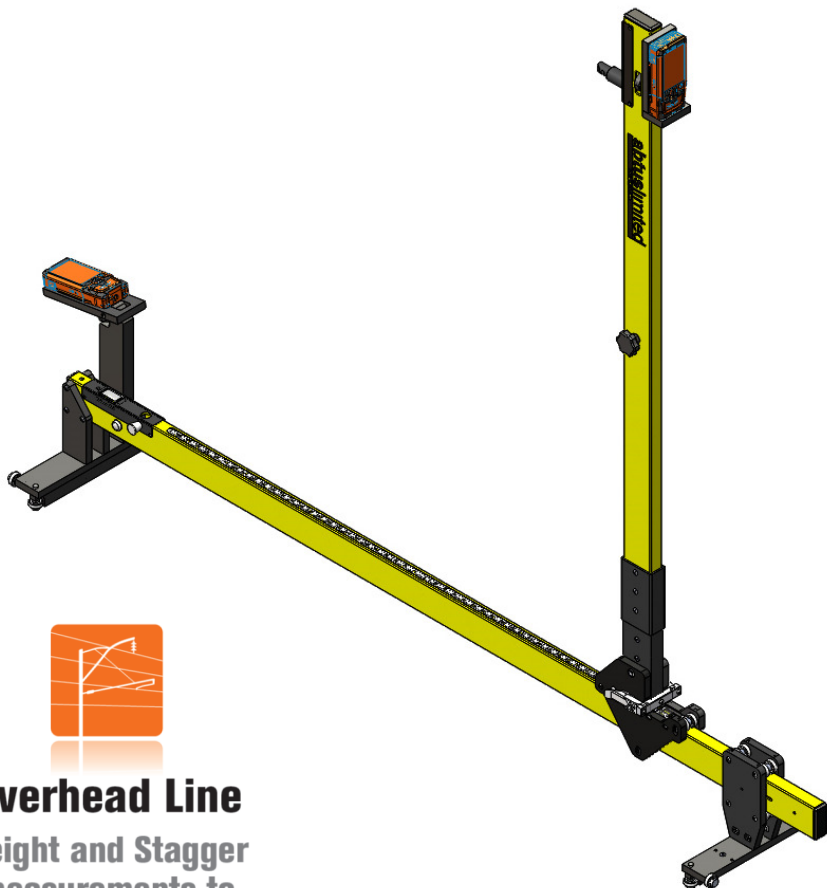




ABT 4640 - Laser Height & Stagger



Overhead Line

Height and Stagger
measurements to
overhead catenary wire.

Instruction Manual

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2.0 Item List

- Height & Stagger Gauge
- REFOS Bracket
- HILTI PD-E Laser + HILTI Documentation
- User Manual



3.0 Technical Specification

Abtus No.	Physical Weight & Dimensions	Cant/ Super-Elevation	Cable Stagger	Cable Height	REFOS
ABT 4640 - 1000g	Length 1170mm Height 1620mm Width 265mm Weight 7.3kg	Range ± 199 mm Accuracy ± 1.0 mm Resolution ± 0.1 mm	Range ± 380 mm Accuracy ± 10 mm @5m Resolution ± 0.1 mm	Range ± 2 m to 100m Accuracy ± 3.0 mm Resolution ± 0.1 mm	Range ± 2 m to 100m Accuracy ± 3.0 mm Resolution ± 0.1 mm
ABT 4640 - 1067g	Length 1240mm Height 1620mm Width 265mm Weight 7.4kg	Range ± 199 mm Accuracy ± 1.0 mm Resolution ± 0.1 mm	Range ± 420 mm Accuracy ± 10 mm @5m Resolution ± 0.1 mm	Range ± 2 m to 100m Accuracy ± 3.0 mm Resolution ± 0.1 mm	Range ± 2 m to 100m Accuracy ± 3.0 mm Resolution ± 0.1 mm
ABT 4640 - 1435g	Length 1450mm Height 1620mm Width 265mm Weight 7.8kg	Range ± 199 mm Accuracy ± 1.0 mm Resolution ± 0.1 mm	Range ± 520 mm Accuracy ± 10 mm @5m Resolution ± 0.1 mm	Range ± 2 m to 100m Accuracy ± 3.0 mm Resolution ± 0.1 mm	Range ± 2 m to 100m Accuracy ± 3.0 mm Resolution ± 0.1 mm
ABT 4640 - IMP	Length 1450mm Height 1620mm Width 265mm Weight 7.8kg	Range ± 199 mm Accuracy ± 1.0 mm Resolution ± 0.1 mm	Range ± 520 mm Accuracy ± 10 mm @5m Resolution ± 0.1 mm	Range ± 2 m to 100m Accuracy ± 3.0 mm Resolution ± 0.1 mm	Range ± 2 m to 100m Accuracy ± 3.0 mm Resolution ± 0.1 mm
ABT 4640 - 1600g	Length 1770mm Height 1620mm Width 265mm Weight 8kg	Range ± 199 mm Accuracy ± 1.0 mm Resolution ± 0.1 mm	Range ± 520 mm Accuracy ± 10 mm @5m Resolution ± 0.1 mm	Range ± 2 m to 100m Accuracy ± 3.0 mm Resolution ± 0.1 mm	Range ± 2 m to 100m Accuracy ± 3.0 mm Resolution ± 0.1 mm
ABT 4640 - 1676g	Length 1845mm Height 1620mm Width 265mm Weight 8.2kg	Range ± 199 mm Accuracy ± 1.0 mm Resolution ± 0.1 mm	Range ± 520 mm Accuracy ± 10 mm @5m Resolution ± 0.1 mm	Range ± 2 m to 100m Accuracy ± 3.0 mm Resolution ± 0.1 mm	Range ± 2 m to 100m Accuracy ± 3.0 mm Resolution ± 0.1 mm

Features:

- Fully insulated
- Expected battery life – 1 year
- Carry/ storage case
- Back light on laser display for night/ tunnel work

4.0 Getting Started

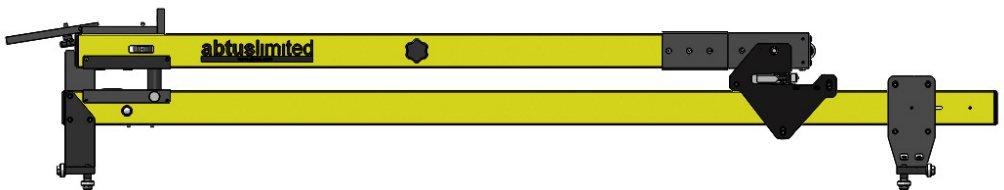
4.1 Overview

The ABT 4640 is a light-weight gauge that allows the user to safely take Height and Stagger measurements of the OHL (Over Head Line) using laser technology. Super-Elevation (SE) and Rail Edge to Face of Structure (REFOS) can also be measured

The laser unit is positioned at eye-level and features a 90° viewing prism, enabling the operator to easily set the laser location marker onto the OHL in all weather conditions including bright sunshine. The Height reading is displayed on an illuminated LCD screen on the laser. Stagger position is indicated on a reflective scale for ease of use at night as well as day.

SE is displayed on an illuminated LCD screen and REFOS is measured by transferring the laser unit to a separate bracket.

The vertical beam folds down flat to the horizontal beam for storage and transport.



4.2 Assembly

1. To release the vertical beam, pull the lever towards you (See Figure 1). Lift the vertical beam until it rests against the stop. Release the toggle latches and fasten securely to the vertical beam (shown in Figure 2).

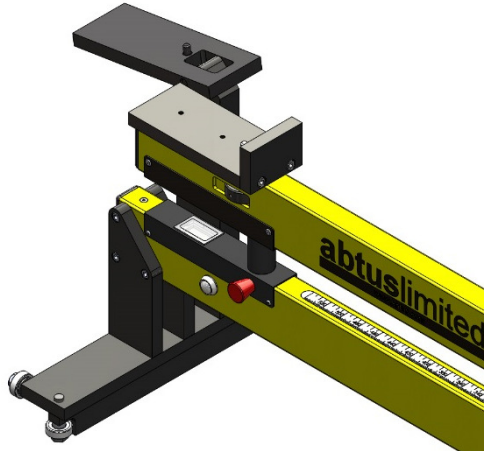


Figure 1

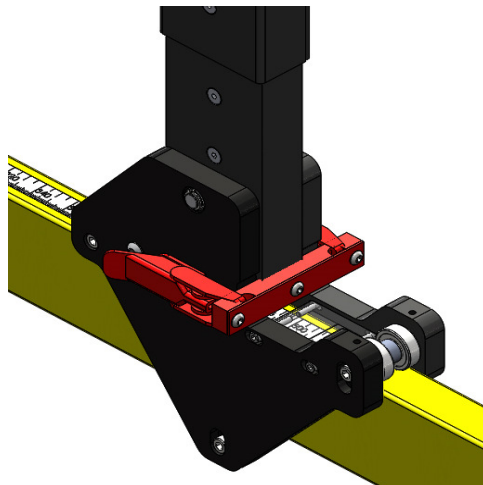


Figure 2

2. Place the laser unit into the holder at the top of the vertical beam and fix in place using the screw provided (See Figure 3).

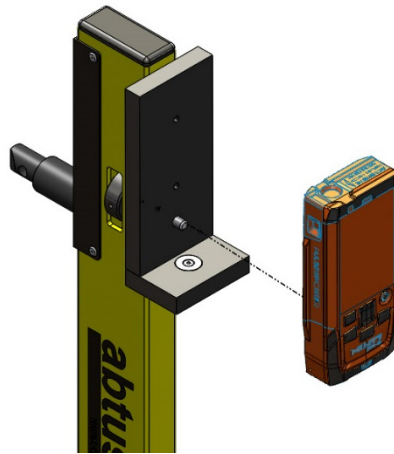


Figure 3

3. Screw the REFOS bracket to the rail foot of the gauge. The REFOS bracket may be fitted to either side of the gauge as required (see Figure 4).

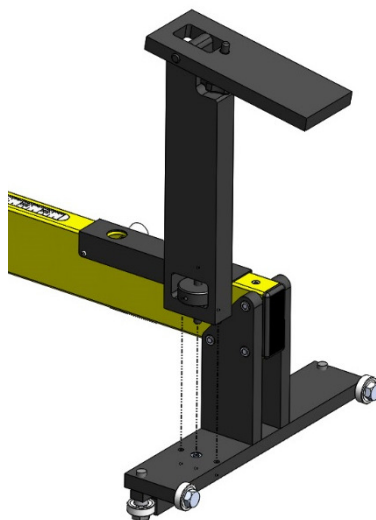



Figure 4


4.3 Operating the Laser

1. Switch on the laser by pressing the  situated on the right hand side of the unit.
 - a. If the laser unit is mounted on the top holder appears the following screen.

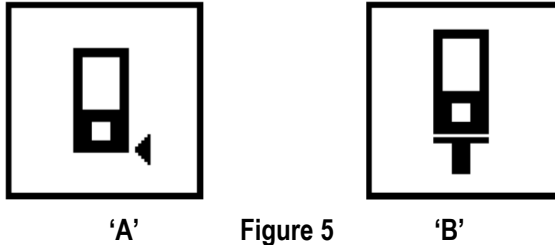



- b. If the laser unit is mounted on the REFOS bracket appears the default screen.



2. Press the  button to go to the next screen if the laser is mounted on the top holder.

3. One of two icons (shown in Figure 5) will be displayed in the top left of the screen which represents the point from which the laser measurements will be taken. Icon 'A' should be shown when the laser unit is mounted on the REFOS bracket and Icon 'B' should be shown when placed in the top holder.



4. Press the  button to reveal the laser location marker (visible red laser beam).
5. Press the same button to take the measurement, which will appear in the bottom right corner of the screen.

4.4 Measuring Height & Stagger

1. Ensure vertical beam is in the operating position and that the laser is secured (as described in section 4.2).
2. With the laser location marker activated, look through the viewing hole of the laser unit (shown in Figure 6). This will allow you to see when the laser is in line with the OHL.

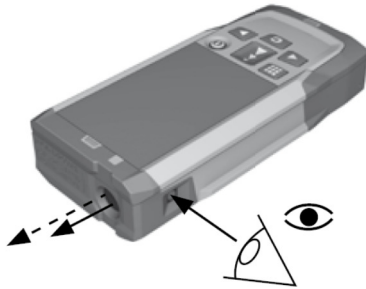


Figure 6

3. The vertical beam can be moved from side to side by turning the stagger adjustment wheel located in the centre of the vertical beam (shown in figure 7). When the overhead cable is in line with the laser the amount of cable stagger can be read from the scale on the upper side of the horizontal beam.

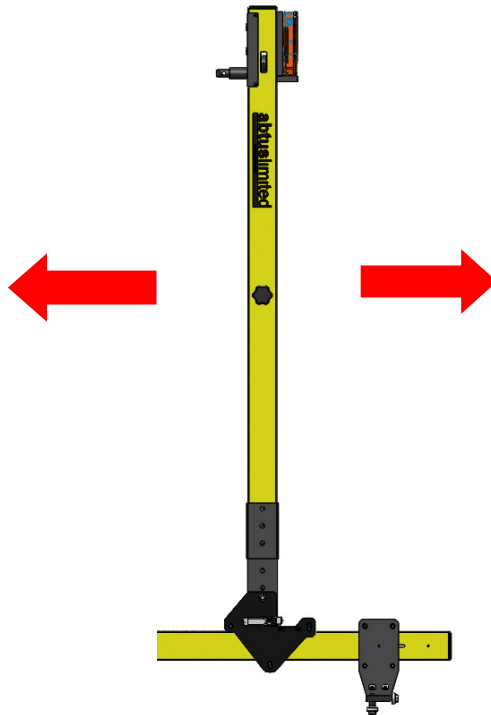


Figure 7

4.5 Measuring Cant/ Super Elevation

1. To measure Cant/ super elevation press the white button at the left end of the gauge, a measurement will appear on the screen above the white button.
2. After pressing the white button, the sensor requires approximately 10 seconds to stabilise. In order to save battery power, the screen will automatically switch off after 50 seconds.
3. A positive SE reading is when the right rail is higher than the left.

4.6 Measuring REFOS

1. Secure laser unit to REFOS bracket (see Figure 4).
2. Use the spirit level on the laser unit to ensure it is level before taking the measurement

5.0 Maintenance

5.1 User Advice

- Check that the bearing surfaces that are in contact with the rail are clean and can move freely
- Ensure that the vertical beam locks firmly into place

5.2 Every 3 Months

- Visually check for damage
- Ensure that there are no flat spots on the bearing surfaces in contact with the rail

5.3 Annual

- To ensure that the accuracy of your ABT4640 remains within specified limits, it should be returned to your local distributor for annual re-calibration.

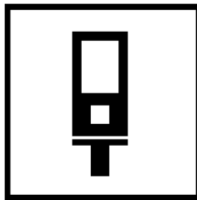
6.0 Trouble Shooter

6.1 Cant is not showing or is incorrect

Try replacing the battery (9V PP3). Remove the battery cover on the underside of the horizontal beam and carefully unplug the existing battery.

6.2 Incorrect icon is displayed on the laser unit

The laser unit senses a magnetic field to select the correct icon – check that a magnet is present in the base of the top holder. If the symbol below does not show, try removing the unit and re-attaching to the laser bracket.



6.3 Hilti PD-E Laser Variation

Each Abtus ABT4640 Laser Height and Stagger has its own Hilti PD-E laser. The laser beam comes out of each laser at a slightly different angle. Hilti claims this angle varies by around $\pm 1^\circ$. Over 4 meters this equates $\pm 7\text{mm}$. To compensate for this, each ABT4640 is calibrated to correct for the variation in this laser angle. Swapping the laser for a different PD-E laser means the gauge is no longer accurately calibrated. The accuracy of a PD-E laser in place for another laser was tested at Abtus and in the worst case, an error of 14mm in stagger measurement was found.

ABT4640 users are advised to return PD-E lasers with their Height and Stagger gauge so that the calibration is done with the correct laser. Users are also advised to keep the same laser with the gauge at all times, until it is returned for the next calibration