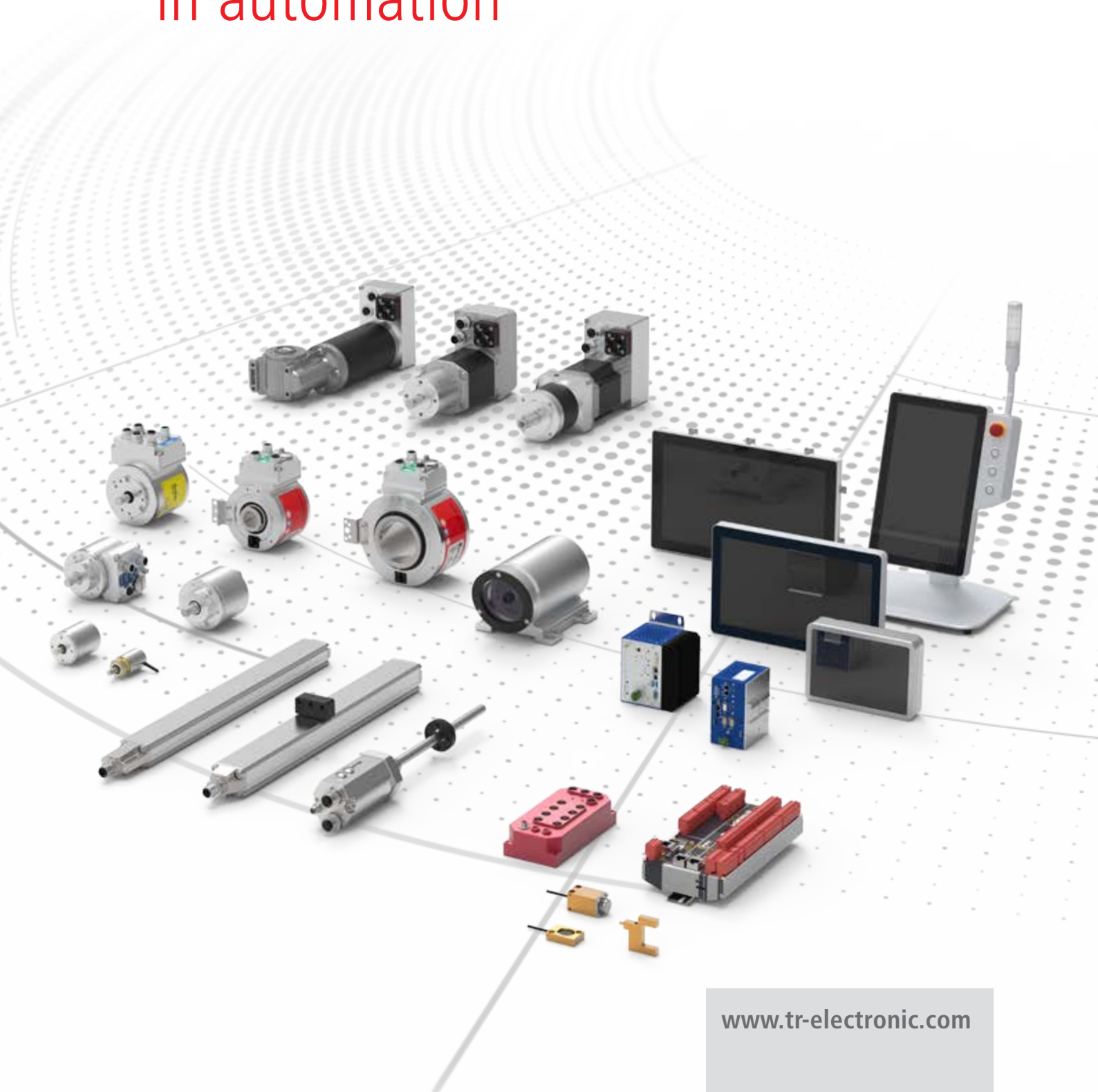


TR-Electronic – your partner in automation



Switch-on – absolute position – safety



Functional Safety

Many applications in automation technology demand the highest safety requirements.

Different Safety Integrity Levels (SIL) or Performance Levels (PL) are required, depending on the field of application. TR offers suitable sensor solutions for the common SIL3 / PL_e or SIL2 / PL_d. These devices are developed and produced in accordance with the valid regulations and standards. Development and production are certified by independent bodies.

Absolute rotary encoder with SIL3 / PL_e

By using SIL3/PL_e-certified products, you will achieve maximum safety in common workplaces or in environments shared by people and machines.

Since several years, TR-Electronic gained experience with the well established 75mm-Series. The new series CD_582+FS now take benefit from these experiences. The compact sized housing with diameter 58 mm, CD_582+FS holds a fully redundant double multiturn rotary absolute encoder with integrated safety check. Output information is transmitted via secured bus protocols.

Depending on the desired features, the encoder is equipped for highest safety level SIL3 / PL_e or optimized for SIL2 / PL_e applications. The modular mechanic concept fits into most constructions. Different flange and shaft geometries make integration quite simple. If changing climate could result in dewfall (e.g. wind turbines), a double magnetic detection can be used. More precision is provided by diverse optical/magnetic detection.

As the encoder system contains two fully independent multiturn detections, CD_582+FS may be used with all safety functions that require a real absolute multiturn position value without any referencing or homing. Suitable safety controls can use the secured position values to realize functions as

(e.g.) safety operation stop (SOS), safe limited position (SLP), safe position (SP), safe direction (SDI). The speed value is likely transmitted via secured protocol and can be used for all safety functions requiring secured speed values.

If the safety functions are fully integrated in the main central control, machine layout can take full benefit from the „integrated safety“ design provided by TR-Electronic: For a secured position information, there is no need for additional safety controllers. A safe and certified bus system transports all data, no configuration of a separate safety controller, The easiest and most cost effective way to safety position detection!

Incremental rotary encoder with SIL3 / PL_e

For simplified safety functions which only require the speed as a signal and in the case of lower safety requirements, certified incremental rotary encoders from TR-Electronic are an effective solution. The know-how and experience from our absolute rotary encoder development is also at your disposal for these simpler applications.

In combination with suitable safety modules, safety functions such as Safely Limited Speed (SLS), Safe Speed Monitor (SSM), Safe Speed Range (SSR) are available. TR-Electronic offers a suitable safety module, but safe incremental rotary encoders can also be combined with other, commercially available modules. Safe incremental rotary encoders are available with a sine/cosine output and with square-wave signals.

The transmission of incremental signals with a sine/cosine signal is particularly advantageous. Thanks to the mathematical relationship, according to which $\sin^2 + \cos^2$ must be = 1 at any given time, the safety module can easily determine the integrity of the signals.

The resolution of safe incremental rotary encoders is always reliably defined by the optical division of the disk.



Cascadable linear encoders up to 20 m

Wire-actuated encoders are subject to wear, while laser measuring systems cannot acquire several positions simultaneously in the same clear width. Magnetic tapes are susceptible to ferromagnetic chips, position marks read optically with readers can become soiled, and magnetostrictive measuring systems are limited in their measuring length glass scales are priceless from certain measurement lengths. With patented LMC 55 we close this gap: Up to 30 positions are acquired simultaneously. The moving part is a passive magnet, which does not require a power supply.



LMC55

Laser distance measurement up to 240 m

**Measurement over long distances without contact
and fast enough for closed-loop control**

Advantages of LE200

- _ Robust design
- _ Detection of linear movement patterns
- _ Contact-free and wear-free distance measurement
- _ Distance measurements up to 125 m, 170 m, 195 m, 240 m. Other distances on request
- _ Parameterizable
- _ Additional interfaces available
- _ Optionally with heating or cooling
- _ Customer-specific adjustments can be requested



LE200

Advantages of LLB65/LLB500

Analog and PROFIBUS-DP interface

- _ RS232, RS422 interface
- _ Detection of positions
- _ Contact-free distance measurement
- _ Distance measurements on natural surfaces:
0.05 to approx. 65 m, with reflector up to 500 m
- _ Programmable
- _ Optional heating

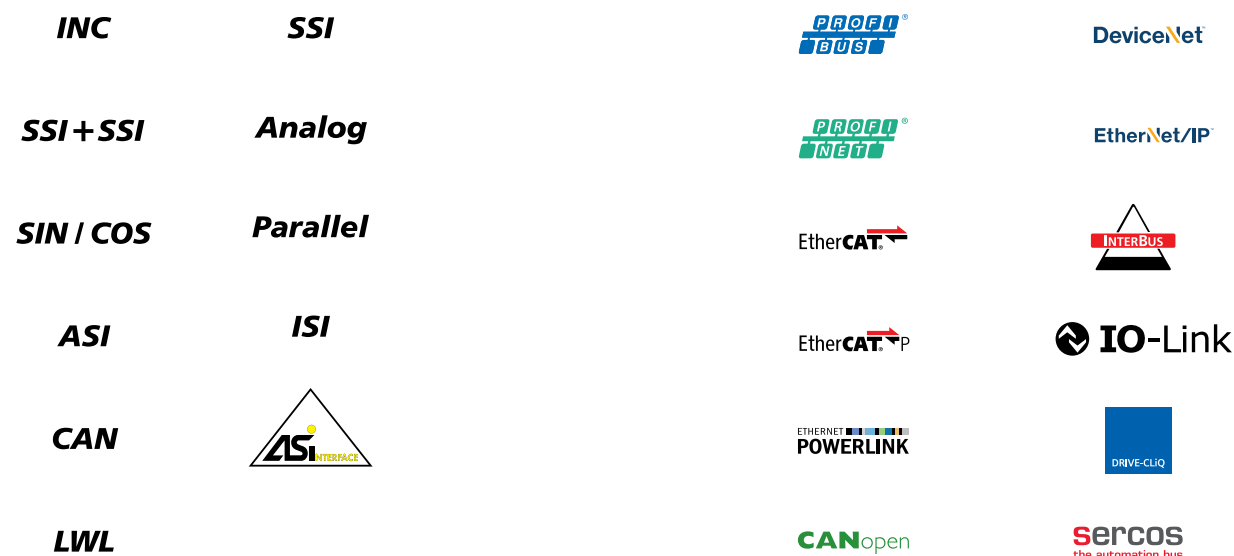


LLB65



LLB500

Interfaces



Interfaces

Since the very beginning TR-Electronic has developed industrial sensors to meet the needs of users. This also includes equipping our sensors with a wide variety of interfaces. TR can even be rightly regarded as one of the companies which (in relation to the entire product spectrum) offers the greatest diversity of industrial interfaces. TR is also right at the forefront when it comes to equipping position sensors with new interfaces, which enable integration into innovative control and system concepts.

Wide variety of interfaces

Starting from the simple analog output (which can also perform very specific tasks, thanks to a number of special options) to established fieldbuses and cutting-edge Industrial Ethernet, TR-Electronic offers a wide range of interfaces for rotary encoders, linear encoders, drives and control technology. TR cooperates with the relevant standardization organizations and thus ensures 100% compatibility and perfect integration into your application. Networked development means that all areas benefit from the integration of a new interface. This gives you considerably more freedom to combine mechanical design, sensor performance and the desired interface, even in the standard product range. And if you don't find what you're looking for right away – please ask us. We can provide far more in addition to what is printed here in the catalog.

Over the years we have developed a number of specializations, particularly for customized devices. New product generations naturally also benefit from this experience. We are confident that we can find (or invent) the right solution for your application too.

We present interfaces and possible extensions in the appendix "TR Information" at the end of this catalog.

Interface combinations

Machines developed in accordance with the latest state-of-the-art technology often work with highly integrated PC-based, programmable logic or special NC controls. All machine parts are linked via high-speed Industrial Ethernet. There are many applications in which a quick signal pick-up directly at the site of the rotary encoder makes an automation task much easier.

Incremental signals, which are acquired directly from the rotary encoder, are used for commutation and provide the necessary signals for secondary speed control loops without any time lag - entirely without an additional measuring system. A decentralized control loop can directly receive SSI signals and consequently move to or maintain a position in the secondary position control loop, even in the event of failure of the communication network.

TR-Electronic – your partner in automation

Rotary encoders

Absolute encoder, incremental rotary encoder, wire-actuated encoder

Rotary encoders with optical and magnetic scanning function register the precise position in a wide variety of applications and industries. In medical engineering, miniature versions ensure correct positioning while SIL3-approved absolute rotary encoders provide the necessary safety. We offer not only high-quality rotary encoders (from Ø 22 to 160 mm) for almost any application but also comprehensive accessories.

Linear encoders

Linear absolute measuring systems, laser displacement measurement

Linear encoders register linear motions in machines, tools and systems according to specific requirements using different technologies. Linear encoders allow measuring distances of max. 20 m almost without any wear. This value is max. 240 m for laser measuring systems. Machines and systems can be precisely controlled to reach their desired positions.

Motion

Compact actuating and positioning drives

Intelligent encoTRive drives are available with the current field bus systems, such as PROFIBUS, PROFINET and CANopen, within a power range of up to 300 watts. The drives are configured to meet customer requirements and can be freely combined with precision gear, holding brake and I/O. Values of up to 4,350 rpm and powerful 200 Nm are available to cope with demanding applications.



Components

**Industrial PC, field bus I/O,
PLC, HMI controller**

Industrial PCs are available in numerous variants and offer customized calculation power for PC-assisted automation. Programmable logic controllers (PLC) are the traditional means for automation. HMI controllers establish the interface to the user. Field bus nodes, I/O modules and cam controllers complete the range of automation components.

Automation

**Consulting and implementation
for new machines and retrofit**

You want to set up a largely automated new machine or retrofit and modernize your existing machine with automation systems? Then you just need our extensive expert knowledge and the more than 20 years of our experience.

Unidor

**Blanking and forming,
systems, controls and sensors**

Trendsetting blanking and forming technology for more than 30 years. We are your reliable partner in the world of blanking and pressing and can prove this with thousands of machines which we have successfully installed all over the world. Sensors, controls and systems ensure optimal results in machines, tools and retrofit projects.

