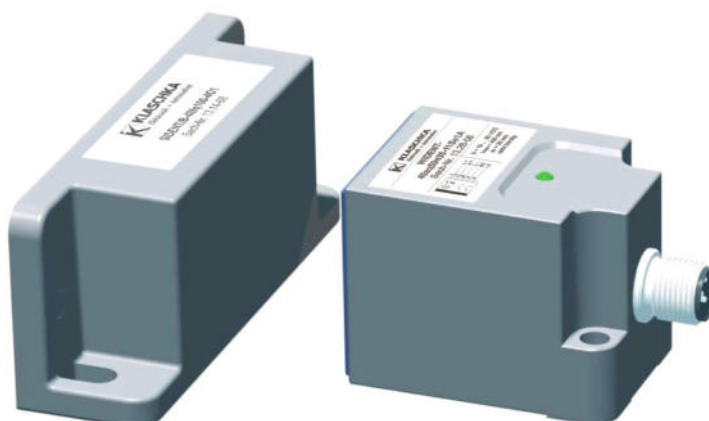




1. Task

Robots are frequently used – in particular in the automotive industry – with exchangeable tools. Since the tool change procedure may not delay or even interrupt the production process, the interface between robot arm and tool has to be constructed in such a way that this change can be accomplished easily and quickly. So-called multi-couplings for supply voltages, control signals, pneumatics and hydraulics help to facilitate this process.

The mechanical connection between robot arm and tool is usually done by gripping a bolt, which is attached to the tool. The grip mechanism is activated and the pin is seized by triggering a pneumatic cylinder. The reversing of the pneumatic cylinder again causes the tool to be put back in place.

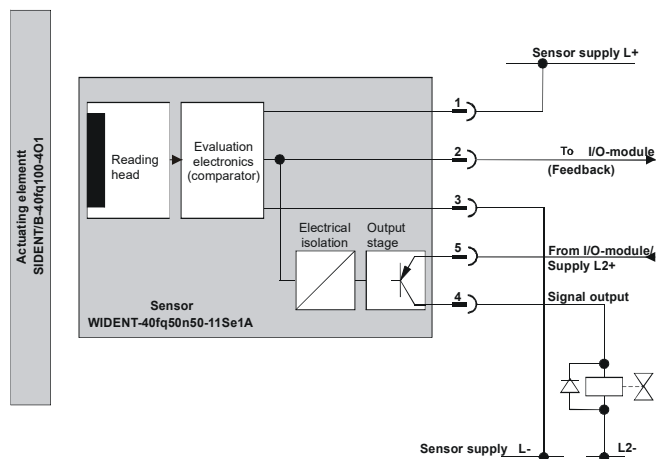
The compressed air supply, which is necessary for the grip mechanism, has to be available only during the coupling and uncoupling procedure. For safety reasons it has to be switched-off during the use of the tool, so that an inadvertent throwing-off is prevented. For this, a pneumatic valve is connected before the grip mechanism, which is activated only during the coupling and uncoupling procedure. This means that the pneumatic valve is activated only within a limited range.

The detection system described above fulfils this task. In addition, it is able to minimise the risk of this safety mechanism possibly being switched off or bridged for negligence or time reasons. The actual sensor is attached at that part of the coupling, which is fixed at the robot arm. The sensor is only activated if it is brought together with the corresponding actuating element, which is mounted at the “silence part” of the tool.

The detection system WIDENT is based on the transponder technology which works with the identification principle. This means that always only one certain actuating element, which has received a defined code, is able to activate the sensor. The operating range of the actuating element is approx. 40 mm x 60 mm, with a recommended distance of approx. 30 mm between sensor and actuating element.

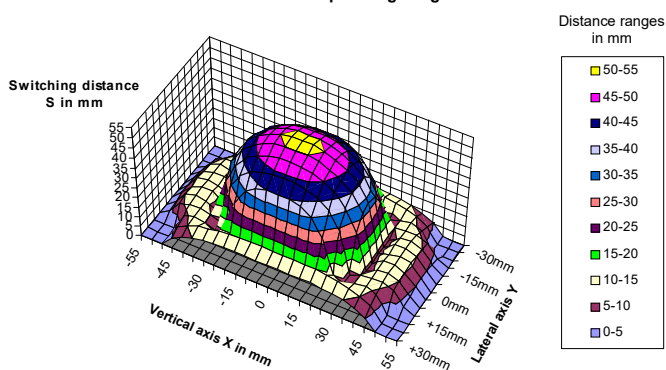
The sensor has got two outputs: The first output transmits the status feedback via an external field bus module, the second output, which is electrically isolated from the first one, triggers the pneumatic valve, which activates the compressed air supply of the grip mechanism.

2. Block circuit diagram and connection

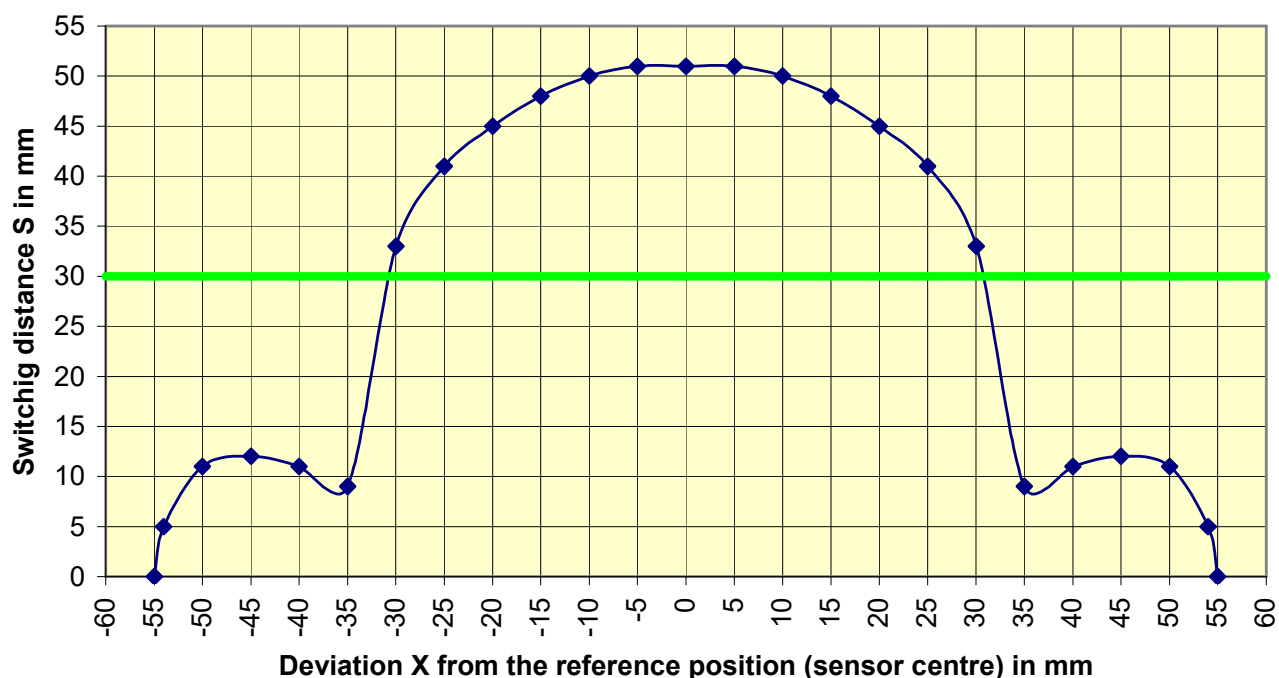


3. Operating range of the actuating element

Three-dimensional schematic of the operating range



Switching distance in the longitudinal axis



**Switching distance in the lateral axis
(vertical to the longitudinal axis)**

