

# TPS1200 Quick Guide

## 10.0 Reference Line and Reference Plane Applications

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### *Reference Line Application*

There are two ways to define a reference line. The reference line can be defined manually by entering known parameters. This line is not stored after the Reference Line application is exited. Or, a reference line can be created, edited, stored or deleted in the active job. These lines can be used at a later time when recalled from that job.

The following tasks can be completed using the Reference Line application:

- measuring to a line/arc where the position of a target point can be calculated from its position relative to the defined reference line/arc,
- staking to a line/arc where a target point is known and instructions to locate the point are given relative to the reference line/arc, and
- gridstaking a line/arc where a grid can be staked relative to a reference line/arc.

Heights and positions are always taken into account; all points must have full coordinate triplets (X, Y and Z).

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### *Reference Plane Application*

The Reference Plane and Face Scan application can be used to measure points relative to a reference plane. A reference plane can also be scanned using Face Scan.

Reference Plane and Face Scan can be used to complete the following tasks:

- measuring points to calculate and store the perpendicular distance to the plane,
- viewing and storing the instrument and/or local coordinates of the measured points,
- viewing and storing the height difference from the measured points to the plane, or
- scanning a defined area.

Planes can only be computed with grid coordinates.

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# TPS1200 Quick Guide

## 10.0 Reference Line and Reference Plane Applications

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*In this Chapter* This chapter shows examples of using reference lines, reference arcs and reference planes.

Section	Topic
10.1	Defining a Reference Line/Arc
10.2	Measure to a Reference Line/Arc
10.3	Stake to a Reference Line/Arc
10.4	Gridstaking to a Reference Line/Arc
10.5	Defining a Reference Plane
10.6	Measuring Points on a Reference Plane
10.7	Scanning a Plane

**Note:** For more details on each of these topics and the definitions of the fields you should refer to chapter 44 *Reference Line* and chapter 45 *Reference Plane & Face Scan* in the *TPS1200 Technical Reference Manual*.

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# TPS1200 Quick Guide

## 10.1 Defining a Reference Line/Arc

### General Information

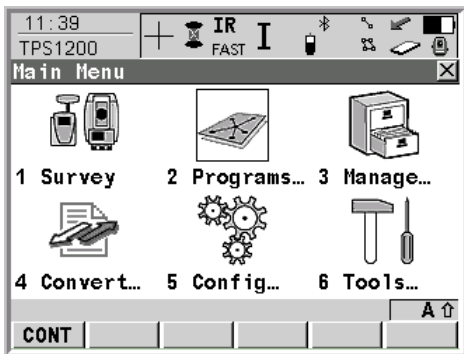
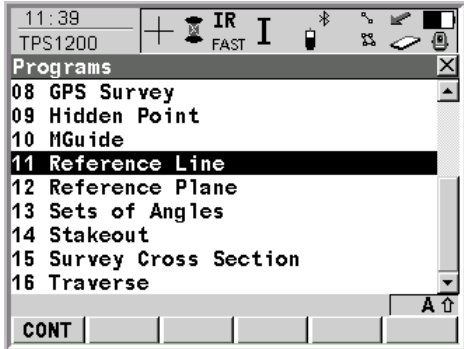
The following steps show the screens and settings that you need to successfully work with the Reference Line application.

A reference line can be defined in one of the following ways:

- two known points,
- one known point, an azimuth, a distance and a gradient, or
- one known point, an azimuth, a distance and a difference in height.

A reference arc can be defined in one of the following ways:

- two known points and a radius or
- three known points.

Step	Action	Display
1	<p>From the Main Menu:</p> <ul style="list-style-type: none"><li>• Tap on <b>2 Programs....</b></li></ul> <p>This takes you to the TPS1200 Programs screen.</p>	
2	<p>In the TPS1200 Programs screen:</p> <ul style="list-style-type: none"><li>• Tap on <b>11 Reference Line.</b></li></ul> <p><b>Note:</b> The program number may be different on your instrument as this number is based on the number of applications you have installed and the order in which they were installed.</p> <p>This takes you to the REFLINE Reference Line/Arc Begin screen.</p>	

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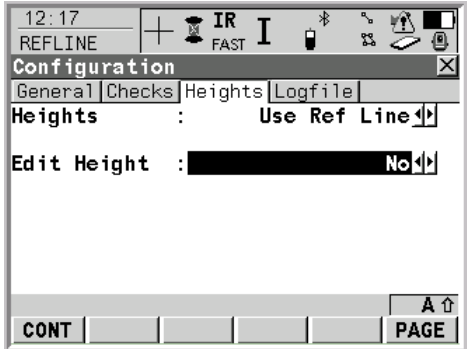
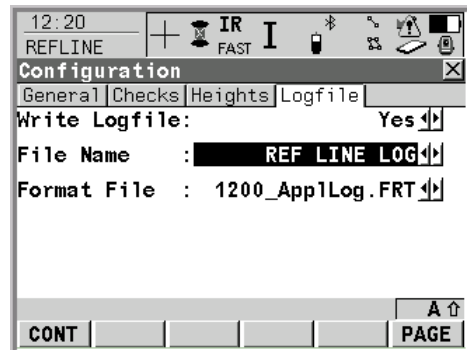
## 10.1 Defining a Reference Line/Arc

Step	Action	Display
3	<p>In the REFLINE Reference Line/Arc Begin screen:</p> <ul style="list-style-type: none"> <li>Select the control job you wish to use.</li> <li>Select the job you wish to use.</li> <li>Select your other preferences for this begin screen.</li> <li>Press the <b>F2 (CONF)</b> button.</li> </ul> <p>This takes you to the General page of the REFLINE Configuration screen.</p>	
4	<p>In the General page of the REFLINE Configuration screen:</p> <ul style="list-style-type: none"> <li>Select your preferences for your orientation, mode and guidance.</li> <li>Select a display mask, if desired.</li> <li>Select <b>Use Stations, Yes/No</b> as preferred for stationing your reference line.</li> <li>Select your station format, if using stations.</li> <li>Select <b>Auto Position: Off</b>, if using the instrument robotically.</li> <li>Press the <b>F6 (PAGE)</b> button.</li> </ul> <p>This takes you to the Checks page of the REFLINE Configuration screen.</p>	
5	<p>In the Checks page of the REFLINE Configuration screen:</p> <ul style="list-style-type: none"> <li>Set your preferences for any checks that you wish to have and their limits.</li> <li>Press the <b>F6 (PAGE)</b> button to advance to the next screen.</li> </ul> <p>This takes you to the Heights page of the REFLINE Configuration screen.</p>	

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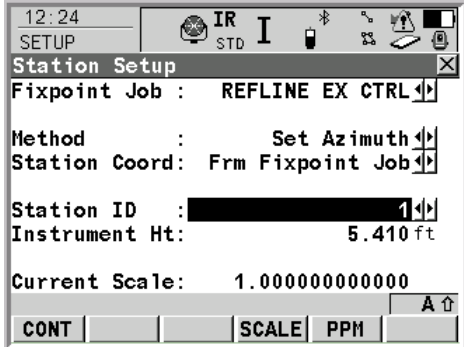
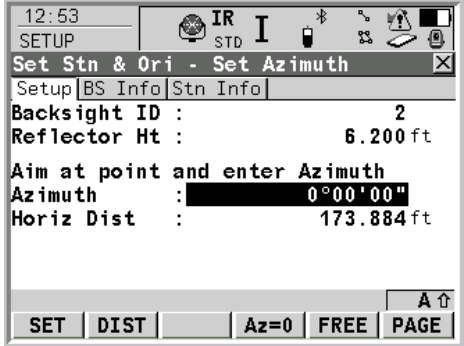
## 10.1 Defining a Reference Line/Arc

Step	Action	Display
<p>6</p>	<p>In the Heights page of the REFLINE Configuration screen:</p> <ul style="list-style-type: none"> <li>• Set <b>Heights</b> to desired selection based on need of particular project.</li> <li>• Set <b>Edit Height: Yes/No</b>.</li> <li>• Press the <b>F6 (PAGE)</b> button.</li> </ul> <p>This takes you to the Logfile page of the REFLINE Configuration screen.</p>	
<p>7</p>	<p>In the Logfile page of the REFLINE Configuration screen:</p> <ul style="list-style-type: none"> <li>• If you want a logfile, set <b>Write Logfile: Yes</b>.</li> <li>• Enter the file name.</li> <li>• Select <b>Format File: 1200_App1Log.FRT</b>.</li> <li>• Press the <b>F1 (CONT)</b> button.</li> </ul> <p>This returns you to the REFLINE Reference Line/Arc Begin screen.</p> <p><b>Note:</b> The format file you select must be loaded into the system RAM. For more information on loading format files please see chapter 3 <i>Utilities</i>, section 3.2 <i>Transfer Objects</i>, of this TPS Quick Guide.</p>	

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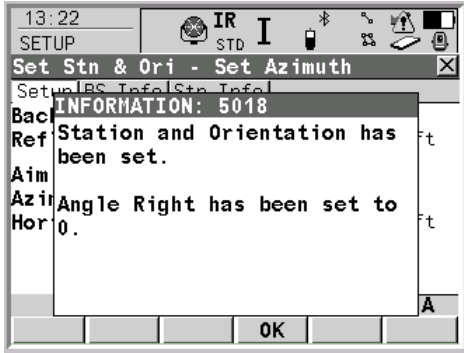
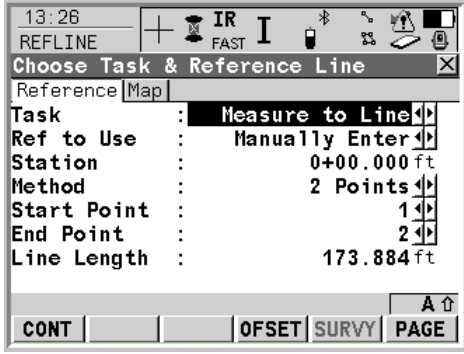
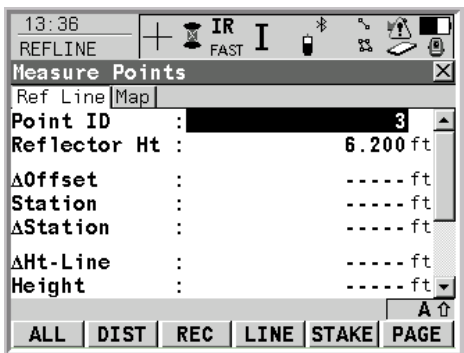
## 10.1 Defining a Reference Line/Arc

Step	Action	Display
<p>8</p>	<p>Continuing in the REFLINE Reference Line/Arc Begin screen:</p> <ul style="list-style-type: none"> <li>• Press the <b>F3 (SETUP)</b> button.</li> <li>• Select your fixpoint job.</li> <li>• Select your setup method. For this example we are using <b>Set Azimuth</b>.</li> <li>• Select where you will get your station coordinate.</li> <li>• Select your station ID.</li> <li>• Enter your instrument height.</li> <li>• Make any necessary changes to your Atmospheric/Geometric PPM values, by selecting <b>F4 (SCALE)</b> or <b>F5 (PPM)</b>.</li> <li>• Press the <b>F1 (CONT)</b> button.</li> </ul> <p>This takes you to the Setup page of the SETUP Set Stn &amp; Ori – Set Azimuth screen.</p>	 <p>The screenshot shows the 'Station Setup' window. At the top, it displays the time '12:24' and the word 'SETUP'. Below that, it says 'Station Setup' with a close button. The main area contains the following information: 'Fixpoint Job : REFLINE EX CTRL', 'Method : Set Azimuth', 'Station Coord: Frm Fixpoint Job', 'Station ID : [redacted]', 'Instrument Ht: 5.410 ft', and 'Current Scale: 1.000000000000'. At the bottom, there are buttons for 'CONT', 'SCALE', and 'PPM'.</p>
<p>9</p>	<p>In the Setup page of the SETUP Set Stn &amp; Ori – Set Azimuth screen:</p> <ul style="list-style-type: none"> <li>• Enter your backsight ID.</li> <li>• Enter your reflector height, if necessary.</li> <li>• Aim at your backsight point and enter your azimuth.</li> <li>• Press the <b>F2 (DIST)</b> button to take a measurement to be able to store a MEAS triplet for the backsight point.</li> <li>• Press the <b>F1 (SET)</b> button.</li> </ul> <p>This takes you to the Orientation Set confirmation screen.</p>	 <p>The screenshot shows the 'Set Stn &amp; Ori - Set Azimuth' window. At the top, it displays the time '12:53' and the word 'SETUP'. Below that, it says 'Set Stn &amp; Ori - Set Azimuth' with a close button. The main area contains the following information: 'Backsight ID : 2', 'Reflector Ht : 6.200 ft', 'Aim at point and enter Azimuth', 'Azimuth : [redacted] 0°00'00"', and 'Horiz Dist : 173.884 ft'. At the bottom, there are buttons for 'SET', 'DIST', 'Az=0', 'FREE', and 'PAGE'.</p>

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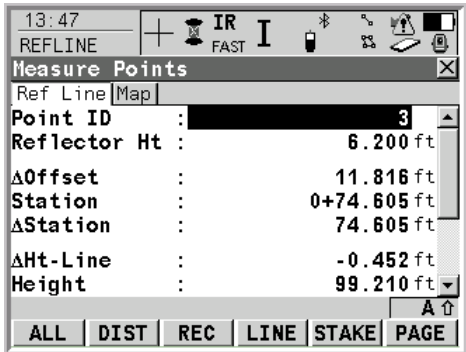
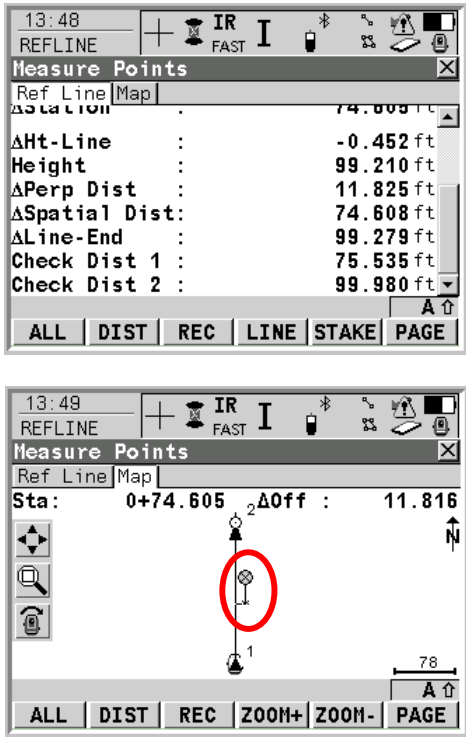
# TPS1200 Quick Guide

## 10.1 Defining a Reference Line/Arc

Step	Action	Display
<p>10</p>	<p>In the INFORMATION: 5018 screen:</p> <p><b>Note:</b> This confirmation screen tells you that the Station and Orientation has been set and that Angle Right has been set to 0, if you are using Angle Right.</p> <ul style="list-style-type: none"> <li>Press the <b>F4 (OK)</b> button.</li> </ul> <p>This takes you to the Reference page of the REFLINE Choose Task &amp; Reference Line screen.</p>	
<p>11</p>	<p>In the Reference page of the REFLINE Choose Task &amp; Reference Line screen:</p> <ul style="list-style-type: none"> <li>Select Task: <b>Measure to Line.</b></li> <li>Select <b>Ref to Use: Manually Enter</b> or <b>Select from Job.</b></li> <li>Station value will always start from the start point of the reference line.</li> <li>Select <b>Method: 2 Points</b>, for this example.</li> <li>Select the <b>Start Point</b> and <b>End Point.</b></li> <li>Press the <b>F1 (CONT)</b> button.</li> </ul> <p>This takes you to the Ref Line page of the REFLINE Measure Points screen.</p>	
<p>12</p>	<p>In the Ref Line page of the REFLINE Measure Points screen:</p> <p>You are now ready to measure points. Continue to the next section.</p>	

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## 10.2 Measure to a Reference Line/Arc

Step	Action	Display
1	<p>After configuring the reference line settings, setting your orientation and defining a reference line/arc in section 10.1, you are now ready to measure points.</p> <ul style="list-style-type: none"> <li>Aim at your target and press the <b>F1 (ALL)</b> button to take a measurement and store it.</li> <li>You can also press the <b>F2 (DIST)</b> button to take a measurement and display the results before pressing the <b>F3 (REC)</b> button to record that measurement.</li> <li>Continue to repeat this action for as many measurements as you require.</li> </ul>	 <p>13:47 REFLINE IR FAST I</p> <p>Measure Points</p> <p>Ref Line Map</p> <p>Point ID : 3</p> <p>Reflector Ht : 6.200 ft</p> <p>ΔOffset : 11.816 ft</p> <p>Station : 0+74.605 ft</p> <p>ΔStation : 74.605 ft</p> <p>ΔHt-Line : -0.452 ft</p> <p>Height : 99.210 ft</p> <p>ALL DIST REC LINE STAKE PAGE</p>
2	<p>Continuing in the Ref Line page of the REFLINE Measure Points screen:</p> <ul style="list-style-type: none"> <li>When pressing the <b>F2 (DIST)</b> button you are able to view the information of your measured point relative to your defined reference line.</li> <li>Press the <b>F6 (PAGE)</b> button to view the MAP page.</li> <li>The Map page view shows your defined reference line, your station point, your measured points and your current position is marked by a prism pole.</li> <li>The Station and Δ Offset values are also displayed at the top of the Map view.</li> </ul> <p><b>Note:</b> When you have completed all the measurements that you require you can press the <b>ESC</b> button to return to the Reference page of the REFLINE Choose Task &amp; Reference Line or press the <b>SHIFT – F6 (QUIT)</b> buttons to exit the application.</p>	 <p>13:48 REFLINE IR FAST I</p> <p>Measure Points</p> <p>Ref Line Map</p> <p>ΔStation : 74.605 ft</p> <p>ΔHt-Line : -0.452 ft</p> <p>Height : 99.210 ft</p> <p>ΔPerp Dist : 11.825 ft</p> <p>ΔSpatial Dist : 74.608 ft</p> <p>ΔLine-End : 99.279 ft</p> <p>Check Dist 1 : 75.535 ft</p> <p>Check Dist 2 : 99.980 ft</p> <p>ALL DIST REC LINE STAKE PAGE</p> <p>13:49 REFLINE IR FAST I</p> <p>Measure Points</p> <p>Ref Line Map</p> <p>Sta: 0+74.605 ΔOff : 11.816</p> <p>Map view showing a reference line and measured points (1 and 2) with a prism pole icon.</p> <p>ALL DIST REC ZOOM+ ZOOM- PAGE</p>

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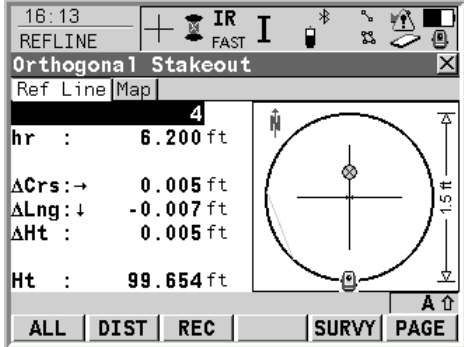
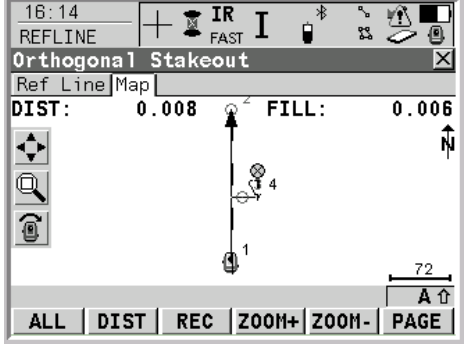
## 10.3 Stake to a Reference Line/Arc

Step	Action	Display
1	<p>After configuring the Reference Line settings and setting your orientation in section 10.1, you are now ready to stake points.</p> <p>Continuing in the Reference page of the REFLINE Choose Task &amp; Reference Line screen:</p> <ul style="list-style-type: none"> <li>• Set <b>Task: Stake to Line</b>.</li> <li>• Set or select your reference line.</li> <li>• Choose your method.</li> <li>• Set the start and end point.</li> <li>• Press the <b>F1 (CONT)</b> button.</li> </ul> <p>This takes you to the REFLINE Enter Offset Values screen.</p>	
2	<p>In the REFLINE Enter Offset Values screen:</p> <ul style="list-style-type: none"> <li>• Enter the point ID.</li> <li>• Enter a stake offset: value left or right of the reference line.</li> <li>• Enter an along line: value up or down the line as determined by the start point established in the previous step. (The value along the line will be displayed in the <b>Station</b> field if you selected to use stations.)</li> <li>• Enter a height offset: value increase or decrease relative to the reference line.</li> <li>• Press the <b>F1 (CONT)</b> button.</li> </ul> <p>This takes you to the Ref Line page of the REFLINE Orthogonal Stakeout screen.</p>	
3	<p>In the Ref Line page of the REFLINE Orthogonal Stakeout screen:</p> <ul style="list-style-type: none"> <li>• Press the <b>F2 (DIST)</b> button to take measurements and locate the point you identified to stakeout.</li> <li>• Repeat this step as necessary until you have located your intended point.</li> </ul>	

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## 10.3 Stake to a Reference Line/Arc

Step	Action	Display
<p data-bbox="298 436 318 464">4</p> <p data-bbox="370 436 906 495">Continuing in Ref Line page of the REFLINE Orthogonal Stakeout screen:</p> <ul data-bbox="418 558 889 617" style="list-style-type: none"> <li>• Press the <b>F1 (ALL)</b> button to record the point that you have located.</li> </ul> <p data-bbox="370 646 906 705">This returns you to the REFLINE Enter Offset Values.</p> <p data-bbox="370 835 415 863">OR</p> <ul data-bbox="418 772 889 915" style="list-style-type: none"> <li>• Enter the offset values for the next stakeout point.</li> <li>• Press the <b>SHIFT – F6 (QUIT)</b> button to exit the application.</li> </ul>		
<p data-bbox="298 961 318 989">5</p> <p data-bbox="370 961 906 1020">The Map view can also be used when staking out the points.</p> <p data-bbox="370 1083 906 1205"><b>Note:</b> The graphics give you the direction to move to locate your point and the top line shows your distance and cut/fill to arrive at the final point location.</p>		

# TPS1200 Quick Guide

## 10.4 Gridstaking to a Reference Line/Arc

Step	Action	Display
1	<p>After configuring the reference line settings and setting your orientation in section 10.1, you are now ready to gridstake.</p> <ul style="list-style-type: none"> <li>Set Task: <b>Gridstake Line</b>.</li> <li>Set or select your reference line.</li> <li>Choose your Method.</li> <li>Set the Start and End Point.</li> <li>Press the <b>F1 (CONT)</b> button.</li> </ul> <p>This takes you to the REFLINE Define Grid screen.</p>	
2	<p>In the REFLINE Define Grid screen:</p> <ul style="list-style-type: none"> <li>Enter Begin Grid At: value. This value is along the reference line beginning at your designated Start Point.</li> <li>Enter Increment By: value.</li> <li>Enter Line Offsets: value. This is how far apart your gridlines are from each other.</li> <li>Enter Next Line: selection. This defines where the starting point of your next gridline will be.</li> <li>Select your Point ID: choice.</li> <li>Press the <b>F1 (CONT)</b> button.</li> </ul> <p>This takes you to the Ref Line page of the REFLINE Stake +20.00 +0.00 screen.</p>	
3	<p>In the Ref Line page of the REFLINE Stake +20.00 +0.00 screen:</p> <p>Similar to steps 3 and 4 in the 10.3 section, Stake to a Reference Line/Arc:</p> <ul style="list-style-type: none"> <li>Press the <b>F2 (DIST)</b> button to measure points and update distances.</li> <li>Press the <b>F1 (ALL)</b> button to record a point and advance to the next point on the grid to stake.</li> </ul> <p>This takes you to the Ref Line page of the REFLINE Stake +40.00 +0.00 screen.</p>	

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## 10.4 Gridstaking to a Reference Line/Arc

Step	Action	Display
4	<p>In the Ref Line page of the REFLINE Stake +40.00 +0.00 screen:</p> <ul style="list-style-type: none"> <li>Navigate to the location of this point and record by pressing the <b>F1 (ALL)</b> button.</li> </ul> <p>If you have a Hotkey setup to view MANAGE Data, select that button.</p>	
5	<p>You will notice in your points list that there are two recorded shots with the point ids of the gridstaking. That is as a result of our selection for point id in step 2 of this section.</p> <ul style="list-style-type: none"> <li>Press the <b>F1 (CONT)</b> button to continue.</li> </ul> <p>This takes you back to the Ref Line page of the REFLINE Stake +20.00 +0.00 screen.</p>	
6	<p>In the Ref Line page of the REFLINE Stake +60.00 +0.00 screen:</p> <p>You can also use the Map page for navigating to the gridstake points and recording them with the <b>F1 (ALL)</b> button.</p> <p>If you continue to press the <b>F1 (ALL)</b> button, you will continue advancing through the grid while staking and recording your points. To quit, press the <b>SHIFT – F6 (QUIT)</b> button.</p>	

# TPS1200 Quick Guide

## 10.5 Defining a Reference Plane

**General information**

The following steps show the screens and settings that you need to successfully work with the Reference Plane application.

Reference planes are created using a right hand system. For two points defining a plane, a vertical plane is used. A reference plane is defined with the X axis and the Z axis of the plane. The Y axis of the plane defines the positive direction of the Y axis. A reference plane can be defined in the following ways:

- Vertical,
- Horizontal, or
- Tilted.

**Note:** Face scan is only available for motorized instruments with a reflectorless EDM.

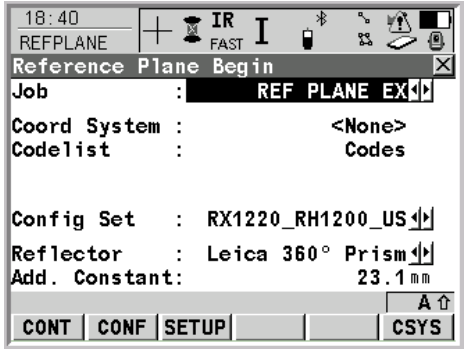
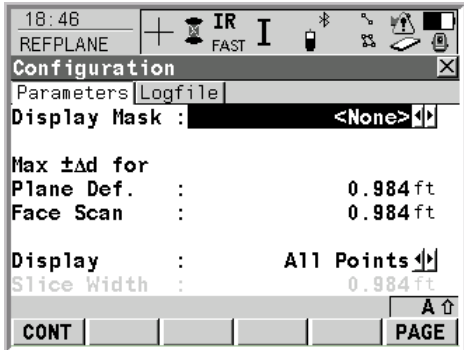
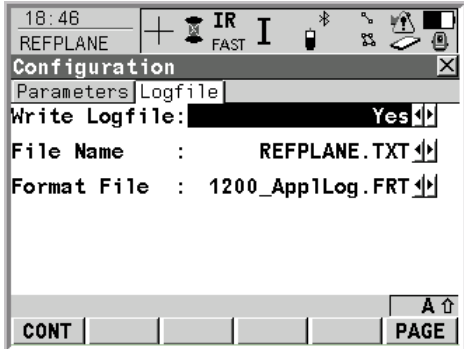
For additional information and explanation of these terms please refer to chapter 45 *Reference Plane & Face Scan* of the *TPS1200 Technical Reference Manual*.

Step	Action	Display
1	<p>From the Main Menu:</p> <ul style="list-style-type: none"> <li>• Tap on <b>2 Programs....</b></li> </ul> <p>This takes you to the TPS1200 Programs screen.</p>	
2	<p>In the TPS1200 Programs screen:</p> <ul style="list-style-type: none"> <li>• Tap on <b>12 Reference Plane</b>.</li> </ul> <p><b>Note:</b> The program number may be different on your instrument as this number is based on the number of applications you have installed and the order in which they were installed.</p> <p>This takes you to the REFLINE Reference Line/Arc Begin screen.</p>	

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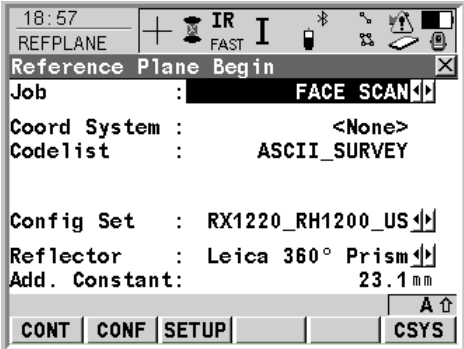

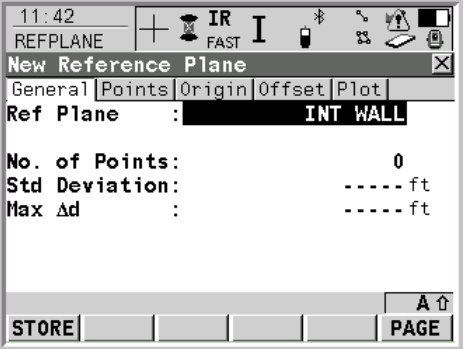
## 10.5 Defining a Reference Plane

Step	Action	Display
3	<p>In the REFPLANE Reference Plane Begin screen:</p> <ul style="list-style-type: none"> <li>Select or create your job.</li> <li>Select your codelist.</li> <li>Select a config set.</li> <li>Select the appropriate reflector.</li> <li>Press the <b>F2 (CONF)</b> button.</li> </ul> <p>This takes you to the Parameters page of the REFPLANE Configuration screen.</p>	
4	<p>In the Parameters page of the REFPLANE Configuration screen:</p> <ul style="list-style-type: none"> <li>Select a <b>Display Mask</b> if preferred.</li> <li>Enter in a value for the maximum allowed distance difference for <b>Plane Definition</b>.</li> <li>Enter in a value for the maximum allowed distance difference for <b>Face Scan</b>.</li> <li>Select <b>Display</b> option to be either <b>All Points</b> or <b>Points in Slice</b>.</li> <li>Press the <b>F6 (PAGE)</b> button.</li> </ul> <p>This takes you to the Logfile page of the REFPLANE Configuration screen.</p>	
5	<p>In the Logfile page of the REFPLANE Configuration screen:</p> <ul style="list-style-type: none"> <li>Set <b>Write Logfile:</b> field to <b>Yes</b>.</li> <li>Select or create a <b>File Name</b>.</li> <li>Select the <b>Format File:</b> <b>1200_AppLog.FRT</b> for logfile results.</li> <li>Press the <b>F1 (CONT)</b> button.</li> </ul> <p>This takes you back to the REFPLANE Reference Plane Begin screen.</p>	

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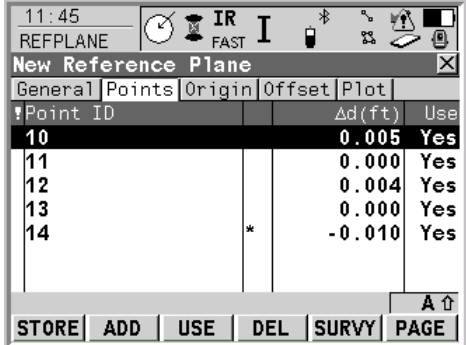
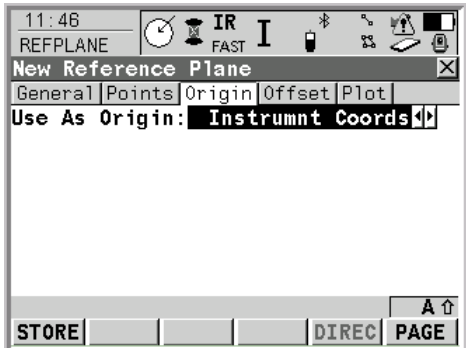
## 10.5 Defining a Reference Plane

Step	Action	Display
6	<p>Continuing in the REFPLANE Reference Plane Begin screen:</p> <ul style="list-style-type: none"> <li>If you need to set the instrument orientation press the <b>F3 (SETUP)</b> button and go through the setup process.</li> <li>Otherwise, press the <b>F1 (CONT)</b> button to continue.</li> <li>You will get a confirmation of Setup page, press the <b>F1 (CONT)</b> button to keep the current setup.</li> </ul> <p>This takes you to the REFPLANE Choose Task &amp; Reference Plane screen.</p>	
7	<p>In the REFPLANE Choose Task &amp; Reference Plane screen:</p> <ul style="list-style-type: none"> <li>Select <b>Measure to Plane</b> for the <b>Task</b> field.</li> <li>Select <b>Create New Plane</b> for the <b>Plane to Use</b> field.</li> <li>Press the <b>F1 (CONT)</b> button.</li> </ul> <p>This takes you to the General page of the REFPLANE New Reference Plane screen.</p>	
8	<p>In the General page of the REFPLANE New Reference Plane screen:</p> <ul style="list-style-type: none"> <li>Enter a reference plane name in the <b>Ref Plane</b> field.</li> <li>Press the <b>F6 (PAGE)</b> button.</li> </ul> <p>This will advance you to the Points page of the REFPLANE New Reference Plane screen.</p>	

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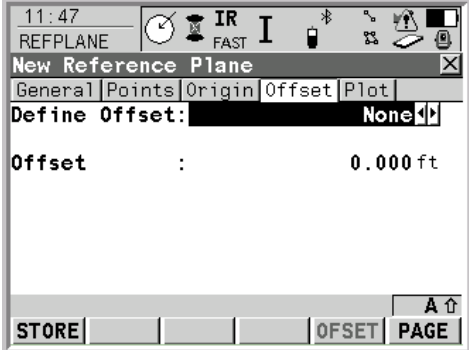
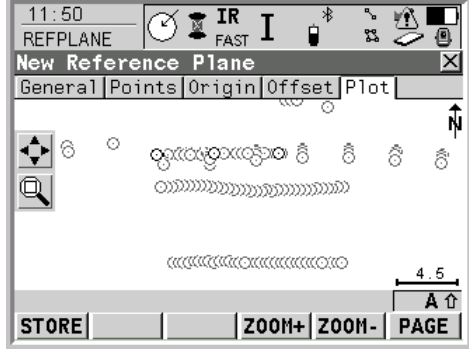
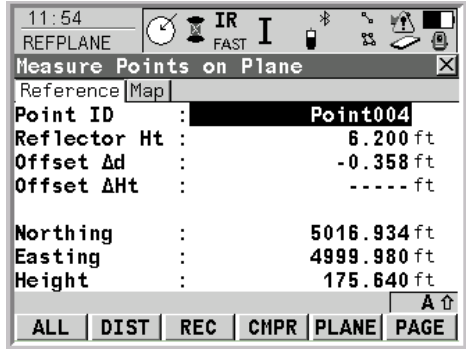
## 10.5 Defining a Reference Plane

Step	Action	Display																		
9	<p>In the Points page of the REFPLANE New Reference Plane screen:</p> <p><b>Note:</b> In this screen we will add points to define our plane. You are able to either select points from your job or survey the plane to define it.</p> <ul style="list-style-type: none"> <li>Press the <b>F2 (ADD)</b> button to select a point from the job.</li> <li>Press the <b>F5 (SURVY)</b> button to measure a point.</li> <li>Repeat this step as necessary until the plane is defined. (Minimum 2 points for a vertical plane.)</li> </ul> <p>The <b>F3 (USE)</b> button can be used to toggle In Use (<b>Yes</b>) or Not In Use (<b>No</b>).</p> <p>The <b>F4 (DEL)</b> button can be used to delete a point from this list.</p> <ul style="list-style-type: none"> <li>Press the <b>F6 (PAGE)</b> button to advance to the next screen.</li> </ul> <p>This takes you to the Origin page of the REFPLANE New Reference Plane screen.</p>	 <table border="1"> <thead> <tr> <th>Point ID</th> <th>Δ(ft)</th> <th>Use</th> </tr> </thead> <tbody> <tr> <td>10</td> <td>0.005</td> <td>Yes</td> </tr> <tr> <td>11</td> <td>0.000</td> <td>Yes</td> </tr> <tr> <td>12</td> <td>0.004</td> <td>Yes</td> </tr> <tr> <td>13</td> <td>0.000</td> <td>Yes</td> </tr> <tr> <td>14</td> <td>-0.010</td> <td>Yes</td> </tr> </tbody> </table>	Point ID	Δ(ft)	Use	10	0.005	Yes	11	0.000	Yes	12	0.004	Yes	13	0.000	Yes	14	-0.010	Yes
Point ID	Δ(ft)	Use																		
10	0.005	Yes																		
11	0.000	Yes																		
12	0.004	Yes																		
13	0.000	Yes																		
14	-0.010	Yes																		
10	<p>In the Origin page of the REFPLANE New Reference Plane screen:</p> <ul style="list-style-type: none"> <li>Set <b>Use As Origin</b> field to <b>Instrumnt Coords</b>.</li> <li>Press the <b>F6 (PAGE)</b> button to advance to the next screen.</li> </ul> <p><b>Note:</b> The other selection choices for this field are defined in the <i>Reference Plane &amp; Face Scan</i> chapter of the Technical Reference Manual.</p> <p>This takes you to the Offset page of the REFPLANE New Reference Plane screen.</p>																			

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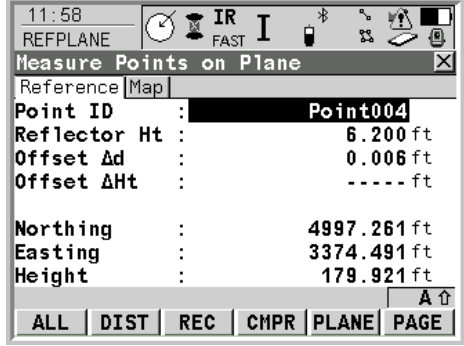
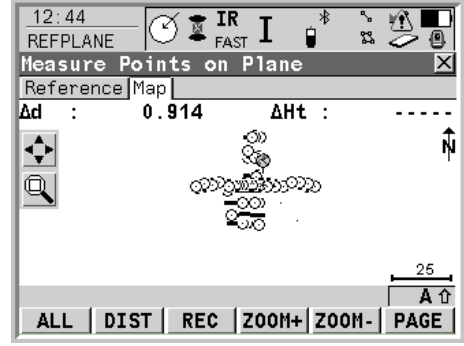
## 10.5 Defining a Reference Plane

Step	Action	Display
<p>11</p> <p>In the Offset page of the REFPLANE New Reference Plane screen:</p> <ul style="list-style-type: none"> <li>Define an Offset method, for this example we will use <b>None</b>.</li> <li>Your other choices are <b>By Point ID</b> or <b>By Distance</b>.</li> <li>If using an offset enter the offset value in the <b>Offset</b> field.</li> <li>Press the <b>F6 (PAGE)</b> button to advance to the next page.</li> </ul> <p><b>Note:</b> The offset is used to shift the plane along the Y-axis.</p> <p>This takes you to the Plot page of the REFPLANE New Reference Plane screen.</p>		
<p>12</p> <p>In the Plot page of the REFPLANE New Reference Plane screen:</p> <p>You are able to view points that define the plane and the orientation to your station point.</p> <ul style="list-style-type: none"> <li>Press the <b>F1 (STORE)</b> button to store this new reference plane.</li> </ul> <p>This takes you to the Reference page of the REFPLANE Measure Points on Plane screen.</p>		
<p>13</p> <p>In the Reference page of the REFPLANE Measure Points on Plane screen:</p> <p>You have now advanced from defining a reference plane to being able to measure points relative to that plane.</p>		

# TPS1200 Quick Guide

## 10.6 Measuring Points on a Reference Plane

**Measure Points** Measuring points on a plane will allow you to measure your targets and record the relative relationship to your reference plane.

Step	Action	Display
1	<p>After defining the reference plane you are ready to measure points on the plane based on the setting in <i>step 7</i> in section 10.5.</p> <ul style="list-style-type: none"> <li>Aim at your target and press the <b>F1 (ALL)</b> button to measure and record the measurement.</li> <li>Press the <b>F6 (PAGE)</b> button to advance to the Map screen.</li> </ul> <p>This will take you to the Map page of the REFPLANE Measure Points on Plane screen.</p>	 <p>The screenshot shows the 'Measure Points on Plane' screen with the following data:</p> <ul style="list-style-type: none"> <li>Point ID: Point004</li> <li>Reflector Ht: 6.200 ft</li> <li>Offset Δd: 0.006 ft</li> <li>Offset ΔHt: ----- ft</li> <li>Northing: 4997.261 ft</li> <li>Easting: 3374.491 ft</li> <li>Height: 179.921 ft</li> </ul> <p>Buttons at the bottom: ALL, DIST, REC, CMPR, PLANE, PAGE.</p>
2	<p>In the Map page of the REFPLANE Measure Points on Plane screen:</p> <ul style="list-style-type: none"> <li>You are able to measure points from the Map screen, also by pressing the <b>F1 (ALL)</b> button. The delta distance and height values from the reference plane are displayed at the top of the map.</li> <li>To exit the application press the <b>SHIFT – F6 (QUIT)</b> button.</li> </ul>	 <p>The screenshot shows the 'Map' page of the 'Measure Points on Plane' screen. At the top, it displays:</p> <ul style="list-style-type: none"> <li>Δd : 0.914</li> <li>ΔHt : -----</li> </ul> <p>The map shows a grid of points and a scale bar of 25 units. Buttons at the bottom: ALL, DIST, REC, ZOOM+, ZOOM-, PAGE.</p>

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## 10.7 Scanning a Plane

### Scan a Plane

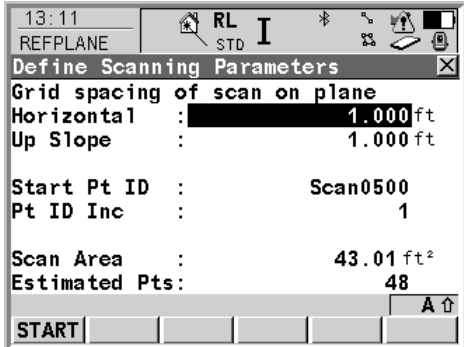
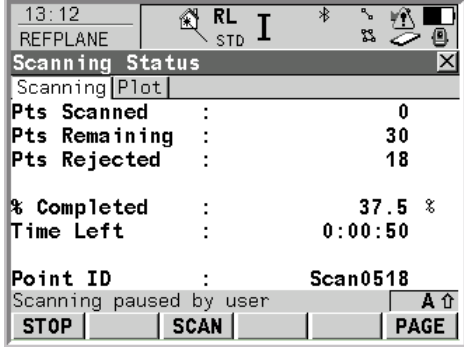
With a reflectorless total station you have the option to define an area and scan that area relative to the defined reference plane.

Step	Action	Display
1	<p>Follow steps 1 through 6 in section 10.5 <i>Defining a Reference Plane</i> to advance to the screen shown in this step.</p> <ul style="list-style-type: none"> <li>Select <b>Scan</b> in the <b>Task</b> field.</li> <li>Since we already created a reference plane, select <b>Select From Job</b> for the <b>Plane to Use</b> field.</li> <li>Select the reference plane that you created for the <b>Ref Plane</b> field.</li> <li>Press the <b>F1 (CONT)</b> button.</li> </ul> <p>This will take you to the INFORMATION: 6314 screen.</p>	
2	<p>In the INFORMATION: 6314 screen:</p> <ul style="list-style-type: none"> <li>Aim the instrument at the first corner of the area you wish to scan.</li> <li>Press the <b>F4 (OK)</b> button.</li> </ul> <p>This takes you to the INFORMATION: 6315 screen.</p>	
3	<p>In the INFORMATION: 6315 screen:</p> <ul style="list-style-type: none"> <li>Aim the instrument at the diagonally opposite corner from the corner you targeted in the previous step.</li> <li>Press the <b>F4 (OK)</b> button.</li> </ul> <p>This takes you to the REPLANE Define Scanning Parameters screen.</p>	

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## 10.7 Scanning a Plane

Step	Action	Display
<p>4</p>	<p>In the REFPLANE Define Scanning Parameters screen:</p> <ul style="list-style-type: none"> <li>• Enter the grid spacing for the measurements as made in the <b>Horizontal</b> direction.</li> <li>• Enter the grid spacing for the measurements made along the <b>Up Slope</b>.</li> <li>• Enter the <b>Start Pt ID</b> value.</li> <li>• Enter the <b>Pt ID Increment</b> value.</li> <li>• The area to be scanned is shown as well as an estimated number of points to be measured.</li> <li>• Press the <b>F1 (START)</b> button to begin scanning.</li> </ul> <p>This will take you to the Scanning page of the REFPLANE Scanning Status screen.</p>	
<p>5</p>	<p>In the Scanning page of the REFPLANE Scanning Status screen:</p> <p>The status of the scan is displayed including the number of points scanned, number of points remaining to be scanned and the number of points that have been rejected. The rejected points do not fall within the parameters of an acceptable distance from the reference plane. A percentage of completion is listed as well as an estimation of the time left to measure the remaining points. The current point ID is also displayed.</p> <p><b>Note:</b> This example was created on the simulator so in your experience you probably won't have as many rejected points.</p> <ul style="list-style-type: none"> <li>• Press the <b>F3 (PAUSE)</b> button to pause the scan process.</li> </ul> <p>This leaves you in the Scanning page of the REFPLANE Scanning Status screen.</p>	

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## 10.7 Scanning a Plane

Step	Action	Display
6	<p>Continuing in the Scanning page of the REFPLANE Scanning Status screen:</p> <p>This screen displays the progress made during the scan and you have the option to:</p> <ul style="list-style-type: none"> <li>Press the <b>F3 (SCAN)</b> button to continue scanning.</li> <li>Press the <b>F1 (STOP)</b> button to stop the scan.</li> </ul> <p>This will return you to the screen displayed in step 1 of this section, REFPLANE Choose Task &amp; Reference Plane.</p>	
7	<p>While in the REFPLANE Scanning Status screen:</p> <ul style="list-style-type: none"> <li>Press the <b>F6 (PAGE)</b> button to view the Plot page.</li> </ul> <p><b>Note:</b> Your points that are currently being scanned are displayed in black, all other points and planes are displayed in gray.</p> <ul style="list-style-type: none"> <li>Press the <b>F3 (SCAN)</b> button to resume scanning.</li> </ul>	
8	<p>Once the scan is complete you will see a similar display.</p> <ul style="list-style-type: none"> <li>Press the <b>F1 (CONT)</b> button to return to the screen shown in step 1 of this section, REFPLANE Choose Task &amp; Reference Plane.</li> <li>Press the <b>SHIFT – F6 (QUIT)</b> buttons to exit the application.</li> </ul>	