

RefSet Captivate

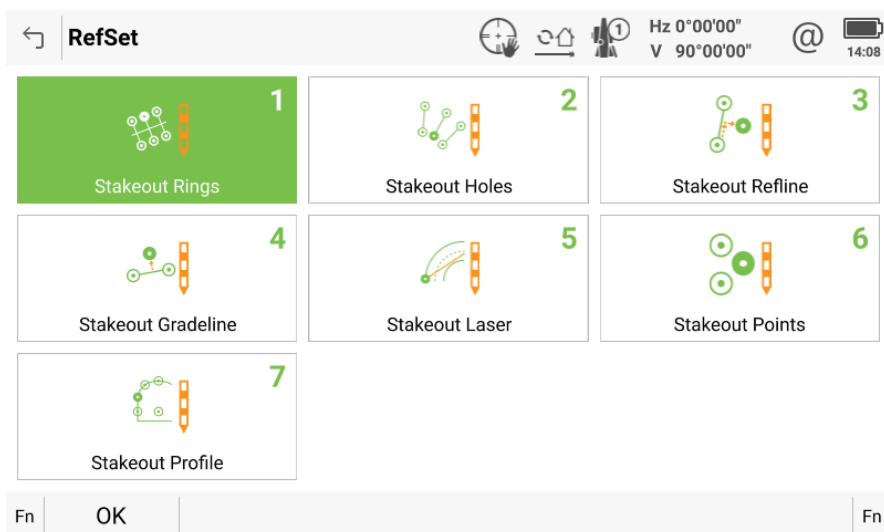
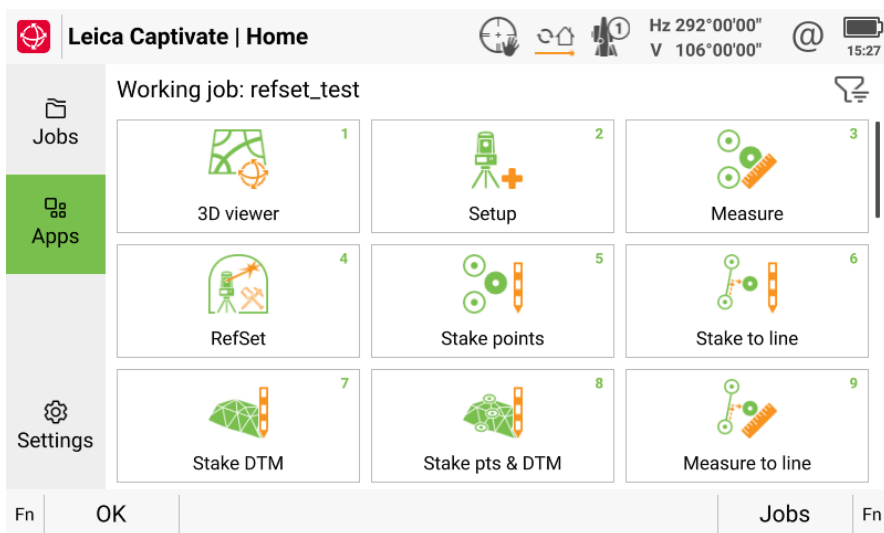
Automatic Reference Line and Stakeout Program for Leica TS20 Total Station Instruments

User Manual

Version 10.00.03

© Justin Gardner 2026

www.refset.com.au



Contents

1. REFSET PROGRAM	3
REFSET CAPTIVATE INSTALLATION ON TPS	3
REFSET CAPTIVATE PROGRAM SETTINGS	3
2. STAKEOUT RINGS	4
STAKEOUT RINGS PROCEDURE	4
STAKEOUT RINGS SETTINGS	5
3. STAKEOUT HOLES	6
STAKEOUT HOLES PROCEDURE	6
STAKEOUT HOLES SETTINGS	7
4. STAKEOUT REFLINE	8
STAKEOUT REFLINE PROCEDURE	8
STAKEOUT REFLINE SETTINGS	9
5. STAKEOUT GRADELINE	10
STAKEOUT GRADELINE PROCEDURE	10
STAKEOUT GRADELINE SETTINGS	12
6. STAKEOUT LASER	13
STAKEOUT LASER PROCEDURE	13
STAKEOUT LASER SETTINGS	14
7. STAKEOUT POINTS	15
STAKEOUT POINTS PROCEDURE	15
STAKEOUT POINTS SETTINGS	16
8. STAKEOUT PROFILE	17
PROFILE JOB DATA FILES	17
PROFILE JOB DATA FILES SETUP PROCEDURE	18
STAKEOUT PROFILE PROCEDURE	19
CHECK PROFILE PROCEDURE	19
STAKEOUT PROFILE SETTINGS	20
9. REFSET GENERAL	21
REFERENCE LINE OFFSETS DESCRIPTION	21

1. RefSet Program

RefSet Captivate Installation on TPS

- Copy the installation file **RefSetCaptivate_{version}.yxx** and the RefSet key file **RefSetCaptivate_{serial number}.key** to the '**System**' folder on the USB stick
- Insert the USB stick into the TPS
- In Captivate go to **Settings > Tools > Update software**
- Select **USB stick** for the '*Update software using*'
- Select **RefSetCaptivate_{version}.yxx** for the '*File to load*'
- Tick the '*I read, understand & agree to the Software ...*' checkbox
- Press **F1** (OK)
- Tap the **RefSet** icon in the **Apps** list to start RefSet Captivate
- On the first start of RefSet Captivate the '*About RefSet*' page will be shown
- Press **F2** (Load Key)
- The app will then read the **RefSetCaptivate_{serial number}.key** file from the USB stick and set the license key into '*Enter RefSet License Key*'
- (Alternatively open the RefSetCaptivate_{serial number}.key file in a text editor on a PC and then manually enter the license key into '*Enter RefSet License Key*')
- Press **F1** (OK)

RefSet Captivate Program Settings

- *Log Staked Points* Tick the checkbox to save the automatic stakeout points to a log file
The points staked in all automatic modes will be saved to a file with the same name as the data job with '*_log*' added which will be saved in a subfolder named '*Log*' on the USB stick or Internal Memory
- *Log File Type* Set to the type of log file to save the automatic stakeout point data to:

CSV	Comma separated text file
STR	Surpac string file
- *Grade Display* Sets the input and output format for grades:

h:v	Horizontal by vertical distance
v:h	Vertical by horizontal distance
%(v/h x 100)	Percentage of vertical by horizontal distance

2. Stakeout Rings

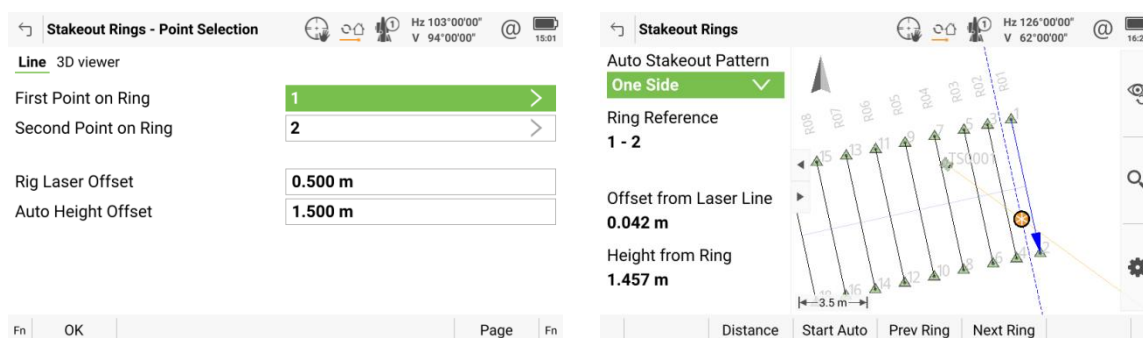
Rings are defined by two points on each ring (eg: Ring1: 1 & 2, Ring2: 3 & 4, etc) which need to be numbered in consecutive order to enable RefSet to increment to the next ring in auto stakeout mode

There are two offset values that can be pre-set for the ring stakeout:

- a) *Rig Laser Offset* This sets the distance from the laser position to the drill rod position on the particular drill rig used to drill the rings. A positive value will move the *Laser Lines* to the right of the ring
- b) *Auto Height Offset* This sets the *Height* offset of the points that will be staked out in the auto stakeout mode. If this setting is not used then the *Height* value of the first point measured when the auto stakeout is started will be used to set the stakeout *Height* offset

Note: These two settings can be enabled or disabled in the Stakeout Rings Settings

Stakeout Rings Procedure

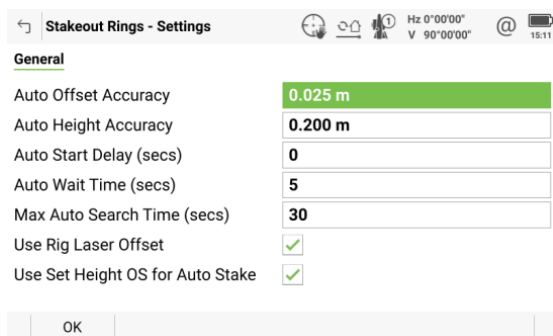


1. Tap or select **Stakeout Rings** on the RefSet menu screen
2. Select the *First Point* and *Second Point* of the ring to be staked out from the lists or press **F6** (Page) to go to the *3D Viewer* and then select the points on the map view
3. If the *Use Rig Laser Offset* and/or *Use Set Height OS For Auto Stakeout* settings have been set in the Settings then enter these values and press **F1** (OK)
4. Choose the *Auto Stakeout Pattern* to use:
 - LRLR....** Will stakeout the left wall, right wall, left wall, etc
 - LRRL....** Will stakeout the left wall, right wall, right wall, left wall, etc
 - One Side** Will stakeout the wall on which the auto stakeout is started
5. Point the TPS towards the first ring on the wall to be staked

For the **LRLR....** and **LRRL....** patterns the auto stakeout needs to always be started with the TPS pointing towards the left wall - that is standing behind the instrument facing the first ring to be staked out then the left wall is the one to the left

For all patterns the auto stakeout needs to be started at a point on the wall that is as near to the first ring position as is possible
6. Press **F3** (Start Auto) to start the auto stakeout

Stakeout Rings Settings



Stakeout Rings - Settings

General

Auto Offset Accuracy	0.025 m
Auto Height Accuracy	0.200 m
Auto Start Delay (secs)	0
Auto Wait Time (secs)	5
Max Auto Search Time (secs)	30
Use Rig Laser Offset	☒
Use Set Height OS for Auto Stake	☒

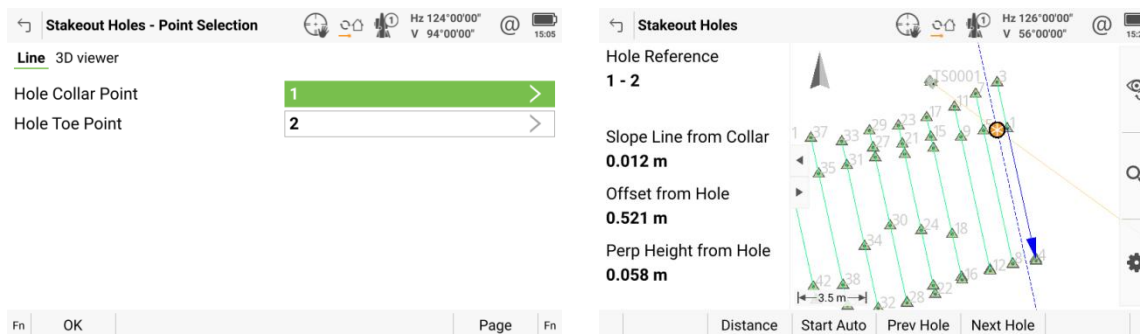
OK

- Auto Offset Accuracy** Sets the accuracy at which the *Offset* value is staked out in auto stakeout mode
 (eg: if set to 0.025 the TPS will stake the rings/laser lines *Offset* value to within $\pm 25\text{mm}$ before moving to the next ring)
- Auto Height Accuracy** Sets the accuracy at which the *Height* value is staked out in auto stakeout mode
 (eg: if set to 0.200 the TPS will stake the rings/laser lines *Height* value to within $\pm 200\text{mm}$ before moving to the next ring)
- Auto Start Delay (secs)** Sets the time the TPS will wait after the *Start Auto* button is pressed before starting the auto stakeout
- Auto Wait Time (secs)** Sets the time the TPS will stop on an auto stakeout point when it has been successfully staked out
 (eg: if set to 5 the TPS will wait 5 seconds after it stakes out a point before it moves on to the next ring)
- Max Auto Search Time (secs)**
 Sets the maximum time the TPS will search for an auto stakeout point. If set to zero the search time is infinite
 (eg: if set to 30 the TPS will search for 30 seconds and if the point is not found it moves on to the next ring)
- Use Rig Laser Offset** Tick to enable a *Rig Laser Offset* to be set and applied to the ring positions
- Use Set Height OS For Auto Stake**
 Tick to enable the *Height* offset of the rings/laser lines staked in auto mode to be staked at a set value, Untick to stake the rings/laser lines at the *Height* offset of the first point measured when the auto stakeout is started

3. Stakeout Holes

Blast holes are defined by two points on each hole, the hole design collar and the hole design toe. (eg: Hole1: 1 & 2, Hole2: 3 & 4, etc) These points need to be numbered in consecutive order to enable RefSet to increment to the next hole in auto stakeout mode

Stakeout Holes Procedure



1. Tap or select **Stakeout Holes** on the RefSet menu screen
2. Select the *Hole Collar Point* and *Hole Toe Point* of the hole to be staked out from the lists and press **F1** (OK) or press **F6** (Page) to go to the 3D Viewer and then select the points on the map view
3. Point the TPS towards the wall near to the first hole to be staked
4. Press **F3** (Start Auto) to start the auto stakeout

Missed Holes Procedure

If any holes are missed during the auto stakeout due to the *Maximum Auto Search Time* being exceeded then when the auto stakeout is stopped or finished a message will be shown asking to stake the missed holes manually

1. Tap or select **Yes** or **No** to stake the holes manually
2. If **Yes** the collar and toe points for the first missed hole will be loaded and the hole can then be staked by manually pointing the telescope
3. Press **F5** (Next Hole) or **F4** (Prev Hole) to cycle through the missed holes
4. Press **ESC** () to finish the missed hole stakeout and resume normal operation

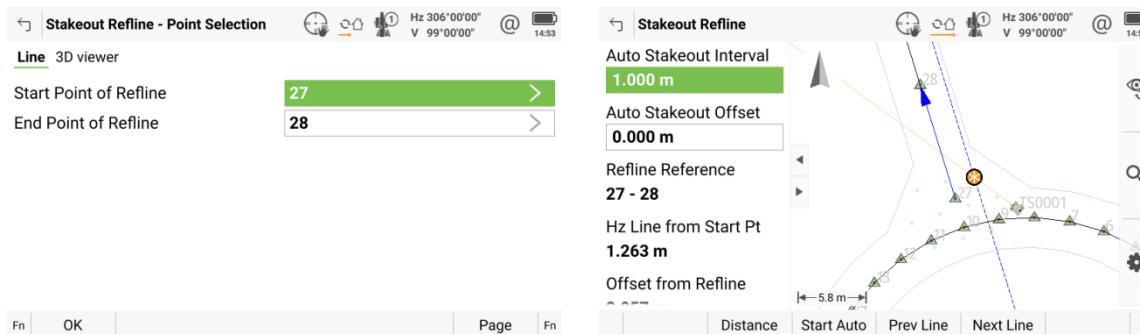
Stakeout Holes Settings

- *Auto Position Accuracy* Sets the accuracy at which the *Offset* and *Perp Height* values are staked out in auto stakeout mode
(eg: if set to 0.025 the TPS will stake the holes *Offset* and *Perp Height* values to within $\pm 25\text{mm}$ before moving to the next hole)
- *Auto Start Delay (secs)* Sets the time the TPS will wait after the *Start Auto* button is pressed before starting the auto stakeout
- *Auto Wait Time (secs)* Sets the time the TPS will stop on an auto stakeout point when it has been successfully staked out
(eg: if set to 5 the TPS will wait 5 seconds after it stakes out a point before it moves on to the next hole)
- *Max Auto Search Time (secs)*
Sets the maximum time the TPS will search for an auto stakeout point. If set to zero the search time is infinite
(eg: if set to 30 the TPS will search for 30 seconds and if the point is not found it moves on to the next hole)

4. Stakeout Refline

Reference Lines (centrelines) are defined by two points

Stakeout Refline Procedure



1. Tap or select **Stakeout Refline** on the RefSet menu screen
2. Select the *Start Point* and *End Point* of the reference line (centreline) to be staked out from the lists and press **F1** (OK) or press **F6** (Page) to go to the 3D Viewer and then select the points on the map view
3. Check the *Auto Stake Interval* value – this is the slope distance between the points staked in auto stakeout mode
4. Check the *Auto Stake Offset* value – this is the *Offset* that will be staked in auto stakeout mode (eg: for a centreline it will be zero)
5. Point the TPS towards the wall or backs near to the reference line at a position near where you want to start the stakeout
6. Press **F3** (Start Auto) to start the auto stakeout

Stakeout Refline Settings

← Stakeout Refline - Settings

Hz 289°00'00"
V 106°00'00"

15:22

General

Auto Offset Accuracy	0.025 m
Auto Interval Accuracy	0.200 m
Auto Start Delay (secs)	0
Auto Wait Time (secs)	5
Max Auto Search Time (secs)	30

OK

- Auto Offset Accuracy** Sets the accuracy at which the *Offset* value is staked out in auto stakeout mode
 (eg: if set to 0.025 the TPS will stake the reference line *Offset* value to within $\pm 25\text{mm}$ of the *Auto Stake Offset* value before moving to the next point on the refline)
- Auto Interval Accuracy** Sets the accuracy at which the slope distance interval between the points is staked out in auto stakeout mode
 (eg: if set to 0.200 the TPS will stake the points on the reference line to within $\pm 200\text{mm}$ of the *Auto Stake Interval* setting from the previous point before moving to the next point)
- Auto Start Delay (secs)** Sets the time the TPS will wait after the *Start Auto* button is pressed before starting the auto stakeout
- Auto Wait Time (secs)** Sets the time the TPS will stop on an auto stakeout point when it has been successfully staked out
 (eg: if set to 5 the TPS will wait 5 seconds after it stakes out a point before it moves on to the next point)
- Maximum Auto Search Time (secs)**
 Sets the maximum time the TPS will search for an auto stakeout point. If set to zero the search time is infinite
 (eg: if set to 30 the TPS will search for 30 seconds and if the point is not found it moves on to the next point)

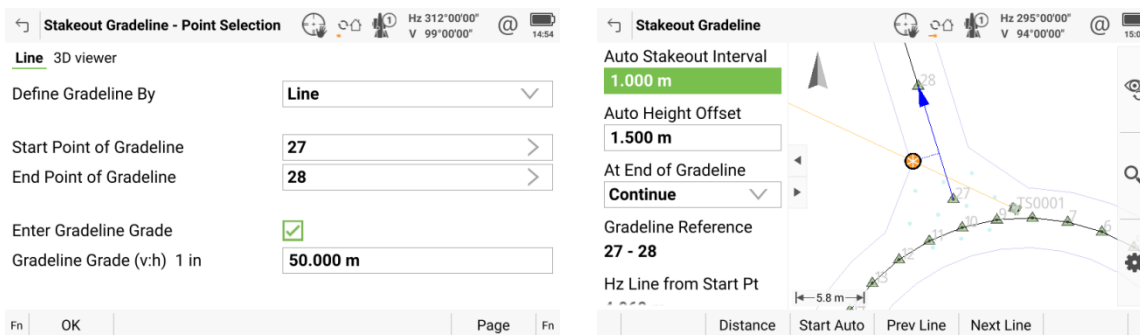
5. Stakeout Gradeline

There are three methods for defining grade lines in RefSet:

- a) Line Uses two design points from the *Data Job*, these points need to be numbered in consecutive order to enable RefSet to increment to the next grade line in auto stakeout mode (eg: First Gradeline: 1 & 2, Second Gradeline 2 & 3, etc)
- b) Measured Line Uses two measured temporary points which will not be saved in a *Data Job* and optionally an entered grade
- c) Arc Uses three design points from the *Data Job* to define an arc

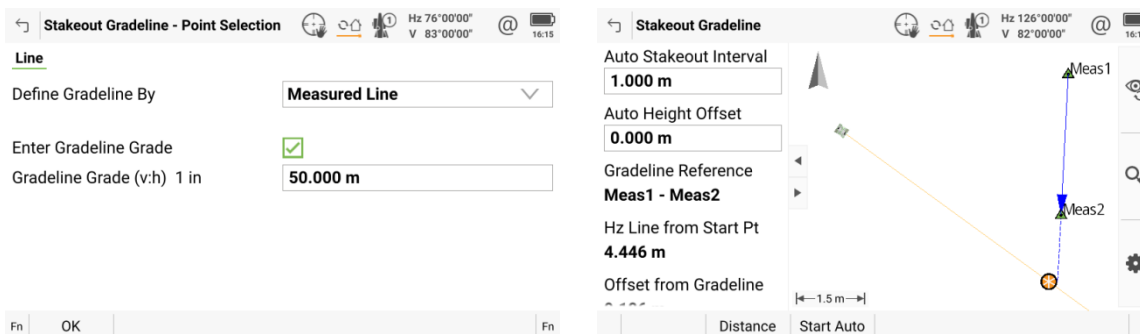
Stakeout Gradeline Procedure

1. Tap or select **Stakeout Gradeline** on the RefSet menu screen
2. Select the method to *Define Gradeline By*
3. Stakeout Gradeline by Line



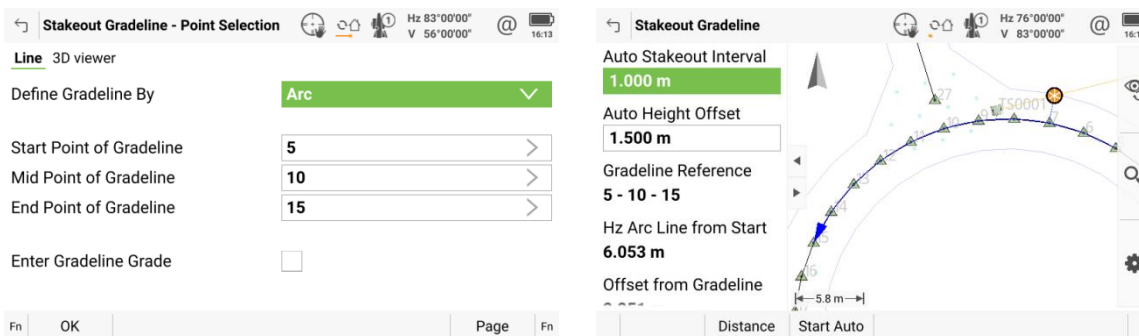
- 3.1. Select the *Start Point* and *End Point* of the grade line to be staked out from the lists or press **F6** (Page) to go to the *3D Viewer* and then select the points on the map view
- 3.2. Tick or Untick to *Enter Gradeline Grade* and if Ticked enter the grade of the grade line (the grade line will then start at the elevation of the start point and go towards the end point at the entered grade) and press **F1** (OK)

3. Stakeout Gradeline by Measured Line



- 3.1. Tick or Untick to *Enter Gradeline Grade* and if Ticked enter the grade of the grade line (the grade line will then start at the elevation of the first measured point and go towards the second measured point at the entered grade) and press **F1** (OK)
- 3.2. Point the TPS at the start point of the grade line (eg: at a point on an existing grade paintline) and press **F1** (Measure)
- 3.3. Point the TPS at the end point of the grade line (eg: at a point near the drive face) and press **F1** (Measure)

3. Stakeout Gradeline by Arc



- 3.1. Select the *Start Point*, *Mid Point* and *End Point* of the grade line to be staked out from the lists or press **F6** (Page) to go to the *3D Viewer* and then select the points on the map view
- 3.2. Tick or Untick to *Enter Gradeline Grade* and if Ticked enter the grade of the grade line (the grade line will then start at the elevation of the start point and go towards the end point at the entered grade) and press **F1** (OK)
4. Check the *Auto Stake Interval* value – this is the distance between the points staked in auto stakeout mode
5. Check the *Auto Height Offset* value – this is the *Height* offset that will be staked in auto stakeout mode
6. For a *Line* stakeout - check the *At End of Gradeline* setting – this defines the behaviour of the program when the end of the current grade line is reached in auto stakeout mode

Continue	The auto stakeout will continue on the same line past the end of the current grade line
Stop	The auto stakeout will stop at the end of the current grade line
Next Gradeline	The auto stakeout will increment to the next grade line at the end of the current grade line (eg: First Gradeline: 1 & 2, Next Gradeline 2 & 3, etc)
7. Point the TPS towards the wall at a position near where you want to start the stakeout
8. Press **F3** (Start Auto) to start the auto stakeout

Stakeout Gradeline Settings

← Stakeout Gradeline - Settings

Hz 289°00'00"
V 106°00'00"

15:24

General

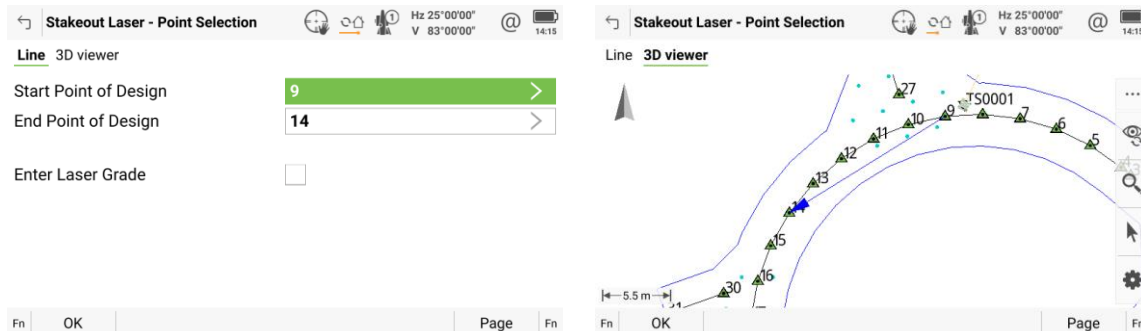
Auto Height Accuracy	0.025 m
Auto Interval Accuracy	0.200 m
Auto Start Delay (secs)	0
Auto Wait Time (secs)	5
Max Auto Search Time (secs)	30

OK

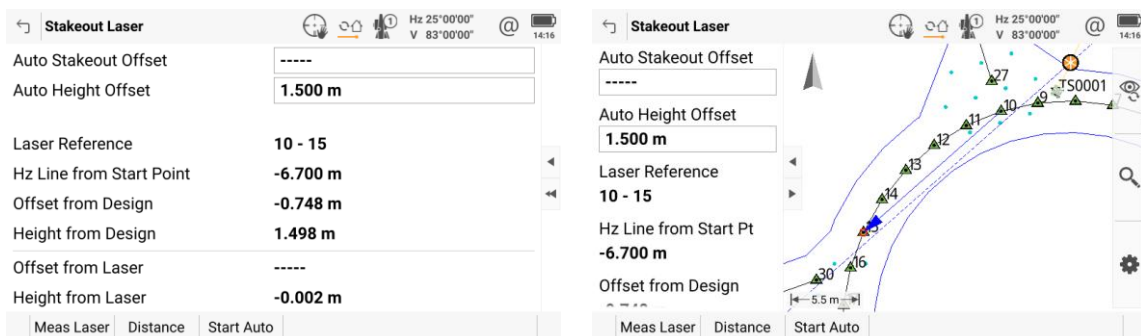
- Auto Height Accuracy** Sets the accuracy at which the *Height* value is staked out in auto stakeout mode
 (eg: if set to 0.025 the TPS will stake the grade line *Height* value to within $\pm 25\text{mm}$ of the *Auto Height Offset* value before moving to the next interval on the grade line)
- Auto Interval Accuracy** Sets the accuracy at which the distance *Interval* between the points is staked out in auto stakeout mode
 (eg: if set to 0.200 the TPS will stake the points on the grade line to within $\pm 200\text{mm}$ of the *Interval* setting from the previous point before moving to the next interval)
- Auto Start Delay (secs)** Sets the time the TPS will wait after the *Start Auto* button is pressed before starting the auto stakeout
- Auto Wait Time (secs)** Sets the time the TPS will stop on an auto stakeout point when it has been successfully staked out
 (eg: if set to 5 the TPS will wait 5 seconds after it stakes out a point before it moves on to the next point)
- Max Auto Search Time (secs)**
 Sets the maximum time the TPS will search for an auto stakeout point. If set to zero the search time is infinite
 (eg: if set to 30 the TPS will search for 30 seconds and if the point is not found it moves on to the next point)

6. Stakeout Laser

Stakeout Laser Procedure

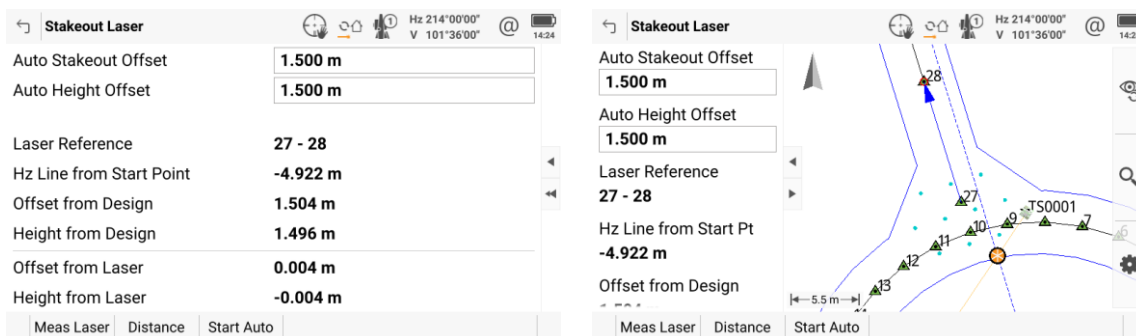


1. Tap or select **Stakeout Laser** on the RefSet menu screen
2. Select the *Start Point* and *End Point* of the laser design reference line to be staked out from the lists and press **F1** (OK) or press **F6** (Page) to go to the 3D Viewer and then select the points on the map view
3. Tick or Untick to *Enter Laser Grade* and if Ticked enter the grade of the laser design reference line (the reference line will then start at the elevation of the start point and go towards the end point at the entered grade) and press **F1** (OK)
4. Stakeout Laser on Curve



- 4.1 In the Stakeout Laser screen - go to the map view and then window in the map to the relevant area
- 4.2 Point the TPS towards the drive wall at a good position for the laser and Press **F2** (Dist) to start measuring - the measured position will then be shown on the map view with a blue dashed line showing the offset line from the laser design reference line
- 4.3 While measuring, turn the TPS and/or reselect the laser design reference line *Start* and *End Points* (by tapping on or near a point symbol) to adjust the dashed offset line to the best position for the laser - including using the displayed *Height from Design* value to position the laser vertically
- 4.4 When the best laser position has been found, mark the position on the drive wall
- 4.5 With the TPS still pointing towards the laser position, press **F1** (Meas Laser) - the TPS will then measure the laser position and set the *Auto Stakeout Offset* and *Auto Height Offset* values to the measured values
- 4.6 Point the TPS towards the drive face near to the laser target position and press **F3** (Start Auto) to start the auto stakeout of the laser target position

4. Stakeout Laser on Straight



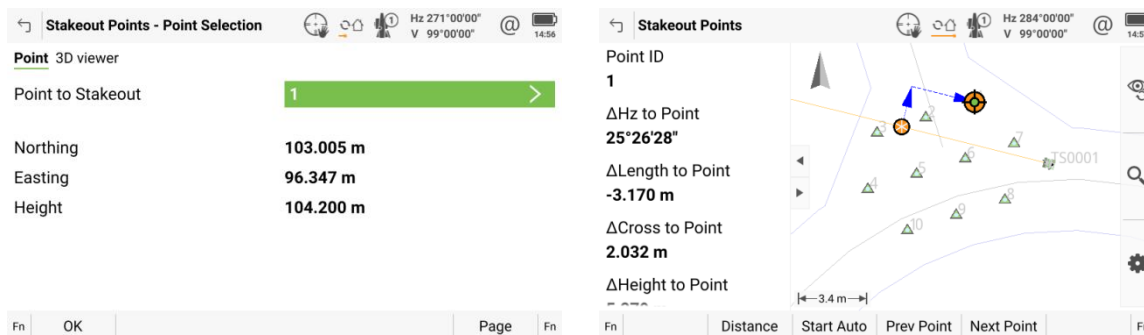
- 4.1 In the Stakeout Laser screen - enter the *Auto Stakeout Offset* value and check the *Auto Height Offset* value - these are the values that will be staked out in the auto stakeout mode
- 4.2 Point the TPS towards the drive wall near to the laser position and press **F3** (Start Auto) to start the auto stakeout of the laser position
- 4.3 When the laser position has been established and marked point the TPS towards the drive face near to the laser target position and press **F3** (Start Auto) to start the auto stakeout of the laser target position

Stakeout Laser Settings

- *Auto Position Accuracy* Sets the accuracy at which the *Auto Stakeout Offset* and *Height Offset* values are staked out in auto stakeout mode
(eg: if set to 0.005 the TPS will stake the laser point *Offset* and *Height Offset* values to within $\pm 5\text{mm}$)
- *Default Auto Height OS* The *Auto Height Offset* value that is used for the auto stakeout will be reset to this value when the function starts

7. Stakeout Points

Stakeout Points Procedure



1. Tap or select **Stakeout Points** on the RefSet menu screen
2. Select the *Point to Stakeout* from the list and press **F1** (OK) or press **F6** (Page) to go to the *3D Viewer* and then select the point on the map view
3. Point the TPS towards the backs near to the first point to be staked
4. Press **F3** (Start Auto) to start the auto stakeout

Missed Points Procedure

If any points are missed during the auto stakeout due to the *Maximum Auto Search Time* being exceeded then when the auto stakeout is stopped or finished a message will be shown asking to stake the missed points manually

1. Tap or select **Yes** or **No** to stake the points manually
2. If **Yes** the first missed point will be loaded and the point can then be staked by manually pointing the telescope
3. Press **F5** (Next Point) or **F4** (Prev Point) to cycle through the missed points
4. Press **ESC** () to finish the missed point stakeout and resume normal operation

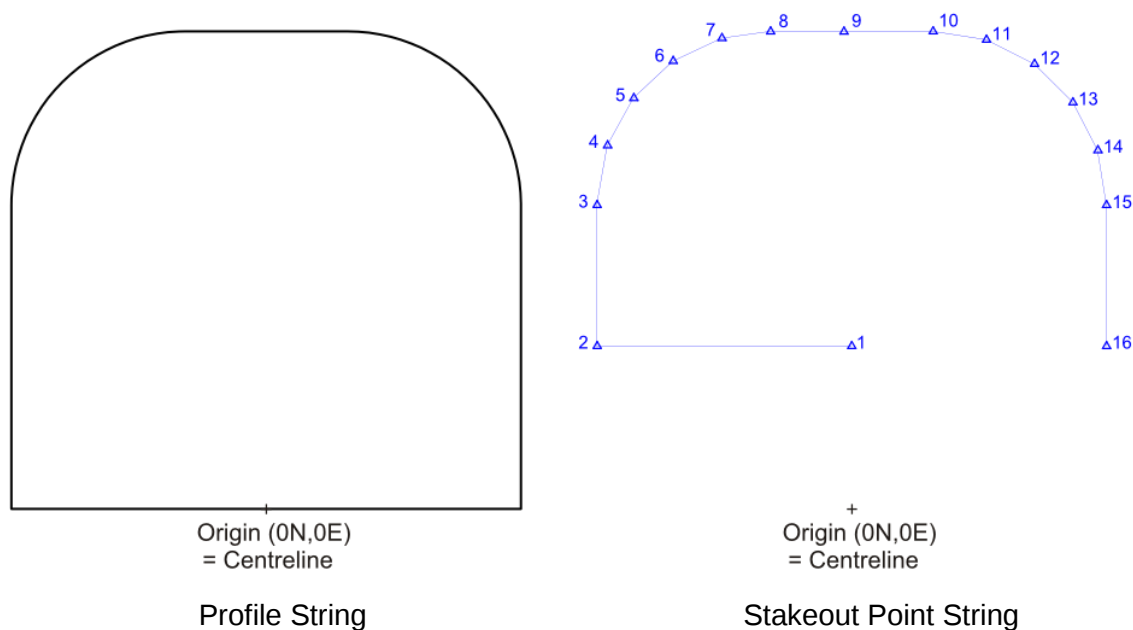
Stakeout Points Settings

- *Auto Position Accuracy* Sets the accuracy at which the *Length* and *Cross* offset values are staked out in auto stakeout mode
(eg: if set to 0.025 the TPS will stake the points *Length* and *Cross* values to within $\pm 25\text{mm}$ before moving to the next point)
- *Auto Start Delay (secs)* Sets the time the TPS will wait after the *Start Auto* button is pressed before starting the auto stakeout
- *Auto Wait Time (secs)* Sets the time the TPS will stop on an auto stakeout point when it has been successfully staked out
(eg: if set to 5 the TPS will wait 5 seconds after it stakes out a point before it moves on to the next point)
- *Max Auto Search Time (secs)*
Sets the maximum time the TPS will search for an auto stakeout point. If set to zero the search time is infinite
(eg: if set to 30 the TPS will search for 30 seconds and if the point is not found it moves on to the next point)

8. Stakeout Profile

Profile Job Data Files

The *Profile Job* data files used in RefSet need to be setup in plan view coordinates (ie: Easting=Drive Width and Northing=Drive Height) with the coordinate origin (0E,0N) located at the centreline point of the profile. Note: The centreline does not need to be located on the profile outline (eg: it may be at the centre point of the profile).



Each *Profile Job* needs two strings:

- a) **Profile String** The full (detailed) profile outline string. The profile outline string needs to be a closed string in a clockwise direction. This outline is used to calculate the *Profile Offset* which is the shortest distance between a measured point and the profile and can be used to check for overbreak and underbreak.
- b) **Stakeout Point String** Contains the points that are to be staked out on the face in the auto stakeout mode. These points need to have individual point id's in consecutive order. Note: These points do not need to be located on the profile outline (eg: there can be a point on the centreline at gradeline height - Pt 1 in the above diagram).

Note: The Profile Job can have both these strings or just one or the other. If you just need to calculate the *Profile Offset* with no stakeout points then you just need the Profile String, and if you just need the stakeout points you don't need the Profile String.

Profile Job Data Files Setup Procedure

1. Create Profile Strings DXF File

- 1.1 Create a profile outline string ([see diagram above](#)) and **ensure the profile outline string is a closed string in a clockwise direction**
- 1.2 Create a profile stakeout points string with the points to be staked out on the face ([see diagram above](#))
- 1.3 Save these strings to a DXF file (eg: profile_5.0x5.0.dxf) and copy the DXF file to the 'Data' folder on the USB stick and insert into the instrument

2. Create Profiles Site (only needs to be done once)

- 2.1 On the instrument in **Captivate** select the **Jobs** tab and then press **F6** (Sites)
- 2.2 Press **F2** (New) to create a new site and enter **Profiles** as the new job site *Name*
- 2.3 Press **F1** (Store) and then press **F1** (OK)

3. Create Profile Job

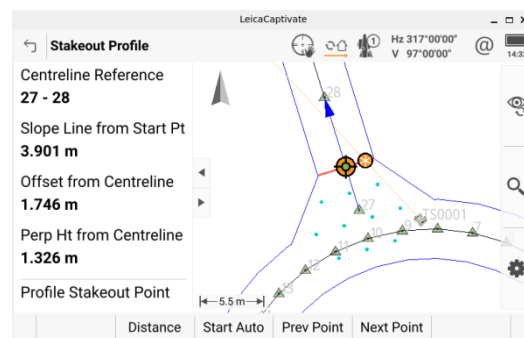
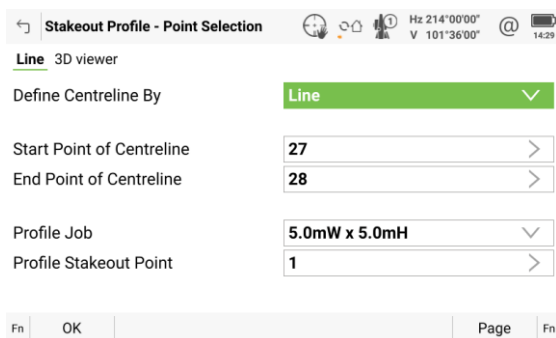
- 3.1 On the instrument in **Captivate** select the **Jobs** tab and then press **F2** (New)
- 3.2 Enter the new profile job *Name* (eg: profile_5.0x5.0) and then select *Profiles* from the *Site* list (this is the site created in [2.](#) above)
- 3.3 Select the 'Reference files' tab at the top of the screen and then select and tick the DXF profile file created in [1.](#) above (eg: profile_5.0x5.0.dxf)
- 3.4 Check the *Units* of the selected DXF file in the list and if needed press **F2** (Unit) to cycle through the units and select the correct one (eg: Metre)
- 3.5 Press **F1** (Store) to create and save the new profile job

4. Create Profile

- 4.1 Select the new profile job (eg: profile_5.0x5.0) in the **Jobs** list and press **F4** (Data)
- 4.2 Select the '3D viewer' tab at the top of the screen then press **Fn + F4** (Layers)
- 4.3 Press **Fn + F1** (Settings) and then select 'Only Lines' in the 'Objects to create when importing entities' list and then press **F1** (OK) and then **F1** (Store)
- 4.4 Tap to select the profile outline string (created in [1.1](#) above) in the map and then tap the **Map Menu** () button and select **Import** from the list (this will create a line entity from the profile string and store it in the profile job)
- 4.5 Press **Fn + F4** (Layers) again then press **Fn + F1** (Settings) and then select 'Only at vertices' in the 'Objects to create when importing entities' list
- 4.6 Set the 'Name points using' setting to blank to ensure the imported stakeout points are numbered without a prefix and then press **F1** (OK) and then **F1** (Store)
- 4.7 Tap to select the profile stakeout points string (created in [1.2](#) above) in the map and then tap the **Map Menu** () button and select **Import** from the list (this will create the stakeout point entities from the string vertices and store them in the profile job) and then press **F1** (OK) to finish creating the profile job

5. Repeat this process ([1.3,4](#) above) for the other profile jobs and when all profile jobs have been created select the **Jobs** tab and press **F6** (Sites) and then select the 'Profiles' site and press **F6** (State) to change the site to *Hidden* (this will ensure that the profile jobs do not show in the main **Jobs** list)

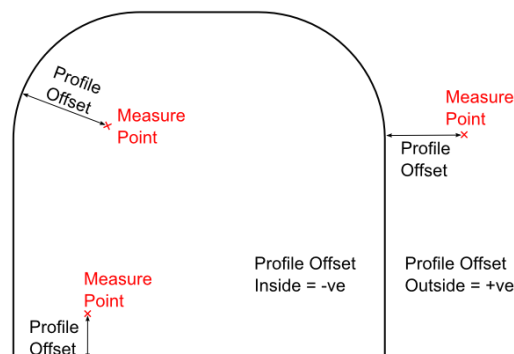
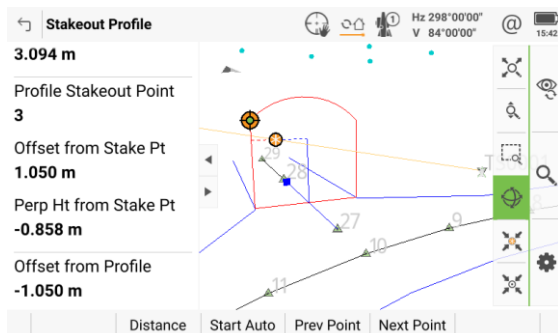
Stakeout Profile Procedure



1. Tap or select **Stakeout Profile** on the RefSet menu screen
2. Select the method to *Define Centreline By*
3. For a *Line* select the *Start Point* and *End Point* of the centreline of the profile to be staked out and for an *Arc* select the *Start Point*, *Mid Point* and *End Point* of the centreline of the profile from the lists or press **F6** (Page) to go to the 3D Viewer and then select the points on the map view
4. Select the *Profile Job* to use from the list
5. Select the *Profile Stakeout Point* to be staked out from the list and press **F1** (OK)
6. Point the TPS towards the drive face near to the first point to be staked
7. Press **F3** (Start Auto) to start the auto stakeout

Check Profile Procedure

1. Tap or select **Stakeout Profile** on the RefSet menu screen
2. Setup the *Profile Centreline* and *Profile Job* as per points 2-4 in the [Stakeout Profile Procedure](#) above.
3. Point the TPS towards the point to be checked and Press **F2** (Dist) to start measuring
4. The *Offset from Profile* value can be used to check for overbreak and underbreak of the drive. Overbreak will have a positive *Offset from Profile* while underbreak will be negative (Note: ensure the profile outline string in the Profile File is a closed string in a clockwise direction otherwise this convention will be the opposite)



Stakeout Profile Settings

- *Auto Position Accuracy* Sets the accuracy at which the stakeout point *Offset* and *Perp Height* values are staked out in auto stakeout mode
(eg: if set to 0.025 the TPS will stake the profile stakeout point *Offset* and *Perp Height* values to within $\pm 25\text{mm}$ before moving to the next stakeout point)
- *Auto Start Delay (secs)* Sets the time the TPS will wait after the *Start Auto* button is pressed before starting the auto stakeout
- *Auto Wait Time (secs)* Sets the time the TPS will stop on an auto stakeout point when it has been successfully staked out
(eg: if set to 5 the TPS will wait 5 seconds after it stakes out a point before it moves on to the next point)
- *Maximum Auto Search Time (secs)*
Sets the maximum time the TPS will search for an auto stakeout point. If set to zero the search time is infinite
(eg: if set to 30 the TPS will search for 30 seconds and if the point is not found it moves on to the next point)
- *Auto Search Limit (m)* Sets the distance limit for the point search in the auto stakeout mode. The auto stakeout will be restricted to within this distance from the start point of the auto stakeout

9. RefSet General

- It is important to number the points in the control job in a logical consecutive order to enable RefSet to increment to the next feature in auto stakeout modes
- Always point the TPS towards the first feature to stakeout before starting any of the auto stakeout modes, RefSet basically uses a trial and error method to do the auto stakeout, so it helps if it is near the first feature when it starts

Reference Line Offsets Description

