1. Dome height inspection of lead frames

The height of the domes on lead frames should be controlled. For this purpose a laser through beam line scan sensor type **L-LAS-TB-F-6x1-20/40-CL** is used. At this, the lead frame is placed in the middle of the laser fork light barrier and will be shifted through the laser light curtain. The positive results are shown in the screen shots.
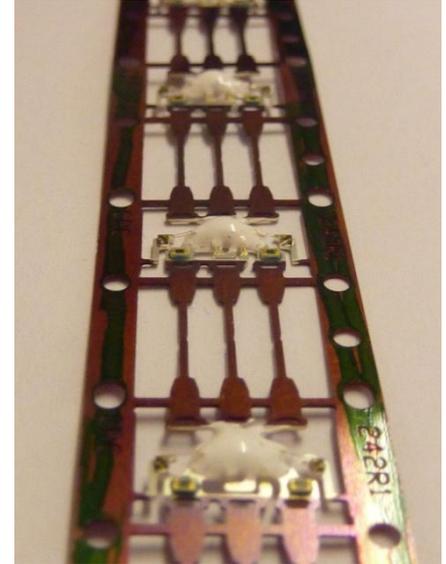

Screenshot:

Video-signal of track assembly + top-edge of leadframe.

The laser beam is passing the track assembly beginning at pixel 256. This pixel represents the top edge of the leadframe.

The laser beam is uncovered starting at pixel 256 and above.

The measured value is 0.8mm

Dome Height, White coat, Clear coat, Die, Leadframe
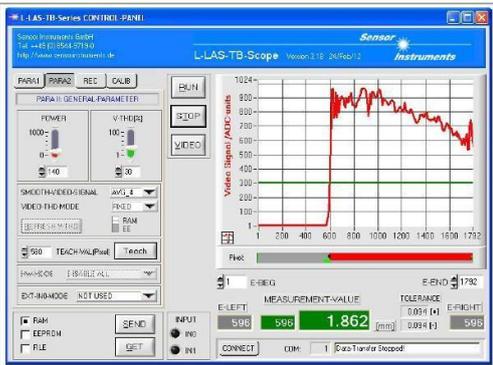

Screenshot:

Video-signal of track assembly at the top of the object (dome).

The laser beam is covered up to pixel 596. This is the top of the dome.

The measured value is 1.862mm.

The dome height can be calculated from the difference of both measurements:

DOME-HEIGHT = 1.862mm – 0.8mm

DOME HEIGHT = 1.062mm
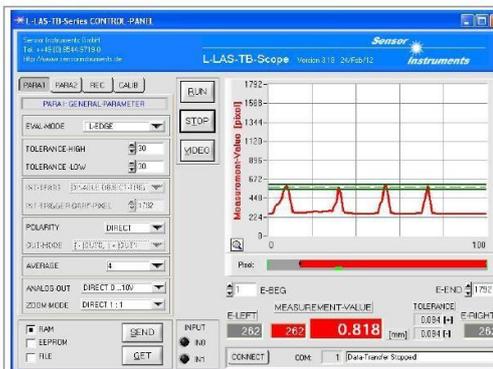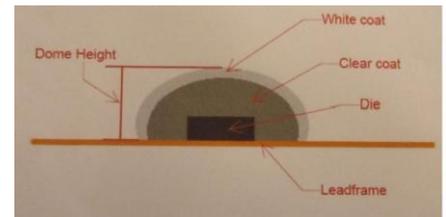
Screenshot:

RUN mode = measurement value transfer over rs232 connection. (only for testing purpose – slow movement of object because of limited data-transfer-rate).

Tolerance-band (green) = +/- 94µm

Teach in value (dash) = typ. height of dome

Red curve = measurement value (proportional to analog output of sensor).
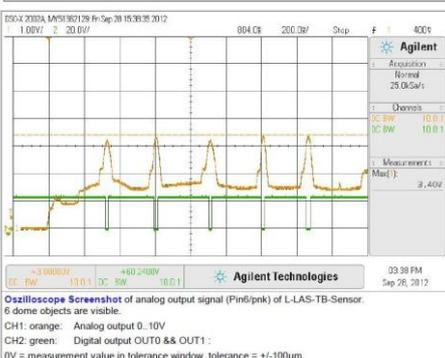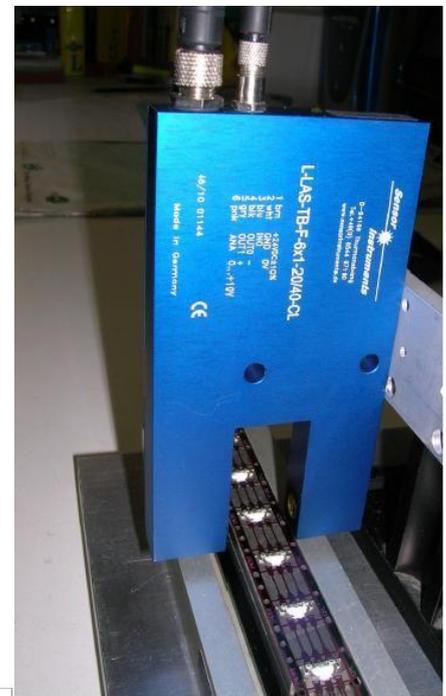
The measurement principle can be used if the leadframe is guided very well at the track assembly. That means you should minimize the height variations of the leadframe base line.

For the transparent domes the teach-in value is different. The transparent domes are not so high. The transparent objects can be evaluated in the similar way.

For the first tests we can use the standard sensor with the actual firmware.

It is possible to detect the dome height by monitoring both digital outputs OUT0 (-) and OUT1(+). If both OUT0 (-) **and** OUT1(+) are 0V the measurement value is within the tolerance window that means the height is OK. You can monitor the digital outputs with a plc, if 10 objects are tested, 10x both outputs must go low to 0V.

The tolerance window can be preset by the software TOLERANCE-HIGH and TOLERANCE-LOW parameter around a TEACH-IN-VALUE.

If the guidance of the leadframe is not precise enough, we could implement a special firmware version which has a internal trigger option and could calculate the difference between base-line and maximum of dome out of the measured signal.

Oszilloscope Screenshot of analog output signal (Pin6/pnk) of L-LAS-TB-Sensor.
6 dome objects are visible.
CH1: orange: Analog output 0...10V
CH2: green: Digital output OUT0 && OUT1
0V = measurement value in tolerance window, tolerance = +/-100µm