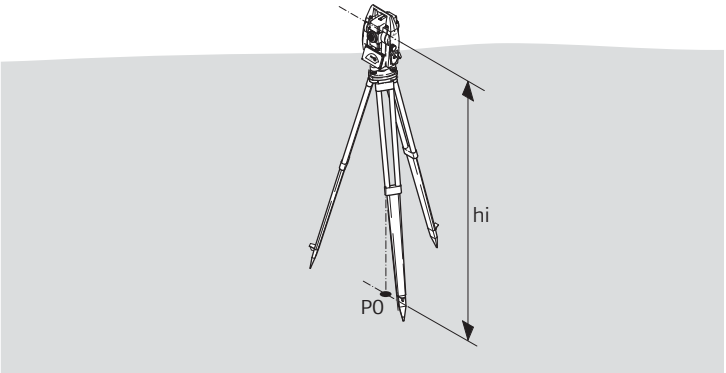
2 Enter **Instrument Height**, then proceed to the next Wizard step. Select **Station Point**, and tap the next Wizard step. Aim telescope in the required direction, and enter a bearing. Tap .







4.4 Transfer Elevation to Instrument Placed over Height Benchmark TPS

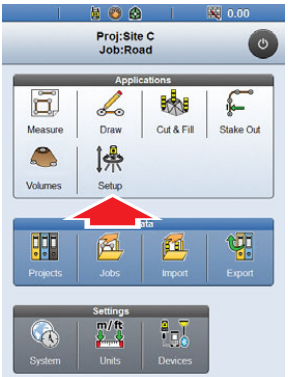


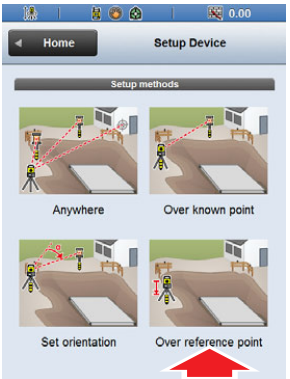
hi Instrument height
P0 Benchmark

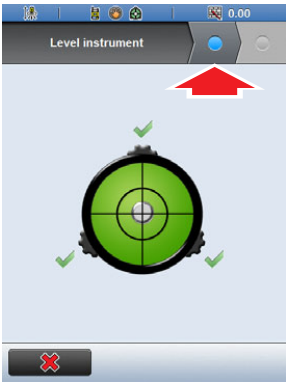
Given:

- Instrument placed over benchmark with given elevation.

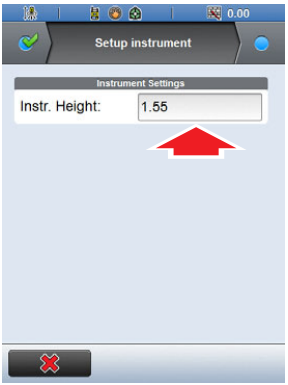
1 Select **Setup** from the Home Menu. Select **Over reference point**. Level instrument, then tap the next Wizard step to proceed.

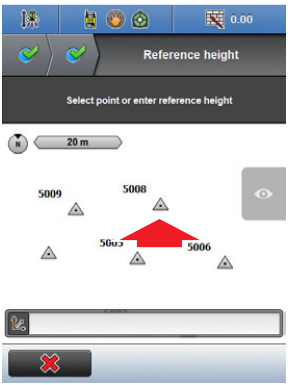


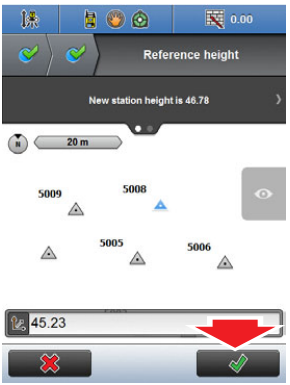




2 Enter the **Instrument Height**. In the next Wizard step, either select the relevant point from the map, or directly enter the height of the benchmark. Tap  to confirm. The new station height is set.





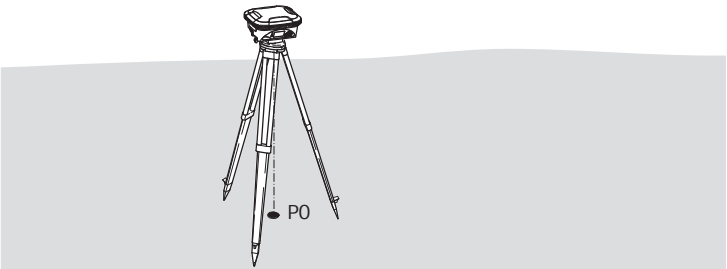


5 How to Setup a GPS Base Station

GPS

5.1 GPS Base Station Setup over Known Point

iCON GPS 60 requires a license to use this application.

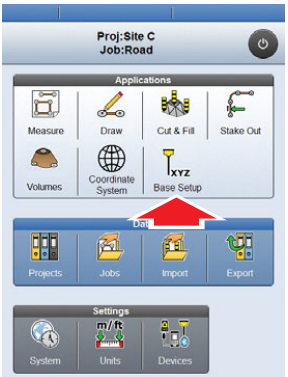


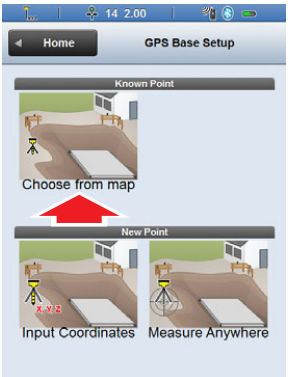
P0 Known point

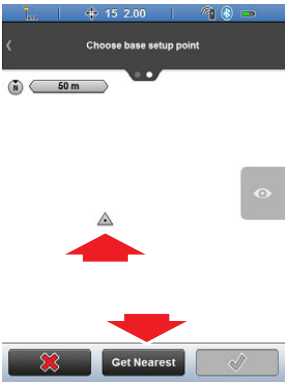
Given:

- Control points in the chosen coordinate system are active within the current job. Refer to "Importing data to the project", page 52.
- Instrument is setup with a Base profile. Refer to "1.5.2 GPS Profile Setup".
- A coordinate system is loaded to the project. Refer to "Importing data to the project", page 52.
- Coordinates must be available in WGS84.

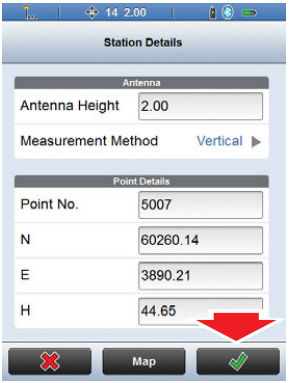
1 Select **Base Setup** from the Home Menu. Select **Known Point - Choose from map**. Tap a point in the Map screen. Alternatively, tap **Get Nearest** to display the closest points to the current antenna position. If there is only one point available, it is automatically selected.







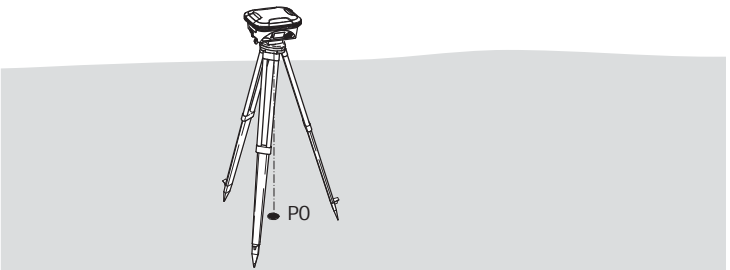
2 When the required point is selected, tap  to accept. The **Station Details** can then be reviewed and edited. Once  is pressed, the GPS Base Station starts transmitting corrections.



5.2 GPS Base Station Setup over New Point

GPS

iCON GPS 60 requires a license to use this application.



P0 Station (sought)

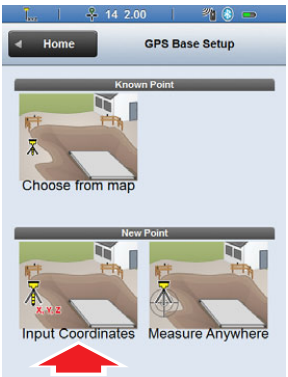
Given:

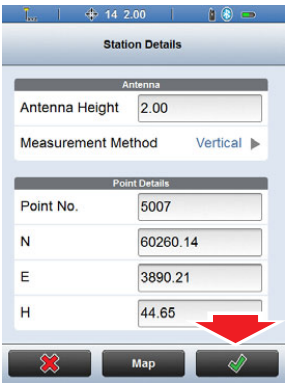
- Instrument is setup with a Base profile. Refer to "1.5.2 GPS Profile Setup" for more information.
- A coordinate system is loaded to the project. Refer to "Importing data to the project", page 52.

Two possibilities available: **Input Coordinates** or **Measure Anywhere**.

1 **Input Coordinates:**

Select **Base Setup** from the Home Menu. Select **New Point - Input Coordinates**. Enter the antenna and point information in the **Station Details** screen, tap ✓ to accept. Once ✓ is pressed, the GPS Base starts transmitting corrections.

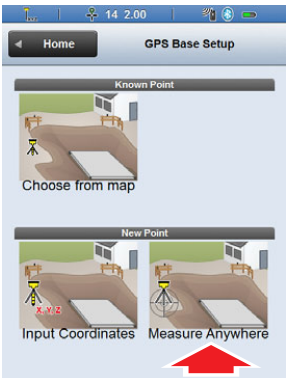


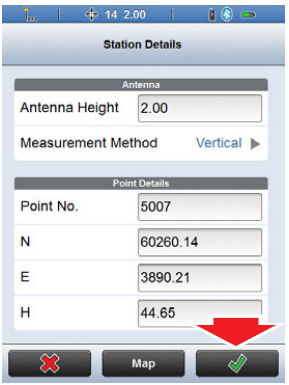


2

Measure anywhere:

From the **GPS Base Setup** Menu, select **New Point - Measure Anywhere**. Centre the antenna over the base point, and tap **Measure**. The **Station Details** screen is displayed. Check the information, and tap ✓ to accept. Once ✓ is pressed, the GPS Base starts transmitting corrections.

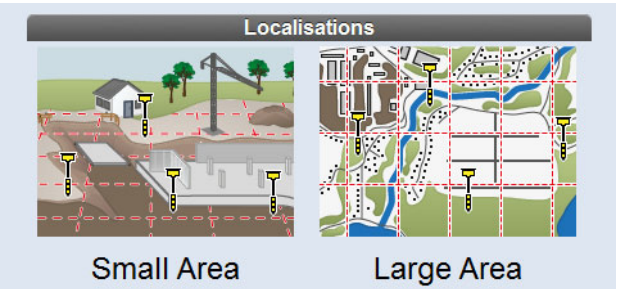




6 Create New Coordinate System

GPS

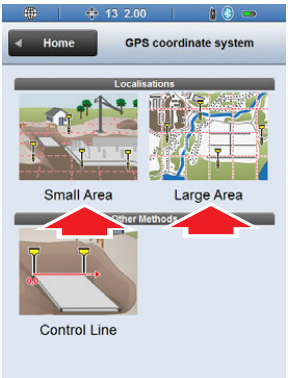
Measure points with known coordinates to create a coordinate system for use in either a **Small Area** (< 10 km^2) or a **Large Area**.

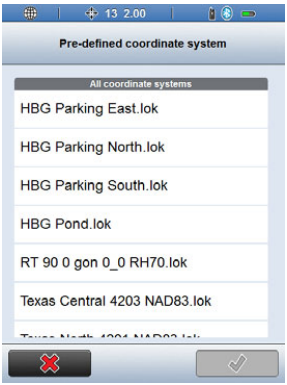


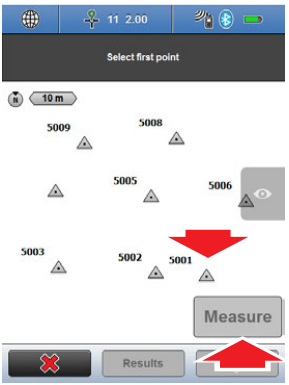
Given:

- Control points are active within the current job. Refer to "Importing data to the project", page 52.
- Instrument is setup with a Rover profile and has a Fixed position. Refer to "1.5.2 GPS Profile Setup".

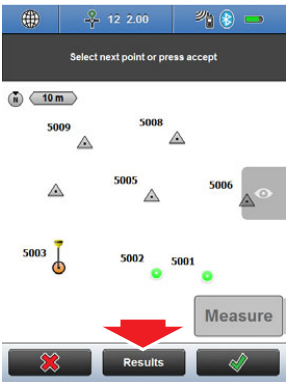
1 From the **GPS coordinate system** Menu, select **Small Area** or **Large Area**. The workflow is the same, except that for **Large Area** a predefined coordinate system must be selected (see 2nd screen). The Map screen is then displayed. In the Map screen, select the first point, then press **Measure**. Repeat for further points.







2 Tap **Results** in the Map screen to view Residuals for each measured point. Inaccurate measurements can be removed. Heights can be turned **ON** and **OFF**. Tap **Map** to return to the Map screen. Tap  to save changes and create the Coordinate System.



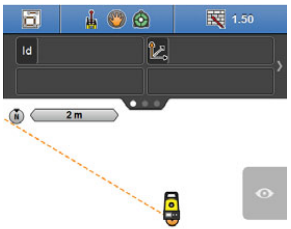
7 How to Measure and Record Data

TPS + GPS

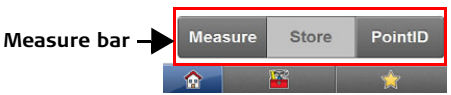
7.1 General Information

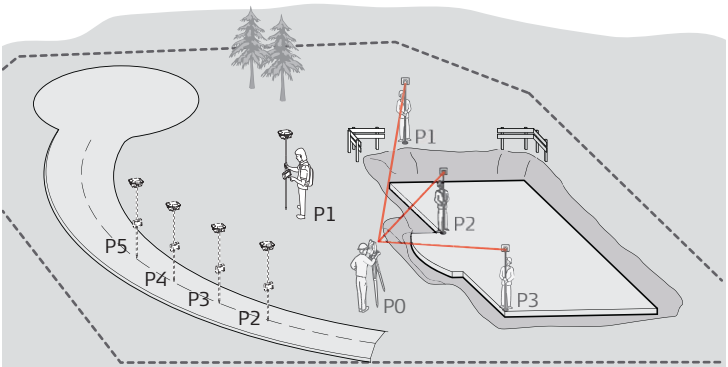
Measure is an application that records and displays point and line information obtained using the connected Total Station or GPS instrument.

Points, lines and arcs can be measured, recorded and displayed within the Map screen. Descriptions, codes, and IDs can be assigned to each element. All element information can later be exported to office software.



All measurements are performed using the **Measure bar**, which can be configured to display the commands you require. Refer to "Measure bar", page 24, for more information.
Commands can also be placed in the Favourites key. Refer to page 25 for more information.





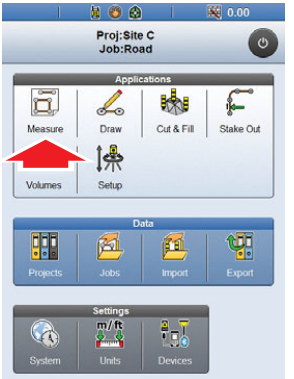
P0 Known station
P1... Target

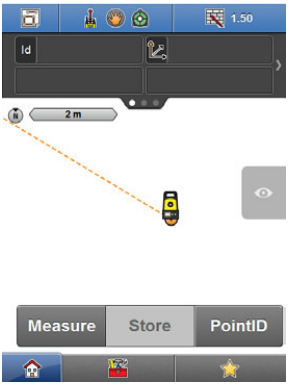
Given:

- Instrument is connected and setup.

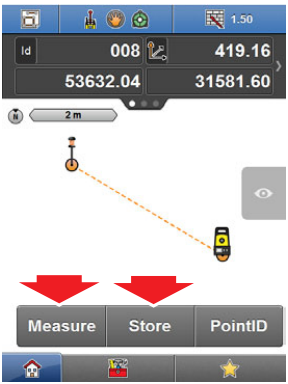
Note that main workflow refers to Total Station. For GPS press **Measure** to record a point.

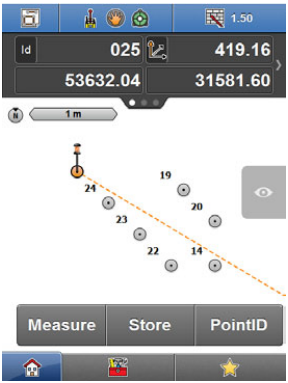
1 Select **Measure** from the Home Menu. Map screen is displayed.



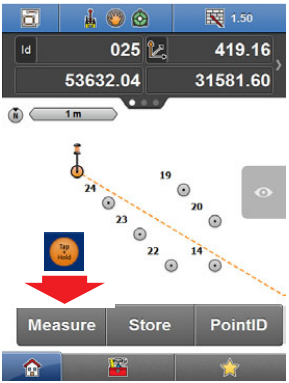


2 Sight target and press **Measure**. After measuring, press **Store** to store the point. Measure and store as many points as required.

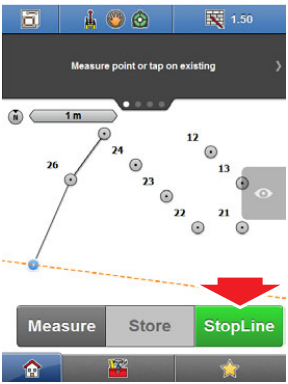




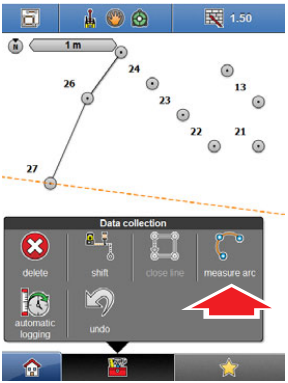
3 To create lines between points, **tap and hold** the Measure bar, and configure to display the **StartLine** function. Tap ✓ to accept.

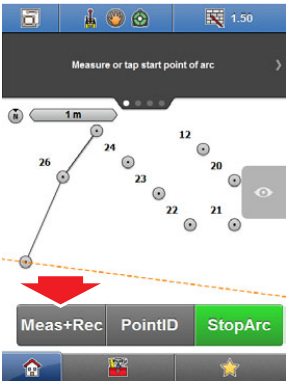


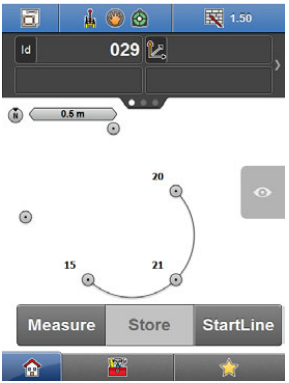
4 Press **StartLine**. Measure and store points. A line is drawn between the points. To disable the line function, tap **StopLine** in the Measure bar.



5 To create arcs from three points, select **measure arc** from the Toolbox. Measure and store three points. When the third point is stored, the arc is created.







To store points immediately after measuring, configure the Measure bar to contain the **Meas+Rec** key.

Define Measure Mode in the Status 1 menu.

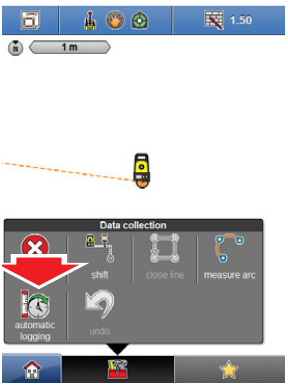
It is also possible to use existing points to create lines and arcs.

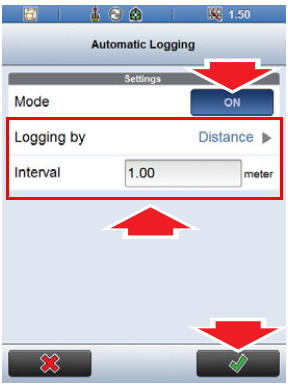
7.3 How to Store Points Automatically

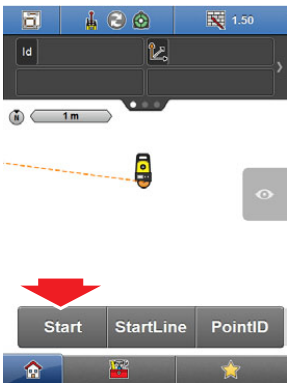
TPS + GPS

This feature is available when using a Robotic Total Station or GPS instrument.

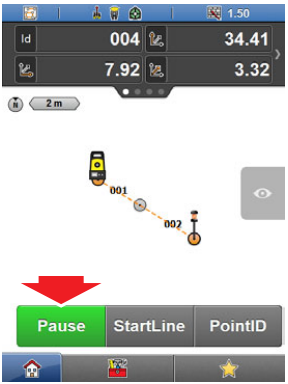
1 In **Measure**, select **automatic logging** from the Toolbox. In the Automatic Logging screen, set the Mode to **ON**. Select **Distance** or **Time** for the logging mode, and define the Interval. Tap to accept. Press **Start** in the Measure bar.







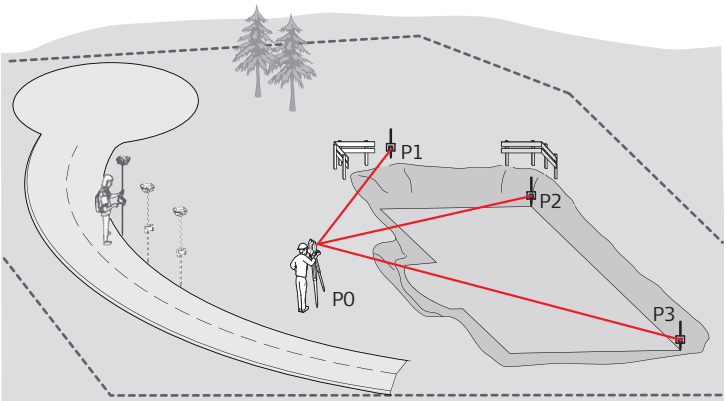
2 As the target position moves, points are automatically stored at the defined time/distance interval. Press **Pause** to temporarily stop storing points. To turn off automatic logging, set the mode to **OFF** in the Automatic Logging screen.



7.4 Descriptions, Point ID´s and Codes

TPS + GPS

7.4.1 Applying Descriptions and Point IDs to Measurements



P0 Known station
P1... Target

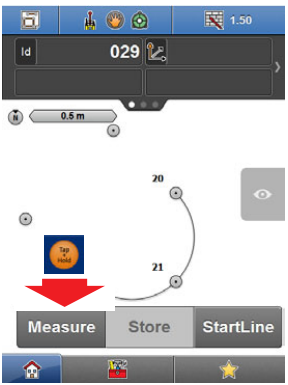
Given:

- Instrument is connected and setup.

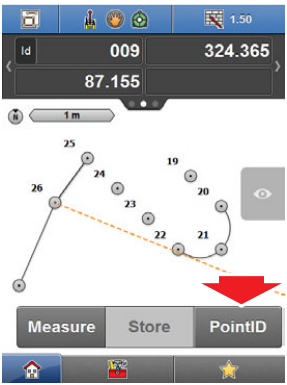
1 To enable the **PointID** function, **tap and hold** the Measure bar, and configure to display **PointID**.

Tap ✓ to accept.

☞ It is possible to add Point ID and other commands to the Favourites menu in the Navigation bar, by tapping and holding the specific key whilst in the Measure Bar Configuration screen.



2 Tap **PointID** to edit ID for the next point. Tap the **Description** arrow to enter a description. When finished, tap  to accept.



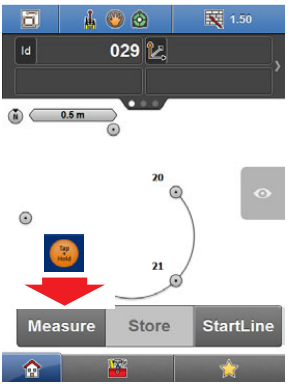
The next stored point will take the defined PointID. Further PointIDs will follow-on numerically.

To automatically recall this function for every measured/stored point, tap the **Prompt always** checkbox.

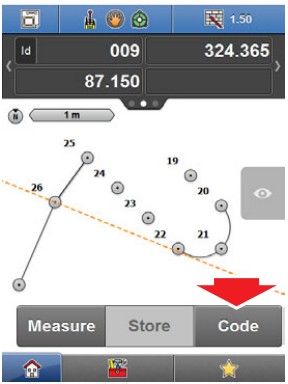
7.4.2 Defining Code for Each Stored Point

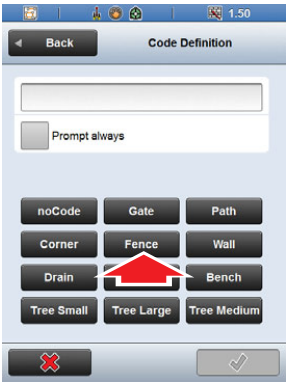
TPS + GPS

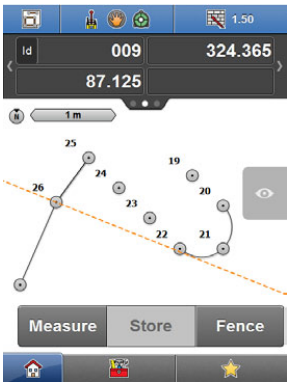
1 To define a code for specific points, configure the Measure bar to display **Code**. **Tap and hold** the Measure bar, select **Code** from the configuration screen, and tap ✓ to accept.



2 Tap **Code** in the Measure bar. Select a predefined code from the list, or define a new code in the text entry field. New codes are stored in the code list. The code key in the Measure bar displays the selected code.







The selected code is assigned to any points that are stored. To change the active code, tap the **Code** key, and select a predefined code, or define a new code.

To automatically recall this function for every measured/stored point, tap the **Prompt always** checkbox.

Refer to "Importing data to the project", page 52, for information about loading pre-defined Code Lists.

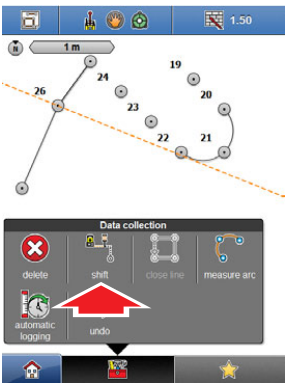
7.5 How to Shift Points

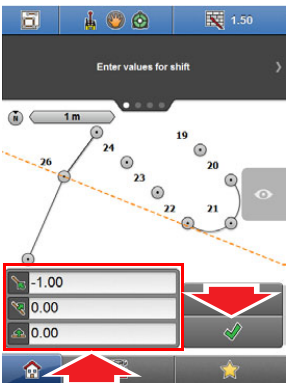
TPS + GPS

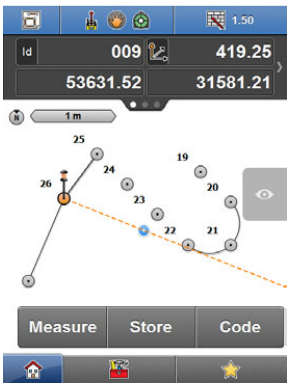
7.5.1 Shift Point

It is possible to shift the position of a measured point in all three dimensions.

Select **shift** from the Toolbox, and enter the Shift values in the displayed Toolbar. Tap ✓ to accept. The next measured point has the defined shift applied to it.



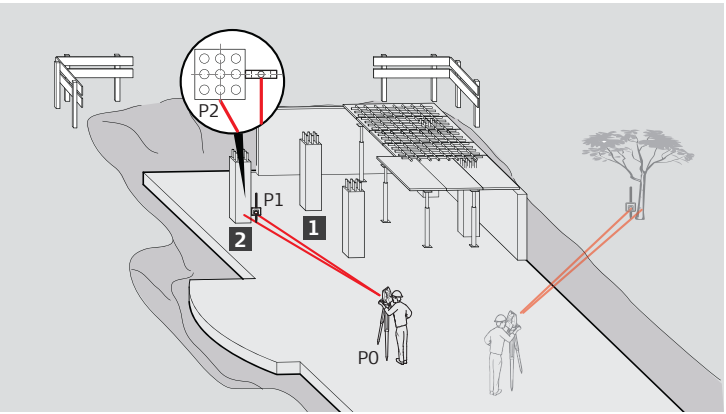




☞ These shift values will not be applied to further measured points.

☞ **TPS** only: Shift applies offsets in relation to the current Total Station orientation.

7.5.2 Measuring the Centre of Trees or Columns

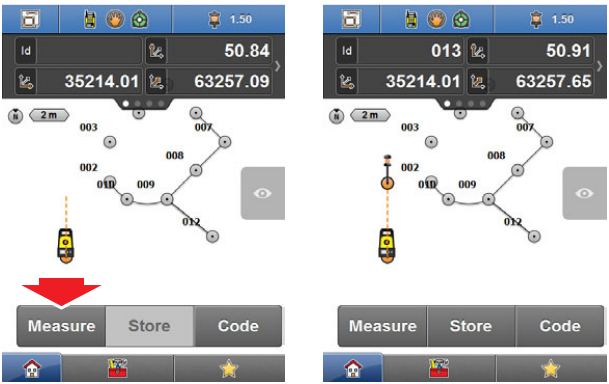


P0 Known station
P1 Target
P2 Centre point

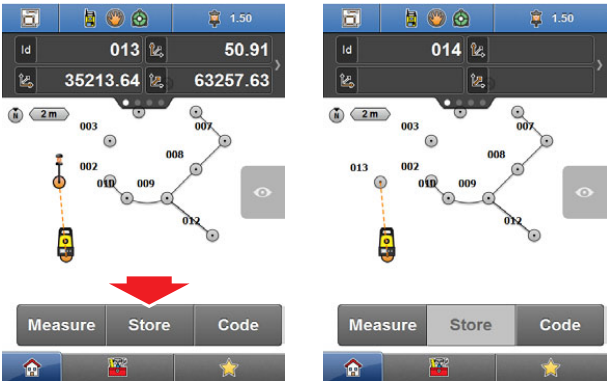
Given:

- Instrument is connected and setup.
- Map handler displays separate **Measure** and **Store** keys. **Tap and hold** Measure bar to configure accordingly.

1 Place prism next to tree or column, at the same distance as the centre, as shown in the illustration on the previous page. Sight prism and press **Measure**.



2 Turn instrument and sight the centre of the tree or column. Press **Store** to store the point with the new angle.

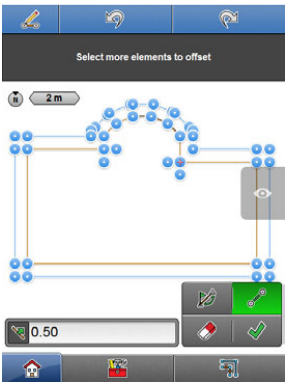


8 How to Sketch a Plan

8.1 Points, Lines and Arcs

Draw is an application that can be used without a connected instrument. Layout plans consisting of **points**, **lines** and **arcs** can be created, and these plans can then be used in another application to be directly staked out.

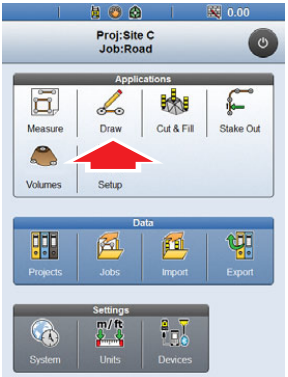
The following is a step-by-step guide to using some of the key functions in Draw to create a layout plan.

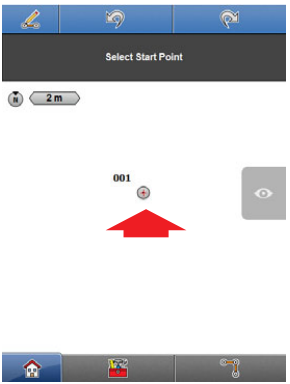


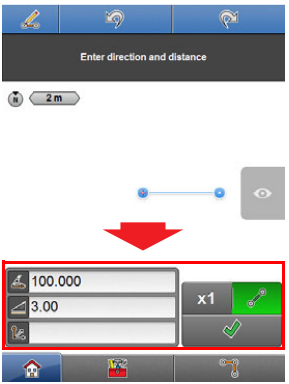
Example of a layout plan

No instrument connection is required.

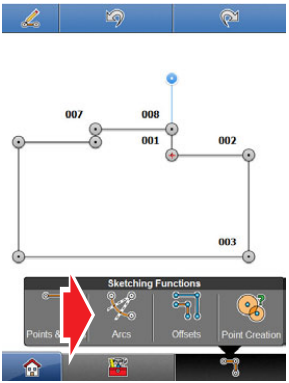
1 Select **Draw** from the Home Menu. If point data is present, tap a point to begin. Use the Toolbar to enter information for the position of the next point. Toolbar contains options to edit **angle**, **distance**, **height**, **multiple points**, and to **draw a line** between points. Tap  to confirm point position. The process can then repeat.

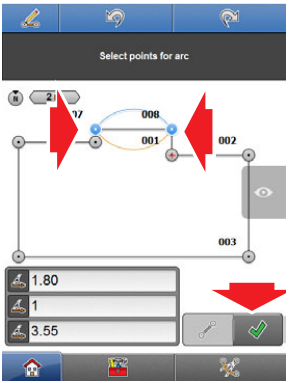


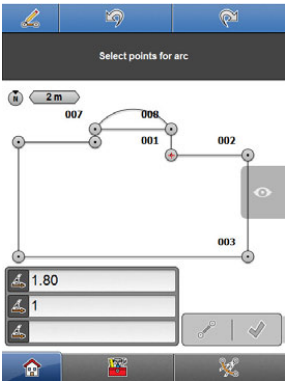




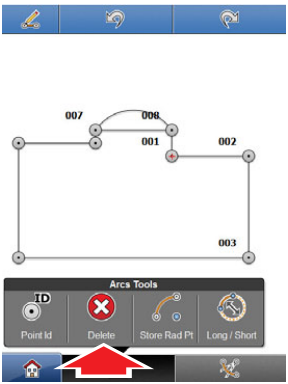
2 To draw an arc, select **Arcs** from the **Sketching Functions** menu. Tap the points for the arc. Arcs can be drawn by tapping **two points** and inputting **radius** information into the Toolbar, or tapping **three points**. Tap ✓ to store the arc.

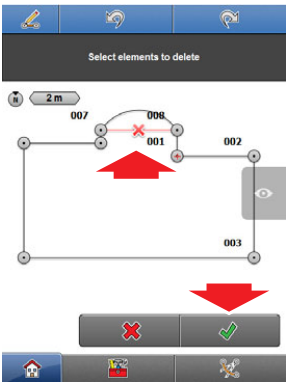


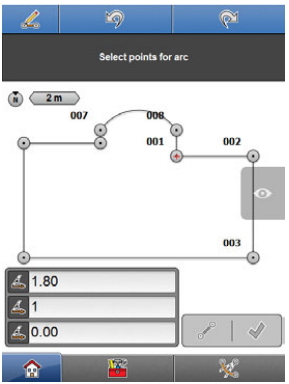




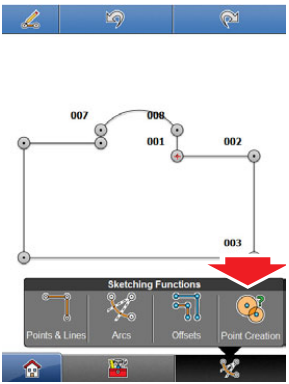
3 The **Delete** function is available in the **Toolbox**. Select the elements for deleting, then press .

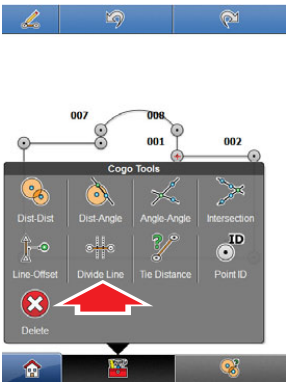


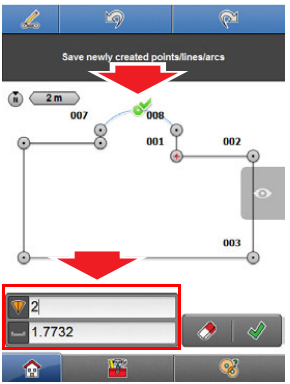


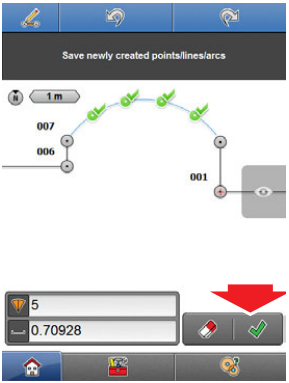


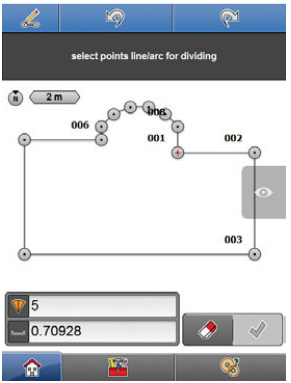
4 To distribute a number of points evenly along an arc/line, select **Point Creation** from the **Sketching Functions** menu, and then from the Toolbox select **Divide Line**. Select the line you need to divide, then input the **Number of Segments**, or alternatively the **Interval length**. Tap ✓ to confirm.



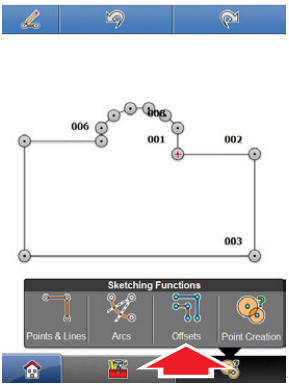


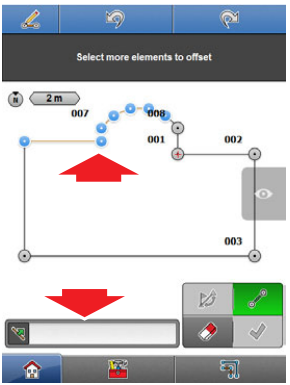


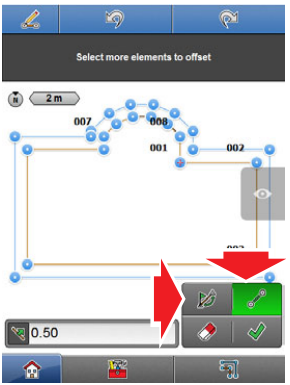

Save newly created points/lines/arcs
1 m
007
006
001
5
0.70928


select points line/arc for dividing
2 m
006
005
001
002
003
5
0.70928

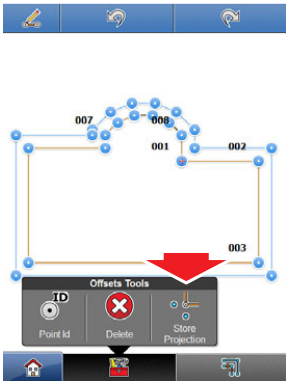
5 To create offset points for the sketch, select **Offsets** from the **Sketching Functions** menu. Select the points required for offset, then enter an **Offset** value. Enable or disable **draw line** as required. Use **flip** to switch the offset value from positive to negative.

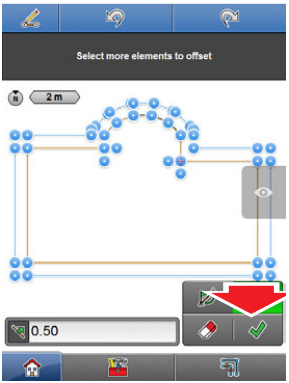






☞ **Store Projection**, which displays two points at each corner at perpendicular offsets, can be toggled **ON/OFF** by accessing the Toolbox. Tap ✓ to accept.



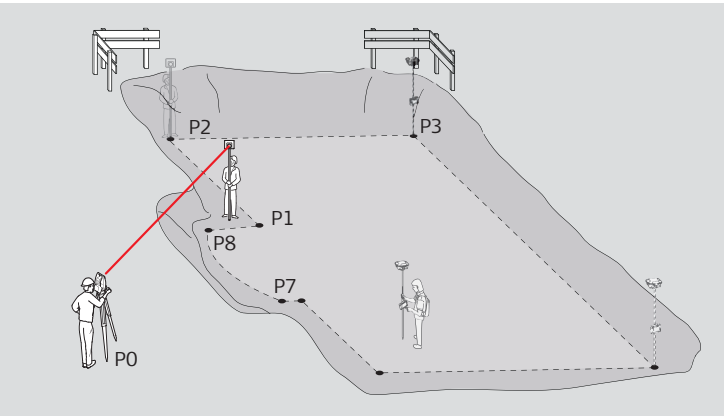


9 How to Stake Out

TPS + GPS

9.1 Staking Out

The Stake Out application is used to place marks in the field at predetermined points. These predetermined points are the points to be staked.



P0 Known station
P1... Point to be staked

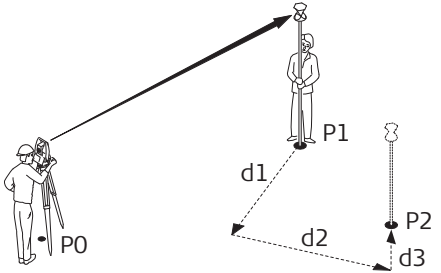
The points to be staked can:

- Be uploaded as a file to a project. Refer to "Importing data to the project", page 52, for more information.
- Be created within the Draw application, and accessed directly. Refer to "8 How to Sketch a Plan".

This chapter explains how to stake out points, lines, and arcs, using **GPS** and **Total Station**.

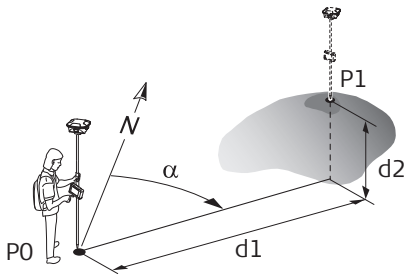
 For information about staking out Surfaces refer to "10 How to Stake Out Surfaces".

TPS



P0 Station
P1 Current position
P2 Point to be staked
d1 Stake out element
d2 Stake out element
d3 Stake out element

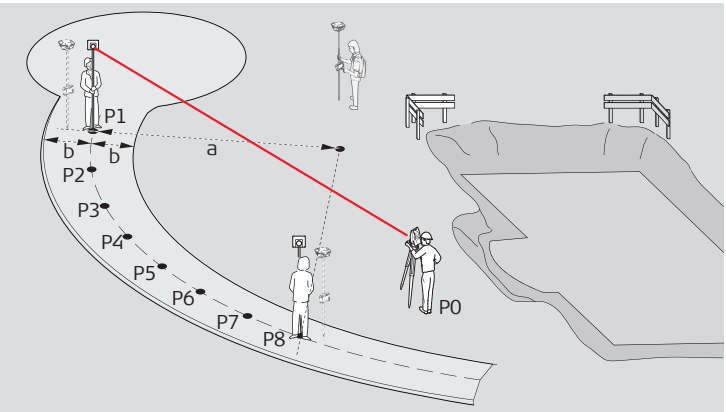
GPS



P0 Current position
P1 Point to be staked
d1 Stake out distance
d2 Height difference between current position and point to be staked
α Stake out direction

9.2 Stake Out Points

TPS + GPS



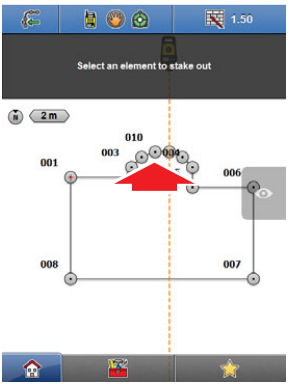
P0	Known station
P1...	Layout points
a	Radius
b	Offset

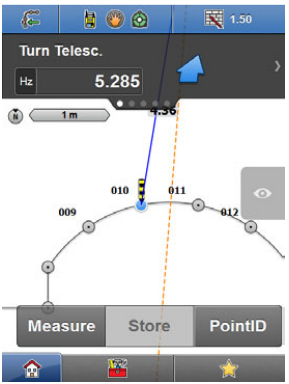
Given:

- Instrument is connected and setup with known station and height.
- Points are active within the current job. Refer to "Importing data to the project", page 52.

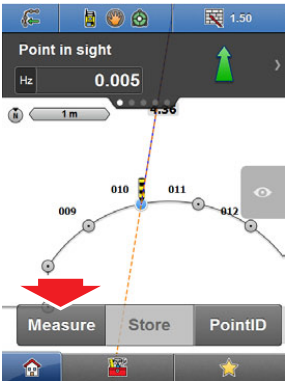
Note that main workflow refers to Total Station. For GPS press **Measure** to record a point.

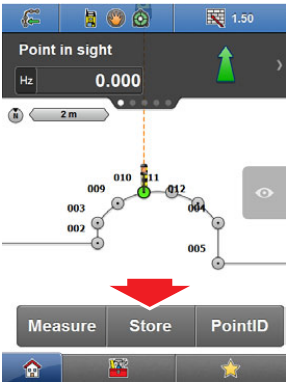
1 Select **Stake Out** from the Home Menu. Map screen is displayed. Select the point to stake, then follow the guidance to navigate the target to the point.

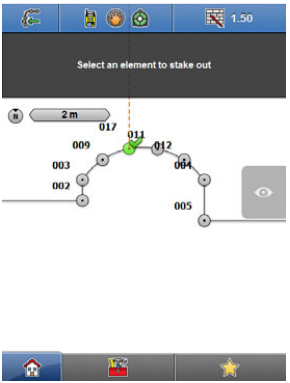




2 Once telescope is aimed to target point, press **Measure**. The difference between the measured point and the point to be staked is displayed. The colour of the measured point indicates whether it is within tolerance. Record the point by tapping **Store**, or measure again, using **Measure**. Once the location is marked, the next point can then be selected, and the process can repeat.







Define **Measure Mode** in the Status 1 menu.

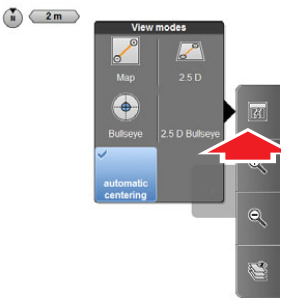
Tolerances can be set in **Units**, which is found in the Home Menu.

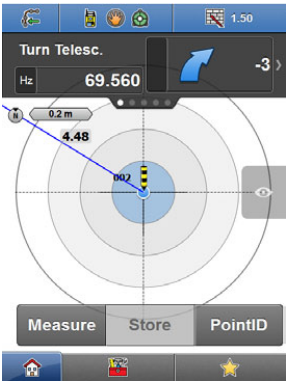
GPS and Robotic Total Station approach

As the target moves around, real-time measurement data and guidance information is constantly displayed in the **Information bar**. Once the point in the screen turns green, the point is staked within tolerance. To record points using the Total Station, press **Store**. If using GPS, press **Measure**.

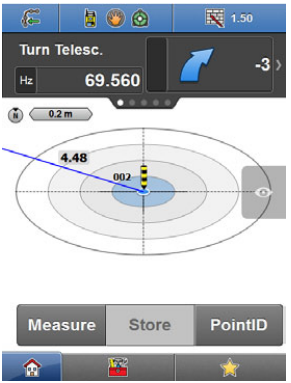
Changing the view

Access **View modes** in the Map handler to toggle between **Map** view, **Bullseye** view, **2.5D** view and **2.5D Bullseye** view. Bullseye and 2.5D Bullseye view display the pole position in relation the point to be staked. Target circles are displayed to visually indicate distance from the point.





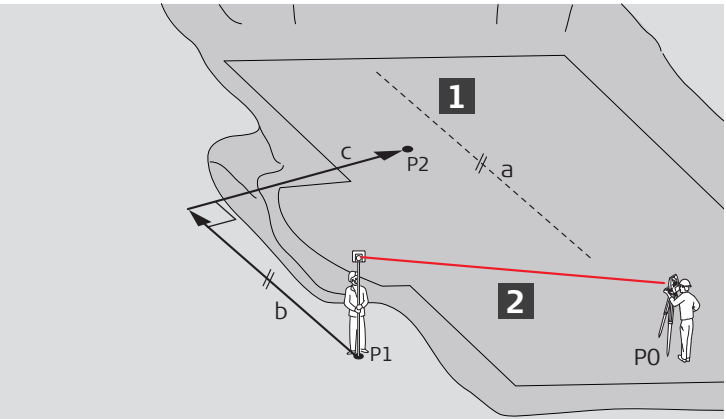
Bullseye view



2.5D Bullseye view

9.3 Stake Out Points with Reference to a Line

TPS + GPS



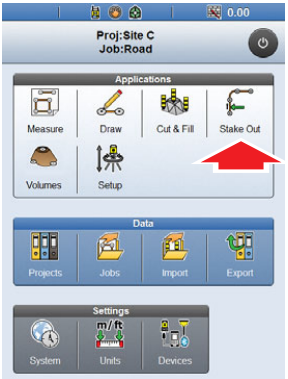
P0	Known station
P1	Measured point
P2	Point to be staked
a	Reference line
b	Line
c	Offset

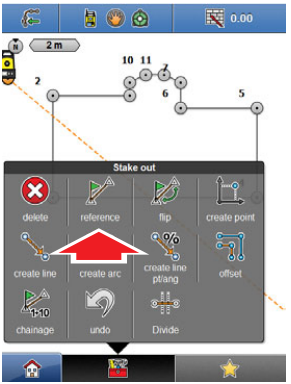
Given:

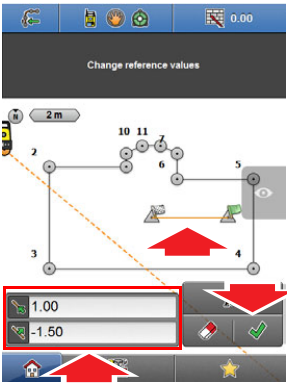
- Instrument is connected and setup with known station and height.
- Points are active within the current job. Refer to "Importing data to the project", page 52.

Note that main workflow refers to Total Station. For GPS press **Measure** to record a point.

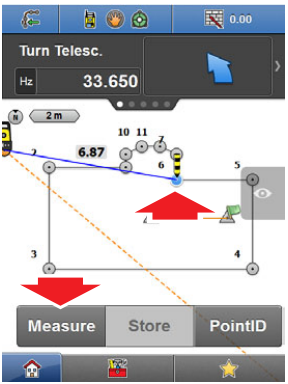
1 Select **Stake Out** from the Home Menu. Select **reference** from the Toolbox. Define the reference line, then use the Toolbar to define any offset for the line. Tap .

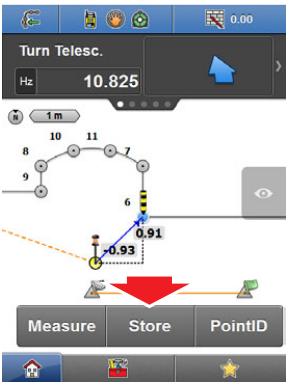






2 Select a point to stake, and then press **Measure**. The difference between the measured point and the point to be staked is displayed, with reference to the line that was defined. Once the location is marked (in the field) and stored, the next point can then be selected, and the process can repeat.



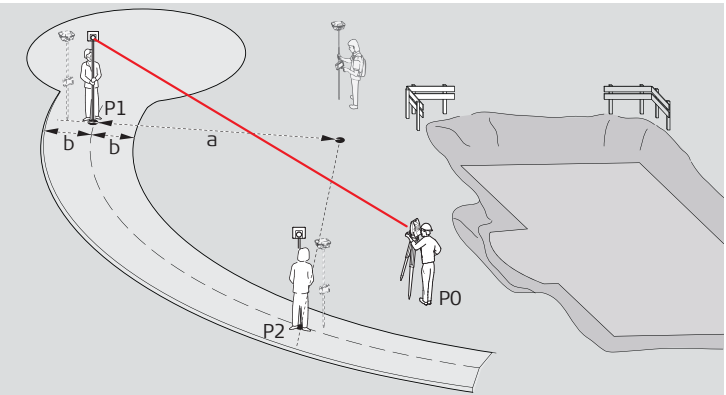


GPS and Robotic Total Station approach

As the target moves around, real-time measurement data and guidance information is constantly displayed in the **Information bar**. Once the point in the screen turns green, the point is staked within tolerance. To record points using the Total Station, press **Store**. If using GPS, press **Measure**.

9.4 Stake Out Lines and Arcs

TPS + GPS



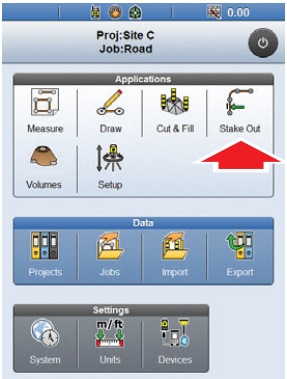
P0	Known station
P1...	Layout points
a	Radius
b	Offset

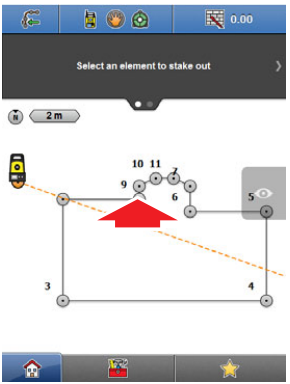
Given:

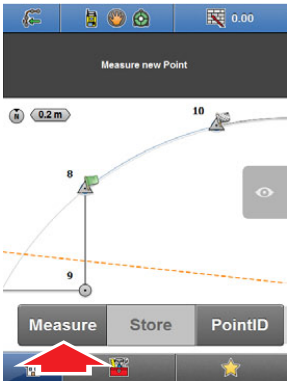
- Instrument is connected and setup with known station and height.
- Points/lines/arcs are available in the current job. Refer to "Importing data to the project", page 52.

Note that main workflow refers to Total Station. For GPS press **Measure** to record a point.

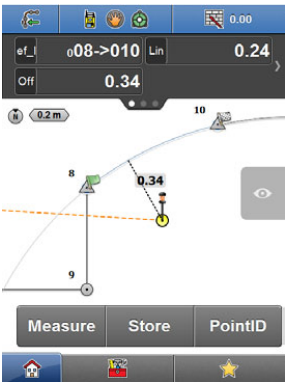
1 Select **Stake Out** from the Home Menu. Define or select the line/arc to stake by tapping the relevant elements. To change the direction of the line, select **flip**  from the Toolbox. Once the line is defined, press **Measure**.

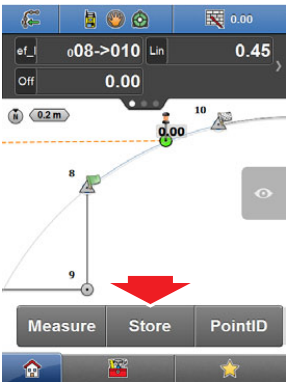






2 Once the target is within tolerance, it changes colour to green. Press **Store**. Mark the staked position (in the field). This process can repeat along the same line. To stake another line, tap the preferred line, and continue the process.





Define **Measure Mode** in the Status 1 menu.

GPS and Robotic Total Station approach

As the target moves around, real-time measurement data and guidance information is constantly displayed in the **Information bar**. Once the point in the screen turns green, the point is staked within tolerance. To record points using the Total Station, press **Store**. If using GPS, press **Measure**.

9.5 General Stake Out Toolbox Functions

TPS + GPS

Function	Description
Create point 	Insert a point into the map by entering the required coordinates. This point can then be staked.
Undo 	Undo previous action.
Delete 	Remove points/lines/arcs.
Create arc 	Tap points to create an arc to be staked.
Create line 	Tap points to create a line to be staked.
Reference 	Stake points with reference to a line.
Flip 	Switch the start point and end point of the active line.
Chainage 	Activates the use of chainages.
Divide 	Divide a line or arc into segments.

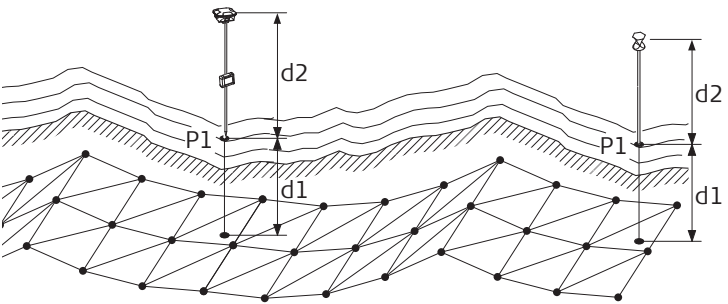
10 How to Stake Out Surfaces

TPS + GPS

A Digital Terrain Model (**DTM**) can be staked for height values. The heights of the measured positions are compared with the heights of the Terrain Model at the same position. The height differences are displayed in the Information bar in a **Cut**/**Fill** format.

Staking a Terrain Model can be used for:

- Staking out where the Terrain Model represents the surface to be staked.
- Quality control purposes, where the Terrain Model represents the final project surface.



P1 Point to be staked
d1 Cut/Fill
d2 Antenna / target height

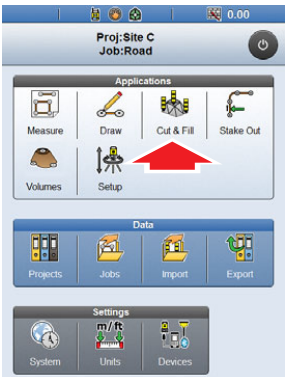
Given:

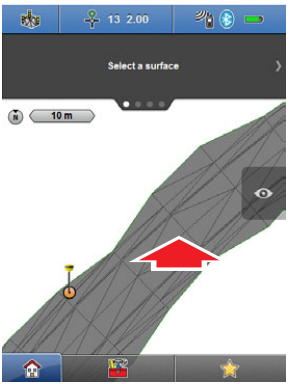
- Instrument is connected and setup with known station and height.
- Terrain Model active within the current job. Refer to "Importing data to the project", page 52.

The Cut/Fill procedure is the same as in the Stake Out application, except the heights to be staked are taken from the selected Terrain Model.

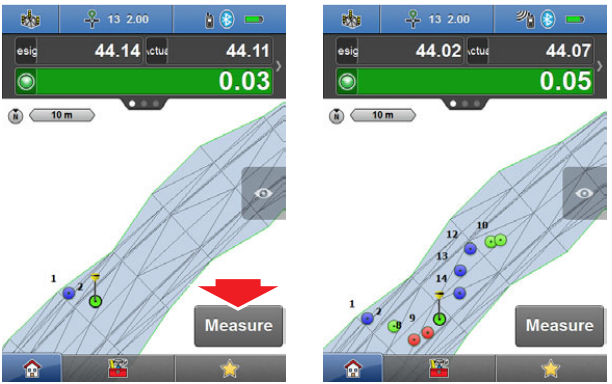
Note that main workflow refers to GPS. For Total Station, press **Measure**, then **Store**.

1 Select **Cut & Fill** from the Home Menu. Tap the required Terrain Model. As the pole moves across the surface, real-time measurement data is displayed in the Information bar.
The **Cut/Fill** value is colour coded, depending on whether the height is above-grade, below-grade, or on-grade, when compared with the Terrain Model. Refer to "Cut/Fill colour indicators", page 144, for details.





2 Record points by tapping **Measure**. The colour of the stored point indicates whether the point is **in** or **out** of **height tolerance**. The process can repeat.



The Cut/Fill tolerance level can be selected in **Tolerances**, which is found in **Units**.

Cut/Fill colour indicators

Indicator	Description
Cut 	Indicates the height measurement is above the surface design.
Fill 	Indicates the height measurement is below the surface design.
On Grade 	Indicates the height measurement matches the surface design.

Cut/Fill can be carried out in three ways:

- Manual Total Station
- Robotic Total Station
- GPS

If using **Manual Total Station**, the Information bar is updated after each point is measured.
If using Total Station in **Continuous Mode**, or if using **GPS**, real time measurement data is displayed automatically in the Information bar.

Toolbox functions

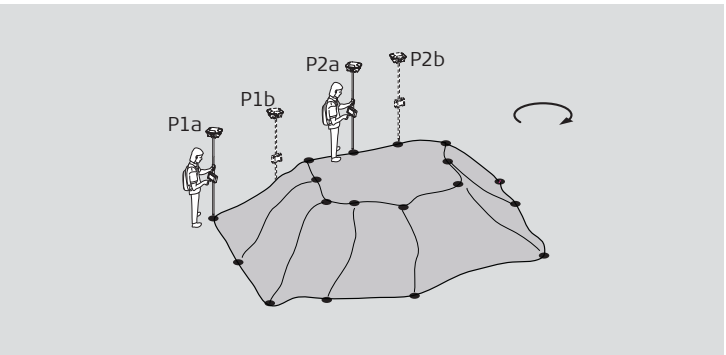
The Toolbox contains some additional functions.

Function	Description
Reference 	Stake out with reference to a line, which is defined by tapping elements on the screen. **Line and Offset** values are displayed in the Information bar. These values are derived from the North and East values of the line. The height value is derived from the height of the Terrain Model.
Offset 	Vertically offset the whole Terrain Model. **Cut/Fill** values in the Information bar are altered according to the offset applied.

11 How to Handle Volumes

TPS + GPS

11.1 Measure Volume and Make a Stockpile Calculation



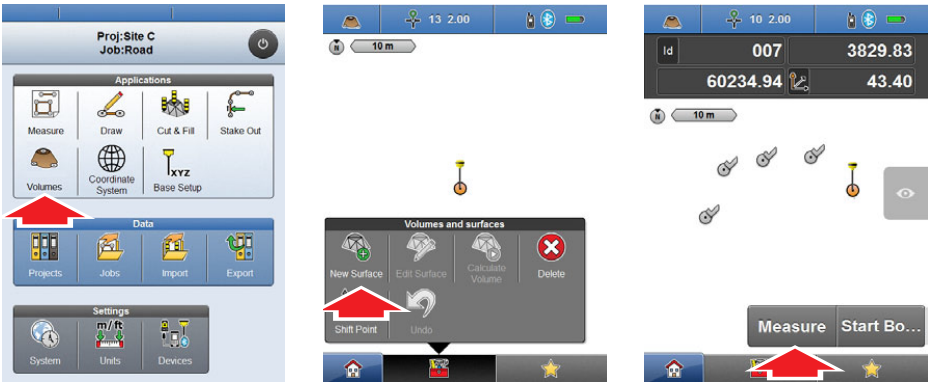
P1a.. Boundary point
P2a.. Surface point

Given:

- Instrument is connected and setup.

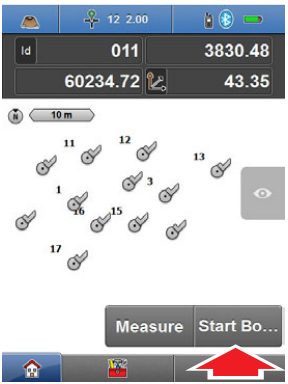
Note that main workflow refers to GPS. For Total Station, press **Measure**, then **Store**.

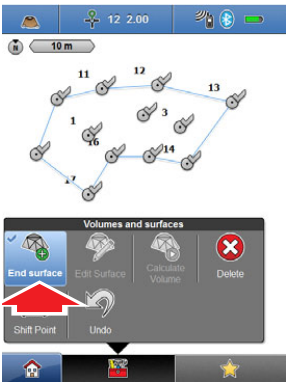
1 Select **Volumes** from the Home Menu. Select **New Surface** from the **Toolbox**. Press **Measure** to record as many points as required.



TPS only: To setup the instrument in a second location in order to measure further points, tap the **Setup** key in the Navigation bar. The Station Setup screen opens. Refer to "4 How to Setup a Total Station" for information about station setup. After the station setup is complete, the Volumes application automatically returns, and measuring can be resumed.

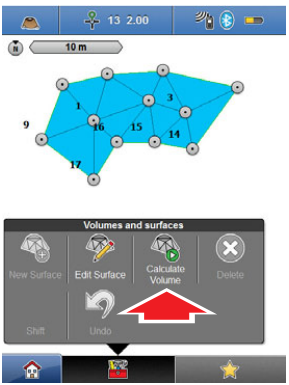
2 If a Boundary is required, select **StartBo**undary in the Measure bar. Tap relevant points on screen to connect all boundary points. Close the boundary by tapping the first boundary point again, then tap **StopBo**undary. The Terrain model is applied to all points within the boundary. Finish surface creation by tapping **End surface** in the Toolbox.

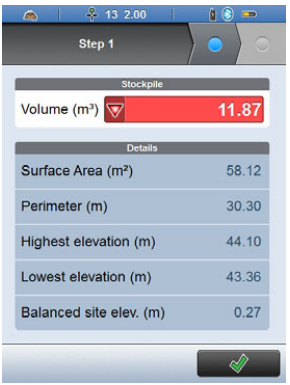


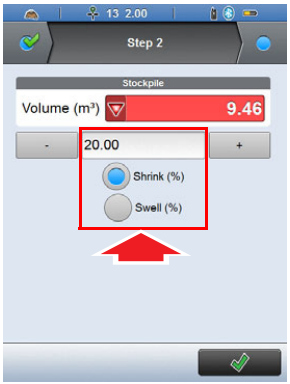


It is possible to activate **StartBo**undary before measuring boundary points. After boundary points are measured, press **StopBo**undary. All surface points can then be measured.

3 Once the surface is defined, select **Calculate Volume** from the **Toolbox**. Select **Stockpile**, and tap ✓ to accept. The Volume Calculation Wizard begins. Step 1 displays the volume of the selected surface, along with measurement data. In Step 2, calculate the new volume based on a percentage **Shrink** or **Swell** of the selected surface. In Step 3, the calculation can be saved.

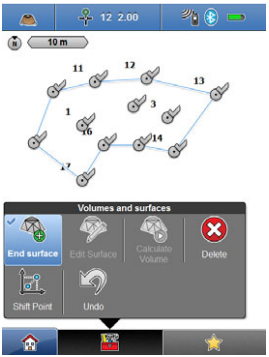


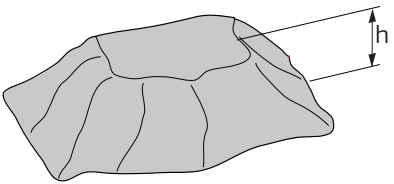




11.2 Calculate Volumes to an Elevation

TPS + GPS



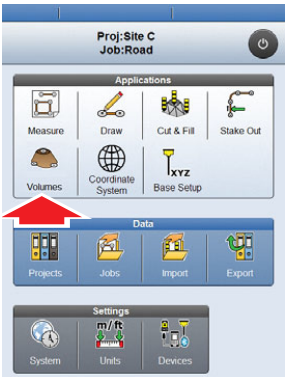


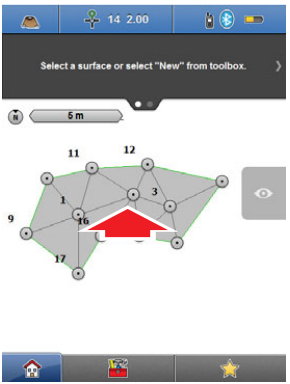
h Elevation

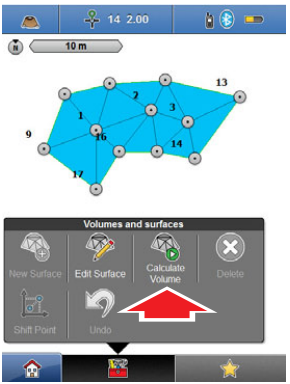
Given:

- Surface file available in active job. It can be either previously created in the Volumes application (refer to "11.1 Measure Volume and Make a Stockpile Calculation", steps 1 & 2), or imported as a reference. Refer to "Importing data to the project", page 52.

1 Select **Volumes** from the Home Menu. Tap the displayed surface to select it. Select **Calculate Volume** from the **Toolbox**.

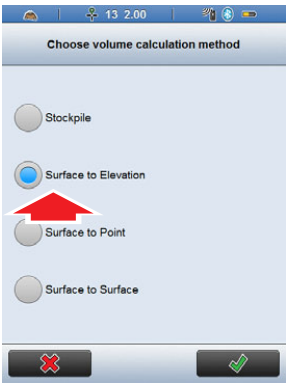


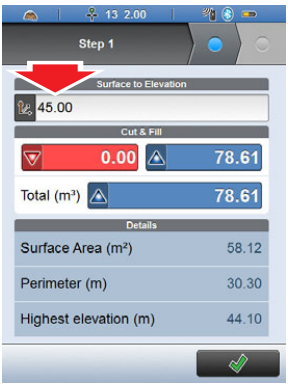


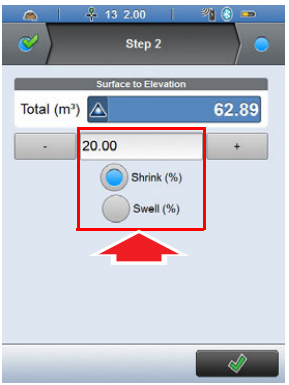


To display different surfaces use **Map View manager**, refer to page 59.

2 Select **Surface to Elevation** in the Calculation Method screen. The Surface to Elevation Wizard begins. In Step 1, input the desired elevation. The volume is recalculated according to the new elevation. In Step 2, calculate the new volume based on a percentage **Shrink** or **Swell** of the selected surface. In Step 3, the calculation can be saved.







Select **Surface to Point** as a volume calculation method to calculate the volume according to the height value of a specific point.

Select **Surface to Surface** as a volume calculation method to calculate the volume between two separate surfaces. The calculated volume is based upon where the two surfaces overlap.

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Leica Geosystems AG
Heinrich-Wild-Strasse
CH-9435 Heerbrugg
Switzerland
Phone +41 71 727 31 31

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