

When the *Offset & Stakeout directions* are set to *Automatic*, the offset and stakeout directions are with respect to the *instrument* perspective in a Servo survey, and to the *target* perspective in a Robotic survey.

The measurements are editable in *Review job* and are always displayed in the perspective in which they were observed. The perspective cannot be changed in review. The measurement is always stored relative to the instrument position.

## Measure points on a plane

In a conventional survey, the Measure points on a plane measurement method is used to define a plane and then measure points relative to the plane.

A horizontal plane, a vertical plane, or a tilted plane can be defined by selecting points in the job or measuring new points. After defining the plane, an *Angles only* measurement to the plane creates an angles and computed distance observation onto the plane. Alternatively, an *Angles and distance measurement* to the plane computes the perpendicular offset to the plane.

The type of plane calculated by the software depends on the number of points selected:

No. of points	Plane type
1	Horizontal
2	Vertical through 2 points
3 or more	Plane with residuals (for 3 points, the residuals will be 0). The plane can be a "Free" plane created as a best fit (typically tilted) plane through all points, or a "Vertical" plane constrained to a best fit vertical plane through all points. Tap the <i>Free / Vertical</i> softkey to toggle between the two modes.

1. From the main menu, select *Measure / Measure points on plane*.
2. To define the plane:
  - a. Either tap *Add* to select the [point selection method](#) and then select the point(s) to use to define the plane, or tap *Measure* to go to the *Measure point* screen and measure a new point to use in the plane definition. Add or measure at least enough points to define the required plane.
  - b. Tap *Calculate* to calculate the plane.
  - c. If the plane uses 3 or more points, you can tap *Vertical* to calculate a vertically constrained plane. If required, tap *Free* to recalculate the plane using the best fit through all points.
  - d. Use the values in the *Residuals* column to identify any points that you want to exclude. Tap a row in the table to exclude or include a point and automatically recalculate the plane. The values in the *Residuals* column are updated.
3. Tap *Continue* to measure points relative to the plane.
4. Enter a *Point name*.

5. Select the *Method* to use for calculating the point:
  - *Angle and distance* calculates coordinates for the measured point as well as the distance from the point to the plane.
  - *Angle only* calculates coordinates for the observed point using the intersection of measured angles and the plane.
6. Tap *Measure*.
7. Tap *Store* to store the point in the database.

**Tip** - When measuring with *Angles and distance*, configure the instrument [EDM settings](#) to turn on tracking mode to see the delta distance to the plane field update in real time.

## Measure 3D axes

To measure a point relative to a 3D axis using General Survey and a conventional instrument:

1. From the *Measure* menu, select *Measure 3D axes*.
2. Key in or measure the two points that define a 3D axis.  
To measure a point, tap the pop-up menu button on the point name field and select *Measure* from the list of options displayed.
3. Tap *Options* to select the format of the delta display for the points measured relative to the axis.

The content and format of the delta display is controlled by XSLT style sheets. Translated default XSLT Measure 3D Axes Style Sheet (\*.3ds) files are included with the language files, and accessed by General Survey from the language folders. You can create new formats in the office and then copy them to the [Systems files] folder on the controller.

4. Tap *Next*.

The instrument is automatically put into TRK mode. When General Survey receives a distance, the deltas fields are automatically updated.

If you are not measuring to a prism, use Instrument functions to set DR mode.

You can accept the TRK measurement, or tap *Measure* to take an STD measurement.

The General Survey software reports the coordinates and elevation for the measured point, and the orthogonal and vertical deltas for the point relative to the 3D axis. The following diagram and table describes the reported deltas using the default format.

