

Measurement of deep-hole drillings

Application description



The measurement of deep hole drilling is always a special task, where besides the linearity, the circularity, the perpendicularity and the parallelism could be of importance. Most often, the solution is a combination of laser measurement technology from Status Pro using established procedures and special adapters, which are aligned to the particular conditions.

1 Measurement procedures with deep-hole drillings

1.1 Linearity of a drilling

If you only need the linearity of the drilling, a system including a T250 Laser, a R545 Receiver, the Software and suitable adapters are needed.

For the measurement the Laser has to be aligned so precisely that the beam is indicated at the 20x20 mm sensor device. The correction of the measurement values will be done from the software ProLine.



The result is a linear measurement of the deviation in X (horizontal) and Y (vertical).

1.2 Centricity of a drilling

If in addition to linearity, the circularity is required, the same equipment as in 1.1 can be used. Only the used software has to be changed to ProOrbit. The procedure of the measurement is the same as it is in 1.1, with the only difference that the Receiver R545 is rotated through 180° at each position to detect the exact position of the centre point.

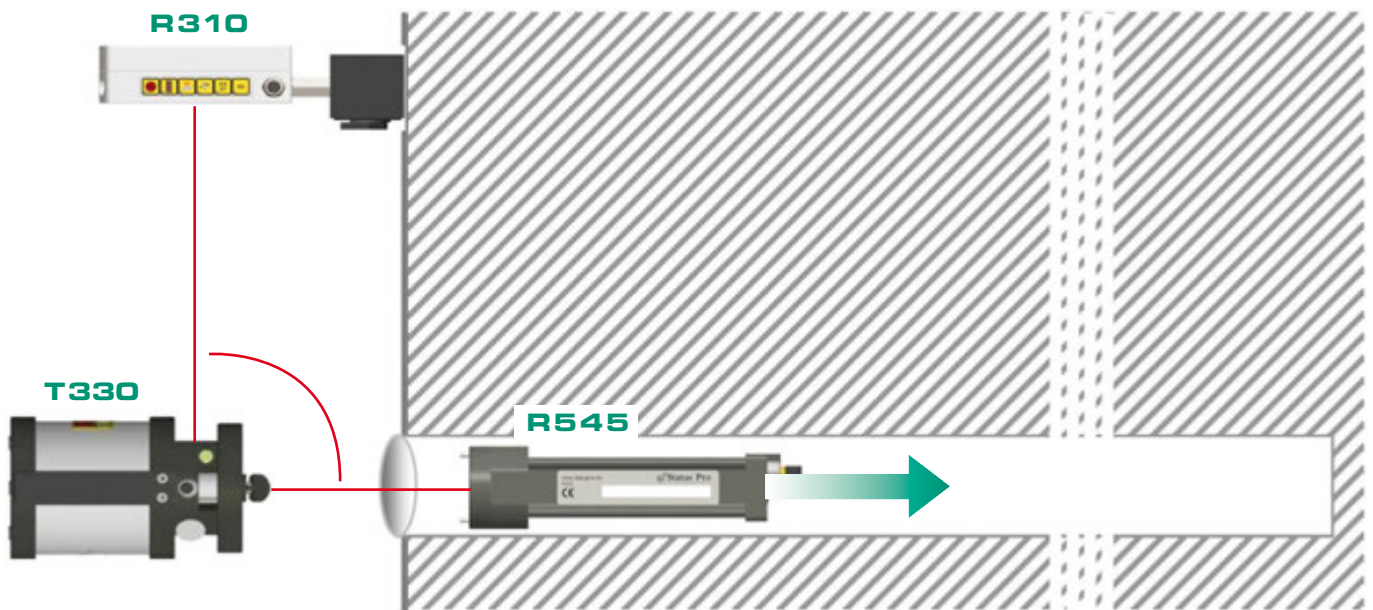


The result is a linear measurement of the centre points and their deviation in X (horizontal) and Y (vertical).

1.3 Linearity and perpendicularity of the drilling

If the linearity and the perpendicularity with reference to the front surface is needed, a T330 Laser, an R310 Receiver and a R545 Receiver are required.

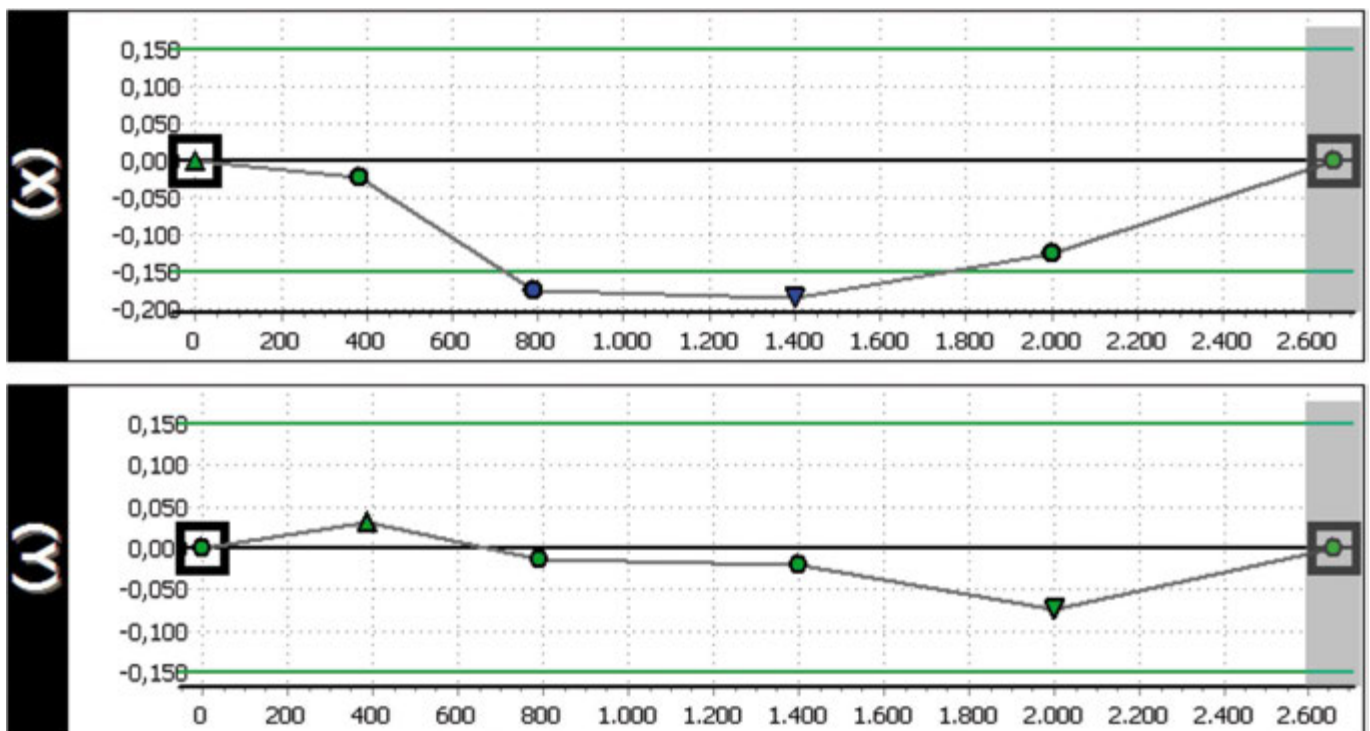
The T330 Laser has two exactly perpendicular aligned laser beams. The stationary laser beam has the same function as the T250 as in 1.1 or 1.2 and is detected from the R545 inside the drilling. The second beam is rotating parallel to the front surface. The rotating beam is detected from a R310 Receiver. With its help the T330 Laser can be aligned parallel to the front surface. A deviation from the rectangularity between the drilling and the front surface can now be measured with the R545 Receiver. If the drilling is rectangular to the front surface the measurement values from the R545 should be parallel to the axis of the drilling.



The linearity can be measured and analysed with ProLine and ProOrbit as described in 1.1 and 1.2.

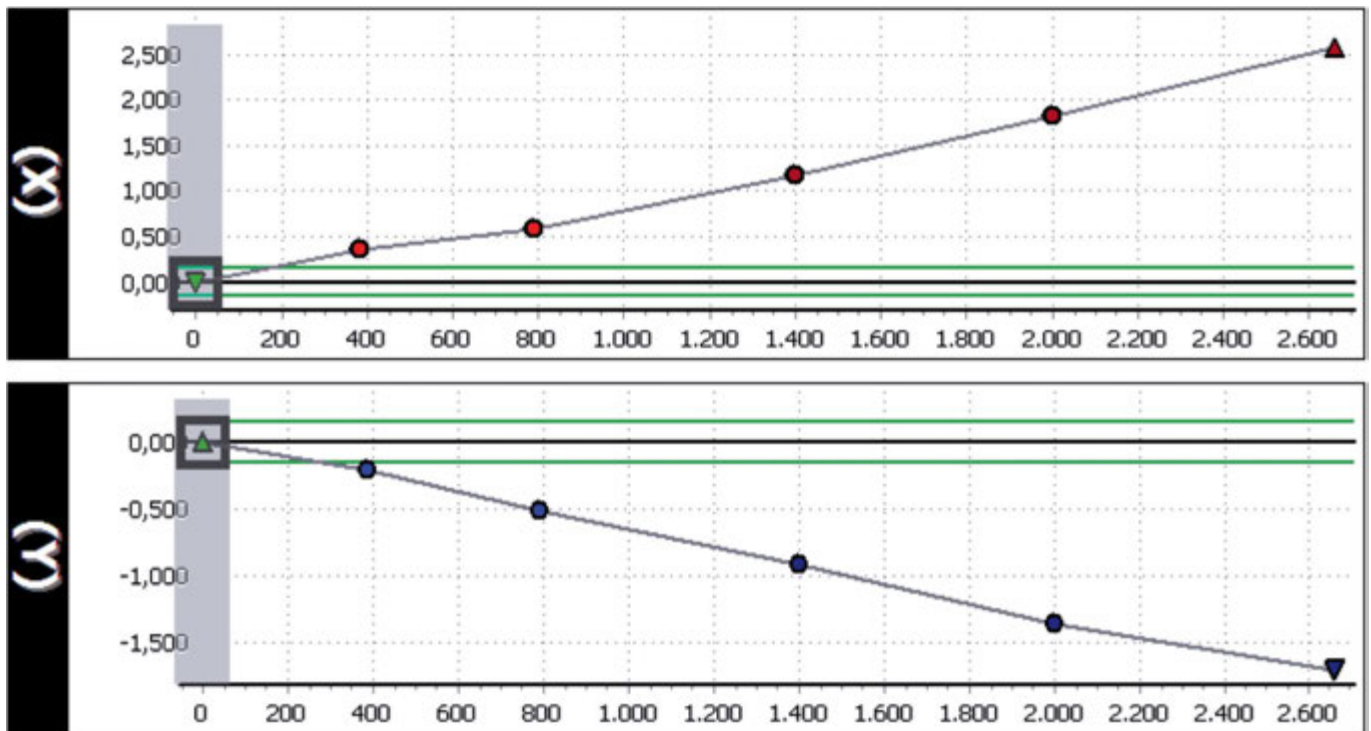
2 Measurement result

The following images show the appearance of the result of a linear measurement as described in 1.1 and 1.2.



The first and the last point are set to zero. By doing this it is possible to analyse the deviations of the points between them.

For the evaluation of the measurement of the perpendicularity, described in 1.3, only the first point is set to zero. The "zero-line" can be seen as the beam rectangular to the front surface. The measurement values show the deviation from the rectangular axis.



In addition to the charts, which allow an immediate analysis of the existing situation, data tables and statistics can be exported, which make a further processing in other programs and a more detailed evaluation possible.

3 System components

T250 – Round laser source (BG 830750)

The T250 Laser is a highly developed Laser source that is very small in dimension, which is a great help when measuring where there's not much room! The T250 Laser, just like the T330 Laser possesses a beam of outstanding quality.

The laser beam is adjustable in angle and in parallel offset using the four differential screws. Power is supplied either through the mains cable or through an optionally purchaseable Battery-Pack and cable.



T330 – Self-levelling sweep laser (BG 830203)

The T330 levelling laser makes even difficult measuring tasks easy! Its main advantages are the self-levelling feature and ease of handling. A laser transmitter transmits the signal and a detector measures the beam position. Done!



R545 – Laser Receiver with a 2-Axis-PSD Technology (SP R545-P)

The R545 is a very accurate and yet robust Laser Position Sensor especially developed for measuring linearity. Connection with the Measurement PC for recording and display purposes is over Bluetooth. The R545 is powered by a commonly used Li-Ion Pack (externally rechargeable) ensuring continual measurement availability. Combined with the Pro Line software and a Bluetooth distance measurement meter, you are equipped to measure the X,Y and Z Axes simultaneously.



Special adapters

When measuring such difficult tasks, special adapters are usually needed. Status Pro provides you with customized solutions so user errors or adapter errors are minimized. The picture shows a specially developed adapter for the R545 which is used for the measurement of deep-hole drillings.





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