Zenith35
TAG SINGLE MODE

Video
https://youtu.be/qNkrluRGX_k

Necessary equipment

- **Zenith35 TAG (Pro or Not Pro)**
- **Zenith35 TAG Calibration Tool**
- **XPAD 3 or FieldGenius 9**
- **Pole**

What is the Single TAG?

- Zenith35 TAG includes tilt sensors for pole tilt calculation and e-compass to have the North direction
- **All** Zenith35 TAG includes tilt sensors and compass

- Until now Zenith35 TAG was available only with Dual TAG mode

- Hidden points was measured with two measures with pole was tilted

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What is the Single TAG?

- **The last firmware enables the electronic compass installed within the Zenith35**
  - 1.25fw Zenith35TAG
  - 2.01fw Zenith35TAG Pro
- The new firmware enables the e-compass to estimate the North direction

- **This allows you to measure points without holding the pole levelled and vertical**
- **Only one measure is needed to record points with the pole tilted**

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What is the Single TAG?

- 1 point measurements -> efficiency
- Available for survey and stakeout operations!
- Tilt range: 15°
- 52cm deflection @2m pole height

TAG Single

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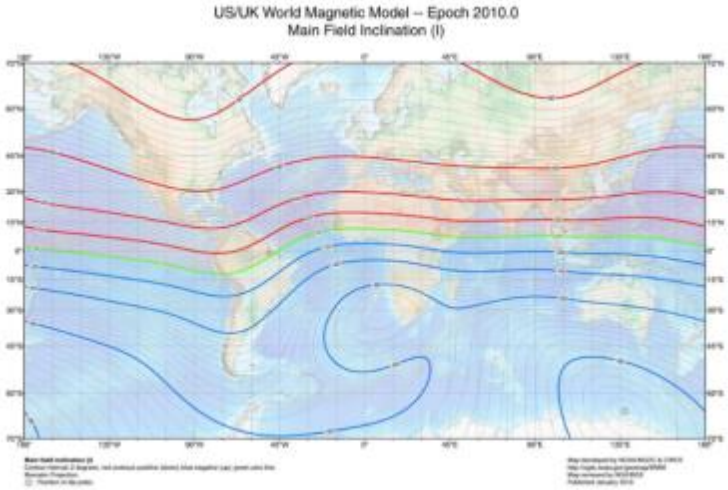
What is the Single TAG?

- The **Tilt Sensor** is used to determine the degree of inclination. This is measured with accelerometers
- The **Compass** is used to determine the direction of tilt. This is measured by magnetometers

➔ Since the compass principle is based on the earth magnetic field, measuring with the compass close to metal objects with an own magnetic field or objects generating magnetic fields such as generators is error-prone.



Compass calibration

- Before starting to use the compass it is needed to **perform a calibration routine**
- The calibration rountine has 3 main steps:
  - Calibrate the e-bubble
  - Scanning modelling the local magnetic field
  - Controlling if the calculated model fits
- A **calibration tool** is needed to perform the calibration
  - Included in new Zenith35TAG packages or as an accessory for old Zenith35TAG

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Compass calibration – Local conditions

- The compass is sensible to magnetic fields, such as
  - **Local earth's magnetic field**
  - **Cars**
  - **Powerlines**
  - **Generators**
  - **Steel reinforced buildings**

Choose a location where the possible interferences are minimum

Calibration of the compass is required to "fit" the local earth's magnetic field, conditions, surroundings and environment. The calibration must be done before starting the measurement campaign

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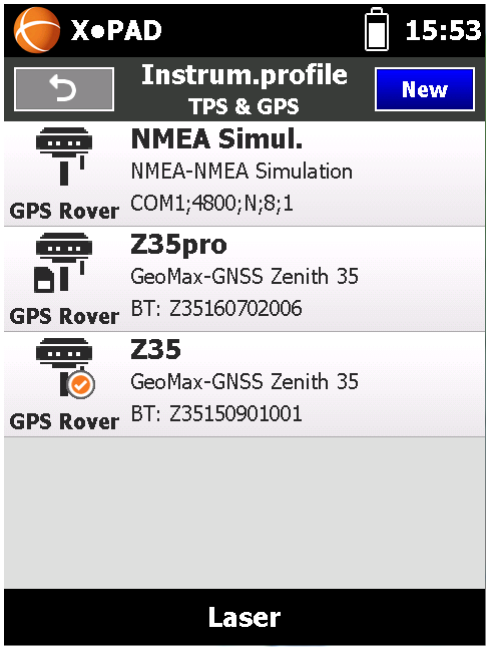
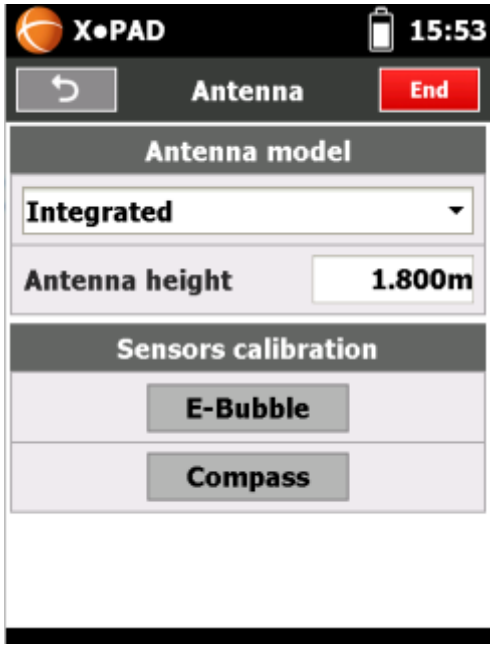
Compass calibration – XPAD

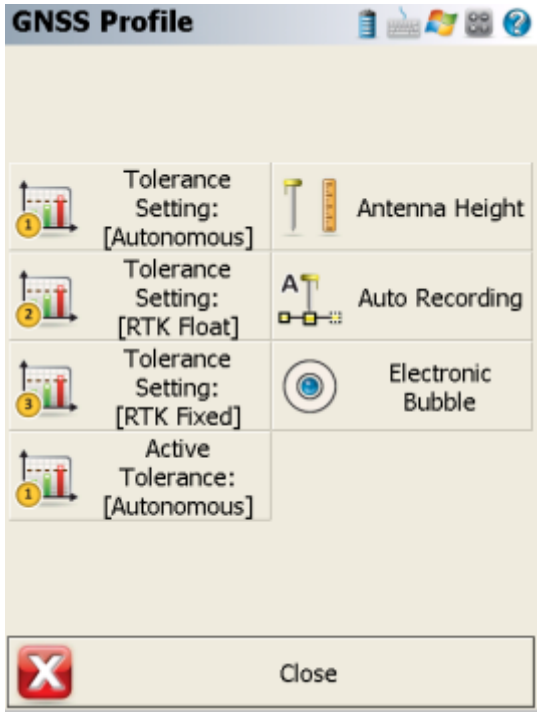
- To start the calibration routine open the XPAD Instrument settings
- Create a new profile or modify an existing profile
- In the Antenna page click on Compass to start the calibration routine

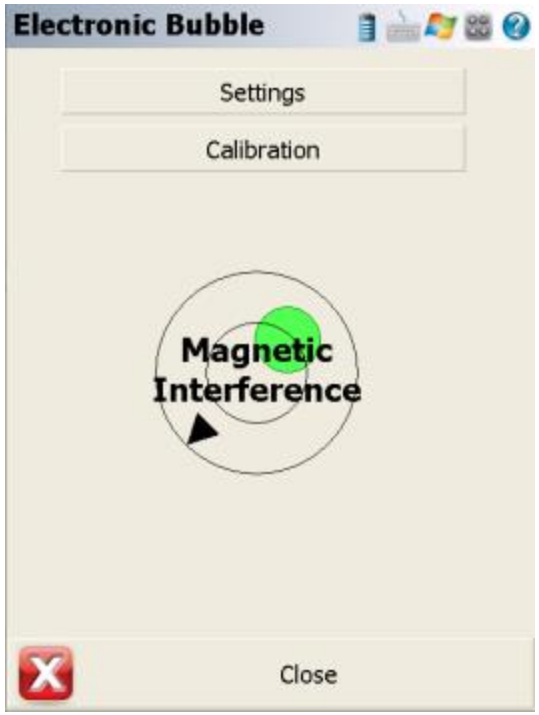




Compass calibration – FIELDGENIUS

- To start the calibration routine after the Zenith35 is configured and connected open Instrument Settings and Sensor Configure
- Click on Electronic Bubble
- Click on Calibration to start the calibration routine



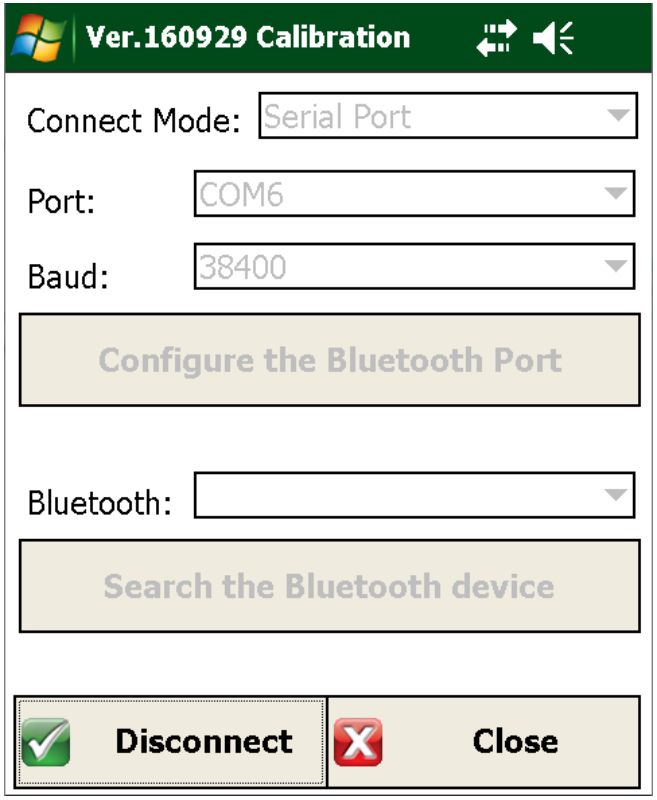


Compass calibration

- To calibration is done in different steps
- **IMPORTANT**: The receiver must be fixed while doing the calibration routine!

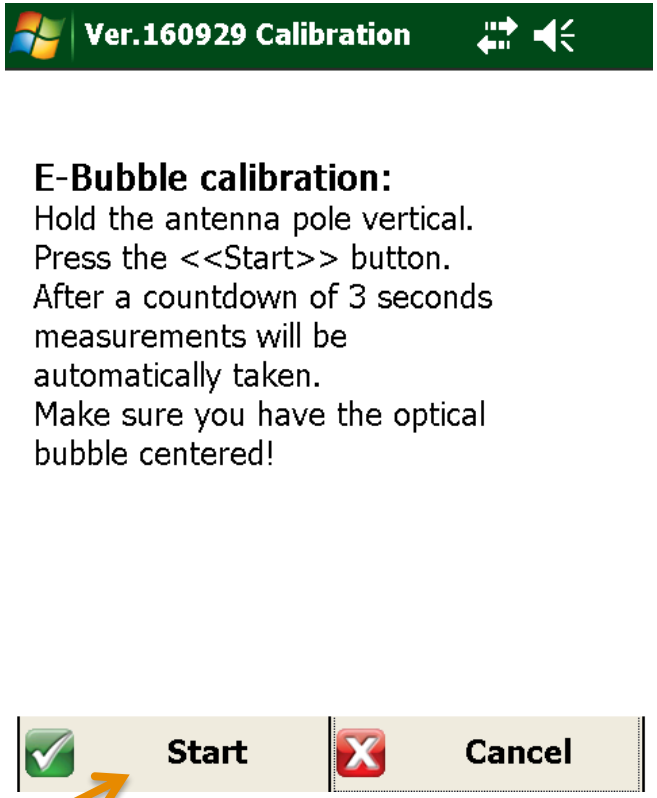
Compass calibration

1. Click on Communication to verify that the Zenith35 is connected by bluetooth



Compass calibration

2. Click on E-bubble to start to calibrate the electronic bubble
3. You must stay vertical with the pole and press START

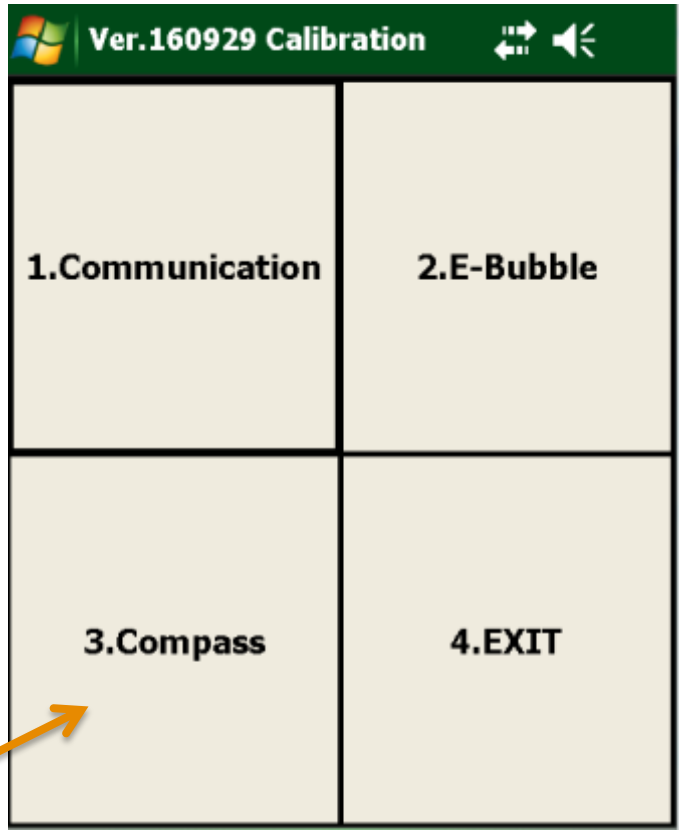


Compass calibration

4. Check that the result is correct
5. Press Accept to validate the result

Compass calibration

6. Click on Compass to open the next step
7. Mount the calibration tool and install it on the pole



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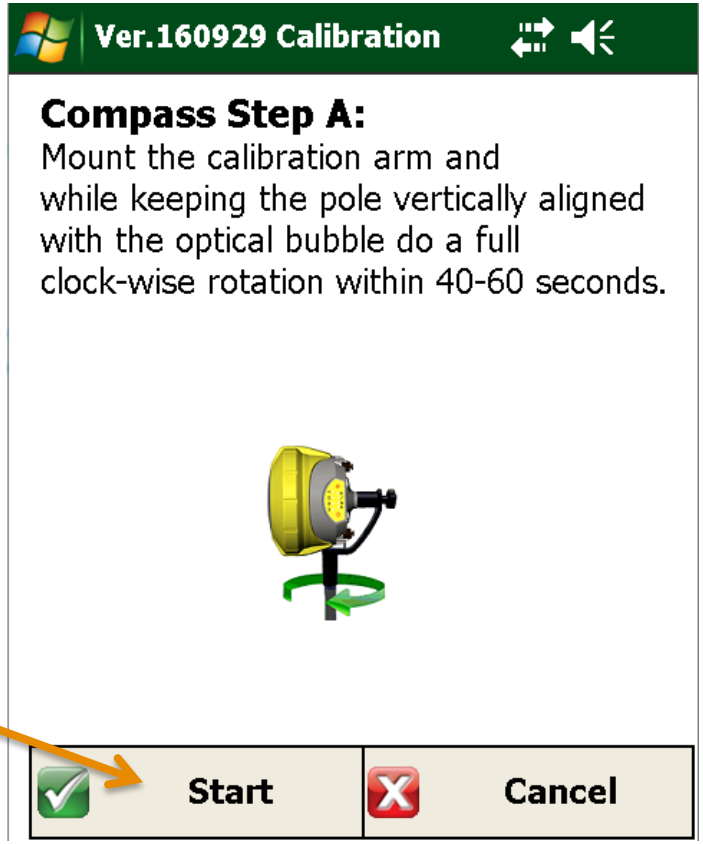
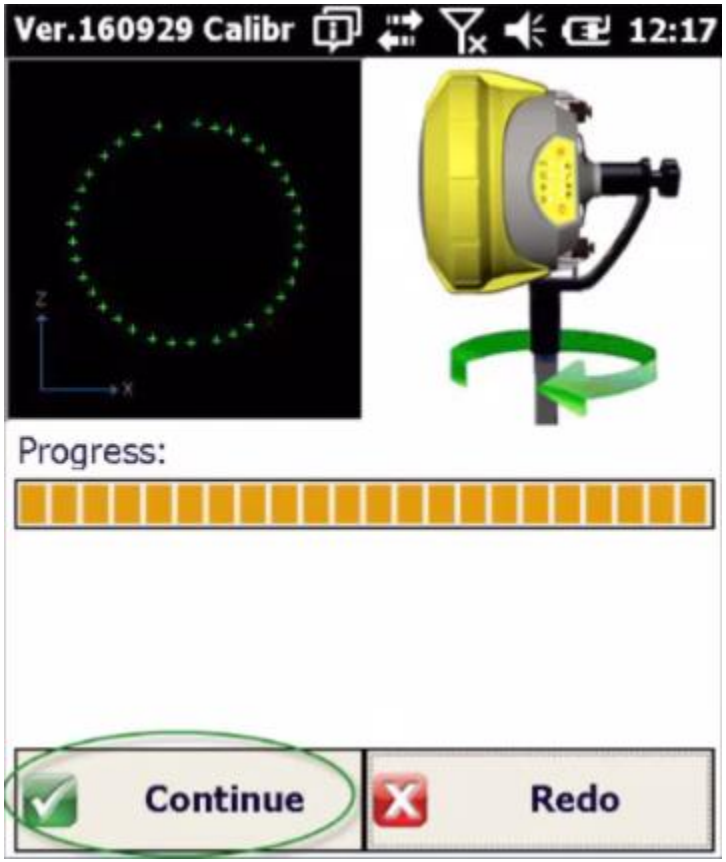
Compass calibration

8. Click Start and slowly rotate clockwise the pole, while vertical
9. The full rotation should take about 40-60 seconds



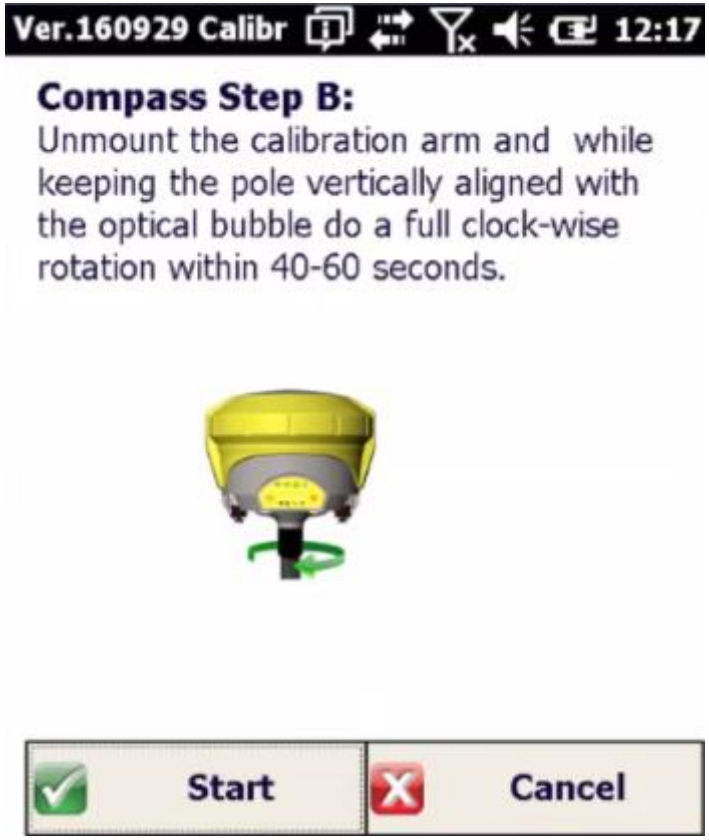
Compass calibration

10. If the calibration is well done you see a circe. After the progress bar is completed, click Continue
11. If on the left side you don’t see a circle, but the points are random, it is recommended to change the calibration area



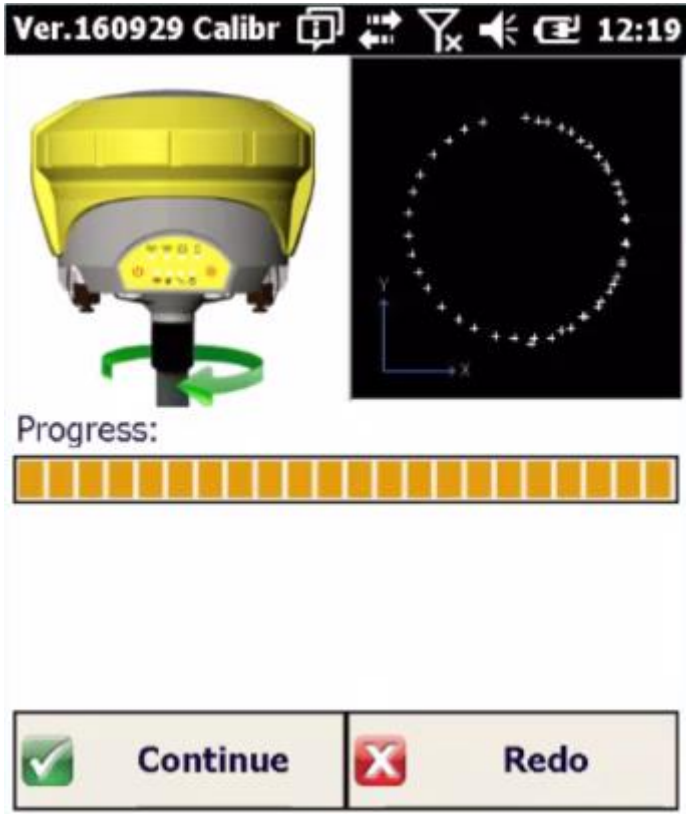
Compass calibration

12. Unmount the calibration tool and place the pole vertical
13. As before rotate clockwise the pole within 40-60 seconds



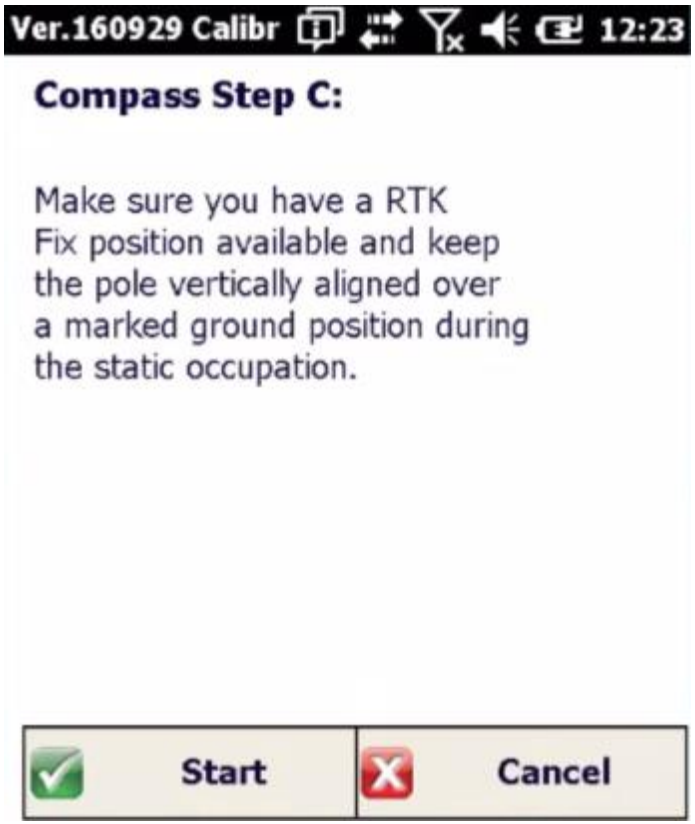
Compass calibration

14. If the calibration is well done you see a circe. After the progress bar is completed, click Continue



Compass calibration

12. For the next step verify that the receiver is FIXED
13. Occupy a marked dround position and click Start to measure the point. When done press Continue.



Compass calibration

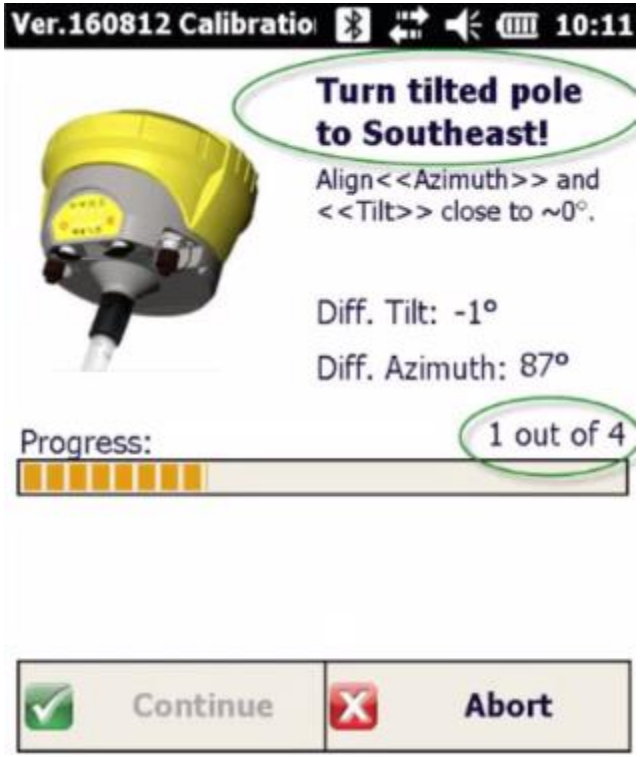
12. While on the same marker, you must measure 4 points with the pole tilted and oriented on different Azimuth angles

13. You must tilt the pole until the Diff.Tilt value is close to zero and rotate around the point until the Diff Azimuth is close to zero

Compass calibration

12. While the two angles are close to zero the instrument measures the point

13. Wait few seconds until point is saved. Then rotate to next angle

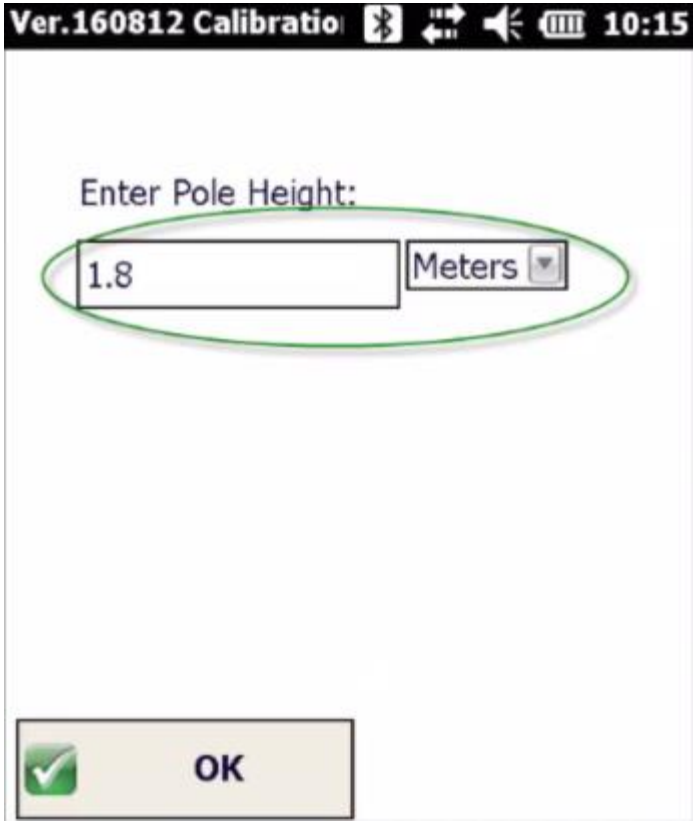


Compass calibration

12. Proceed in the same way for all the four points
13. When done press Continue to complete the calibration

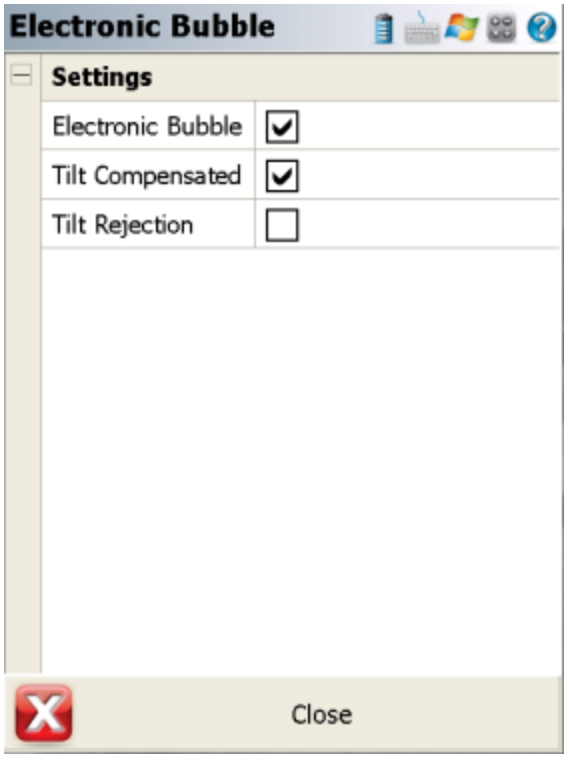
Compass calibration

12. Enter the pole height
13. Check that the calibration is succesful!



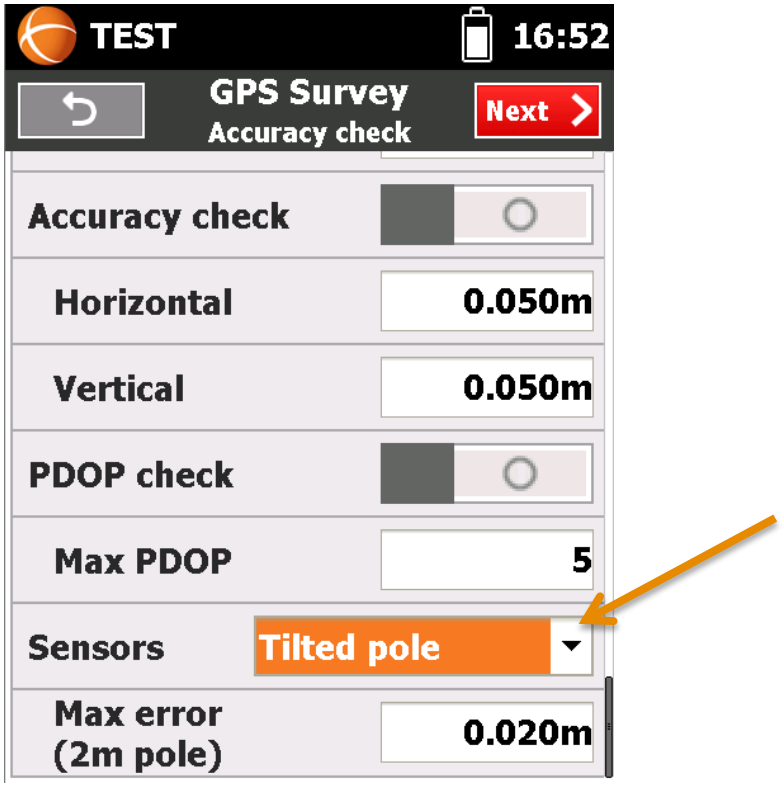
Compass calibration

- Calibration is done and now you can start to use the compass to measure all points with pole tilted!
- **FIELDGENIUS**
  - Enable it from Electronic Bubble menu



Compass calibration

- **XPAD**
  - Enable it from Survey Settings



When re-calibrate?

- A re-calibration is needed after:
  - A change of location
  - A significant drop
  - A significant temperature change (30° or more)
  - A long period without calibration
  - A transport (-> vibration)
  - A battery is inserted that was never inseted before
  - A firmware upgrade

➔ Not calibrating the unit after events as listed above negatively affects the accuracy of the measured points.

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Accuracy

Accuracy (typical)*

	2D-Position**	1D-Position (Height)
5°-Tilt	~ ±1 cm	~ ±1 cm
10°-Tilt	~ ±2 cm	~ ±1.2 cm
15°-Tilt	~ ±3 cm	~ ±1.5 cm

* The following values represent an average achieved during tests under normal to favourable conditions.
** Please note that these error needs to be applied on top of the standard GNSS accuracy.

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Examples and Recommendations

Bad measurement conditions - Following examples showing locations with high magnetic influence, resulting in a point accuracy about 5-10 times worse as typical. Typical situations are measurement close to cars, lamp poles, and power lines. Errors of 30-50 cm appeared during our tests….

➔ In those cases it is mandatory either to switch off the Single mode at all and measure in conventional way, holding the pole vertical or if not possible, to use the dual mode to eliminate the magnetic influence.

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Examples and Recommendations

Medium measurement conditions - Following examples showing locations with some magnetic influence, resulting in point accuracy worse as typical. Typical situations are measurement on car-parking lots, house corners, close to metal fences….

➔ In such conditions, it is strongly recommended to perform a control measurement to see if the achieved accuracy is sufficient.

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Examples and Recommendations

Good measurement conditions - Following examples showing locations with low to none magnetic influence, where you can expect the above listed typical point accuracy.

Thanks for your attentions

Any question?

For comment/suggestion please send an email to:

webinar@geomax-positioning.com

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