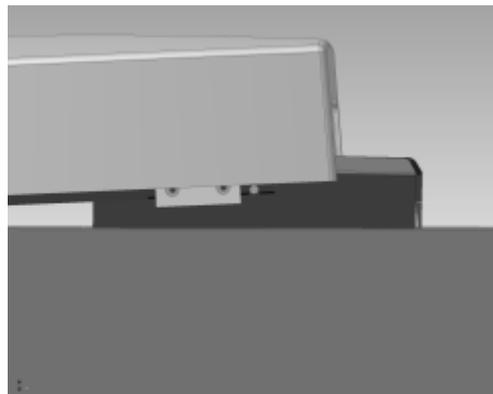


LTL-X Mark II, calibration

The instrument is delivered with two calibration units.

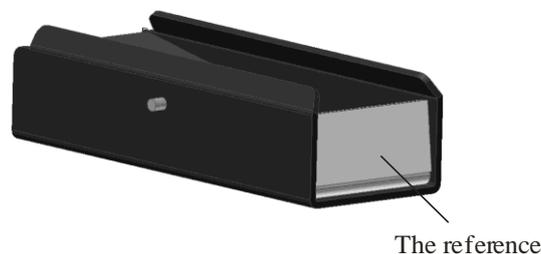
- the **RED** *field calibration unit*, for calibration of the instrument at regular intervals. This unit should be kept together with the LTL-X Mark II.
- the **BLACK** *reference calibration unit*, for verification of the (red) field calibration unit. This unit should be kept away in a safe place, and is only needed when the field calibration unit has to be checked.



The LTL-X Mark II is factory calibrated and very stable. Anyway, during daily use it is recommended that the operator calibrate the instrument, with the **RED** *field calibration unit*, at suitable intervals e.g. before starting a new series of measurements. **This procedure is called calibration.**

The daily use of the calibration unit can affect the accuracy of the calibration value due to dirt, scratches etc. Therefore, at appropriate intervals, the **RED** *field calibration unit* must be verified against the **BLACK** *reference calibration unit*. **This procedure is called verification.**

The **BLACK** *reference calibration unit* is factory calibrated and traceable to the International calibration institutes PTB and NIST.



Calibration procedure

To calibrate the LTL-X Mark II carry out the following steps using the **RED** *field calibration unit*:

- Before mounting the calibration unit note the R_L value written on label on the calibration unit.

- Place the instrument upon the calibration unit. It is done by tilting the instrument slightly backward, and then mount the unit underneath the front end of the instrument. Make sure that the pins on the side of the unit fit into the slots in the LTL-X structure.

It is important that the calibration unit faces with the white ceramic towards the instrument tower.

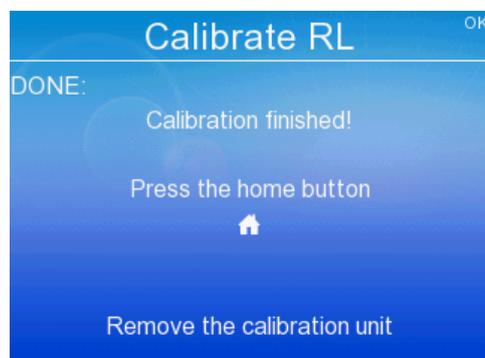
- Press the CALIBRATION button . Select **CALIBRATE RL** and press OK-button.



Check the value displayed and, if necessary, adjust it using the DOWN or UP buttons so it match the value stamped on the calibration unit.



- Press the OK-button to calibrate.
- When calibration is finished, press HOME.



The calibration procedure is now completed. Before removing the calibration unit, check the calibration by taking a regular measurement on the calibration unit. The measured value should preferably match the value stamped on the calibration unit ($\pm 2-3$ unit deviation is acceptable). Remove the calibration unit and store it properly.

Verification procedure

At appropriate intervals the value on the **RED** field calibration unit must be verified, or if necessary updated. The procedure to do this is:

- Do a calibration on the **BLACK** reference calibration unit. Follow the instructions in the calibration procedure above.
- Following take 2-3 measurement on the **RED** field calibration unit. If the average R_L value on the **RED** field calibration unit differs from the measured value, shown in the display, update the label on the **RED** field calibration unit with the new average R_L value.

The verification is now done and the **RED** field calibration unit is “recalibrated”.

Keep the calibration ceramic in good condition!

To make sure that calibration of the retroreflectometer is correct, it is important that the ceramic on the calibration units is clean and undamaged. Always keep the calibration units well protected.

If the ceramic on a calibration unit is stained, scratched or broken, the calibration unit has to be repaired and recalibrated or changed to a new one. In case of dust on the ceramics surface, the use of clean compressed air is recommended for removal. The use of a soft damp cloth is recommended if compressed air fails to remove the dirt. If necessary, use a mild household detergent.

Calibration service

To ensure reliable measurements, it is recommended that the **BLACK** reference calibration unit periodically is recalibrated to a traceable standard or replace by purchasing a new ceramic reference block.

DELTA offers calibration traceable to PTB (Physikalsich-Technische Bundesanstalt, Germany) and NIST (National Institute of Standards and Technology, USA).

For information about service please contact your DELTA distributor or DELTA directly. At DELTA you can forward your request via our web-site www.roadsensors.com or send a mail directly to: roadsensors@delta.dk.

Always store the calibration unit in a dry, dust free and clean environment.

If stained, scratched or broken it must be replaced.