

IIT – Inspection of Internal Threads

Many manufacturers, especially suppliers for automotive industry put great emphasis on 100% quality control of internal threads and holes in critical parts. It is a commitment to supply high quality products to their customers in first place. Right inspection can also determine optimal intervals of tools replacement and also reveal miscellaneous production process instabilities.

› Quick and reliable inspection system

Quality of manufactured parts for automotive industry is key for success in the business. Even a simple thing such as thread can negatively influence the production process if it is not made properly. If it is the assembly process of the robustness of the joint that it provides, reliable inspection of threads is a must for critical components in automotive industry such as engine castings, wheel bearings and other. Moreover, understanding the real parameters of each production process is a key to control it. IIT is the best system giving you all of this in a single package.

› Advantages and benefits

- 100% process inspection
 - Very short cycle times
 - 360° measuring field around probes
 - Practically unlimited length of thread
 - No wearing of measuring equipment
 - More detection capabilities than other methods
 - Better control over tolerance settings
 - Reduction
- Missing thread
 - Wrong thread dimension (diameter, pitch)
 - Incomplete thread length
 - Local thread damages
 - Chips and metallic debris
 - Chamfers, tapers, recesses
 - Other thread flaws
 - Indirectly – cutting tool wearing



Detection Capabilities

› System parameters

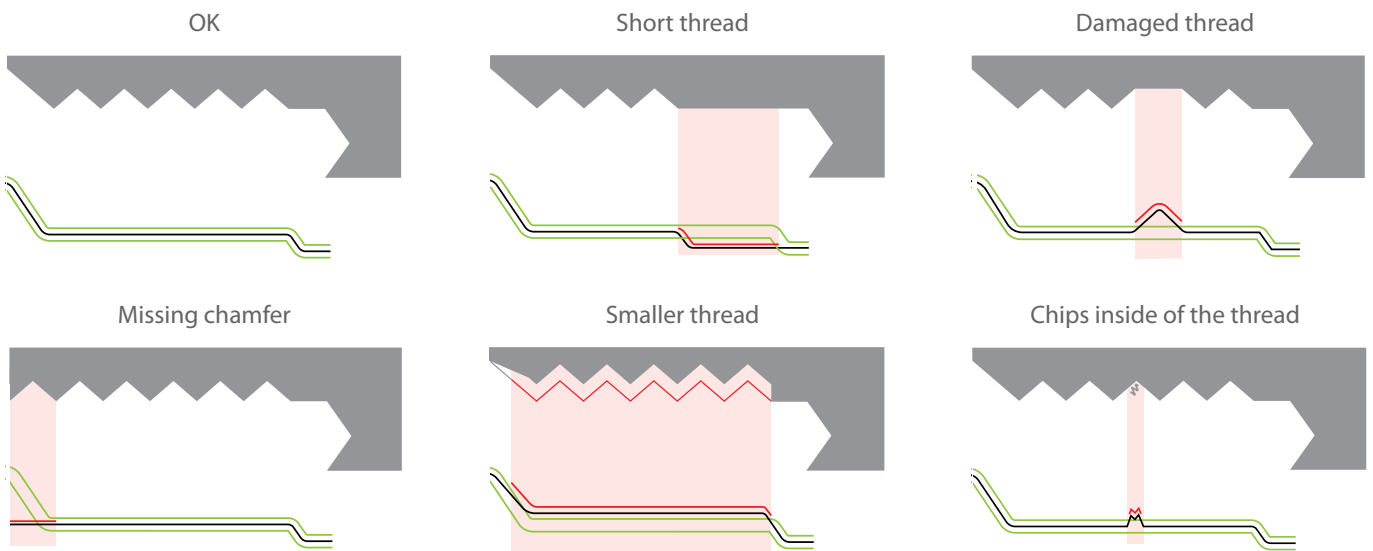
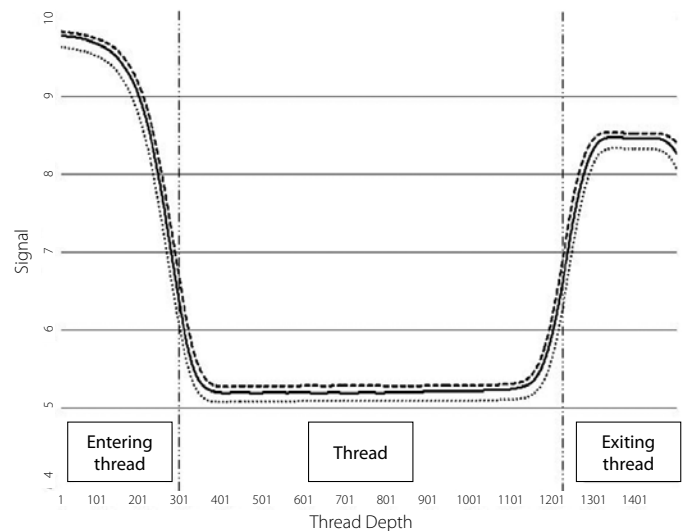
Measurement range	M5 – M25 (custom sensors for higher dimensions)
Measurement speed	20 kHz readout, approximately 1 part/s based on application
Accuracy	0.02 mm average
Inspection configuration	Teach-in based on sample master parts
Number of product configurations	Unlimited
Number of probes per control unit	4; can be extended with additional control units

› Measurement method description

The inspection system consists mainly from a capacitive probe with toroid measurement field, special fixture for centering of probe, amplifier to process the signal and control unit to evaluate the signal readout and outcome of quality inspection.

The probe is inserted into a threaded opening and an equidistantly synchronized signal is captured. It is further processed to detect any deviations from the expected waveform. Several approaches can be applied to detect different types of defects. Different tolerances can be applied depending on the product and customer requirements for the thread quality. Various features (not only thread) can be evaluated from the readout.

System provides calibration and teach-in capabilities, online visualization and statistical processing, storage of data about rejected parts and other data processing functions.



› Integration options

There are multiple options to integrate the contactless thread inspection into serial manufacturing process. It depends on the cycle time and material process flow. It is also possible to integrate other types of inspection such as camera system or 3D measurement of parts into the same station for higher added value and ROI.

- Standalone automated machine with feeders (for small parts)
- Multiple-probes single purpose high speed inspection station
- Robotic station (for flexible solution with many inspection points)
- OEM components for further integration into existing equipment