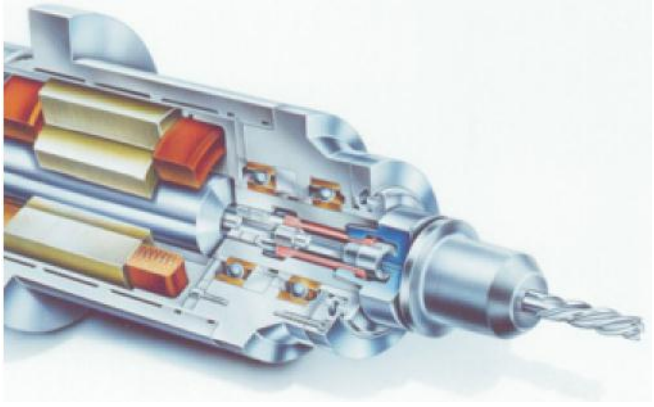
Monitoring the clamping of tools

Modern, high performance machine tools are now achieving accuracies of just a few micrometers or even less. Such precision can only be achieved by optimum matching of all components, starting with the drive, then the release unit, tool chuck through to the tool itself. Since most components are permanently installed on the machine, then with correct installation the highest precision can be achieved. The only problem is that the tool is changed with each new phase of the operation and can therefore cause critical deviations. So special attention has to be paid to correct clamping of the tool in the holder. In each case the correct seating of the tool or whether its position has changed must be detected. Swarf in the tool seating has fatal results: The fault due to the slightly protruding tool would be immediately visible on the product and would lead to the scrapping of expensive work pieces.

Previously, proximity sensors and connector rings, which supplied a switching signal, were used for monitoring the clamped position.

However, this had to be adjusted and set in a complicated manner. Analog sensors from the Series vipSENSOR offer a significant improvement. The sensor is integrated into the release unit and directly measures the clamping stroke of the drawbar. It can be universally used with the most varied types of tool due to an extremely compact design. The sensor supplies an analog signal according to the stroke motion of the drawbar when clamping the tool. Consequently, continuous monitoring is possible without the switching point having to be laboriously set mechanically. The miniaturized sensor electronic unit is supplied with 24 VDC and can either be accommodated at the point of measurement or in the control cabinet.

Due to its high accuracy, the sensor provides a significant contribution in satisfying the continually increasing demands on the precision and availability of machine tools.



clamping tool

sensor with target ring

Application

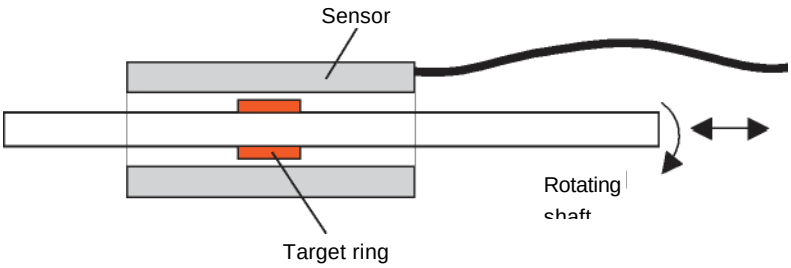
Measurement system requirements:

- Measurement range: 25 mm
- Linearity: typically ±0.5% FSO
- Resolution: 0.01 mm
- Dynamic response: 150 Hz (-3dB)
- Temperature range: -20... + 120°C
- Temperature stability: < ±0.01 % FSO / °C
- Medium: air, oil

Reasons for choosing the system

- Short sensor shape, but with a large measurement range
- Compact sensor for easy integration
- Non-contact measuring principle
- No adjustment of proximity sensors needed
- High resolution

Principle



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