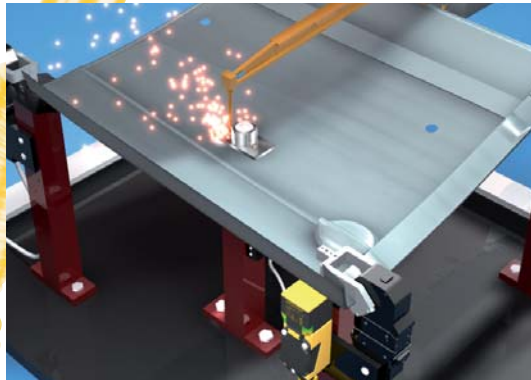
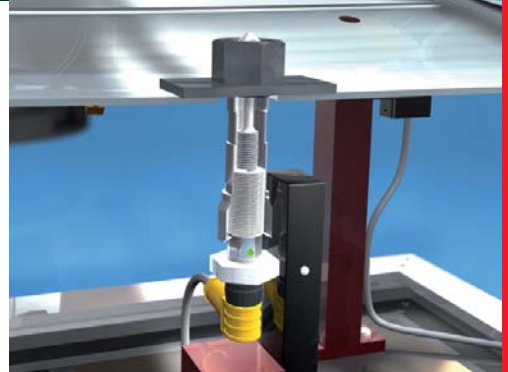
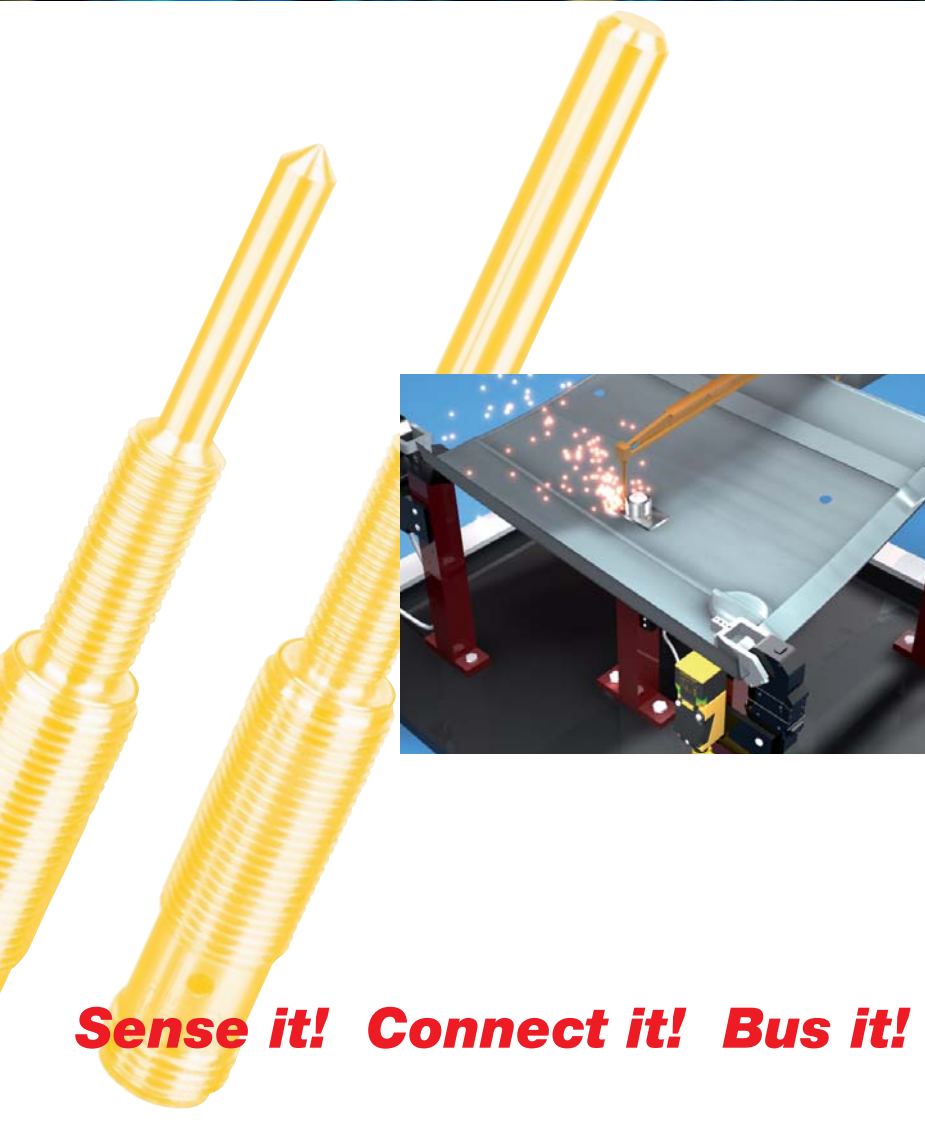


The TURCK logo is displayed in a bold, black, sans-serif font on a yellow background.

Industrial
Automation

DETECTION OF WELDING NUTS SENSORS



Sense it! Connect it! Bus it! Solve it!

MAGNETIC INDUCTIVE WELD SENSOR WORKING AS INTELLIGENT LOCATION BOLT

In the automotive industry spacer sleeves and welding nuts are used to assemble elements of the carbody shell. The assembly process has to be monitored continuously according to the correct supply of nuts and sleeves.



If either one is missing or may not have the required material quality, the automatic assembly process stops and the workpiece will be rejected. If these errors are not detected and rejects are produced, production costs will increase considerably. Even complete carbody shells may not be further assembled if the stabilizing elements are not welded.

The welding process

The body component is placed in the corresponding fixture. The power clamps keep the component in position. Next the operator puts the nut or sleeve on the centering pin. The sensor reliably detects the presence or absence of the parts. An empty welding position is immediately signalled to the control. If all welding nuts are in place, the roboter starts the spot welding process.

Process safe sensor technology

The new sensor for detection of welding nuts made by TURCK is an economic and process safe alternative for sheet metal processing.

The sensor works on the basis of attenuation and thus detects ferromagnetic parts like sleeves, nuts and slices etc. The sensor is mounted in a chrom-plated brass housing and features degree of protection IP67. LEDs reliably indicate the current switching state (presence/absence of target objects and errors).

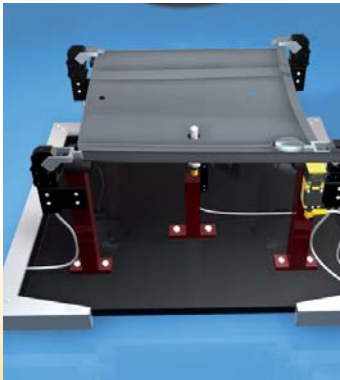
As the detection of welding nuts takes place in an extremely rough production environment, the centering pin and the sensor have to be protected against mechanical strains. This is done with stainless steel sleeves which are plugged on the sensor and thus keep the nut in position. The new magnetic inductive sensors detect ferromagnetic material through non-ferromagnetic stainless steel sleeves.

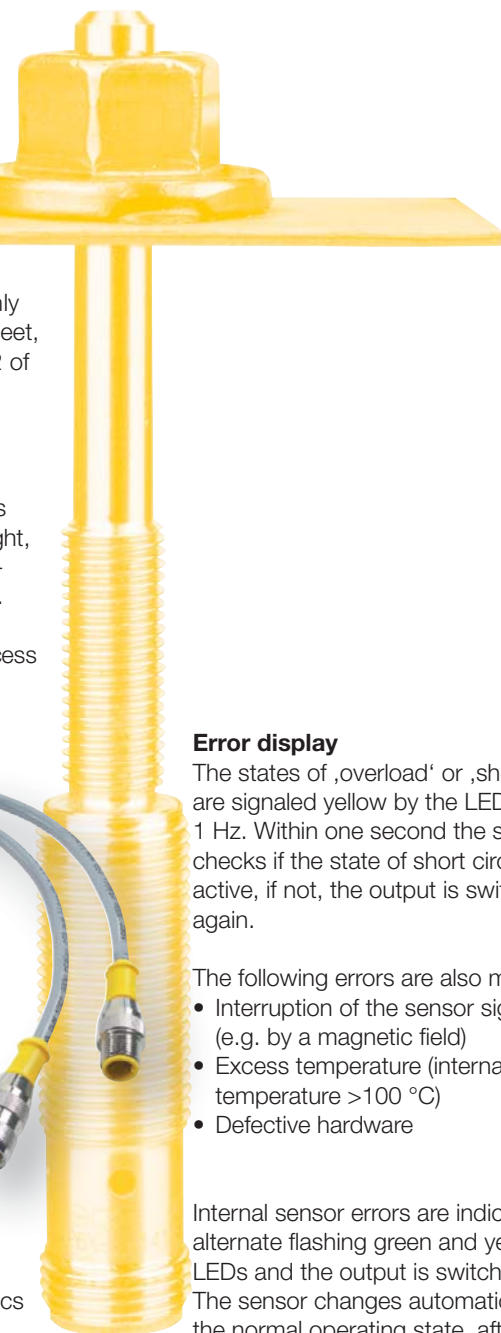
In combination with the stainless steel sleeve the new sensor functions a location bolt.

To assure that the TURCK sensor only detects the nut and not the metal sheet the sensor is taught either via pin 2 of the M12 x 1 connector or with an additional teach adapter (VB2-SP1). At the push of a button the sensor "learns" to differentiate between the metal sheet and the metal sheet plus welding nut. Once the sensor is taught the "learned" parameters are memorized until the sensor is taught again. Extreme fluctuations of temperature which occur during the welding process are compensated.

Advantages

- Extremely reliable and process safe
- Easy teach function
- Cheaper than conventional methods
- Optimally integrated and adapted
- No additional software or electronics required
- Simplified programming





Error display

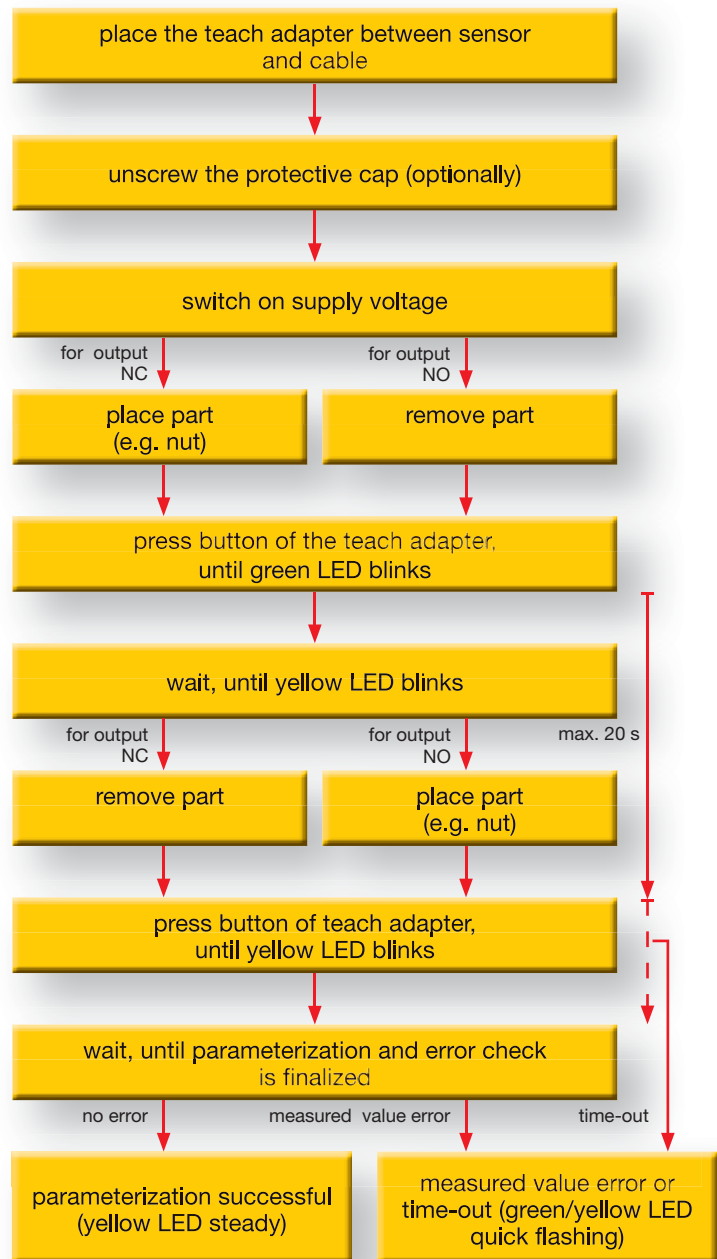
The states of 'overload' or 'short circuit' are signaled yellow by the LED with 1 Hz. Within one second the sensor checks if the state of short circuit is still active, if not, the output is switched-on again.

The following errors are also monitored:

- Interruption of the sensor signal (e.g. by a magnetic field)
- Excess temperature (internal device temperature $>100\text{ }^{\circ}\text{C}$)
- Defective hardware

Internal sensor errors are indicated by alternate flashing green and yellow LEDs and the output is switched-off. The sensor changes automatically to the normal operating state, after the error was corrected.

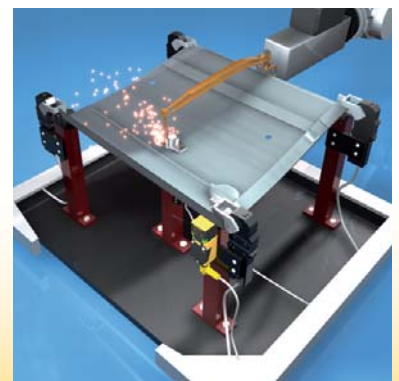
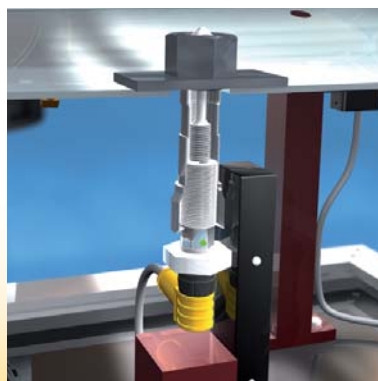
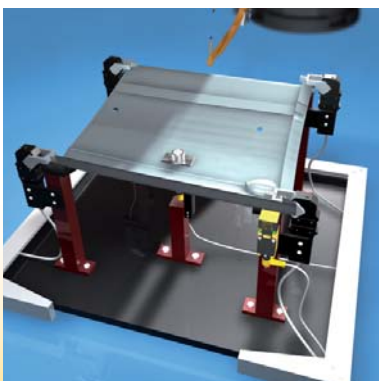
After switch on of the operating voltage the sensor checks its operating parameters. If errors occur during the checking process, the sensor remains in the error state (green LED blinking). In this case calibration has to be restarted via teach adapter.



Teach function

The measuring signal in the sensor is influenced by the diameter and the material characteristics of the center bolt, but also by the cover of the sensitive area. Therefore each sensor has to be conditioned to the operating environment, i.e. to the applied sleeves,

protective caps and the target (nut, sleeve etc.). The TURCK teach adapter VB2-SP1 is used for calibration.



The magnetic field sensors for welding nuts are available in two different versions, with different signal intensities and diameters. Ferromagnetic spares which differ strongly in their material properties and diameters can be detected.

A target part has to be located within the so called sensitive area in order to be detected. The internal sensor signal reaches the maximum intensity if the sensitive area is completely covered by the target. Partial coverage is also possible.

Sensitive area S

Within this area the sensor signal changes when assembly parts are placed.

Maximum area M

The maximum signal intensity is reached if the sensitive area is completely covered.

Type designation Ident no	Connection Wiring diagram	Sensitive area S	Maximum- area M
NIMFE-M12/4,6L88-UP6X-H1141 1600608	male connector M12 x 1	9 mm	13 mm
NIMFE-M12/6,2L101-UP6X-H1141 1600609	male connector M12 x 1	11 mm	14 mm

- Degree of protection IP67
- DC 3-wire, 10...30 VDC, 200 mA
- Parameterizable (PNP normally open/ PNP normally closed) with teach adapter VB2-SP1
- -25...+70 °C

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