

TPS1200 Quick Guide

11 Sets of Angles

Sets of Angles Description

The Sets of Angles application program is used to measure sets of directions and distances to target points in one or two faces. The average direction of all sets is calculated. Standard deviations are calculated for single directions/distances and average directions/distances.

Monitoring is a module integrated within the Sets of Angles application. It uses a timer to enable repeated and automated angle and distance measurements to predefined target points at defined intervals. This quick guide does not cover Monitoring.

ATR search and ATR measurements can be performed to a reflector. After the first measurements to each target point is done, the measurements to the target points in the next sets can be automated.

Before starting the Sets of Angles application program, Station set up and orientation is optional. They are required if oriented grid coordinates are to be recorded.

Point Properties

The properties stored with Sets of Angles points are:

- Class: **MEAS** or **NONE**
- Sub class: **TPS**
- Source: **Sets of Angles**
- Instrument source: **TPS**.

Point Averaging

An average is never calculated for Sets of Angles points if a measured point of class MEAS already exists with the same point ID.

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11 Sets of Angles

In this Chapter

This chapter explains how to access the Sets of Angles application, how to configure the Sets of Angles application, and then describes the procedure to turn 4 sets of angles between two points.


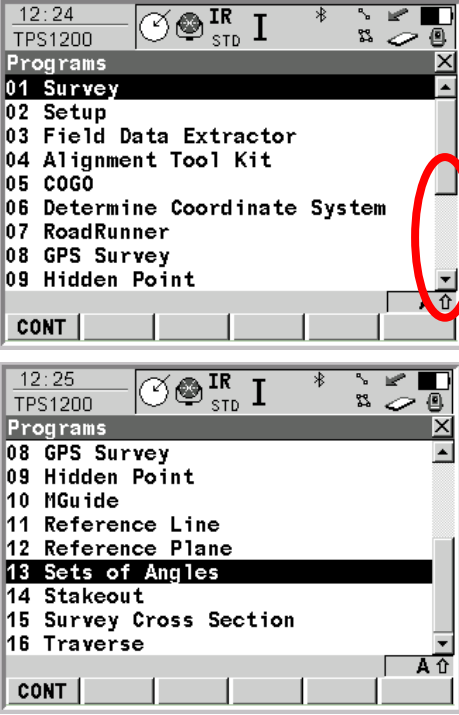
Section	Topic
11.1	Accessing Sets of Angles
11.2	Configuring Sets of Angles
11.3	Sets of Angles
11.3.1	Sets of Angles: Select Points
11.3.2	Sets of Angles: Measure Sets
11.3.3	Sets of Angles: Calculate Angles
11.3.4	Sets of Angles: Calculate Distances
11.3.5	Sets of Angles: End of Sets of Angles

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11.1 Accessing Sets of Angles

Accessing Sets of Angles There are many ways of accessing the Sets of Angles application program. In this example, we will access it via **2 Programs....**

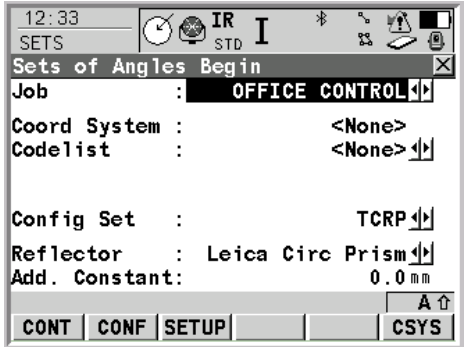
Follow the steps below to access Sets of Angles.

Step	Action	Display
1	From the Main Menu: <ul style="list-style-type: none"> Tap on 2 Programs.... <p>This takes you to the TPS1200 Programs screen.</p>	
2	In the TPS1200 Programs screen: <p>In this example we had to use the scroll bar to see Sets of Angles in the choice list.</p> <ul style="list-style-type: none"> Tap on 13 Sets of Angles. <p>Note: Sets of Angles may be under a different number on your instrument.</p> <p>This takes you to the SETS Sets of Angles Begin screen.</p>	

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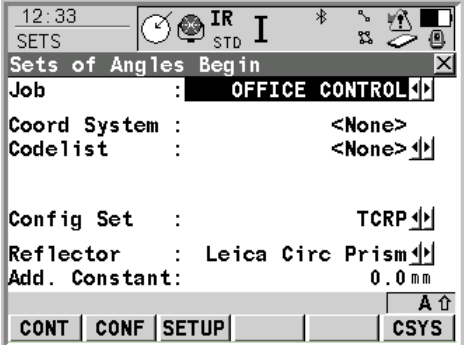
11.1 Accessing Sets of Angles

Step	Action	Display
<p>3</p>	<p>In the SETS Sets of Angles Begin screen:</p> <p>F2 (CONF): Press this button to access the Configuration screen of the Sets of Angles application program.</p> <p>F3 (SETUP): Press this button to access the SETUP Station Setup application program.</p> <p>F6 (CSYS): Press this button to select a different coordinate system.</p> <p>Job: This field allows you select the active job. (See chapter 1, sections 1.7 <i>Job Management: Creating a Job</i> and 1.8 <i>Job Management: Selecting a Job</i>.)</p> <p>Coord System: This field displays the active coordinate system.</p> <p>Codelist: This field displays the active codelist. This field allows you to select a codelist that resides in the instrument's System RAM. Selecting a codelist copies the codes to the job. If codes have not been copied from an existing codelist residing in the System RAM but entered manually, then the name of the active job is displayed.</p> <p>Config Set: This field displays the active configuration set. This field allows you to select a configuration set. See chapter 2 <i>Configuration Sets</i> for information on creating a configuration set.</p> <p>This step continues on the following page.</p>	

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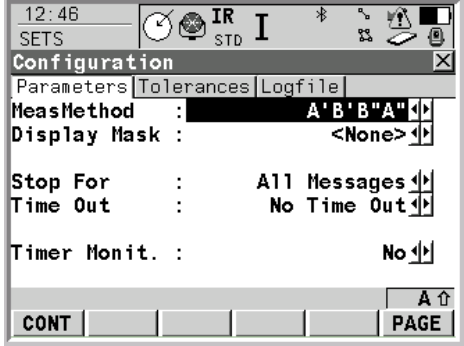
11.1 Accessing Sets of Angles

Step	Action	Display
<p>3</p> <p>This step continues from the previous page:</p> <p>Reflector: This field displays the reflector currently set in the selected configuration set. Use this field to select a reflector.</p> <p>Add. Constant: This field displays the additive constant stored with the chosen reflector.</p> <ul style="list-style-type: none"> • Select a job from the Job field. In this example we created a job called OFFICE CONTROL. • Select a coordinate system. In this example we are not using a coordinate system. • Select a codelist from the Codelist field. In this example we will not use a codelist for the setup. • Select a configuration set from the Config Set field. In this example we are using the TCRP. • Press the F2 (CONF) button. <p>This takes you to the Parameters page of the SETS Configuration screen.</p>		 <p>The screenshot shows a handheld device screen with a status bar at the top displaying '12:33', 'IR STD', and various icons. Below the status bar is a title bar for 'SETS' and a window title 'Sets of Angles Begin'. The main area contains several fields with labels and values: 'Job' is 'OFFICE CONTROL', 'Coord System' is '<None>', 'Codelist' is '<None>', 'Config Set' is 'TCRP', 'Reflector' is 'Leica Circ Prism', and 'Add. Constant' is '0.0 mm'. At the bottom of the screen, there are four buttons: 'CONT', 'CONF', 'SETUP', and 'CSYS'.</p>

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11.2 Configuring Sets of Angles

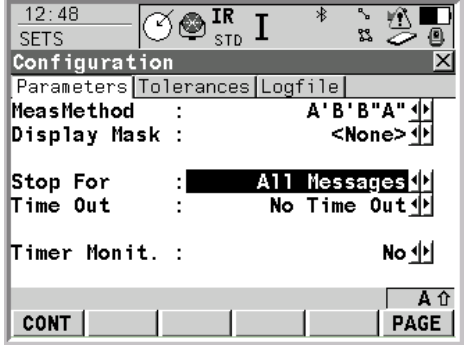
Sets of Angles Configuration The SETS Configuration screen allows you to configure some specific functionality of the Sets of Angles application.

Step	Action	Display
1	<p>In the Parameters page of the SETS Configuration screen:</p> <p>MeasMethod: This field allows you to select the order in which the points are to be measured. The choices are: A'A"B"B" – Point A face 1 – point A face 2 – point B face 2 – point B face 1 – (and then on to) point C face 1... A'A"B'B" – Point A face 1 – point A face 2 – point B face 1 – point B face 2 - (and then on to) point C face 1... A'B'A"B" – Point A face 1 – point B face 1... point A face 2 – point B face 2 ... A'B'B"A" – Point A face 1 – point B face 1... point B face 2 – point A face 2 ... A'B'C'D' – Point A face 1 – point B face 1 – point C face 1 – point D face 1 ...</p> <p>In this example we will select the A'B'B"A" measurement method.</p> <ul style="list-style-type: none"> Select A'B'B"A" in the MeasMethod field. <p>Display Mask: This field allows you to select the user-defined display mask to be shown in SETS Select Points – Survey screen.</p> <p>In this example we will not be selecting a display mask.</p> <ul style="list-style-type: none"> Leave the Display Mask field to None unless you require a display mask. <p>This step continues on the following page.</p>	 <p>The screenshot shows the 'Configuration' window with tabs for 'Parameters', 'Tolerances', and 'Logfile'. The 'Parameters' tab is active. The 'MeasMethod' field is set to 'A'B'B'A"'. The 'Display Mask' field is set to '<None>'. Other fields include 'Stop For' (All Messages), 'Time Out' (No Time Out), and 'Timer Monit.' (No). Buttons for 'CONT' and 'PAGE' are visible at the bottom.</p>

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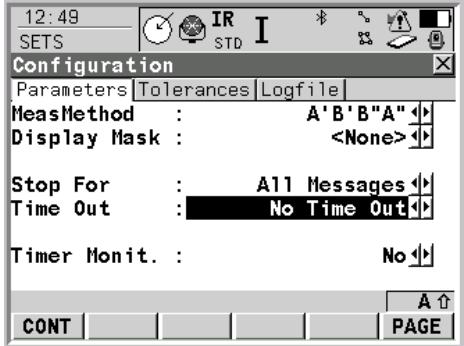
11.2 Configuring Sets of Angles

Step	Action	Display
<p>1</p> <p>This step continues from the previous page.</p> <p>Stop For: This field defines what action is taken when a message dialog appears during a measurement set. The choices are:</p> <p>All Messages – All message dialogs are displayed as per normal use and are closed as defined by the settings in the Time Out field.</p> <p>To Exceed Only – Only the message dialog relating to the exceeding of tolerances is displayed and is closed as defined by the settings in the Time Out field.</p> <p>Never – No message dialogs are displayed except for specific warnings.</p> <p>Note: Specific warnings that affect the instrument and its ability to continue with the monitoring process will be displayed and will remain on the screen. These include the overheating of the instrument, low battery levels, and unavailable space on the CompactFlash card.</p> <ul style="list-style-type: none"> Set the Stop For field to All Messages. <p>This step continues on the following page.</p>		 <p>The screenshot shows a 'Configuration' dialog box with tabs for 'Parameters', 'Tolerances', and 'Logfile'. The 'Parameters' tab is active. The 'MeasMethod' is set to 'A'B'B"A"'. The 'Display Mask' is set to '<None>'. The 'Stop For' field is highlighted and set to 'All Messages'. The 'Time Out' field is set to 'No Time Out'. The 'Timer Monit.' field is set to 'No'. At the bottom, there are 'CONT' and 'PAGE' buttons.</p>

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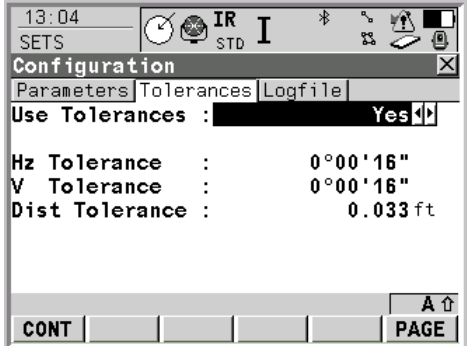
11.2 Configuring Sets of Angles

Step	Action	Display
1	<p>This step continues from the previous page.</p> <p>Time Out: This field defines the time delay for the automatic closing of message dialogs during a measurement set. This choice list is not available when the Stop For field is set to Never. The choices are: No Time Out – With this setting there will be no automatic closure of message dialogs. When a message dialog appears, it is only closed by pressing the F4 (YES) button. 1 sec to 60 sec – All message dialogs are automatically closed as defined by these individual time settings.</p> <ul style="list-style-type: none"> Set the Time Out field to No Time Out. <p>Time Monit.: This field is only available when the Monitoring application program has been registered through a license key. For more information on monitoring, see section <i>11.3 Monitoring</i> in the <i>TPS Application Field 1 Manual</i> or see section <i>45.3 Monitoring</i> in the <i>TPS Technical Reference Manual</i>.</p> <ul style="list-style-type: none"> Leave the Timer Monit. field as No. Press the F6 (PAGE) button to access the Tolerances tab. <p>This takes you to the Tolerances page of the SETS Configuration screen.</p>	

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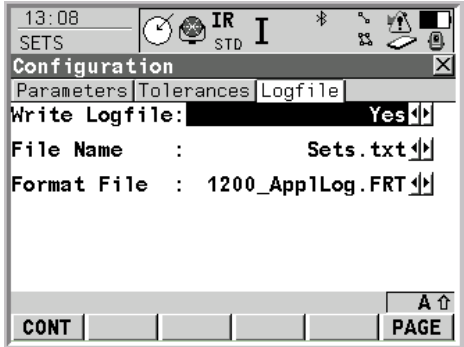
11.2 Configuring Sets of Angles

Step	Action	Display
2	<p>In the Tolerances page of the SETS Configuration screen:</p> <p>Use Tolerance: Use this field to set this application so that the entered horizontal, vertical, and distance tolerances are checked during the measurements. This will verify accurate pointing and measurements.</p> <ul style="list-style-type: none"> Set the Use Tolerances field to Yes. <p>Hz, V, Dist Tolerance: Use these fields to set the tolerances for the horizontal directions, vertical directions, and distances respectively.</p> <ul style="list-style-type: none"> Set these fields to the values displayed in the image on the right. You can adjust these to your preference if these above values are not acceptable. Tap on the Logfile tab. <p>This takes you to the Logfile page of the SETS Configuration screen.</p>	

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11.2 Configuring Sets of Angles

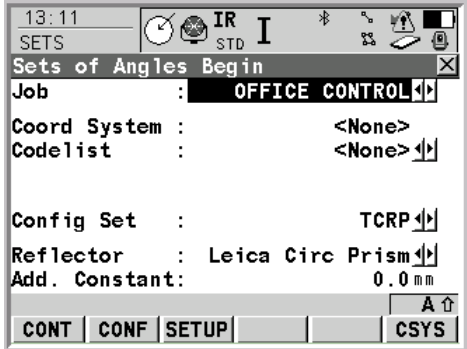
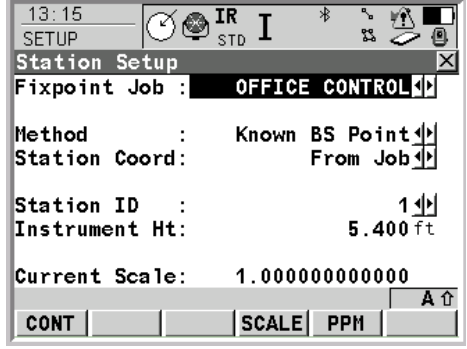
Step	Action	Display
<p>3</p>	<p>In the Logfile page of the SETS Configuration screen:</p> <p>A logfile is a summary of the calculations done while using the Sets of Angles program. Data is always appended to the file. The logfile is written to the Data directory of the CompactFlash card or the internal memory if fitted in the instrument. It is generated using the selected format file.</p> <p>Write Logfile: This field allows you to have the application program generate a logfile when the application is exited.</p> <p>File Name: This field is available if the Write Logfile field is set to Yes. Opening the choice list accesses the SETS Logfiles screen where a name for a new logfile can be created or an existing logfile can be selected or deleted.</p> <p>Format File: This field is available if the Write Logfile field is set to Yes. A format file defines which and how data is written to a logfile. Format files are created using Format Manager within LGO. A format file must first be transferred from the CompactFlash card to the System RAM before it can be selected. Opening the choice list accesses the SETS Format Files screen where existing format files can be selected or deleted.</p> <p>In this example we will not be using a logfile.</p> <ul style="list-style-type: none"> • Set the Write Logfile field to No. Set it to Yes if you require a logfile. • Press the F1 (CONT) button. <p>This returns you to the SETS Sets of Angles Begin screen.</p>	

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11.3 Sets of Angles

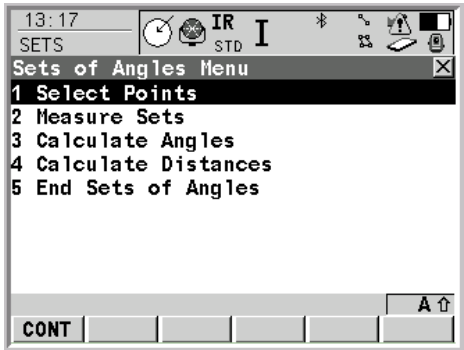
Sets of Angles In this example we will be using the **A'B'B"A** measurement method. (You may remember we configured this method in *step 1* of section 11.2 *Configuring of Sets of Angles*.) We will be set up on point **1** and turning between point **101** and **120**.

Step	Action	Display
<p>1</p>	<p>In the SETS Sets of Angles Begin screen:</p> <p>Although it is not necessary to use the SETUP application program to perform the sets of angles routine, we recommend that you set up the instrument.</p> <ul style="list-style-type: none"> Press the F3 (SETUP) button. <p>This takes you to the SETUP Station Setup screen.</p>	
<p>2</p>	<p>In the SETUP Station Setup screen:</p> <ul style="list-style-type: none"> Advance through the required steps to set the station and orientation of the instrument. <p>For a detailed explanation on using the SETUP application program, please see chapter 6 <i>Setup</i>.</p> <p>When setup has completed you are taken to the SETS Sets of Angles Menu screen.</p>	

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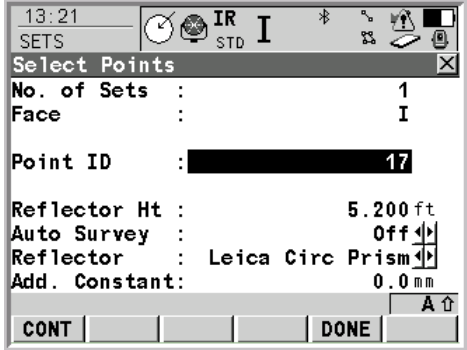
11.3.1 Sets of Angles: Select Points

Step	Action	Display
1	<p>In the SETS Sets of Angles Menu screen:</p> <p>In this screen we have five menu options.</p> <p>1 Select Points – Use this menu selection to select points and measure the first set.</p> <p>2 Measure Sets – Use this menu selection to measure the second and all further sets.</p> <p>3 Calculate Angles – Use this menu selection to calculate vertical and horizontal angles and their standard deviations.</p> <p>4 Calculate Distances – Use this menu selection to calculate distances and their standard deviations.</p> <p>5 End Sets of Angles – Use this menu selection to end the Sets of Angles application program.</p> <p>This quick guide will describe all five menu options.</p> <ul style="list-style-type: none">• Tap on 1 Select Points. <p>This takes you to the SETS Select points screen.</p>	

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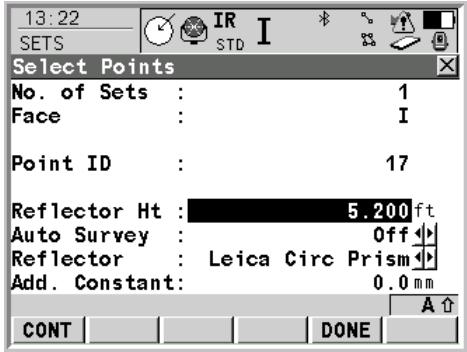
11.3.1 Sets of Angles: Select Points

Step	Action	Display
<p>2</p>	<p>In the SETS Select points screen:</p> <p>The points to be used for Sets of Angles can be selected and the first set measured. The measurement settings of the first measurement to each point are used for all further sets.</p> <p>F1 (CONT): Use this button to measure the entered point and to access SETS Select Points – Survey screen.</p> <p>F5 (DONE): Use this button to finish the selection of points and access SETS Sets of Angles Menu for further steps.</p> <p>SHIFT F4 (GETPT): Use this button combination to select points stored in the database.</p> <p>SHIFT F5 (INDIV) and SHIFT F5 (RUN): Use these two button combinations to change between entering an individual point ID different to the defined ID template and the running point ID according to the ID template.</p> <p>Point ID: Use this field to enter the point ID of the point that will be used in the angle sets.</p> <ul style="list-style-type: none"> Enter the point ID of the first point of the angle set in the Point ID field. In this example we will be pointing the telescope at point 17. Point 17 is in our database so we will use the SHIFT F4 (GETPT) button combination. <p>This step continues on the following page.</p>	

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11.3.1 Sets of Angles: Select Points

Step	Action	Display
2	<p>This step continues from the following page.</p> <p>Reflector Ht: Use this field to enter the height of the reflector of the point that was entered in the Point ID field.</p> <ul style="list-style-type: none"> Enter the height of the reflector in the Reflector Ht field of the point that you entered in the Point ID field. <p>Auto Survey: This field is for instruments with ATR, and with the Auto Survey field set to ON, ATR search and ATR measurements are done to specified targets in additional sets. The instrument will automatically measure the selected points in the second face of the first set.</p> <ul style="list-style-type: none"> Set the Auto Survey field to On if you have an instrument with ATR and you wish to use auto survey. <p>Reflector: Use this field to enter the reflector type of the target point that you entered in the Point ID field.</p> <ul style="list-style-type: none"> Enter the reflector type of the target point that you entered in the Point ID field. In this example we are using a Leica circular prism. Press the F1 (CONT) button. <p>This takes you to the Sets page of the Select Points – Survey screen.</p>	

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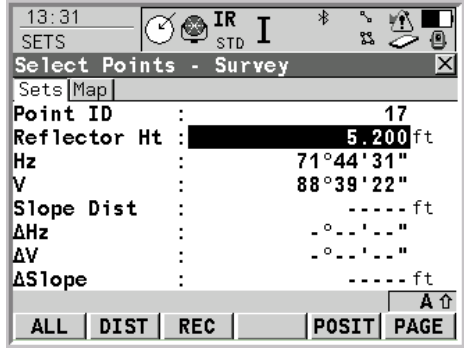
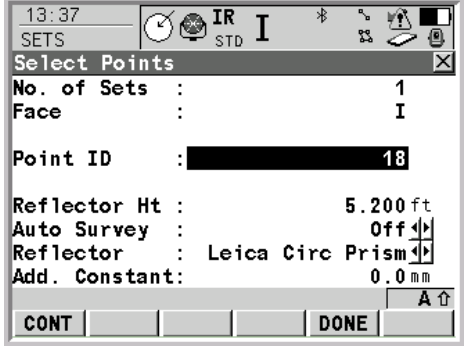
11.3.1 Sets of Angles: Select Points

Step	Action	Display
<p>3</p>	<p>In the Sets page of the Select Points – Survey screen:</p> <p>Because we setup the instrument on a known point (1) from the database, and we happen to be targeting a point that is also in the database, and the Auto Survey field is set to On, the instrument automatically turns to point 17.</p> <p>F1 (ALL): Use this button to measure and store angles and distances and to return to the SETS Select Points screen.</p> <p>F2 (DIST): Use this button to measure a distance.</p> <p>F3 (REC): Use this button to store data and return to the SETS Select Points screen.</p> <p>F5 (POSIT): Use this button to position the instrument to the selected target point.</p> <p>H_z and V: These fields display the current horizontal angle and vertical angle respectively.</p> <p>Slope Dist: This field displays the measured slope distance after the F2 (DIST) button is pressed.</p> <p>Δ HZ, Δ V, Δ Slope: These fields display the difference between the current horizontal angle, vertical angle, or distance and the horizontal angle, vertical angle, or distance to this target when selected.</p> <p>This step continues on the following page.</p>	 z: -°--'---\", ΔV: -°--'---\", ΔSlope: ----- ft. At the bottom, there are buttons for ALL, DIST, REC, POSIT, and PAGE."/>

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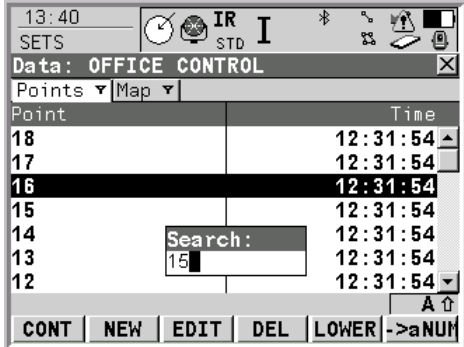
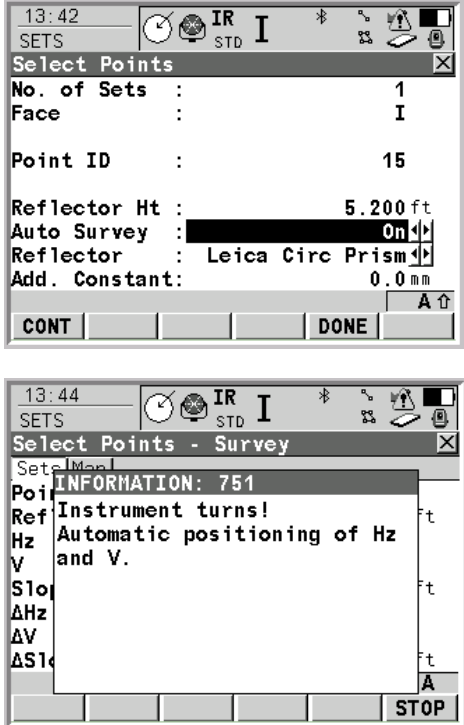
11.3.1 Sets of Angles: Select Points

Step	Action	Display
<p>3</p> <p>This step continues from the previous page:</p> <p>Once the instrument is pointed at the first point in the angle set,</p> <ul style="list-style-type: none"> Press the F1 (ALL) button to measure this point. <p>This takes us to the SETS Select Points screen.</p> <p>Notice the message alerting us that the point has been stored and the Point ID field has incremented to point 18.</p> <p>We now want to select the next point (in our example, 15) we will point the telescope at to complete the first half of the first set.</p> <ul style="list-style-type: none"> Press the SHIFT F4 (GETPT) button combination and select the next point. If the point does not exist in the database, enter the point ID of the next point in the angle set. <p>This takes you to the SETS Data screen.</p>		 

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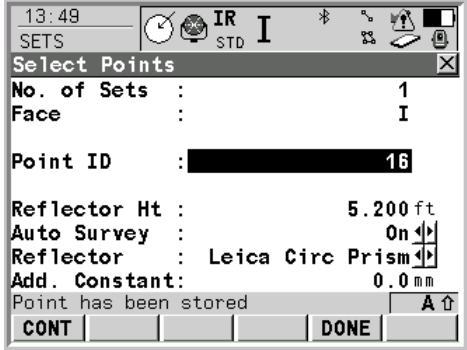
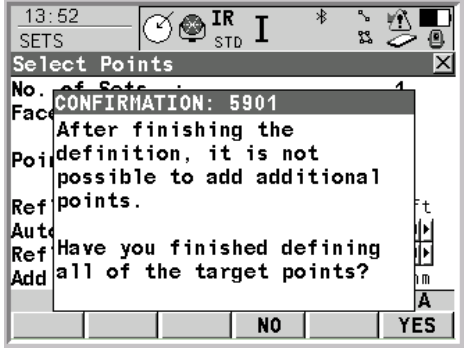
11.3.1 Sets of Angles: Select Points

Step	Action	Display
<p>4</p>	<p>In the SETS Data screen:</p> <ul style="list-style-type: none"> Select the next point in the angle set. In this example it is 15. Press the F1 (CONT) button. <p>This returns us to the SETS Select Points screen.</p>	
<p>5</p>	<p>In the SETS Select Points screen:</p> <p>Remember to check the Reflector field to ensure the correct reflector type is being used.</p> <ul style="list-style-type: none"> Set the Auto Survey field to On if you have an instrument with ATR and you wish to use auto survey. Enter a reflector height in the Reflector Ht field. In our example the skill of our rod person shined, as she was able to set the second target height to be the exact same height as the first prism height. Press the F1 (CONT) button. Press the F1 (ALL) button to store the measurement. <p>Our instrument turns to point 15 and this takes us back to the SETS Select Points screen.</p>	

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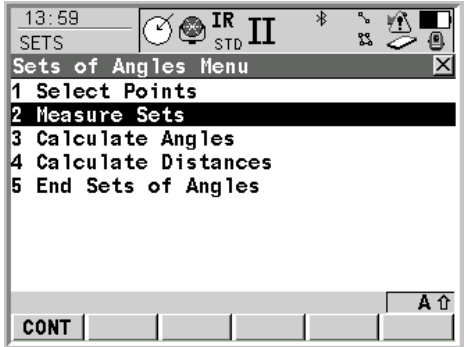
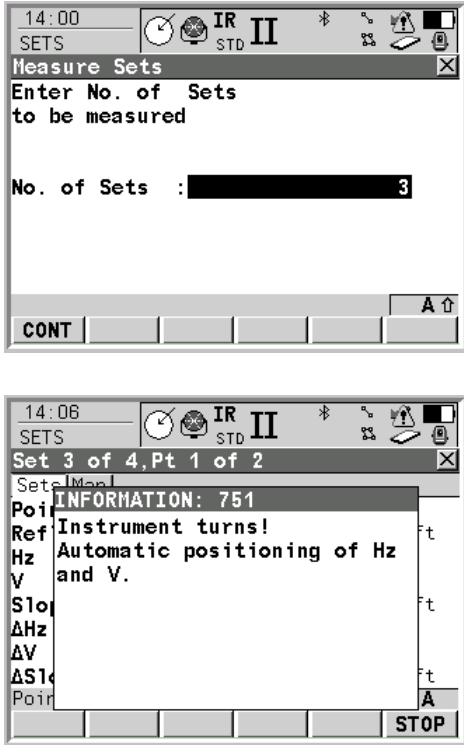
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11.3.1 Sets of Angles: Select Points

Step	Action	Display
<p data-bbox="302 436 318 464">6</p> <p data-bbox="370 436 773 464">In the SETS Select Points screen:</p> <p data-bbox="370 527 911 617">We have completed instructing the instrument which points we want to include in our sets of angles.</p> <ul data-bbox="418 680 808 707" style="list-style-type: none"> <li data-bbox="418 680 808 707">• Press the F5 (DONE) button. <p data-bbox="370 894 865 1014">We are presented with a Confirmation window asking us if we want to add any additional points. Since we have selected both points, we are ready to proceed.</p> <ul data-bbox="418 1077 784 1104" style="list-style-type: none"> <li data-bbox="418 1077 784 1104">• Press the F6 (YES) button. <p data-bbox="370 1167 894 1257">This measures the points in the second face and takes you to the SETS Sets of Angles Menu.</p>		 

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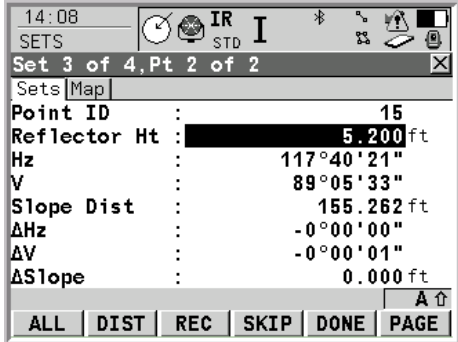
11.3.2 Sets of Angles: Measure Sets

Step	Action	Display
1	<p>In the SETS Sets of Angles Menu:</p> <p>We are now ready to enter how many sets of angles we would like our total station to turn.</p> <ul style="list-style-type: none"> • Tap on 2 Measure Sets. <p>This takes you to the SETS Measure Sets screen.</p>	
2	<p>In the SETS Measure Sets screen:</p> <ul style="list-style-type: none"> • Enter the number of sets you wish the instrument to turn. In this example we will enter 3 sets. • Press the Enter button when finished entering the number of sets. • Press the F1 (CONT) button. <p>The instrument begins to turn angle sets. Notice that the Sets indicator says "x of 4". Since in the selecting of points phase (see section 11.3.1) the instrument already turned the first set, when we entered 3 in No. of Sets field, the instrument actually turns a total of 4 sets.</p> <p>This step continues on the following page.</p>	

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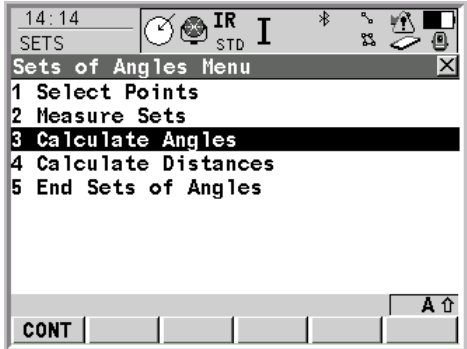
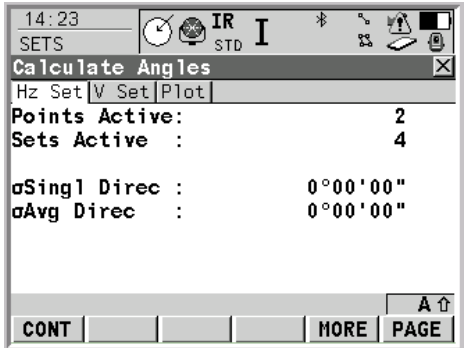
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11.3.2 Sets of Angles: Measure Sets

Step	Action	Display
<p data-bbox="302 436 886 468">2 This step continues from the previous page:</p> <p data-bbox="370 527 870 615">As the instrument turns angle sets, the set number and point number information is displayed.</p> <p data-bbox="370 648 873 768">The buttons and fields on this page are similar to the fields on the Sets page of the Select Point – Survey screen except the following:</p> <p data-bbox="370 831 883 919">F4 (SKIP): Press this button to skip measuring the displayed point and continue with the next point.</p> <p data-bbox="370 953 906 1012">F5 (DONE): Press this button to end the sets of angles measurements.</p> <p data-bbox="370 1045 891 1134">SHIFT F5 (POSIT): Press this button combination to position the instrument to the selected target point.</p> <p data-bbox="370 1194 883 1346">ΔHz, ΔV, ΔSlope: These fields display the difference between the current horizontal/vertical angle or distance and the horizontal/vertical angle or distance to this target when selected.</p> <p data-bbox="370 1409 906 1558">Once the instrument has completed turning the number of sets entered in the No. of Sets field of the SETS Measure Sets screen, you are returned to the SETS Sets of Angles Menu screen.</p>		

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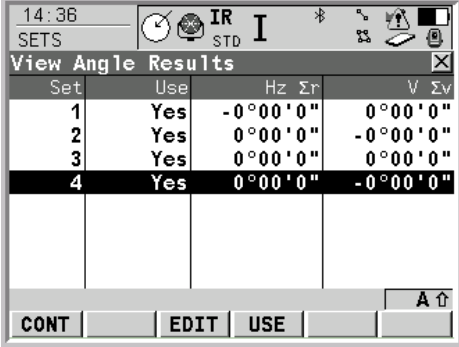
11.3.3 Sets of Angles: Calculate Angles

Step	Action	Display
1	<p>In the SETS Sets of Angles Menu:</p> <ul style="list-style-type: none"> Tap on 3 Calculate Angles. <p>Note: This example describes the displays for measuring sets of angles in both faces. To learn more about sets of angles measured in one face, see the <i>TPS Technical Reference Manual</i>, section 45.2.7 <i>Calculations – Viewing Results in One Face</i>.</p> <p>This takes you to the Hz Set page of the SETS Calculate Angles screen.</p>	
2	<p>In the Hz Set page of the SETS Calculate Angles screen:</p> <p>Calculations for angles and distances are displayed for two or more sets measured with angles and distances in two faces.</p> <p>Note: The following fields and buttons also apply to the V Set page.</p> <p>F5 (MORE): Press this button to view the results of the angles calculation.</p> <p>Points and Sets Active: These fields display the number of active points/sets which are set to On in the Use column of the SETS View Angle Results screen.</p> <p>σSingl Direc and σAvg Direc: These fields display the standard deviation of a single horizontal direction and the standard deviation of the average horizontal direction respectively.</p> <ul style="list-style-type: none"> Press the F5 (MORE) button. <p>This takes you to the SETS View Angle Results screen.</p>	

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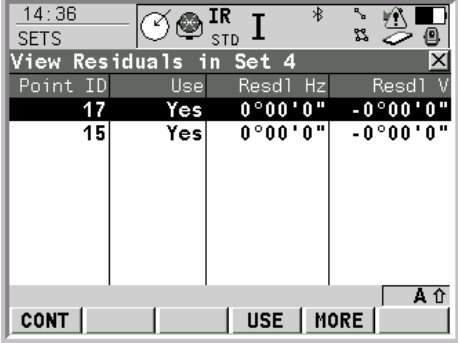
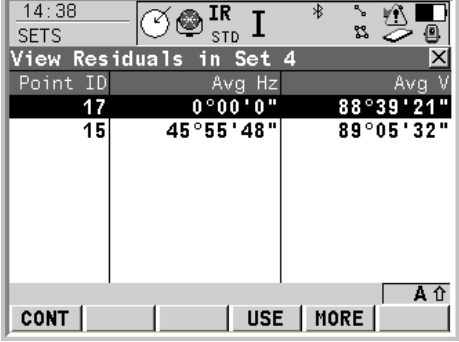
11.3.3 Sets of Angles: Calculate Angles

Step	Action	Display																				
<p>3</p> <p>In the SETS View Angle Results screen:</p> <p>Set: This column displays the numbers of all sets measured.</p> <p>Use: Yes signifies the selected set is used for calculations. No signifies the selected set is not used for calculations.</p> <p>H_z Σr: This column displays the calculated Σr in horizontal direction of the selected set where Σr is the sum of the difference between the reduced average direction and each set's directions. For sets not used for calculation, a ----- is displayed.</p> <p>V Σr: This column displays the calculated Σr in vertical direction of the selected set where Σr is the sum of the difference between the average vertical angles and each set's vertical angles. For sets not used for calculation, a ----- is displayed.</p> <p>F3 (EDIT): Use this button to view the residuals in the highlighted row.</p> <p>F4 (USE): Use this button to set Yes or No in the Use column for the highlighted set.</p> <ul style="list-style-type: none"> Select a set number and press the F3 (EDIT) button. In this example we will arbitrarily select set number 4. <p>This takes you to the SETS View Residuals in Set 4 screen.</p>		 <p>The screenshot shows the 'View Angle Results' screen. At the top, it displays the time '14:36' and the title 'SETS'. Below the title is a table with the following data:</p> <table border="1"> <thead> <tr> <th>Set</th> <th>Use</th> <th>H_z Σr</th> <th>V Σr</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Yes</td> <td>-0°00'0"</td> <td>0°00'0"</td> </tr> <tr> <td>2</td> <td>Yes</td> <td>0°00'0"</td> <td>-0°00'0"</td> </tr> <tr> <td>3</td> <td>Yes</td> <td>0°00'0"</td> <td>0°00'0"</td> </tr> <tr style="background-color: #e0e0e0;"> <td>4</td> <td>Yes</td> <td>0°00'0"</td> <td>-0°00'0"</td> </tr> </tbody> </table> <p>At the bottom of the screen, there are four buttons: 'CONT', 'EDIT', 'USE', and 'A ↑'. The 'EDIT' button is currently highlighted.</p>	Set	Use	H _z Σr	V Σr	1	Yes	-0°00'0"	0°00'0"	2	Yes	0°00'0"	-0°00'0"	3	Yes	0°00'0"	0°00'0"	4	Yes	0°00'0"	-0°00'0"
Set	Use	H _z Σr	V Σr																			
1	Yes	-0°00'0"	0°00'0"																			
2	Yes	0°00'0"	-0°00'0"																			
3	Yes	0°00'0"	0°00'0"																			
4	Yes	0°00'0"	-0°00'0"																			

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11.3.3 Sets of Angles: Calculate Angles

Step	Action	Display																					
<p data-bbox="302 436 318 457">4</p> <p data-bbox="370 436 898 464">In the SETS View Residuals in Set 4 screen:</p> <p data-bbox="370 527 911 678">Point ID: This column lists the Point ID of the measured points in the order in which they were defined and measured in the SETS Select Points screen. The point ID is truncated to six digits from the right.</p> <p data-bbox="370 709 428 737">Use:</p> <p data-bbox="370 741 789 800">Yes: The selected point is used for calculations in all sets.</p> <p data-bbox="370 804 821 863">No: The selected point is not used for calculations in all sets.</p> <p data-bbox="370 894 899 1045">Resdl Hz: This column displays the residual in horizontal of the selected point within the set that was highlighted when F3 (EDIT) was pressed in the SETS View Angle Results screen.</p> <p data-bbox="370 1077 911 1228">Resdl V: This column displays the residual in vertical of the selected point within the set that was highlighted when F3 (EDIT) was pressed in the SETS View Angle Results screen.</p> <p data-bbox="370 1260 902 1472">Avg Hz: This column displays the average horizontal value of the appropriate point within the set highlighted when F5 (MORE) was pressed in the SETS View Residuals in Set X screen. The average values displayed are the averaged observations of this point in all active sets.</p> <p data-bbox="370 1503 907 1715">Avg V: This column displays the average vertical value of the appropriate point within the set highlighted when F5 (MORE) was pressed in the SETS View Residuals in Set X screen. The average values displayed are the averaged observations of this point in all active sets.</p> <p data-bbox="370 1776 865 1803">This step continues on the following page.</p>		 <p>The screenshot shows the 'View Residuals in Set 4' screen. The table has columns for Point ID, Use, Resdl Hz, and Resdl V. Point 17 is highlighted with a black background.</p> <table border="1"> <thead> <tr> <th>Point ID</th> <th>Use</th> <th>Resdl Hz</th> <th>Resdl V</th> </tr> </thead> <tbody> <tr> <td>17</td> <td>Yes</td> <td>0°00'0"</td> <td>-0°00'0"</td> </tr> <tr> <td>15</td> <td>Yes</td> <td>0°00'0"</td> <td>-0°00'0"</td> </tr> </tbody> </table>  <p>The screenshot shows the 'View Residuals in Set 4' screen. The table has columns for Point ID, Avg Hz, and Avg V. Point 17 is highlighted with a black background.</p> <table border="1"> <thead> <tr> <th>Point ID</th> <th>Avg Hz</th> <th>Avg V</th> </tr> </thead> <tbody> <tr> <td>17</td> <td>0°00'0"</td> <td>88°39'21"</td> </tr> <tr> <td>15</td> <td>45°55'48"</td> <td>89°05'32"</td> </tr> </tbody> </table>	Point ID	Use	Resdl Hz	Resdl V	17	Yes	0°00'0"	-0°00'0"	15	Yes	0°00'0"	-0°00'0"	Point ID	Avg Hz	Avg V	17	0°00'0"	88°39'21"	15	45°55'48"	89°05'32"
Point ID	Use	Resdl Hz	Resdl V																				
17	Yes	0°00'0"	-0°00'0"																				
15	Yes	0°00'0"	-0°00'0"																				
Point ID	Avg Hz	Avg V																					
17	0°00'0"	88°39'21"																					
15	45°55'48"	89°05'32"																					

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11.3.3 Sets of Angles: Calculate Angles

Step	Action	Display
4	<p>This step continues from the previous page:</p> <p>Mean Hz: This column displays the mean horizontal value of the selected point within the set highlighted when F5 (MORE) was pressed in the SETS View Residuals in Set X screen. The mean values displayed are the mean observations of this point in all active sets.</p> <p>Mean V: This column displays the mean vertical value of the selected point within the set highlighted when F5 (MORE) was pressed in the SETS View Residuals in Set X screen. The mean values displayed are the mean observations of this point in all active sets.</p> <p>F4 (USE): Use this button to set Yes or No in the Use column for the highlighted point.</p> <p>F5 (MORE): Use this button to view additional information.</p> <p>In this example, we are pleased with the results so there will be no need to not use any of the observations in the angle sets measurement.</p> <ul style="list-style-type: none">• Press the F1 (CONT) button. <p>This returns you to the SETS View Angle Results screen.</p>	<p>14:40 SETS IR STD I View Residuals in Set 4 Point ID Mean Hz Mean V 17 71°44'33" 88°39'22" 15 117°40'21" 89°05'32" CONT USE MORE A ↑</p>

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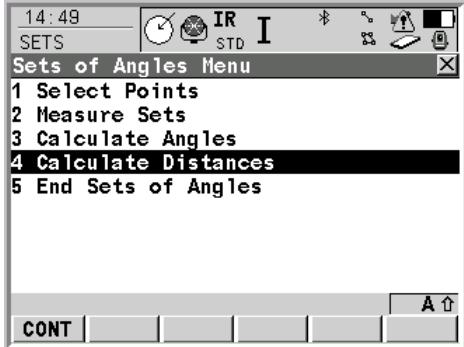
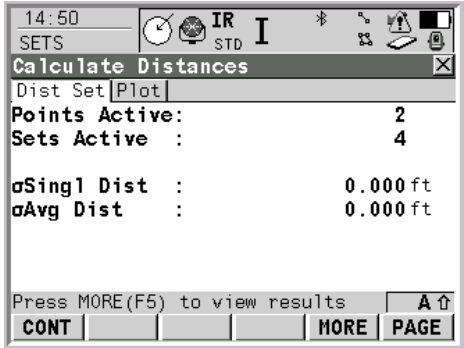
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11.3.3 Sets of Angles: Calculate Angles

Step	Action	Display
5	<p>In the SETS View Angle Results screen:</p> <ul style="list-style-type: none"> Press the F1 (CONT) button. <p>This returns you to the SETS Calculate Angles screen.</p>	
6	<p>In the SETS Calculate Angles screen:</p> <ul style="list-style-type: none"> Tap on the Plot tab or press the F6 (PAGE) button twice. <p>This takes you to the Plot page of the SETS Calculate Angles screen.</p>	
7	<p>In the Plot page of the SETS Calculate Angles screen:</p> <p>In this screen we can see the instrument point and the two target points used in the sets of angles.</p> <p>Note: The functionality and softkeys in the plot page are described in detail in the <i>Setup Method Resection</i> section of chapter 6 <i>Setup</i>.</p> <ul style="list-style-type: none"> Press the F1 (CONT) button. <p>This takes you to the SETS Sets of Angles Menu.</p>	

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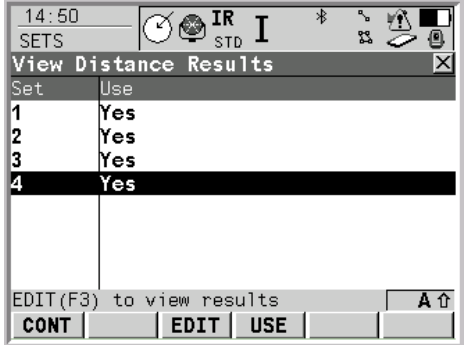
11.3.4 Sets of Angles: Calculate Distances

Step	Action	Display
1	<p>In the SETS Sets of Angles Menu:</p> <p>The next step is to calculate distances.</p> <ul style="list-style-type: none"> Tap on 4 Calculate Distances. <p>This takes you to the Dist Set page of the SETS Calculate Distances screen.</p>	
2	<p>In the Dist Set page of the SETS Calculate Distances screen:</p> <p>Points and Sets Active: These fields display the number of active points/sets which are set to On in the Use column of the SETS View Distance Results screen</p> <p>σSingl Dist and σAvg Dist: These fields display the standard deviation of a single distance and the standard deviation of the average distance respectively.</p> <ul style="list-style-type: none"> Press the F5 (MORE) button. <p>This takes you to the SETS View Distance Results screen.</p>	

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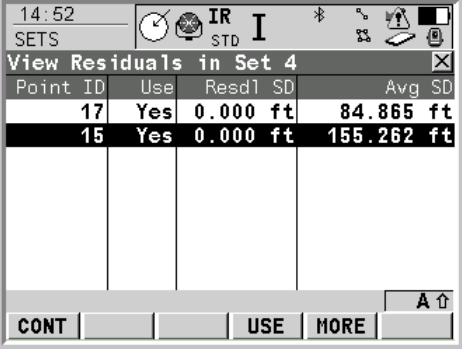
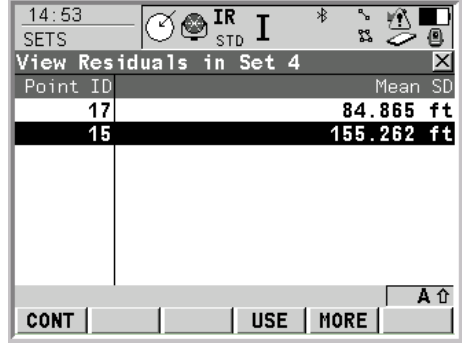
11.3.4 Sets of Angles: Calculate Distances

Step	Action	Display										
<p>3</p>	<p>In the SETS View Distance Results screen:</p> <p>Set: This column displays the numbers of all sets measured.</p> <p>Use: Yes signifies the selected set is used for calculations. No signifies the selected set is not used for calculations.</p> <p>F3 (EDIT): Use this button to view the residuals of the highlighted row.</p> <p>F4 (USE): Use this button to set Yes or No in the Use column for the highlighted set.</p> <ul style="list-style-type: none"> Select a set number and press the F3 (EDIT) button. In this example we will arbitrarily select set number 4. <p>This takes you to the SETS View Residuals in Set 4 screen.</p>	 <table border="1"> <thead> <tr> <th>Set</th> <th>Use</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Yes</td> </tr> <tr> <td>2</td> <td>Yes</td> </tr> <tr> <td>3</td> <td>Yes</td> </tr> <tr> <td>4</td> <td>Yes</td> </tr> </tbody> </table>	Set	Use	1	Yes	2	Yes	3	Yes	4	Yes
Set	Use											
1	Yes											
2	Yes											
3	Yes											
4	Yes											

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11.3.4 Sets of Angles: Calculate Distances

Step	Action	Display
<p data-bbox="302 436 318 457">4</p> <p data-bbox="370 436 898 464">In the SETS View Residuals in Set 4 screen:</p> <p data-bbox="370 527 906 674">Point ID: This column lists the Point ID of the measured points in the order in which they were defined and measured in the SETS Select Points screen. The point ID is truncated to six digits from the right.</p> <p data-bbox="370 709 427 737">Use:</p> <p data-bbox="370 741 789 800">Yes: The selected point is used for calculations in all sets.</p> <p data-bbox="370 804 821 863">No: The selected point is not used for calculations in all sets.</p> <p data-bbox="370 926 906 1073">Resd1 SD: This column displays the residual in distance of the selected point within the set that was highlighted when F3 (EDIT) was pressed in the SETS View Dist Results screen.</p> <p data-bbox="370 1108 889 1318">Avg SD: This column displays the average value in distance of the selected point within the set that was highlighted when F3 (EDIT) was pressed in the SETS View Dist Results screen. Averaged values displayed are the averaged observations of this point in all active sets.</p> <p data-bbox="370 1354 906 1564">Mean SD: This column displays the mean value in distance of the selected point within the set that was highlighted when F5 (MORE) was pressed in the SETS View Residuals in Set X screen. Mean values displayed are the mean observations of this point in all active sets.</p> <p data-bbox="370 1600 906 1659">F4 (USE): Use this button to set Yes or No in the Use column for the highlighted point.</p> <p data-bbox="370 1694 797 1753">F5 (MORE): Use this button to view additional information.</p> <p data-bbox="370 1780 862 1808">This step continues on the following page.</p>	 <p data-bbox="959 432 1417 779">The screenshot shows the 'View Residuals in Set 4' screen. The top status bar displays '14:52', 'SETS', and 'IR STD'. The table below has columns: Point ID, Use, Resd1 SD, and Avg SD. Row 17 is highlighted with '17', 'Yes', '0.000 ft', and '84.865 ft'. Row 15 is highlighted with '15', 'Yes', '0.000 ft', and '155.262 ft'. The bottom of the screen shows buttons for 'CONT', 'USE', 'MORE', and 'A ↑'.</p>  <p data-bbox="959 1350 1417 1696">The screenshot shows the 'View Residuals in Set 4' screen. The top status bar displays '14:53', 'SETS', and 'IR STD'. The table below has columns: Point ID and Mean SD. Row 17 is highlighted with '17' and '84.865 ft'. Row 15 is highlighted with '15' and '155.262 ft'. The bottom of the screen shows buttons for 'CONT', 'USE', 'MORE', and 'A ↑'.</p>	

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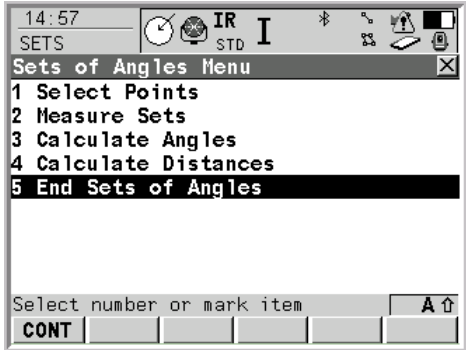
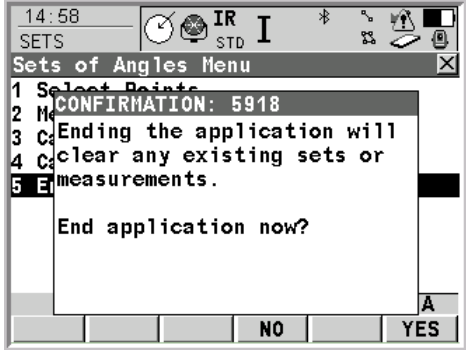
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11.3.4 Sets of Angles: Calculate Distances

Step	Action	Display
4	<p>This step continues from the previous page:</p> <p>In this example, we are pleased with the results so there will be no need to not use any of the observations in the angle sets measurement.</p> <ul style="list-style-type: none"> Press the F1 (CONT) button. <p>This returns you to the SETS View Distances Results screen.</p>	
5	<p>In the SETS View Distances Results screen:</p> <ul style="list-style-type: none"> Press the F1 (CONT) button. <p>This returns you to the Dist Set page of the SETS Calculate Distances screen.</p>	
6	<p>In the Dist Set page of the SETS Calculate Distances screen:</p> <ul style="list-style-type: none"> Press the F1 (CONT) button. <p>This returns you to the SETS Sets of Angles Menu.</p>	

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11.3.5 Sets of Angles: End Sets of Angles

Step	Action	Display
1	<p>In the SETS Sets of Angles Menu</p> <ul style="list-style-type: none">Tap on 5 End of Sets of Angles. <p>A confirmation window appears giving you the option of ending the application or not.</p> <ul style="list-style-type: none">Press F6 (YES) to accept the ending of the application or F4 (NO) to continue within the application. In this example we will press F6 (YES) to accept the ending of the application. <p>This returns you to the Main Menu.</p>	 <p>The screenshot shows the 'SETS' application interface. At the top, the time is 14:57. Below the title bar, there are icons for IR, STD, and I. The main menu is titled 'Sets of Angles Menu' and contains five numbered options: 1 Select Points, 2 Measure Sets, 3 Calculate Angles, 4 Calculate Distances, and 5 End Sets of Angles. The option '5 End Sets of Angles' is highlighted with a black background. At the bottom, there is a prompt 'Select number or mark item' and a button labeled 'CONT'.</p>  <p>The screenshot shows the same 'SETS' application interface, but now a confirmation dialog box is displayed over the menu. The dialog box has a title bar that says 'CONFIRMATION: 5918'. The text inside the dialog box reads: 'Ending the application will clear any existing sets or measurements.' Below this text, it asks 'End application now?'. At the bottom of the dialog box, there are two buttons: 'NO' and 'YES'. The 'YES' button is highlighted.</p>