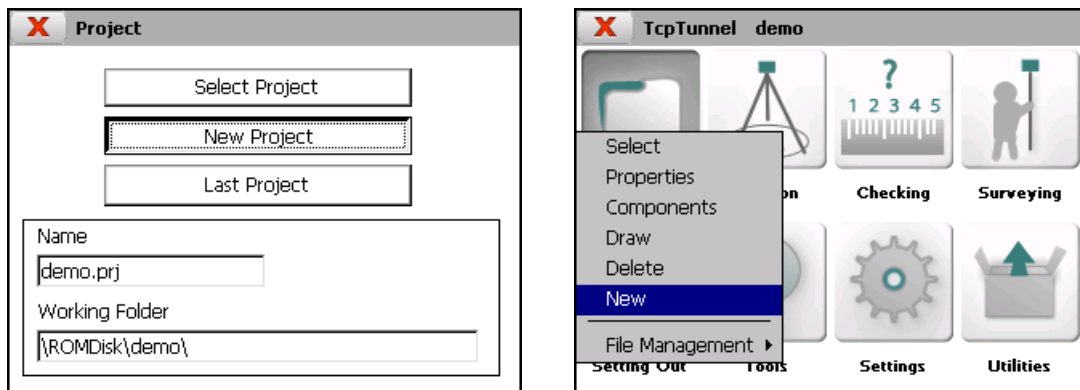


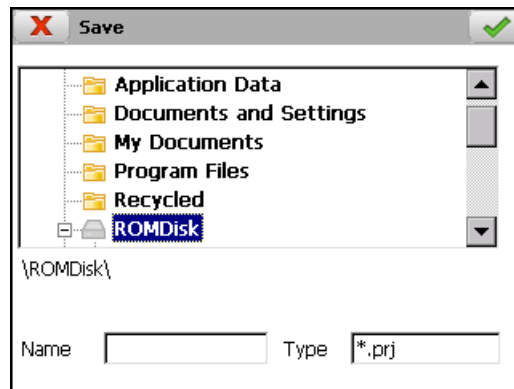
## TcpTunnel – Demonstration Guide

### Creation of the Project

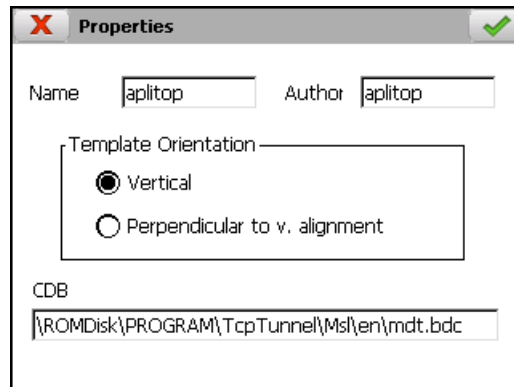
Select **New Project** option, on initial screen, or select **Project > New**, within the program.




Select a flash memory folder (i.e. Storage Card, SD Card, etc), enter the project name and tap on accept button.



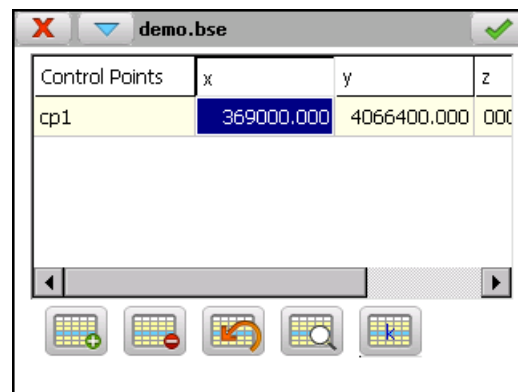
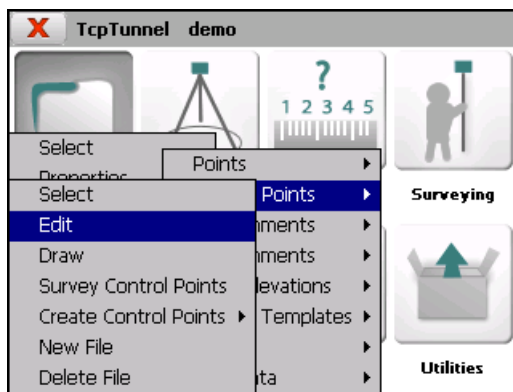
On **Project > Properties** screen, set **Name** and **Author**, leave the **Template Orientation** option with its default value and tap on accept button.



### Creation of the Reference Station

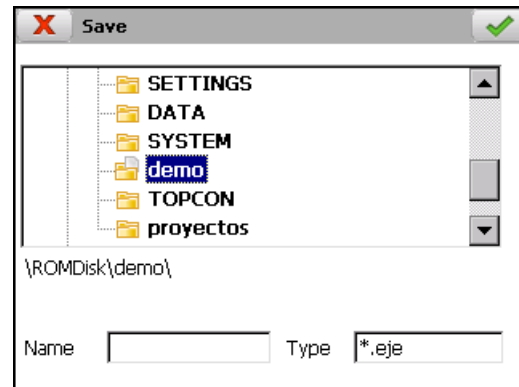
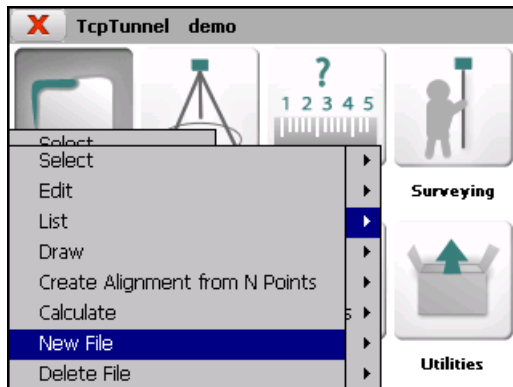
Select **Project > File Management > Control Points > Edit** and create a new control point, tapping on  button. Set the following data and tap on accept button:

**Control Point = cp1**  
**X = 369000.000**  
**Y = 4066400.000**  
**Z = 100.000**

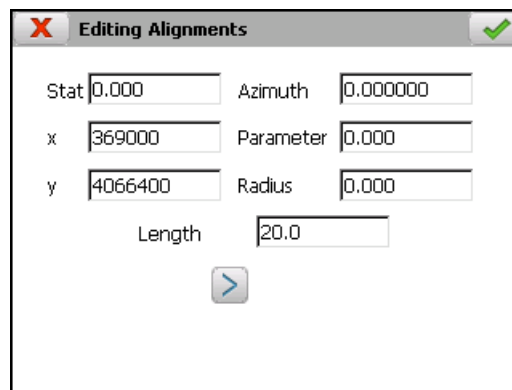



### Creation of the Horizontal Alignment

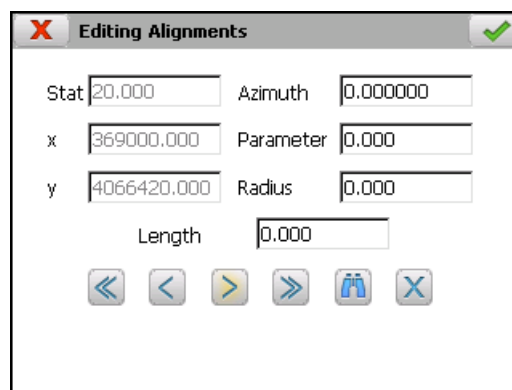
Select **Project > File Management > H. Alignments > New File**, enter a name for the new horizontal alignment and tap on accept button.



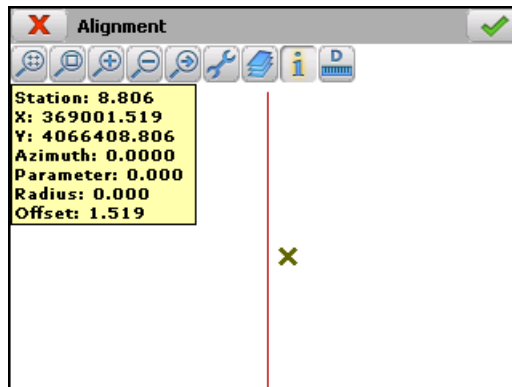
Create a horizontal alignment with two vertices. For doing this, enter the following data:



Tap on  button for creating automatically the second vertex of the horizontal alignment. The program will show the following data:

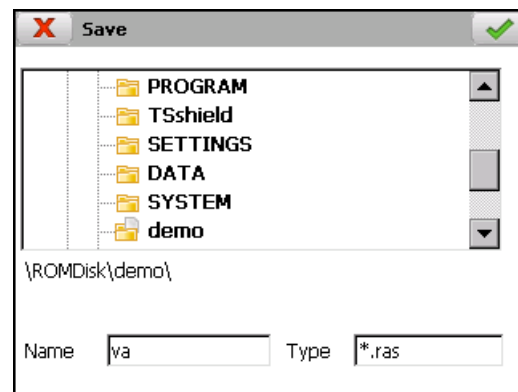
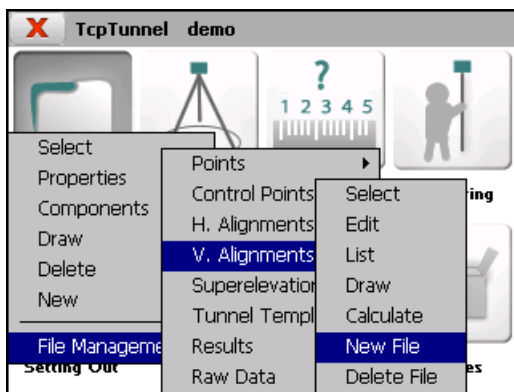


Tap on accept button and select **Project > File Management > H. Alignments > Draw.**

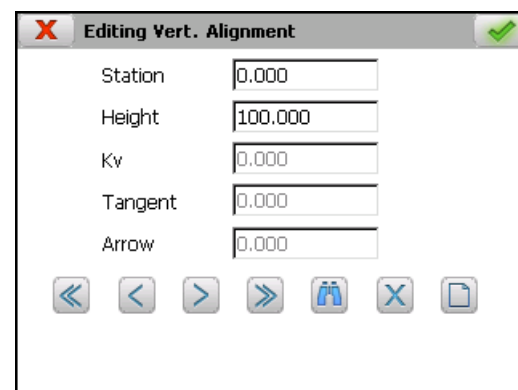
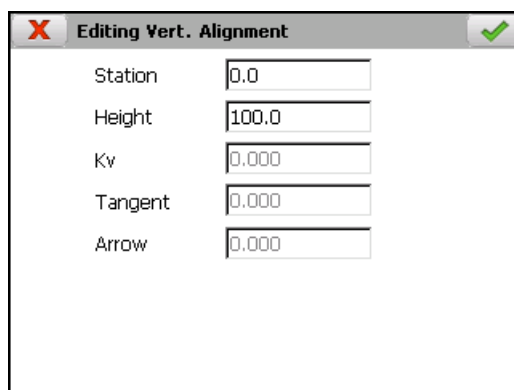



### Creation of the Vertical Alignment

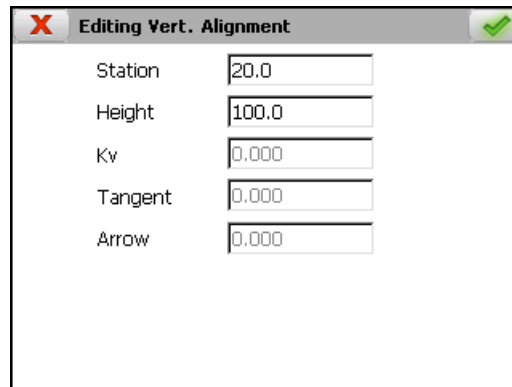
Select **Project > File Management > V. Alignments > New File**, enter a name for the new vertical alignment and tap on accept button.



Enter the following data for creating the first vertex of the vertical alignment and tap on accept button.

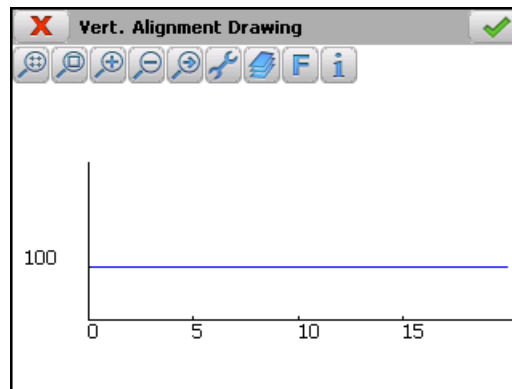


Tap on  button, enter the data for the second vertex and tap on accept button.



Field	Value
Station	20.0
Height	100.0
Kv	0.000
Tangent	0.000
Arrow	0.000

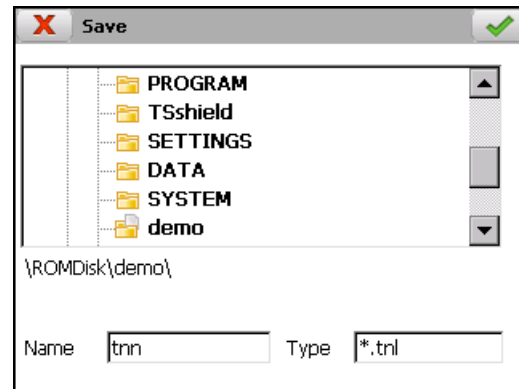
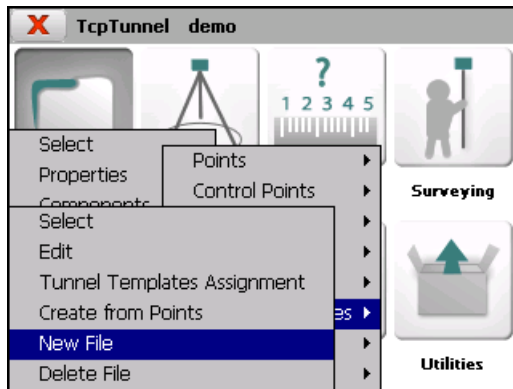
Select **Project > File Management > V. Alignments > Draw** and tap on zoom extension button.



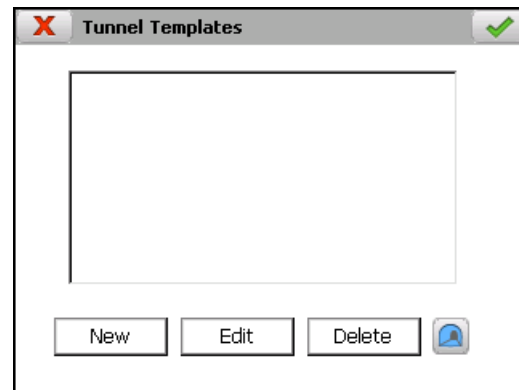
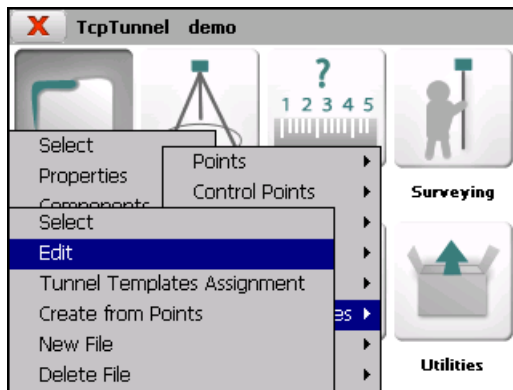
### **Creation of the Tunnel Template**

*In this chapter, a tunnel template will be created. In this case, for doing the process simpler, the steps explained will help the user to create a circular tunnel template within the data collector or total station, but, normally, the tunnel template will be created from drawing in CAD.*

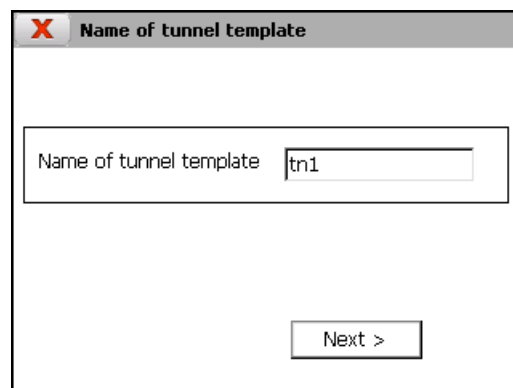
Select **Project > File Management > Tunnel Templates > New File**, enter a name and tap on accept button.



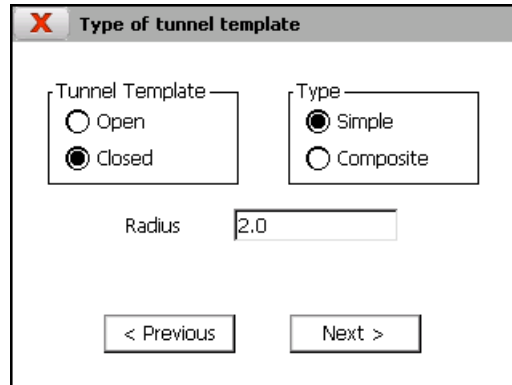
Select **Project > File Management > Tunnel Templates > Edit.**



Tap on **New** button, enter a name for the tunnel template and tap on **Next** button.



Enter the following values and tap on **Next** button. The value of the **Radius** should be entered depending of the area dimensions where the program will be tested.



**X Type of tunnel template**

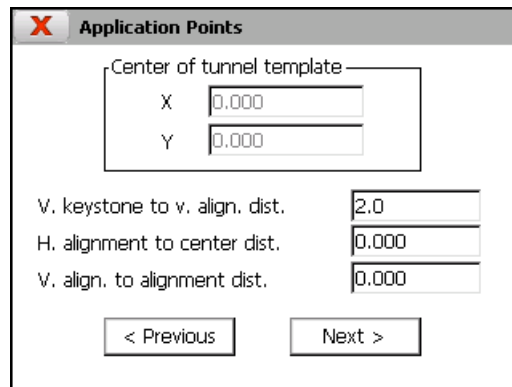
Tunnel Template  
 Open  
 Closed

Type  
 Simple  
 Composite

Radius

< Previous      Next >

In the next screen, leave all parameters with the default values unless the parameter **V. keystone to v. align. dist.**, that it must be the same as the radius entered in previous screen. Tap on **Next** button.



**X Application Points**

Center of tunnel template  
 X   
 Y

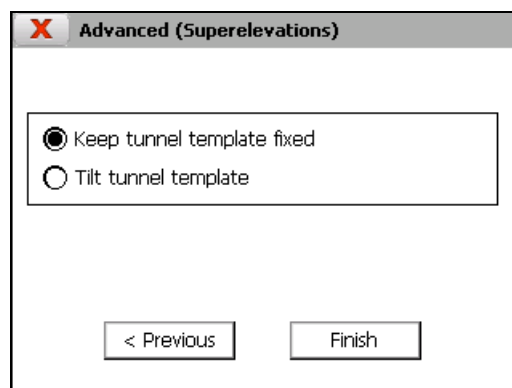
V. keystone to v. align. dist.

H. alignment to center dist.

V. align. to alignment dist.

< Previous      Next >


Leave the default value for the parameter in the next screen and tap on **Finish** button.

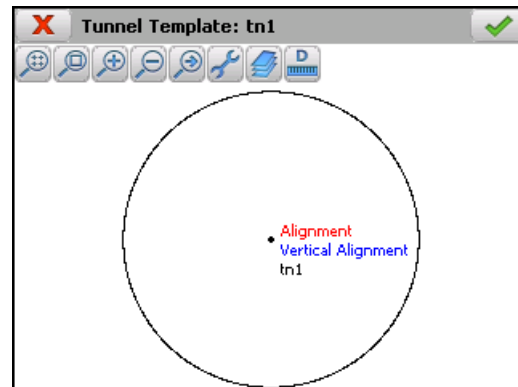
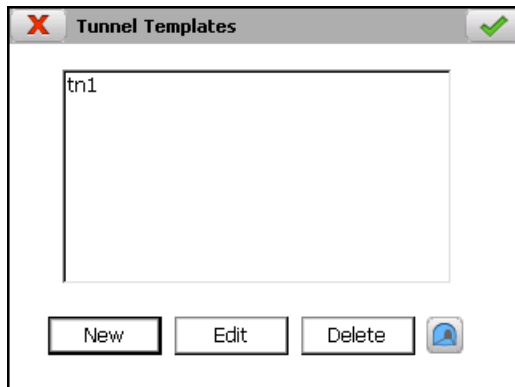


**X Advanced (Superelevations)**

Keep tunnel template fixed  
 Tilt tunnel template

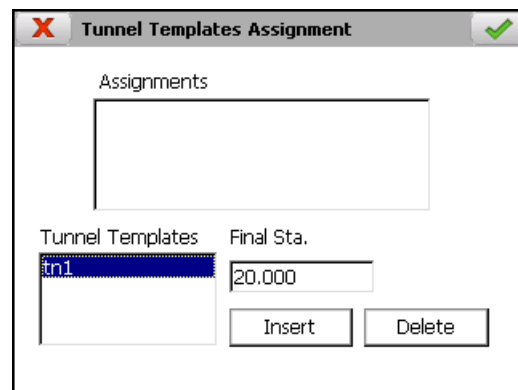
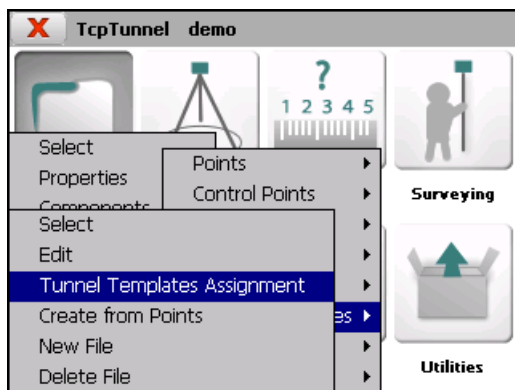
< Previous      Finish

Select the new tunnel template and tap on  button for viewing the drawing.

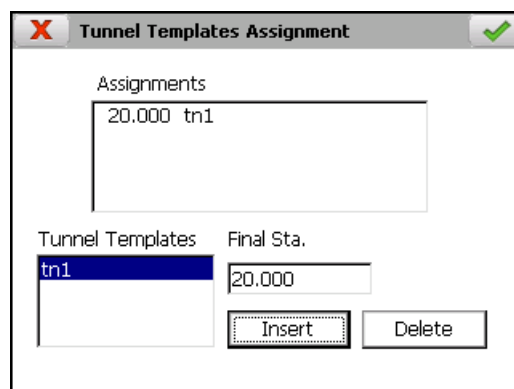


### Assignment of the Tunnel Template to the Horizontal Alignment

Select **Project > File Management > Tunnel Templates > Tunnel Templates Assignment**.



Select the tunnel template created in the previous step, from the **Tunnel Templates** list, and tap on **Insert** button. The tunnel template is assigned to the horizontal alignment from initial station, 0.0, to the selected **Final Station**, 20.0, that, in this case, it's the final station of the horizontal alignment. Tap on accept button for closing the dialog.

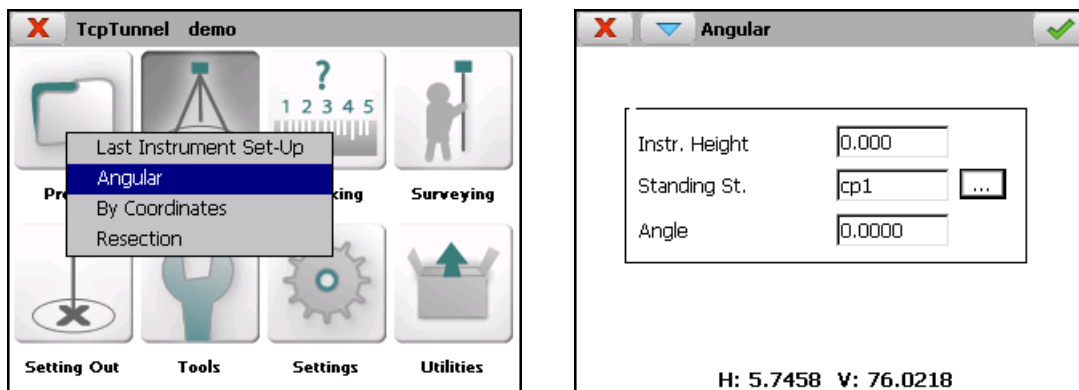




## Positioning

*It's recommended to position the total station centered on the area where the demonstration will be performed.*

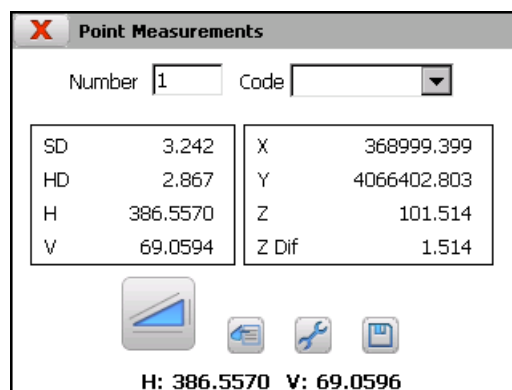
Select **Position > Angular**, enter the following values and tap on accept button.



Without moving the total station, select **Surveying > Points**, measure a point and check if the measured horizontal angle is close to 0.0.

## Checking Points

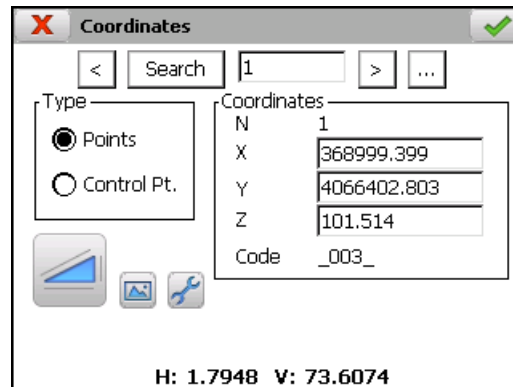
Select **Surveying > Points** and save a point easy to identify.



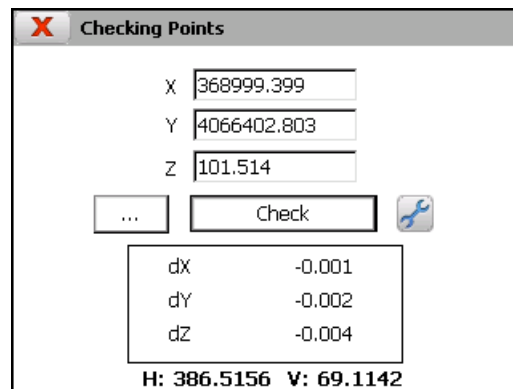
Manually turn the total station to a different point.

Select **Checking > Points**.

Select the measured point. For doing this, tap on ... button, check **Points** option and select it from the list. Press accept button.

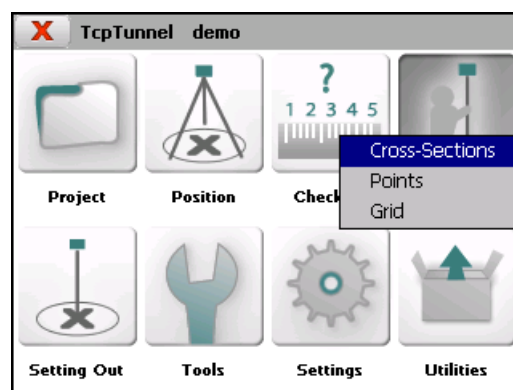


Tap on **Check** button and verify that the X, Y, Z differences are minimal.

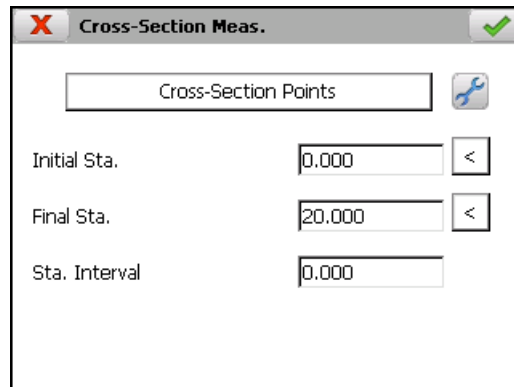


## Cross-Sections Survey

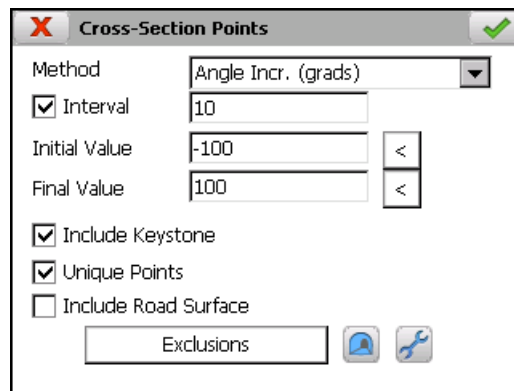
Select **Surveying > Cross-Sections**.




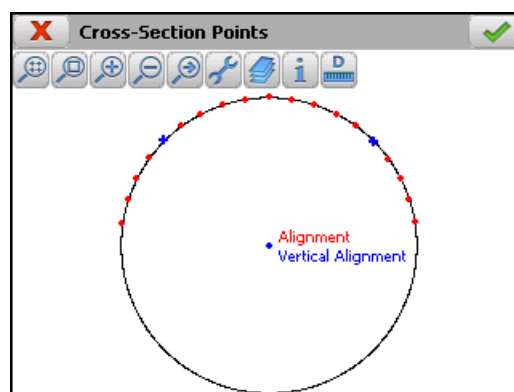
Tap on **Cross-Section Points** for selecting the theoretical points that will be measured.



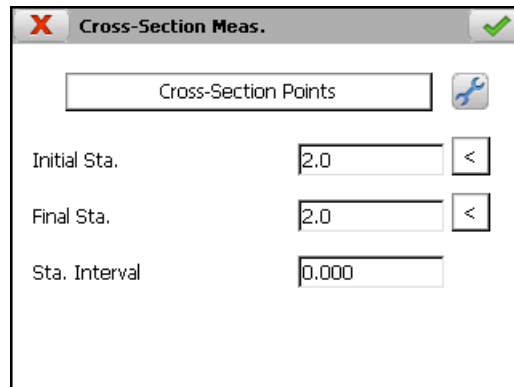
Enter the following values:



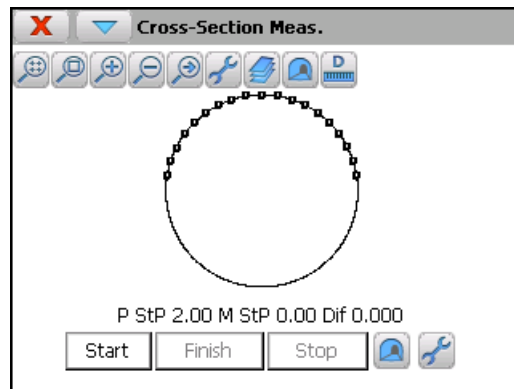
Tap on  button for drawing the theoretical points calculated and tap on accept button.



Press accept button to return to the data entry screen. Set the following values:



Tap on accept button for going to the screen where the data survey will be performed.



Press **Start** for initiating the data survey.

For each measured cross-section, a drawing with the theoretical and measured cross-section is shown. It can see how the shape of the measured cross-section differs from the theoretical one. As mentioned above, would have been normal to use a CAD drawing with the tunnel template definition.

