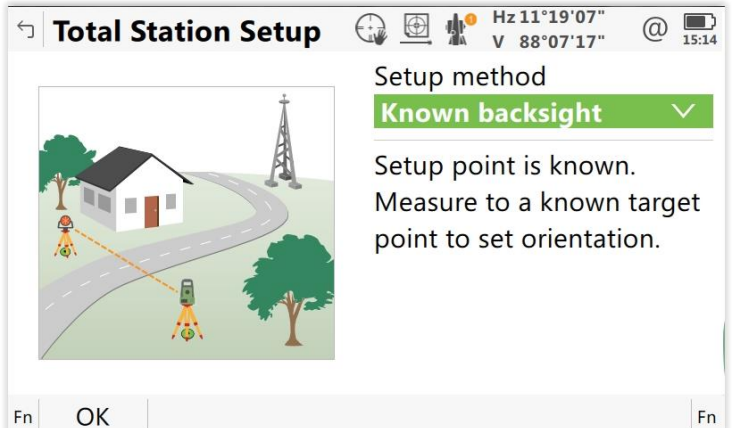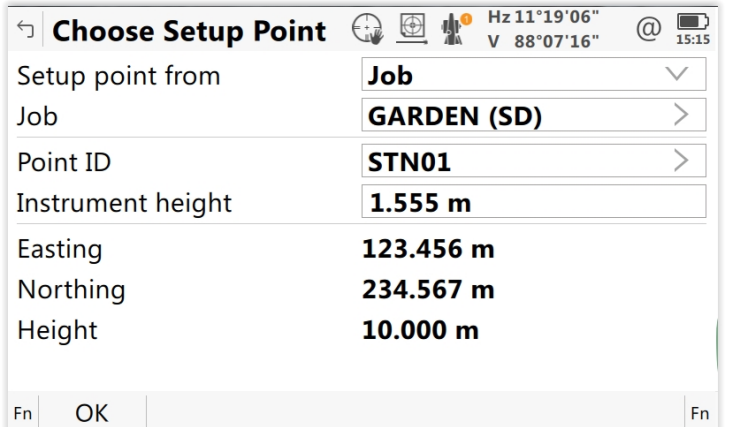# Leica Captivate Known Coordinate Setup

This guide covers setting up a total station on a known coordinate and then sighting another known coordinate as an orientating Backsight. This method has fallen from favour amongst site engineers as resection has become increasingly popular. Resection is a good way of setting the instrument up but is far less good at creating new control points.
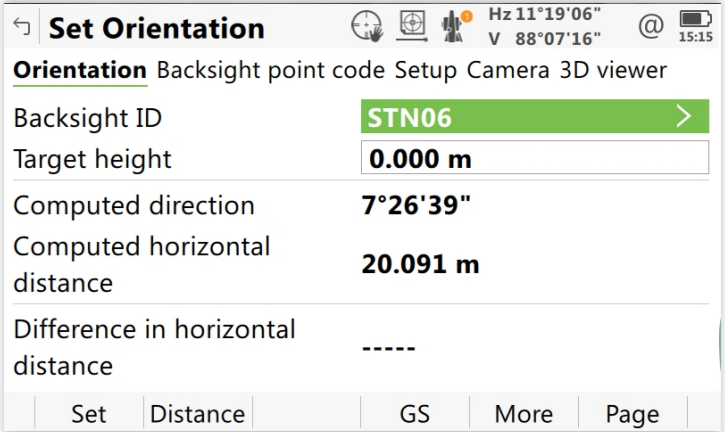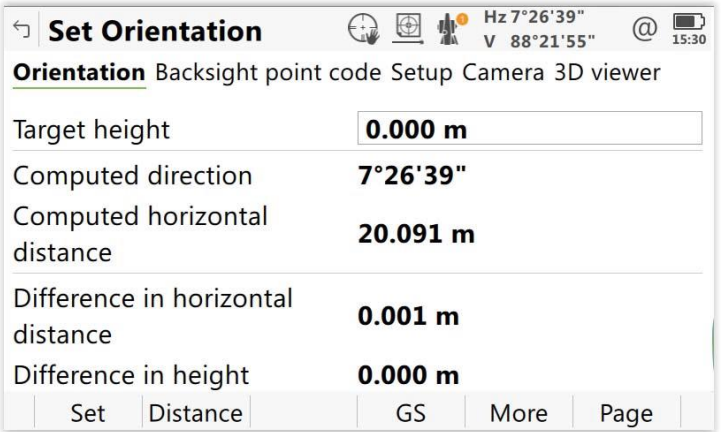
The known coordinate method along with a traverse kit is still the best way to create new stations. Surveyors would use no other method! The notes at the end might even look at measuring the points in Face Left and Face Right!
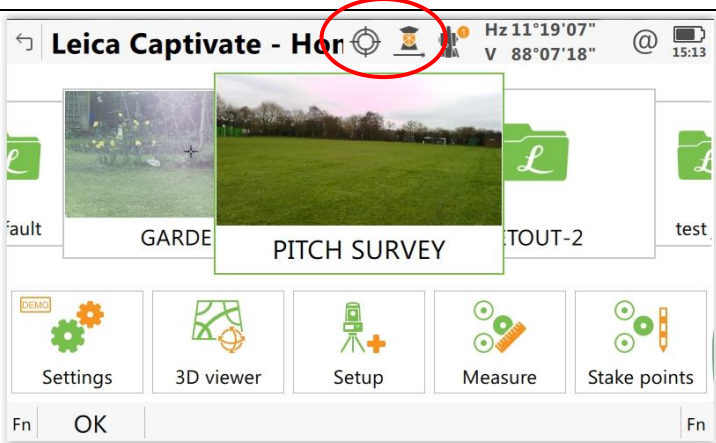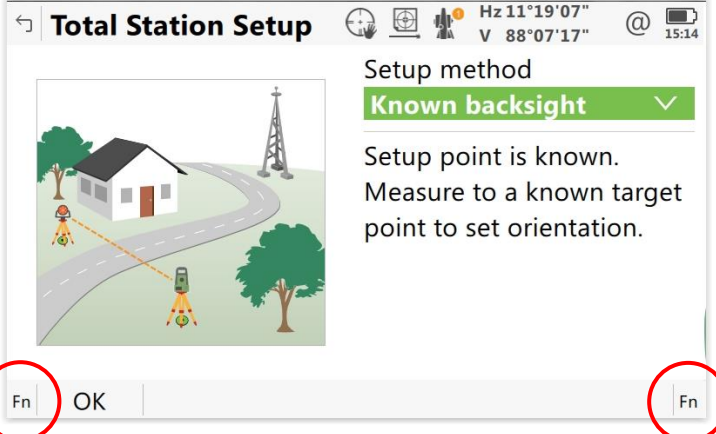
Step	Action	Screen Display
1	I am assuming you have set up a job and have some station coordinates entered into it. I am also assuming the total station is set over the station you wish to use. With the job you are using central on the top row, tap **Setup**.	
2	Tap the **Setup method** option box and select **Known backsight** from the list. Then press **F1 (OK)**.	
3	I uploaded my station coordinates during a previous guide. This means that I need to set the **Setup point from** line to **Job**. Select the correct **Job**. The SD in brackets refers to where the particular job is stored. The **Point ID** refers to the station point that the instrument is set up on. I am going to working in 3D so I have measured the **Instrument height** from the top of the station nail to the	

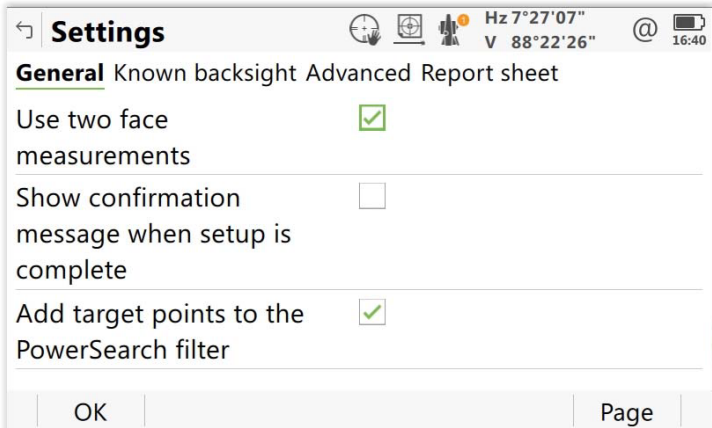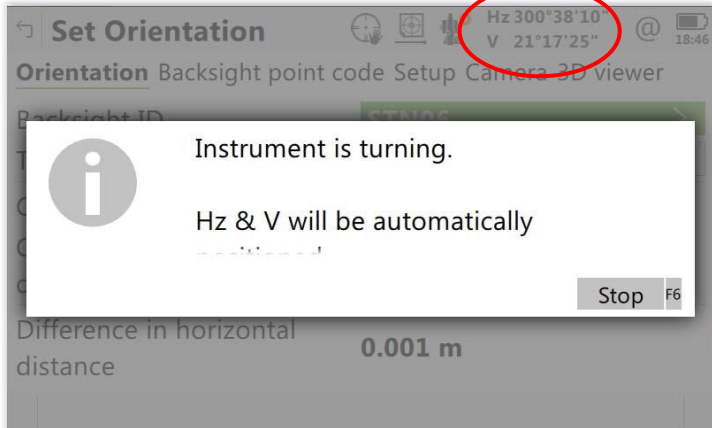|		
	height of collimation mark indicated on the side of the instrument. The **Easting**, **Northing** and **Height** of the point highlighted in the **Point ID** are then displayed to allow you to visually check for errors. Press **F1 (OK)**.	
4	On this **Set Orientation** screen, we must select the **Backsight ID** from the list of points entered previously. This is the station the target is set up on. As my backsight point is a retro target sticker, the 0.000m **Target height** is correct. If using a prism target, you need to measure the height from the top of the station nail to middle of the prism. A **Computed direction** (Whole Circle Bearing) and a **Computed horizontal distance** are displayed. These are mathematically calculated by the software and will be compared to the actual measured distance when we press **F2 (Distance)**.	Set Orientation Hz 11°19'06" V 88°07'16" @ 15:15 **Orientation** Backsight point code Setup Camera 3D viewer Backsight ID STN06 Target height 0.000 m Computed direction 7°26'39" Computed horizontal distance 20.091 m Difference in horizontal distance ----- Set Distance GS More Page
5	Please note, I have scrolled down the page slightly before I recorded this screen grab. The line of information missing from the top is the **Backsight ID**. What has changed is shown towards the bottom of the page. The measured distance has been compared with the Calculated horizontal distance to give us a **Difference in horizontal distance** of 0.001m. There is also a **Difference in height** calculated from the measured distance and vertical angle. If the Differences are acceptable, press **F1 (Set)**. *(See Notes for explanation of the*	Set Orientation Hz 7°26'39" V 88°21'55" @ 15:30 **Orientation** Backsight point code Setup Camera 3D viewer Target height 0.000 m Computed direction 7°26'39" Computed horizontal distance 20.091 m Difference in horizontal distance 0.001 m Difference in height 0.000 m Set Distance GS More Page

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other pages.)

6	With the Setup now complete, you will be returned to the **Home** screen. Whilst we are looking at this screen, look at the Target icons I have circled and compare them to the icons displayed from *Stage 2* onwards. Captivate will still allow you to measure to different targets on the setup. Annoyingly, you now have to set the function as a **Hotkey**. Here is the procedure: Tap **Settings** on the far left of the bottom line of the Home screen. Tap the **Customisation** option and then select **Hotkeys & favourites**. Select one of the keys F7 to F12 and tap the list box. From the list select **TS – Measure & target**. Set any other Hotkeys you want and Press **F1 (OK)** to store. Use the function key to set your **Measure** and **Setup** target options. ****The guide is complete. Only look at the rest if you want to use Face Left/Face Right****	
7	****You do not need to follow these next steps. For first order control points and monitoring tasks, it will be useful**** **A Few Notes on Face Left and Face Right Measurements:** On occasion, it is necessary to chase as much accuracy as possible. Measuring in new First Order control is one such time so I thought a few notes here might be a good idea. Obviously, you probably wouldn't be using retro targets if true accuracy was your goal but, it is what I have and the procedure is the same! You need to get the screen shown here. Press the green **Fn** key or tap either of the **Fn** icons circled. Press **F1 (Settings)** which will have appeared upon pressing **Fn**.	

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8	There are a lot of settings found here! You can for example on the **Known backsight** page instruct Captivate to inform you if the setup does not reach your required level of accuracy. You can set this level of accuracy on the **Advanced** page. Back to what we are trying to achieve here! I have already ticked the relevant box on this screen. It is of course, the **Use two face measurements** option. With this box ticked, you will be expected to measure in both faces within the Setup program. If you only ever set up using the 360° prism in robotic mode, do not follow this part of the guide! Press **F1 (OK)** to exit.	
9	The process is quite difficult to explain and show in pictures but, if you're versed in theory you already know what will happen. Press **F2** to measure the **Distance** as in Stage 4. When you go to store the shot, the above message will appear. The total station will turn in both axes by 180° so that the slow motion tangent screws will end up on the other side of the instrument. I have caught the instrument above in mid-turn. I have circled the angle display and you can see on the vertical angle especially, the instrument is well on the way to Face Right. Once the instrument has stopped moving, carefully sight the target again and press **F2 (Distance)**. Once measured, press **F1 (Set)** and the details of the setup will be recorded and the instrument will turn back to Face Left. The Setup is complete and you are ready to go!	

Notes:

- This guide was written using V1.30 Firmware.
- There were a few pages that we didn't look at. If you look at the Stage 5 picture, you will see Backsight point code, Setup, Camera and 3D viewer. I didn't include them because I am trying to keep the number of pages to a minimum! For the most part,

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they confirm data we have already seen and set. The Camera option will only work if you have an Imaging option in the TS16 and the 3D viewer will show a line between our two points!

- Rather than use the UK terms of Face Left and Face Right, Leica have gone for the more international Face 1 and Face 2. Look at the images above and check the icon of the total station on the top line. The little number (either a 1 or a 2) in the orange circle refers to Face 1 or 2. For 99.9% of the time it needs to show Face 1 (Left).
- The main advantages of this technique if you require extra accuracy are that you firstly end up with two sets of angles and distances to average. Secondly, any small errors in the horizontal and vertical circles are halved.
- Face 1 and Face 2 on the setup is only worth doing if that is how you intend to measure in any new points in the Measure program, mainly new stations or monitoring points.