

Smart Switches

New technology of the uprox3 series enables the largest switching distances of all inductive sensors worldwide – including factor 1

When Turck presented the first uprox factor 1 sensor in 1994, conventional inductive proximity switches had already been in use for around 40 years. Then and now, uprox can claim to be a sensor that considerably reduces the wide range of different sensor types required; one proximity switch with the same switching distance for all metals – hence the term factor 1 – large operating temperature ranges and suitability for different mounting requirements.

At that time, the new air coil system was superior to the conventional ferrite core in virtually every situation. Besides the factor 1 features, it also provided such a high magnetic field immunity that the uprox sensor could be operated fault-free in the proximity of electric welding plants, induction ovens or linear drives.

PCB coils instead of ferrite core

The classical uprox principle consists of a transmitter coil and two receiver coils, and is considered as the forefather of all differential transformer sensor systems. The developers of the uprox+, which Turck presented in 2004, furthered this idea and used two pairs of transmitter and receiver coils directly on the

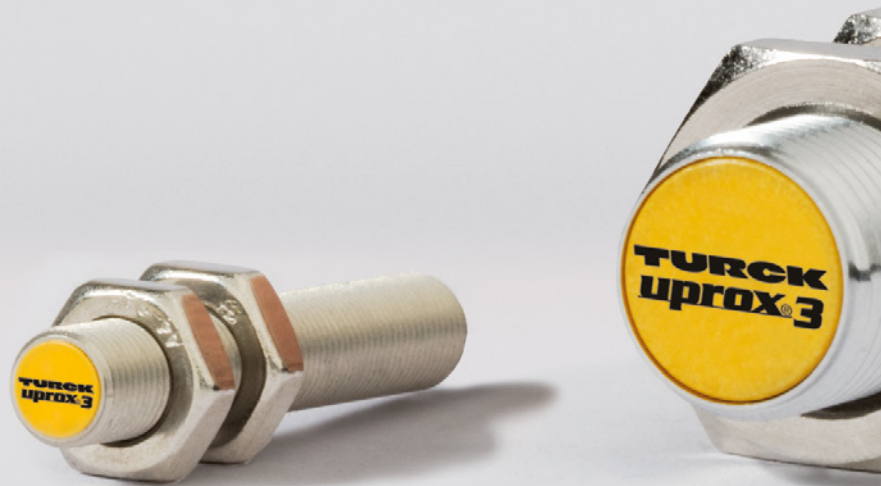
chip in order to increase the effective signal. This second generation offered the benefits of larger switching distances together with designs and mounting options that were previously unheard of.

Another ten years further on, Turck is once more setting a milestone at the Hannover Messe 2015 with the development of inductive proximity switches and is presenting uprox3, the third generation of its long-standing product. Although the existing uprox+ sensors offered large switching distances for all metals, these can be increased in the new series by up to 50 percent.

Nothing of the basic operating principle of the uprox sensor, which has been proven in millions of applications, had to be altered. A modified electronics architecture and the use of the latest chip and production technologies enable the third generation of the uprox sensors to achieve the largest switching distances of all inductive sensors on the market, including factor 1 sensors. For flush mounting, this is an as yet unattained 3 millimeters for the M8 design, 6 millimeters for M12 and 10 millimeters for M18. Thanks to the consistent further development of its

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Turck's uprox factor 1 sensor has been the standard in the automotive sector for twenty years. The same large switching distances for all metals, weld field immunity and a large degree of mounting flexibility are the key benefits of these inductive sensors without a ferrite core. The recently developed third generation of the uprox series enabled the automation specialist to increase the already large switching distances by up to 50 percent and launch the world's first ultracompact factor 1 sensors with Ø 4 millimeter smooth and M5 barrels. The new "mini sensors" create previously inconceivable options, particularly for designers in special machine building.





The third generation uprox sensors stand out on account of their shorter designs and larger switching distances

uprox technology, Turck has been able to achieve these larger switching distances without any compromises in terms of performance and mounting requirements.

uprox3 for restricted mounting conditions

With this new version of the uprox series, the automation specialists are launching two particularly interesting designs for industrial sectors that are characterized

by a notorious shortage of mounting space. The extremely compact Ø4 millimeter smooth barrel and M5 threaded barrel sensors are now available as factor 1 sensors – a world first.

The “smart mini sensors” have a 1 millimeter switching distance – also naturally for flush mounting in all metals. These miniature uprox models are particularly suited to detecting small parts made of non-ferrous metal or stainless steel. The mini uprox3





World premier: Turck launches the first factor 1 sensors with Ø 4 millimeter smooth and M5 barrels



will be able to simplify several applications in the special machine building sector. As a factor 1 sensor it switches just as well with aluminum targets, such as are frequently used in lightweight construction, as with steel targets. The other designs of the third generation also stand out on account of their shorter housing designs as well as the larger switching distances. As the trend towards miniaturization in machine building continues, this meets the requirements of many designers and planners.

Finding typical applications for the uprox in factory automation is just as easy as naming regions of Germany where they like to drink beer: actually everywhere. In the automotive industry, particularly in body construction, the previous generations of uprox have become the sector standard, and this will not be any different with the uprox3, as has been confirmed by the field tests to date.

Field test in automobile production

In field tests at automobile manufacturers, where the previous 8 millimeter switching distance of the M18 uprox+ was reaching its limits, the new factor 1 sensor proved to be a perfect further development. In the automotive industry vacuum grippers are frequently used for picking up and moving sheet metal. Suction cups are applied to the sheets and a negative pressure is generated. An inductive sensor close to one of the suction cups detects whether the gripper was able to grip metal or not. However, the sensor cannot be mounted too close to the detected target, otherwise it may be damaged when a sheet is picked up. A safety

Efficient sensor program

Virtually all applications for all target metals are covered with only the few sensors of the uprox3 series. The small range of types reduces the maintenance required and the antivalent sensors in standard lengths, which can be used as NC and NO contacts, also do not require any compromises in terms of their electrical design. In the first step, Turck is launching the Ø 4 millimeter smooth barrel and M5-, M8-, M12- and M18 threaded barrel designs at the Hannover Messe 2015. PTFE-coated variants of the last three types will also be launched. Besides the PNP variants, NPN variants are also available for markets such as the North American market.

distance of 1 to 2 millimeters must be ensured. When the gripper then moves with the held sheet, the rubber suction cups are expanded by the weight and the inertia of the sheet. Depending on the acceleration and weight of the sheet, the suction cups may be extended so much that the proximity switch can no longer detect the target, resulting in a switching error. As a slower process is out of the question, the larger switching distance of the uprox3 solves a critical problem here. The larger switching distance of the uprox3 will make a critical contribution to more reliable and efficient production processes as the cycle times will continue to increase in future.

The welding spark resistant M8-, M12- and M18 variants with PTFE-coated housings will be used for welding applications in the automotive sector in particular. As with previous generations, the design of all uprox3 sensors provides them with an extremely good EMC performance and immunity to magnetic fields. The coating reliably prevents welding spatter from sticking.

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The small sizes and large switching distances with aluminum are especially required for the special machine building sector – the uprox3 is a frontrunner for both these requirements.