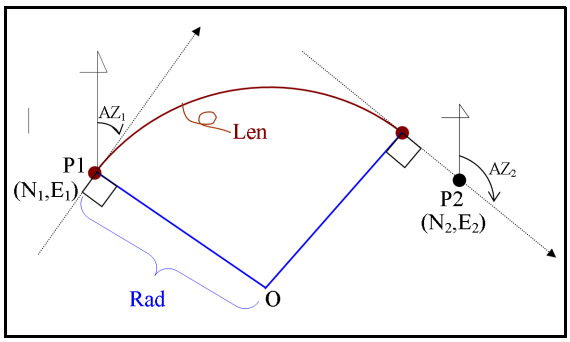


Once you entered all factors, the Focus 4W calculates the curve. If the curve length (Len) is too large for a circle of the given radius, the curve is shortened.

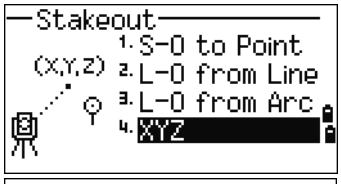
Note – *Press* DSP *to switch between display screens. See also page 90.*

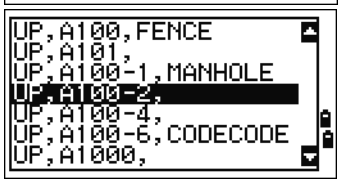
XYZ

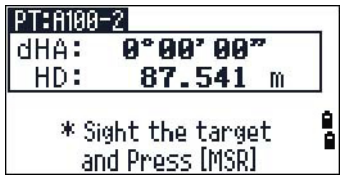
Select this option to specify the stakeout point by coordinates.

1. Press 4 or select XYZ in the Layout menu.
2. Do one of the following:
   - Enter the point name that you want to establish and then press ENT.
   - Specify the point by code or radius from the Focus 4W. If several points are found, they are displayed in a list. Press ^ or v to move up and down the list. Use < to move up one page, or > to move down one page.
3. Highlight a point in the list and then press ENT.

   The delta angle and the distance to the target are shown.
4. Rotate the instrument until the dHA is close to 0°00'00". Press MSR1 or MSR2.



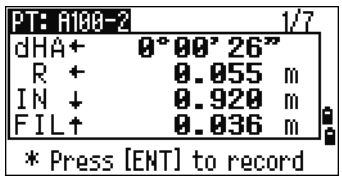




dHA	Difference in horizontal angle to the target point
HD	Distance to the target point

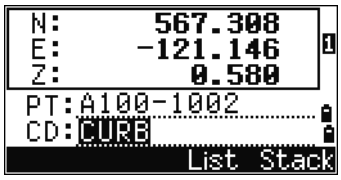
5. Ask the rod person to adjust the target position. When the target is on the intended position, the displayed errors become 0.000 m (0.000 ft).

dHA	Difference in horizontal angle to the target point
R/L	Right/Left (Lateral error)
IN/OUT	In/Out (Longitudinal error)
CUT/FIL	Cut/Fill



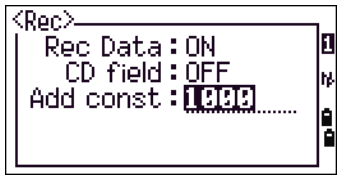
Once a measurement is taken, the Cut/Fill value and Z coordinate are updated as the VA is changed.

6. To record the point, press ENT. The PT field defaults to the specified PT + 1000.

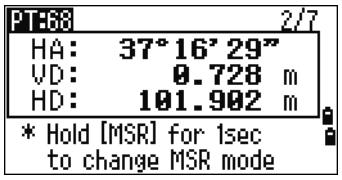


Press MENU and then select `Settings / Rec.`

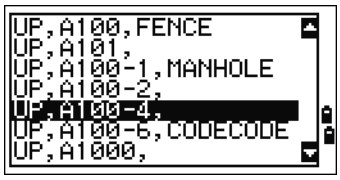
Use the Add Constant field to specify an integer. The integer is added to the point number that is being laid out to generate a new number for recording the layout point. The default value is 1000. For example, when you stake out PT3 with an Add Constant of 1000, the default value in the SO field (layout record) is 1003.



The display then returns to the observation screen. Press ESC. The display returns to the PT/CD/R input screen. If you entered the stakeout point using a single point name, the PT defaults to the last PT + 1.

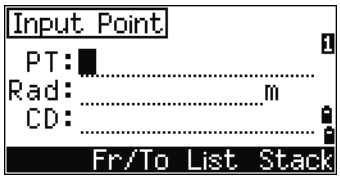


7. If you selected a point from the list, the display returns to the list, unless all points have been selected. Press ESC to return to the point input screen.

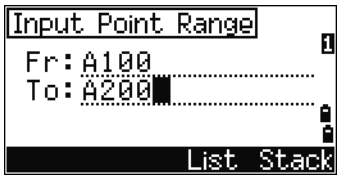


Advanced feature: Specifying a layout list by inputting points by range

1. Select the Fr/To softkey when the PT field is selected.

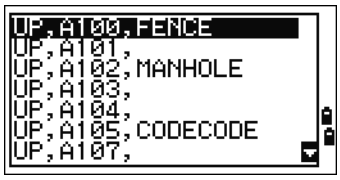


2. Enter the start point (Fr) and the end point (To). The range between Fr and To must be less than 1001 points.

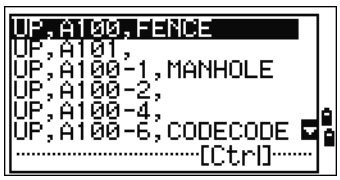


   – If existing points are found between Fr and To, a point list appears.

     To highlight a point in the list, press ^ or v. To go to the layout observation screen, press ENT.

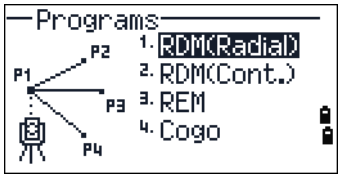


   – If you have assigned a control job, and additional points are found in the control job, the Ctrl softkey appears under the list.



Programs menu

To access the Programs menu, press PRG in the BMS.



To select a command from the Programs menu, press the corresponding number key. Alternatively, press ^ or v to highlight the command and then press ENT.

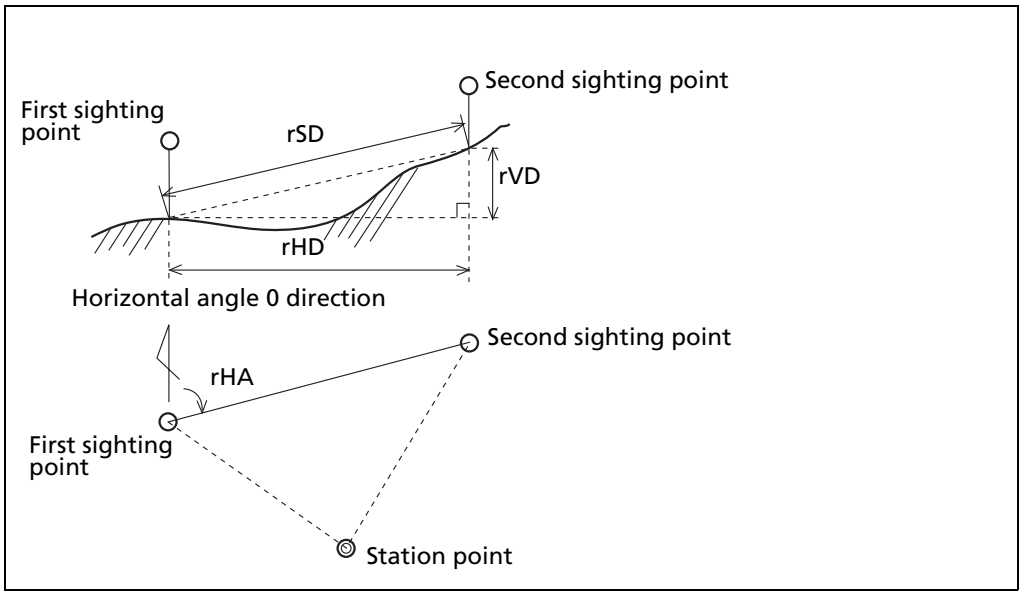
The last function used is highlighted.

The Programs menu has the following options:

- RDM (Radial), page 77
- RDM (Cont), page 77
- REM, page 78
- Cogo, page 78

Remote distance measurement (RDM) - overview

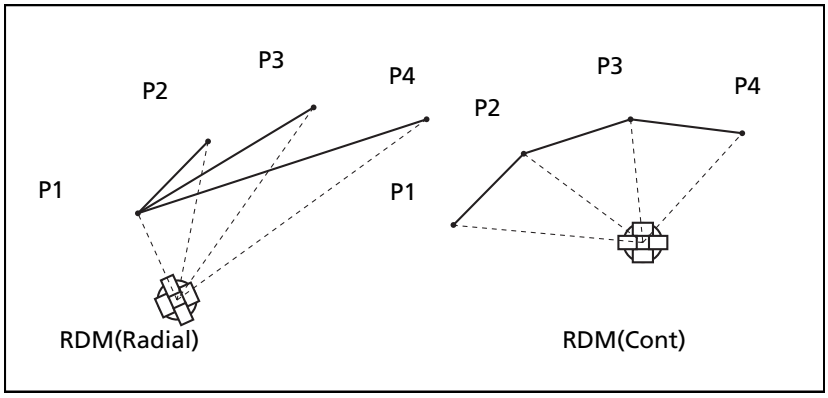
RDM or “Remote distance measurement” measures the horizontal distance, vertical distance, and slope distance between two points.



rSD	Slope distance between two points
rVD	Vertical distance between two points
rHD	Horizontal distance between two points
rV%	Percentage of grade (rVD/rHD) × 100%
rGD	Vertical grade (rHD/rVD):1
rAZ	Azimuth from first point to second point

Difference between RDM (Radial) and RDM (Cont) measurement methods

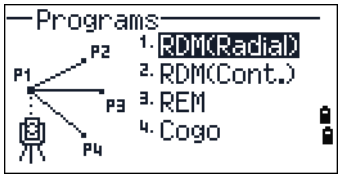
RDM (Radial) calculations are made with reference to the first point. RDM (Cont) calculations are made with reference to the two preceding points.



RDM (Radial)

Choose this option to measure between the current point and the first point measured.

1. Press 1 or select RDM(Radial) in the Programs menu.

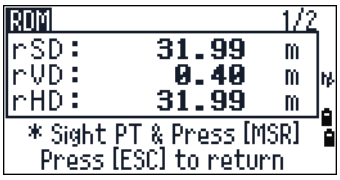


2. Sight the first point and press MSR1 or MSR2.

   The distance from the station point to the first point appears.

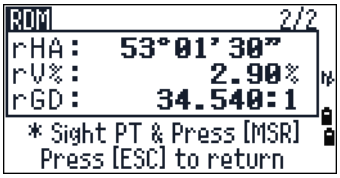
3. Sight the second point and press MSR1 or MSR2. The distances between the first and second point are displayed.

rSD	Slope distance between two points
rVD	Vertical distance between two points
rHD	Horizontal distance between two points



4. To change display screens, press DSP.

rHA	Azimuth from first point to second point
rV%	Percentage of grade (rVD/rHD) × 100%
rGD	Vertical grade (rHD/rVD): 1

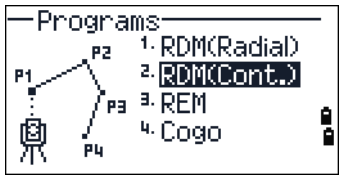


5. Press ESC to exit.

RDM (Cont)

Choose this option to measure between the current point and the immediately preceding point.

1. Press 2 or select RDM(Cont.) from the Programs menu.

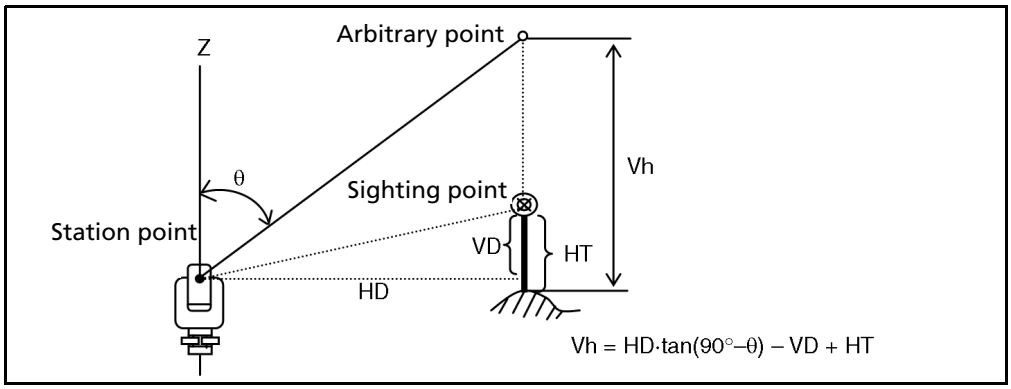


2. Follow the procedure as for a radial RDM measurement. See also RDM (Radial), page 77.

REM

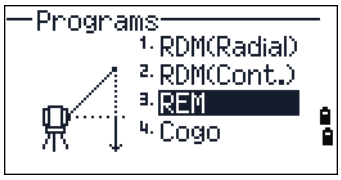
Choose this option to measure a remote elevation.

Note – *A prism is required only at the sighting (target) point.*



1. Press 3 or select REM in the Programs menu.
2. Enter the height of the target.
3. Sight the target point and press MSR1 or MSR2.
4. Loosen the vertical clamp and then turn the telescope to aim at an arbitrary point.

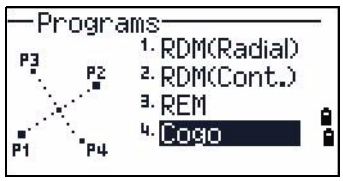
   The difference in elevation (Vh) appears.
5. Press ESC to exit.



Cogo

Choose the Cogo option to perform coordinate geometry (Cogo) calculations.

To open the Cogo menu, press 5 on the Programs menu.



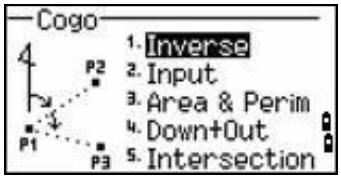
There are five items in the Cogo menu:

- Inverse, page 79
- Input, page 81
- Area & Perm, page 83
- Down+Out, page 84
- Intersection, page 85

Inverse

Choose this option from the Cogo menu to calculate angle and distance between two coordinates.

Press 1 or select Inverse in the Cogo menu. The Inverse menu appears.

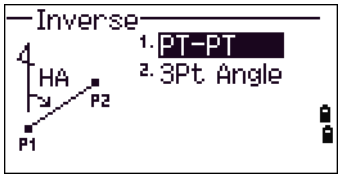


PT-PT inverse

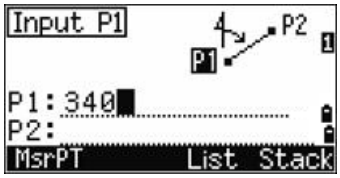
PT-PT calculates the distance and the angle between two input points.

To calculate a PT–PT inverse:

1. Press 1 or select PT-PT in the Inverse menu.

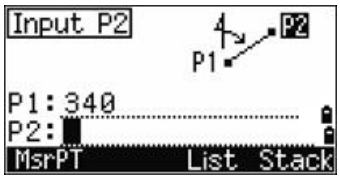


2. Enter the first point number or name, and then press ENT.

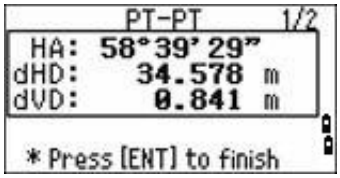


If you press ENT without entering a point name, a coordinate input screen appears, and you can enter coordinates. These coordinates are ***not*** stored to the database. If you want to store the point, specify a new point name.

3. Type the second point number/name, and then press ENT. If necessary select the MSR softkey to shoot the point on the spot so that you can use it in the calculation.

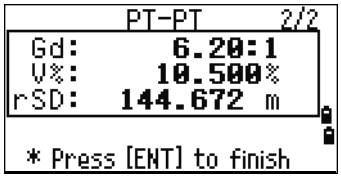


   The azimuth, horizontal distance, and vertical distance from the first point to the second point are displayed.

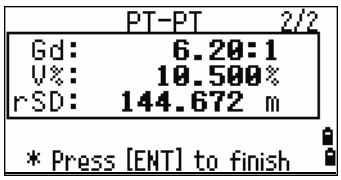


4. Do one of the following:

   - To return to the PT input screen, press ESC.
   - To return to the Cogo menu, press ENT.
   - To change the contents of the result screen, press DSP.

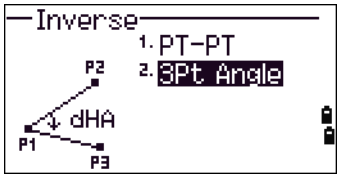


Gd	Grade (HD/VD)
V%	100/Gd
rSD	Slope distance PT1 to PT2



3Pt Angle

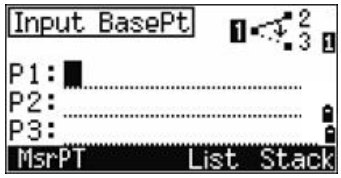
If you choose 3Pt Angle, the Focus 4W calculates the angle between two lines defined by three points.



To calculate a 3Pt angle:

1. Press 2 or select `3Pt Angle` from the Inverse menu.

   P1 is the base point. Two lines are to be defined by P2 and P3, both from P1.



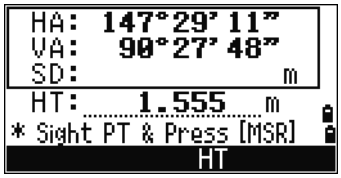
2. Enter the P1 point name. Alternatively, use the `MSR` softkey to take a measurement to the point.

3. Enter the second point (P2) to define the baseline, P1–P2. The angle (dHA) is measured from the baseline.

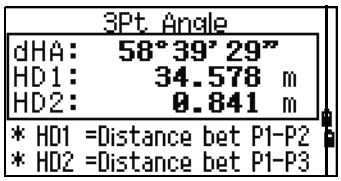
4. Enter the third point (P3) to define the second line, P1–P3.

   When you press the MSR softkey, a temporary measuring screen appears. Sight the target and press MSR1 or MSR2 to take a measurement.

   After the measurement, a recording point screen appears. To store the measured point, enter the PT, HT, and CD values and press ENT. To use the point without recording it, press ESC.



   When you have entered three points, the instrument calculates the angle and distances.

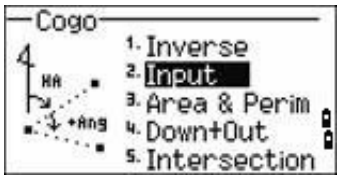


5. Do one of the following:
   - To return to the Inverse menu, press ENT.
   - To return to the Input BasePt screen, press ESC.

Input

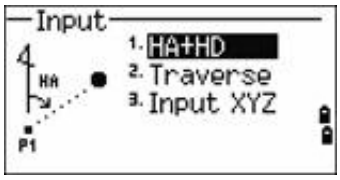
Choose this option from the Cogo menu to calculate and manually input coordinates.

To enter the Input menu, press 2 or select Input from the Cogo menu. There are three functions in this menu for recording new coordinate points.

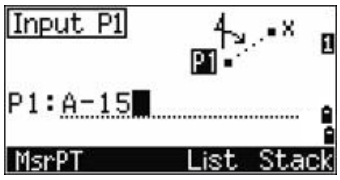


Azimuth+HD input

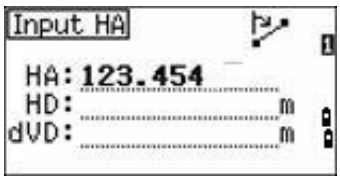
To calculate a coordinate by an angle and distance input from the base point (P1), press 1 or select HA+HD from the Input menu.



Enter the base point, P1. Type the point name and press ENT.

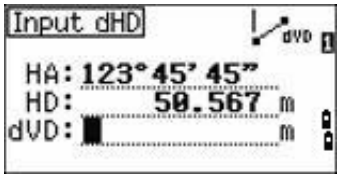


Enter the azimuth, horizontal distance, and vertical distance. Then press ENT.



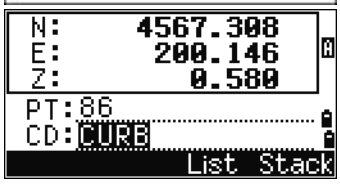
For example, to enter 123°45'45", type 123.4545 and then press ENT.

If you do not enter a value in the dVD field, the value 0.0000 is used.



A recording point screen with the calculated coordinates appears. The PT field defaults to the last recorded point + 1.

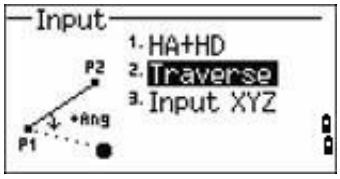
Press ENT to store the point.



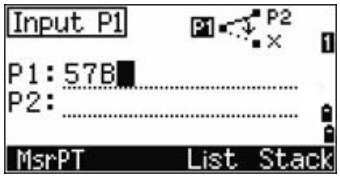
Traverse

To calculate a new point based on two defined points and the angle, horizontal and vertical distances from the line defined by those two points, use the Traverse (2Pt Angle) function.

Press 2 or select Traverse in the Input menu.

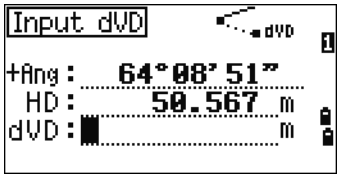


To enter P1 and P2, enter point names or take measurements to targets.



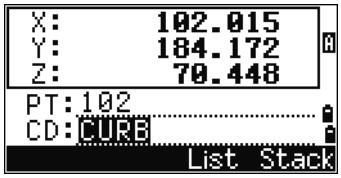
Enter the plus-minus angle, horizontal distance, and vertical distance from the baseline defined by P1–P2.

If you do not enter a value in the dVD field, the value 0.0000 is used.

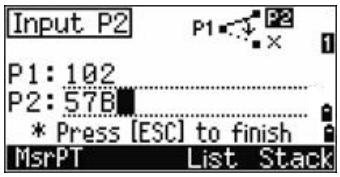


When you press ENT in the dVD field, a new point is calculated. The name in the PT field defaults to the last recorded point, + 1.

To record the new point and return to the point input screen, press ENT.



P1 (the base point) defaults to the previously recorded point value. P2 defaults to the previous P1 value.

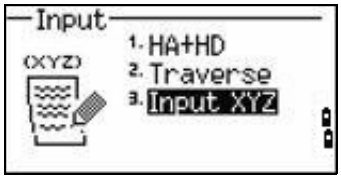


Tip – To continuously calculate a new point, enter +Ang, HD, and dVD from the previous bearing line. This is a convenient way to enter Traverse points.

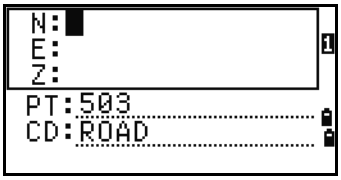
Entering coordinates

To manually enter the XYZ coordinates, press 3 or select `Input XYZ` from the Input menu.

The PT name defaults to the last recorded PT + 1.

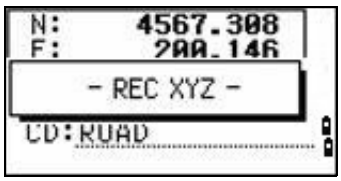


Enter the coordinates using the numeric keys. To move to the next field, press ENT or v in a field.



To store the point as an MP record and return to the point input screen, press ENT in the Z field. The default PT is incremented to the next value.

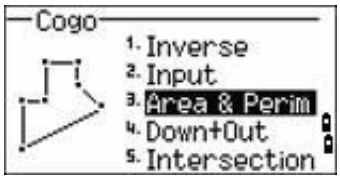
You can record NE, NEZ, or Z-only data.



Area & Perm

Choose this option from the Cogo menu to calculate area and perimeter.

Press 3 or select Area & Perim in the Cogo menu.

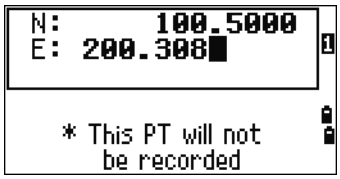


To take a measurement, enter the first point and press ENT, or select the MSR softkey.

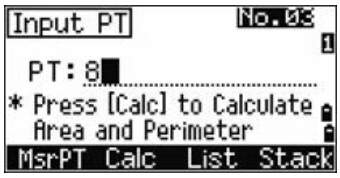
In the upper right corner of the screen, a counter indicates how many points you have entered.

To input point numbers consecutively, use the Fr/To softkey. See also Advanced feature: Entering a range of points, page 83.

If you enter a new point name, you can enter new coordinates and record the point. If you do not want to record the point, press ENT without entering a value in the PT field. An XY coordinate input screen appears.

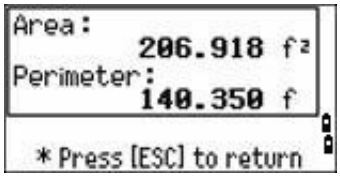


Continue to enter points until you have defined all the points in the lot. Then, press ∨ to calculate the area and perimeter.



The first and last points that you enter are joined to close the area. You must enter the points in the order in which they define the lot. You can enter up to 99 points.

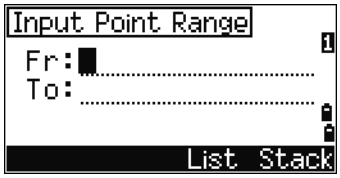
Press ENT to exit from the function, or press ESC to return to the previous screens one by one.



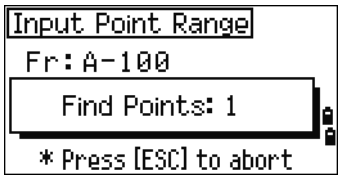
Advanced feature: Entering a range of points

To quickly enter a sequential range of points, use the range input function. To access this function, select the Fr/To softkey in the No. 01 or No. 02 input screens.

Enter the start point name in the Fr field and the end point name in the To field. You can include letters and hyphens in the point names, but the last character must be numeric.



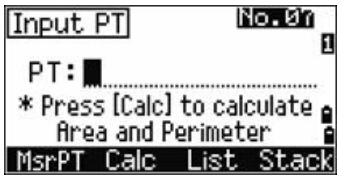
To start searching for matching points, press ENT in the To field. The counter shows the number of matching points found.



When the search is complete, you are returned to the Input PT screen.

Select the Calc softkey to calculate the area and perimeter, or enter point names in the PT field.

Press ESC to return to the Input PT screen where the preceding point name appears.

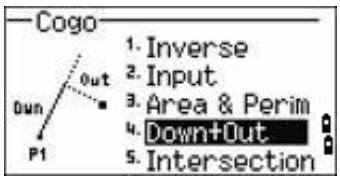


Note – *If you search for a point when a control job is specified, and the system cannot find the point in the current job, the control job is also searched. If the point is found in the control job, it is copied to the current job as a UP record. See also* *Setting the control job, page 95*.

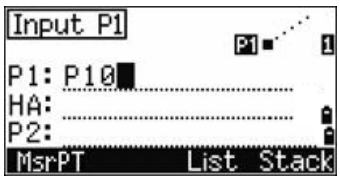
Down+Out

Choose this option from the Cogo menu to calculate coordinates from Down and Out.

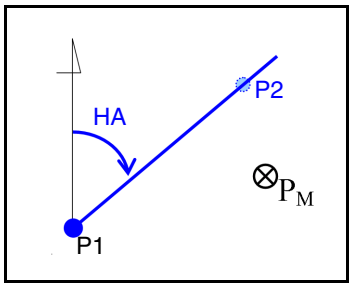
Press 4 or select Down & Out in the Cogo menu.

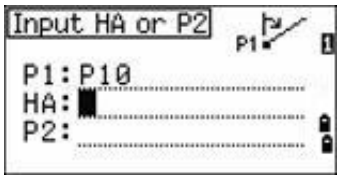


Enter the base point (P1).

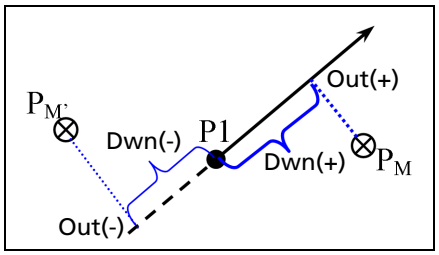


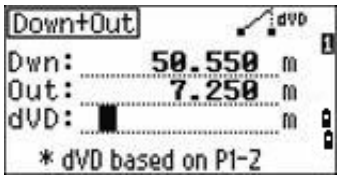
Specify the azimuth bearing. To do this, enter a value in the HA or P2 field. P2 is a second point on the line.





Enter the horizontal distance along the baseline (Dwn), the horizontal distance perpendicular to the line (Out), and the vertical distance (dVD).

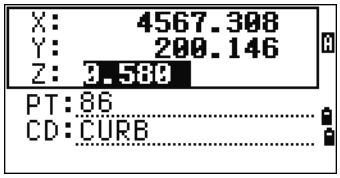




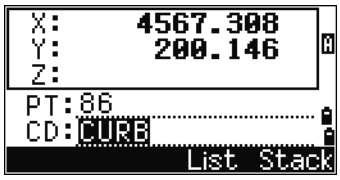
A negative value in the Dwn field means the opposite direction along the defined bearing line.

A negative value in the Out field is for the left-hand side of the bearing line.

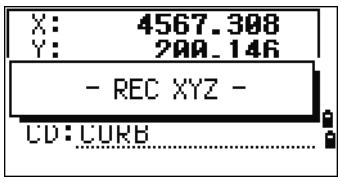
To calculate the coordinates of the point (PM), press ENT in the dVD field. You can change the Z coordinate here.



To record the point, press ENT in the CD field.



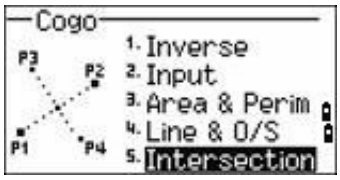
The coordinates are stored as a CC record.



Intersection

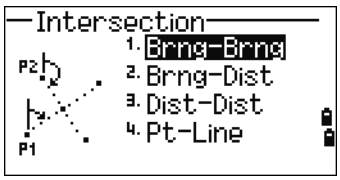
Choose this option from the Cogo menu to calculate coordinates using intersection functions.

Press 5 or select `Intersection` in the Cogo menu. The Intersection menu appears. It has four functions for calculating coordinates.

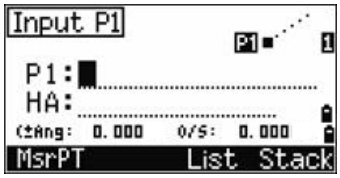


Calculating a bearing-bearing intersection

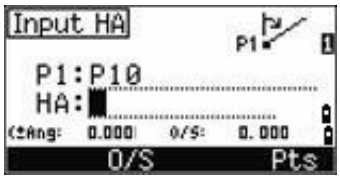
A bearing-bearing intersection is the intersection point of two lines. To calculate a bearing-bearing intersection:



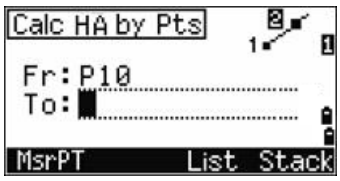
1. Press 1 or select Brng-Brng in the Intersection menu.



2. Enter the first point name and press ENT. Alternatively, to measure directly to the point, select the MSR softkey.



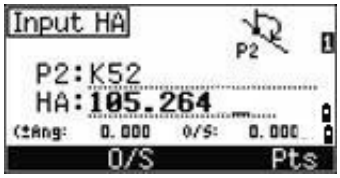
3. Define the first line by azimuth.



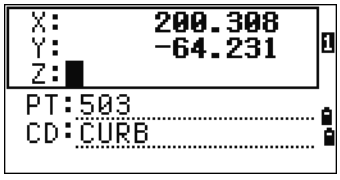
4. To define the line by two points, select the Pts softkey. The Fr field defaults to the P1 point, but you can change the selected point. In the To field, enter or measure to the second point.

   See also Advanced feature: Entering angle and distance offsets, page 89.

5. Do one of the following:
   - To return to the previous screen, press ENT. The calculated value appears in the HA field.
   - To go to the next screen, press ENT.



6. Define the second line by two points or by P2 and HA.



7. To calculate the coordinates of the intersection point, press ENT in the HA field.

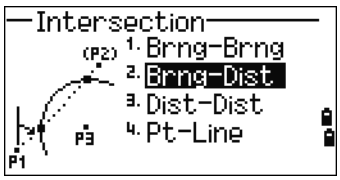
   The calculated coordinates are displayed. You can input a Z coordinate if necessary.

8. Enter a value in the PT field and in the CD field.
9. To record the point, press ENT.

Calculating a bearing-distance intersection

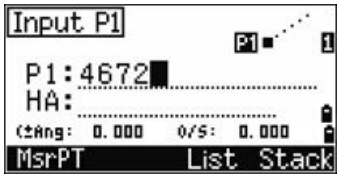
1. Press 2 or select Brng-Dist in the Intersection menu.

   Brng-Dist calculates the intersection point formed by one line and one distance (radius).



2. Enter a point on the line.

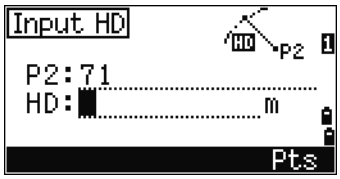
   The line can be defined by two points or by a point and an azimuth.



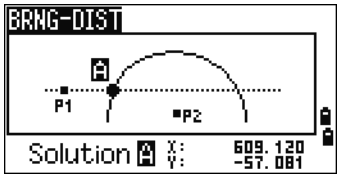
3. Enter the second point (P2) as the center of the circle.

4. Enter the distance from P2:

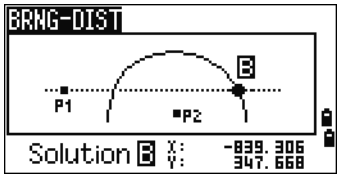
   – To define the distance (HD) by two points, select the Pts softkey.



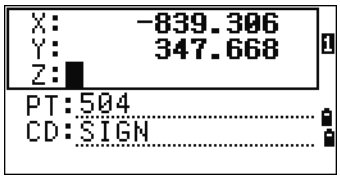
   – To calculate the coordinates of the intersection point, press ENT in the HD field.



5. If there are two results, the first solution appears graphically relative to the P1–P2 line. To display the second solution, press < or >.

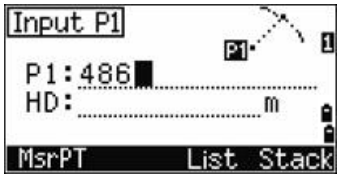


6. To record the point, press ENT when the required solution appears.
7. Enter a Z coordinate if necessary.
8. To move to the PT and CD fields, press ENT.

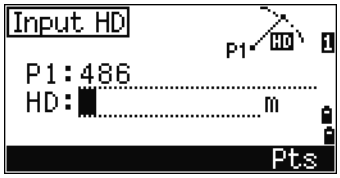


Calculating a distance-distance intersection

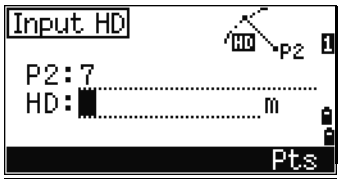
1. Press 3 or select Dist-Dist in the Intersection menu.
2. Enter the first point name and press ENT, or select the MSR softkey to measure directly to the point.



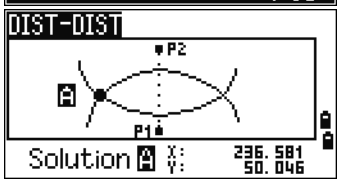
3. Enter the distance from P1 and press ENT.
4. To define the distance (HD) by two points, select the Pts softkey.



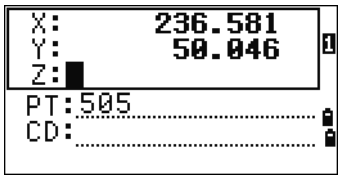
5. Enter P2 and the distance from P2 (HD).
6. To calculate the coordinates of the intersection point, press ENT in the HD field.



7. Press < or > to display the second solution.
8. To record the point, press ENT when the required solution appears.

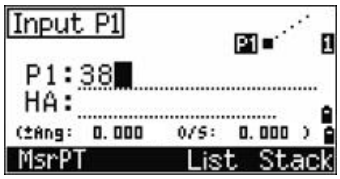


9. Enter a Z coordinate if necessary.
10. Press ENT to move to the PT and CD fields.

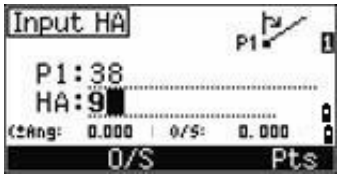


Calculating a point-line intersection

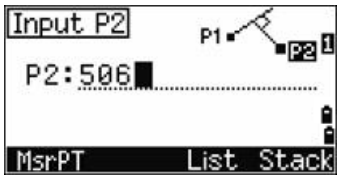
1. Press 4 or select Pt-Line in the Intersection menu.
2. Enter the first point name and press ENT, or select the MSR softkey to measure directly to the point.



3. Enter the azimuth, or select the Pts softkey to enter another point name on the line.

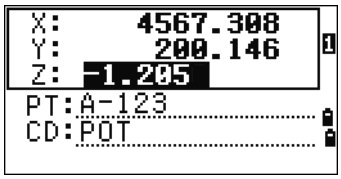


4. Enter the perpendicular point to the line, or select the MSR softkey to take a measurement to the point.



5. To calculate the coordinates of the intersection point, press ENT.

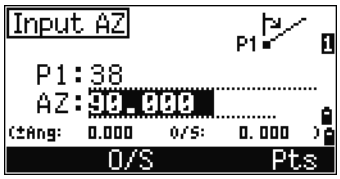
   If P1 and P2 are 3D points, the Z coordinate of the perpendicular point is calculated relative to the P1–P2 slope.



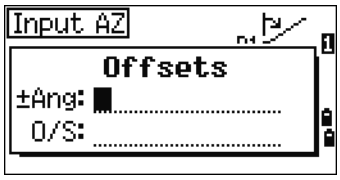
6. Enter PT and CD then press ENT to record the point.

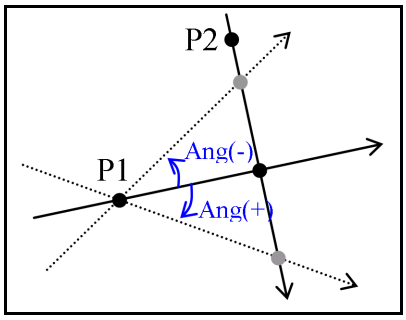
Advanced feature: Entering angle and distance offsets

To display the offset input screen, select the O/S softkey.

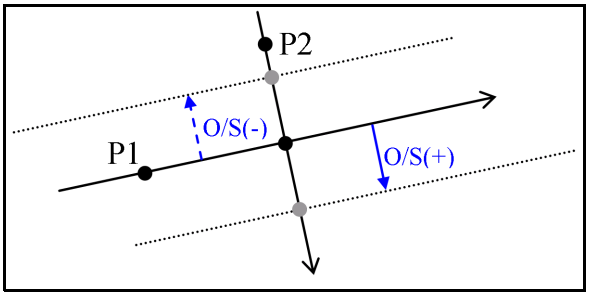


In the Ang field, enter a positive value to rotate the line clockwise. Enter a negative value to rotate the line counter clockwise.

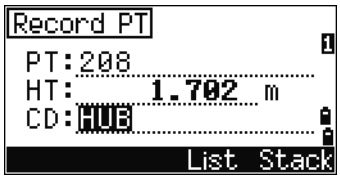




In the O/S field, enter a positive value to specify an offset to the right. Enter a negative value to specify an offset to the left.



Recording measurement data

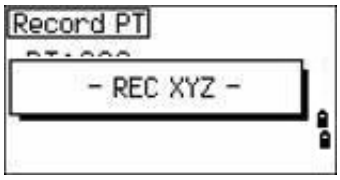


To record points from any observation screen, press ENT.

PT defaults to the last recorded PT, + 1.

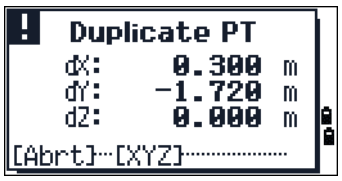
You can enter the PT name from the point list or the point stack. See Entering a point from the point list, page 53, and Entering a point from the point stack, page 52.

To record the point, press ENT on the last field.



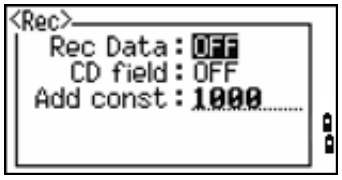
If HA or VA is moved after you take a measurement, but before you press ENT, the recalculated coordinates will be stored.

If the point name that you want to record already exists in the job, an error message appears. Depending on the type of existing record, you can overwrite the old record with the new data. See Recording data, page 139.



If you do not need to record data, press MENU and set Settings / Rec to OFF.

The default setting is OFF.



Switching between display screens

Press DSP to switch between display screens. See the DSP button, page 44. Each time you press DSP, the next screen appears. When you press DSP in the final screen, the first screen appears.

CHAPTER

5

Menu Screen

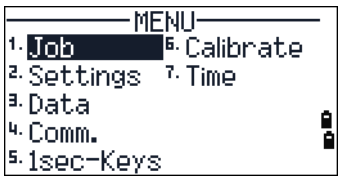
In this chapter:

Use the MENU screen to access functions and settings.

To display the MENU screen, press the MENU key.

Job

Use the Job option to open, create, delete, and manage jobs.



To open the Job Manager, press 1 or select `Job` from the MENU screen.

If jobs are stored on the Focus 4 total station, the job list appears. It shows all the stored jobs with the newest job at the top of the list. See Opening an existing job, page 92.

If no jobs are stored, the Create Job screen appears. See Creating a new job, page 92.

Opening an existing job

The job list shows all the jobs stored on the instrument, in descending date order.

The following symbols provide extra information about jobs:

Symbol	Meaning
*	Current job
@	Control job
!	Some of the job settings are different from the current job

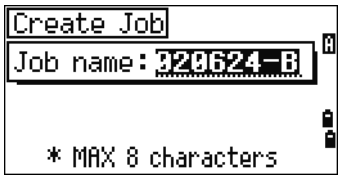
Press ^ to move up or v to move down the job list. Press ENT to open the highlighted job.

When you open a job, all job settings are automatically changed to match those used in the open job.

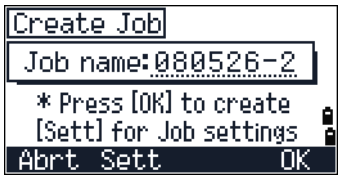
Creating a new job

1. Select the `Creat` softkey in the job list.

2. Enter a job name of up to eight characters. Select ENT.



3. Do one of the following:
   - To check the job settings, select the `Sett` softkey.
   - To create a new job using the current job settings, press ENT or select the `OK` softkey.



Job settings

Job settings are separate from other temporary settings.

Job settings are established when a job is created, and cannot be changed. This ensures that the data in a job is correctly stored in the database, and that all necessary corrections are applied when you store each record.

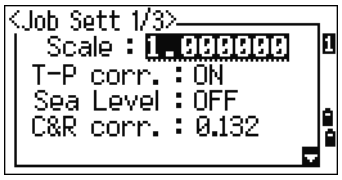
To move between fields, press ^ or v. Alternatively, to move to the next field, press ENT.

To change the setting in the selected field, press < or >.

To confirm the job settings and create the job, press ENT in the last field.

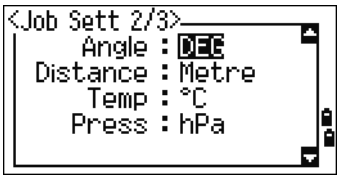
Screen 1

Scale Factor	0.999600 to 1.000400
T-P correction	ON / OFF
Sea Level	ON / OFF
C&R correction	OFF / 0.132 / 0.200



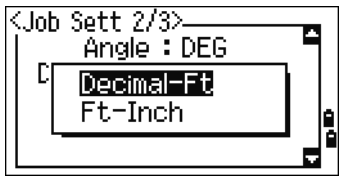
Screen 2

Angle unit	DEG / GON /MIL
Distance unit	Metre / US-Ft / I-Ft
Temp unit	°C / °F
Press unit	hPa / mmHg / inHg



Screen 3

If you select US–Ft or I–Ft, an additional settings screen appears. Use this screen to specify whether to display values in Decimal–Ft or Ft–Inch.



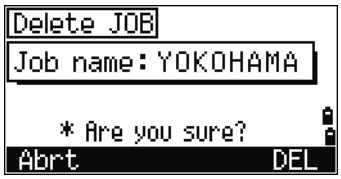
VA zero	Zenith / Horizon
Order	NEZ / ENZ

Deleting a job

Note – *There is no undelete function in Job Manager. Before you press* ENT *or select* DEL*, make sure that the selected job is the one that you want to delete.*

1. In the job list, highlight the job to delete.

2. Select the DEL softkey. A confirmation screen appears.



3. Do one of the following:
   - To delete the selected job, press ENT or select the DEL softkey.
   - To cancel the deletion and return to the previous screen, press ESC or select the Abrt softkey.

   After you delete a job, the job list appears.

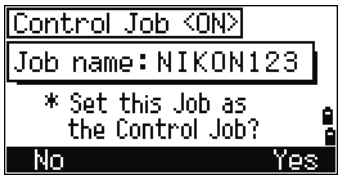
Setting the control job

A control job has the same format as a standard job. You can open and modify it like any other job, and you can use it to record any measured data.

To set the control job:

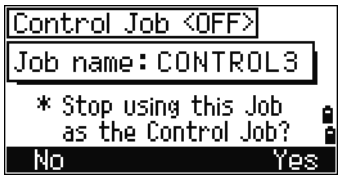
1. Highlight the job that you want to use as the control job.
2. Select the `Ctrl` softkey.

   A confirmation screen appears.



3. Do one of the following:
   - To set the selected job as the control job, press ENT or select the `Yes` softkey.
   - To cancel the process, press ESC or select the `No` softkey.

   If a control job is already assigned, the newly assigned control job replaces it as the control job.



   To clear the selected control job, highlight the current control job in the job list and select the `Ctrl` softkey. Then press ENT or select the `Yes` softkey.

Displaying job information

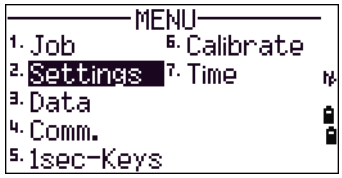
To display job information, highlight the job name and then select the `Info` softkey.

The Information screen shows the number of records in the job, the free space, and the date when the job was created. Free space indicates how many points can be stored in the job.

To return to the job list, press any button.

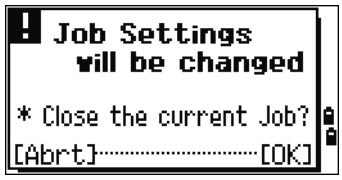
Settings (basic job settings)

Use the Settings menu to configure the basic job settings.



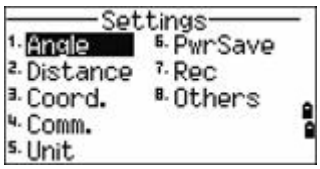
Press 2 or select Settings on the MENU screen.

Some job settings, as identified in the following sections, cannot be changed once a job is created. If you attempt to change any of these settings while a job is open, a confirmation screen appears, asking you to create a new job with the new settings, or to work with the new settings without recording any data. See Settings, page 141.

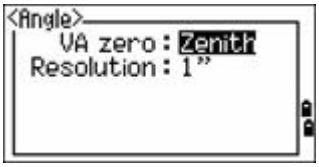


Angle

To change the angles, press 1 or select Angle in the Settings menu.



VA zero	Zenith / Horizon
Resolution	1" / 5" / 10" 0.2 / 1 / 2 mgon 0.005 / 0.02 / 0.05 mil



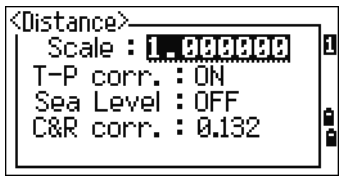
The VA zero job setting cannot be changed once a job is created.

Distance

These settings cannot be changed once a job is created.

To change the distance, press 2 or select Distance in the Settings menu.

Scale	Numeric value between 0.999600 and 1.000400
T-P corr	ON / OFF
Sea Level	ON / OFF
C&R corr	OFF / 0.132 / 0.200



Temperature and pressure corrections

$$K = 275 - \frac{106 \times P \times \left(\frac{10000.0}{13.5951 \times 980.665}\right)}{273 + T}$$

$$SD' = \left(1 + \frac{K}{1000000}\right) \times SD$$

SD	Slope dist. (before adj.)
SD'	Slope dist. (after adj.)
K	Compensation coefficient
P	Pressure (hPa)
T	Temperature (°C)

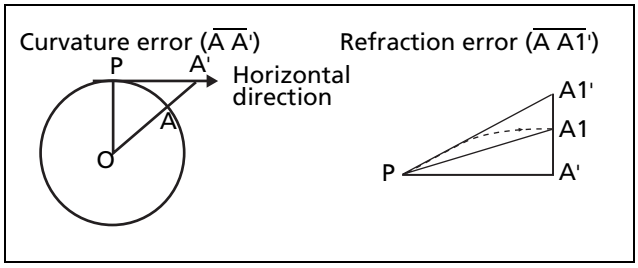
Sea-level corrections

$$HD' = \frac{HD \times R_e}{R_e + Z_{STN}}$$

HD	Horizontal dist. (before adj.)
HD'	Horizontal dist. (after adj.)
Z_{STN}	Instrument-Z
R_e	6370 km

Curvature and refraction corrections

Because the surface of the earth is curved, the vertical difference (VD and Z) at the measurement point, as referenced to the horizontal plane, inevitably includes some error. This error is called ***curvature error***. Also, because the density of the air surrounding the earth decreases with altitude, light is refracted at different rates at different altitudes. The error caused by this change in refraction is called ***refraction error***.



$$HD' = HD - \frac{SD^2 \sin(2VA)}{2R_e}\left(1 - \frac{k}{2}\right)$$

$$VD' = VD + \frac{HD^2}{2R_e}(1 - k)$$

HD	Horizontal dist. (before adj.)
HD'	Horizontal dist. (after adj.)
VD	Vertical dist. (before adj.)
VD'	Vertical dist. (after adj.)
SD	Slope dist
VA	Vertical angle
R_e	6370 km
k	C&R constant (0.132 or 0.200)

Coordinate

Press 3 or select Coord. in the Settings menu. The Coordinate menu appears.

Order	NEZ / ENZ
Label	XYZ / YXZ / NEZ(ENZ)

The Order cannot be changed once a job is created.

Communications

Press 4 or select Comm. in the Settings menu. The Communication menu appears.

Ext.Comm	NIKON / SET
Port	Serial/Bluetooth ***Note –*** *This field appears only when the optional Bluetooth® wireless technology is on-board.*
Baud (bps)	1200 / 2400 / 4800 / 9600 / 19200 / 38400
Length	7 / 8
Parity	EVEN / ODD / NONE
Stop bit	1 / 2

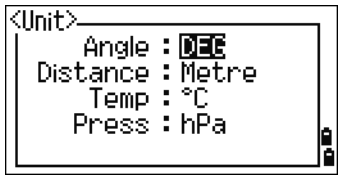
See also Chapter 7, Transferring Coordinate Data.

Unit

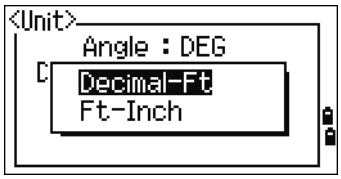
Note – *The Angle, Distance, Temp, and Press job settings cannot be changed once a job is created.*

Press 5 or select Unit in the Settings menu. The Unit menu appears.

Angle	DEG (Degree) GON (GON) MIL (Mil6400)
Distance	Meter US-Ft I-F
Temp	°C (Celsius) °F (Fahrenheit)
Pressure	hPa mmHg inHg



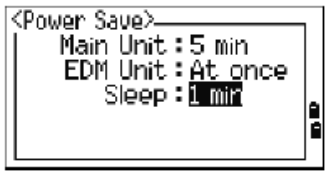
If you select US-Ft or I-Ft, an additional settings screen appears. Use this screen to specify whether to display values in Decimal-Ft or Ft-Inch.



Power saving

To open the Power Save menu, press 6 or select Pwr Save in the Settings menu.

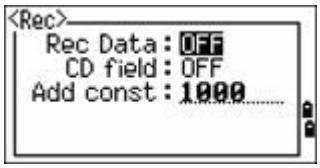
Main unit	OFF / 5 min / 10 min / 30 min
EDM unit	OFF / At Once / 0.1 min / 0.5 min / 3 min / 10 min
Sleep	OFF / 1 min / 3 min / 5 min



Recording

Press 7 or select Rec in the Settings menu. The Rec Menu appears.

Rec Data	ON / OFF
CD field	ON / OFF
Add const	Integer between 1 and 999,999



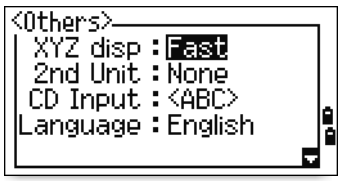
- If you need to record data from your observations, set the Rec Data field to ON. Both raw and coordinate data is stored. If you set the Rec Data field to OFF, no record is stored.
- If you would like to record a feature code when you record coordinate data, set the CD field to ON. The CD field appears in the Recording PT screen.
- This field sets the default point number for the observed coordinate data when you select Layout / XYZ.

Other settings

Press 8 or select Other in the Settings menu. The Others menu appears.

<<Sorry, your instructions were not clear to me - do I need to replace the table below and the snap with the

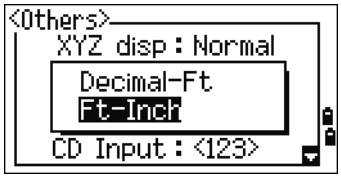
XYZ disp	Fast / Normal / Slow / +ENT
2nd Unit	None / Meter / US-Ft / I-Ft
CD input	123 / ABC
Language	English / Russian
Owner's Detail	Up to 20 characters



XYZ disp defines the speed to move to the next screen after showing XYZ of the input point.

When the secondary unit is set to a unit, an extra display screen is available in the BMS, layout observation screens, and L–O from line screens. The extra screen shows the HD, VD, and SD in the secondary unit.

If you select US-Ft or I-Ft, an additional settings screen appears. Use this screen to specify whether to display values in Decimal-Ft or Ft-Inch.



The CD Input field sets the default input mode when a CD field appears.

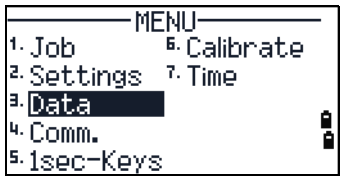
In the Language field, use < / > to open the language screen and v / ^ to select the required language. Press ENT to confirm. In the Reboot confirmation screen, press ENT to restart the instrument. The instrument reboots and displays the start-up screen in the selected language.

The Owner's Detail field allows you to enter your name or the name of your company. If you enter a value in this field, it appears when you start the Focus 4 total station.

To provide easier configuration for common regional settings, you can quickly configure the Focus 4 total station to a pre-set combination of default regional settings. See also Regional configuration, page 49.

Data

Use the Data menu to view or edit records. To display the Data menu, press 3 on the MENU screen.



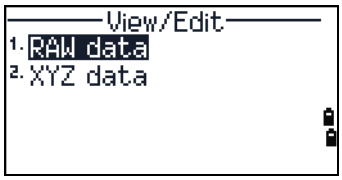
Raw and coordinate data is stored when the Data Rec setting is ON. If the Data Rec setting is OFF, no data is recorded in MENU / Data / Data Rec.

Viewing records

Tip – You can view data at any time, even in an observation screen.

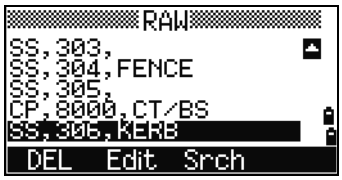
Viewing RAW data

To show the raw data records in a list, press 1 in the Data menu.

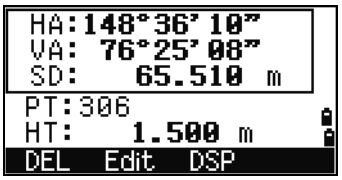


The newest record is at the bottom of the screen.

To scroll through the records, press ^ or v. To move up or down one page, press < or >.



To view more detailed information for a selected record, press ENT. To return to the record list, press ESC.



SS and F1 records

Raw SS and F1 records contain PT, HT, CD, HA, VA, and SD fields.

SS records are sideshots (topo shots). All shots taken from the Basic Measurement Screen (BMS) are stored as SS records.

F1 records are backsight shots that are taken when you set up a station. Coordinates are not available for an F1 record.

When you take more than one measurement to the same point and choose to overwrite the XYZ data, the old raw ***record*** becomes raw ***data*** only. As a result, only one SS (RAW) record keeps its corresponding SS(XYZ) record. Other SS(RAW) records to the same point no longer have a record on their coordinates.

ST records

ST (station) records contain ST, HI, BS, and AZ fields.

Press DISP to switch between the screens:

- The first screen shows ST, HI, BS, and AZ
- The second screen shows X, Y, Z, PT, and CD

SO records

SO records are layout (L-O) shots. There shots are recorded in stakeout functions.

Press DISP to switch between the screens:

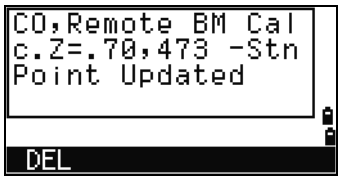
- The first screen shows HA, VA, SD, PT, and HT
- The second screen shows X, Y, Z, PT, and CD
- The third screen shows dX, dY, dZ, PT, and CD

The dX, dY, and dZ fields store the difference between the actual position and the planned position of the stakeout shot. These fields are downloaded as comment records in Nikon RAW format.

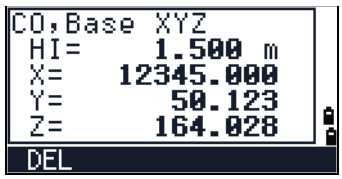
CO records

A CO record is a comment that is added to the job by the system.

For example, the system writes a comment record when you use the Remote Benchmark function to change the Stn-Z, or when you use the BSCheck function to reset the horizontal angle.



When you enter a Stn-XYZ by Base-XYZ function, the recorded station appears as a comment record.



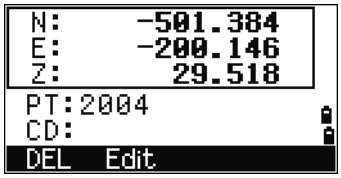
Viewing coordinate data

To show the coordinate data records in a list, press 2 in the Data menu.

The newest record is at the bottom of the screen.

To scroll through the records, press ^ or v. To move up or down one page, press < or >.

Press ENT to see more detailed information about the selected record.



The header (XYZ, YXZ, NEZ, or ENZ) depends on the Coord. Label setting in MENU / Settings / Coord. See also Coordinate, page 99.

UP, MP, CC, and RE records

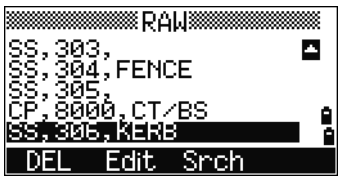
All coordinate records contain PT, CD, X, Y, and Z fields.

- UP records are uploaded point coordinates.
- MP records are manually input point coordinates.
- CC records are points calculated in Cogo.
- RE records are points calculated in Base Line and Resection station setup.

Deleting records

Deleting raw records

1. In the RAW screen, use ^ or v to highlight the record that you want to delete. Then select the DEL softkey.



2. A confirmation screen appears.

   a. To delete the selected record, press ENT or select the Yes softkey.

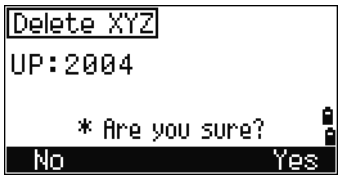
   b. To cancel the deletion of data, press ESC or select the No softkey.

The system also deletes the corresponding coordinate data when you delete an SS or SO record.

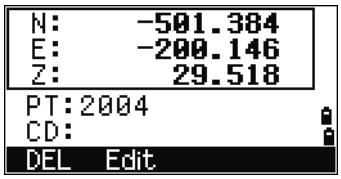
Deleting coordinate records

1. In the XYZ screen, use ^ or v to highlight the record that you want to delete. Then select the DEL softkey.

2. A confirmation screen appears.
   a. To delete the selected record, press ENT or select the Yes softkey.
   b. To cancel the deletion of data, press ESC or select the No softkey.



Alternatively, delete coordinate data by selecting the DEL softkey in the detailed display screen for the record.

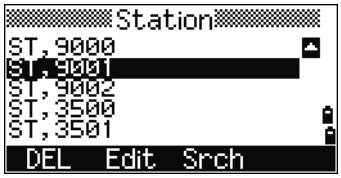


If the record that you want to delete is referred by any ST record, a warning message appears.

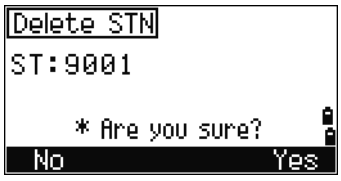
Deleting station records

CAUTION – There is no undelete function on the instrument. Before you confirm the deletion by pressing the DEL softkey, make sure that you have selected the correct station record.

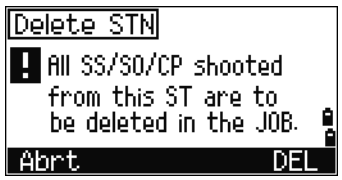
1. In the Station screen, use ^ or v to highlight the record that you want to delete. The select the DEL softkey.



2. A confirmation screen appears.
   a. To delete the selected record, press ENT or select the Yes softkey.
   b. To cancel the deletion of data, press ESC or select the No softkey.

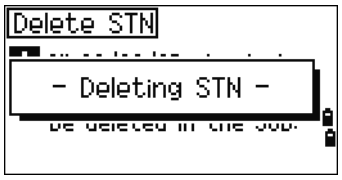


3. If you select `Yes`, a warning screen appears. Select the `DEL` softkey to confirm the deletion.



Note – *You cannot press* ENT *in this screen.*

All observations from the station that you selected are deleted.



Editing raw records

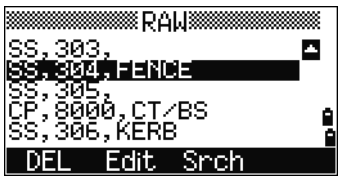
For any point record, you ***can edit*** the following:

- Point name (PT)
- Feature code (CD)
- Height of target (HT)
- Height of instrument (HI)
- Backsight point (BS)
- Backsight azimuth (AZ)

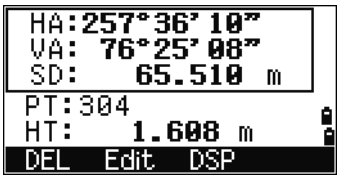
You ***cannot edit*** the following:

- The CD field for SO and F1 records
- HA, VA, or SD values

1. Do one of the following:
   - In the RAW screen, use ^ or v to highlight the record to edit. Then select the `Edit` softkey.



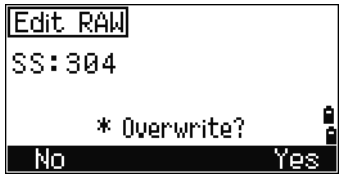
   - In the detailed data screen, select the `Edit` softkey.



2. Use ^ or v to highlight a field. Then modify the value in the selected field.

Note – *When you change the HT of an SS or SO measurement record, the Z coordinate is recalculated.*

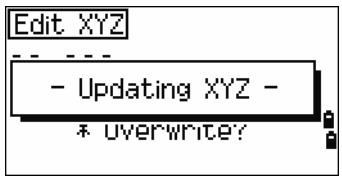
3. Press ENT in the last line of the edit screen. A confirmation screen appears.



4. Do one of the following:

   – To accept the changes and return to the data view screen, press ENT or select the `Yes` softkey.

   – To return to the Edit screen, press ESC or select the `No` softkey.



Editing coordinate records

You ***can edit*** PT, CD, and coordinate values.

You ***cannot edit:***

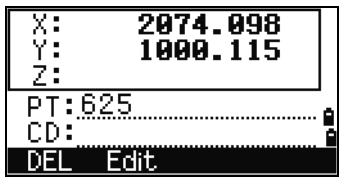
- The coordinate record for the current station
- SS and SO records
- Record referred by Station

To edit coordinate records:

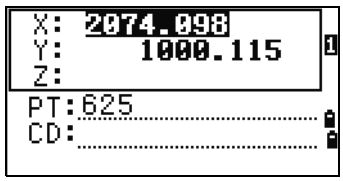
1. Do one of the following:

   – In the XYZ screen, use ^ or v to highlight the record to edit. Then select the `Edit` softkey.

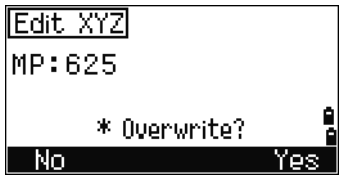
   – In the detailed data screen, select the `Edit` softkey.



2. Use ^ or v to highlight a field. Then modify the value in the selected field.



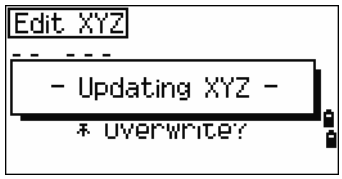
3. To finish editing, press ENT in the CD field. A confirmation screen appears.



4. Do one of the following:

   – To accept the changes and return to the data view screen, press ENT or select the Yes softkey.

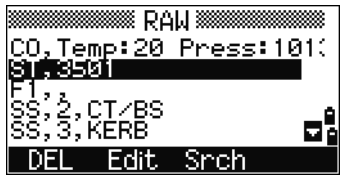
   – To return to the Edit screen, press ESC or select the No softkey.



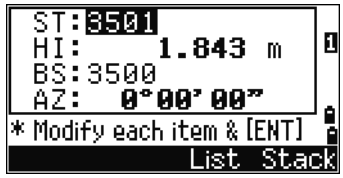
Editing station records

Note – *The system will not recalculate measurements if you change the station record. You will need to recalculate all coordinate and raw data that was collected from an edited station record in your postprocessing software.*

1. In the RAW screen, use ^ or v to highlight the station record to edit. Then select the Edit softkey.



2. Use ^ or v to highlight a field. Then modify the value in the selected field. You can edit any field in the ST record, but the instrument does not recalculate the measurements from this station.



3. To finish editing, press ENT in the AZ field.

   If you change the ST and HI values, the coordinates of observation points are not recalculated. A comment record is stored to record the change. The following is a comment record for a changed HI value: CO, HI changed at ST:9012 Old HI = 1.3456m

   If you change the BS or AZ values, raw records are not recalculated. A comment record is stored to record the change.