Leica Geosystems campus

- when it has to be right

Leica Geosystems

Leica Geosystems - System Viva Quick Guide
Reference Plane and Grid Scan

The Reference Plane and Grid Scan guide covers the following.

1. Measure to Reference Plane discussing using a Local or Global coordinate system. The plane is defined using points previously measured
2. Grid Scan to a plane, defining the plane by surveying new points and defining a rectangular scan area.
3. Grid Scan to a surface, defining the scan area using a polygon.

NB: Some functions are interchangeable between the tasks but to avoid repetition the tasks have been written using different methods of definition.

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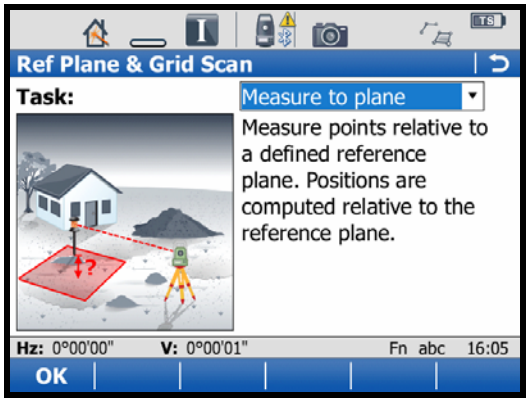
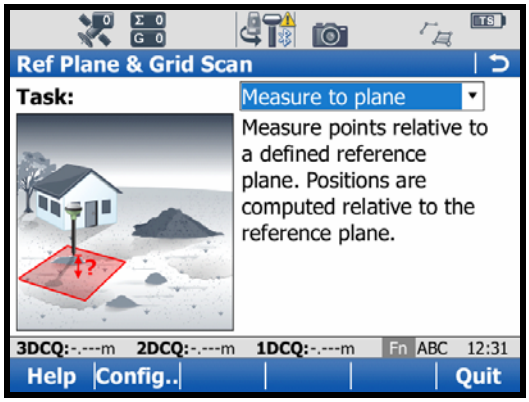
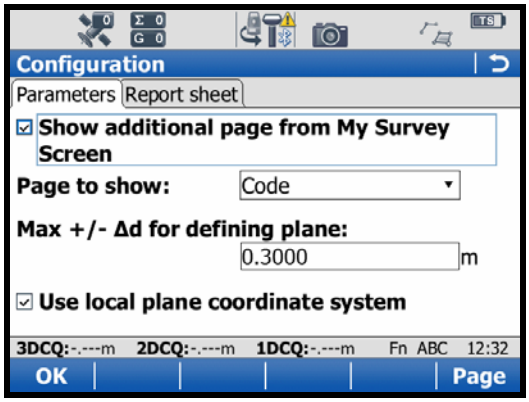
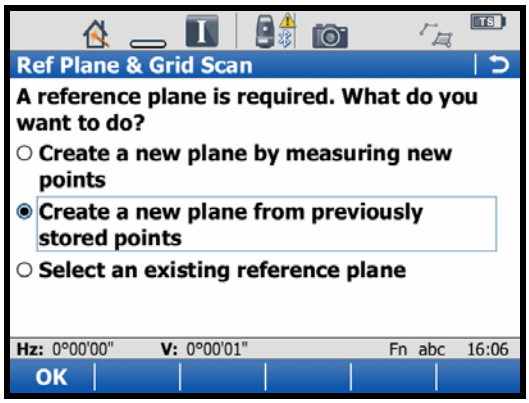
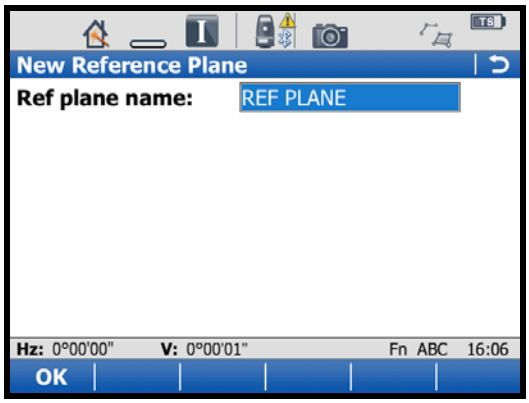
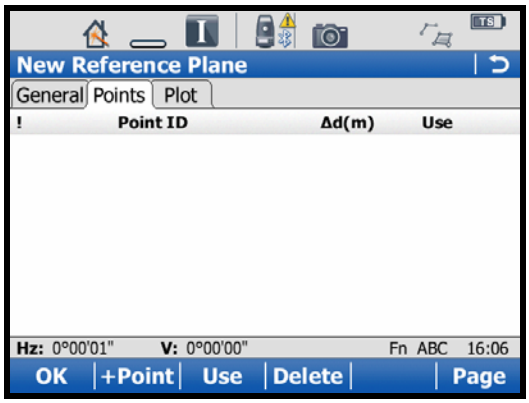
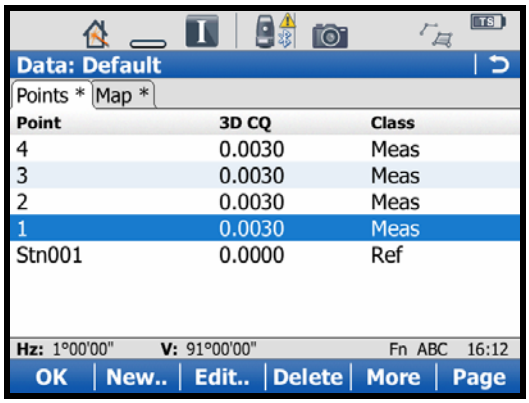
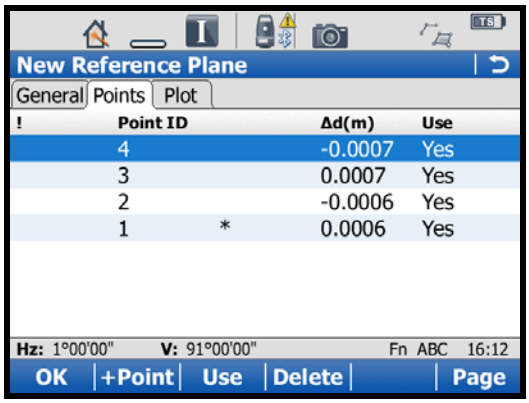
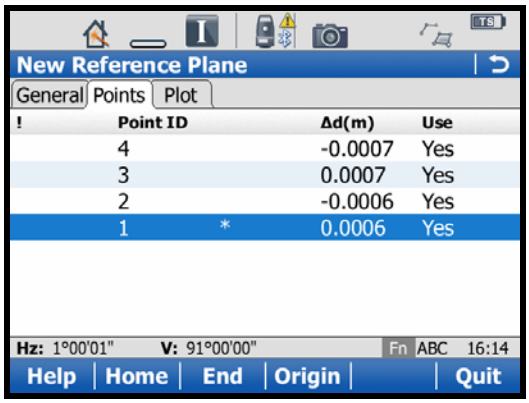
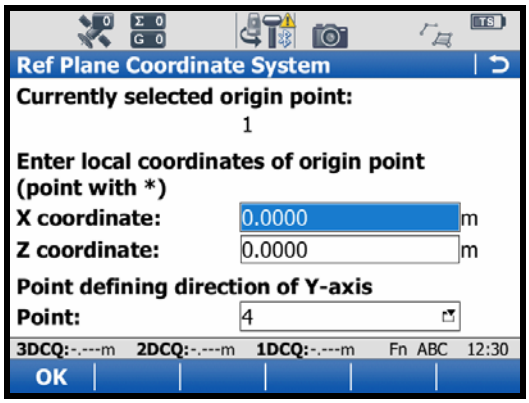
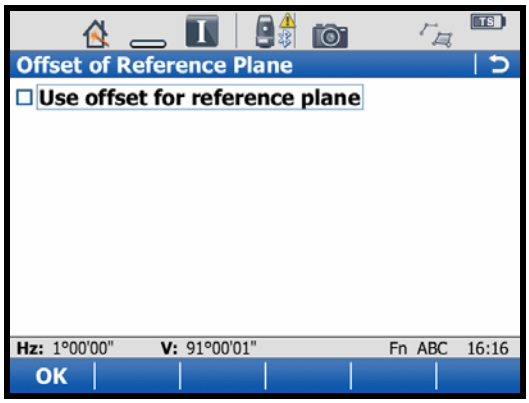
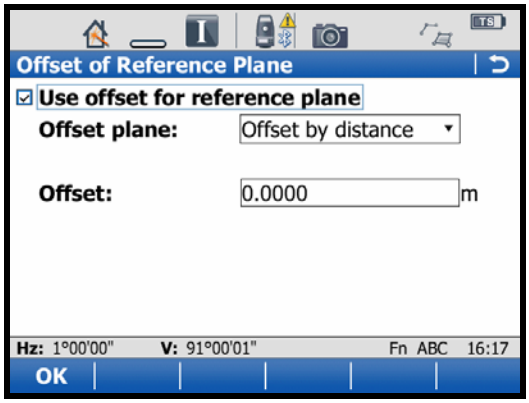
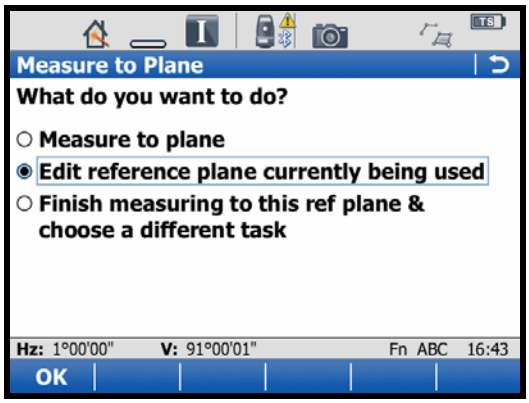
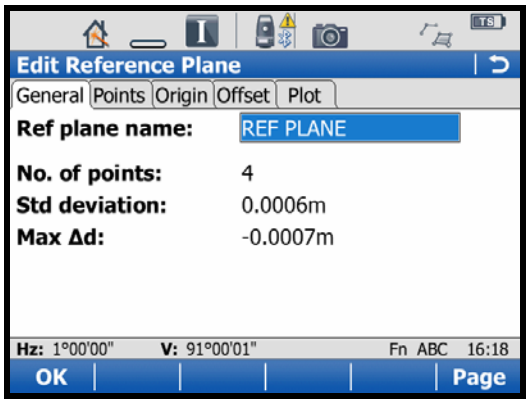
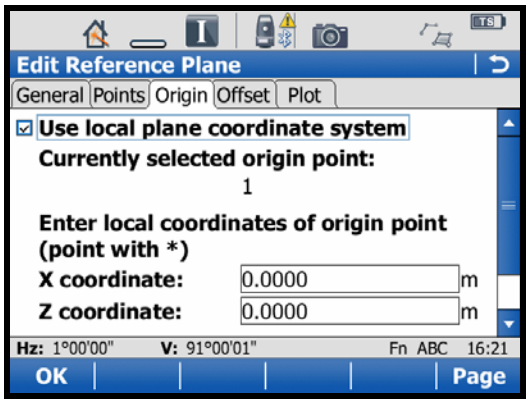
- Reference Plane and Grid Scan
  - Measure to a plane

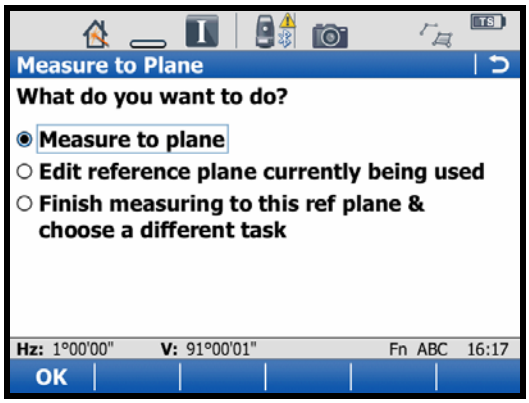
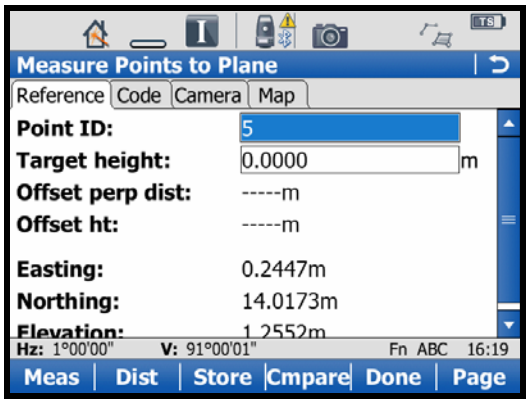
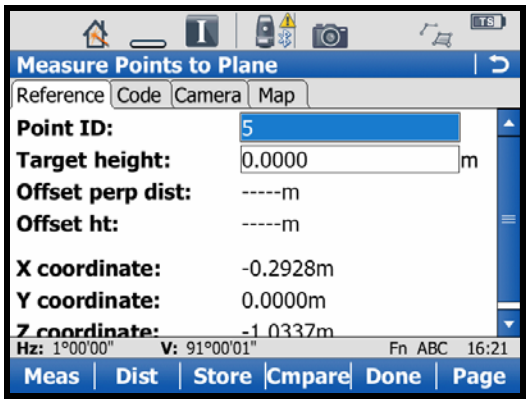
Step	Instruction	Screenshots
1.1	Select 1. Go to Work! > 4 Survey+ > 1 Ref Plane and Grid Scan. Select Measure to plane and F1 OK (To edit so of the settings for the program press the FN key)	
1.2	Then press F2 Config	
1.3	This allows the user to add an additional display screen to the application from the survey application. Set a tolerance for how well the points defining the plane fit to it Whether to use a local coordinate grid (tick) or be in the same grid as the instrument setup (untick)	

Step	Instruction	Screenshots
1.4	Choose the option that suits. In this case select the option to Create a new plane by from previously measured points. F1 OK	
1.5	Give the reference plane a name. F1 OK	
1.6	In the point tab select F2 +Point.	

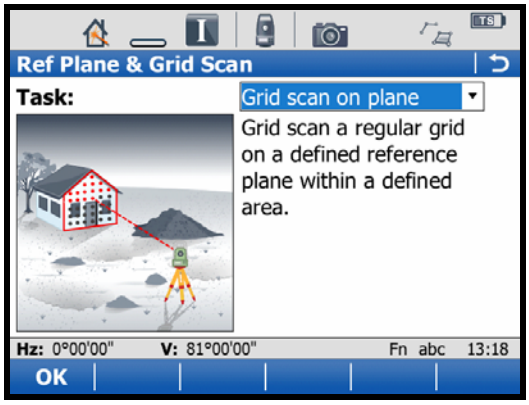
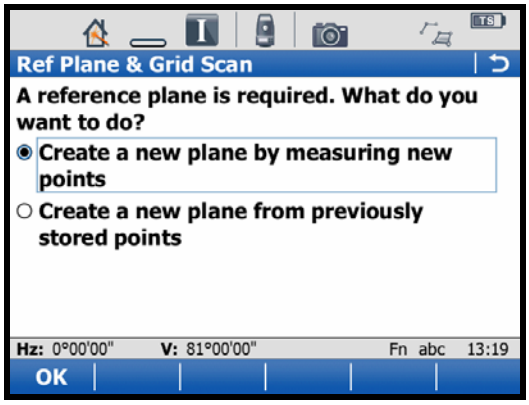
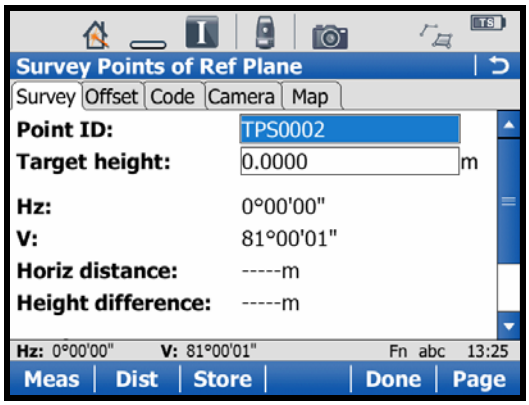
Step	Instruction	Screenshots
1.7	Select the point from the list of points available. Click on F1 OK to select the highlighted point. NB: These can be previously measured or keyed into the active working job.	
1.8	Repeat steps 1.4 and 1.5 until the reference plane is defined. You will see residual values for each point to show how well they fit onto the surface of the defined plane	
1.9	If you have opted to use a local grid system you need to indicate which point on the grid is to be the grid origin. Highlight the point you want and Press the FN key. Then select F4 Origin. A * will be placed next to the chosen point to indicate this as the origin point.	

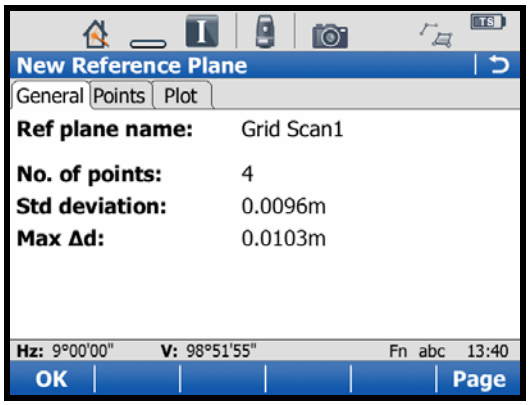
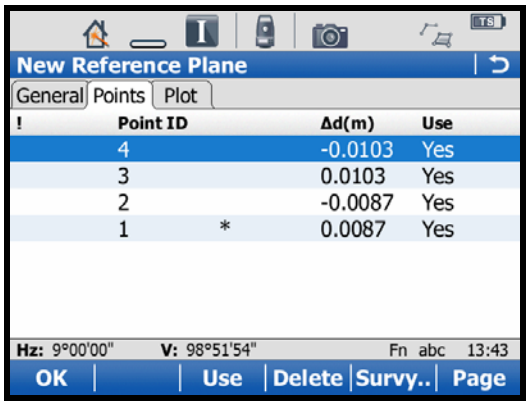
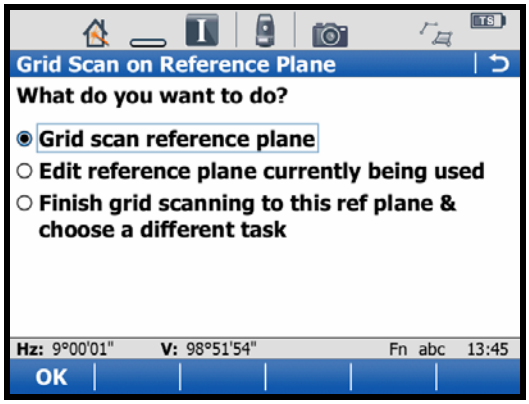
Step	Instruction	Screenshots
1.10	This screen will only appear in the wizard if "Use local Plane Coordinate System" was select in the config page. (1.3) The X axis will be horizontal, with the Z axis perpendicular taking the steepest course from the origin. The Y axis will be perpendicular to the XZ plane. The positive direction of the 3 axes is determined by selecting a point above or below the XZ plane that determines the negative direction of the Y axis. The origin can then be shifted from 0,0,0 by updating the X and Z coords.	
1.11	You will also need to offset the reference plane if you do not want the XZ plane to give a 0 Y value	
1.12	Select a Distance to move the XZ plane along the Y axis. Alternatively you can select a point that you want to have a 0 Y value on the XZ plane. Set Offset plane to be "Offset to a point"	

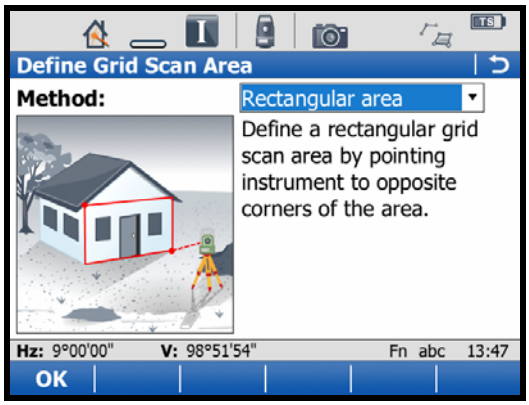
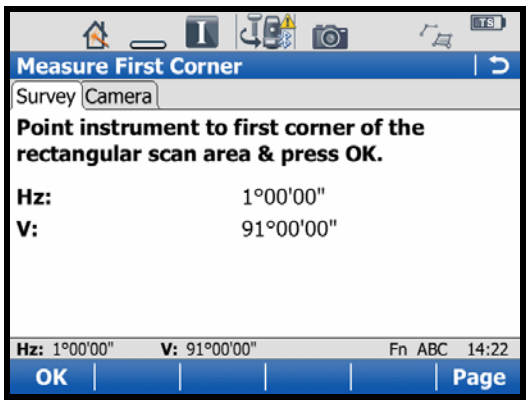
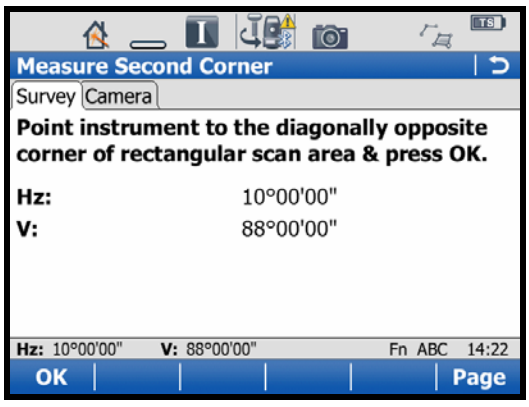
Step	Instruction	Screenshots
1.13	If when you have defined the plane you forgot to set the local system (or you want to switch back to coords within the grid of the total station setup position, choose Eddit reference plane currently being used.	
1.14	This allows all the setting defined in the wizard to be changed. Adding or removing points from the definition.	
1.15	Redefine the origin or switch back to global coordinate system. Once the edits are complete click on OK.	

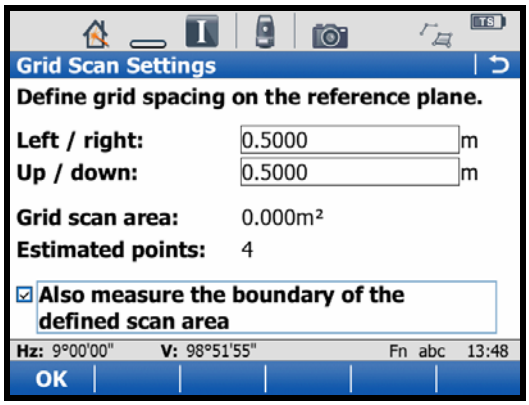
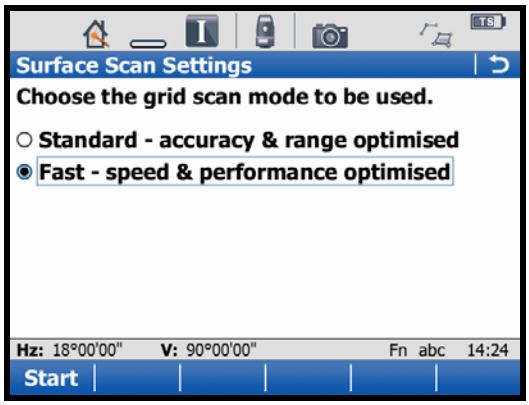
Step	Instruction	Screenshots
1.16	Now choose the option to Measure to plane. Click F1 OK	
1.17	If you have opted to go with a Global Coordinate system when you measure a distance to a point the position will be shown in ENZ. Angles only observations will be projected onto the reference plane and given coordinates accordingly	
1.18	If you have opted to go with a Local Coordinate system when you measure a distance to a point the position will be shown in XYZ. Angles only observations will be projected onto the reference plane and given coordinates accordingly	

- Grid scan on plane

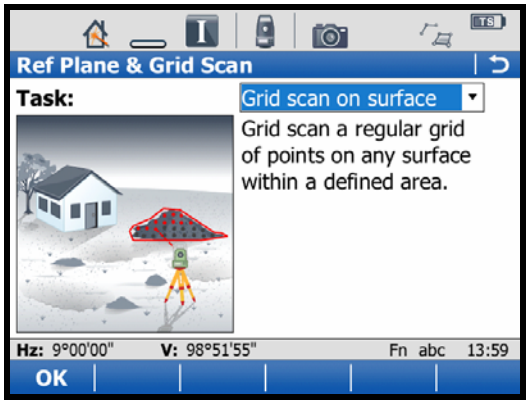
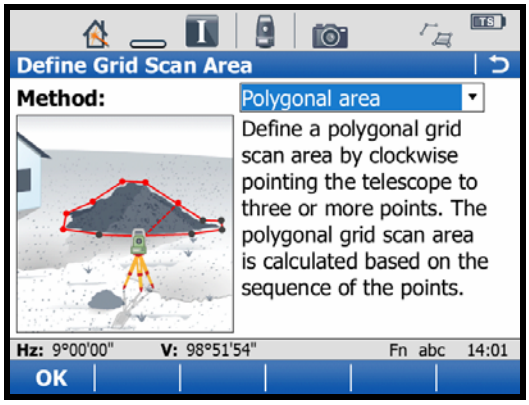
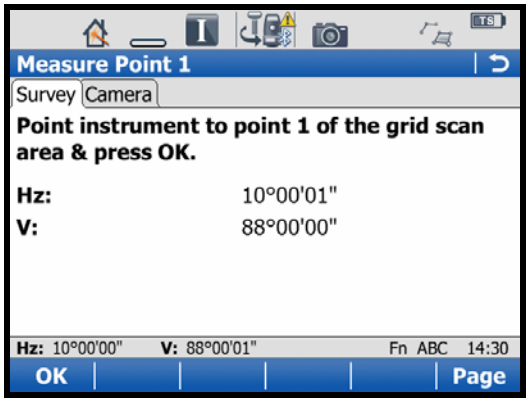
Step	Instruction	Screenshots
2.1	Select 1. Go to Work! > 4 Survey+ > 1 Ref Plane and Grid Scan. Select Grid Scan on Plane and F1 OK	
2.2	Choose the option that suits. In this case select the option to Create a new plane by measuring new points. F1 OK	
2.3	After giving the Plane a name you will be in a survey screen. Measure points in the normal way or select the Camera tab to use the image assisted surveying When completed Select F5 Done	

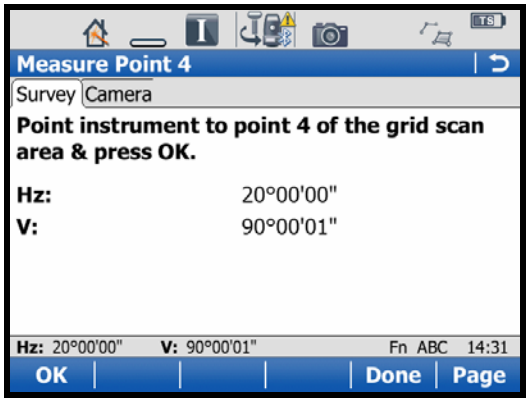
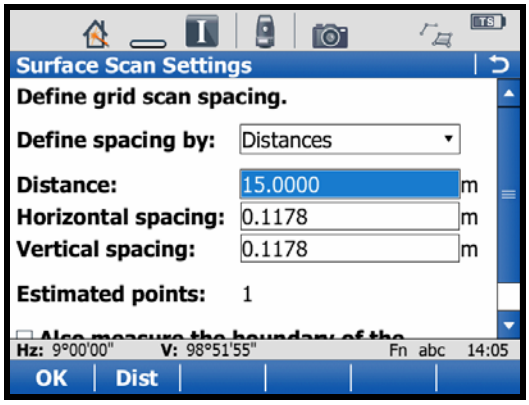
Step	Instruction	Screenshots
2.4	You will now see a summary of the plane and how well the surveyed points fit to the plane. Page using F6 to see more info and remove points or add extra points to the plane.	
2.5	Once satisfied that the plane is suitable click F1 or OK to continue The next screen asks if you want to offset the plane.	
2.6	Choose Grid Scan to Reference Plane	

Step	Instruction	Screenshots
2.7	Choose either; Rectangular area: This will request that you observe diagonally opposite corners of the area to be scanned Or, Polygonal Area: This will request a minimum of three points to define the area to be scanned. If using Polygonal Area, Done will appear on F5 after the third point has been defined.	
2.8	Aim at the first point to define the area. This can be done using the camera. Use f6 to page to the camera. Remember to measure a distance if using the camera to correct to parallax. Click F1 OK	
2.9	Then aim at the second corner diagonally opposite. Again this can be done using the camera.	

Step	Instruction	Screenshots
2.10	Then define the grid spacing. The tick box for boundary points will add extra points to survey the area boundary even if it does not relate to the regular grid spacing	
2.11	After defining the Point Id Style and increment value. You will be asked for the speed of the scan. It is essentially Speed versus Accuracy	

- Grid scan on surface

Step	Instruction	Screenshots
3.1	Select 1. Go to Work! > 4 Survey+ > 1 Ref Plane and Grid Scan. Select Grid Scan on Surface and F1 OK	
3.2	Choose either, Rectangular surface: This will request that you observe diagonally opposite corners of the area to be scanned or Polygonal Surface: This will request a minimum of three points to define the area to be scanned.	
3.3	Aim at the first point to define the area. This can be done using the camera. Use f6 to page to the camera. Remember to measure a distance if using the camera to correct to parallax. Click F1 OK	

Step	Instruction	Screenshots
3.4	Aim at further points to define the polygonal area. These can be done using the Camera. Done will appear on F5 after the third point has been defined. Select this to complete the scan area or continue to observe more points.	
3.5	The grid spacing can be by Angles Or it can be done by distances The Horizontal and vertical spacing is defined for a particular distance from the instrument. That distance can be estimated or measured using the F2 button. It is an idea to pick a point at roughly the middle of the object. Again an option is available to survey points on the boundary	
3.6	After defining the Point Id Style and increment value. You will be asked for the speed of the scan. It is essentially Speed versus Accuracy