

Title: Calibration of Laser Height and Stagger (H&S) Gauges

1 Scope

Work Instruction for the calibration of laser height and stagger gauges. To be used in the absence of a manufacturer's calibration instruction.

Note procedure is based on calibration procedure DCP 69 Issue 4, dated may 2011 from EMICS Ltd, Radford, Nottingham.

2 Preparation

Calibration shall be carried out using Category 'A' master instruments.

Equipment required:

- Track gauge fixture
- Gauge blocks
- 'V' blocks grade 2
- Cylinders and laser measure.
- Grade 1 level surface table
- Linear scale
- Height and stagger fixture

3 Method

3.1 Calibration of Stagger Gauge Centre Line and Linear Scale

a) Centre Line

Place the H&S gauge on an appropriate track gauge fixture. Using the datum on the fixture verify that the centre line of the stagger gauge scale is at the correct distance from its fixed feet, i.e. that the stagger gauge centre line is positioned at the centre of the rail when in use.

b) Linear Scale

Using a calibrated linear scale, check the accuracy of the stagger gauge scale in both directions from centre line throughout the scale range of the gauge being calibrated as follows;

Gauge	Scale Range from Centre Line
Abtus	± 540mm
Pet-Rail	± 600mm
Sola	± 600mm

3.2 Super Elevation

Set the track gauge fixture to 1435mm. Place two matching rollers in the V's of a matching pair of 'V' blocks on a levelled surface table. Place the H&S gauge onto the rollers such that the centres of the feet are approximately over the centres of the

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rollers. Check the scale is set at zero. If the display is not at zero adjust accordingly using the adjustment screw.

When zero has been attained, check the accuracy as follows:-

- Elevate one end of the gauge while still resting on the rollers and 'V' blocks to a known height. The display should now be reading the same value as the known height.
- Repeat this process checking the scale through its range elevating both ends as required.

3.3 Super Elevation Removable Clinometer.

Remove the clinometer and place on a grade 1 surface table. Zero the instrument then place on the sine table. Checking both clockwise and anti-clockwise throughout its range, measure the accuracy of the clinometer by generating angles at 10 degree increments.

3.4 Laser Distance Meter

Mount the H&S gauge laser measure and take a measurement to a suitable target at a distance of 5m. Note the reading and using a calibrated laser measure, compare values. The laser measure should be accurate to within 1%.

Note a suitable target would be a ground steel block of 40 x 40 x 100mm.

3.5 Stagger Offset

Place the H&S gauge on an appropriate height & stagger fixture that includes a series of spigots set at fixed heights and lateral positions relative to the gauge centre line to simulate track use.

NOTE Suitable positions for these spigots are 4500mm height 250mm left of centre line, 4543mm height 0mm (i.e. at centre line) and 4587mm height 250mm right of centre line.

Turn the laser on and align the laser dot to the centre line position, note any error as received. Lock in position and rotate the gauge through 180 degrees. The laser dot should be within $\pm 5\text{mm}$ of its original position. If it is not, then make the required adjustments. This process should then be repeated along the linear scale by setting the laser at 250mm left and noting the height & stagger position, then setting to 250mm right and noting the height & stagger position. All readings shall be within $\pm 5\text{mm}$.

3.6 Visual Checks

All gauges shall be visually checked for:

- Straightness of the shaft (vertically & horizontally).
- Condition and security of gauging pins.
- Condition and operation of screw and spring operated mechanisms.
- Condition and security of vial.

Note after measurements have been noted, return to initial setting/datum to confirm repeatability.