

Using SurvCE's Live Digital Level (LDL) Feature

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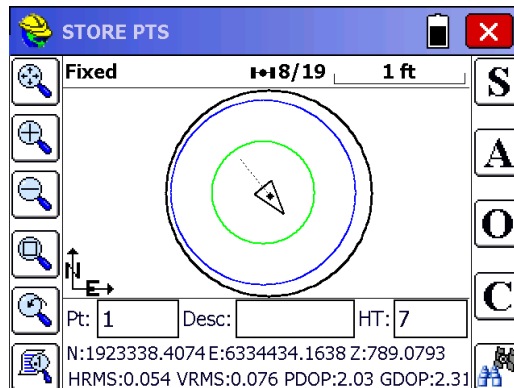
OVERVIEW

Version 4.0 of Carlson Software's SurvCE data collection software now includes a Live Digital Level (LDL) or electronic bubble vial feature. The LDL reads the internal tilt or level sensors in Carlson's BRx5 GNSS receiver, displays the BRx5 level status on the data collector display and warns the user if the BRx5 position is outside the user specified level tolerance. SurvCE's Live Digital Level can both speed up data collection and improve positional accuracy.

This document shows how to configure the LDL feature in SurvCE and provides guidelines for using LDL in the field.

HOW DOES Live Digital Level WORK?

Just as a bubble vial attached to the survey pole indicates when the pole is vertical, the LDL feature displays an electronic representation of the bubble on the data collector screen indicating when the GNSS receiver is level, i.e when the pole is vertical. The LDL feature works best with the GNSS receiver has been calibrated and a straight survey pole is used.



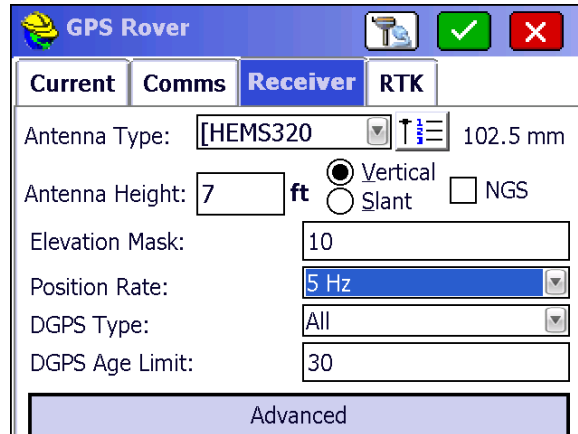
CONFIGURING SurvCE for the Live Digital Level

LDL capabilities are supported in SurvCE 4.0 or later. LDL requires a GNSS receiver that contains integrated level sensors. At the time this document was prepared, only the Carlson BRx5 GNSS receiver supports LDL, though it is expected that other GNSS receivers with integrated level sensors will be supported as they come to market.

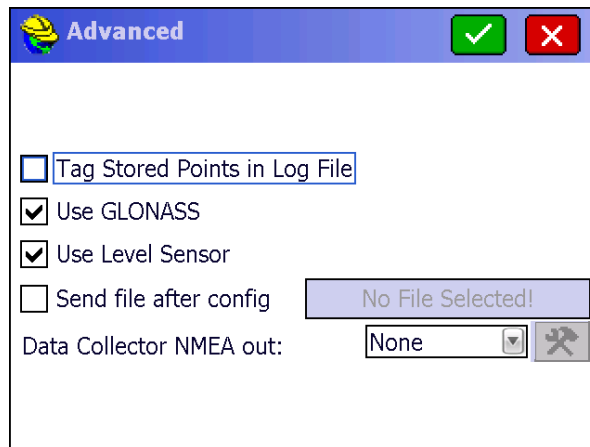
The recommended SurvCE configurations for effectively using LDL are:

1. Antenna Height – The antenna height is used to calculate how far the GNSS receiver is off center from the bottom of the pole. Be sure your antenna height is correctly set.

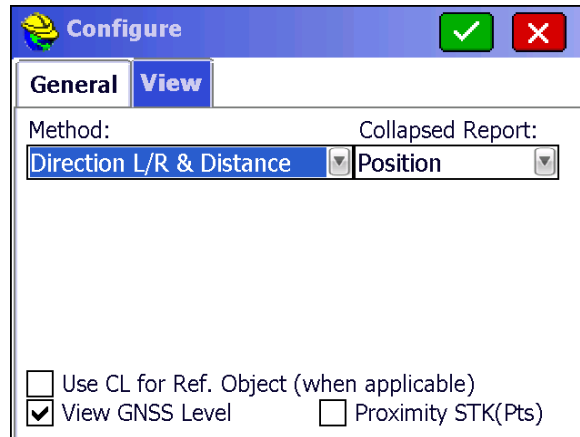
2. Position Rate – We recommend setting the position rate to 5 Hz. 5 Hz gives the smoothest and fastest response for the LDL bubble on the display. LDL works fine at slower position update rates, like 1 Hz or 2 Hz, but the responsiveness will lag. The antenna height and the position rate are set in Equip/GPS Rover/Receiver as shown below.



3. Use Level Sensor – In Equip/Rover/Receiver/Advanced, the “Use Level Sensor” box must be checked. The “Use Level Sensor” box turns on the level sensor and activates level tolerance checking in the GNSS receiver.

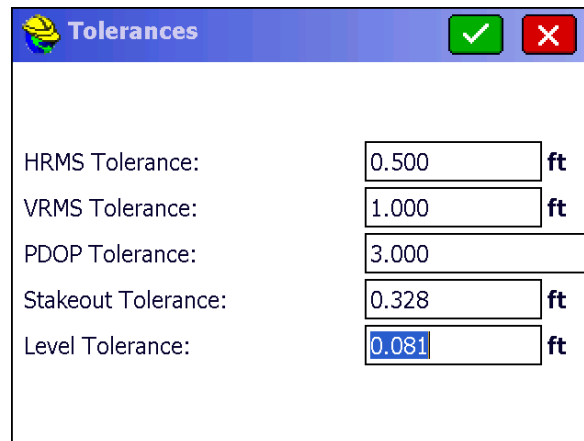


4. View Level Sensor – in order to see the LDL bubble on the display, the “View GNSS level” box must be checked in Equip/Configure/View as shown below.

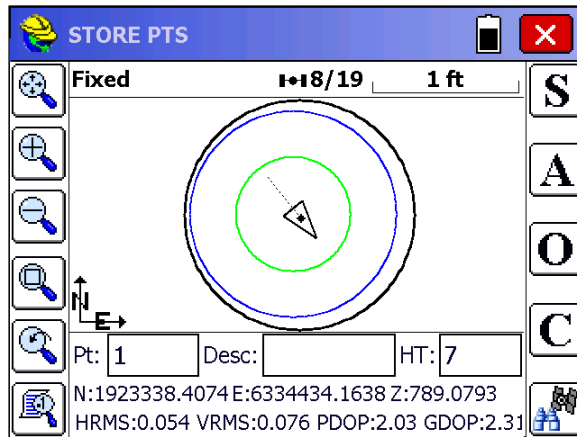


5. Level Tolerance – The level tolerance field should be set in the Equip/Tolerances screen. The level tolerance is a distance (feet or meters depending on the unit of measure). The level tolerance value is the maximum horizontal distance the top of the survey pole can be offset from the bottom of the survey pole because the pole is not exactly vertical. Table 1 has suggested values for different pole heights to be equivalent to a 40 minute bubble vial (typical bubble vial used on a survey pole). You can calculate the desired level tolerance using this equation: $\text{Level Tolerance} = \text{Pole Height} \times \tan(\text{desired bubble vial accuracy in degrees})$.

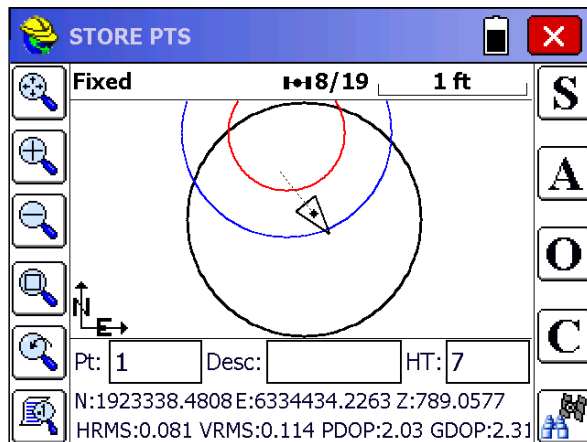
Table 1	
Pole Height	Level Tolerance
6 ft (1.828 m)	0.069 ft (0.021 m)
6.5617 ft (2.0 m)	0.075 ft (0.023 m)
7 ft (2.134 m)	0.081 ft (0.025 m)



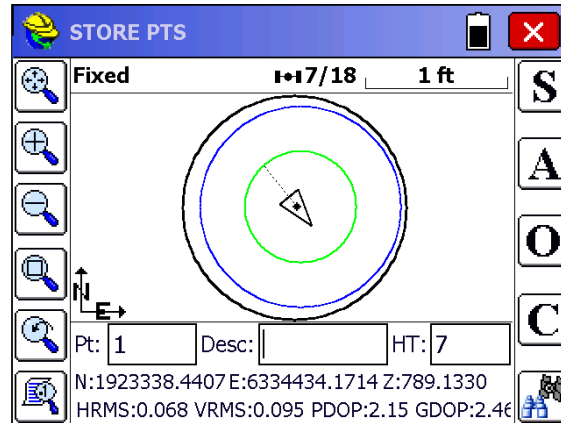
6. Once the Live Digital Level has been configured and enabled as described above, when you are in Store Points, the LDL will appear on the data collector display as shown below. This example shows that the GNSS receiver is level. The outer black circle defines the tolerance limits and does not move. The two inner circles will move as the tilt of the pole changes.



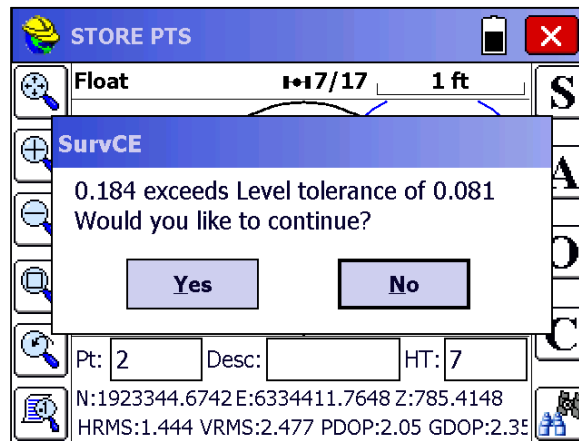
7. When the BRx5's control LEDs are facing the operator as shown in the picture on the right, then the LDL bubbles respond exactly like a bubble vial. Moving the pole towards you moves the bubble up, moving it away from you moves the bubble down on the display. Moving the pole to the right, moves the bubble to the left and moving the pole to the left moves the bubble to the right.
8. When the GNSS receiver is out of tolerance, the inner bubble turns red as shown below.



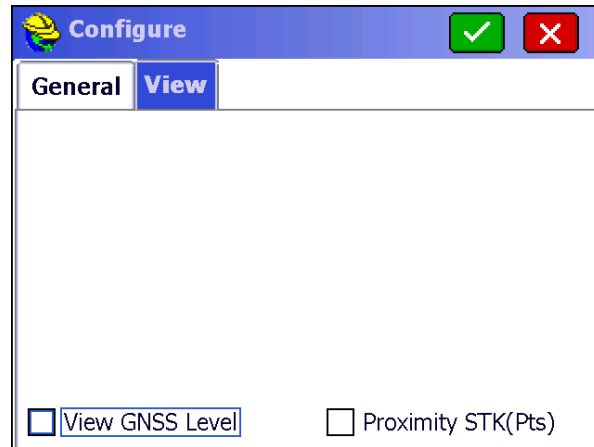
9. To bring the receiver back to a level in tolerance position, you would need to move the pole away from you and a little to the left until the inner circle turns green.



10. If you attempt to store a point when the LDL is out of tolerance (red inner circle) a warning message will be displayed as shown below. Selecting “Yes” stores the out of level tolerance position, while selecting “No” will not store the point and return to the Store Pts screen.



11. The Live Digital Level display is easily turned off, by selecting the Configure or “C” button in Store Points and then unchecking the “View GNSS Level” box. This only turns off the LDL display. SurvCE will continue to check the level tolerances and display a warning with the GNSS receiver is out of tolerance when storing a point. To turn off level tolerance checking, go to Equip/Rover/Receiver/Advanced and uncheck the “Use Level Sensor” box as shown in step 3 of this document.



Additional Notes:

The procedures for calibrating the level sensors in the BRx5 are described in a separate article.

If you have any questions, or problems, please contact the Carlson Technical Support Team:

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Phone: (606) 564-5028

Fax: (606) 564-6422

FURTHER INFORMATION:

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