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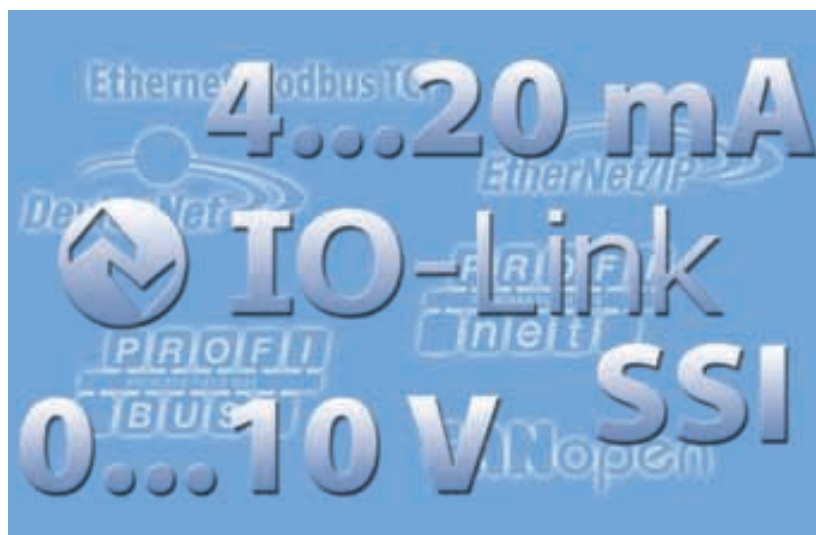
The LI-Q25 detects an object's position via a resonant positioning device, not with magnets

Linear Leader

Turck's new inductive sensor family can replace more expensive magnetostrictive linear displacement sensors, as well as interference-prone potentiometric solutions

Until now, an inconvenient truth could be applied to most linear displacement sensors: They were either low-priced and prone to wear (potentiometric solutions), or they were wear-free and accurate but expensive (magnetostrictive systems). Although there are different methods for position detection – ranging from

analog sensors, to incremental devices, to digital switches – virtually no linear displacement sensor could efficiently be applied to short-range and long-range applications alike. Turck has changed all this with the introduction of a new series of powerful linear displacement sensors based on the resonant circuit technology, the LI series.



The LI series provides output signals in four different formats: 0 to 10 V, 4 to 20 mA, IO-Link or SSI

where chippings or external magnetic fields might affect the sensor's functionality. Injection molding machines require the operator to verify the locking device's movement, locate the injection unit, check the ejector's motion and measure the holm's strain: diverse tasks Turck's noise- and wear-free inductive linear displacement sensors are particularly suited for.

The versatile LI sensor series helps users to optimize their application and increase the machine's availability. Turck's linear displacement sensors are also suited for welding machines, as they are absolutely insensitive to strong magnetic fields that occur during welding processes. This feature allows users to utilize inductive linear displacement sensors in various applications like machine tools, molding presses, rolling machines, die-casting, bending or lining machines, dosing systems, mixing units, packing machines, wind turbines or stroke and alignment control systems.

Resonating positioning device

Unlike magnetostrictive or conventional inductive position sensors that use magnets to detect position, the LI-Q25 detects an object's position via a resonant positioning device. The functional principle: A transmitter coil integrated into the IP67-rated

The new inductive linear displacement sensors provide a 1 µm resolution and are less expensive than most of the conventional sensor solutions available on the market. Whether measuring ranges of only 100 mm or up to 1,000 mm, the sensor's flexibility allows users to apply it to diverse applications like injection molding machines or metal working,

▶ Quick read

Based on the resonant circuit principle, Turck has developed new linear displacement sensors that allow users to apply position detection to various new applications – more efficiently than existing solutions.



Maintenance-free: Due to their rugged housing, Turck's IP67-rated sensors are insusceptible to moisture

housing generates a high-frequency alternating magnetic field that activates the resonator integrated into the positioning device. Each time the transmitting coil stops transmitting, the resonator induces voltage into two receiving coils integrated into the sensor. The voltage intensity depends on where the positioning device overlaps the receiving coils. An integrated 16 bit processor provides a corresponding proportional output signal in different formats: 0 to 10 V, 4 to 20 mA, IO-Link or SSI.

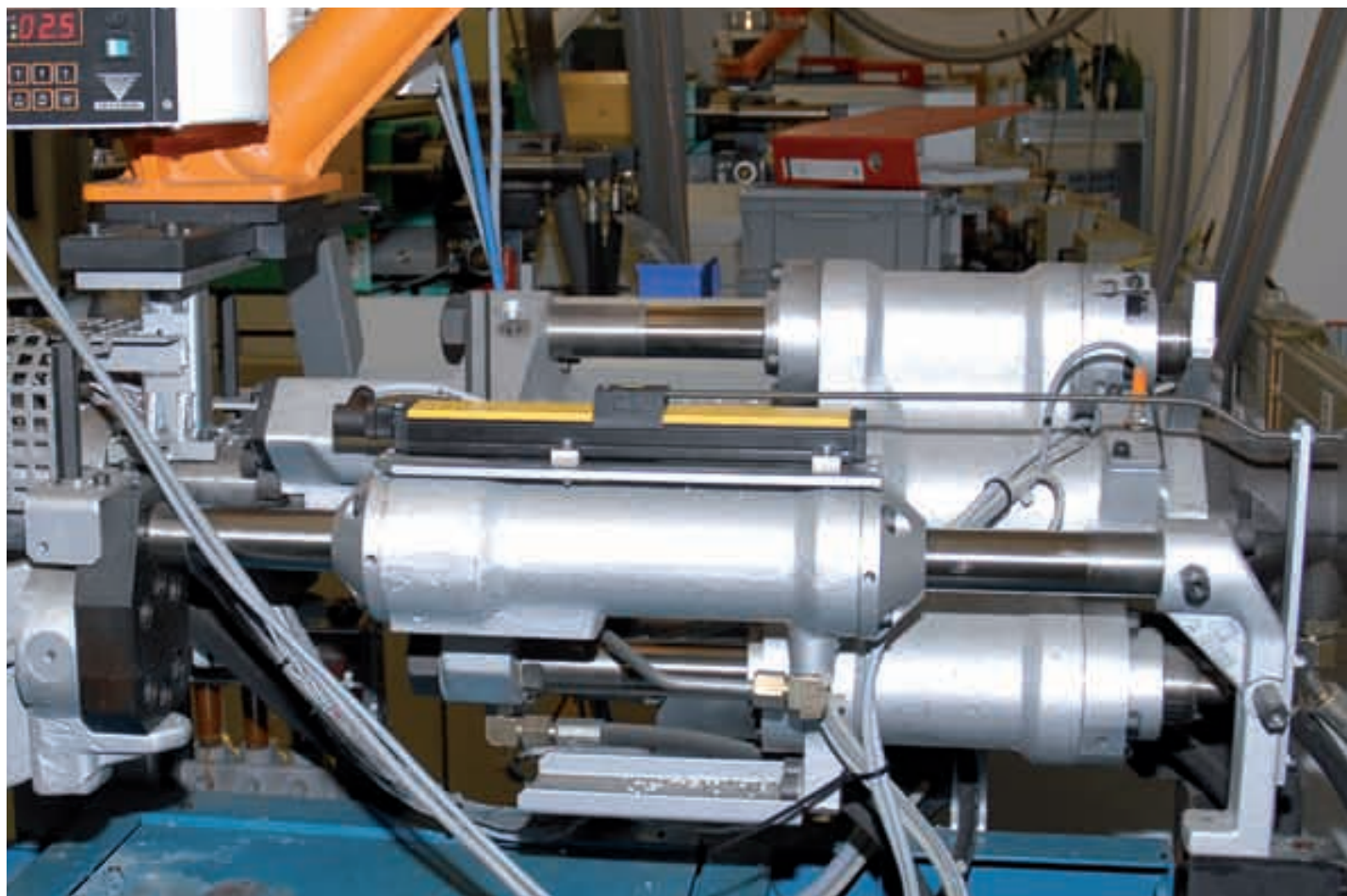
Unlike magnetostrictive sensors, this resonant circuit principle is completely immune to external electromagnetic fields and since there are no magnets involved, splinters that may affect the sensor's function do not accumulate on the positioning device. Unlike potentiometric detection solutions, not even dirt or dampness affect the sensor – thanks to a fully sealed housing. Moreover, the coils' special design guarantees that the output signal is not affected by the distance between the sensor and the positioning device. Because of this, measuring errors caused by slight deviations are effectively eliminated, as long as it is within the sensors 0 to 4 mm measuring range.

Easy to adapt

Due to their resistance to interference and high accuracy, the wear-free LI sensors can replace potentiometric solutions, as well as the more expensive magnetostrictive systems, in a lot of applications. The linear displacement sensors include features that make them easy to apply in many areas. Opposite to the active sensing face, the sensor housing features an aluminium profile that allows easy application via optional mounting accessories, and stainless steel accessories provide safe mounting and flexibility with regard to the alignment of the sensor.

Extremely short blind zones of only 30 mm on each side, along with a wide temperature range of -25 to 70 °C and the option to adopt the sensor by programming it to different measuring ranges, allows users to dispense with special variants for specific applications. Using only one sensor family for measuring ranges between 100 and 1,000 mm simplifies warehousing and helps users reduce their total cost of ownership.

Users can rely on Turck for the most versatile linear displacement solution for their application. Turck developed the new sensor family true to their motto "Sense it, Connect it, Bus it, Solve it" – meaning that flexible output configurations allow the sensor to be easily integrated into existing automation structures. Whether the application calls for an analog output, IO-Link or SSI, a standard M12x1 connector provides a convenient connection to a wide range of fieldbus installations, including Turck's BL20, BL67 and BL Compact families. In particular, IO-Link provides numerous advantages with respect to commissioning, maintenance and warehousing.



Three-wire technology advantage

Based on the popular three-wire technology, the IO-Link standard enables users to commission their intelligent field devices faster and maintain them more conveniently. Requiring only one cable for data transmission and power supply, IO-Link simplifies connection diagrams and reduces cabling expenses, in addition to allowing users to download device parameters from one sensor to an identical replacement sensor. In this way, cumbersome manual parameterization on site becomes redundant. Since IO-Link sensors may provide additional diagnostics data via the combined process/configuration data channel, failures can be localized faster – allowing plant operators to reduce machine downtime significantly.

Turck provides a corresponding driver – the device type manager, DTM – for its new LI-Q25 series. Allowing user-friendly visualization via a non-proprietary software tool like PACTware, DTM enables users to manage and parameterize their intelligent sensors with only a few mouse-clicks.

Successful pilot project

The German connectivity company, Escha, has implemented the LI series a few months ago, and the sensors have been delivering optimal perfor-

mance under harsh operating conditions. Cooperating with the mechanical engineers of the machine builder, Turck's sensor specialists replaced four existing potentiometric measuring devices with LI-sensors in one machine. In this machine, the sensors guarantee safe and reliable detection of a locking device, ejector, injection unit and holm strain. "One of the most significant advantages of Turck's IP67 sensors is their rugged housing that makes them insusceptible to moisture," says Markus Hühn, head of the connector production department with Escha Bauelemente GmbH in Halver. "The contact-free sensor works maintenance-free. Turck's new sensors have been meeting our expectations completely."

Closing the gap

Based on the resonant circuit principle, the new inductive position sensors can be used in a wide area of applications that could not be solved efficiently in the past. Whether an application contains short or long-range distances, limited installation space or external interferences – Turck's new linear displacement sensor offers a flexible solution that can easily be applied to various applications, closing the gap between functionally limited potentiometric solutions and complex magnetostrictive position sensors. ■

**Pilot application:
Four Turck LI
sensors on an
injection molding
machine**



“Turck's new sensors have been meeting our expectations completely.”

**Markus Hühn,
Escha**