

EL

Nulling Device

56803300

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Introduction

What is the EL Nulling Device?

The EL Nulling Device is an installation tool. It helps the installer adjust the initial tilt of the EL sensor. The nulling device cannot be used as a readout.

The nulling device is compatible with both standard EL sensors and signal-conditioned EL SC sensors (but it is not compatible with special-order SC sensors that output a 0-5 volt signal).

Why is it needed?

EL tiltmeters and EL beam sensors have a very narrow range. They must be adjusted at installation time to ensure that the full range of the sensor is made usable.

How does it work?

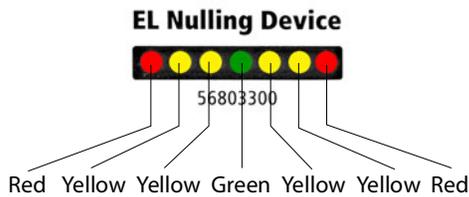
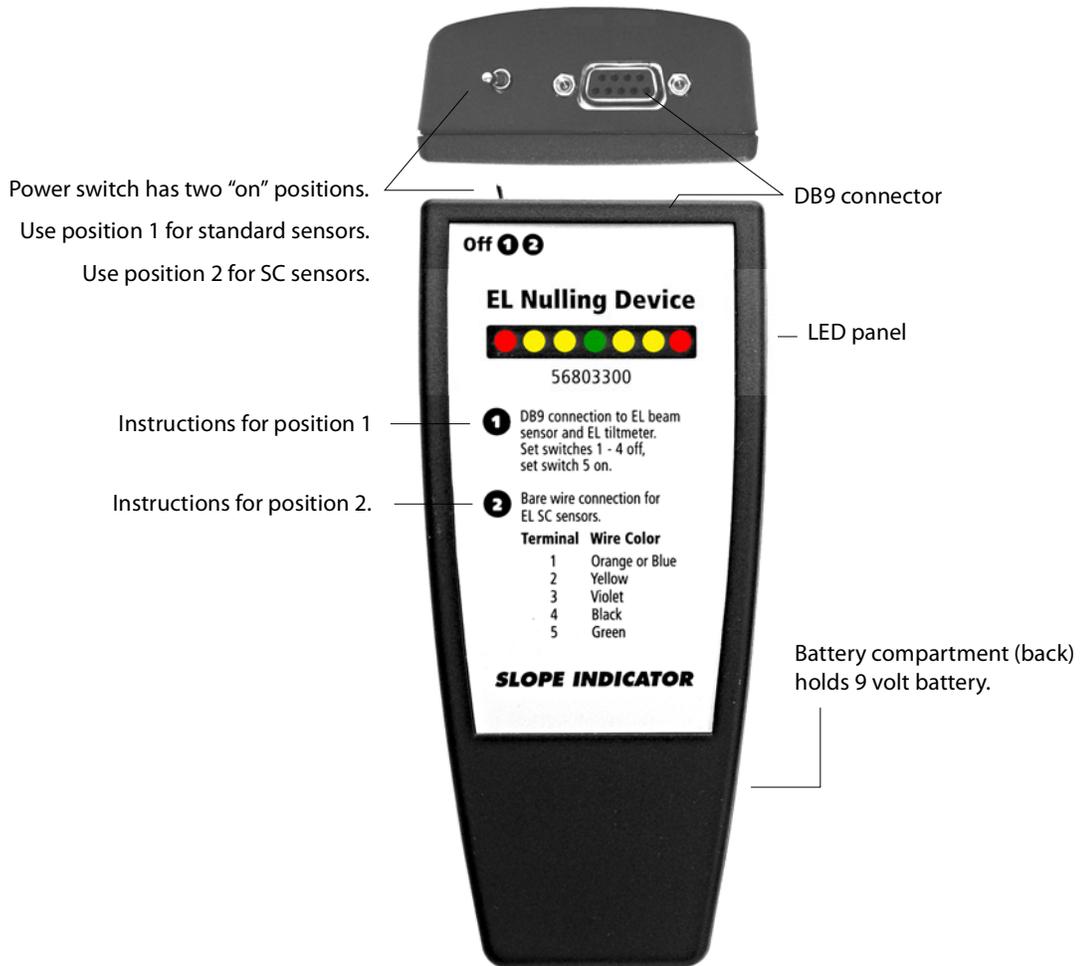
The nulling device has a series of LEDs that guide the user in leveling the sensor. The LEDs change from red to yellow to green as the sensor approaches horizontal. When only the green LED shows, the sensor is perfectly level and its output is “null.”

Components

The EL nulling device is shipped with an interface cable and a bare-wire adaptor.



Controls The various parts of the nulling device are labelled below:

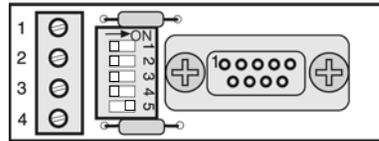


Watch the LEDs as you adjust the sensor. First you will see a red light, then a yellow, another yellow, and finally a green. The sensor is perfectly adjusted when only the green light is illuminated. Sometimes you will see the green light alternating with a yellow light. This is also a satisfactory adjustment.

Connecting to Standard Sensors

Standard Terminal Board

Standard sensors have a terminal board with four terminals. Other notable features are a DB9 connector and a bank of switches.



For the nulling operation, set switches as shown in this drawing: Switch 1-4 off, Switch 5 on. Refer to the sensor manual for more details.

Connecting to Standard Sensors

Use the interface cable to connect to the DB9 on the terminal board. Check that the switches match the drawing above, then switch power on, using position 1 of the power switch.

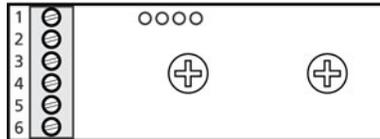
Check that the switches are in the proper position. Then switch power on, using position 1 of the power switch. Note that these instructions also appear on the front panel of the nulling device.



Connecting to SC Sensors

SC Terminal Board

SC sensors have a terminal board with 6 terminals. The only other notable feature is a row of four pins at the top of the board. Refer to the sensor manual for proper wiring of the terminal board. A meter of cable should be fixed to the structure before you begin the nulling process. Fixing the cable later may disturb the sensor.



Connecting to SC Sensors

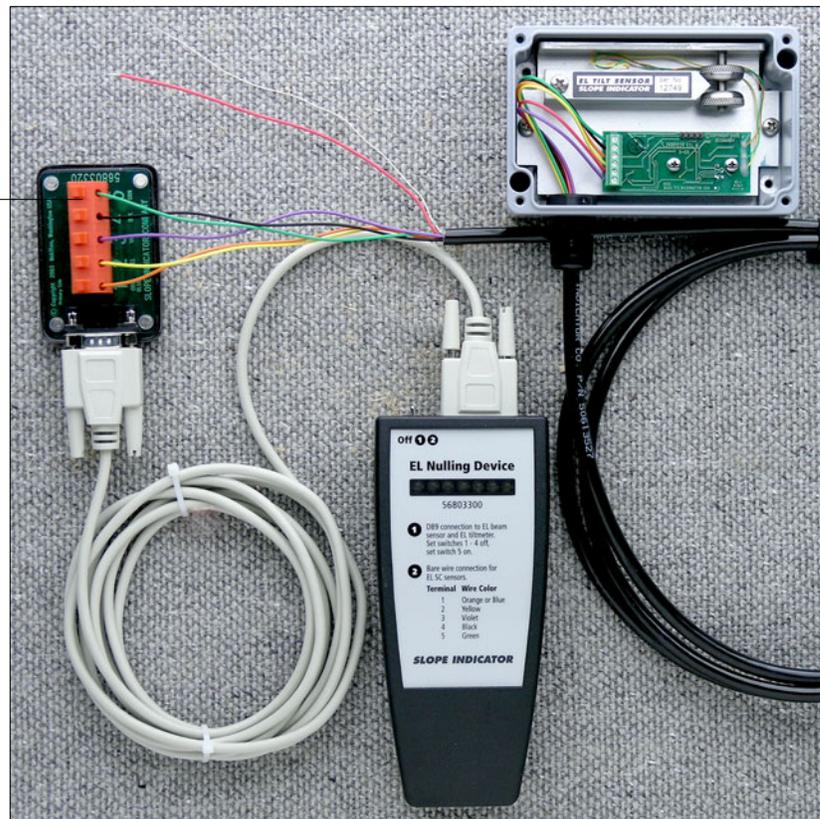
Use the interface cable and the bare-wire adaptor, as shown in the photograph below. After you connect the wires, switch on the nulling device using position 2 of the power switch.

Connect signal cable to the bare wire adaptor as follows:

- Terminal 1: Orange
- Terminal 2: Yellow
- Terminal 3: Violet
- Terminal 4: Black
- Terminal 5: Green

Red and white wires are not used.

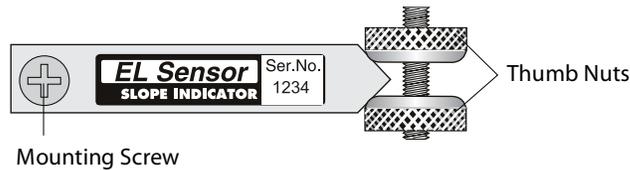
Color codes are also listed on the front panel of the nulling device in the instructions for position 2.



Adjusting the Sensor

Adjustment Mechanism

The position of the sensor is controlled by two thumb nuts, as shown in the drawing below. It may be necessary to loosen the mounting screw holding the sensor to its back plate.



Adjustment Process

This process is fully explained in the manuals for EL sensors. Here we present a simple overview.

1. Loosen both of the knurled adjustment nuts. If the sensor does not move, loosen the mounting screw slightly. Visually level the sensor.
2. Connect the nulling device. Switch on, choosing either position 1 or position 2. The nulling device goes through a small initialization routine.

Position 1 is about half way. If you want position 2, move the switch full over, firmly and quickly. If you allow the switch to dwell in position 1, the position 1 initialization may start. If this happens, switch off and try again for position 2.
3. The LEDs tell you if the pointed-end of the sensor is high or low. Left-side LEDs light up if it is low. Right-side LEDs light up if it is high.
4. Adjust the bottom nut until the LED is green or alternates between yellow and green.
5. Tighten the top nut gently against the sensor so there is a slight pressure from both the top and bottom nuts.
6. If the light is still green, try tightening the mounting screw. You will probably have to make some fine adjustments to the thumb nuts.
7. When the sensor is adjusted, apply non-permanent thread-lock to the adjusting nuts and the mounting screw.

Troubleshooting

Troubleshooting The table below lists some symptoms and possible solutions

Symptom	Possible Solution
No lights when you switch on	Check battery
Red LED at left is blinking.	Battery voltage is low. Replace battery.
Cannot null standard sensor.	Switch off. Then carefully switch back on to position 1.
	Check that dip switches 1-4 are off and switch 4 is on.
	Check that interface cable is connected properly.
Cannot null SC sensor	Switch off. Then switch on to position 2.
	Check signal cable at sensor and at bare-wire adaptor. Tug on cables to make sure they cannot be pulled out. Also check interface connectors.