

# The Catalog







## Editorial

### Our innovations for you!

For 35 years, you, our customers, are the focus of all our efforts. We use all our innovative capabilities to constantly develop new products that will provide you with the best solution to meet the challenges of the marketplace. To help you find the right sensor quickly and easily, we have provided an overview of the extensive range of TR sensors. From absolute or incremental rotary encoders, linear encoders, programmable or non-programmable, draw-wire encoders, laser-based sensors, to different fields of application such as safety-oriented applications, heavy duty and much more, to motion control and individual sensors designed to customer requirements, you can find the right sensor using the tables provided. You will also find sensors specially tailored to your individual requirements in this catalog. Once again we are forging new paths, as is the tradition at TR. If you require detailed data you can conveniently download data sheets, CAD drawings and much more from your desk using the Internet link provided. Or you can simply capture the QR code with your smartphone to receive all detailed data directly on your cell – wherever you are and without an app.

If you have any other detailed requests please don't hesitate to contact us!

We look forward to hearing from you.



left to right:

<b>Holger Schilling:</b>	<b>Head of R&amp;D Encoder</b>
<b>Christoph Kuner:</b>	<b>Head of R&amp;D functional safety</b>
<b>Dr. Markus Ron Dietrich:</b>	<b>CTO</b>
<b>Claudia Tessari:</b>	<b>Managing Board</b>
<b>Klaus Tessari:</b>	<b>CEO</b>
<b>Burkhard Düllo:</b>	<b>VP Sales</b>
<b>Hartmut Becker:</b>	<b>CFO</b>













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# Three Steps Towards Your Specific TR-Sensor

## 1st step

You know which sensor type you need:  
Open to the relevant sensor chapter (from page 36).

### OR

You have a technical problem and are looking for a sensor solution: Open to the "Application" chapter (from page 218) and look for the most appropriate solution in the listed examples. You can choose the relevant sensor chapter from the listed sensors.

### OR

You have specific tasks which are not covered by standard sensors: Then we will work with you to develop solutions individually tailored to your task and show you what TR's innovative sensor technology can do (see page 208). Simply contact us and put us to the test. TR is near you, wherever you are in the world (see page 532).

## 2nd step

Then select the appropriate series and the right product from the extensive portfolio.

### Optional – detailed selection in the TR selector

Have you found the right series, but need further technical data for the product selection?

Enter the web link from the table into your web browser.

### OR

Simply scan the QR code with your smartphone (requires suitable app). This will take you directly to the "Selector" on the TR website. Here you can find your TR sensor by individually selecting the technical data.

### Selection in TR product selector

1. Directly in the TR product selector via web link or QR code



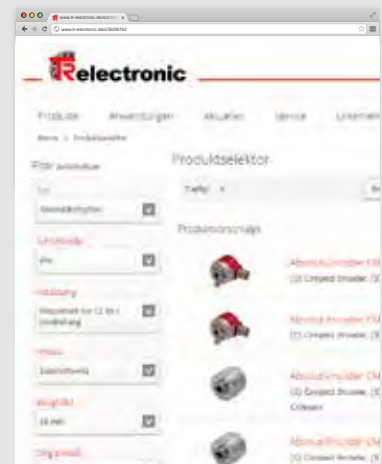
2.a) Scan QR code



2.b) Web link from table into input field in browser (top left)



3. Detailed selection in TR product selector



## 3rd step

Select your preferred type from the "Suggested products" table.

### Optional – further product information

For further product information simply enter the order number in the search field at [www.tr-electronic.com](http://www.tr-electronic.com).

### Here you will find data sheets

- CAD drawings
- Interface descriptions
- Operating instructions
- Brochures and much more.

### Further product information

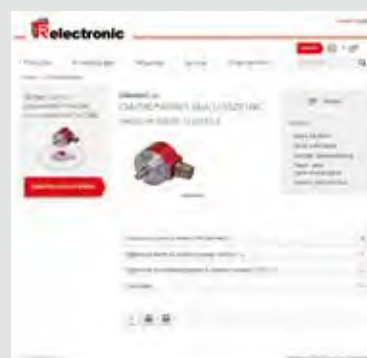
1. Enter order code into ...



2. Searchfield (top right) on [www.tr-electronic.com](http://www.tr-electronic.com)



3. Choose desired information



## Note

This catalog provides an overview of the TR product portfolio. The combination of interfaces, housing options and flanges, for example, results in an enormous number of products, which are available in our standard product range. If you do not see a suitable type in this catalog, we will gladly advise you on making a selection from TR's complete product range. Please contact us ([info@tr-electronic.de](mailto:info@tr-electronic.de)).

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## TR-Electronic – Innovative and Successful



### We provide: Measurement and control systems for automation technology

When industrial processes need to run smoothly and reliably, measurement and control solutions from TR-Electronic play their part. When a theater curtain goes up, for example, systems made by TR monitor the complex stage technology. People and machines work safely together and the audience enjoys a perfect production. Wind energy plants generate electricity with maximum efficiency thanks to optimally aligned rotor blades - controlled by TR solutions.

In press lines for the automotive industry TR sensors guarantee safe forming of the body components. In logistics TR measuring systems enable smooth transport of goods, e.g. in conveying systems and high racks. TR control and measuring modules control and monitor pumps for the drinking water supply, regulate correct feeding of pellets in woodfueled installations or help to detect faults in a punching machine at an early stage.



*Our team spirit helps us leave our competitors behind.*

For all of these and other applications TR-Electronic supplies the right rotary encoders, linear encoders and drives – as high-quality standard products or customized solutions.





## Technology leader and quality from the very start

TR-Electronic develops, manufactures and sells sensors and actuators for industrial applications in automation technology. In order to better integrate the individual areas of expertise and make them more transparent for our customers, we have organized the company into business units: Products in the Rotary Encoders Business Unit with optical or magnetic scanning are required to detect the angular movement of a rotating shaft.

Magnetostrictive linear encoders measure the position of a linear movement without contact, for example in a hydraulic cylinder. Intelligent compact drives from the Drives Business Unit are used as actuators or, in the high-end version, as process drives.

Customized control and measuring modules in combination with special know-how in pressing and punching processes complete the extensive product portfolio. Automation com-



*Modern production technology in the SMD department*

ponents from the Components Business Unit round out the product range.

The development services provided by the Automation Business Unit bring press lines to new levels of performance, provide smart metering solutions for efficient energy utilization and fair billing, enable remote monitoring of water supply networks or ensure a cosy environment through intelligent heating automation.



## Based in the region, present throughout the world

Characterized by the typical Swabian inclination to hard work, TR-Electronic has strong regional roots while at the same time being active throughout the world. Its most important customer is the mechanical and plant engineering industry, which has a strong tradition in Germany. In addition to the primary location of Trossingen, our subsidiaries and technical sales partners in Europe, the USA, Canada, Brazil and Asia offer professional advice and project planning and ensure worldwide access to the TR product range. TR's sales subsidiary established in China in 2010, with head office in Beijing, is now the direct contact for production locations in Asia for many European companies and supports ambitious industrial projects in the Far East.

The basis of our innovative products and growing global success are the experts, their ideas and development expertise in Trossingen. The optimal combination of longstanding



experience and the fresh inspiration provided by qualified new employees ensures a competitive advantage in terms of the functionality, quality and cost efficiency of our product range, both today and in the future.

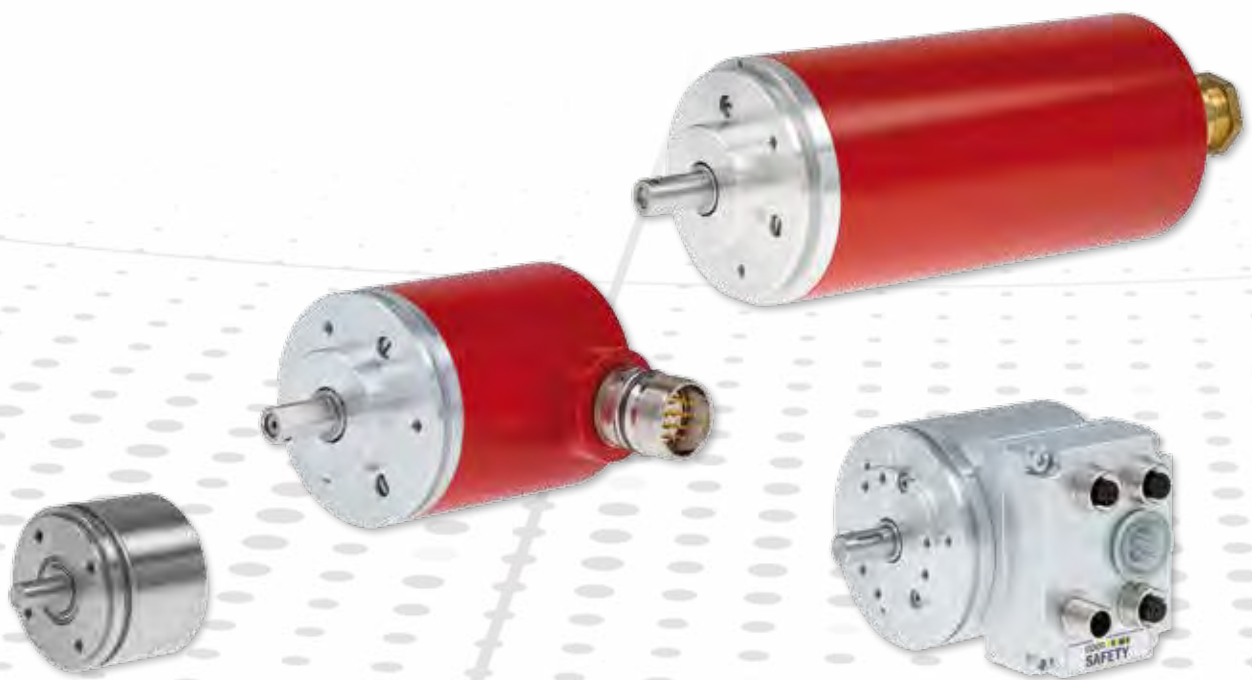
**This is what we stand for. This is what we work for.  
And this is what we want to be measured by!**





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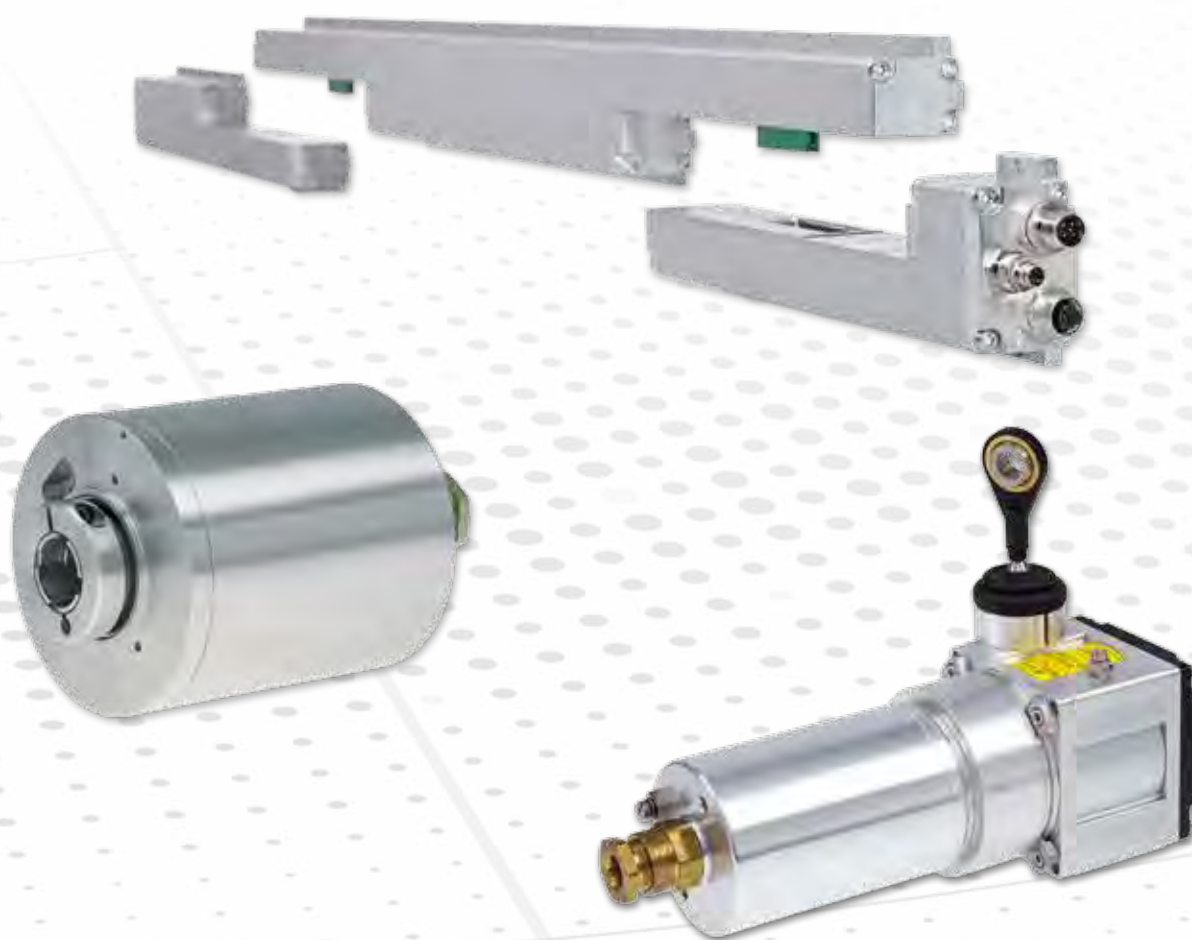
## TR expertise



### 30 years of experience

TR-Electronic has been developing and producing angular and position measuring technology for over three decades. Its experience and expertise goes far beyond the pure conversion of mechanical positions into electronic signals. On the following pages we have set out some of our technologies and specialties.

We use these to produce your rotary encoder, linear encoder, positioning drive or automation solution to optimally measure, control and regulate your processes – with the experience of more than 30 years as a pioneer in industrial position measuring technology.



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# TR expertise

## 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<sub>e</sub> or SIL2 / PL<sub>d</sub>. 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<sub>e</sub>

By using SIL3/PL<sub>e</sub>-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<sub>e</sub> or optimized for SIL2 / PL<sub>e</sub> 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<sub>e</sub>

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. The measuring system is only assembled to the full measuring length in the machine, and the individual parts are convenient (2 m long) to transport and store. The final measuring length is defined in situ by connecting the intermediate elements together to the desired overall length. Up to 20 m absolute position detection is supplied as standard (special lengths on request).

### Advantages

- \_ Wear-free measurement up to 20 m
- \_ Compact pieces of strand-cast aluminium
- \_ Closed housing, flat surface
- \_ Flush (no beads and edges)
- \_ Easy installation possible without special tool
- \_ Magnets do not require any supply leads

The flat housing of the actual measuring system can be installed flush with the floor, and as it has no beads, product residues cannot stick to it. The actual positions are output to the control via EtherCAT or CANopen. Quick activation is ensured with a little technical skill and standard tools. Other interfaces are possible on request.

## Laser distance measurement up to 240 m

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

Laser distance measuring systems from TR-Electronic are powerful optical sensors, which enable measurement of long distances without contact and fast enough for closed-loop control. The measuring system comprises a laser light source, light collector, electronic evaluation and data interface as well as a reflector.

Our laser distance measuring systems enable absolute and wear-free measurement of long distances up to 240 m, which can then be output via SSI, field bus interface or Industrial Ethernet. Our barcode positioning system even enables an absolute measuring distance of 10,000 meters.

In addition: On our in-house laser reference measuring section we can compare our laser measuring systems with a reference system and also linearize them accordingly. We can thus achieve an absolute repeatability of +/- 1 mm at speeds which are commonplace in high-rack warehouses.

### 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

### 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

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## Heavy duty – rotary encoder in gas-tight, welded stainless steel housing up to IP69K

The 36 series - developed for growing requirements. The new, compact single-turn rotary encoder CMV 36 S has a completely encapsulated electronics unit. There is no rotating feedthrough. The position information is transferred contactlessly through a fixed housing wall. The rotary encoder is protected from dust and water, and is also used in applications with changing temperatures (risk of condensation) or for speed monitoring. The maximum achievable tightness corresponds to a rating of IP69K. This rotary encoder can therefore be used without problem in vehicle manufacture, for mobile machines and other outdoor applications.

## Seal Pack – salt water-resistant housing

This optional package has an additionally sealed housing cover. It combines coordinated measures for absolute rotary encoders in order to guarantee the following characteristics: An upgraded rating of IP67, hermetically sealed against the ingress of moisture and special imperviousness to the ingress of penetrating oils such as honing oil. It also passes the salt spray test, which lasts 672 h (EN-DIN 60068-2-52 (severity 1), without any problem.

## Further options

With us you are safely equipped for all eventualities. TR measuring systems can be adapted to a wide range of ambient conditions with special housings. A stainless steel housing can be used for aggressive environments or food applications, for example. The extruded aluminium housing (size 115 mm) offers exceptional protection against vibrations and high temperature fluctuations.

Appropriately equipped rotary encoders can also operate safely in explosive atmospheres up to Zone 1/21 or 2/22, guaranteeing maximum safety. Another special feature consists in equipping the encoders with bearing modules. These serve as collar bearings for our 58, 65 and 100 mm encoders, to absorb increased bearing load. A typical application is the mounting of a chain disk or belt pulley.

## Intelligent compact drive technology

Different batch sizes, huge product diversity, the individualization of production and maximum cost efficiency are central requirements of modern production processes. In order to cope with these requirements, secondary functions are increasingly being electromechanically automated in machines and systems, in addition to primary processes.

TR-Electronic's fieldbus-capable encoTRive compact drives make this possible – in machine construction and machine tools as well as in the packaging, press, woodworking, glass, printing, plastic and textile industries. These compact drives have no external electronics. They integrate actuator, sensor and control technology in one housing: control logic, position, speed and torque controller, power electronics and absolute rotary encoder. These compact drives can communicate with the PLC via fieldbus. Further components such as transmission, holding brakes or I/Os are added, depending on the application. On the basis of the encoTRive communication and controller platform both simple control applications and complex machine processes can be automated efficiently and consistently with different drive types - simply, flexibly and cost-effectively.



## 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.

### 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

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.

the communication network. For operator information in situ a simple value display which is connected via SSI is sometimes sufficient - a laboriously parameterized control panel with a network connection is not always necessary. In many applications the combination of complex interfaces (such as SSI, field bus or Industrial Ethernet) with a simple output signal solves the problem of integrating existing system parts with analog control technology into larger systems with modern interfaces.

TR's digital angle and position measuring systems are available with such interface combinations.

The rotary encoder series with 65 mm outer diameter traditionally offers sufficient space for such combinations and the necessary connections. Fieldbuses or Industrial Ethernet with SSI or incremental signals are already available. Combinations such as SSI, analog and limit switches are naturally also feasible. And last but not least, a rotary encoder with a combination interface also helps to avoid long machine downtime during generation changes in control technology.

As long as the old control still works, the direct interface (SSI) is addressed, and as soon as the new control is operational the system is switched to the fieldbus or Industrial Ethernet - all without having to replace the encoder. And only one type, which can be used in both configurations, needs to be stocked as a spare part.

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## Press retrofit / hydraulic controls

A retrofit serves as a replacement for components that are no longer available. A process optimization can also be carried out, i.e. productivity is increased. In comparison to purchasing a new system, costs are minimized, as the existing system is only upgraded and retrofitted. In many cases the machine can be used more flexibly after a retrofit. Retrofitting a machine has a higher level of internal acceptance, as the machines and systems are for the most part already familiar.

## Customized controls

Our HMI controllers are perhaps the most compact route into the world of precise, reliable and cost-effective control technology. With compact HMI controllers from TRsystems, you have the choice between controllers with a display or without a display.

The compact controller comes with Ethernet, USB and an onboard CAN fieldbus interface. If you need more, additional fieldbus interfaces (CAN or PROFIBUS) can be optionally added. For ease of operation all HMI controllers can be extended with a touch screen and/or a keyboard front panel.

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## Individual visualization systems

We also provide visualization to go with new hardware.

**ProVi** enables both data display and data input.

It visualizes the operating system. It is based on Microsoft Net Framework and is integrated into a client/server architecture. The visualization is clearly structured and easy to operate. It has an implemented language changeover and user administration. The user interface varies depending on the preselected functions.

It has system-specific input masks. In addition to the convenient dynamic signal display, extensive diagnostics functions in relation to messages, PLC processes, static process signals and much more are available. All Windows-based programs can be integrated into the visualization, e.g. Media Player, Adobe Reader etc.



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## Monitoring of presses and punches

Deformations and material damage can mean the end for the system. It must therefore operate safely within defined load limiting ranges.

All recorded values are monitored and logged. SmartControl, with its specially developed piezo sensors, is used for this purpose. The system visualizes, measures and checks all sensor signals and combines them.

Any violation of preset target or limit values is indicated and recorded. It is quick to install and ready for operation in a few easy steps.

Convenient data output/evaluation is enabled by special software on the powerful industrial PC.

SmartControl protects the system safely and reliably.



# Industries and Applications



## At home in every industry – draw on years of experience!

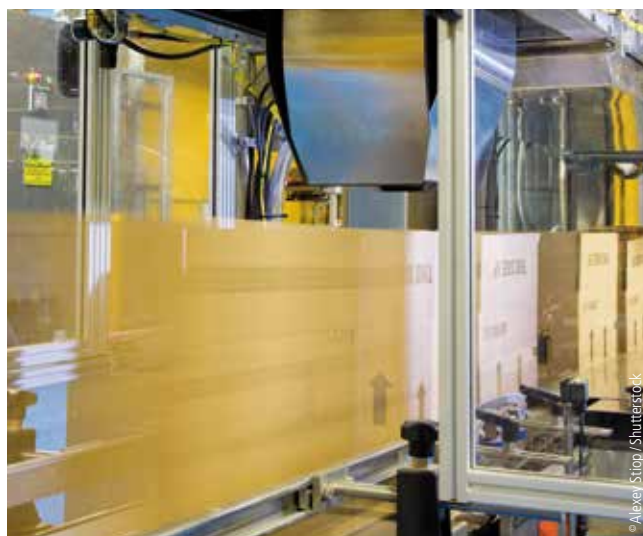
Goods find their way to the right place in deserted high-rack warehouses as if by magic. Fully automated processes ensure that sheets are bent, rolled or welded. Hoists, curtains and scenery move across the stages of the world's most famous theaters and festival halls, invisibly controlled. Wind power plants and solar reflectors invariably rotate into the optimal position.

The list of examples in which absolute rotary encoders and incremental rotary encoders, linear encoders, intelligent compact drives and components from TR-Electronic are used could be continued ad infinitum.

Our measurement and control systems offer the right solution for your individual application: From laser distance measuring sensors in mechanized container picking systems in logistics to sensors in punching and forming processes to SIL3-/PLC-certified safety rotary encoders in event technology to high-performance cam groups and compact drives in sheet offset machines in the printing industry.

But however different the sensors may be from one another, they have one thing in common: their reliability. TR attaches the greatest importance to this during the product development stage.





## Sensors for everyday use

TR sensors do their jobs effectively for renowned companies in countless industries around the world. TR can offer the right sensor for almost any process task from its extensive standard portfolio. If you can't find "your" sensor in the portfolio, please contact us; we will find the right solution for your requirements.

### That's where we are your specialists

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## Storage and logistics

Particularly in the area of modern warehouse setups, such as shelf-stacking devices, transfer belts and crane systems, a powerful, decentralized measuring and control system for simple project processing and quick configuration makes all the difference.

## Successful products in the field of storage and logistics

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All information and data can be found at:  
[www.tr-electronic.com/applications/storage-and-logistics](http://www.tr-electronic.com/applications/storage-and-logistics)

Access information even faster:  
 by scanning the QR code.







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## Printing technology and paper processing

Fast signal processing for printing machines enables high register accuracy and decentralized compact drives automate setting processes. Rotary encoders with stainless steel housings can resist even aggressive media such as groundwood pulp in paper machines. Small absolute encoders measure movements in restricted installation spaces.

## Successful products in the field of printing technology and paper processing

_ Absolute rotary encoders .....	Page 36
_ Incremental rotary encoders .....	Page 212
_ encoTRive compact drive .....	Page 382
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All information and data can be found at:  
[www.tr-electronic.com/applications/printing-and-paper](http://www.tr-electronic.com/applications/printing-and-paper)

Access information even faster:  
 by scanning the QR code.





## Metal processing

The world of presses and punches has long been TR-Electronic's special field. We develop the products from the outset so that they can withstand the high stresses of shocks and vibrations.

## Successful products in the field of metal processing

_ Absolute rotary encoders .....	Page 36
_ Heavy-duty absolute rotary encoders .....	Page 196
_ High-resolution linear measuring systems .....	Page 354
_ Sensors for punching and forming processes .....	Page 510

All information and data can be found at:  
[www.tr-electronic.com/applications/metal-processing](http://www.tr-electronic.com/applications/metal-processing)

Access information even faster:  
 by scanning the QR code.







## Event technology

TR-Electronic absolute encoders offer safety for all requirement classes in event technology. From rotary encoders with an additional incremental track through to SIL3-/PLe-certified safety rotary encoders, we offer the right solution for your customized safety concept.

## Successful products in the field of event technology

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All information and data can be found at:  
[www.tr-electronic.com/applications/  
event-technology](http://www.tr-electronic.com/applications/event-technology)

Access information even faster:  
by scanning the QR code.





## Woodworking

Intelligent, decentralized control concepts, efficient sensors with local signal processing and components which operate reliably despite strong temperature fluctuations are the basis for automation solutions in the woodworking industry. The intelligent equipping and networking of transfer machines, machining centers and assembly cells is our speciality, especially when you require a platform for your own special machine philosophy or special function!

### Successful products in the field of woodworking

- \_ Linear position sensors ..... Page 316
- \_ Decentralized positioning drives ..... Page 382

All information and data can be found at:  
[www.tr-electronic.com/applications/woodworking](http://www.tr-electronic.com/applications/woodworking)

Access information even faster:  
by scanning the QR code.





## Renewable energies

Intelligent tracking of photovoltaic systems increases efficiency and accelerates automation. High-resolution rotary encoders enable exact positioning. Compact drives reduce the number of components to be networked and align your system with the sun, even after a number of years.

Safe rotary encoders in pitch and azimuth drives in wind power plants assist optimal alignment for the most efficient energy conversion, whilst at the same time offering sufficient reliability to put the system into a safe condition in the event of a malfunction.

## Successful products in the field of photovoltaic systems

_ High-resolution rotary encoders.....	Page 36
_ Safety rotary encoders.....	Page 160
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All information and data can be found at:  
[www.tr-electronic.com/applications/renewable-energies](http://www.tr-electronic.com/applications/renewable-energies)

Access information even faster:  
 by scanning the QR code.







## Packaging industry

Flexible automation solutions according to our customers' wishes are the intelligent basis for successful machine concepts within the packaging industry. High processing speeds enable fast turnaround times and large quantities. Absolute measuring systems save time-consuming reference travel, while highly integrated, intelligent sensor technology reduces space requirements and relieves higher-level controls. We can provide solutions which were previously not possible, particularly for high-precision applications.

## Successful products in the field of the packaging industry

- \_ Absolute rotary encoders ..... Page 36
- \_ Programmable incremental rotary encoders ..... Page 218
- \_ Decentralized positioning drives ..... Page 382

All information and data can be found at:  
[www.tr-electronic.com/applications/packaging-industry](http://www.tr-electronic.com/applications/packaging-industry)

Access information even faster:  
 by scanning the QR code.





## Plastics processing

Diverse measurement tasks in plastics processing machinery and systems require fast signal processing and high precision. Linear measuring systems for installation in hydraulic cylinders can be integrated seamlessly into injection molding machines, while industrial PCs are a universal platform for user-specific control systems in both series machines and special systems.

## Successful products in the field of plastics processing

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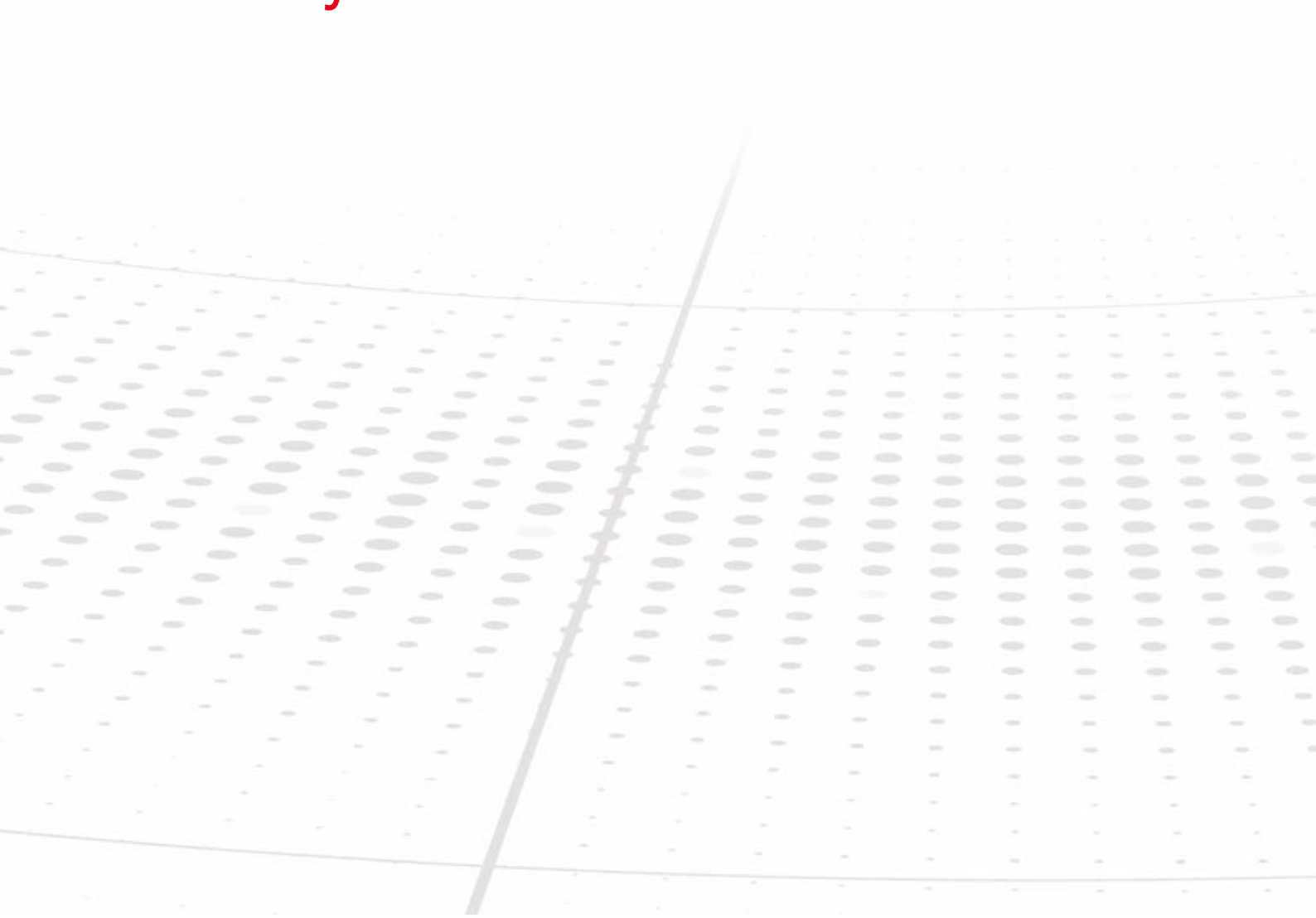
All information and data can be found at:  
[www.tr-electronic.com/applications/plastics-processing](http://www.tr-electronic.com/applications/plastics-processing)

Access information even faster:  
 by scanning the QR code.



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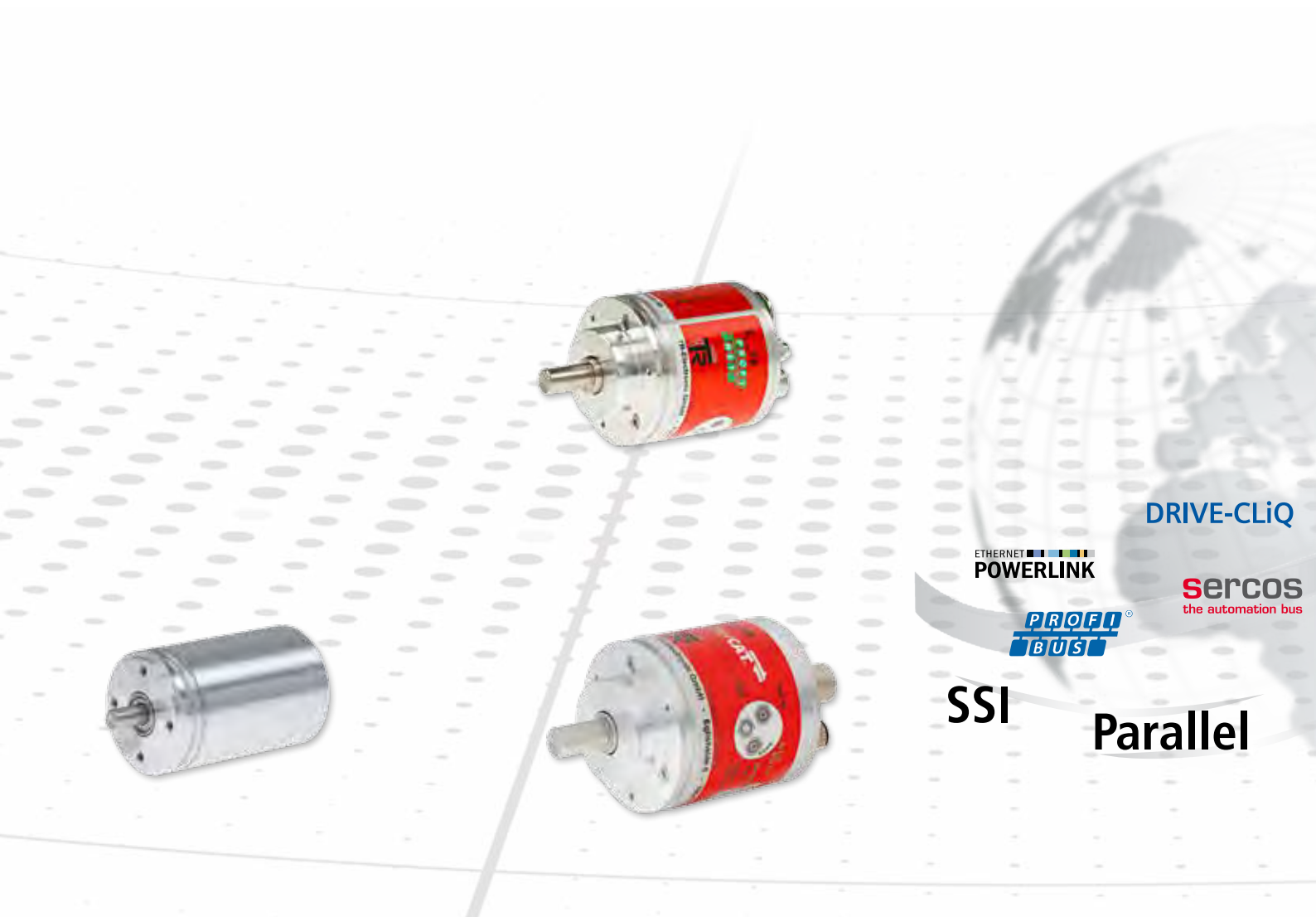
# Rotary Encoders



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# Absolute Rotary Encoders

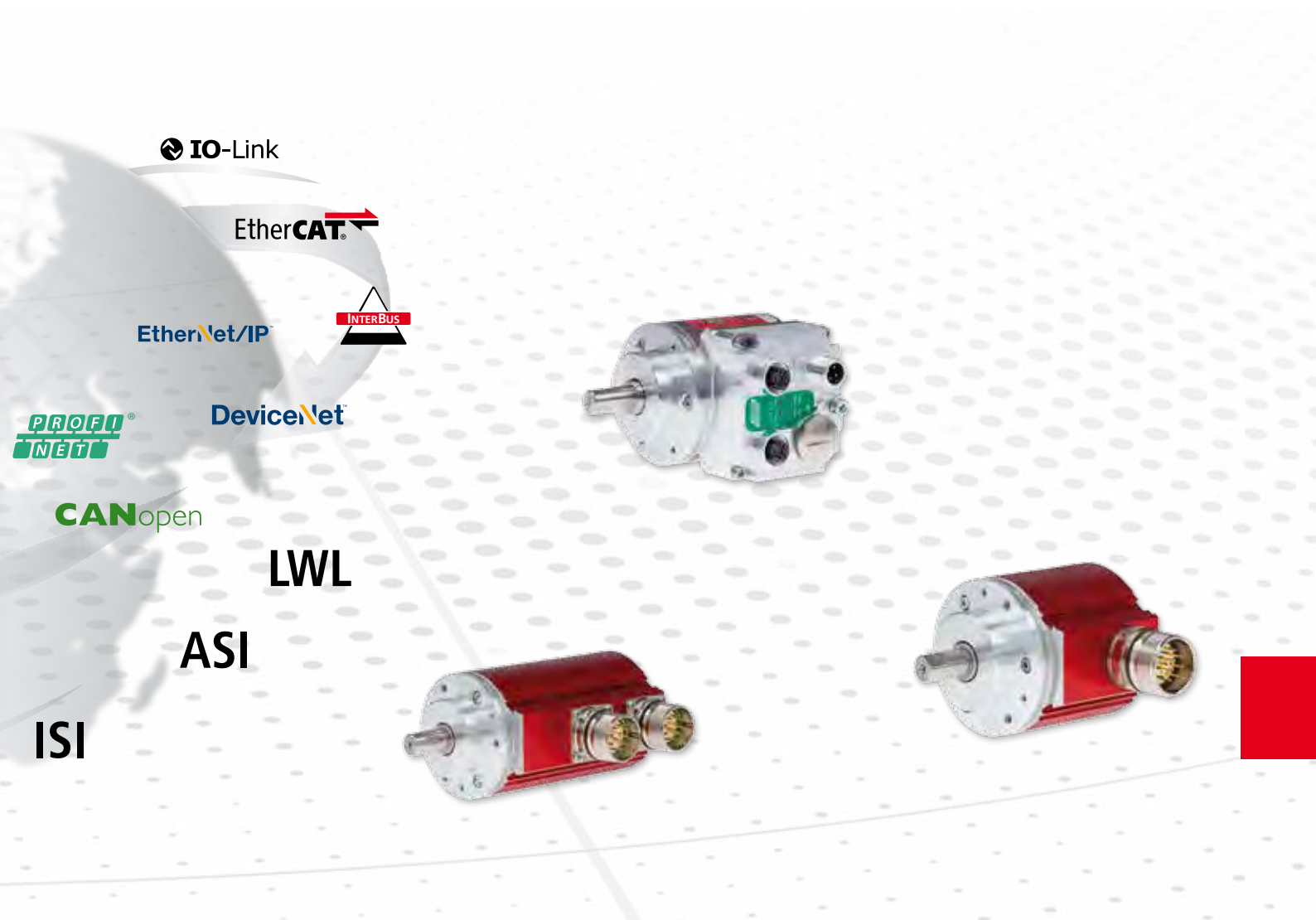


## Rotary encoders for industrial applications

TR-Electronic rotary encoders with optical or magnetic scanning precisely acquire position in steel production, wind power plants, cranes and ships as well as in explosion-proof versions in painting lines. Miniature versions ensure the correct position in medical technology and SIL-approved absolute rotary encoders ensure the necessary safety.

In addition to high-quality rotary encoders for almost every application, we also offer extensive accessories such as programming tools, displays and assembly components for quick and simple implementation and seamless integration into your processes.

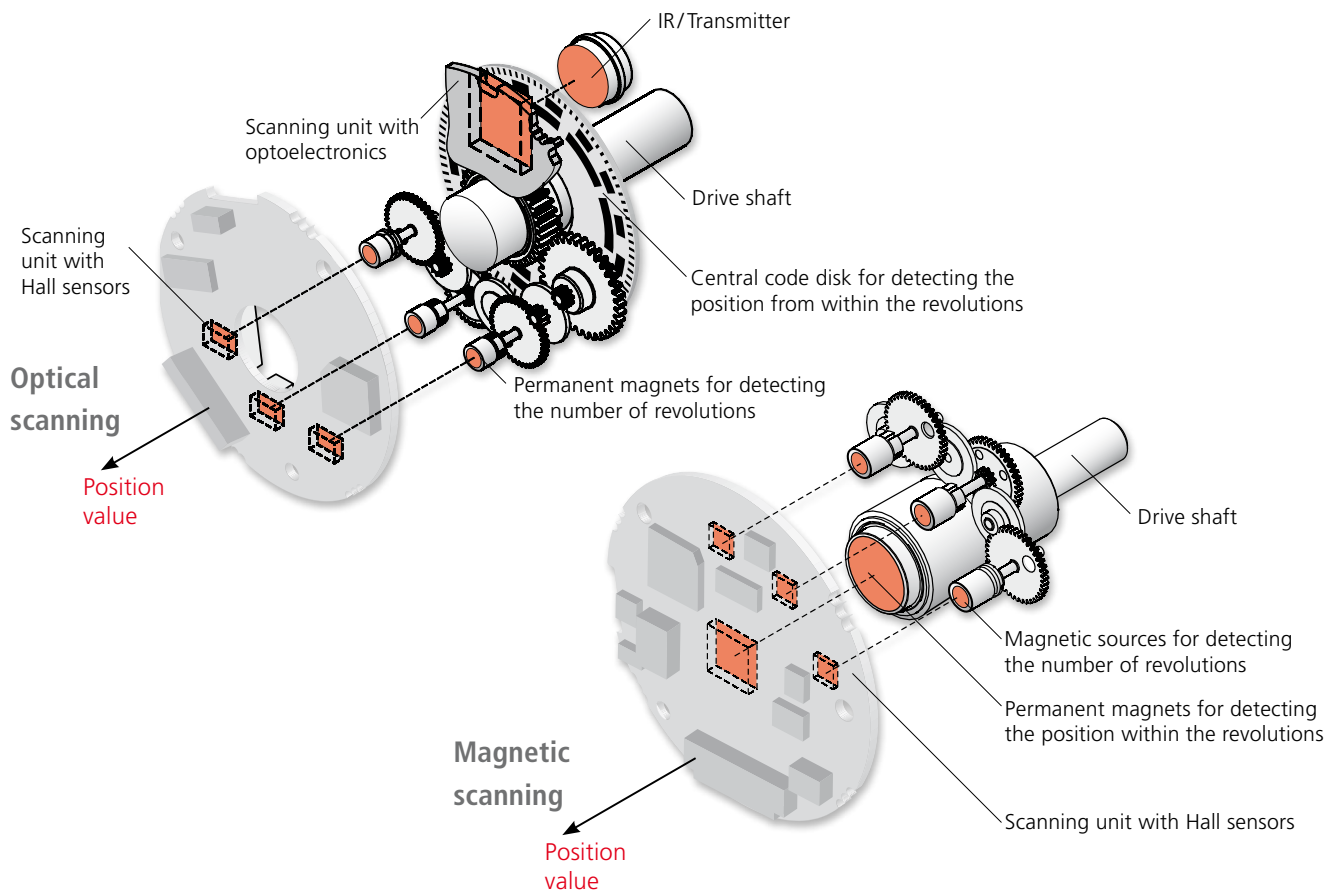




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## Scanning – Optical and magnetic



### Three detections for perfect cost-benefit ratio

#### **O** High-resolution optical scanning

Thanks to modern Opto-Asic technology, up to 18 bits (262,144 steps) can be generated within a single revolution. This is supplemented with up to 4,096 absolute scanned revolutions. Signal processing occurs at FPGA speed. This type of scanning is always used whenever position values need to be captured very quickly and with high resolution. This type of scanning is denoted by the letter "O" in the type designation.

#### **E** Optical scanning for standard applications

The majority of industrial applications use rotary encoders with a resolution of up to 15 bits per revolution and up to 4,096/256,000 scanned revolutions. Signal processing within the processor enables multiple evaluation functions and

optimal adjustment to new requirements. Signals such as limit switches and speed monitoring can also be generated. This type of scanning is denoted by the letter "E" in the type designation.

#### **M** Magnetic scanning for price-sensitive applications

Price-conscious, magnetic rotary encoders are the first choice for applications with lesser requirements in terms of accuracy, resolution and timing. The resolution of a revolution is 11 bits and this is supplemented with 4,096 absolute scanned revolutions. There is no extended signal processing, though the resolution of this device is programmable. This type of scanning is denoted by the letter "M" in the type designation.

## Shaft types

Solid shaft



Blind shaft



Hollow shaft



## Persistent machine concept

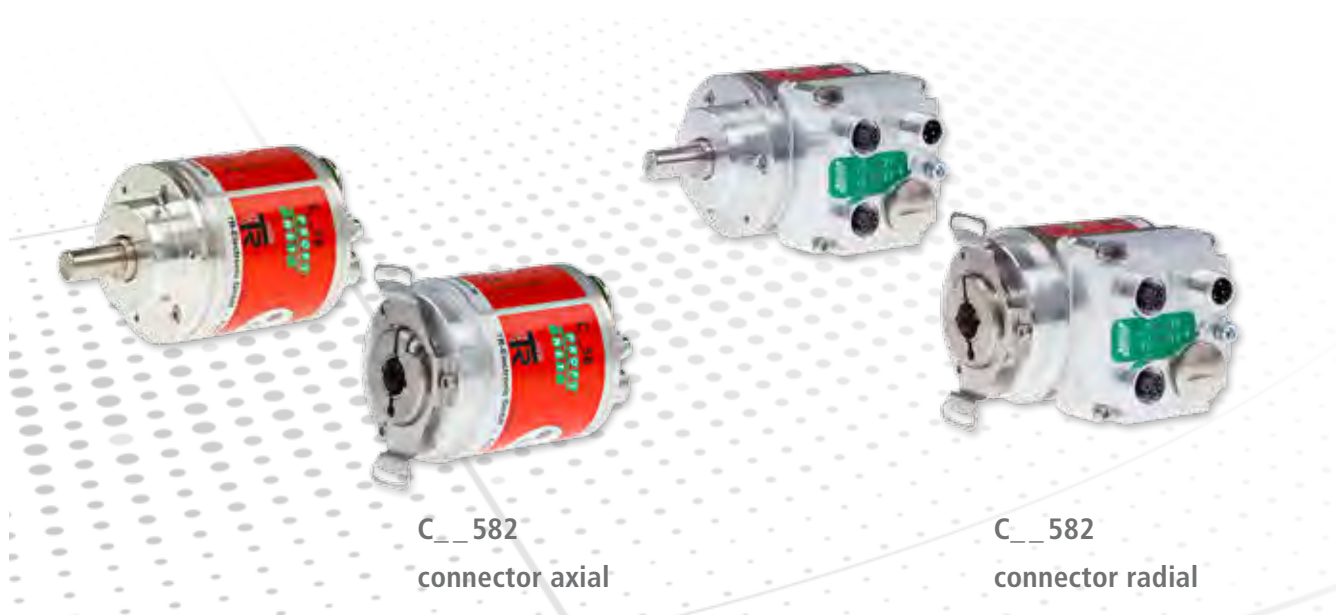
The 58 mm series of the compact rotary encoder was developed for diverse mounting variations. Therefore, there will always be a fitting device for any installation situation that should arise. Functions that you need with a solid shaft, are also available with a hollow shaft. Our rotary encoders with solid shaft are available with many coupling options for easy integration.

The variety of mechanical solutions enhances your room for innovative constructions. You will find a sample of the numerous mounting possibilities in the following overview.

Important: not all possible combinations will be shown.



## C\_\_582 – the next generation: Standard size with outstanding features



### **\_ Efficient design**

Everything the application needs – reduce to the max.

### **\_ Robust magnetic multiturn rotary encoder CM\_582**

13 bit resolution within one revolution (singleturn)  
12 bit revolutions (multiturn), optionally 16 bit.  
Output up to 256,000 revolutions.

### **\_ Servo flange, clamping flange Slip-on hollow shaft up to 15 mm**

Plenty of shaft diameters, flanges and torque supports  
make the magnetic encoders CM\_582 fit into the mechanic  
surroundings of many applications.

### **\_ Precise optical multiturn encoder CE\_582, CO\_582**

15 or 18 bit resolution in one revolution (singleturn)  
12 bit revolutions (multiturn), optionally 16 bit.  
Output of up to 256,000 revolutions."

### **\_ Servo flange, clamping flange Slip-on hollow shaft up to 15 mm Hollow-through-shaft up to 15 mm**

CE\_582 and CO\_582 add hollow-through shafts with  
diameters up to 15 mm to the standard range of solid  
and slip-on blind shafts and flanges.

### **\_ Connectors axial or radial**

Mounting space is valuable. Do not let cabling interfere with  
other parts and components.  
For solid and slip-on shafts (blind shaft), you can choose  
between connectors axial (at the side opposite to the shaft)  
or radial (at the side of the encoder housing).



#### **\_ Parameterizable gearbox**

Fractional gearbox parameters (numerator/denominator) for almost any reproduction of gearbox factors.  
Also for exact detection of closed rotary axes.

#### **\_ Latest communication standards for Industry 4.0**

The new C\_\_582 generation of industrial standard rotary encoders is rigorously equipped with state-of-the-art chip families.

#### **\_ Easy installation with open configuration options**

TR absolute rotary encoders fulfill the standards of the respective user organizations for parameterization. Users can thus navigate the standard parameters without difficulty. The free configuration also offers easy access to all functions which are available in addition to the standard functions.

#### **\_ Alarms and diagnostics**

How's about my machine? To know that at any time is one of the core aspects of industry 4.0.  
Be it capacity utilisation or upcoming services: C\_\_582 provides all necessary alarms and diagnostic messages for long term machine and plant surveillance.

#### **\_ "On the fly" preset for adjustment during the process**

Preset values are transmitted via the real-time capable process image area. This means that absolute adjustments (also called "preset" or "offset adjustment") can be performed synchronously with the control cycle even while the system is in operation. No more axis stops necessary.

#### **\_ Update time <1 ms**

Suitable for quick position control with less than 1 ms encoder actual value updating for the bus output.

#### **\_ Speed output with adjustable averaging**

The time base for the speed evaluation can be freely set within a range of one millisecond to one second and can also be scaled in any units.



### **\_ Free mapping of process data in Ethernet Telegram**

For EtherCAT, the transmitted telegram can be freely designed to meet the programmers needs. Choose free from current reading position, speed, warnings, alarms, software-cams ... what is needed for your process / your control architecture.

### **\_ Software-Cams**

Since industrial revolution, cams were a propriate way to control automated processes. At first with mechanical camshafts and then with electromechanic cam switches. Now, cam signals are calculated in the central control - or, even more comfortable – directly in C\_\_582 ETC. Cam signals are mapped arbitrarily into the process data channel and are available to other bus nodes.

### **\_ Distributed Clocks down to 100 µs cycle time**

For precise position and path control of moving axes, all sensors and actors involved must be synchronized. With EtherCAT, this is achieved by distributed clocks. The smallest possible cycle time in C\_\_582 is 100 µs.



### **\_ Firmware Update via TCP/IP**

Computer and smartphones are the role model: New functionality by new firmware. New firmware for C\_\_582 EIP can be loaded via the asynchronous TCP/IP-cannel. Existing hardware is future-proof and can be equipped even for new applications.

### **\_ Device Level Ring DLR**

A ring makes the network safe. Similar to MRP with PROFINET, DLR provides higher availability to machines and plants with Ethernet/IP. With one additional connection from the last encoder in a branch back to the switch, connection is closed to a ring with much higher reliability. Break in signal transmission is detected at once and bypassed. A single cable break this does not lead to failure of all nodes behind the break in a branch.





### **\_ Encoderprofile**

C\_\_582 EPN consequently supports the EPN-Encoder profile of Profibus International standardisation organisation.

### **\_ Profinet with IRT**

The PROFINET variant therefore uses cutting-edge technology with long-term availability and is absolutely compliant with the latest standards of the PI User Organization. Real-time synchronization (IRT) enables precisely synchronized positioning of several axes.

### **\_ Neighborhood detection**

With neighborhood detection, you exchange devices without the use of an engineering tool. An encoder that is connected newly to the network can determine his position and function in the network by help of his physical neighbours and then requests the parameter data for this function from the master control.

### **\_ Fast Startup for quick system availability**

C\_\_582 PROFINET starts faster than any other bus rotary encoder. Once configured a stable, valid absolute position value is available in the PROFINET control just a few instants after restoration of supply. System startup is greatly accelerated and modular machine concepts in particular (with periodically decoupled modules) benefit directly from this technology.\*

### **\_ Media-Redundancy Protocol for highest reliability**

One ring for reliability. The PROFINET interface of the C\_\_582 supports the innovative Media Redundancy Protocol MRP. Normally PROFINET only supports a linear/tree structure. A redundant connection is not primarily provided as standard. MRP significantly increases availability with one simple device! Branches are connected to a ring with an additional line from the last node to the next switch. The appropriately configured nodes detect this. One of the nodes now disconnects this ring, by "ignoring" the second connection. If a connection fails (due to cable breakage or failure of a node), the nodes detect this and attempt to find another way to the rest of the system. The previously opened connection is now closed and all nodes are reconnected to the network.\*

\*An encoder can either be configured for Fast Startup or for MRP.



- \_ Low connection costs:**  
**M12, 4-pin, A-coded, without shield,**  
**supply and data in one cable.**
- \_ Cyclical transfer:**  
**Position, speed, 2 independent**  
**position limit switches, speed monitor.**
- \_ Transferred parameters can be configured.**
- \_ Cycle time for cyclical transfer  $\geq 1$  ms.**
- \_ Acyclical transfer:**  
**Error messages, operating hours.**
- \_ Hardware switching output programmable:**  
**Either speed monitor, limit switches ...**

An IO-Link master is often already present in a machine, usually to read in and parameterize initiators. TR-Electronic rotary encoders with IO-Link use exactly this infrastructure to communicate with the control.

If a machine or system already has IO-Link integrated as a bus system, the obvious approach is to also control absolute rotary encoders with this bus system. The actual value communication uses a star distribution system between rotary encoder and the next distribution node and is compatible with normal, digital initiator communication.

The zero position of the rotary encoder is conveniently adjusted via IO-Link and the usual bus parameterization tools – without turning the encoder itself.

This makes installation child's play. The transferred parameters can also be selected at the same time.

Machine condition monitoring made easy: Important status information is transferred via the acyclical services.

C\_ \_582 with IO-Link enables internal states to be converted into programmable switching states of the digital output. This enables simple implementation of e.g. speed monitoring, position limit value monitoring, limit switches and much more. The rotary encoder reacts to exceeding of a speed range, for example, through a digital signal like a normal initiator and can also send status messages to a very simple electronic analysis module.



**\_ The direct route for mounted encoders to SINAMICS® drives.**

DRIVE-CLiQ is the open system interface for position sensors for the SINAMICS® drive family from Siemens AG for motion control. This fast absolute encoder interface connects the converter centrally installed in the switch cabinet to the rotary encoders and position sensors directly on the respective axes.

**\_ Direct position measurement without gear backlash**

For increased reliability and precision, it may be desirable not only to use the encoder in the motor for position control. Encoders mounted directly on the axis to be measured eliminate the uncertainties caused by gear backlash.

**\_ Reliability through redundancy**

Mounted encoders used in conjunction with motor-integrated systems can reliably detect slipping of connections or even shaft/gear breakage.

**\_ All mechanical variants of Generation 2**

The C\_\_582s from TR-Electronic are available with the DRIVE-CLiQ interface.

The design engineers thus have access to the entire mechanical diversity of the modular system with full integration into the SINAMICS® drive technology family.



# Numerous special functions within the 65 mm housing

## Space for more functions within the 65 mm housing

The larger diameter makes it possible to implement additional functions, which are not available in the small size series of 58 mm.

## More interface possibilities

TR-Electronic's 65 mm rotary encoders allow total communication flexibility. With the combination of point-to-point interfaces or the networking of fieldbuses such as PROFIBUS or CANopen with one or more point-to-point interfaces – the 65 mm series rotary encoder has enough space.

### Common combination possibilities for point-to-point interfaces

- \_ SSI+analog
- \_ SSI + digital output (end switch, standstill monitor, speed monitor) parallel output (retrofitting, spares ...)
- \_ cam
- \_ special connectors

### Combination of fieldbus and point-to-point interfaces

- \_ fieldbus + analog (speed or position)
- \_ fieldbus + SSI
- \_ fieldbus + incremental signal (as feedback to the servo converter)
- \_ fieldbus + SSI + incremental signal

### Interfaces for special market niches

- \_ FiberOptic I/O (FO)
- \_ Interbus on FO
- \_ FIPIO (others on request)

## Generous connection space for fieldbuses

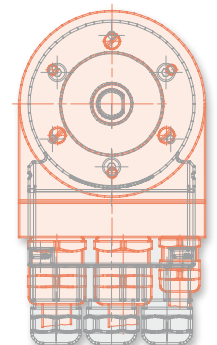
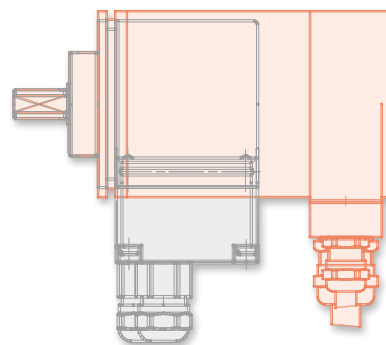
In special engineering applications, it has been proven that the use of cable from a roll to connect field devices saves costs. The cables will be cut and connected when installed. The fieldbus hood of the 65 mm series offers comfortable connection space. Less bend in the cable and a generous clamping area makes it easier to connect on-site. Due to the bigger cable gland, a wider variety of fieldbus cables can be used.

## Comparison of the models 58/65 mm-housing

58 mm-housing



65 mm-housing



58 mm-housing

65 mm-housing

# Safety rotary encoders

## Possible application areas

- \_ crane technology
- \_ event and stage technology
- \_ drive technology
- \_ conveying systems and logistics
- \_ machinery and plant engineering
- \_ automation technology
- \_ wind energy plant

### **Cranes with overlapping work areas or with obstacles within the working area**

Through measurement of rope positions and rotation angles, collisions can be avoided. Numerous travelling cranes on a common track – through safe measurement of each position, collision can be avoided.

### **Common work areas of men and machines –**

Through safe position detection in the various areas of safety, safe work areas can be differentiated from each other.

**Processes with minimal or maximum speed** – Through safe speed sensing, it is assured that the drive never oversteps a maximum speed or that it safely achieves a required speed before starting a process.

**Synchronous run monitoring**<sup>1</sup> – An unsafe electrical axial synchronization can be made safe by using a certified SIL 3/PL e rotary encoder with an externally attached safety system.

**Shaft control**<sup>1</sup> – Rotation through overload or a twist-off will be detected through a SIL 3/PL e rotary encoder with an external safety system.

## Advantage of certified components

The basic safety standard IEC 61508<sup>2</sup> differentiates between measures to eliminate errors and measures to control errors. The measures to eliminate errors embrace the entire design and development process. These are required for the development of individual components and they serve to avoid systematic errors.

Important for error control are quantifiable characteristics of the considered components and of the complete system. The probability of a dangerous failure of the safety function has priority. The calculation results in the rated failure probability of all individual components for the entire safety chain. It is checked and documented how systematic errors can be avoided or controlled for certified components.

If non-certified components are chosen to be used solely based on their mathematical safety value, the responsibility is laid upon the person who undertook the construction. The producer of components with certification makes a clear statement: "Yes, ideal for safety-oriented applications". As a user of certified components you can rely on this – after all, the certification according to SIL 3 or PL e has been given by independent specialists.

<sup>1</sup>on request <sup>2</sup>test regulations category 4/PL e according to EN ISO 13849-1, SIL CL3 according to EN 61800-5-2/EN 62061 and IEC 61508.

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## Safety rotary encoders



### SIL and PL – two scales for safety

#### **SIL**

The safety integrity level (SIL) is described in the international standard according to IEC 61508. It serves to judge electrical/programmable systems relying on dependability of safety functions. The aimed-at level indicates which safety-related construction principals have to be satisfied to minimize the risk of malfunctions.

#### **PL**

Within the standard EN ISO 13849-1 five categories are defined, called performance levels (PL). They build on one another, starting with a, b, c, d and e. The different levels help to classify safety-related performance. They are determined according to the average probability of a dangerous failure and the diagnostic coverage and in consideration of the structural design of a system (how many channels the system has, how independent they are from each other).





## Functional safety – plant safety and personal security

For a lot of applications in automation technology, there are high safety requirements. Dangerous plant conditions can be avoided by using SIL3/PLe-certified rotary encoders. You don't have to independently prove the functional safety of these position sensors.

### Current solution

Until now, for applications with high safety requirements, absolute rotary encoders with additional incremental signals have been used. The incremental signals function as a control over the positioning values. With this method, there was a safety deficit when turning on the machine because there was only one absolute value available. If this value was

wrong due to data loss or an adjustment value, it couldn't be detected.

### Certified solution

The absolute rotary encoder with integrated functional safety captures the revolution information through a mechanical gear without a battery backed revolution counter. Development, technology and production of this device is certified through the \*TÜV.

\*German Association for Technical Inspection

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## CD\_582+FS – functional safety in standard industrial form factor



### Technology

#### **\_ Efficient design**

Everything the application needs – reduce to the max.

#### **\_ Certified according to DIN EN 62061 (SIL) und 61508 (PL) by TÜV NRW**

CD\_582+FS are developed and certified according the two leading standards for devices providing integrated safety. Most application standards refer to these basic standards and thus CD\_582+FS fits into these applications.

#### **\_ safety validated process data**

CD582+FS provides safety evaluated process data as absolute position values for connected F-Hosts. The safety protected data channel completely supports the concept of integrated safety. Received and verified input data may be used in a functional safe applications without addl. plausibility check.



**SIL2/PLd, cat3;  
SIL3/PLe, cat4**

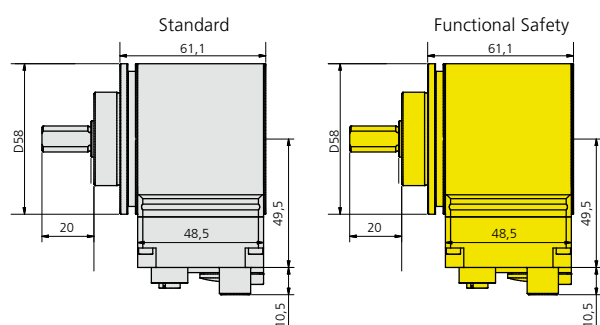
SIL 2 or SIL 3 – use the same mechanical and electrical features with precise the safety level your application needs.

**architecture according category 4  
„two encoders in one“**

CD\_58+FS was designed with category 4 architecture in focus. That means that you can replace existing solutions with two separate encoders on a common shaft by this one-piece-solution.

## Mechanics

**Mounting space**



CD582+FS uses the same installation space as standard encoders in size 58mm would use. Installation situation can be used as before.

**Robust magnetic/optic multiturn  
rotary encoder CD\_582M+FS**

13 bit resolution within one revolution (singleturn)  
16 bit revolutions (multiturn)

**rugged double magnetic multiturn  
rotary encoder CD\_582MM+FS**

13 bit resolution within one revolution (singleturn)  
16 bit revolutions (multiturn)

Solid shaft

Blind shaft

Hollow shaft



## C\_\_582 – the next generation: Standard form factor with so many possibilities

- Solid shaft, clamping flange  
Slip-on hollow shaft up to 15 mm  
Hollow-through-shaft up to 15 mm

Safety integrated multiturn rotary encoders are available with solid shaft, blind shaft and hollow through shaft up to 15 mm. Plenty of available flange geometries adapt the encoders perfect into the specific application.

- Shafts with form closure

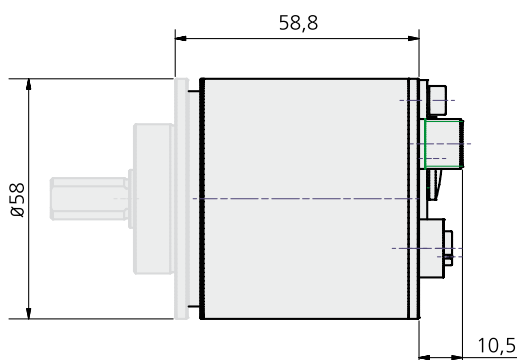
Solid shaft, blind shaft or hollow shafts are connected by form closure (keyway) to the driving shaft.



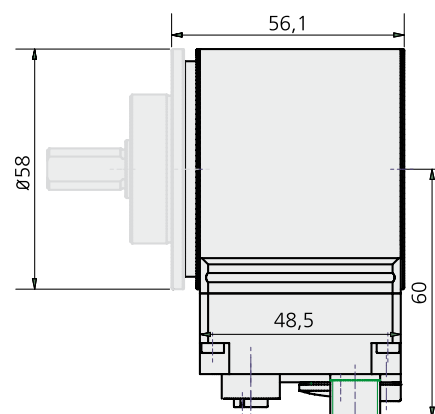
- Connectors axial or radial

Mounting space is valuable. Do not let cabling interfere with other parts and components. For solid and slip-on shafts (blind shaft), you can choose between connectors axial (at the side opposite to the shaft) or radial (at the side of the encoder housing).

Connectors axial



Connectors radial





### **\_protective bearing**



CD\_582+FS can be equipped with a rugged bearing unit. This bearing unit handle big forces on the shaft. Application with driving chains or belts are possible.

## **Interface**

### **\_Parameterizable gearbox**

Fractional gearbox parameters (numerator / denominator) for almost any reproduction of gearbox factors. Also for exact detection of closed rotary axes.

### **\_Easy installation with open configuration options**

TR absolute rotary encoders fulfill the standards of the respective user organizations for parameterization. Users can thus navigate the standard parameters without difficulty. The free configuration also offers easy access to all functions which are available in addition to the standard functions.

### **\_Speed output with adjustable averaging**

The time base for the speed evaluation can be freely set within a range of one millisecond to one second and can also be scaled in any units.

### **\_Alarms and diagnostics**

How's about my machine? To know that at any time is one of the core aspects of industry 4.0. Be it capacity utilisation or upcoming services: C\_\_582 provides all necessary alarms and diagnostic messages for long term machine and plant surveillance.

### **\_Latest communication standards for Industry 4.0"**

The new C\_\_582 generation of industrial standard rotary encoders is rigorously equipped with state-of-the-art chip families.

### **\_Reset switch**

CD\_582+FS is equipped with a hardware reset switch. This resets the encoder to delivery state (factory settings) without the use of an engineering system or programming device.

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# C\_\_582 – the next generation: Standard form factor with so many possibilities

## PROFINET / PROFI-safe



\_ Update time <1 ms (grey channel),  
<3 ms (safety channel)

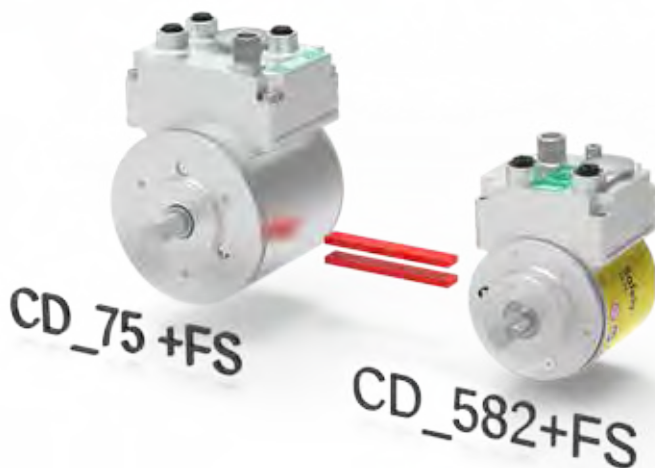
Suitable for quick position control with less than 1 ms encoder actual value updating for the bus output.

\_ TCI implementation

TR-Electronic provides a manufacturer specific device tool that links into the TCI-Interface of Siemens engineering systems (e.g. TIA Portal)

\_ Legacy-Mode

CD\_582+FS behaves identically to successful series CD\_75 by setting up in legacy mode. Function blocks that are already in use in existing safety programmes may be re-used without big changes into new projects.



\_ Encoder Profile 4.2

CD\_582+FS EPN fulfils the Profinet Encoder Profile issued by Profibus-International user organisation for both, the grey and the secured data channel.

\_ 32 bit data words

Full resolution in a single telegram – the full bandwidth for position or speed value can be transmitted in a single data word with 32 bit payload.

## PROFINET with IRT

PROFINET version uses the most recent standards and technology with long term availability. It is compliant with the current standards of PI user organisation. Synchronisation to the bus clock (IRT) allows precise positioning of multiple axes.

## Secondary interface: INK SIN / COS SSI

For local speed monitoring and position control or secondary surveillance systems, addl. interface can provide either incremental (square), sine/cosine or absolute SSI position values.

## Shared device / grey and safe world

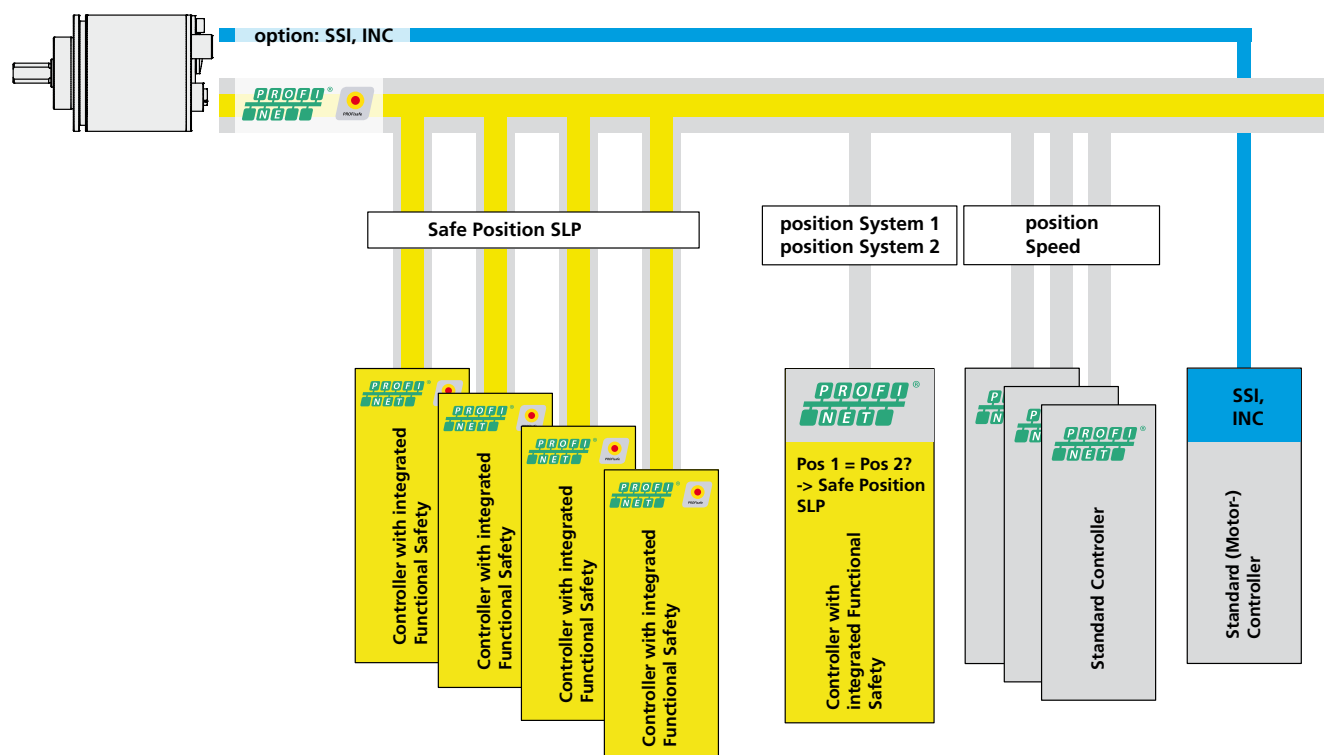
„Grey“ (non safe) position and speed values can be shared independently from one another. CD\_58+FS can provide values the same time to a high speed controller and a safety control system.

## Shared Device / up to 4 safety instances

Up to 4 safety controls can establish a secured communication channel to CD\_582+FS. No more need to hand over secured position values from one to the other safety control.

## Direct readout of the two encoder channels by bus

For non secured applications, the two detection channels can be read out directly via PROFINET IO. With this technology, you can realize installations with high availability.



---

## **\_ PROFISAFE V2.6.1**

CD\_582M+FS implements the basic protocol (BP) and extended Protocol (XP) according to PROFIsafe standard V2.6.1.

## **\_ extended „F-Dest“-address**

Via TC-Integrated application, the user can choose „F-Dest-Addresses (PROFIsafe addressing) in range 1...65536 via software.

## **PROFINET / PROFIsafe**

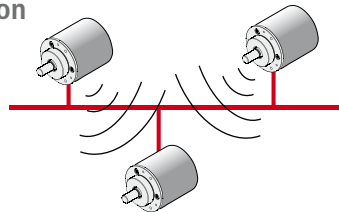
### **\_ Reintegration after passivation**

After a protocol failure, safety encoders enter a passive state. CD\_582+FS can be reintegrated into safety control mechanism without a global system restart.

### **\_ “On the fly” preset for adjustment during the process**

Preset values are transmitted via the real-time capable process image area. This means that absolute adjustments (also called “preset” or “offset adjustment”) can be performed synchronously with the control cycle even while the system is in operation. No more axis stops necessary.

### **\_ Neighborhood detection**



With neighborhood detection, you exchange devices without the use of an engineering tool. An encoder that is connected newly to the network can determine his position and function in the network by help of his physical neighbours and then requests the parameter data for this function from the master control.

### **\_ Fast Startup for quick system availability**

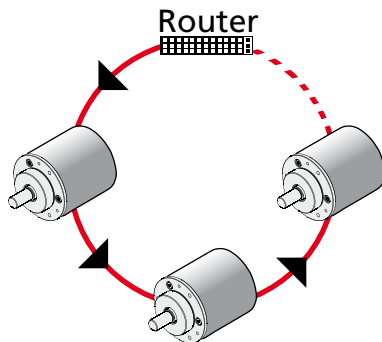


The new CD\_582M+FS PROFINET starts faster than any other bus rotary encoder. Once configured, a stable, valid absolute position value is available in the PROFINET control just a few instants after restoration of supply. System startup is greatly accelerated and modular machine concepts in particular (with periodically decoupled modules) benefit directly from this technology.\*

\*CD\_582+FS EPN can be set up either for fast startup or media redundancy protocol.



### **\_Media-Redundancy** **Protocol for highest reliability**



One ring for reliability. The PROFINET interface of the CD\_582M+FS supports the innovative Media Redundancy Protocol MRP. Normally PROFINET only supports a linear/tree structure. A redundant connection is not primarily provided as standard. MRP significantly increases availability with one simple device! Branches are connected to a ring with an additional line from the last node to the next switch. The appropriately configured nodes detect this. One of the nodes now disconnects this ring, by "ignoring" the second connection. If a connection fails (due to cable breakage or failure of a node), the nodes detect this and attempt to find another way to the rest of the system. The previously opened connection is now closed and all nodes are reconnected to the network.\*

### **\_Bus synchronized**

Position detection of CD\_582M+FS can be synchronized with bus clock. Unwanted dead times and jitter can be reduced to a minimum for perfect position control.

\*CD\_582+FS EPN can be set up either for fast startup or media redundancy protocol.

# Absolute encoder with completely encapsulated electronics IM\_36, CM\_36S, CD\_36S

- \_ completely encapsulated single-turn encoder
- \_ extremely robust and extremely tight (IP 69 K)
- \_ for areas where the temperature fluctuates (thawing)
- \_ compact design, only 36 mm in diameter
- \_ professional solution for your outdoor applications
- \_ optional double scanning for redundancy (2 × SSI)
- \_ optionally as incremental rotary encoder
- \_ optional separate bearing (completely free from wear and tear)
- \_ magnetic scanning

## Area of application

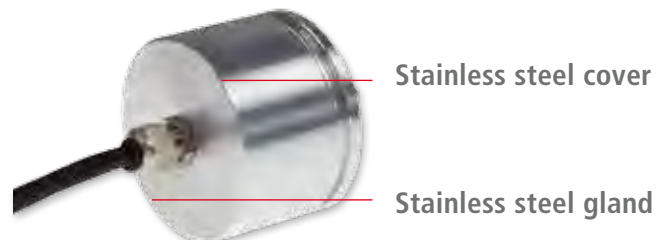
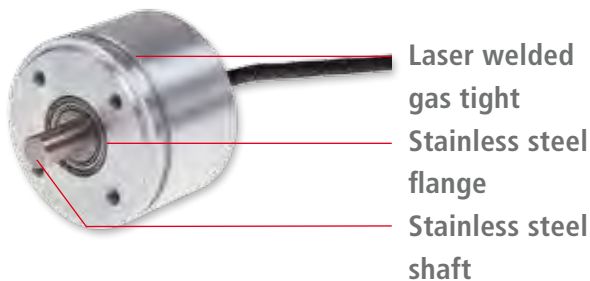
This standard applies to the IP protection classes for electrical fittings in road vehicles.



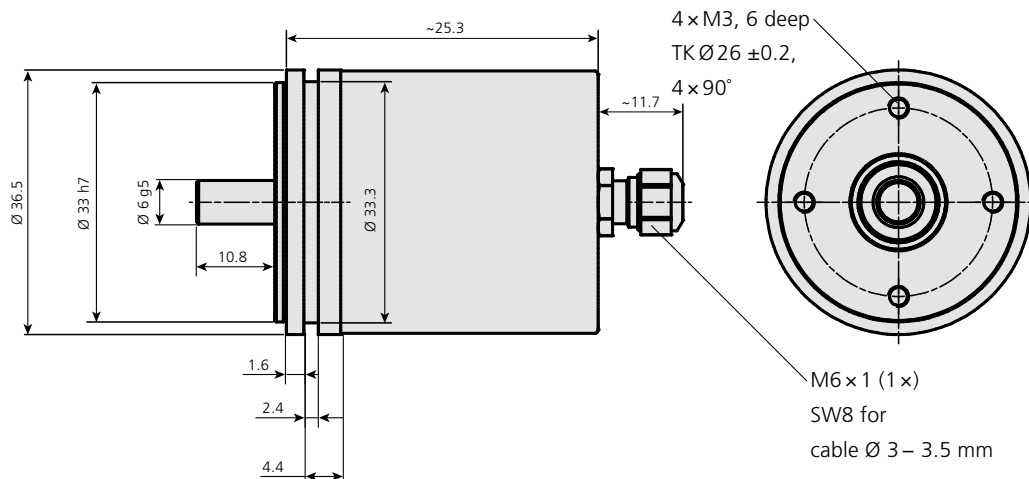
## Purpose of application – the following has been defined

Name and definition of IP protection classes and degrees through the housing around the electrical fittings in road vehicles to protect the electrical fittings inside the housing against the ingress of water and foreign bodies. There is also a regulation in place for the protection of people.

## stainless steel-housing (IP 69 K)



## Available for incremental and absolute single-turn variants



# Assembly of a magnet holder

## For bearing free \_\_F36

TR-Electronic constructs and manufactures the magnet holder custom fit for your application and delivers it with a built-in magnet. The example shows a magnet holder pressed into the face-sided drilling 6h7 (7 mm deep) of the shaft

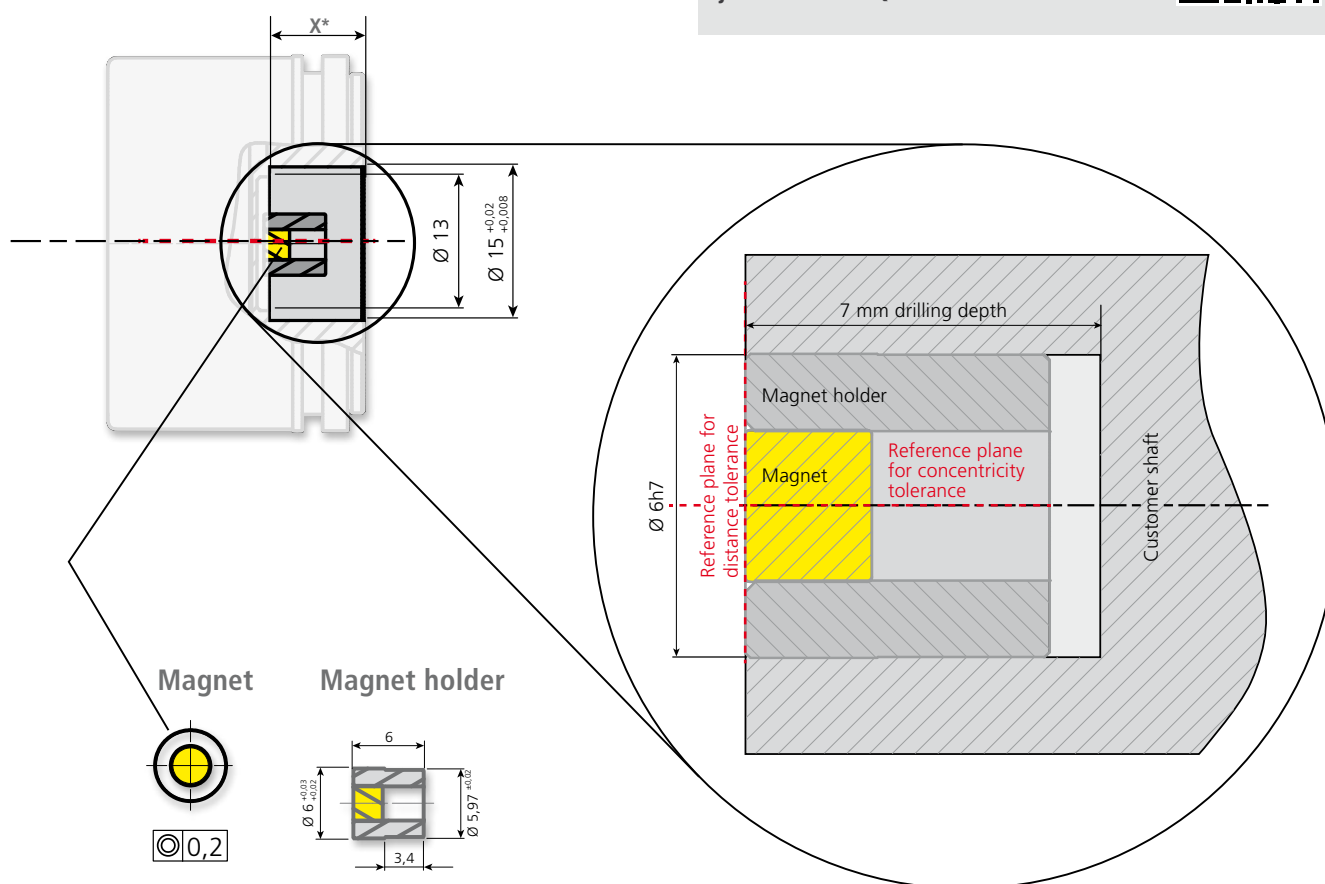
(order no. 49150092). The magnet holder is not part of delivery. Please order this item separately. Magnet holders in other sizes will be designed and delivered according to customers' specifications.

## Exemplary illustration for a face-sided drilling 6h7 of 7 mm depth at the IMF 36

X\* depends on device. See all information at TR-Web

[www.tr-electronic.com/s/S006824](http://www.tr-electronic.com/s/S006824)

To get information faster, just scan the QR code.



This type:  
Order no. 49150092

# ATEX-compliant rotary encoders

## Zone 0 / 20

**probability of explosion:  
permanent, long-term or frequent.**

Dangerous, explosible atmosphere as a mixture of air and inflammable gases, vapors, mists or dust.



**risk of explosion by  
gases, mists, vapors and dust**

## Zone 1 / 21

**probability of explosion:  
occasional**

Dangerous, explosible atmosphere as a mixture of air and inflammable gases, vapors, mists or dust.



## Classification into EX zones

EX atmospheres are divided into six zones. The table on the right describes how the zones are classified, according to hazardous environments for gases, vapors and mists on the one hand and dust on the other.

Additionally, a distinction is made between the risk category and the probability of a hazard occurring. Ultimately, the EX categories are allocated according to the degree of safety of the device. The table shows which specifications the device has to fulfill in order to be used in a specific zone. Naturally, the devices belonging to higher categories fulfill the requirements of the lower categories.



## Zone 2 / 22

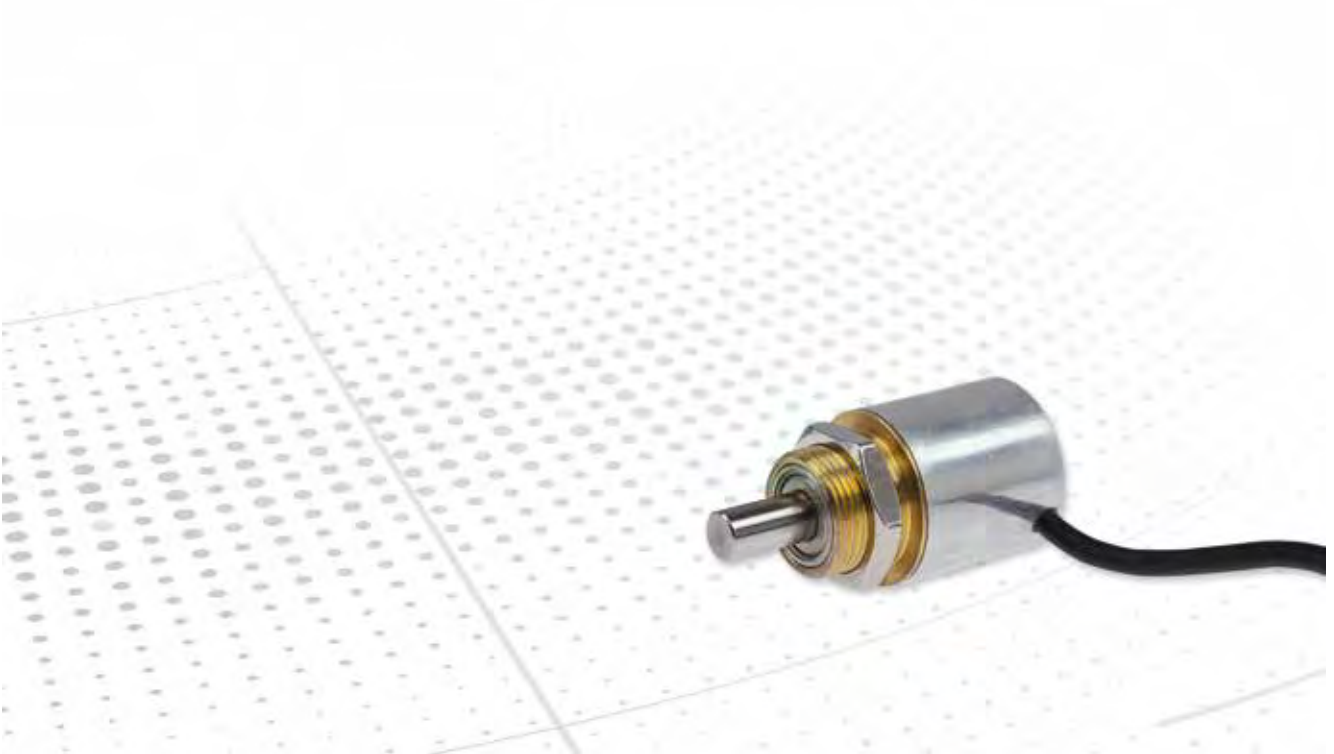
**probability of explosion:  
rarely and short-term**

Dangerous, explosible atmosphere as a mixture of air and inflammable gases, vapors, mists or dust.

**no ATEX requirements**

Flammable materials	Probability	Classification of explosive atmospheres	Identification of equipment			
			Device group	Device category for EX atmosphere		
<b>Gases Mist Vapors</b>	permanent, long-term or frequent	Zone 0	II	1 G		
	occasional	Zone 1	II		2 G	
	unlikely	Zone 2	II			3 G
<b>Dusts</b>	permanent, long-term or frequent	Zone 20	II	1 D		
	occasional	Zone 21	II		2 D	
	unlikely	Zone 22	II			3 D

## Encoder - Family C\_\_22 - Housing 22 mm



### Tiny but an absolutely real encoder!

Within the CMV 22 M we have combined our innovative ideas of rotary encoder technology and the experience gained over the years and placed it into a miniature rotary encoder. With a 22 mm diameter, it is the smallest absolute multi-turn rotary encoder of its kind. Amazingly compact, it can be easily mounted in the most confined machine spaces. The contact-free detection guarantees shock and vibration resistance which combined with its low mass make it perfect for use in demanding environments.

#### **Application**





Direct installation into servo drives for wear-free, absolute position detection over several revolutions. The small size of 22 mm enables real multi-turn position measuring without battery back-up in fields such as apparatus construction and medical engineering, where up till now only incremental rotary encoders or multiple-ganged potentiometers were used.

---

### Contents

Products.....	63
Suggested Products.....	64
Dimensional Drawings.....	65
Shaft Types.....	66

## Magnet detection (M)

Products	CMV22M	CMV22M
		
Detection	Magnet detection (M)	Magnet detection (M)
Single / multi	(M) Multi	(M) Multi
Supply	7...26 VDC	14...30 VDC
Steps per turn	4096	4096
Number of turns	265	4096
Precision	$\pm 1,0^\circ$	$\pm 1,0^\circ$
Shaft diameters available	3mm, 6mm, 1/4"	3mm, 6mm, 1/4"
Connectors	Cable outlet radial	Cable outlet radial
Ambient temperature	0...+60 °C	0...+60 °C
Protection class	IP64	IP64
Interface	<b>SSI</b> <b>ASI</b>	<b>Analog</b>
Weblink	<a href="http://www.tr-electronic.com/s/S007235">www.tr-electronic.com/s/S007235</a>	<a href="http://www.tr-electronic.com/s/S007234">www.tr-electronic.com/s/S007234</a>
QR-Code		

Can't find the right variant? Please contact us ([info@tr-electronic.de](mailto:info@tr-electronic.de))

## Suggested Products

Order code	Steps per turn	Turns	Shaft / Flange	Connector position	Cable length	Remark
------------	----------------	-------	----------------	--------------------	--------------	--------

### CMV22 - Analogue

CMV22M-00008	4096	256	1/4"X12 M16X1	Open end	0,500 m	Analogue voltage
CMV22M-00013	4096	10	6,35GL/12 with groove M16X1	1X8P.M12-connector	0,360 m	Analogue voltage
CMV22M-00025	4096	256	1/4"X12 M16X1	Open end	0,500 m	Analogue current
CMV22M-00039	4096	4096	6GL/12,7 M16X1	Open end	1,000 m	Analogue voltage
CMV22S-00001	4096	1	1/4"X12 M16X1	Open end	0,500 m	Analogue voltage
CMV22S-00004	4096	1	1/4"X12 M16X1	Open end	0,500 m	Analogue current

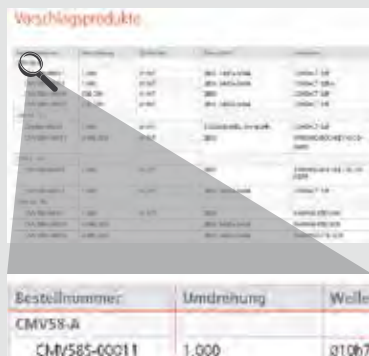
### CMV22 - SSI

CMV22M-00005	4096	256	1/4"X12 M16X1	Open end	0,500 m	
CMV22M-00010	4096	256	1/4"X12 M16X1	Open end	0,500 m	
CMV22M-00037	4096	256	6GL/12,7 M16X1	Open end	10,000 m	
CMV22S-00003	4096	1	1/4"X12 M16X1	Open end	0,300 m	

For further product information simply enter the order number in the search field at [www.tr-electronic.com](http://www.tr-electronic.com).

### Further product information

1. Enter order code into ...



2. Searchfield (top right) on [www.tr-electronic.com](http://www.tr-electronic.com)



3. Choose desired information

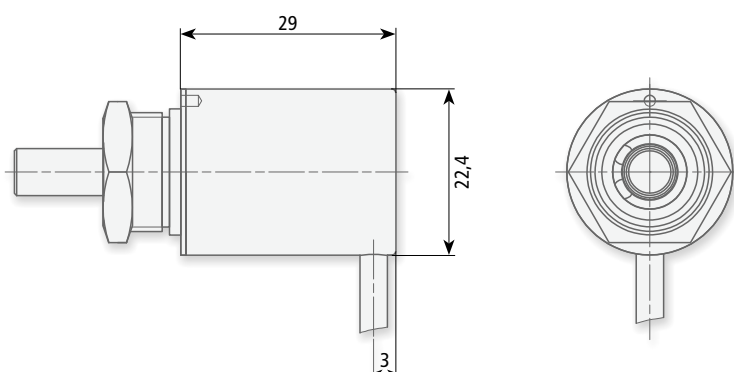


We will help you to select the most suitable products from the complete TR range. Please contact us ([info@tr-electronic.de](mailto:info@tr-electronic.de)).

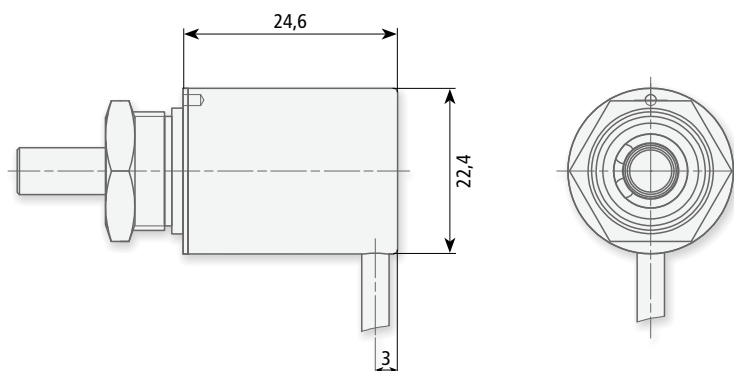


## Dimensional Drawings

**CMV22 Analogue**

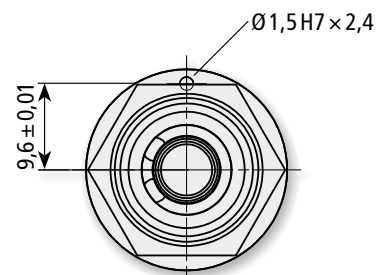
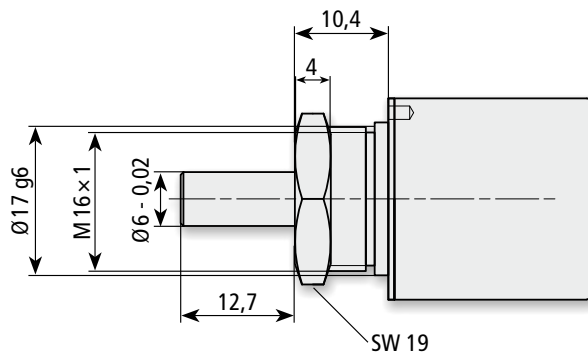


**CMV22 SSI, ASI**

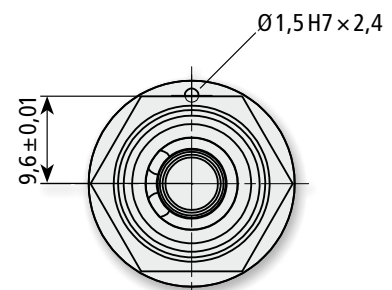
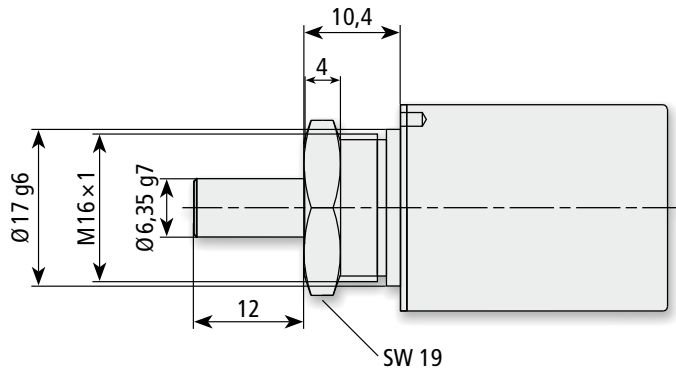


## Shaft Types

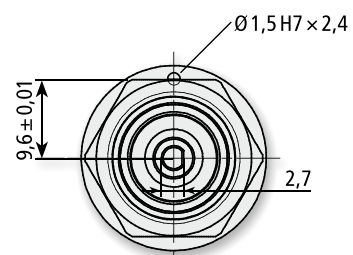
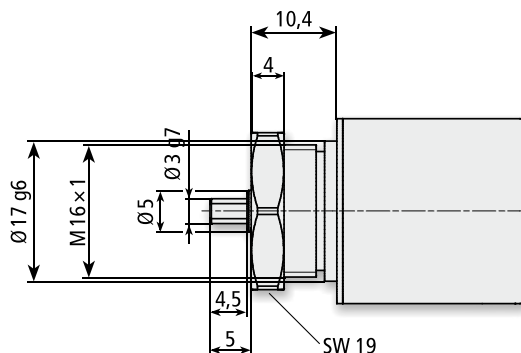
**Shaft 6mm**



**Shaft 6,35mm**  
1/4"

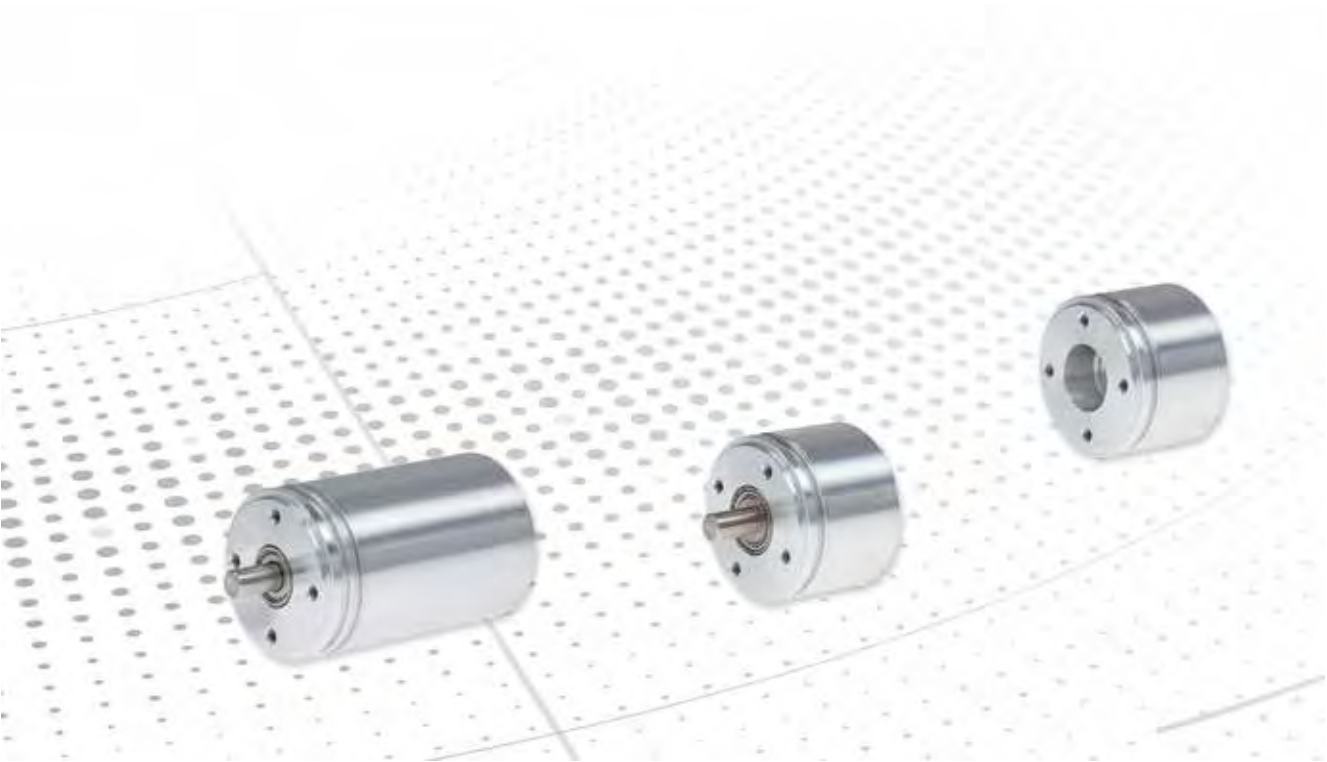


**Shaft 3mm**  
With flat





# Rotary Encoder - Family C\_\_36 - Housing 36 mm



## Compact absolute rotary encoder family - also washdown safe (IP69K)

A new design size is taking the market by storm: with a diameter of 36 mm, advanced encoder technology is moving in where there is no room for typical industrial design sizes. And there is absolutely no need for the 36 mm series of encoders from TR to hide behind the bigger design sizes. The series is made up of incremental, single and real multi-turn rotary encoders, some with single-scan, some with double-scan functionality, and implemented according to the redundancy concept from the gears to the scan, power supply and interface.

Compact encoders C\_\_36 are available with magnetic and optic detection with up to 18 bit resolution per revolution.







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## Contents

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## Magnet detection (M)

Products	CMV36-S	CMV36-S+FS	CMV36-M
			
Detection	Magnet detection (M)	Magnet detection (M)	Magnet detection (M)
Single / multi	(S) Single	(S) Single	(M) Multi
Supply	11...27 VDC	11...27 VDC	11...27 VDC
Steps per turn	32, 40, 64, 80, 100, 128, 160, 200, 256, 320, 400, 500, 512, 1,000, 1,024, 1,600, 2,000, 2,048, 4,096, 8,192*	4096	32, 40, 64, 80, 100, 128, 160, 200, 256, 320, 400, 500, 512, 1,000, 1,024, 1,600, 2,000, 2,048, 4,096, 8,192*
Number of turns	1	1	4,096 (option: 16,777,216)
Shaft diameters available	6mm	6mm	6mm
Connectors	Cable gland axial	Cable gland axial	Cable gland axial, M12 axial (DRIVE CLiQ)
Maximum SIL/PL		SIL2/PLd	
Ambient temperature	-25...+70°C	-25...+70°C	-25...+70°C
Protection class	IP65 (option IP69k)	IP65 (option IP69k)	IP54 (option IP65)
Interface	<b>SSI</b> <b>ASI</b> <b>Analog</b> <b>CAN</b>	<b>Analog</b>	<b>SSI</b>  <b>ASI</b> <b>CAN</b>
Option, additional interfaces (on request)	<b>INC</b>	<b>INC</b>	<b>INC</b>
Weblink	<a href="http://www.tr-electronic.com/s/5007174">www.tr-electronic.com/s/5007174</a>		<a href="http://www.tr-electronic.com/s/5007175">www.tr-electronic.com/s/5007175</a>
QR-Code			

\*Factory set

Can't find the right variant? Please contact us ([info@tr-electronic.de](mailto:info@tr-electronic.de))

## Magnet detection (M)

Products	CMS36-M	CMF36-S	CDV36-S	
				
Detection	Magnet detection (M)	Magnet detection (M)	Magnet detection (M)	
Single / multi	(M) Multi	(S) Single	(S) Single	
Supply	11...27 VDC	11...27 VDC	11...27 VDC	
Steps per turn	32, 40, 64, 80, 100, 128, 160, 200, 256, 320, 400, 500, 512, 1,000, 1,024, 1,600, 2,000, 2,048, 4,096, 8,192*	32, 40, 64, 80, 100, 128, 160, 200, 256, 320, 400, 500, 512, 1,000, 1,024, 1,600, 2,000, 2,048, 4,096, 8,192*	32, 40, 64, 80, 100, 128, 160, 200, 256, 320, 400, 500, 512, 1,000, 1,024, 1,600, 2,000, 2,048, 4,096, 8,192*	
Number of turns	4,096 (option: 16,777,216)	1	1	
Shaft diameters available	8mm blind shaft	See drawings section	6mm	
Connectors	Cable gland axial, M12 axial (DRIVE CLiQ)	Cable gland axial	2x cable gland axial	
Maximum SIL/PL				
Ambient temperature	-25...+70°C	-25...+70°C	-25...+70°C	
Protection class	IP54 (option IP65)	IP65 (option IP69k)	IP65 (option IP69k)	
Interface	<b>SSI</b>  <b>ASI</b> <b>CAN</b>	<b>SSI</b> <b>ASI</b> <b>Analog</b> <b>CAN</b>	<b>SSI</b>	
Option, additional interfaces (on request)	<b>INC</b>	<b>INC</b>	<b>SSI</b>	
Weblink	<a href="http://www.tr-electronic.com/s/S007176">www.tr-electronic.com/s/S007176</a>	<a href="http://www.tr-electronic.com/s/S007177">www.tr-electronic.com/s/S007177</a>	<a href="http://www.tr-electronic.com/s/S007178">www.tr-electronic.com/s/S007178</a>	
QR-Code				

\*Factory set

# Magnet detection (M)

## Optical 15 bit (E)

## Optical 18 bit (O)

CDV36-M	CDF36-S	CEV36-M	COV36-M
			
Magnet detection (M)	Magnet detection (M)	Optical 15 bit (E)	Optical 18 bit (O)
(M) Multi	(S) Single	(M) Multi	(M) Multi
11...27 VDC	11...27 VDC	5...27 VDC	5...27 VDC
32, 40, 64, 80, 100, 128, 160, 200, 256, 320, 400, 500, 512, 1,000, 1,024, 1,600, 2,000, 2,048, 4,096, 8,192*	32, 40, 64, 80, 100, 128, 160, 200, 256, 320, 400, 500, 512, 1,000, 1,024, 1,600, 2,000, 2,048, 4,096, 8,192*	1...32,768*	1...262,144*
4.096	1	65.536	65.536
6mm	See drawings section	6mm	6mm
2x cable gland axial	2x cable gland axial	M12 axial	M12 axial
-25...+70°C	-25...+70°C	-25...+70°C	-25...+70°C
IP54 (option IP65)	IP65 (option IP69k)	IP54 (option IP65)	IP54 (option IP65)
<b>SSI</b>	<b>SSI</b>	<b>SSI</b>	<b>SSI</b>
<b>SSI</b>	<b>SSI</b>		
<a href="http://www.tr-electronic.com/s/S007179">www.tr-electronic.com/s/S007179</a>	<a href="http://www.tr-electronic.com/s/S007180">www.tr-electronic.com/s/S007180</a>	<a href="http://www.tr-electronic.com/s/S007293">www.tr-electronic.com/s/S007293</a>	<a href="http://www.tr-electronic.com/s/S007294">www.tr-electronic.com/s/S007294</a>
			

\*Factory set

Can't find the right variant? Please contact us ([info@tr-electronic.de](mailto:info@tr-electronic.de))

## Suggested Products

Order code	Steps per turn	Turns	Shaft / Flange	Connector position	Cable length	Remark
<b>CMV36-SSI (M) Magnet detection, solid shaft, SSI</b>						
CMV36M-00011	4096	4096	6GL/10,8	Cable gland	1,000 m	
CMV36S-00005	4096	1	6GL/10,8 ZB33	Cable gland	1,000 m	
<b>CMV36-SSI (M) Magnet detection, solid shaft, CANopen</b>						
CMV36M-00016	4096	4096	6GL/10,8 ZB33	Cable gland	1,000 m	
<b>CMV36-SSI (M) Magnet detection, solid shaft, ASI</b>						
CMV36M-00009	4096	4096	6GL/10,8 ZB33	Cable gland	0,300 m	
<b>CMV36-DQ (M) Magnet detection, solid shaft, DRIVECLiQ</b>						
CMV36M-00010	4096	4096	6GL/10,8	1x M12 8pin		
<b>CMF36-SSI (M) Magnet detection, bearing free, SSI</b>						
CMF36S-00002	4096	1	See chapter drawings	Cable gland	1,000 m	
<b>CEV36-SSI (E) Optical detection, solid shaft, SSI</b>						
CEV36M-00002	4096	4096	6GL/10,8 ZB33	1x M12 8pin		
<b>CDV36-SSI (D) Double detection, solid shaft, double SSI</b>						
CDV36M-00002	4096	4096	6GL/10,8 ZB33	2x cable gland	1,000 m	
CDV36S-00002	4096	1	6GL/10,8 ZB33	2x cable gland	1,000 m	
<b>CDF36-SSI (D) Double detection, bearing free, double SSI</b>						
CDF36S-00002	4096	1	See chapter drawings	2x cable gland	1,000 m	

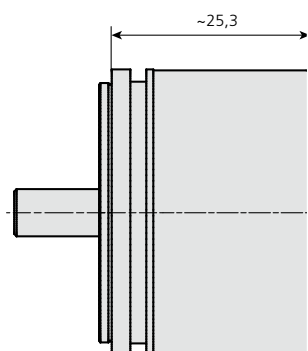
For further product information simply enter the order number in the search field at [www.tr-electronic.com](http://www.tr-electronic.com).



## Dimensional Drawings

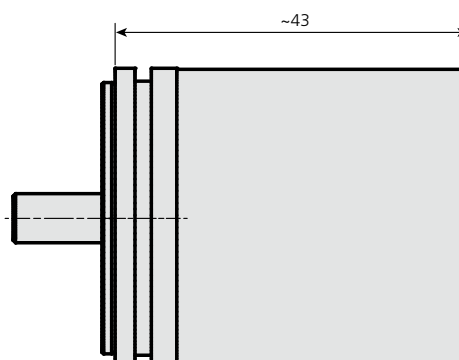
### Singleturn

Length of housing



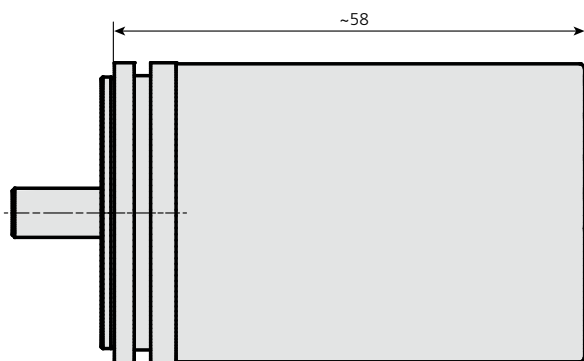
### Multiturn

Length of housing



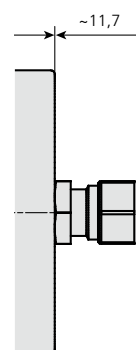
### Multiturn DRIVE CLiQ

Length of housing



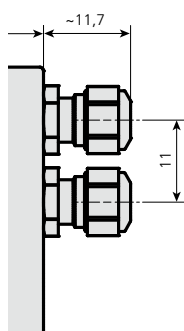
### SSI, CANopen, analogue

1 cable gland



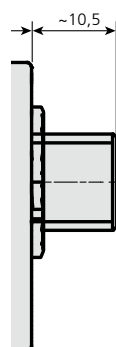
### 2xSSI, 2x analogue

2 cable glands



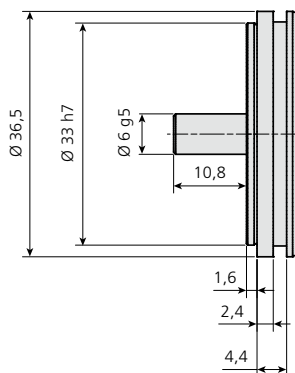
### DRIVE CLiQ, all CE\_36, CO\_36

1 x M12

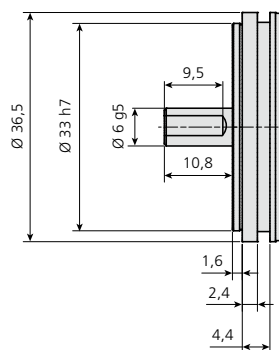


# Flanges

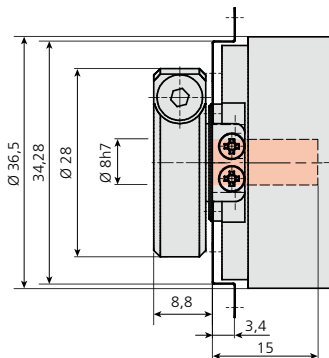
**Solid shaft**  
6GL10,8 (round shaft)



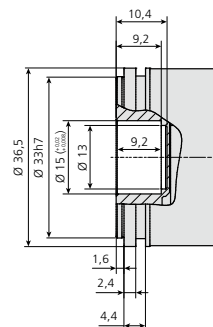
**Solid shaft**  
6FL10,8 (shaft with flat)



**Blind shaft**  
8h7

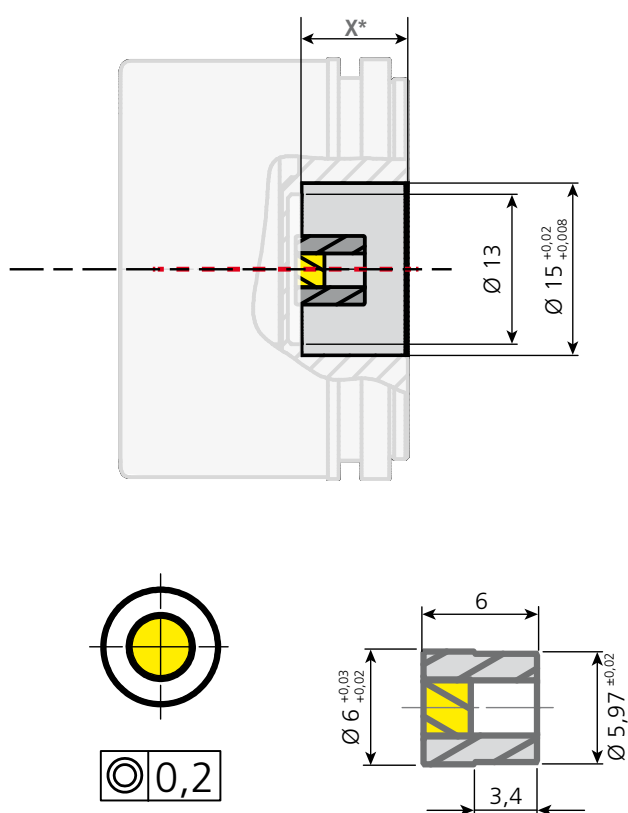


**Bearing free**



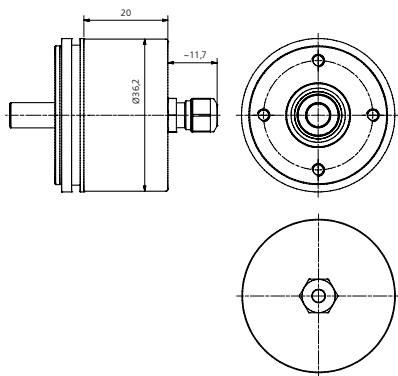
## Assembly Examples

-- F36 singleturn

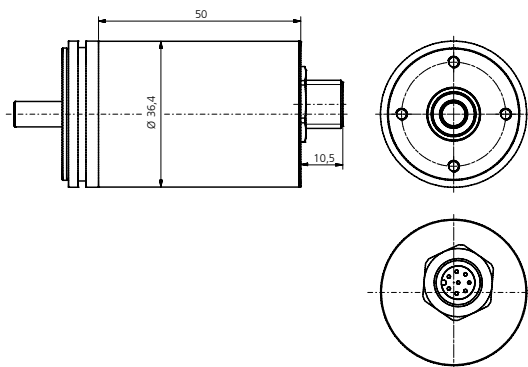


# Samples

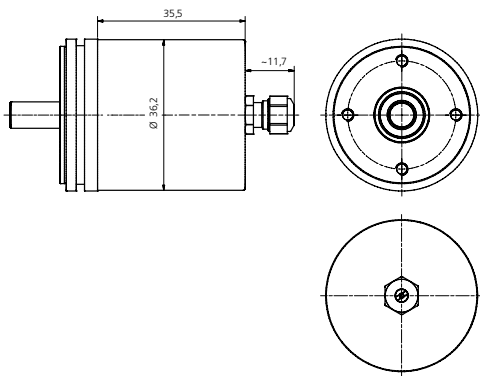
CMV36-SSI singleturn



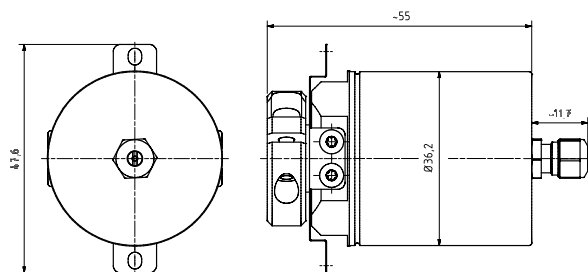
CMV36-DRIVE CLiQ multiturn



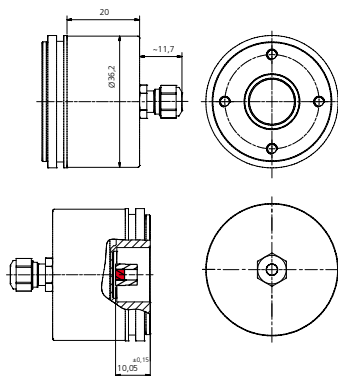
CMV36-SSI multiturn



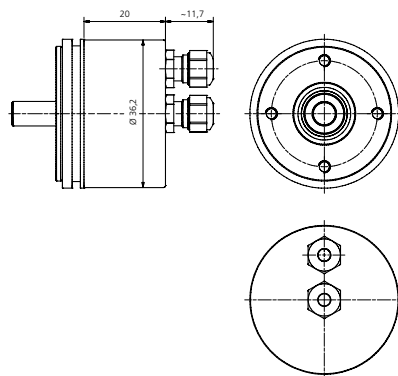
CMS36-SSI multiturn



CMF36-SSI singleturn

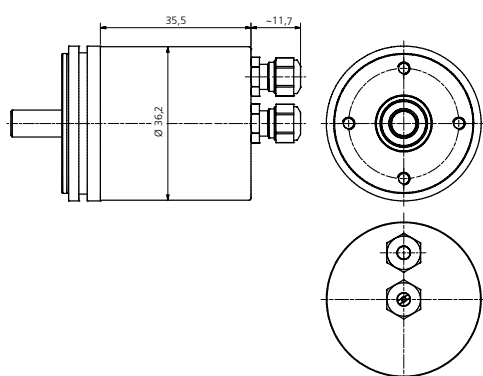


CDV36-SSI singleturn

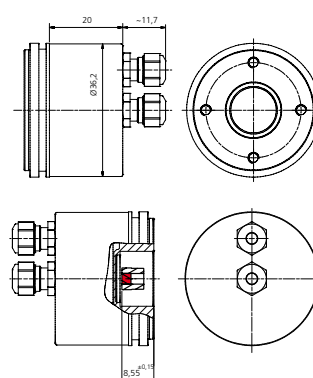


# Samples

**CDV36-SSI multiturn**

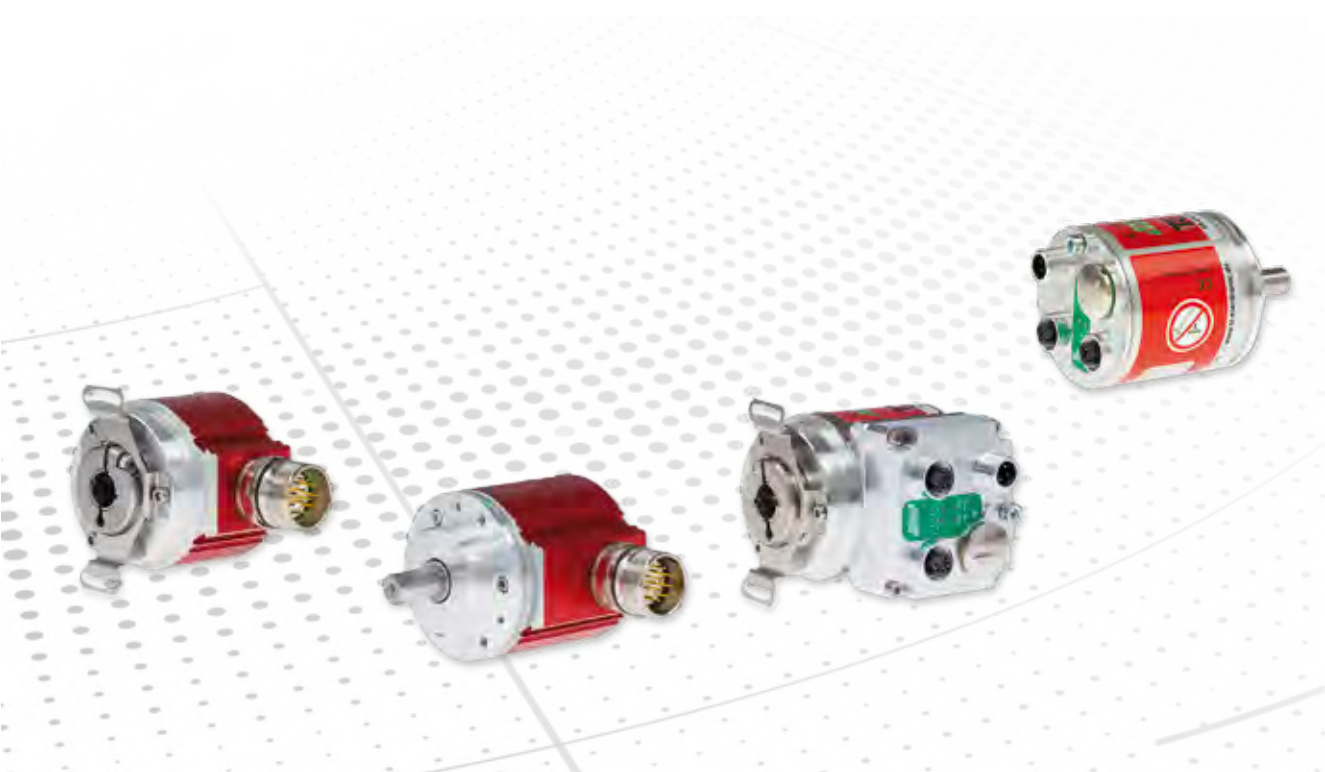


**CDF36-SSI singleturn**





# Absolute Rotary Encoders - Family C\_\_58 - Housing 58 mm



## 58 mm housing for standard industrial applications

Encoders with size 58 mm have been established as the industrial standard for absolute and incremental encoders. With TR-Electronic, you get as a standard what is special with other manufacturers. Absolute encoders of Series 58 are modular. Your demands can be realized precisely and in most cases without any special development.










- \_ Industrial standard size 58 mm
- \_ Cost optimized by different resolution ranges
- \_ Compatible with a vast number of control systems
- \_ Shaft-, flange - and assembly versions
- \_ Same mechanics - plenty of interfaces
- \_ Compact Connector System - perfect for machines produced in series
- \_ Can be adapted to singular applications via parametrization done by user
- \_ Available with customer-specific connector systems
- \_ UL approval for most types

## Contents

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Suggested Products.....	83	Assembly Examples .....	96
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Dimensional Drawings.....	90		

# Magnet detection (M)

# Magnet detection (P)





















Product	CMV582	CMS582	CPV582
			
Detection	Magnet detection (M)	Magnet detection (M)	Magnet detection (P)
Single / multi	(M) Multi (S) single	(M) Multi (S) single	(M) Multi (S) single
Supply	11...27 VDC *	11...27 VDC *	11...27 VDC *
Full resolution	<= 25 bit *	<= 25 bit *	<= 28 bit *
Steps per turn	<= 8192 *	<= 8192 *	<= 65536 *
Number of turns	<= 4096 *	<= 4096 *	<= 4096 *
Precision	± 0,5 °	± 0,5 °	± 0,5 °
Shaft diameters available	6, 8, 10, 12, 14, 1/4", 3/8", 1/2"	6, 8, 10, 12, 14, 15, 1/4", 3/8", 1/2"	6, 8, 10, 12, 14, 1/4", 3/8", 1/2"
Connectors	Connector axial or radial *	Connector axial or radial *	Connector axial or radial *
Ambient temperature	-20...+75 °C	-20...+75 °C	-20...+75 °C
Protection class	IP65	IP65	IP65
ATEX-zone	Option 2/22	Option 2/22	Option 2/22
Interface	<b>SSI</b> <b>Analog</b>   <b>CANopen</b>  	<b>SSI</b> <b>Analog</b>   <b>CANopen</b>  	<b>SSI</b> <b>Analog</b>   <b>CANopen</b>  
Option, additional interfaces (on request)			
Weblink	<a href="http://www.tr-electronic.com/s/S013306">www.tr-electronic.com/s/S013306</a>	<a href="http://www.tr-electronic.com/s/S013307">www.tr-electronic.com/s/S013307</a>	
QR-Code			

\* depending on the interface

Can't find the right variant? Please contact us ([info@tr-electronic.de](mailto:info@tr-electronic.de))

# Magnet detection (P)

























## Optical 15 bit (E)

Product	CPH582	CP5582	CEV582	
				
Detection	Magnet detection (P)	Magnet detection (P)	Optical 15 bit (E)	
Single / multi	(M) Multi (S) single	(M) Multi (S) single	(M) Multi (S) single	
Supply	11...27 VDC*	11...27 VDC*	11...27 VDC*	
Full resolution	<= 28 bit *	<= 28 bit *	<= 33 bit *	
Steps per turn	<= 65536 *	<= 65536 *	<= 32768 *	
Number of turns	<= 4096 *	<= 4096 *	<= 256000 *	
Precision	± 0,5 °	± 0,5 °	± 1 digit	
Shaft diameters available	6, 8, 10, 12, 14, 15, 1/4", 3/8", 1/2"	6, 8, 10, 12, 14, 15, 1/4", 3/8", 1/2"	6, 8, 10, 12, 14, 1/4", 3/8", 1/2"	
Connectors	Connector radial	Connector axial or radial *	Connector axial or radial *	
Ambient temperature	-20...+75 °C	-20...+75 °C	-20...+75 °C	
Protection class	IP54, option 65	IP65	IP65	
ATEX-zone	Option 2/22	Option 2/22	Option 2/22	
Interface	<b>SSI</b> <b>Analog</b>   <b>CANopen</b>  	<b>PROFINET</b> <b>EtherCAT</b>   <b>EtherNet/IP</b>  <b>CANopen</b>   	<b>SSI</b> <b>Analog</b>   <b>EtherNet/IP</b>  <b>CANopen</b>   	
Option, additional interfaces (on request)				
Weblink			<a href="http://www.tr-electronic.com/s/S013308">www.tr-electronic.com/s/S013308</a>	
QR-Code				

\* depending on the interface

# Optical 15 bit (E)



# Optical 18 bit (O)

CEH582	CES582	COV582	COH582
			
Optical 15 bit (E)	Optical 15 bit (E)	Optical 18 bit (O)	Optical 18 bit (O)
(M) Multi (S) single	(M) Multi (S) single	(M) Multi (S) single	(M) Multi (S) single
11...27 VDC *	11...27 VDC *	11...27 VDC *	11...27 VDC *
<= 33 bit *	<= 33 bit *	<= 36 bit *	<= 36 bit *
<= 32768 *	<= 32768 *	<= 262144 *	<= 262144 *
<= 256000 *	<= 256000 *	<= 262144 *	<= 262144 *
± 1 digit	± 1 digit	± 1 digit	± 1 digit
6, 8, 10, 12, 14, 15, 1/4", 3/8", 1/2"	6, 8, 10, 12, 14, 15, 1/4", 3/8", 1/2"	6, 8, 10, 12, 14, 1/4", 3/8", 1/2"	6, 8, 10, 12, 14, 15, 1/4", 3/8", 1/2"
Connector radial	Connector axial or radial *	Connector axial or radial *	Connector radial
-20...+75 °C	-20...+75 °C	-20...+75 °C	-20...+75 °C
IP54, option 65	IP65	IP65	IP54, option 65
Option 2/22	Option 2/22	Option 2/22	Option 2/22
<b>SSI</b>  <b>Analog</b>   <b>CANopen</b>  <b>EtherCAT</b>	<b>SSI</b>  <b>Analog</b>   <b>CANopen</b>  <b>EtherCAT</b>	<b>SSI</b>  <b>Analog</b>   <b>CANopen</b>  <b>EtherCAT</b>	<b>SSI</b>  <b>Analog</b>   <b>CANopen</b>  <b>EtherCAT</b>
www.tr-electronic.com/s/S013312	www.tr-electronic.com/s/S013313	www.tr-electronic.com/s/S013314	www.tr-electronic.com/s/S013315
			

\* depending on the interface

Can't find the right variant? Please contact us (info@tr-electronic.de)

# Magnet detection (P) Optical 15 bit (E)

Product	COS582 
Detection	Optical 18 bit (O)
Single / multi	(M) Multi (S) single
Supply	11...27 VDC*
Full resolution	<= 36 bit *
Steps per turn	<= 262144 *
Number of turns	<= 262144 *
Precision	± 1 digit
Shaft diameters available	6, 8, 10, 12, 14, 15, 1/4", 3/8", 1/2"
Connectors	Connector axial or radial *
Ambient temperature	-20...+75 °C
Protection class	IP65
ATEX-zone	Option 2/22
Interface	<div> <div>SSI</div> <div>PROFINET</div> <div>Analog</div> <div>EtherCAT</div> <div>DRIVE-CLIQ</div> <div>EtherNet/IP</div> <div>PROFINET BUS</div> <div>ETHERNET POWERLINK</div> <div>CANopen</div> <div>SERCOS the automation bus</div> <div>INTERBUS</div> <div>IO-Link</div> <div>EtherCAT P</div> </div>
Option, additional interfaces (on request)	
Weblink	<a href="http://www.tr-electronic.com/s/S013316">www.tr-electronic.com/s/S013316</a>
QR-Code	

\* depending on the interface



## Suggested Products

Order code	Steps per turn	Turns	Shaft / Flange	Connector position	Connector type	Remark
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### CEH582 -EIP(E) Optical 15 Bit, hollow shaft, Ethernet/IP

CEH582M-00002	8192	4096	3/8" hollow through shaft	Radial	3x 4 pin M12	Clamping ring flange side
CEH582M-00005	32768	4096	12H7 hollow through shaft	Radial	3x 4 pin M12	Clamping ring flange side

### CEH582-EPN (E) Optical 15 Bit, hollow shaft, PROFINET

CEH582M-00003	8192	4096	10H7 hollow through shaft	Radial	3x 4 pin M12	Clamping ring flange side
CEH582M-00004	8192	4096	12H7 hollow through shaft	Radial	3x 4 pin M12	Clamping ring flange side

### CEH582-ETC (E) Optical 15 Bit, hollow shaft, EtherCAT

CEH582M-00007	8192	4096	10H7 hollow through shaft	Radial	3x 4 pin M12	Clamping ring flange side
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### CEH582 -SSI (E) Optical 15 Bit, hollow shaft, SSI

CEH582M-10271	4096	4096	10H7 hollow through shaft	Radial	12 pin M23	Clamping ring flange side
CEH582M-00019	4096	4096	10H7 hollow through shaft	Radial	12 pin M23	Clamping ring flange side
CEH582M-00022	4096	4096	12H7 hollow through shaft	Radial	12 pin M23	Clamping ring flange side
CEH582S-00001	4096	1	12H7 hollow through shaft	Radial	12 pin M23	Clamping ring flange side

### CE582-EIP (E) Optical 15 Bit, blind shaft, Ethernet/IP

CE582M-00009	8192	4096	14H7 blind shaft	Axial	3x 4 pin M12	Clamping ring flange side
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### CE582-EPN (E) Optical 15 Bit, blind shaft, PROFINET

CE582M-00001	8192	4096	15H7 blind shaft	Radial	3x 4 pin M12	Clamping ring flange side
CE582M-00004	8192	4096	12H7 blind shaft	Axial	3x 4 pin M12	Clamping ring flange side
CE582M-00007	8192	4096	12H7 blind shaft	Radial	3x 4 pin M12	Clamping ring flange side
CE582S-00001	8192	1	15H7 blind shaft	Radial	3x 4 pin M12	Clamping ring flange side

### CEV582-EIP (E) Optical 15 Bit, solid shaft, Ethernet/IP

CEV582M-00027	4096	4096	6GL/10 ZB50	Radial	3x 4 pin M12	
CEV582M-00003	8192	4096	10FL/19,5 ZB36 3xM3+3xM4	Axial	3x 4 pin M12	
CEV582M-00004	8192	4096	10FL/19,5 ZB36 3xM3+3xM4	Radial	3x 4 pin M12	

For further product information simply enter the order number in the search field at [www.tr-electronic.com](http://www.tr-electronic.com).

## Suggested Products

Order code	Steps per turn	Turns	Shaft / Flange	Connector position	Connector type	Remark
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**CEV582-EPN (E) Optical 15 Bit, solid shaft, PROFINET**

CEV582M-00024	4096	4096	6GL/10 ZB50	Radial	3x 4 pin M12	Absorber flange
CEV582M-00002	8192	4096	10FL/19,5 ZB36 3xM3+3xM4	Radial	3x 4 pin M12	
CEV582M-00011	8192	4096	10FL/19,5 ZB36 3xM3+3xM4	Radial	3x 4 pin M12	Reset Switch
CEV582M-00014	8192	4096	10FL/19,5 ZB50 D65	Radial	3x 4 pin M12	
CEV582M-00015	8192	4096	10GL/19,5 ZB36 D65	Axial	3x 4 pin M12	
CEV582M-00022	8192	4096	6GL/10 ZB50	Radial	3x 4 pin M12	Reset Switch
CEV582M-00025	8192	4096	10FL/19,5 ZB50	Axial	3x 4 pin M12	
CEV582M-00032	8192	4096	10FL/19,5 ZB36 3xM3+3xM4	Radial	3x 4 pin M12	Reset Switch
CEV582S-00005	8192	1	6GL/10 ZB50	Radial	3x 4 pin M12	Absorber flange
CEV582S-00004	32768	1	10FL/19,5 ZB36 3xM3+3xM4	Radial	3x 4 pin M12	Seal Pack

**CEV582-ETC (E) Optical 15 Bit, solid shaft, EtherCAT**

CEV582M-00005	8192	4096	10FL/19,5 ZB36 3xM3+3xM4	Axial	3x 4 pin M12	
CEV582M-00006	8192	4096	10FL/19,5 ZB36 3xM3+3xM4	Radial	3x 4 pin M12	
CEV582M-00008	8192	4096	6GL/10 ZB50	Radial	3x 4 pin M12	
CEV582M-00013	8192	4096	10GL/19,5 ZB36 3xM3+3xM4	Axial	3x 4 pin M12	
CEV582M-00030	8192	4096	10FL/19,5 ZB36 D65	Radial	3x 4 pin M12	

**CEV582 -SSI (E) Optical 15 Bit, solid shaft, SSI**

CEV582M-00036	4096	4096	10GL/19,5 ZB36 3xM3+3xM4	Radial	12 pin M23	
CEV582M-00038	4096	4096	6GL/10 ZB50 D65	Radial	12 pin M23	
CEV582M-00045	4096	4096	6GL/10 ZB50	Radial	12 pin M23	
CEV582M-00072	4096	4096	12FL/25 ZB36 D65	Radial	12 pin M23	
CEV582M-10025	4096	4096	10FL/19,5 ZB36	Radial	12 pin M23	
CEV582M-10069	4096	4096	6GL/10 ZB50	Radial	12 pin M23	
CEV582M-00055	8192	4096	12FL/25 ZB36 3xM3+3xM4	Radial	1 m cable, open end	

**CEV582 -IBS (E) Optical 15 Bit, solid shaft, Interbus**

CEV582M-00039	4096	4096	10FL/19,5 ZB50 D65	Radial	2 x 9pin M23	
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For further product information simply enter the order number in the search field at [www.tr-electronic.com](http://www.tr-electronic.com).

## Suggested Products

Order code	Steps per turn	Turns	Shaft / Flange	Connector position	Connector type	Remark
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### CMS582-EIP (M) Magnet detection, blind shaft, Ethernet/IP

CMS582M-00012	8192	4096	12H7 blind shaft	Axial	3x 4 pin M12	Clamping ring flange side
CMS582M-00016	8192	4096	15H7 blind shaft	Radial	3x 4 pin M12	Clamping ring flange side

### CMS582-EPN (M) Magnet detection, blind shaft, profinet

CMS582M-00001	8192	4096	10H7 blind shaft	Axial	3x 4 pin M12	
CMS582M-00004	8192	4096	15H7 blind shaft	Radial	3x 4 pin M12	
CMS582M-00010	8192	4096	15H7 blind shaft	Axial	3x 4 pin M12	Clamping ring flange side
CMS582M-00011	8192	4096	12H7 blind shaft	Axial	3x 4 pin M12	Clamping ring flange side
CMS582M-00014	8192	4096	12H7 blind shaft	Radial	3x 4 pin M12	Clamping ring flange side
CMS582M-00015	8192	4096	10H7 blind shaft	Radial	3x 4 pin M12	Clamping ring flange side
CMS582M-00017	8192	4096	14H7 blind shaft	Radial	3x 4 pin M12	Clamping ring flange side, Reset
CMS582M-00019	8192	4096	08H7 blind shaft	Axial	3x 4 pin M12	Clamping ring flange side, Reset
CMS582M-00021	8192	4096	12H7 blind shaft	Radial	3x 4 pin M12	Clamping ring flange side

### CMS582-ETC (M) Magnet detection, blind shaft, EtherCAT

CMS582M-00009	8192	4096	12H7 blind shaft	Radial	3x 4 pin M12	Clamping ring flange side
CMS582M-00013	8192	4096	10H7 blind shaft	Axial	3x 4 pin M12	Clamping ring flange side

### CMS582-IOL (M) Magnet detection, blind shaft, IO-Link

CMS582M-00018	4096	4096	10H7 blind shaft	Radial	4 pin M12	Clamping ring flange side
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### CMS582-SSI (M) Magnet detection, blind shaft, SSI

CMS582M-00025	8192	4096	12H7 blind shaft	Radial	12 pin M23	Clamping ring flange side
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### CMV582-EIP (M) Magnet detection, solid shaft, Ethernet/IP

CMV582M-00003	8192	4096	10FL/19,5 ZB36	Axial	3x 4 pin M12	
CMV582M-00004	8192	4096	10FL/19,5 ZB36	Radial	3x 4 pin M12	
CMV582M-00015	8192	4096	6GL/10 ZB50	Radial	3x 4 pin M12	
CMV582M-00018	8192	4096	3/8"FL/22,3 ZB36	Axial	3x 4 pin M12	

For further product information simply enter the order number in the search field at [www.tr-electronic.com](http://www.tr-electronic.com).

## Suggested Products

Order code	Steps per turn	Turns	Shaft / Flange	Connector position	Connector type	Remark
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### CMV582-EPN (M) Magnet detection, solid shaft, Profinet

CMV582M-00001	8192	4096	10FL/19,5 ZB36	Axial	3x 4 pin M12	
CMV582M-00002	8192	4096	10FL/19,5 ZB36	Radial	3x 4 pin M12	
CMV582M-00007	8192	4096	10FL/19,5 ZB36 3xM3+3xM4	Axial	3x 4 pin M12	
CMV582M-00008	8192	4096	10FL/19,5 ZB36	Axial	3x 4 pin M12	With reset button
CMV582M-00009	8192	4096	10FL/19,5 ZB50	Radial	3x 4 pin M12	
CMV582M-00016	8192	4096	6GL/10 ZB50	Axial	3x 4 pin M12	
CMV582M-00022	8192	4096	10FL/19,5 ZB36/D65	Radial	3x 4 pin M12	
CMV582M-00025	8192	4096	6GL/10 ZB50	Radial	3x 4 pin M12	Reset Switch

### CMV582-ETC (M) Magnet detection, solid shaft, EtherCAT

CMV582M-00002	8192	4096	10FL/19,5 ZB36	Axial	3x 4 pin M12	
CMV582M-00006	8192	4096	10FL/19,5 ZB36	Radial	3x 4 pin M12	
CMV582M-00013	8192	4096	12FL/25 ZB36	Axial	3x 4 pin M12	

### CMV582-IOL (M) Magnet detection, solid shaft, IO-Link

CMV582M-00028	4096	4096	10FL/19,5 ZB36 3xM3+3xM4	Radial	4 pin M12	
CMV582M-00034	4096	4096	10FL/19,5 ZB36/D65	Radial	4 pin M12	

### CMS582-SSI (M) Magnet detection, blind shaft, SSI

CMV582M-00039	4096	4096	10FL/19,5 ZB36 3xM3+3xM4	Radial	4 pin M12	
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### COS582-EPN (O) Optical 18 Bit, blind shaft, PROFINET

COS582M-00001	262144	1	10H7 blind shaft	Axial	3x 4 pin M12	Clamping ring flange side
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### COV582-EPN (O) Optical 18 Bit, solid shaft, PROFINET

COV582M-00002	262144	4096	10FL/19,5 ZB36 D65	Radial	3x 4 pin M12	
COV582M-00003	262144	4096	10FL/19,5 ZB36 3xM3+3xM4	Axial	3x 4 pin M12	

For further product information simply enter the order number in the search field at [www.tr-electronic.com](http://www.tr-electronic.com).

## Suggested Products

Order code	Steps per turn	Turns	Shaft / Flange	Connector position	Connector type	Remark
<b>COV582-ETC (O) Optical 18 Bit, solid shaft, EtherCAT</b>						
COV582M-00001	262.144	4096	10GL/19,5 ZB36 3xM3+3xM4	Radial	3x 4 pin M12	
<b>COH582-SSI (O) Optical 18 Bit, solid shaft, SSI</b>						
COH582M-00001	262.144	64	12H7 hollow shaft with keyway	Radial	12 pin M23	

For further product information simply enter the order number in the search field at [www.tr-electronic.com](http://www.tr-electronic.com).

### Further product information

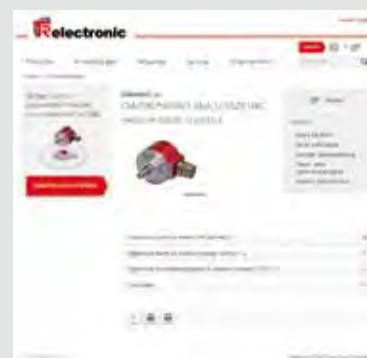
1. Enter order code into ...



2. Searchfield (top right) on [www.tr-electronic.com](http://www.tr-electronic.com)



3. Choose desired information

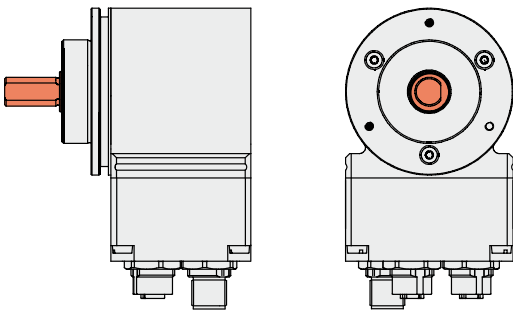


We will help you to select the most suitable products from the complete TR range. Please contact us ([info@tr-electronic.de](mailto:info@tr-electronic.de)).

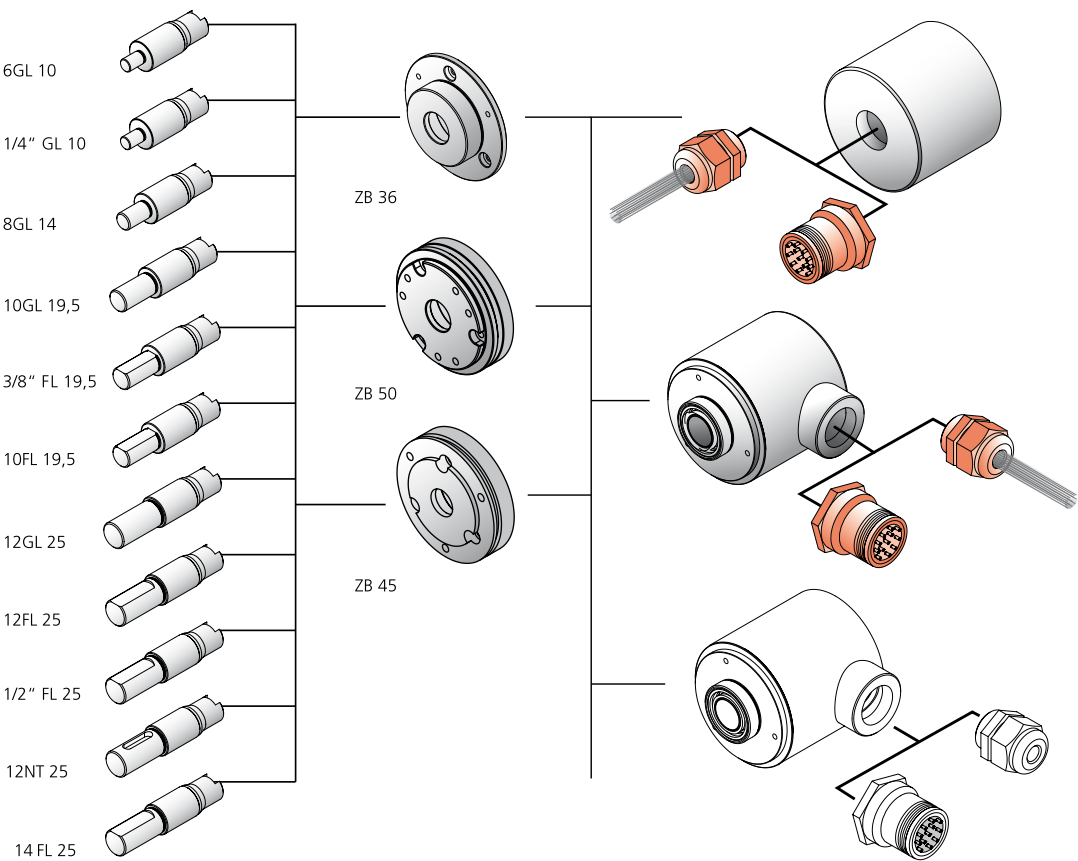


# Shaft Types

## Solid shaft



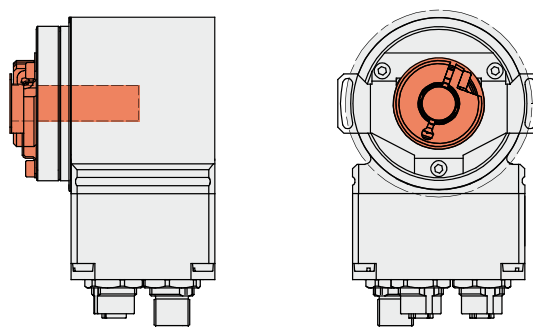
## Standard shafts and flanges



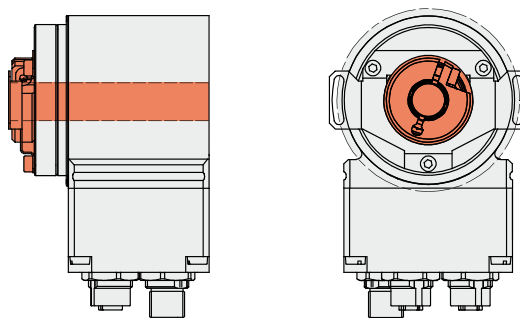
Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at [www.tr-electronic.com](http://www.tr-electronic.com) or on request.

## Shaft Types

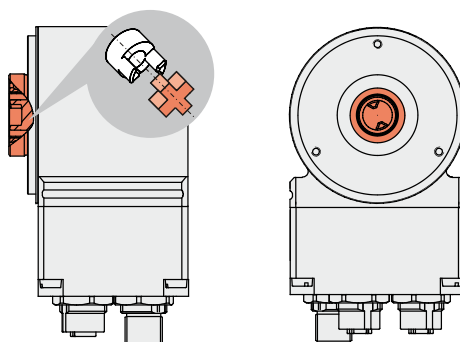
**Blind shaft**



**Hollow shaft**



**Integrated coupling**



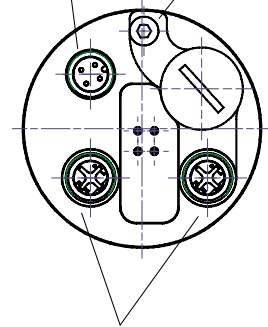
## Dimensional Drawings

### C\_\_582 axial

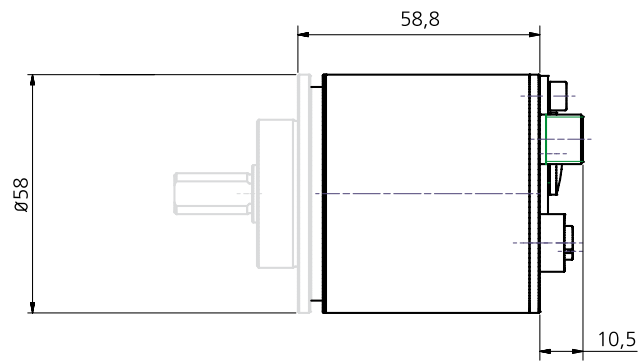
PROFINET, EtherCAT, Ethernet/IP, PROFIBUS axial

4pin. M12-male-connector (Supply voltage)

thread M4 for  
potential equalisation



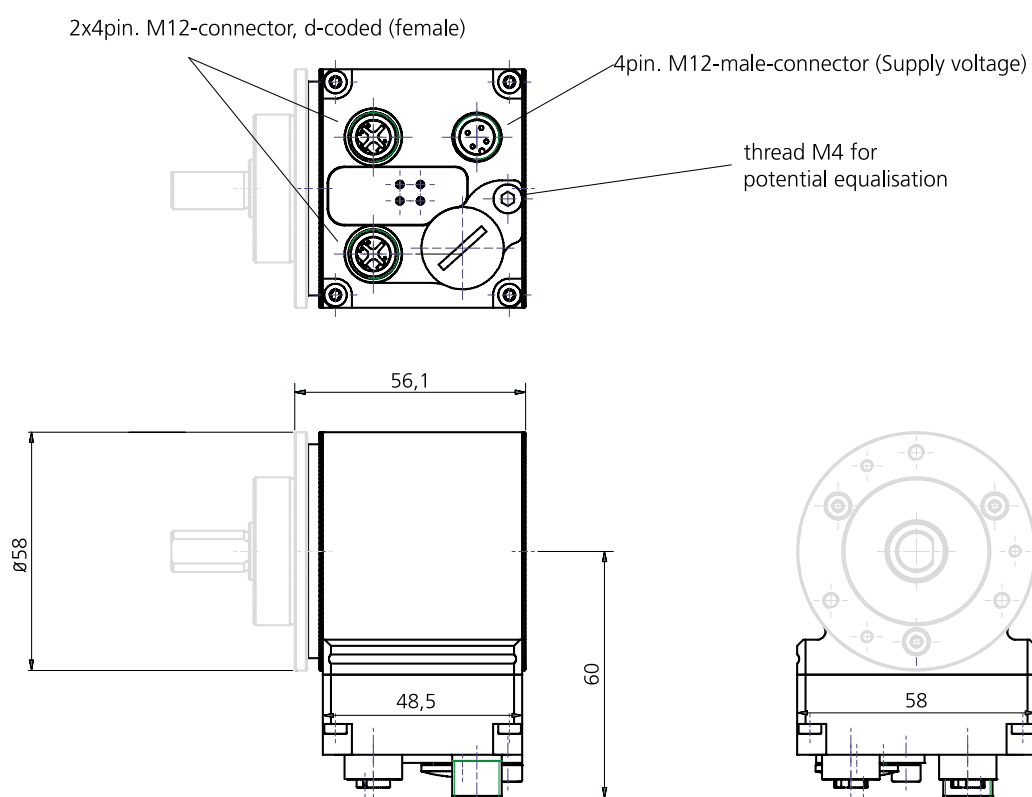
2x4pin. M12-connector, d-coded (female)



# Dimensional Drawings

## C\_582 radial

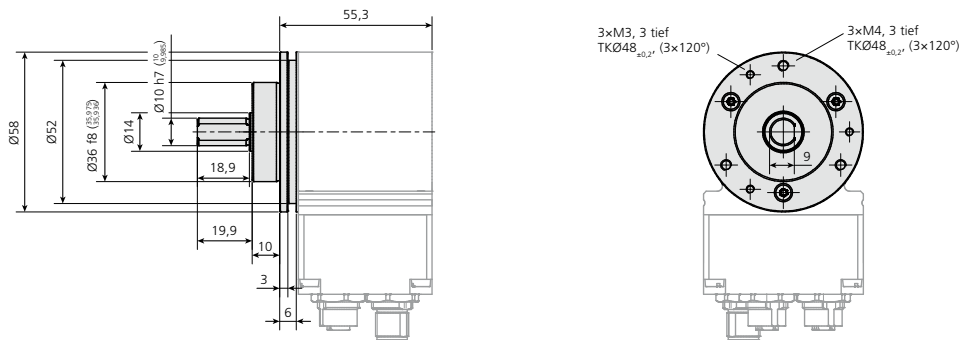
PROFINET, EtherCAT, Ethernet/IP, PROFIBUS radial



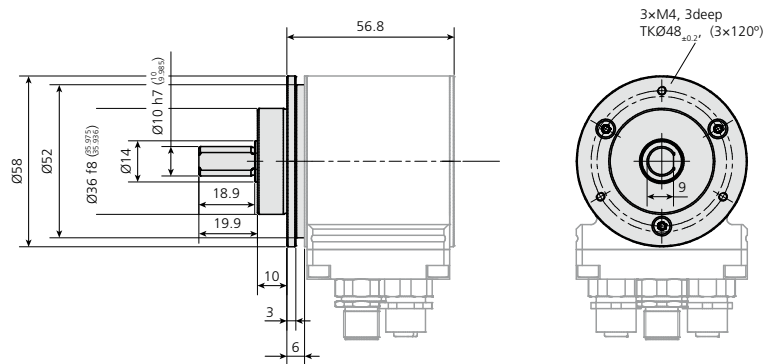
## Flanges

### Standard flange ZB 36 M3/M4

Other drill patterns available

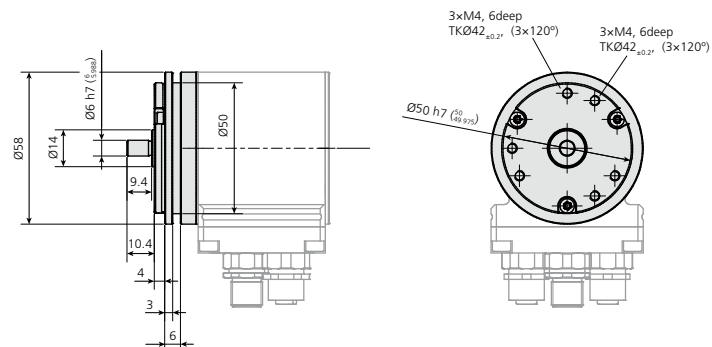


### Standard flange ZB 36 M4



### Standard flange ZB 50

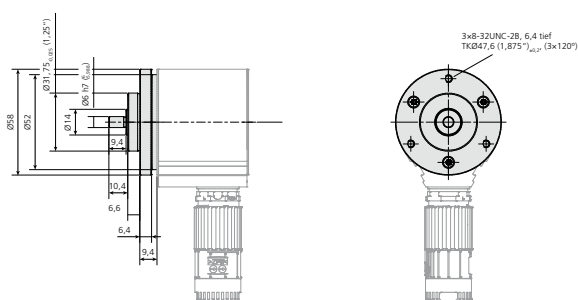
Other drill patterns available



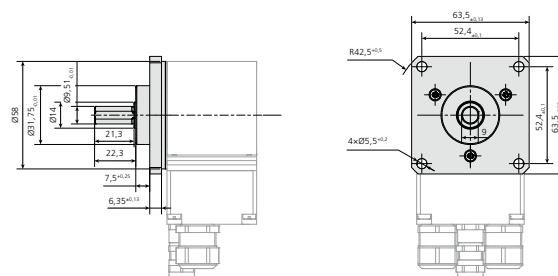


# Flanges

**Flange ZB 31,75 (1,25")**

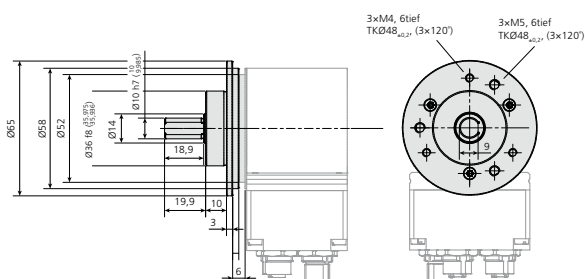


**Square flange ZB 31,75 (1,25")**



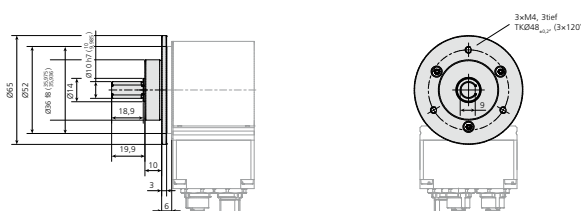
**Flange option D65 ZB36 M3/M4**

Fits encoder mounting places 65mm, ZB 36mm, 3x M4 and 3x M5 threads



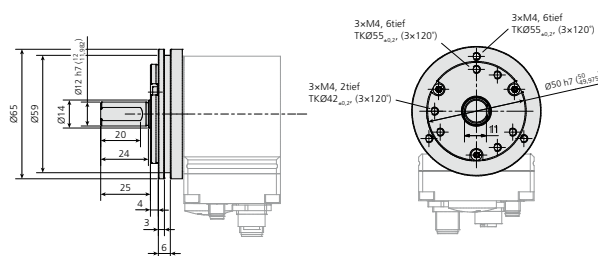
**Flange option D65 ZB36 M4**

Fits encoder mounting places 65mm, ZB 36mm, 3x M4 threads



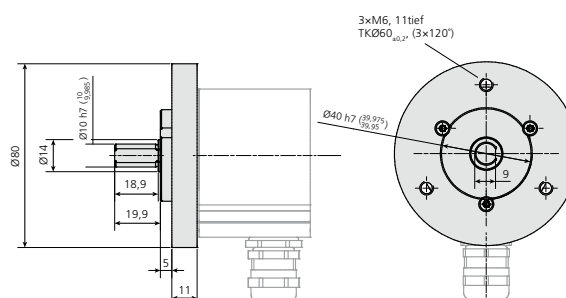
**Flange option D65 ZB50**

Fits encoder mounting places 65mm, ZB 50mm



**Flange option D80 ZB40**

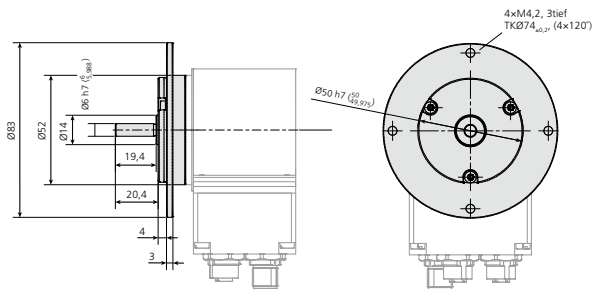
Fits encoder mounting places 80 mm, ZB 40mm



# Flanges

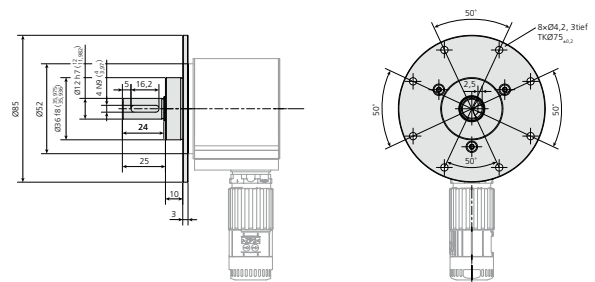
## Flange option D83 ZB36

Fits encoder mounting places 83mm, ZB 50mm



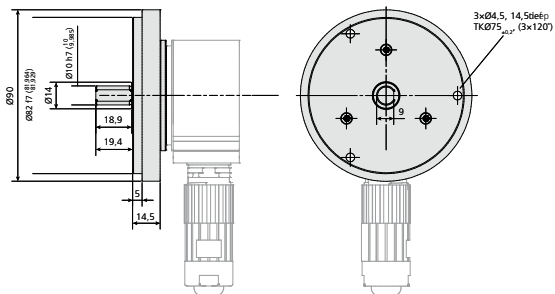
## Flange option D85 ZB36

Fits encoder mounting places 85mm, ZB 36mm



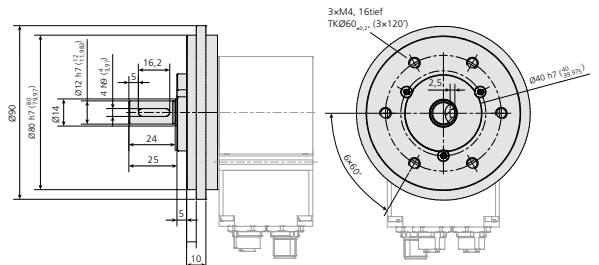
## Flange option D90 ZB82

Fits encoder mounting places 90mm, ZB 82mm



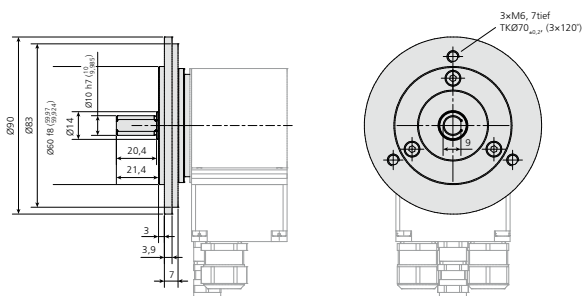
## Flange option D90 ZB80,40

Fits encoder mounting places 90mm, ZB 80mm, 40mm



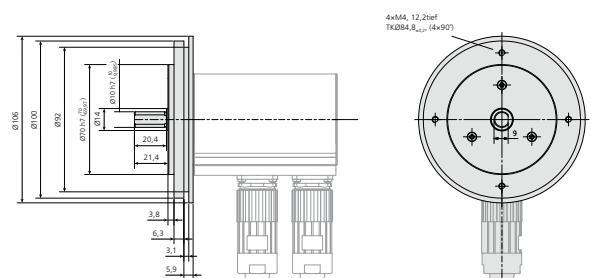
## Flange option D90 ZB 60

Fits encoder mounting places 90mm, ZB 60mm



## Flange option D106 ZB70

Fits encoder mounting places 106mm, ZB 70mm

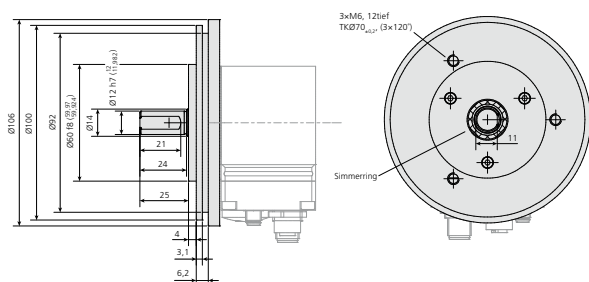


Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at [www.tr-electronic.com](http://www.tr-electronic.com) or on request.

# Flanges

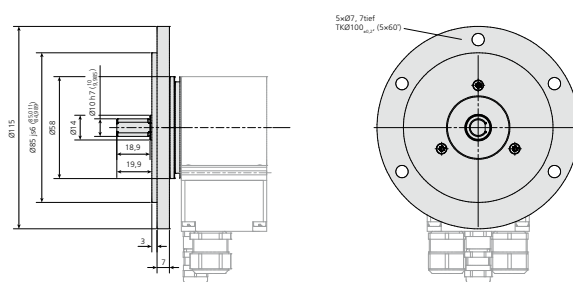
## Flange option D106 ZB60

Fits encoder mounting places 106mm, ZB 60mm



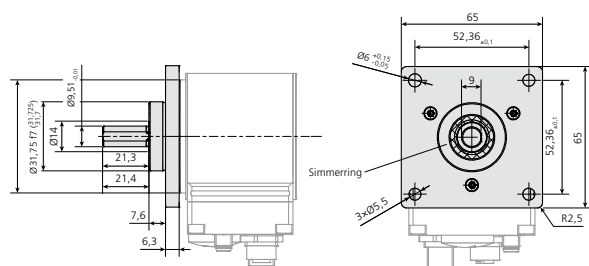
## Flange option D115 ZB85

Fits encoder mounting places 115mm, ZB 85mm



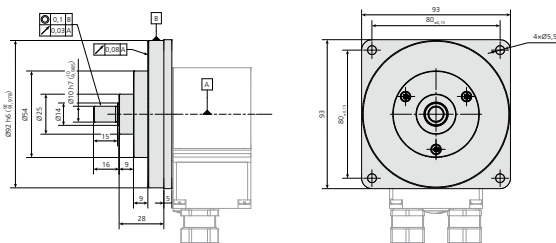
## Flange option Q65

Square flange 65mm



## Flange option Q93

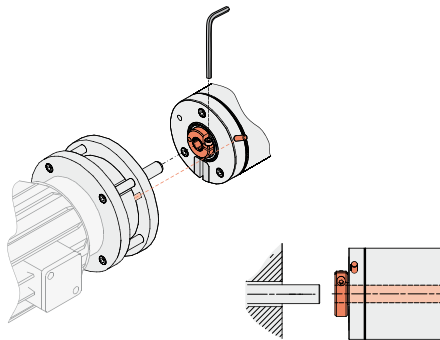
Square flange 93mm



## Assembly Examples

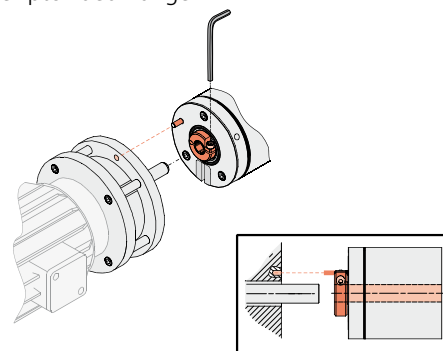
### Blind- and hollow-shaft - encoder fixation

Pin, radial, fits into a groove of customer-provided flange



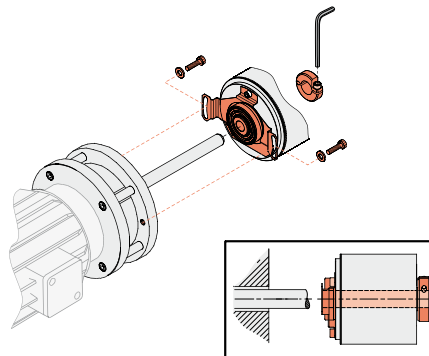
### Blind- and hollow-shaft - encoder fixation

Pin, axial in encoder flange fits into bore/groove of customer-provided flange



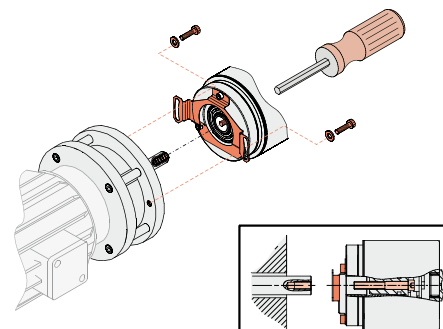
### Blind- and hollow-shaft - encoder fixation

Sheet-metal torque support, here with clamping ring.



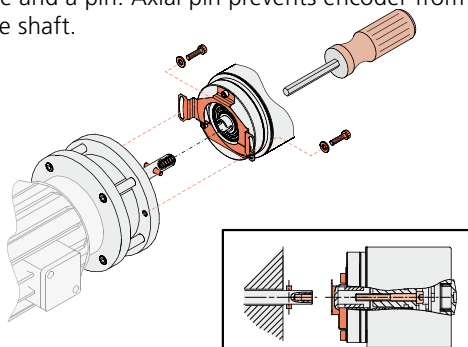
### Blind- and hollow-shaft - encoder fixation

Axial screw attaches the shaft to the encoder. Here with a sheet-metal torque support.



### Blind- and hollow-shaft - shaft fixation

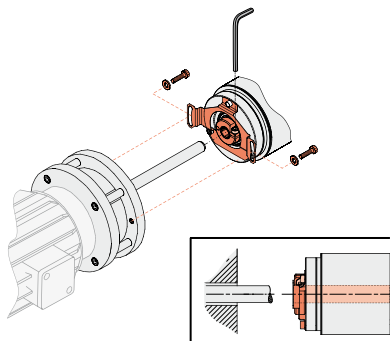
Transmission of torque is done by form closure by a V-groove and a pin. Axial pin prevents encoder from falling off the shaft.



# Assembly Examples

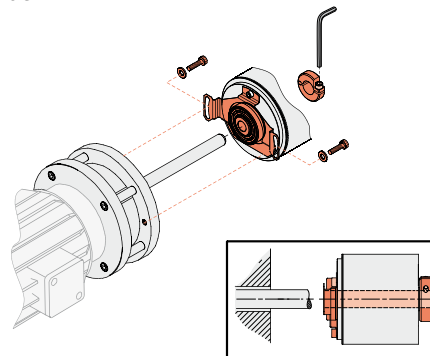
## Blind- and hollowShaft - shaft fixation

Blind shaft and hollow shaft devices usually have clamping ring on flange side.



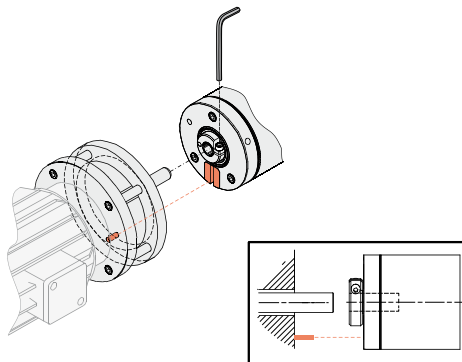
## Blind- and hollow-shaft - shaft fixation

Hollow shaft devices can be ordered with clamping ring hood side.



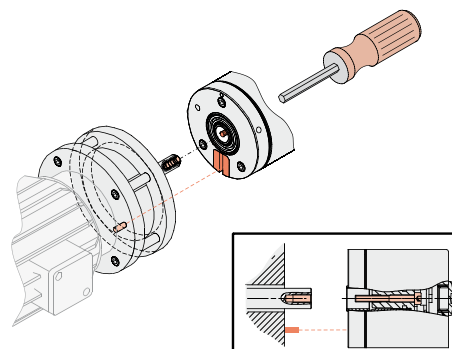
## Blind shaft

Pin/groove axial, clamping ring



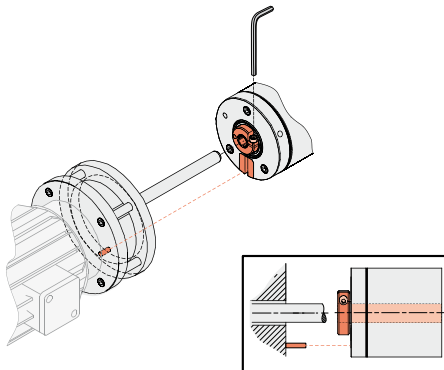
## Blind shaft

Axial screw

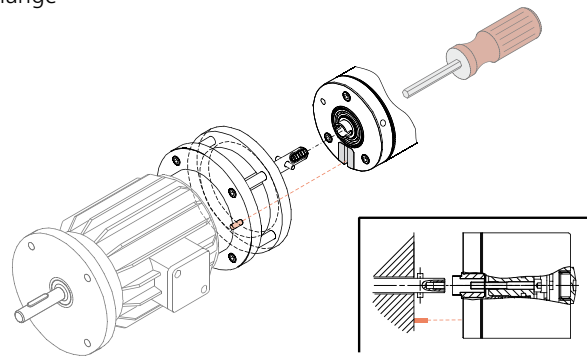


## Assembly Examples

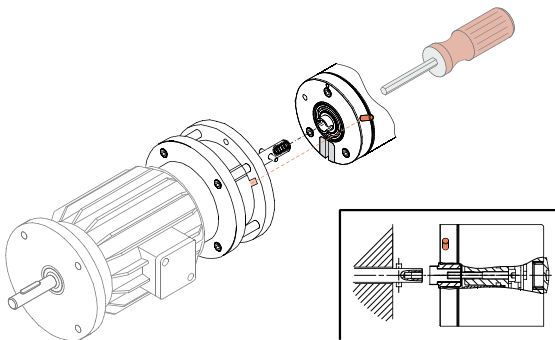
**Hollow shaft - clamping ring flange side**  
Pin/groove, clamping ring flange side



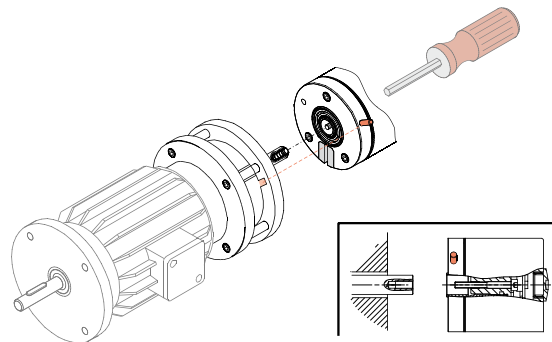
**Blind shaft**  
V-groove, axial screw and pin in customer-provides flange



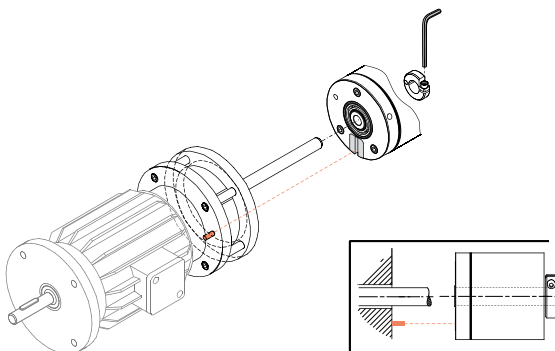
**Blind shaft**  
V-groove, axial screw and pin in encoder flange



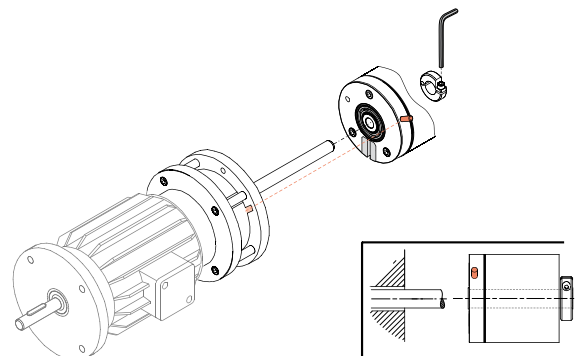
**Blind shaft**  
Axial screw and radial pin in encoder flange



**Hollow shaft - clamping ring hood side**  
Assembly hollow shaft, pin axial in encoder flange



**Hollow shaft - clamping ring hood side**  
Assembly hollow shaft, pin radial in encoder flange.



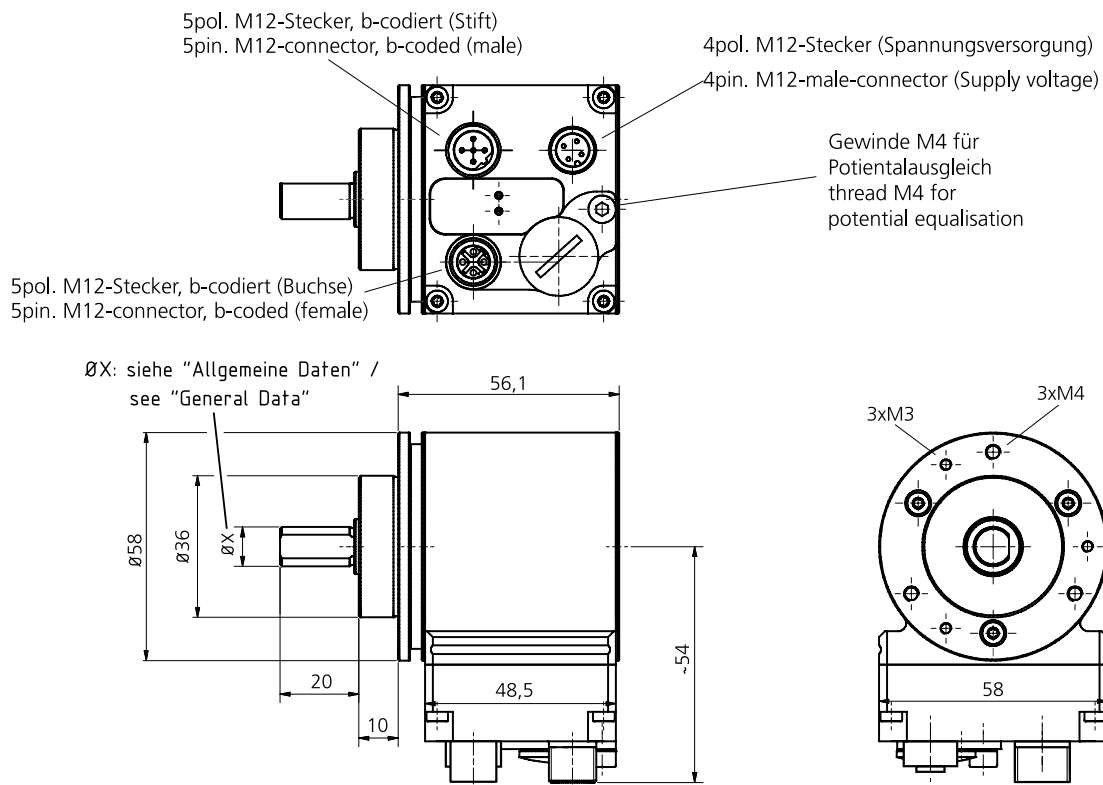
Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at [www.tr-electronic.com](http://www.tr-electronic.com) or on request.



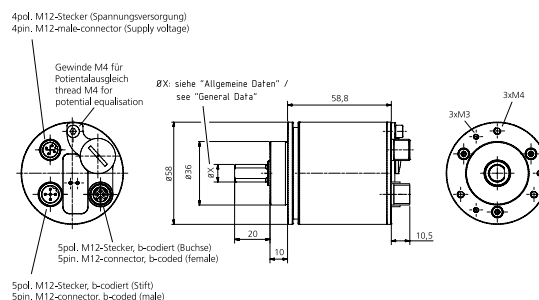


## Dimensional Drawings

### C\_V582 PB radial PROFIBUS



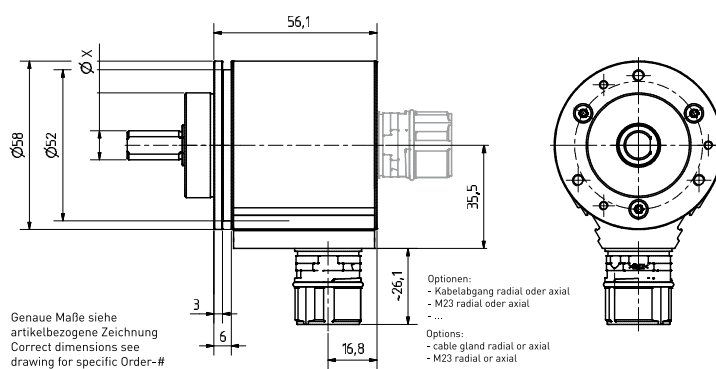
### C\_V582 PB axial PROFIBUS



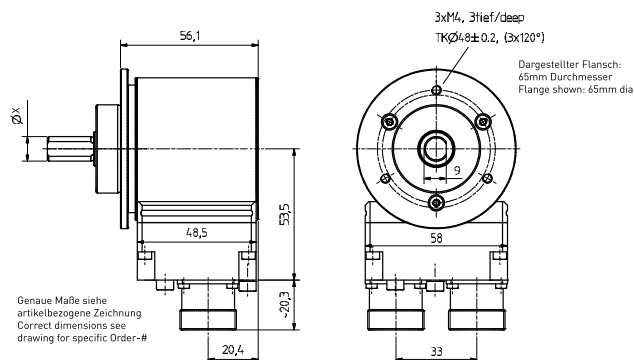
Fehlende Abmaße bzw. abweichendes Design, siehe Art.-Nr. bezogene Zeichnung /  
Missing dimensions or different design, see drawing related to the order number

# Dimensional Drawings

## C\_V582 SSI

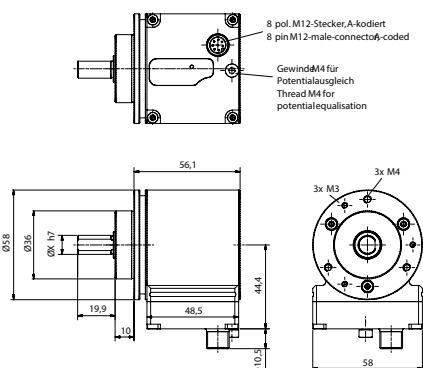


## C\_V582 IBS



## C\_V582

IO-Link, DRIVE-CLiQ



## Dimensional Drawings

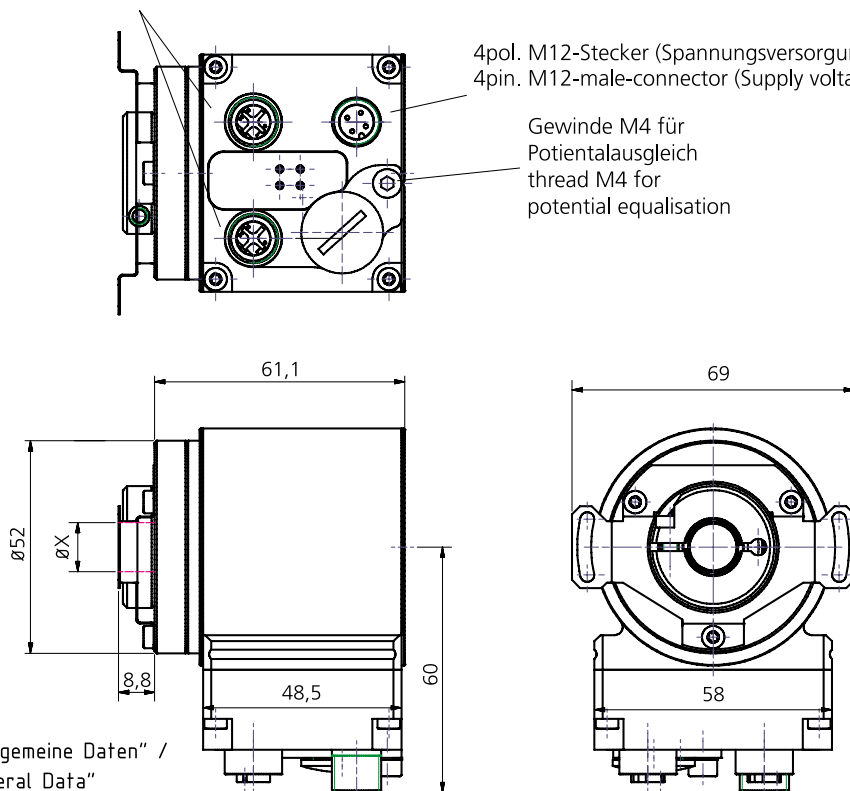
### C\_S582 Industrial Ethernet radial

PROFINET, EtherCAT, Powerlink, Ethernet / IP

2x4pol. M12-Stecker, d-codiert (Buchse)  
2x4pin. M12-connector, d-coded (female)

4pol. M12-Stecker (Spannungsversorgung)  
4pin. M12-male-connector (Supply voltage)

Gewinde M4 für  
Potentialausgleich  
thread M4 for  
potential equalisation

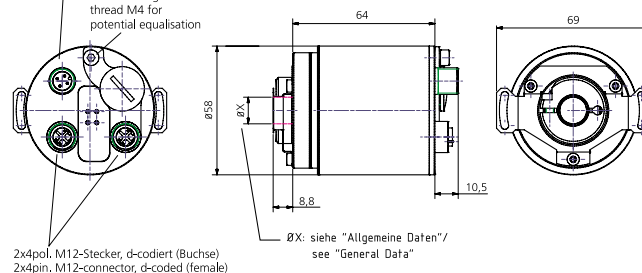


### C\_S582 Industrial Ethernet axial

PROFINET, EtherCAT, Powerlink, Ethernet / IP

4pol. M12-Stecker (Spannungsversorgung)  
4pin. M12-male-connector (Supply voltage)

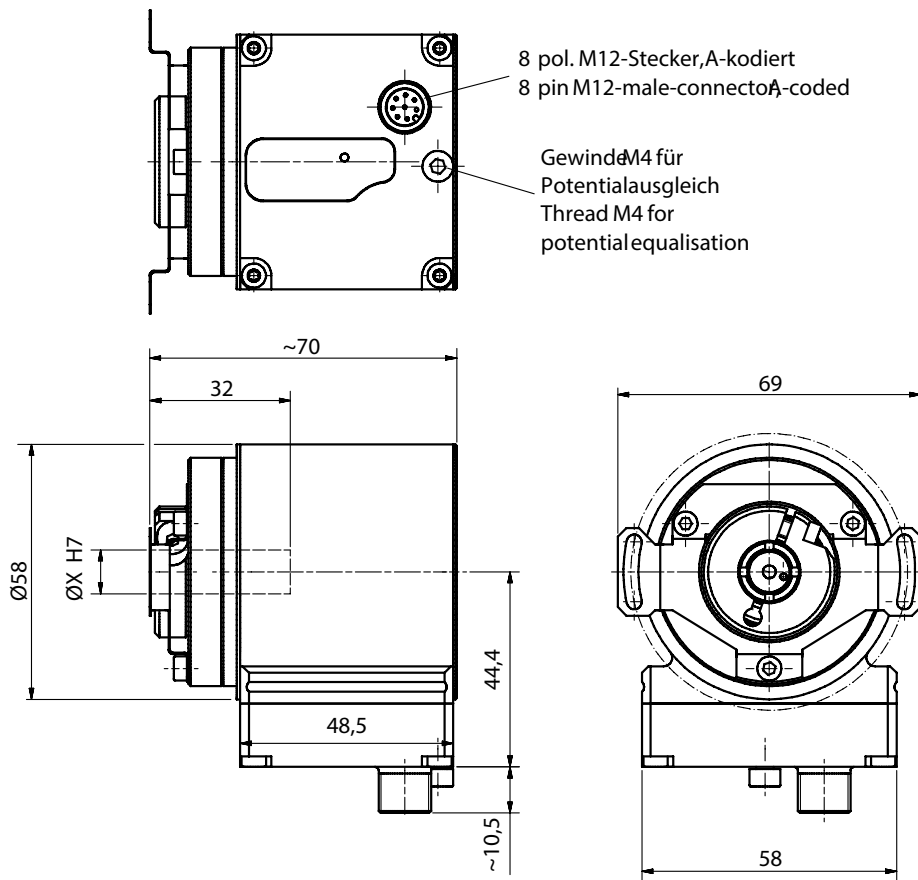
Gewinde M4 für  
Potentialausgleich  
thread M4 for  
potential equalisation



# Dimensional Drawings

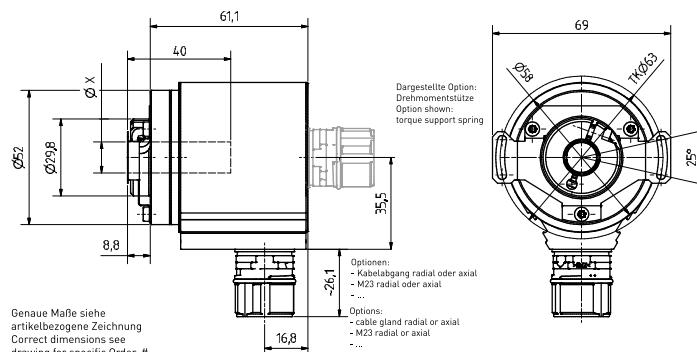
## C\_5582

IO-Link, DRIVE-CLiQ



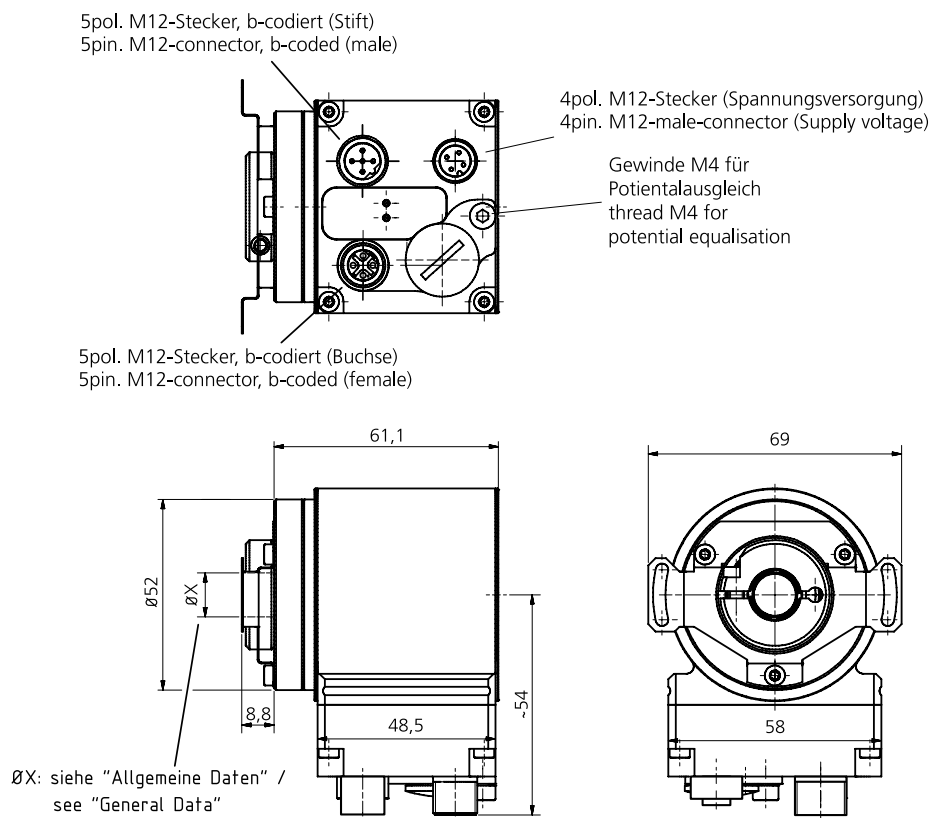
## C\_5582 SSI

SSI

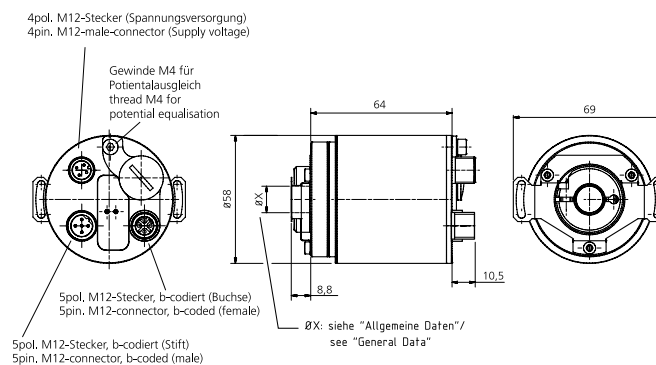


## Dimensional Drawings

### C\_S582 PB radial PROFIBUS



### C\_S582 PB axial PROFIBUS





# Dimensional Drawings

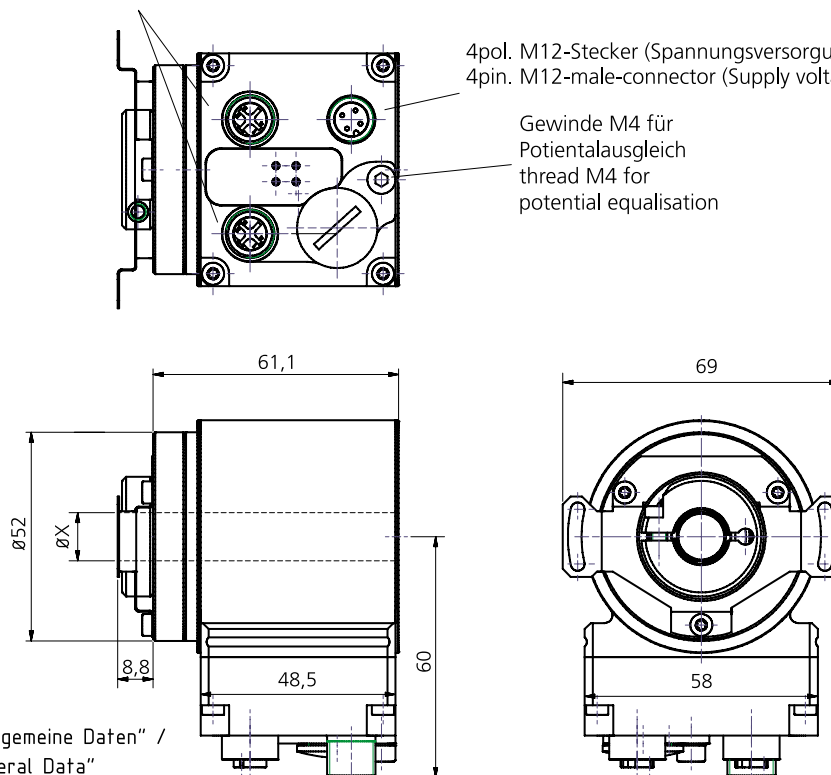
## C\_H582 Industrial Ethernet

PROFINET, EtherCAT, Powerlink, Ethernet / IP

2x4pol. M12-Stecker, d-codiert (Buchse)  
2x4pin. M12-connector, d-coded (female)

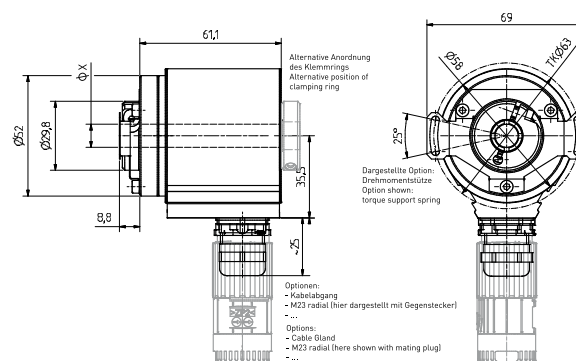
4pol. M12-Stecker (Spannungsversorgung)  
4pin. M12-male-connector (Supply voltage)

Gewinde M4 für  
Potentialausgleich  
thread M4 for  
potential equalisation



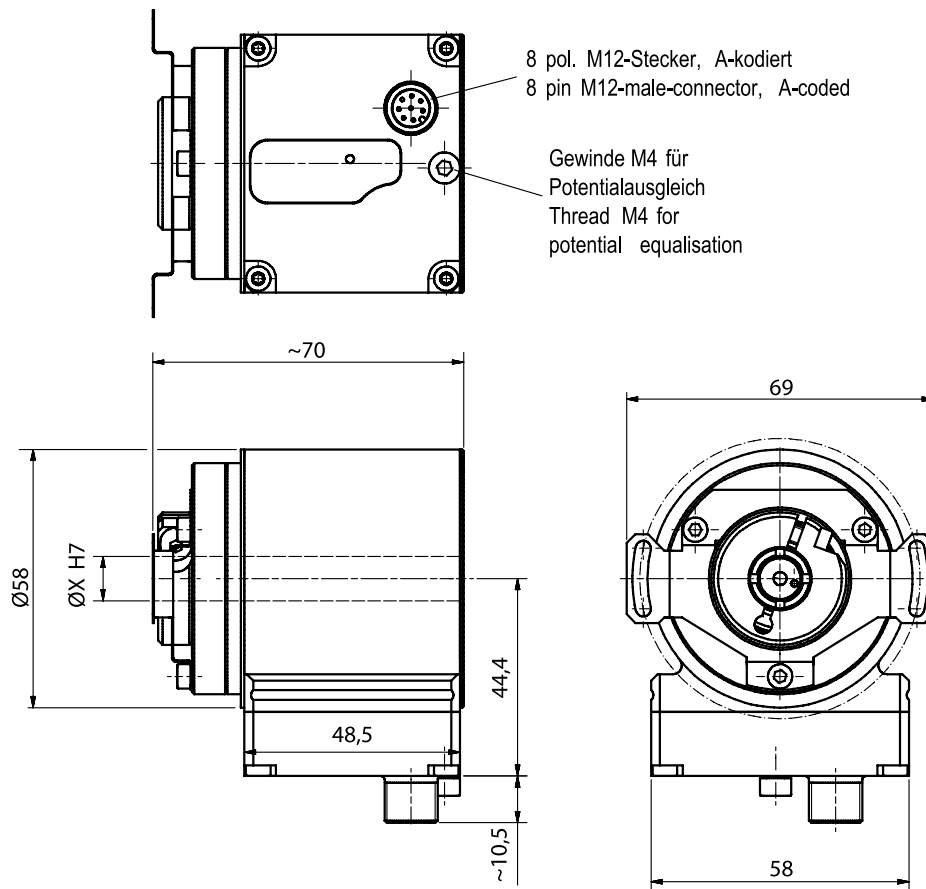
## C\_H582 SSI

SSI

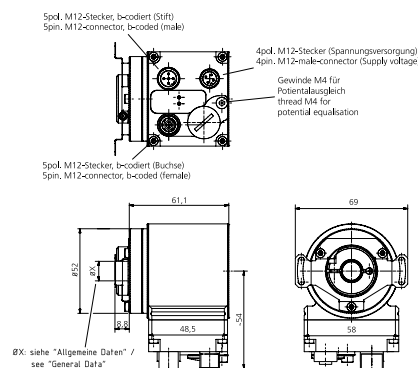


## Dimensional Drawings

**C\_H582**  
IO-Link, DRIVE-CLiQ



**C\_H582 PB**  
PROFIBUS





# Rotary Encoder - Family C\_\_65 - Housing 65 mm



## The 65 mm housing with room for more options

Encoders size 65 have been established in the marketplace for some times. Comfortable room for wiring in the rugged fieldbus hood makes them attractive when encoder cabling is done directly on the construction site, e.g. in facility automation and special machines. Even unusual interface combinations are possible directly “out of the box”, without special development. Due to changeable shafts and flanges, a vast number of shaft/flange combinations are available in short order.

- \_ Size 65 mm
- \_ many flange/shaft combinations
- \_ ample wiring room for fieldbusses - perfect for special machines and big facilities
- \_ User programmable, suited to special applications even in small quantities
- \_ Room for customer-specific connection systems
- \_ Option: Atex Zone 2/22







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## Contents

Products.....	109	Dimensional Drawings.....	112
Suggested Products.....	111	Assembly Examples .....	116

# Magnet detection (M)






## Optical 15 bit (E)

Product	CMV65	CEV65	CES65
			
Detection	Magnet detection (M)	Optical 15 bit (E)	Optical 15 bit (E)
Single / multi	(M) Multi (S) Single	(M) Multi (S) Single	(M) Multi (S) Single
Supply	11...27 VDC	11...27 VDC (A: 18...27VDC)	11...27 VDC (A: 18...27VDC)
Full resolution	<= 23 .. 24 bit	<= 25 ... 33 bit	<= 25 ... 33 bit
Steps per turn	2048 /2096	8192 / 32768	8192 / 32768
Number of turns	4096	32768 / 25600	32768 / 25600
Precision	± 1,0 °	± 1 digit	± 1 digit
Shaft diameters available	6...12mm	6...12mm	8, 10, 12mm
Connectors	Connectors axial or radial *	Cable gland or connector, radial or axial, fieldbus hood radial *	Cable gland or connector, radial or axial, fieldbus hood radial *
Ambient temperature	-20...+70 °C	-20...+70 °C	-20...+70 °C
Protection class	IP65	IP65	IP65
ATEX-zone			
Interface	<b>SSI</b> 	<b>SSI</b> <b>Nocken</b> <b>Analog</b>  <b>ASI</b> <b>CANopen</b> <b>Parallel</b> <b>DeviceNet</b>	<b>SSI</b>  <b>Analog</b> <b>EtherNet/IP</b> <b>Parallel</b>
Option, additional interfaces (on request)		<b>SSI</b> <b>Nocken</b> <b>Analog</b> <b>INC</b> <b>Parallel</b> <b>SIN / COS</b>	<b>SSI</b> <b>Nocken</b> <b>Analog</b> <b>INC</b> <b>Parallel</b> <b>SIN / COS</b>
Weblink	<a href="http://www.tr-electronic.com/s/S007147">www.tr-electronic.com/s/S007147</a>	<a href="http://www.tr-electronic.com/s/S007148">www.tr-electronic.com/s/S007148</a>	<a href="http://www.tr-electronic.com/s/S007149">www.tr-electronic.com/s/S007149</a>
QR-Code			

\* depending on the interface

Can't find the right variant? Please contact us ([info@tr-electronic.de](mailto:info@tr-electronic.de))

# Optical 18 bit (O) Optical 15 bit (E)

Product	COV65	AEV65
		
Detection	Optical 18 bit (O)	Optical 15 bit (E)
Single / multi	(M) Multi (S) Single	(M) Multi (S) Single
Supply	11...27 VDC (A: 18...27VDC)	11...27 VDC (A: 18...27VDC)
Full resolution	<= 36 bit	<= 33 bit
Steps per turn	262144	32768
Number of turns	25600	25600
Precision	± 1 digit	± 1 digit
Shaft diameters available	6...12mm	6...12mm
Connectors	Cable gland or connector, radial or axial, fieldbus hood radial *	Connectors axial or radial *
Ambient temperature	-20...+70 °C	-20...+60 °C
Protection class	IP65	IP64
ATEX-zone		2/22
Interface	<b>SSI</b>  <b>ASI</b>	<b>SSI</b> <b>Analog</b>
Option, additional interfaces (on request)	<b>SSI</b> <b>ASI</b>	
Weblink	<a href="http://www.tr-electronic.com/s/S007150">www.tr-electronic.com/s/S007150</a>	<a href="http://www.tr-electronic.com/s/S007151">www.tr-electronic.com/s/S007151</a>
QR-Code		

\* depending on the interface

Can't find the right variant? Please contact us (info@tr-electronic.de)



## Suggested Products

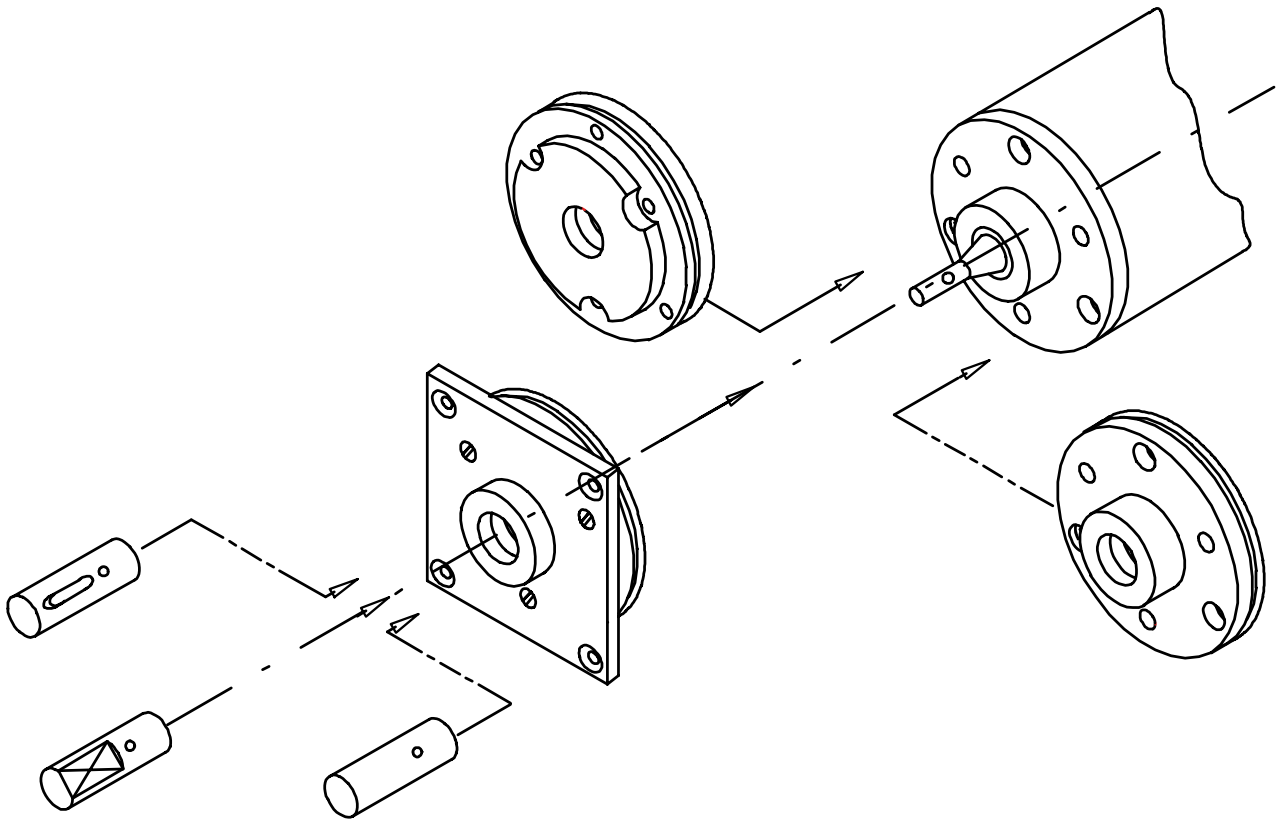
Order code	Steps per turn	Turns	Shaft / Flange	Connector position	Connector type	Remark
<b>CEV65 PARALLEL PUSH PULL</b>						
CEV65M-10498	4096	4096	10FL/19,5 - ZB36	Cable gland radial		
<b>CEV65 SSI</b>						
CEV65M-00444	4096	4096	10FL/19,5 - ZB36	Connector radial	M23, 12 pin	
<b>CEV65 PROFIBUS DP</b>						
CEV65M-01460	4096	4096	10FL/19,5 - ZB36	Fieldbus hood	Cable glands	Most sold type for profibus with cable connection
CEV65M-01542	8192	4096	10FL/19,5 - ZB36	Fieldbus hood	Cable glands	Similar to -01460, but 13 bit
CEV65M-01748	4096	4096	6GL/10 - ZB50	Fieldbus hood	Cable glands	
CEV65M-01858	8192	4096	6GL/10 - ZB50	Fieldbus hood	Cable glands	
<b>CEV65 CAN/DEVICE NET</b>						
CEV65M-10076	4096	4096	10FL/19,5 - ZB36	Fieldbus hood	Cable glands	
CEV65M-10089	8192	4096	10FL/19,5 - ZB36	Fieldbus hood	Cable glands	
<b>CEV65 PROFINET IO</b>						
CEV65M-10323	4096	4096	10FL/19,5 - ZB36	Fieldbus hood	Connectors M12	
<b>CEV65 ETHERNET IP</b>						
CEV65M-10261	8192	4096	10FL/19,5 - ZB36	Fieldbus hood	Connectors M12	
<b>CEV65 POWERLINK V2.0</b>						
CEV65M-10231	8192	4096	10FL/19,5 - ZB36	Fieldbus hood	Connectors M12	
<b>CES65 ETHERNET IP</b>						
CES65M-10060	8192	4096	12H7 Blind Shaft	Fieldbus hood	Connectors M12	
<b>AEV65 SSI+ANALOG</b>						
AEV65M-00001	4096	4096	10FL/19,5 - ZB36	Connector radial	M23, 12 pin	ATEX zone 2/22

For further product information simply enter the order number in the search field at [www.tr-electronic.com](http://www.tr-electronic.com).

We will help you to select the most suitable products from the complete TR range. Please contact us ([info@tr-electronic.de](mailto:info@tr-electronic.de)).

## Dimensional Drawings

### Modular flange / shaft assembly



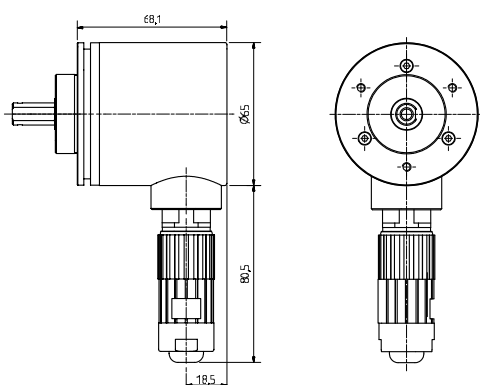
### Fieldbus hood

More room for connections in fieldbus hood series 65 (right) compared to series 58 (left)

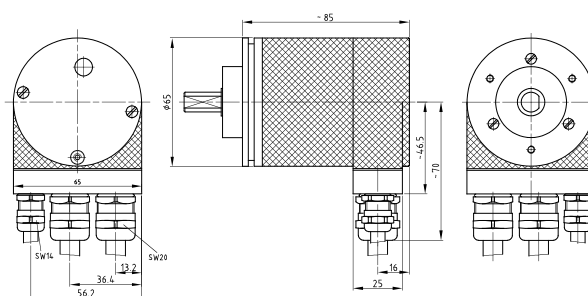


# Dimensional Drawings

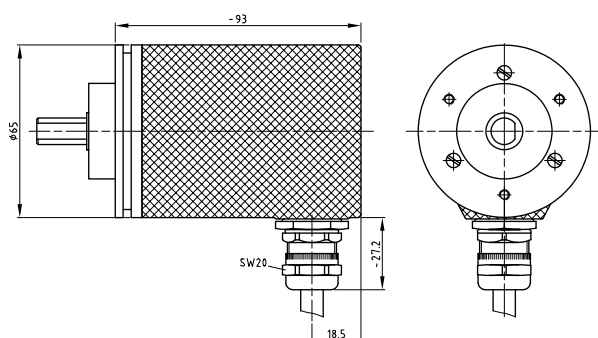
**CMV65-SSI**



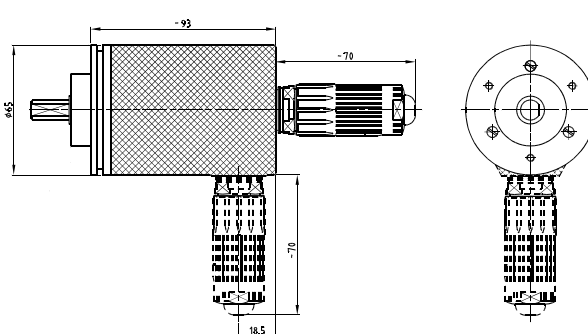
**CMV65-Profibus**



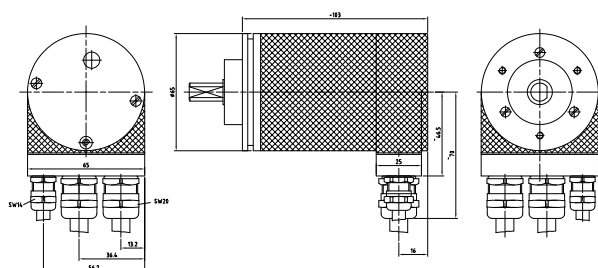
**CEV65-PAR, NSW**



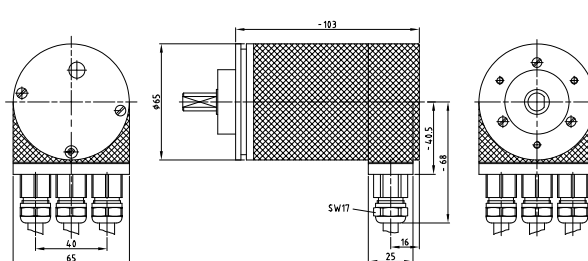
**CEV65-SSI, Analog, ASI; COV65-SSI, Analog**



**CEV65-Profibus**

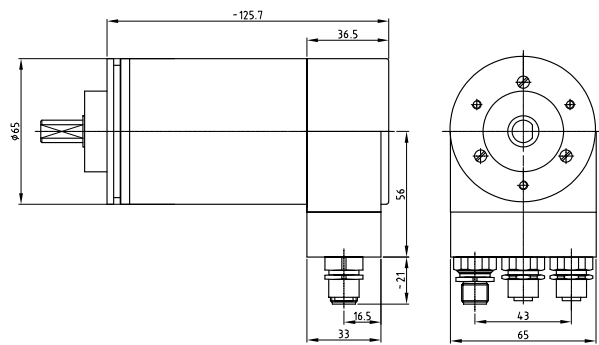


**CEV65-CANopen, DeviceNet**

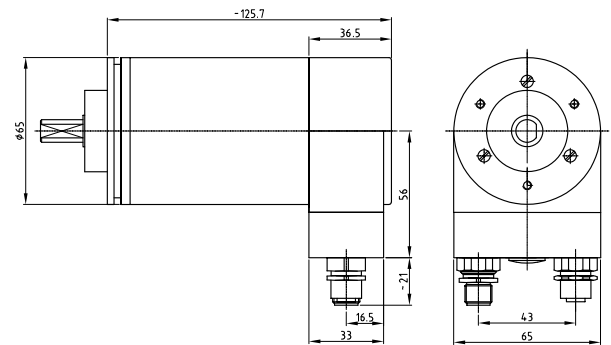


## Dimensional Drawings

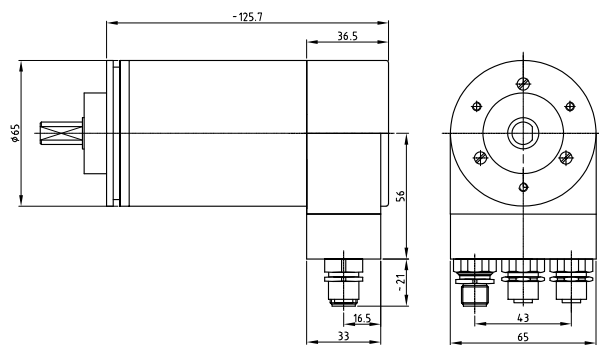
**CEV65-Profinet**



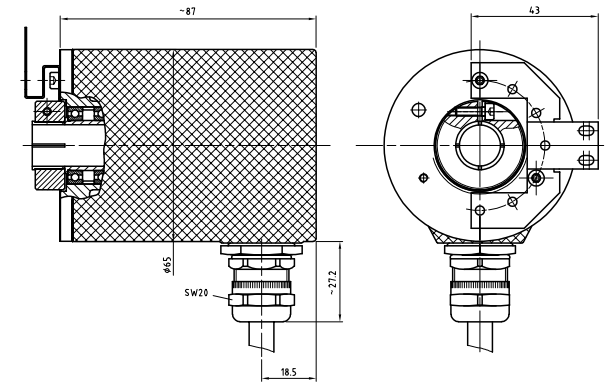
**CEV65-Ethernet/IP; COV65-Ethernet/IP**



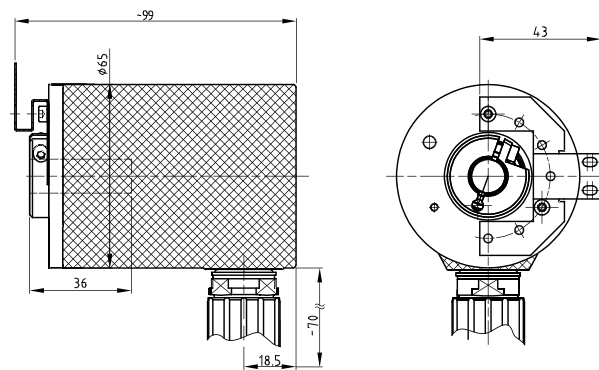
**CEV65-Powerlink; COV65-Powerlink**



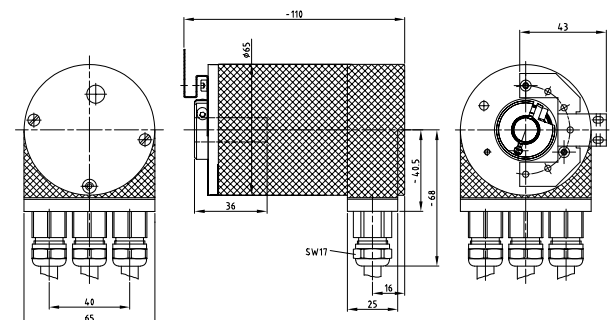
**CES65-PAR**



**CES65-SSI, Analog**



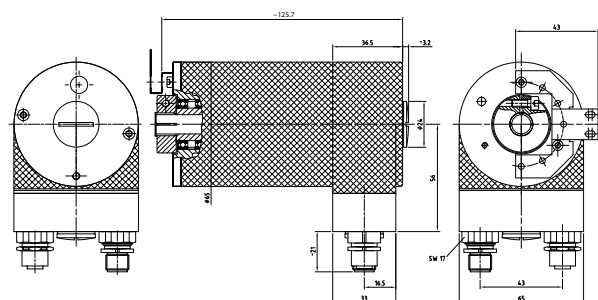
**CES65-Profibus**



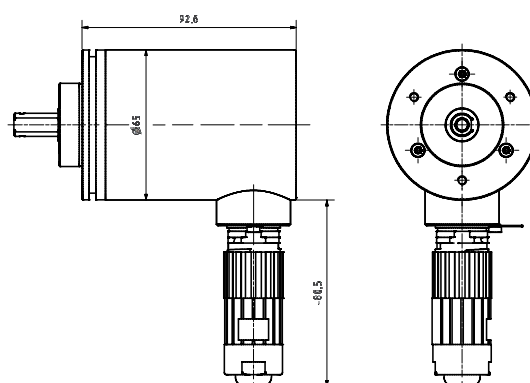
Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at [www.tr-electronic.com](http://www.tr-electronic.com) or on request.

## Dimensional Drawings

**CES65-Ethernet/IP**

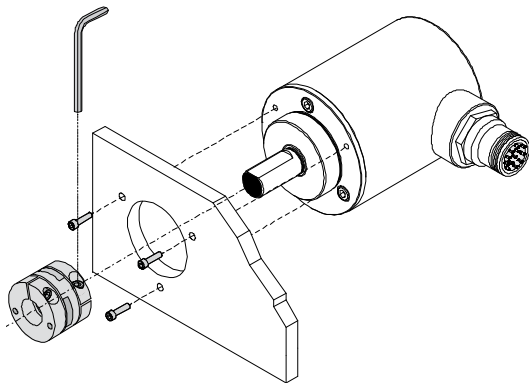


**AEV65-Analog**

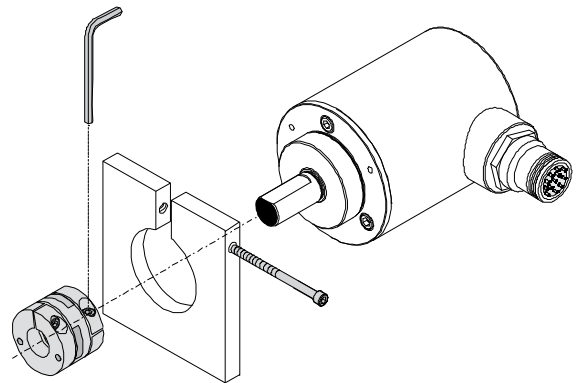


## Assembly Examples

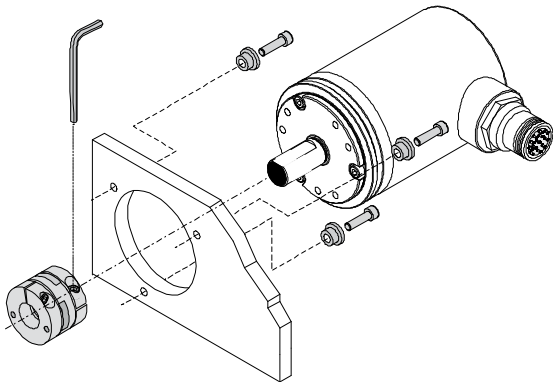
**Solid shaft - screws in axial threads**



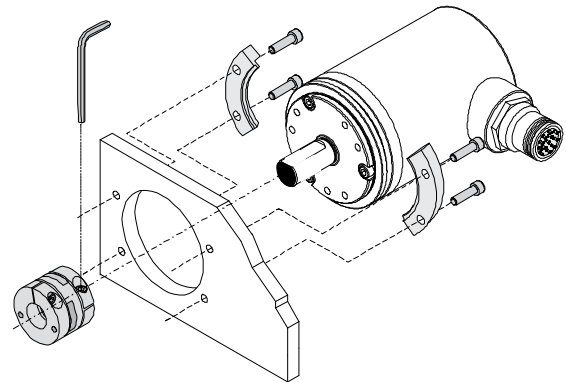
**Solid shaft - clamping flange**



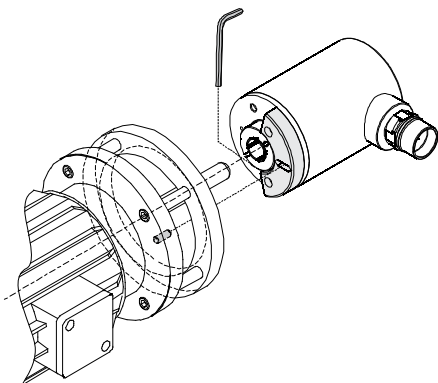
**Solid shaft - servo clamps**



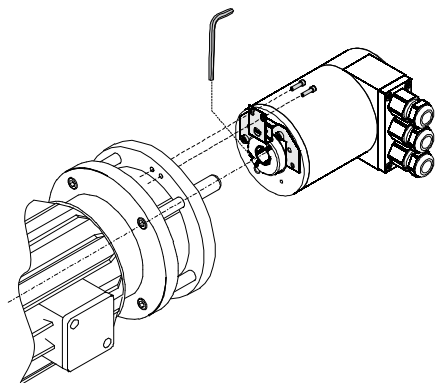
**Solid shaft - clamping brackets**



**Blind shaft - groove / pin**



**Blind shaft - torque support spring**



Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at [www.tr-electronic.com](http://www.tr-electronic.com) or on request.





## Encoder - Family C\_H80 - Housing 80 mm



### Hollow shaft encoder for shafts up to 27 mm

Hollow shaft encoders made by TR-Electronic provide a current absolute position reading value immediately after power up without any referencing, counters or batteries. The encoder is supported mechanically by the passing shaft. To prevent the encoder from turning with the shaft, a compact torque support spring can be used or a pin/groove connection in the flange of the encoder. Family 80 covers shaft diameters from 10 to 27 mm with an extensive choice of industrial interfaces as you've come to expect from TR-Elec-

tronic. Two resolution classes meet your demands perfectly: CEH measures up to 15 bits per turn, COH up to 18 bits per turn. Both detections measure up to 256,000 absolute turns. C\_H80 is available for ATEX Zones 2/22 named A\_H80. See chapter "Absolute rotary encoders - ATEX - Zone 2/22".


















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### Contents

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# Optical 15 bit (E)














# Optical 18 bit (O)

Produkt	CEH80	CEH802	COH80
			
Abtastung	Optisch 15 Bit (E)	Optisch 15 Bit (E)	Optisch 18 Bit (O)
Single / Multi	(M) Multi (S) Single	(M) Multi (S) Single	(M) Multi (S) Single
Versorgung	24 VDC (11...27)	24 VDC (11...27)	24 VDC (11...27)
Schrittzahl pro Umdrehung	32768	32768	262144
Anzahl Umdrehungen	256000	256000	262144
verfügbarer Wellendurchmesser	10, 14, 16, 20, 24, 25, 27	10, 14, 16, 20, 24, 25, 27	10, 14, 16, 20, 24, 25, 27
Steckerausführung	Stecker radial (Option Kabel*)	3x M12	Stecker radial (Option Kabel*)
Arbeitstemperatur	0...+60 °C (Option -20...+70 °C)	-20...+70°C	0...+60 °C (Option -20...+70 °C)
Schutzart	IP54	IP54	IP54
Schnittstellen	SSI	          	SSI
Optionale Zusatzschnittstellen (auf Anfrage)	INC		INC
Weblink	<a href="http://www.tr-electronic.de/s/S008496">www.tr-electronic.de/s/S008496</a>	<a href="http://www.tr-electronic.de/s/S019339">www.tr-electronic.de/s/S019339</a>	<a href="http://www.tr-electronic.de/s/S008497">www.tr-electronic.de/s/S008497</a>
QR-Code			

\* depending on the interface

Can't find the right variant? Please contact us ([info@tr-electronic.de](mailto:info@tr-electronic.de))

## Optical 18 bit (O)

Produkt	COH802 
Abtastung	Optisch 18 Bit (O)
Single / Multi	(M) Multi (S) Single
Versorgung	24 VDC (11...27)
Schrittzahl pro Umdrehung	262144
Anzahl Umdrehungen	262144
verfügbarer Wellendurchmesser	10, 14, 16, 20, 24, 25, 27
Steckerausführung	3x M12
Arbeitstemperatur	-20...+70°C
Schutzart	IP54
Schnittstellen	          
Optionale Zusatzschnittstellen (auf Anfrage)	
Weblink	<a href="http://www.tr-electronic.de/s/5019339">www.tr-electronic.de/s/5019339</a>
QR-Code	

## Suggested Products

Order code	Steps per turn	Turns	Shaft	Connector position
<b>CEV84 - Ethernet/IP</b>				
CEV84M-10046	8192	4096		Axial
<b>CEV84 - PROFINET</b>				
CEV84M-10049	8192	4096		Axial
<b>CEV84 - EtherCAT</b>				
CEV84M-10050	8192	4096		Axial
<b>CEV84 - Sercos</b>				
CEV84M-10054	8192	4096		Axial
<b>CEV84 - Powerlink</b>				
CEV84M-10052	8192	4096		Axial

For further product information simply enter the order number in the search field at [www.tr-electronic.com](http://www.tr-electronic.com).

### Further product information

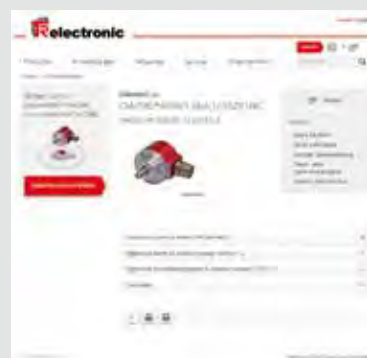
1. Enter order code into ...



2. Searchfield (top right) on [www.tr-electronic.com](http://www.tr-electronic.com)



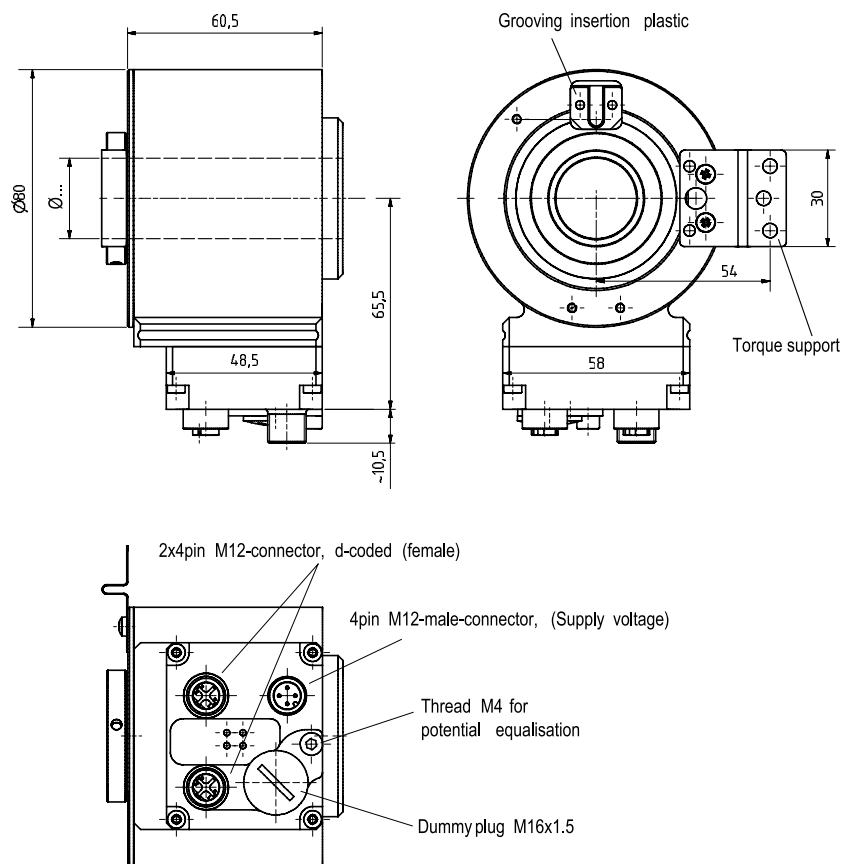
3. Choose desired information



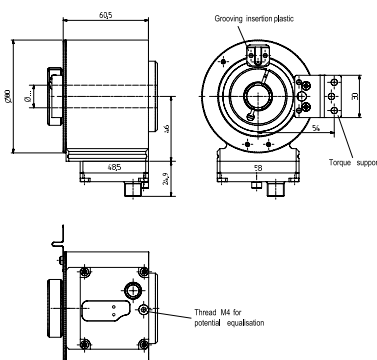
We will help you to select the most suitable products from the complete TR range. Please contact us ([info@tr-electronic.de](mailto:info@tr-electronic.de)).

## Suggested Products

### C\_H802 PROFINET, EtherCAT, Ethernet/IP



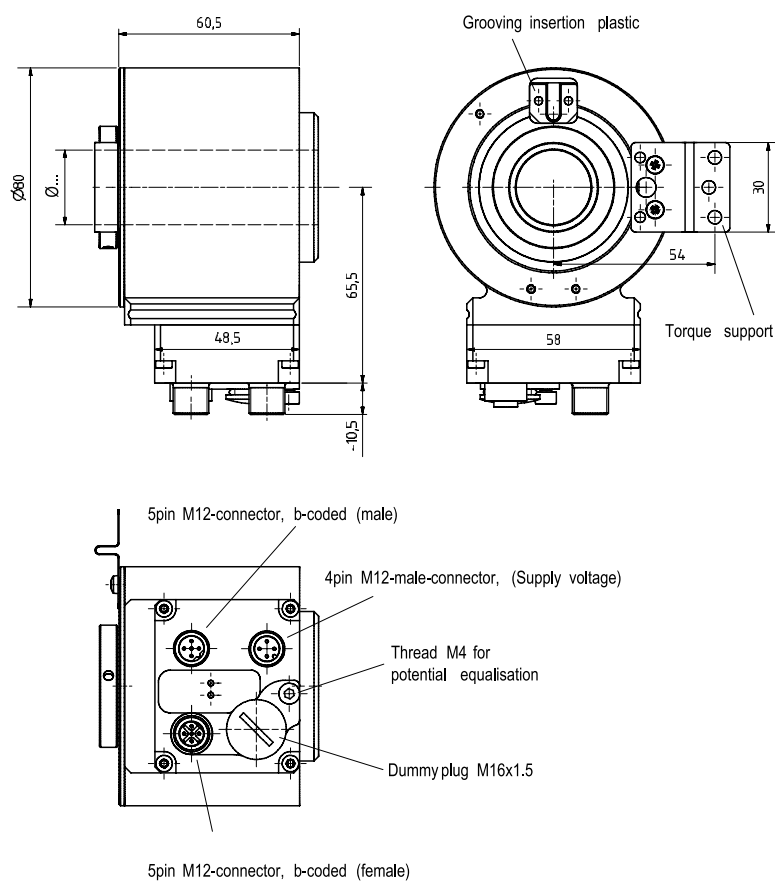
### C\_H802 DRIVE CLiQ, IOLink



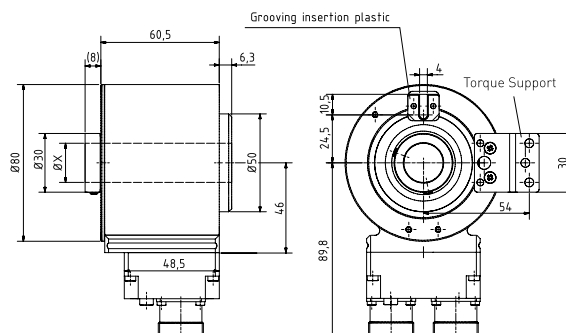


# Dimensional Drawings

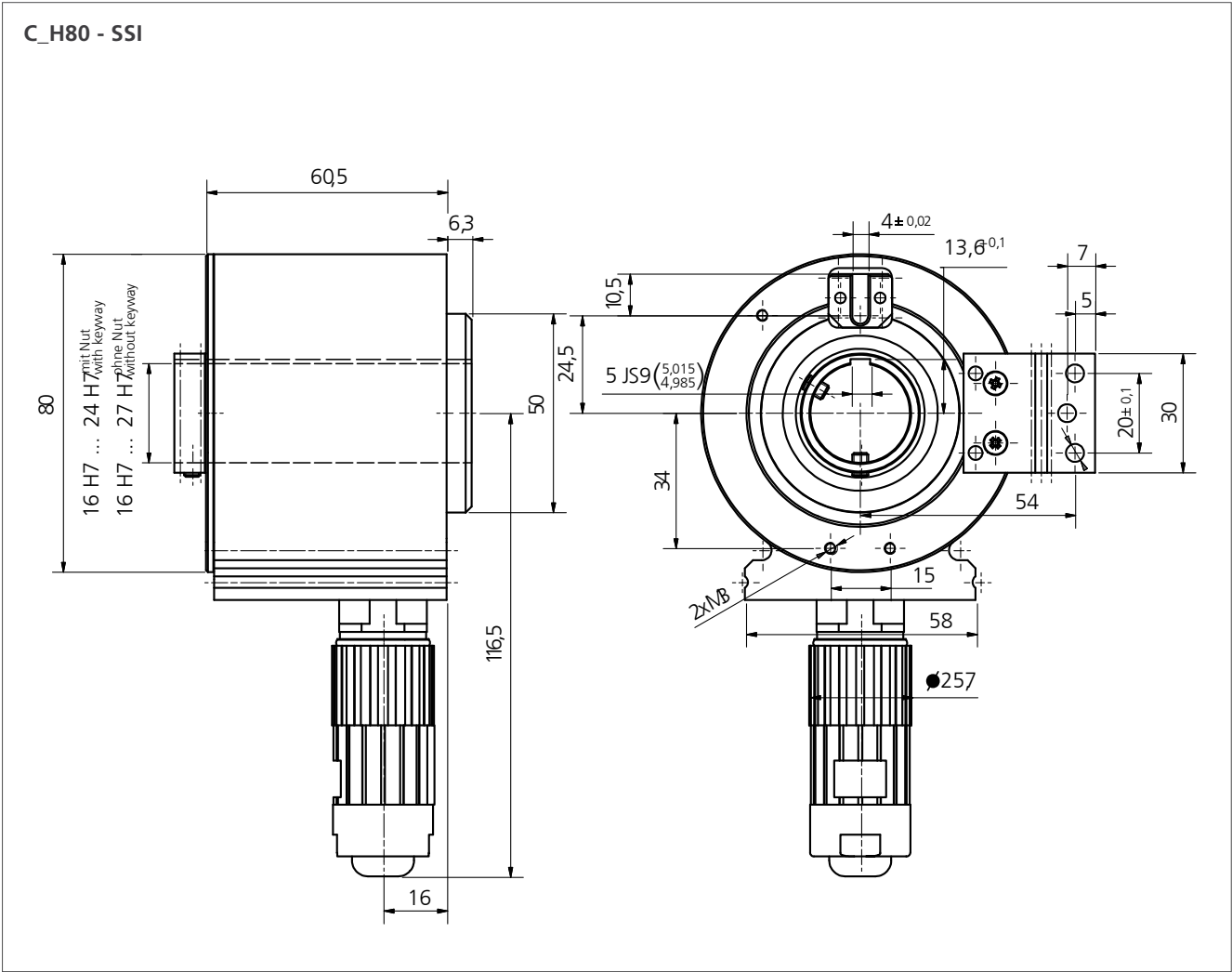
## C\_H802 Profibus



## C\_H802 Interbus-S



# Dimensional Drawings





## Rotary Encoder - Family Q\_H80/81 - Housing 80 mm



### Hollow shaft encoder for shafts up to 25 mm

Hollow shaft encoders made by TR-Electronic provide a current absolute position reading value immediately after power up without any referencing, counters or batteries. The encoder is supported mechanically by the passing shaft. The larger housing (compared with C\_H80) offers more room and possibilities for interfaces and interface combinations. Special highlight: The same encoder contains more interfaces and only the clamps used in the spacious connection hood decide which interface is to be used in your application.

Combination of multi-turn with an independent single-turn detection can be used for a simple cross-check of the encoder position (single-turn is used to monitor the multi-turn-detection in a separate monitoring unit) or to provide special feedback systems for commutation (also with SIN/COS).

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### Contents




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## Optical 15 bit (E) Double detection (D)

Products			
Detection	Optical 15 bit (E)	Optical 15 bit (E)	Double detection (D)
Single / multi	(M) Multi (S) Single	(M) Multi (S) Single	(M) Multi (S) Single (2nd detection: Single)
Supply	24 VDC (11..27)	24 VDC (11..27)	24 VDC (11..27)
Steps per turn	<= 8192	<= 8192	<= 8192
Number of turns	<= 256000	<= 256000	<= 256000
Shaft diameters available	16, 20, 24, 25	16, 20, 22, 24, 25	12, 14, 16, 20, 22, 24, 25
Connectors	Connector radial, connection hood with cable glands	Connector radial, connection hood with cable glands	Connector radial, connection hood with cable glands
Ambient temperature	0...+60 °C (option -20...+70 °C)	0...+60 °C (option -20...+70 °C)	0...+60 °C (option -20...+70 °C)
Protection class	IP54	IP54	IP54
Interface	<b>SSI</b>   <b>INC</b>	<b>SSI</b>   <b>INC</b>	<b>SSI</b>   <b>INC</b>
Option, additional interfaces (on request)	<b>INC</b>	<b>INC</b>	<b>INC</b>
Weblink	<a href="http://www.tr-electronic.com/s/S008515">www.tr-electronic.com/s/S008515</a>	<a href="http://www.tr-electronic.com/s/S008518">www.tr-electronic.com/s/S008518</a>	<a href="http://www.tr-electronic.com/s/S008516">www.tr-electronic.com/s/S008516</a>
QR-Code			

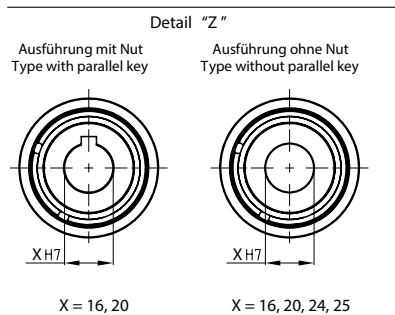
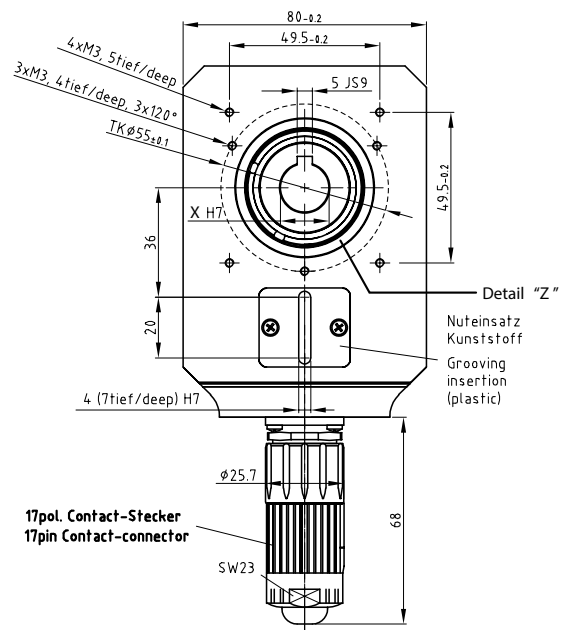
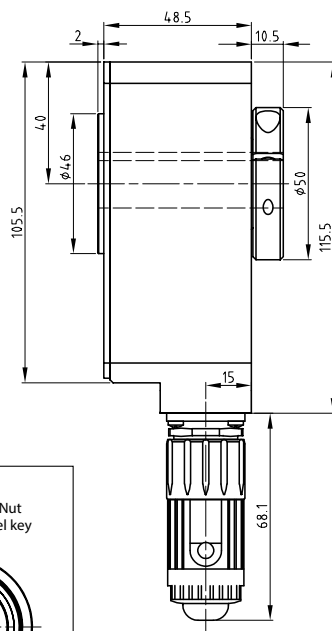
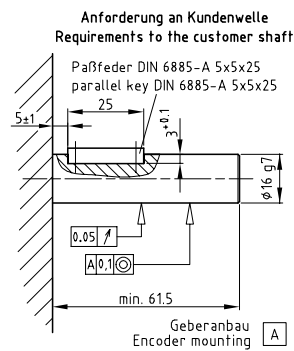
Can't find the right variant? Please contact us ([info@tr-electronic.de](mailto:info@tr-electronic.de))

## Double detection (D)

Products	QDH81 
Detection	Double detection (D)
Single / multi	(M) Multi (S) Single (2nd detection: Single)
Supply	24 VDC (11..27)
Steps per turn	<= 8192
Number of turns	<= 256000
Shaft diameters available	16, 20, 22, 24, 25
Connectors	Connector radial, connection hood with cable glands
Ambient temperature	0...+60 °C (option -20...+70 °C)
Protection class	IP54
Interface	<b>SSI</b>  <b>INC</b>
Option, additional interfaces (on request)	<b>INC</b>
Weblink	<a href="http://www.tr-electronic.com/s/S008517">www.tr-electronic.com/s/S008517</a>
QR-Code	

# Dimensional Drawings

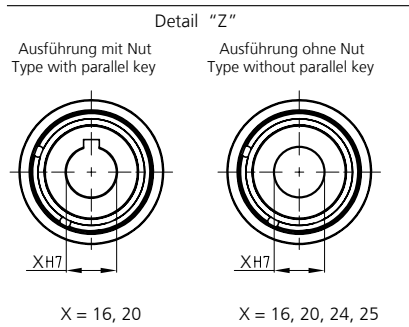
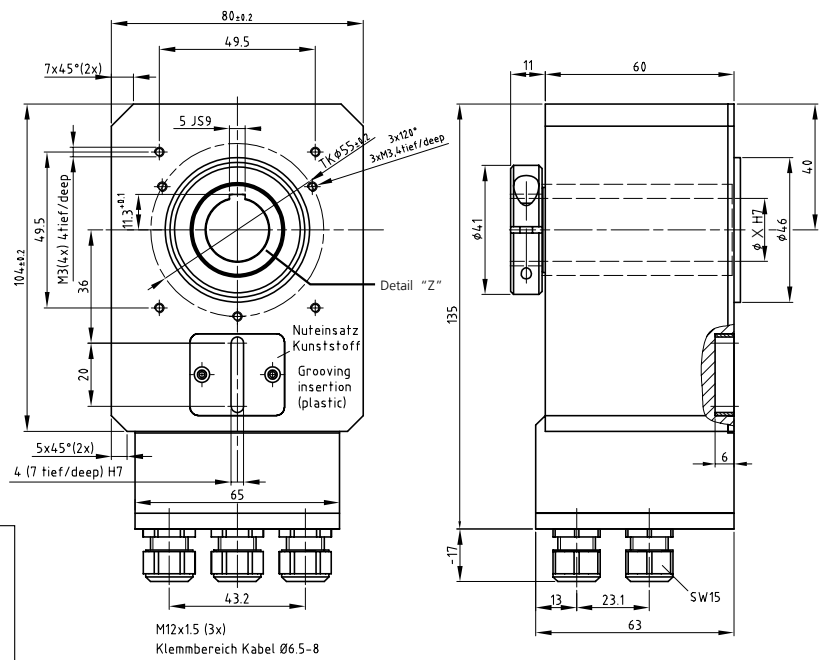
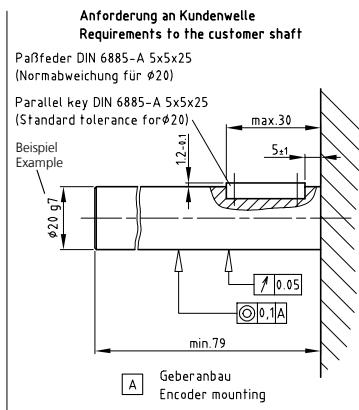
## QEH80, QDH80





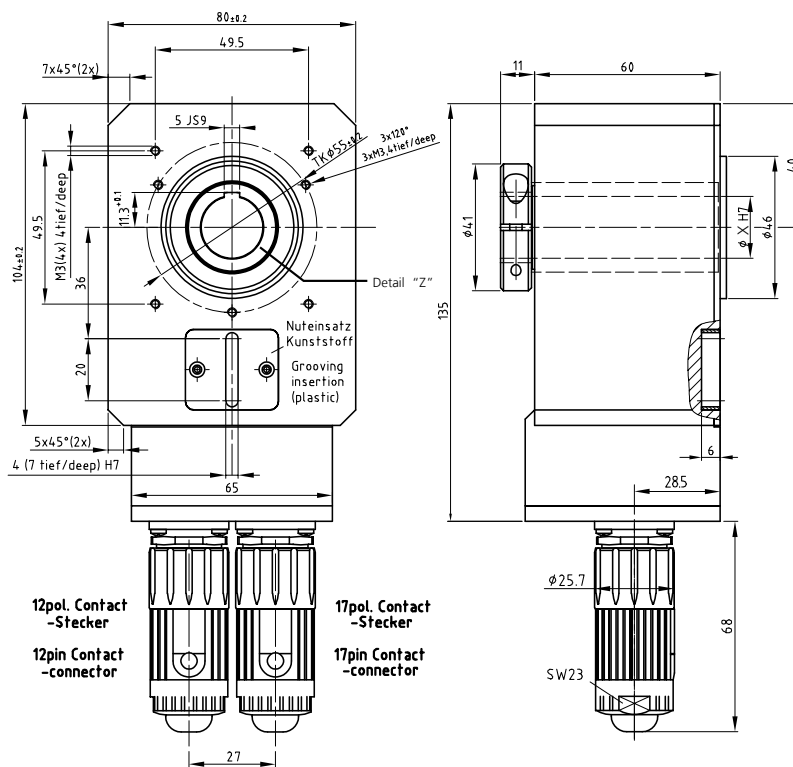
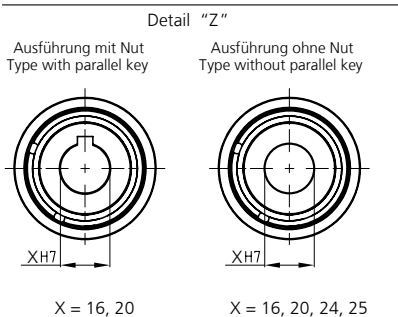
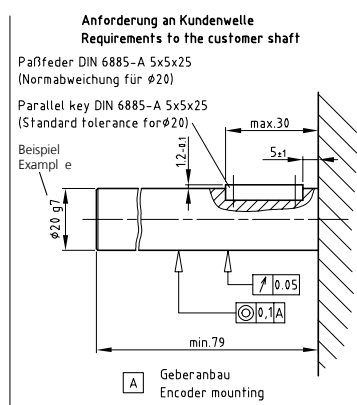
# Dimensional Drawings

## QEH81

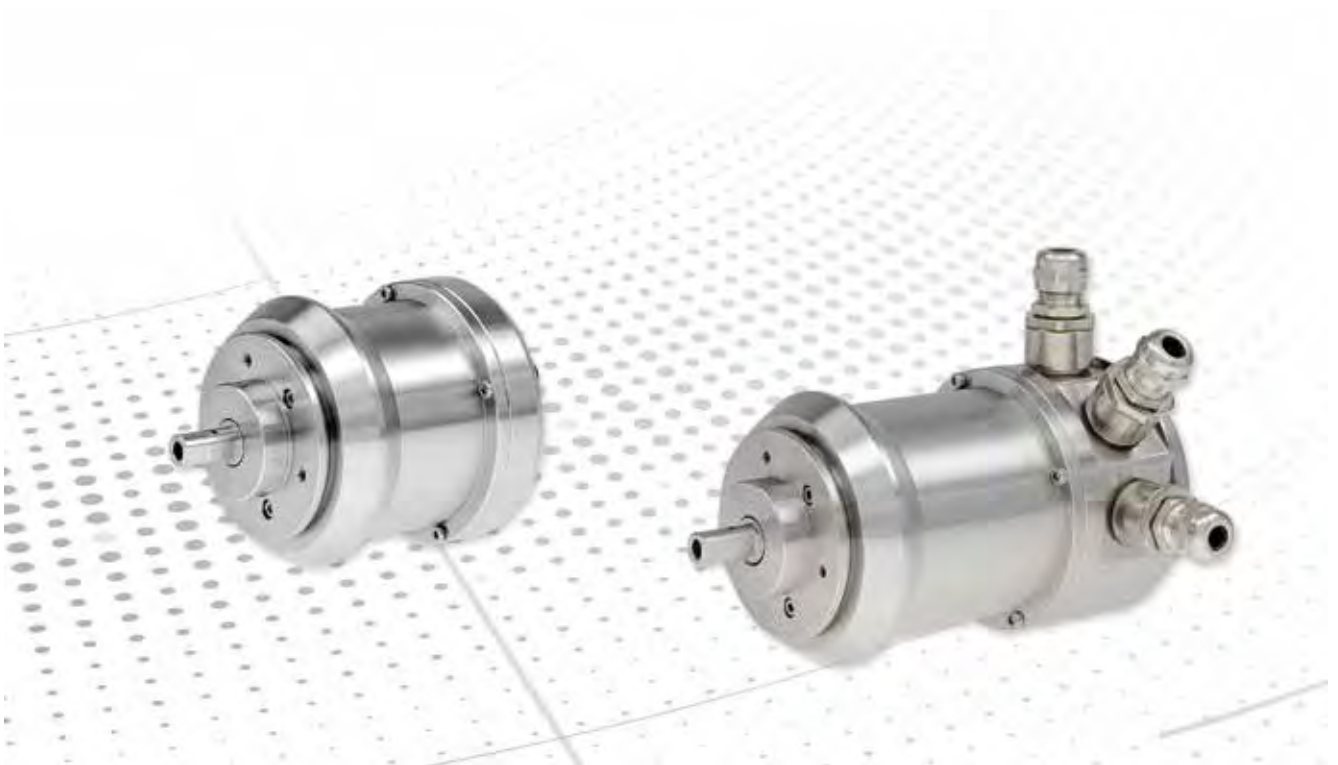


# Dimensional Drawings

## QDH81



## Rotary Encoders - Stainless Steel Housing - C\_\_84



### Protective housing for aggressive surroundings

In paper processing it is groundwood pulp, in process technology it is acids and lyes, in food processing technology it is hot cleaning solutions under high pressure. Rotary encoders constantly come into contact with corrosive media. Compact rotary encoders are suitably equipped for an aggressive environment: Encased in the proven protective housing, the CEV84Ms can withstand everything that an ordinary stainless steel can tolerate. At the same time they can be cleaned with water under high pressure and are therefore also suitable for

use in food processing machines and plants. For industrial Ethernet, installation and activation is considerably simplified. The encoder is integrated into the network by watertight connectors located at the rear side of the encoder. CEV84M brings the world of cutting-edge industrial networks to paper machines, process plants and to the pharmaceutical and food industries.









Stainless steel housings of series 84 provides perfect protection in aggressive surroundings even for the most recent Generation 582 with all its interface features.

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## Stainless steel

Product	CEV84	CEV84 Field Bus	CEV84 Industrial Ethernet
			
Material	1.4305 (X12 Cr NiS 18 08 / 18 9)	1.4305 (X12 Cr NiS 18 08 / 18 9)	1.4305 (X12 Cr NiS 18 08 / 18 9)
Detection, Resolution choose from	C__58, L__58	C__58, L__58	C__58, L__58
Supply	11...27 VDC	11...27 VDC	11...27 VDC
Maximum rpm	3000 1/min	3000 1/min	3000 1/min
Mass (typical)	1,5..2,5 kg	1,5..2,5 kg	1,5..2,5 kg
Shaft diameters available	6, 10, 12 mm	6, 10, 12 mm	6, 10, 12 mm
Connectors	M23 axial / radial	Fieldbus hood / cable glands radial	3 x M12 axial
Ambient temperature	-20...+70 °C (option -40...+85 °C)	-20...+70 °C (option -40...+85 °C)	-20...+70 °C (option -40...+85 °C)
Protection class	IP68	IP68	IP68
ATEX			
Interface	<b>SSI</b> <b>Parallel</b>  <b>Analog</b>	 <b>DeviceNet</b>  <b>CANopen</b>	 <b>ETHERNET POWERLINK</b>  <b>EtherCAT</b> <b>sercos</b> the automation bus  <b>EtherNet/IP</b>
Option, additional interfaces (on request)	<b>Analog</b> <b>INC</b>  <b>Parallel</b>	<b>SSI</b> <b>Parallel</b>  <b>Analog</b> <b>INC</b>	
Weblink	<a href="http://www.tr-electronic.com/s/S007190">www.tr-electronic.com/s/S007190</a>	<a href="http://www.tr-electronic.com/s/S007190">www.tr-electronic.com/s/S007190</a>	<a href="http://www.tr-electronic.com/s/S007190">www.tr-electronic.com/s/S007190</a>
QR-Code			

Can't find the right variant? Please contact us ([info@tr-electronic.de](mailto:info@tr-electronic.de))

## Suggested Products

Order code	Steps per turn	Turns	Shaft / Flange	Connector position	Connector type	Remark
<b>CEV84 - Ethernet/IP</b>						
CEV84M-10046	8192	4096	10FL19,5 ZB36	Axial	3 x M12	
<b>CEV84 - PROFINET</b>						
CEV84M-10049	8192	4096	10FL19,5 ZB36	Axial	3 x M12	
<b>CEV84 - EtherCAT</b>						
CEV84M-10050	8192	4096	10FL19,5 ZB36	Axial	3 x M12	
<b>CEV84 - Sercos</b>						
CEV84M-10054	8192	4096	10FL19,5 ZB36	Axial	3 x M12	
<b>CEV84 - Powerlink</b>						
CEV84M-10052	8192	4096	10FL19,5 ZB36	Axial	3 x M12	

For further product information simply enter the order number in the search field at [www.tr-electronic.com](http://www.tr-electronic.com).

### Further product information

1. Enter order code into ...



2. Searchfield (top right) on [www.tr-electronic.com](http://www.tr-electronic.com)



3. Choose desired information

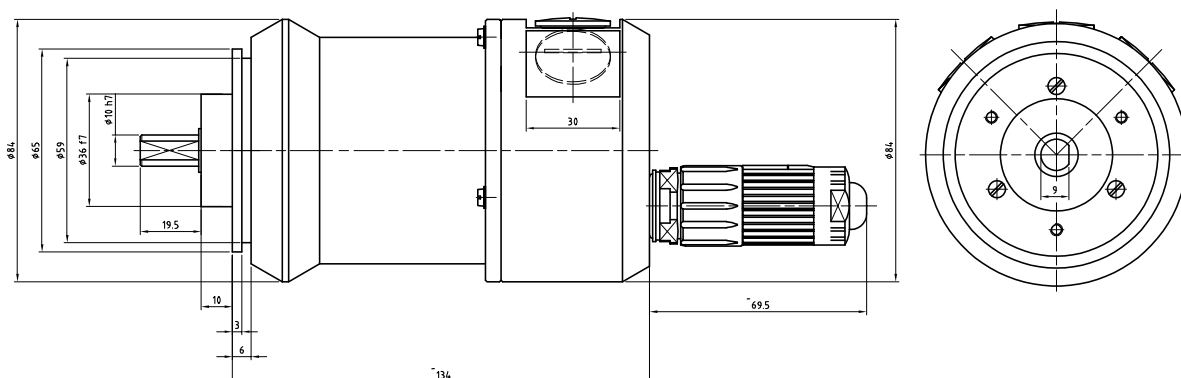


We will help you to select the most suitable products from the complete TR range. Please contact us ([info@tr-electronic.de](mailto:info@tr-electronic.de)).

# Dimensional Drawings

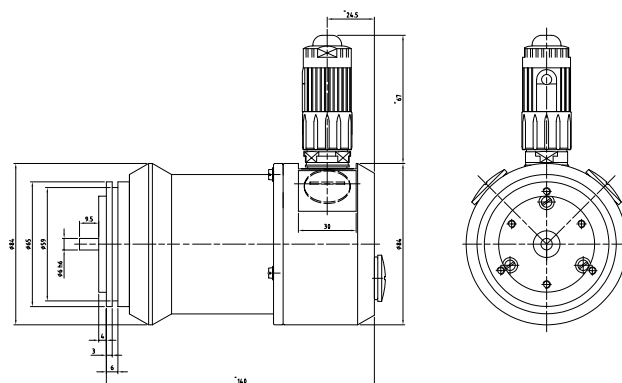
## CEV84

SSI, Analog, PAR - axial



## CEV84

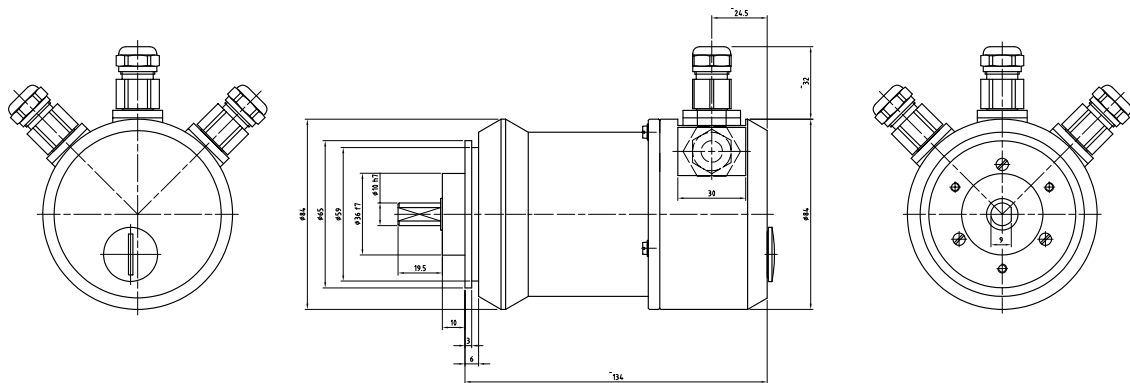
SSI, Analog, PAR - radial



## Dimensional Drawings

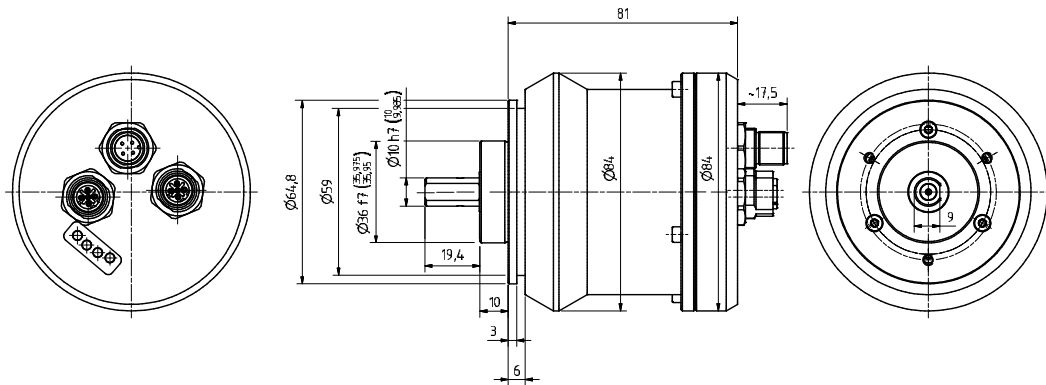
### CEV84 Fieldbus

CANopen, CAN DeviceNet, Profibus



### CEV84 Industrial Ethernet

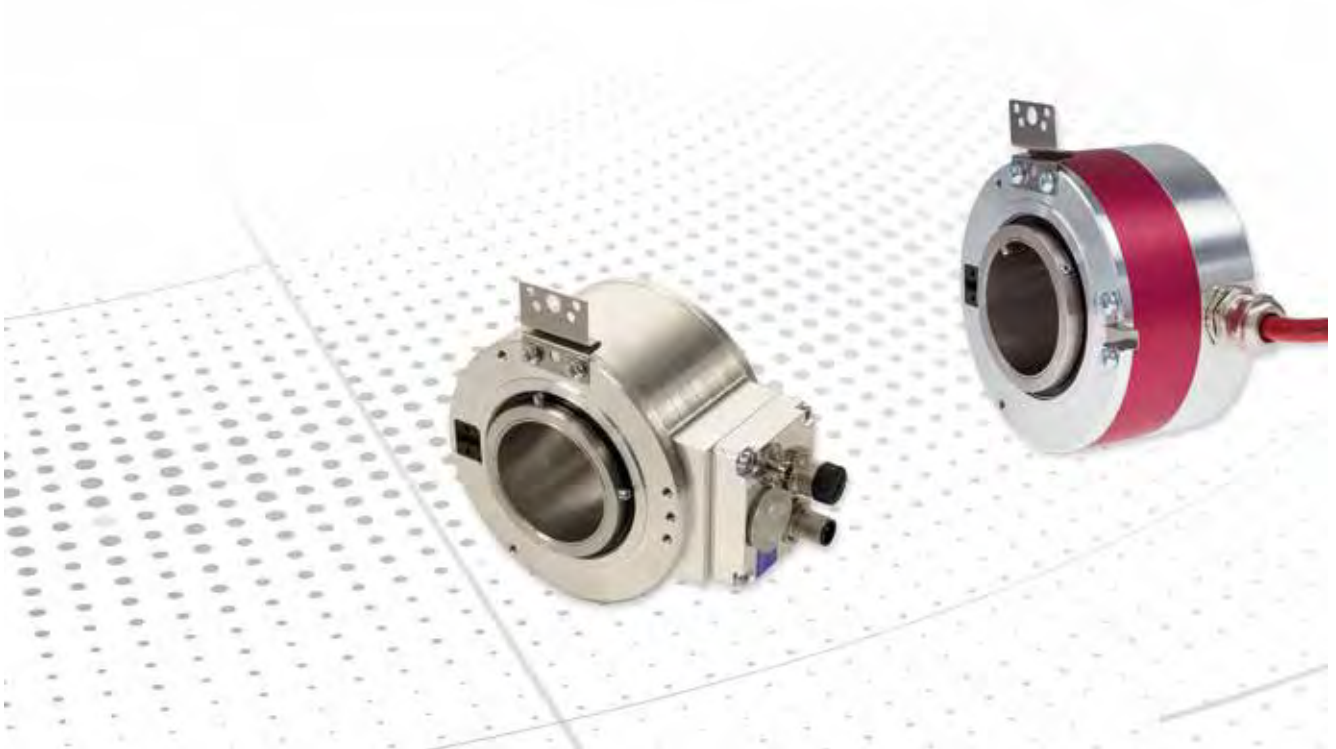
EtherNet/IP, Sercos, EtherCAT, PROFINET IO, POWERLINK







## Rotary Encoders - Family C\_H110(2) - Housing 110 mm



### Hollow shaft encoder for shafts up to 50 mm

Hollow shaft encoders made by TR-Electronic provide a current absolute position reading value immediately after power up without any referencing, counters or batteries. The encoder is supported mechanically by the passing shaft. To prevent the encoder from turning with the shaft, a compact torque support spring can be used or a pin/groove connection in the flange of the encoder. Family 110 covers shaft diameters from 15 up to 20 mm with an extensive choice of industrial interfaces as you've come to expect

from TR-Electronic. Two resolution classes fit your demands perfectly: CEH measures up to 15 bits per turn, COH up to 18 bits per turn. Both detections measure up to 262,144 absolute turns.


















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### Content

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# Optical 15 bit (E)














# Optical 18 bit (O)

Product	CEH110	CEH1102	COH110
			
Detection	Optical 15 bit (E)	Optical 15 bit (E)	Optical 18 bit (O)
Single / multi	(M) Multi (S) Single	(M) Multi (S) Single	(M) Multi (S) Single
Supply	24 VDC (11...27)	24 VDC (11...27)	24 VDC (11...27)
Steps per turn	32768	32768	262144
Number of turns	256000	256000	262144*
Shaft diameters available	15, 28, 30, 35, 38, 40, 45, 50	15, 28, 30, 35, 38, 40, 45, 50	15, 28, 30, 35, 38, 40, 45, 50
Connectors	connector radial	connector radial	connector radial
Ambient temperature	0...+60 °C (option -20...+70 °C)	0...+60 °C (option -20...+70 °C)	0...+60 °C (option -20...+70 °C)
Protection class	IP54	IP54	IP54
Interface	<b>SSI</b>	          	<b>SSI</b>
Option, additional interfaces (on request)	<b>INC</b>	<b>INC</b>	<b>INC</b>
Weblink	<a href="http://www.tr-electronic.com/s/S008519">www.tr-electronic.com/s/S008519</a>	<a href="http://www.tr-electronic.com/s/S008519">www.tr-electronic.com/s/S008519</a>	<a href="http://www.tr-electronic.com/s/S008520">www.tr-electronic.com/s/S008520</a>
QR-Code			

\* depending on the interface

Can't find the right variant? Please contact us ([info@tr-electronic.de](mailto:info@tr-electronic.de))

# Optical 15 bit (E) Optical 18 bit (O)

Product	COH1102 
Detection	Optical 18 bit (O)
Single / multi	(M) Multi (S) Single
Supply	24 VDC (11...27)
Steps per turn	262144
Number of turns	262144*
Shaft diameters available	15, 28, 30, 35, 38, 40, 45, 50
Connectors	connector radial
Ambient temperature	0...+60 °C (option -20...+70 °C)
Protection class	IP54
Interface	          
Option, additional interfaces (on request)	<b>INC</b>
Weblink	<a href="http://www.tr-electronic.com/s/S008520">www.tr-electronic.com/s/S008520</a>
QR-Code	

\* depending on the interface

Can't find the right variant? Please contact us ([info@tr-electronic.de](mailto:info@tr-electronic.de))

## Suggested Products

Bestellnummer	Schritte je Umdrehung	Umdrehungen	Welle / Flansch	Anschluss	Hinweis
<b>CEH110 - SSI</b>					
CEH110M-00001	4096	4096		Kabelabgang, 0,3 m Leitung, M23 12 pin	
<b>CEH110 - SSI</b>					
CEH110M-00009	8192	4096		Kabelabgang, 3 m Leitung, unbearbeitetes Ende	
<b>CEH110 - SSI</b>					
CEH110S-00002	8192	1		Kabelabgang, 0,3 m Leitung, M23 12 pin	

Für mehr Produkt-Informationen tragen Sie einfach die Bestellnummer in das Suchfeld auf [www.tr-electronic.de](http://www.tr-electronic.de) ein.

### Further product information

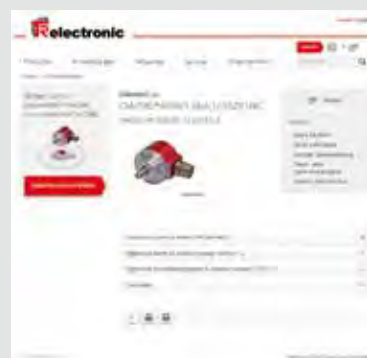
1. Enter order code into ...



2. Searchfield (top right) on [www.tr-electronic.com](http://www.tr-electronic.com)

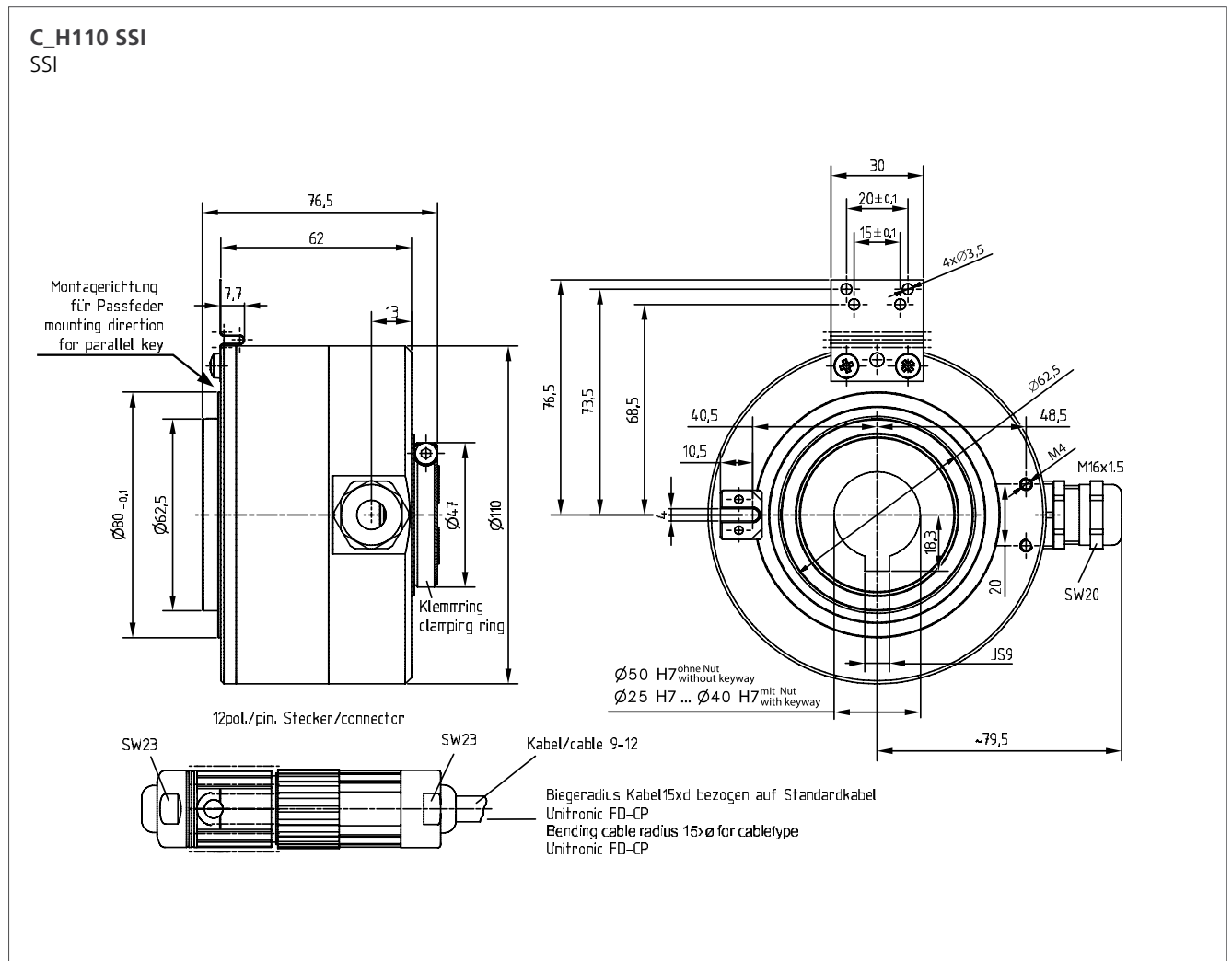


3. Choose desired information



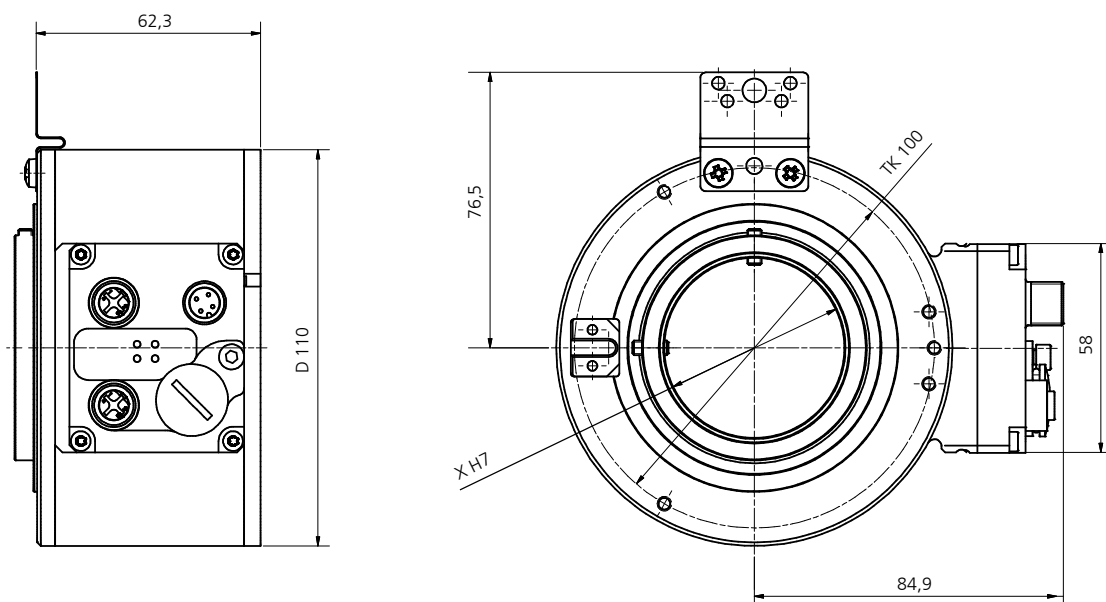
We will help you to select the most suitable products from the complete TR range. Please contact us ([info@tr-electronic.de](mailto:info@tr-electronic.de)).

## Dimensional Drawings



## Dimensional Drawings

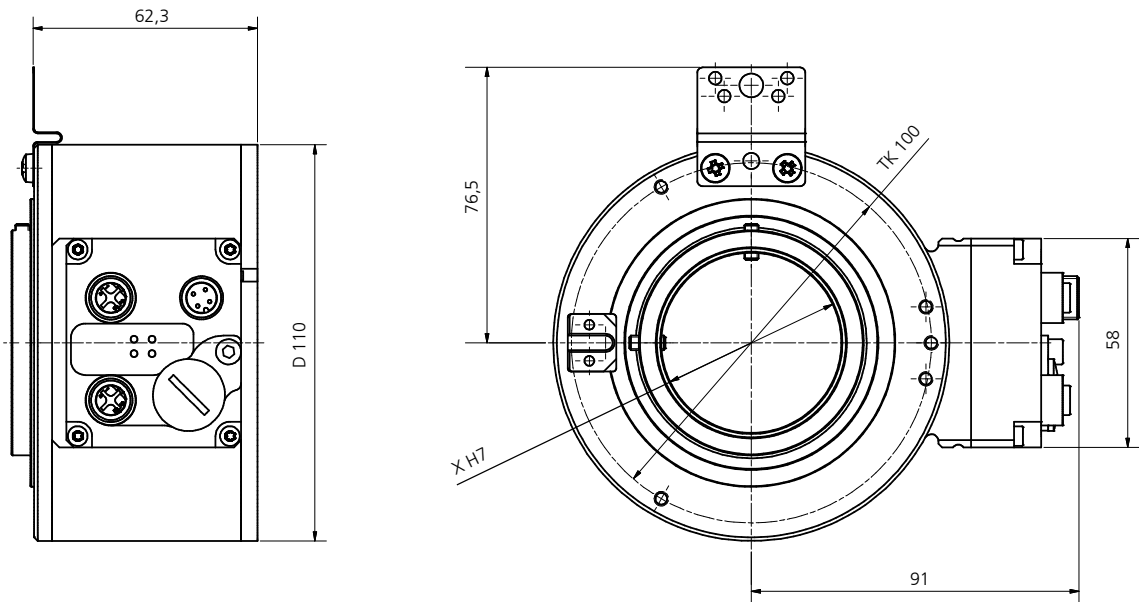
**C\_H1102 Profibus**  
PB





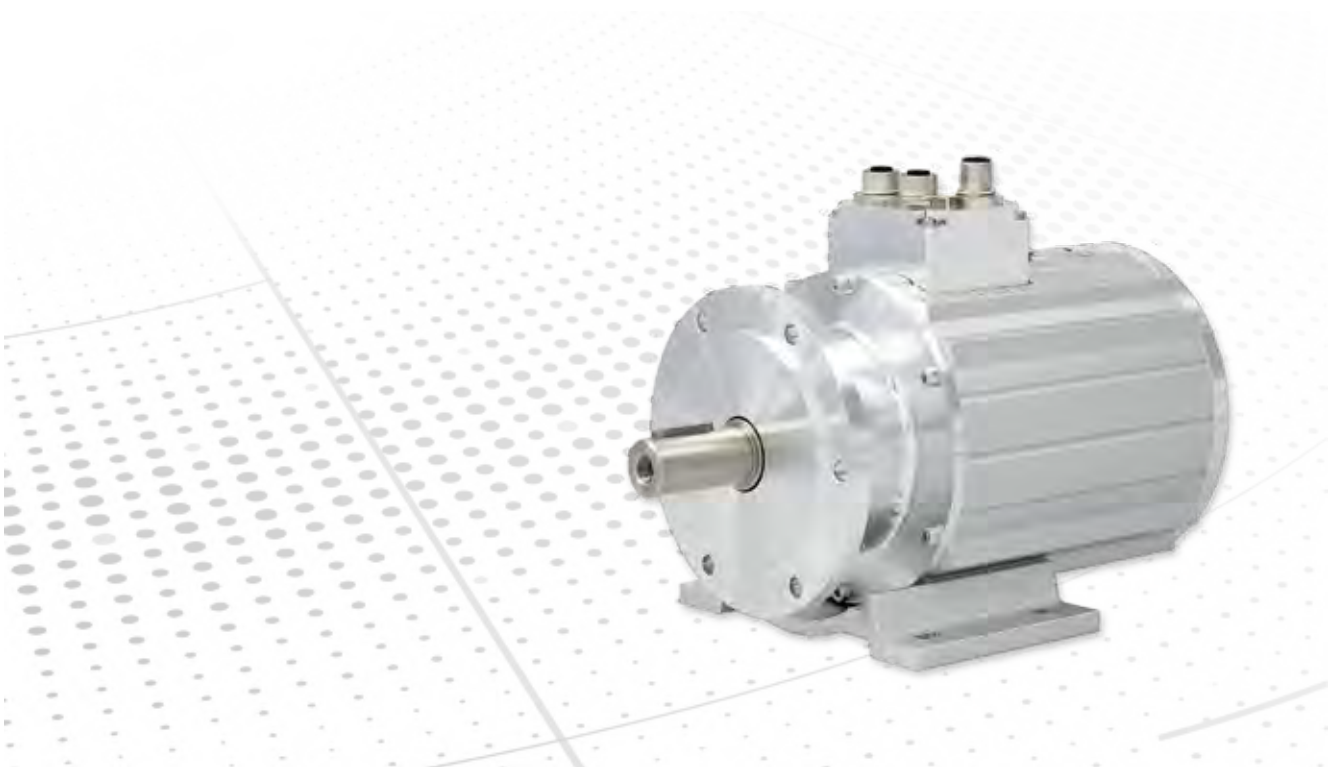
# Dimensional Drawings

**C\_H110 Industrial Ethernet**  
ETC, EPN, EIP, EPL





## Rotary Encoders - Family C\_V115 - Housing 115 mm



### Heavy-duty protective housing for rotary encoders families C\_\_58, C\_\_65 and I\_\_58

In crane installations, mining, oil and gas production, steel-works or in wind power plants rotary encoders must perform their tasks reliably even under the most demanding environmental conditions and extreme mechanical influences. This demands particularly intelligent and robust design, as well as durable technology. Heavy-duty absolute rotary encoders family C\_V115 from TR-Electronic offer thick-walled hous-

ings made of aluminium and are equipped with heating or cooling elements if required. Internally, the detection and interface technology of the C\_\_58, C\_\_65, CD\_75 (SIL) and I\_\_58 series are used. With same mechanics, types for explosive atmospheres for Zones 2/22 are available.

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# Housing option for rotary encoders

## Encoder with protective housing

## Double encoder with protective housing

Product	C_V115	AEV115	ADV115
			
Type	Housing option for rotary encoders	Encoder with protective housing	Double encoder with protective housing
Technical data encoder	See rotary encoders C__58 / C__65 / I__58	8192 / 256000	8192 / 256000
Shaft diameters available	12, 14, 20	12, 14, 20	12, 14, 20
Connectors	Cable gland / connector	Cable gland	Cable gland
Ambient temperature	-20...+60 °C	0...+40 °C	0...+40 °C
Protection class	IP65 (option IP67)	IP65	IP65
ATEX zone	Option 22	22	22
Interface	<b>SSI</b> <b>DeviceNet</b> <b>Analog</b> <b>PROFINET</b> <b>Parallel</b> <b>EtherCAT</b> <b>Nocken</b> <b>EtherNet/IP</b> <b>PROFIBUS</b> <b>ETHERNET POWERLINK</b> <b>CANopen</b>	<b>PROFIBUS</b>	<b>SSI</b> <b>PROFIBUS</b>
Option, additional interfaces (on request)		<b>SSI</b>	<b>SSI</b> <b>INC</b>
Weblink	<a href="http://www.tr-electronic.com/s/S008524">www.tr-electronic.com/s/S008524</a>	<a href="http://www.tr-electronic.com/s/S008524">www.tr-electronic.com/s/S008524</a>	<a href="http://www.tr-electronic.com/s/S008525">www.tr-electronic.com/s/S008525</a>
QR-Code			

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## Suggested Products

Order code	Steps per turn	Turns	Shaft / Flange	Connector position	Remark
<b>CDV115 PB/SSI + SSI/INC</b>					
CDV115M-00002	4096/4096	4096/4096	20 Keyway /40 ZB85	Fieldbus hood with 4 x M16 cable glands	Encoder 1 Profibus + SSI Encoder 2 SSI + INC
<b>CEV115 SSI</b>					
CEV115M-01368	4096	4096	14 Keyway /33 ZB85	Cable gland, 10 m cable	
<b>CEV115 Profibus</b>					
CEV115M-10005	8192	4096	14 Keyway /33, ZB85	Fieldbus hood with 3 x M16 cable glands	
CEV115M-10010	8192	4096	14 Keyway /33, ZB85	Fieldbus hood with 3 x PG 11 cable glands	
<b>CEV115 SSI</b>					
CEV115M-10021	4096	4096	20 Keyway /40 ZB85	M23 12 radial	Address 10 factory set
<b>CEV115 Profibus + SSI</b>					
CEV115M-10024	4096	4096	20 Keyway /40 ZB85	Fieldbus hood with 3 x M16 cable glands	
<b>CEV115 Profinet</b>					
CEV115M-10060	8192	4096	20 Keyway /40 ZB85	3 x M12 radial	
<b>CEV115 EtherCAT</b>					
CEV115M-10061	8192	4096	20 Keyway /40 ZB85	3 x M12 radial	

For further product information simply enter the order number in the search field at [www.tr-electronic.com](http://www.tr-electronic.com).

### Further product information

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2. Searchfield (top right) on [www.tr-electronic.com](http://www.tr-electronic.com)



3. Choose desired information



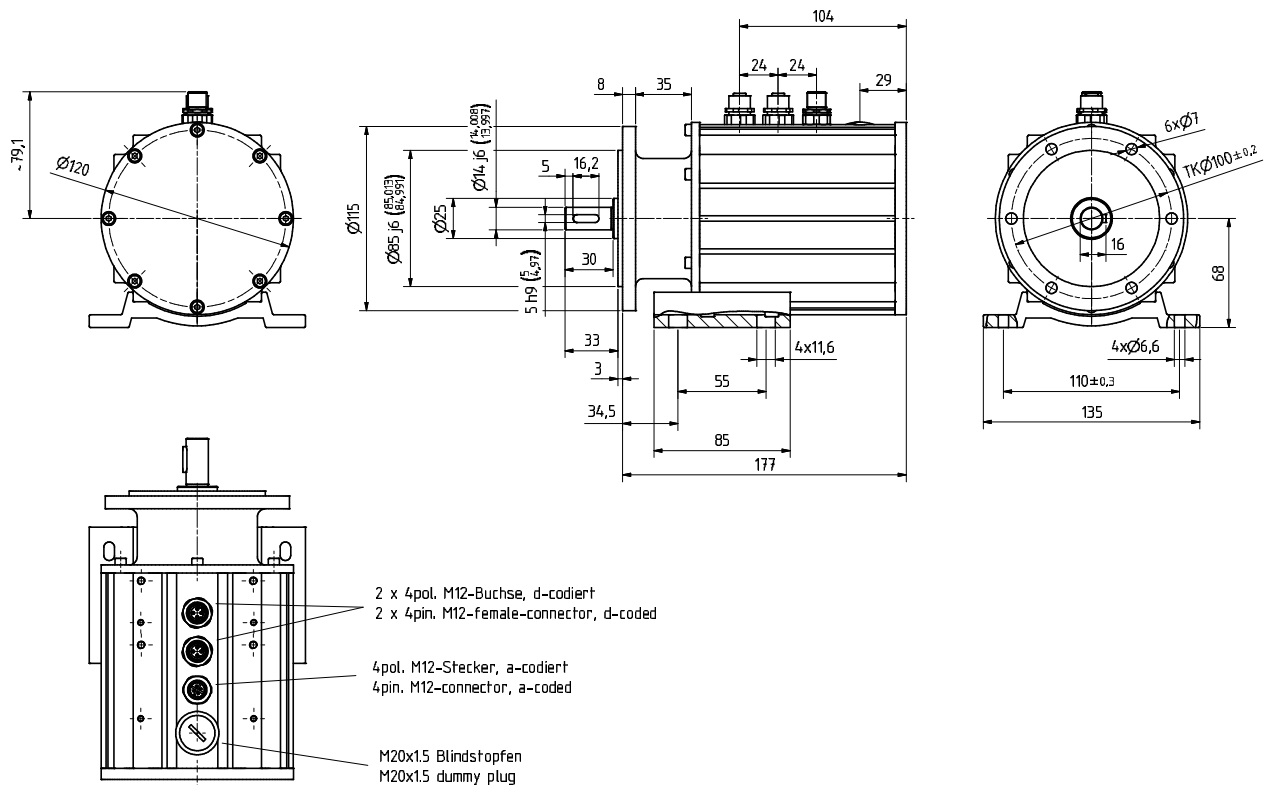
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## Dimensional Drawings

### CEV115

3 x M12 (e.g. Ethernet/IP)

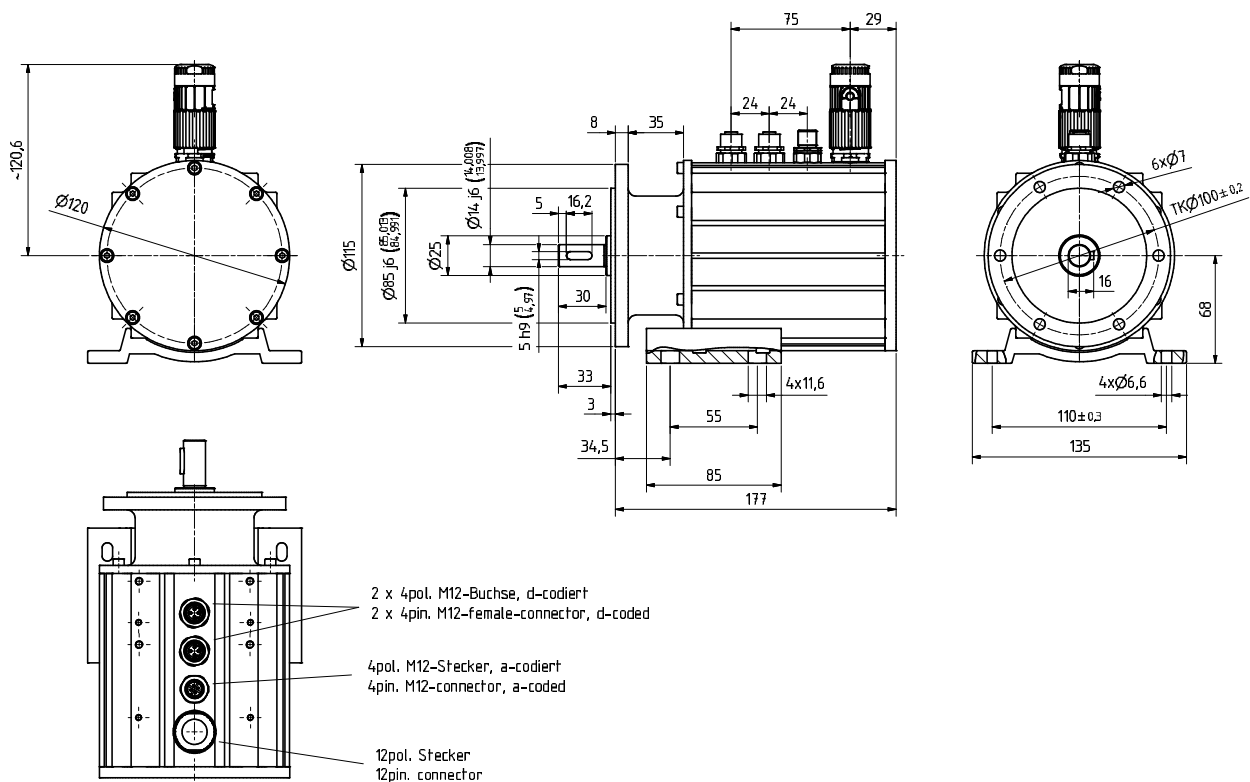




# Dimensional Drawings

## CEV115

3 x M12 (e.g. Ethernet/IP) + 1 x M23 12 pin (e.g. heating, SSL...)

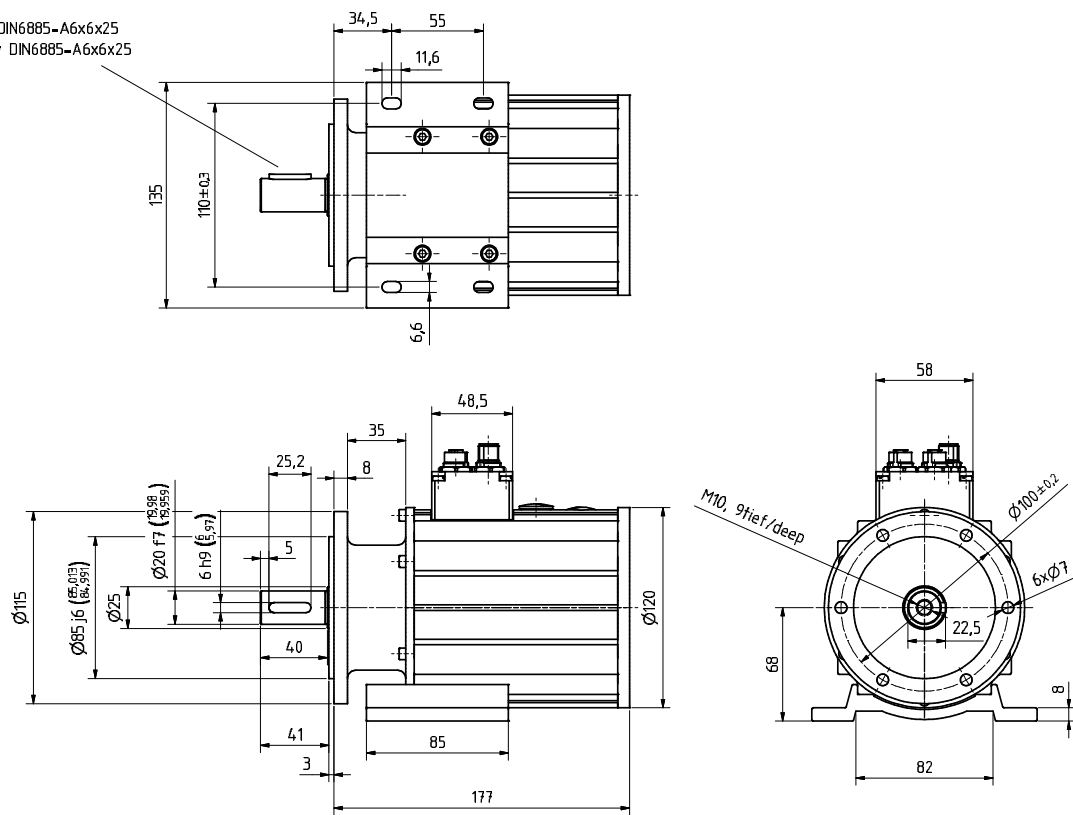


## Dimensional Drawings

### CEV115

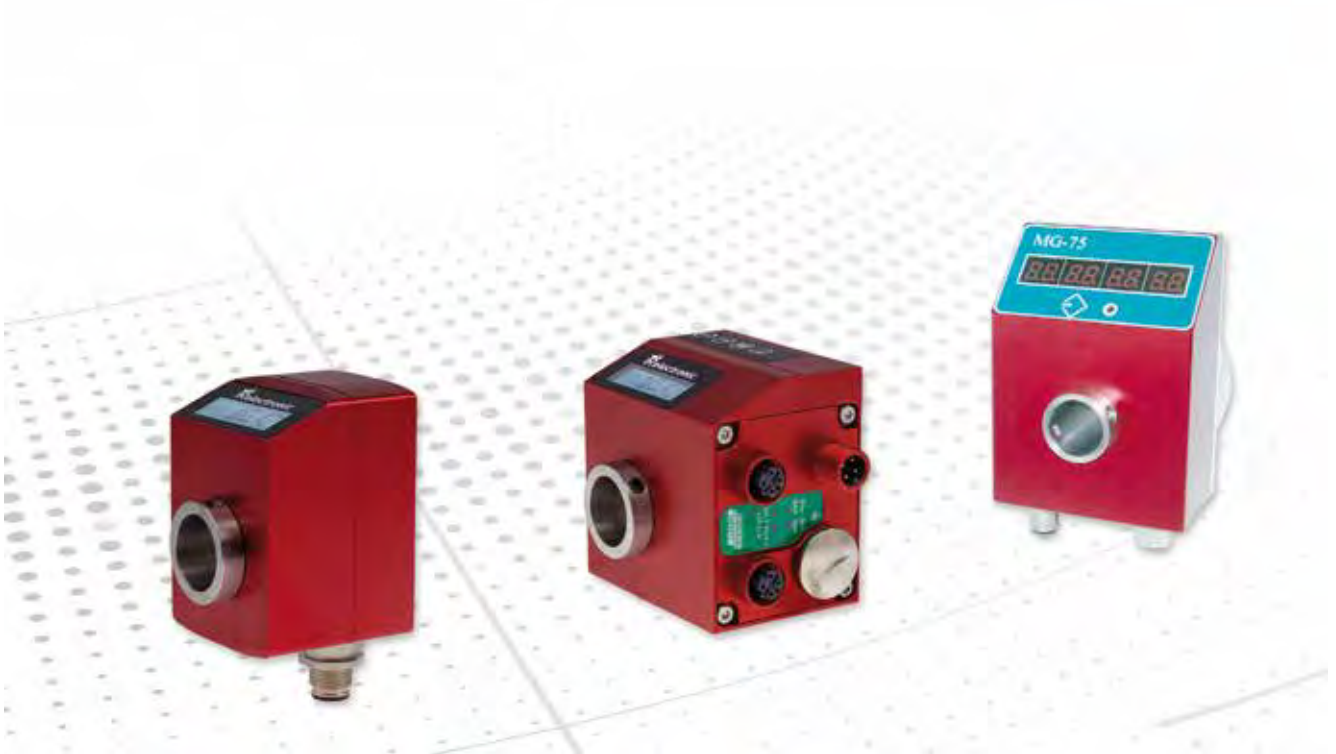
Connector hood radial for PROFINET, EtherCAT

Passfeder DIN6885-A6x6x25  
parallel key DIN6885-A6x6x25





## Encoder - Family M\_\_Display - Position Indicators



### When information is needed directly in the applications

Position indicator encoders MG provide absolute multiturn position information directly where the movement happens. Manual adjustments can be observed with high precision and reliability.

MG48 is available as position indicator encoder, driven by the solid shaft inserted into the encoders hollow shaft. The modern, graphic capable display provides best legibility. Due to flexible programming, the display orientation fits different integration situations. For programming, USB interface is integrated. The mini-USB-connector is protected by a threaded plug.

The bus-version MG48 BUS and MG75 adds the possibility to connect the encoder to a central control. With this feature, all manual adjustments can be documented by the control and even parametrized by sending new target values from the control to the encoder.







Number of steps per turn and number of turns can be programmed with both systems. MG48 BUS communicates via industrial standard bus systems with a master control.

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### Contents

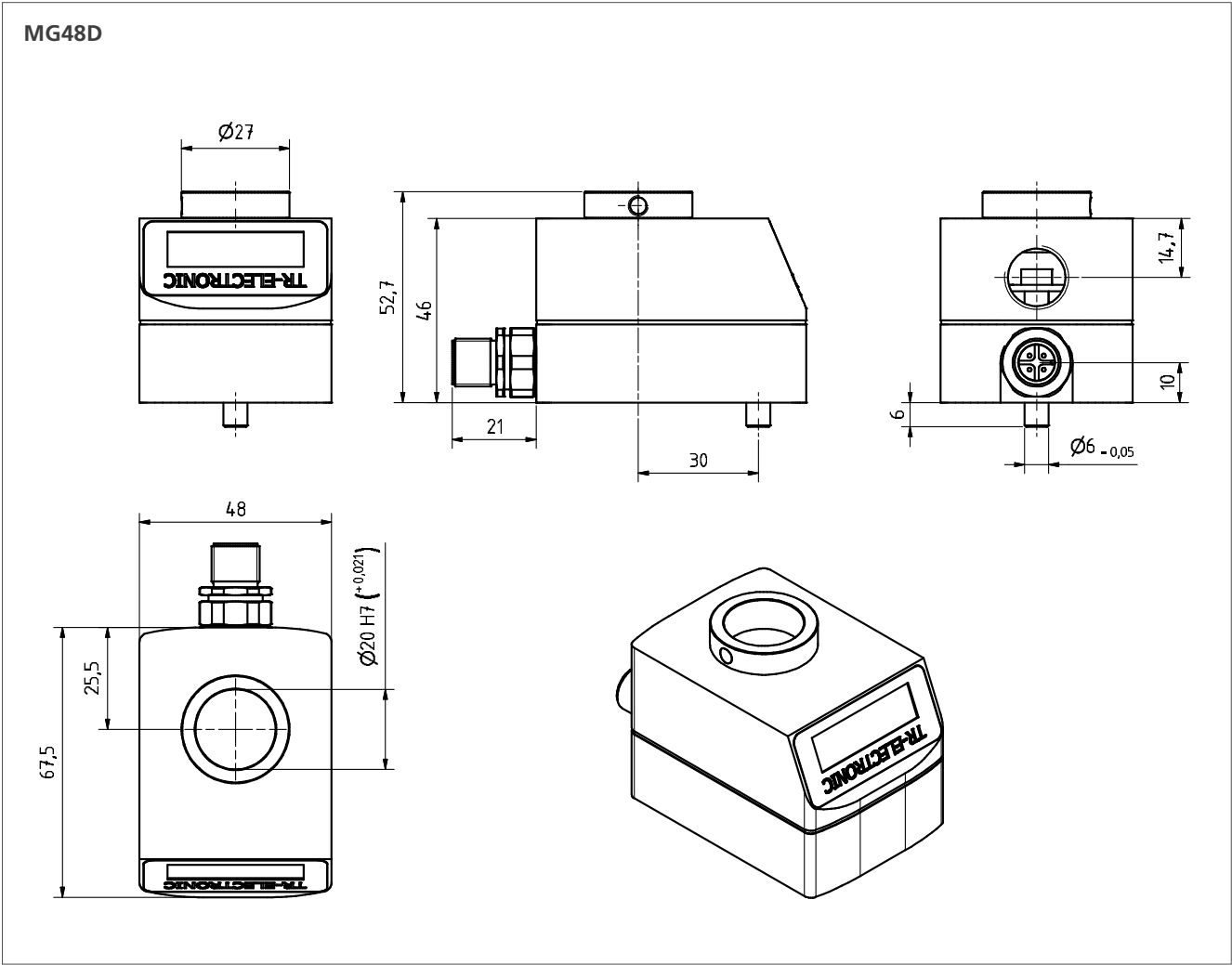
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## Magnet detection (M)

Product	MG48	MG48 BUS	MG75
			
Detection	Magnet detection (M)	Magnet detection (M)	Magnet detection (M)
Single / multi	(M) Multi	(M) Multi	(M) Multi
Application	Electronic Position Indicator	Electronic Position Indicator with Industrial Ethernet	Electronic Position Indicator with Control Communication
Supply	11...27VDC	11...27VDC	11...27VDC
Steps per turn	4096	4096	64
Number of turns	4096	4096	65536
Shaft diameters available	20H7	20H7	20H7
Connectors	M12 connector	M12 connector	2 M12 connectors
Ambient temperature	0...+60 °C	0...+60 °C	0...+60 °C
Protection class	IP50	IP50	IP50
Interface		  	<b>ASI</b>
Weblink	<a href="http://www.tr-electronic.com/s/S016505">http://www.tr-electronic.com/s/S016505</a>	<a href="http://www.tr-electronic.com/s/S016505">http://www.tr-electronic.com/s/S016505</a>	
QR-Code			

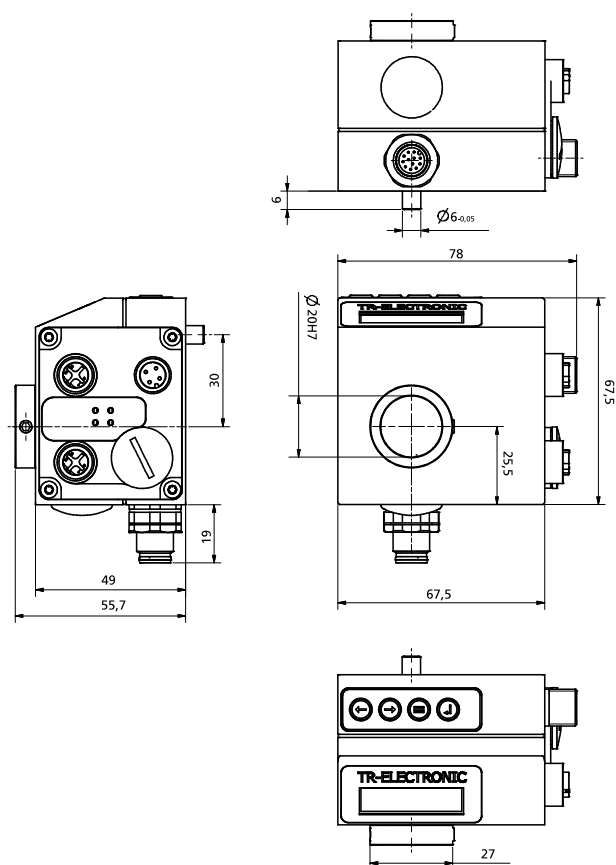
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# Dimensional Drawings



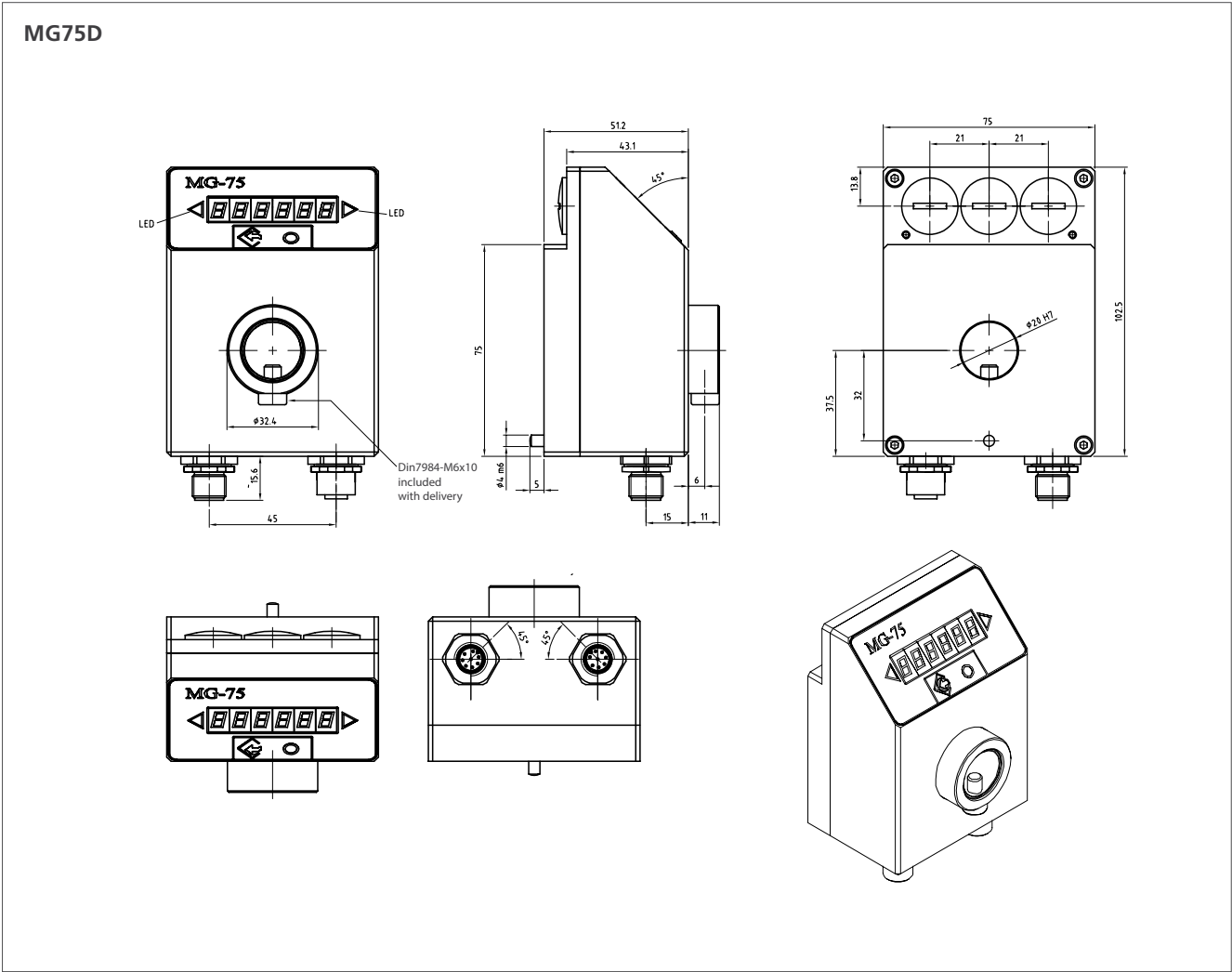
## Dimensional Drawings

**MG48D Industrial Ethernet**



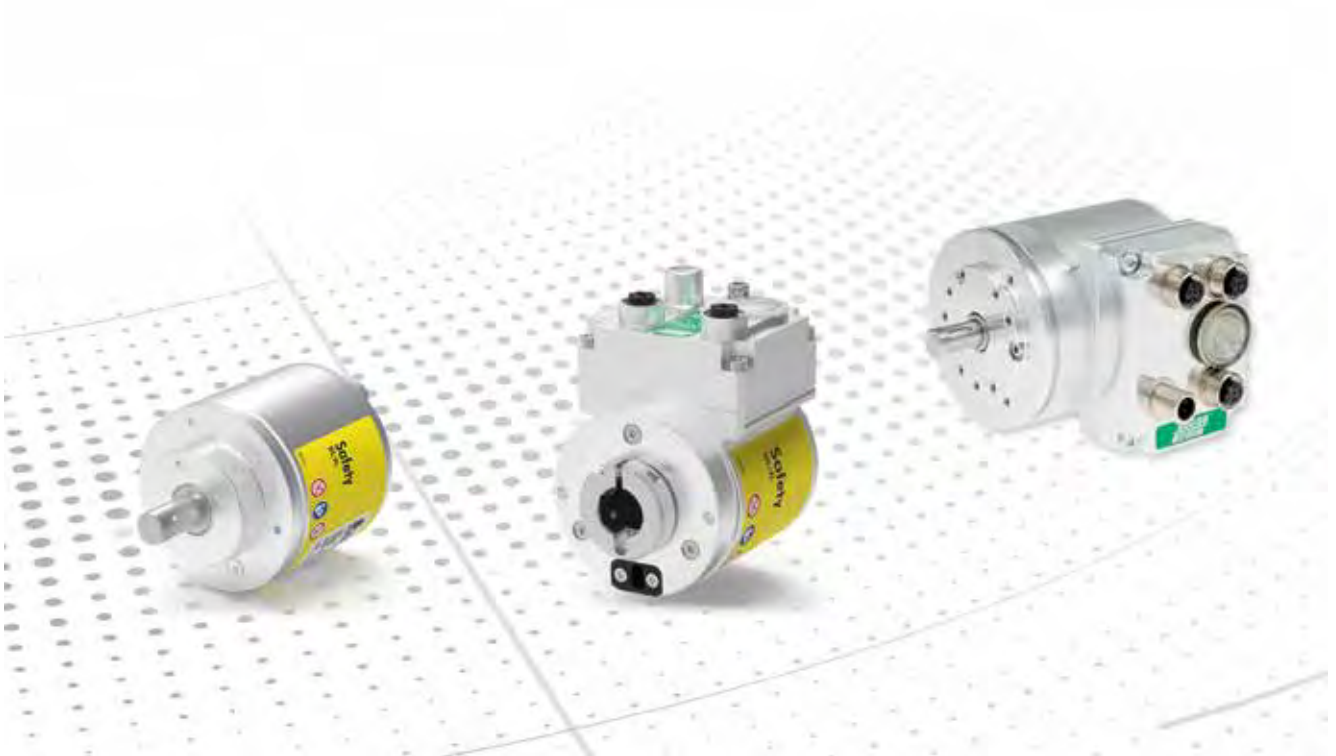


# Dimensional Drawings





## Rotary Encoders- Functional Safety - SIL3 / PLe



### Functional safety up to SIL3 / PLe

Many applications in automation technology are subject to the highest safety requirements. By using SIL3/PLe-certified products you will achieve maximum safety in workplaces or environments that are shared by people and machines. Our absolute rotary encoders with SIL3 or PLe certification (safety rotary encoders) are available in size 75 mm (hollow shaft or solid shaft) and recently introduced size 58 mm (hollow, blind or solid shaft). Standard interfaces such as Double SSI, PROFIsafe via PROFIBUS, PROFIsafe via PROFINET or Open-


Safety via Powerlink or FSoE via EtherCAT guarantee optimal safety and precision. The ATEX-compliant housing variant offers additional protection in explosive atmospheres. No separate modules are necessary for reliable position output, and there is no need to separately program a safety module - you couldn't get a simpler or more cost-effective solution. With the newest series 582+FS, the most recent interface features are available in your secured application - by using same space as an ordinary 58mm Industrial Encoder.

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### Contents

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## Optical detection (E)

Product	CDV582M+FS3	CDH582M+FS3	CDS582M+FS3
			
Detection	Optical detection (E)	Optical detection (E)	Optical detection (E)
Single / multi	(M) Multi	(M) Multi	(M) Multi
Supply	10...30 VDC	10...30 VDC	10...30 VDC
Full resolution	28 bit	28 bit	28 bit
Steps per turn	8192	8192	8192
Number of turns	65536	65536	65536
Properties	Fast optical main detection	Fast optical main detection	Fast optical main detection
Shaft diameters available	10, 12, 14 mm; 1/4", 1/2", 3/8" with keyway	10, 12, 14, 15 mm; 1/4", 1/2", 3/8" with partial keyway	10, 12, 14, 15 mm; 1/4", 1/2", 3/8" with partial keyway
Connectors	Connectors radial, axial	Connectors radial	Connectors radial, axial
Ambient temperature	-20...+75°C	-20...+75°C	-20...+75°C
Protection class	IP 65	IP 54	IP 65
ATEX zone			
Interface			
Option, additional interfaces (on request)	<b>SSI</b> <b>INC</b>  <b>SIN / COS</b>	<b>SSI</b> <b>INC</b>  <b>SIN / COS</b>	<b>SSI</b> <b>INC</b>  <b>SIN / COS</b>
Weblink	<a href="http://www.tr-electronic.com/s/S018153">www.tr-electronic.com/s/S018153</a>	<a href="http://www.tr-electronic.com/s/S018153">www.tr-electronic.com/s/S018153</a>	<a href="http://www.tr-electronic.com/s/S018153">www.tr-electronic.com/s/S018153</a>
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## Magnetic detection (M)

Product	CDV582MM+FS3	CDH582MM+FS3	CDS582MM+FS3	
				
Detection	Magnetic detection (M)	Magnetic detection (M)	Magnetic detection (M)	
Single / multi	(M) Multi	(M) Multi	(M) Multi	
Supply	10...30 VDC	10...30 VDC	10...30 VDC	
Full resolution	28 bit	28 bit	28 bit	
Steps per turn	8192	8192	8192	
Number of turns	65536	65536	4096	
Properties	Dewfall proof	Dewfall proof	Dewfall proof	
Shaft diameters available	10,12, 14 mm; 1/4", 1/2", 3/8" with keyway	10, 12, 14, 15mm; 1/4", 1/2", 3/8" with partial keyway	10, 12, 14, 15mm; 1/4", 1/2", 3/8" with partial keyway	
Connectors	Connectors radial, axial	Connectors radial	Connectors radial, axial	
Ambient temperature	-20...+75°C	-20...+75°C	-20...+75°C	
Protection class	IP 65	IP 54	IP 65	
ATEX zone				
Interface				
Option, additional interfaces (on request)	<b>SSI</b> <b>INC</b>  <b>SIN / COS</b>	<b>SSI</b> <b>INC</b>  <b>SIN / COS</b>	<b>SSI</b> <b>INC</b>  <b>SIN / COS</b>	
Weblink	<a href="http://www.tr-electronic.com/s/S018153">www.tr-electronic.com/s/S018153</a>	<a href="http://www.tr-electronic.com/s/S018153">www.tr-electronic.com/s/S018153</a>	<a href="http://www.tr-electronic.com/s/S018153">www.tr-electronic.com/s/S018153</a>	
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## Optical detection (E)

## Magnetic detection (M)

	CDV75M	CDV75MM	CDH75M
			
	Optical detection (E)	Magnetic detection (M)	Optical detection (E)
	(M) Multi	(M) Multi	(M) Multi
	11...27 VDC	11...27 VDC	11...27 VDC
	28 bit	28 bit	28 bit
	8192	8192	8192
	32768	32768	32768
	Fast optical main detection	Dewfall proof	Fast optical main detection
	10mm with keyway	10mm with keyway	20mm with keyway
	Connectors radial, cable glands radial (SSI)	Connectors radial, cable glands radial (SSI)	Connectors radial, cable glands radial (SSI)
	-20...+70 °C	-40...+65°C	-20...+70 °C
	IP 54	IP 65	IP 54
	<b>SSI</b>   <b>EtherCAT</b> 	<b>SSI</b>   <b>EtherCAT</b> 	<b>SSI</b>   <b>EtherCAT</b> 
	<b>INC</b>	<b>INC</b>	<b>INC</b>
	<a href="http://www.tr-electronic.com/s/S007271">www.tr-electronic.com/s/S007271</a>	<a href="http://www.tr-electronic.com/s/S007271">www.tr-electronic.com/s/S007271</a>	<a href="http://www.tr-electronic.com/s/S007272">www.tr-electronic.com/s/S007272</a>
			

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## Suggested Products

Order code	Steps per turn	Turns	Shaft / Flange	Connector position	Connector type	Remark
<b>CDV75M-SSI (E) Double detection, solid shaft, SSI</b>						
CDV75M-00001	8192	4096	10Keyway/19,5 ZB50	2 x cable gland		TTL Incr -20...70°C
<b>CDV75M-PB (E) Double detection, solid shaft, Profibus</b>						
CDV75M-00008	8192	32768	10Keyway/19,5 ZB50/D75 9XM4	Connector radial	5 x M12	SIN/COS -20°...70°C
<b>CDV75M-PN (E) Double detection, solid shaft, Profinet</b>						
CDV75M-00012	8192	32768	10Keyway/19,5 ZB50/D75 9XM4	Connector radial	4 x M12	TTL Incr -20°...70°C
CDV75M-00014	8192	32768	10Keyway/19,5 ZB50/D75 9XM4	Connector radial	4 x M12	
CDV75M-00018	8192	32768	10Keyway/19,5 ZB36	Connector radial	4 x M12	TTL Incr -20°...70°C IP65
CDV75M-00026	8192	32768	10Keyway/19,5 ZB50/D75 9XM4	Connector radial	4 x M12	Seawater-resistant
CDV75M-00020	8192	32768	10Keyway/19,5 ZB36	Connector radial	4 x M12	Stainless steel
<b>CDV75M-EPL (E) Double detection, solid shaft, Powerlink</b>						
CDV75M-00021	8192	32768	10Keyway/19,5 ZB36	Connector radial	4 x M12	
<b>CDV75M-PN (E) Double detection, solid shaft, EtherCAT</b>						
CDV75M-00054	8192	32768	10Keyway/19,5 ZB50	Connector radial	4 x M12	TTL Incr -25°...60°C
<b>CDV75M-PN (E) Double detection, both magnetic, solid shaft, EtherCAT</b>						
CDV75M-00056	8192	32768	10Keyway/19,5 ZB50 D75	Connector radial	4 x M12	-40°C...+65°C
<b>CDV75M-PN (M) Double detection, both magnetic, solid shaft, Profinet</b>						
CDV75M-00061	8192	32768	10Keyway/19,5 ZB36	Connector radial	4 x M12	-40°C...+65°C
<b>CDV75M-PN (E) Double detection, both magnetic, solid shaft, EtherCAT</b>						
CDV75M-00059	8192	32768	10Keyway/19,5 ZB36	Connector radial	4 x M12	-40°C...+65°C
<b>CDV75M-PN (M) Double detection, both magnetic, solid shaft, Profinet</b>						
CDV75M-00043	8192	32768	10Keyway/19,5 ZB50	Connector radial	4 x M12	-40°C...+65°C
<b>CDV75M-PN (M) Double detection, both magnetic, solid shaft, Powerlink</b>						
CDV75M-00065	8192	32768	10Keyway/19,5 ZB50 D75	Connector radial	4 x M12	-40°C...+65°C

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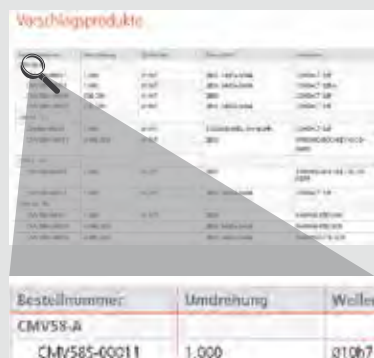
## Suggested Products

Order code	Steps per turn	Turns	Shaft / Flange	Connector position	Connector type	Remark
<b>CDH75M-SSI (E) Double detection, hollow shaft, SSI</b>						
CDH75M-00001	8192	4096	20H7/Keyway slot for pin D4	2 x cable gland		TTL Incr -20...70°C 2x KV
CDH75M-00024	8192	4096	14H7/Keyway slot for pin D4	2 x cable gland		
<b>CDH75M-PB (E) Double detection, hollow shaft, Profibus</b>						
CDH75M-00008	8192	32768	20H7/Keyway slot for pin D4	Connector radial	5 x M12	TTL Incr -20°...70°C
<b>CDH75M-PN (E) Double detection, hollow shaft, Profinet</b>						
CDH75M-00013	8192	32768	20H7/Keyway slot for pin D4	Connector radial	4 x M12	TTL Incr -20°...70°C
CDH75M-00019	8192	32768	20H7/Keyway slot for pin D4	Connector radial	4 x M12	Seawater-resistant
CDH75M-00046	8192	32768	20H7/Keyway ZB46	Connector radial	5 x M12	TTL Incr -20°...70°C
<b>CDH75M-EPL (E) Double detection, hollow shaft, Powerlink</b>						
CDH75M-00026	8192	32768	20H7/Keyway slot for pin D4	Connector radial	4 x M12	
<b>CDH75M-PN (E) Double detection, hollow shaft, EtherCAT</b>						
CDH75M-00041	8192	32768	12H7/Keyway slot for pin D4	Connector radial	4 x M12	TTL Incr -25°...60°C

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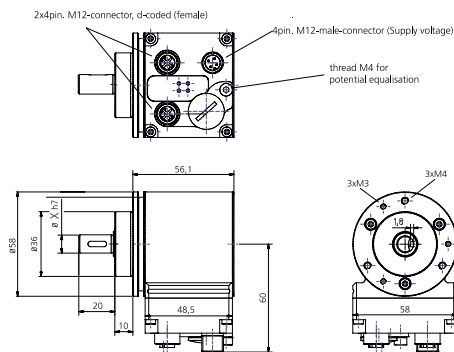


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## Dimensional Drawings

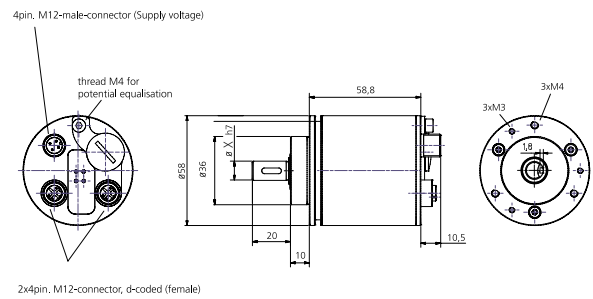
### CDV582+FS RADIAL

Absolute-Encoder CDV582M+FS, CDV582MM+FS



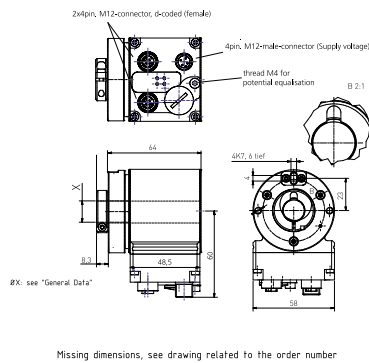
### CDV582+FS AXIAL

Absolute-Encoder CDV582M+FS, CDV582MM+FS



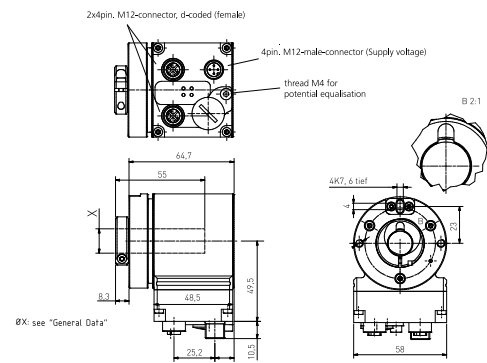
### CDH582+FS RADIAL

Absolute-Encoder CDH582M+FS, CDH582MM+FS



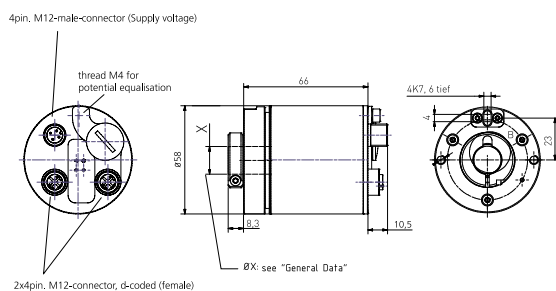
### CDS582+FS RADIAL

Absolute-Encoder CDS582M+FS, CDS582MM+FS



### CDS582+FS AXIAL

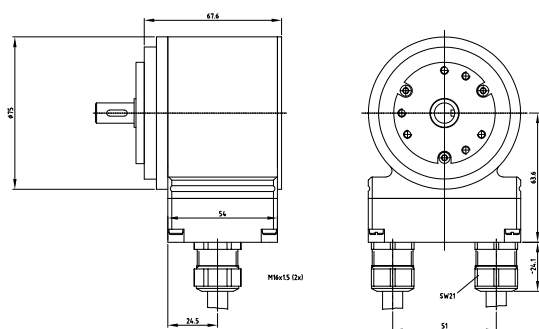
Absolute-Encoder CDS582M+FS, CDS582MM+FS



# Dimensional Drawings

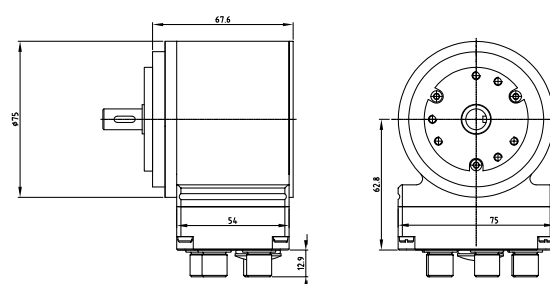
## CDV75-SSI

Absolute encoder CDV75M - SSI



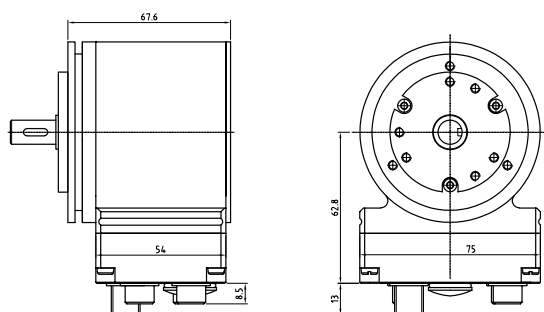
## CDV75-PB

Absolute encoder CDV75M - PB



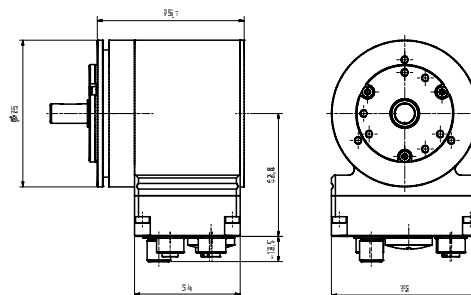
## CDV75-PN / EPL / ETC

Absolute encoder CDV75M - PROFINET / PROFIsafe , - Powerlink / openSAFETY ; - EtherCAT / FSoE



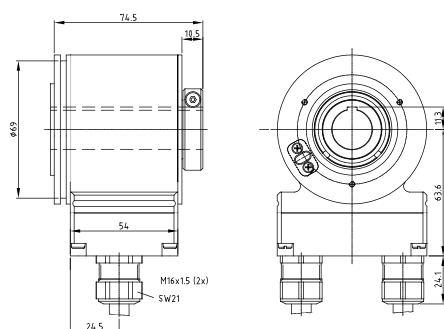
## CDV75-PN

Absolute encoder CDV75M PROFINET / PROFIsafe+FS SealPack



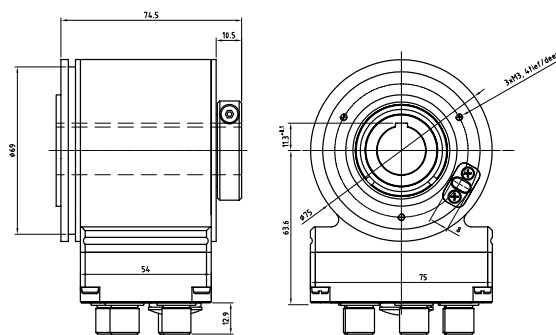
## CDH75-SSI

Absolute encoder CDH75M - SSI



## CDH75-PB

Absolute encoder CDH75M - PB



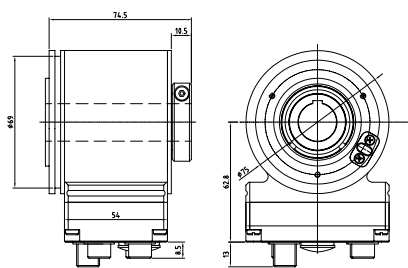
Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at [www.tr-electronic.com](http://www.tr-electronic.com) or on request.

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## Dimensional Drawings

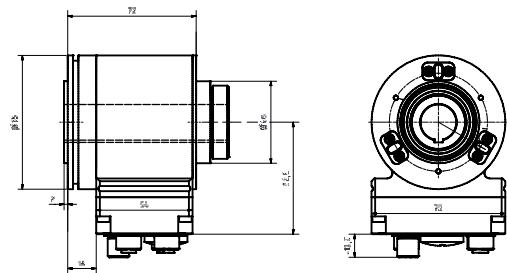
### CDH75-PN / EPL / ETC

Absolute encoder CDH75M - PROFINET / PROFIsafe , - Powerlink / openSAFETY, - EtherCAT / FSoE



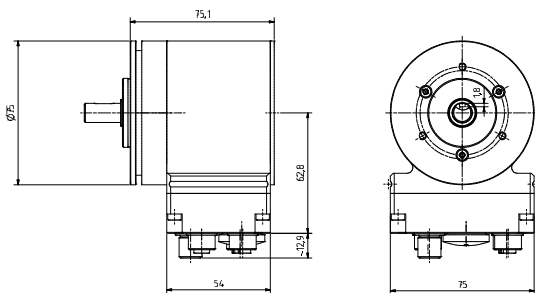
### CDH75-PN

Absolute encoder CDH75M PROFINET / PROFIsafe+F5 SealPack



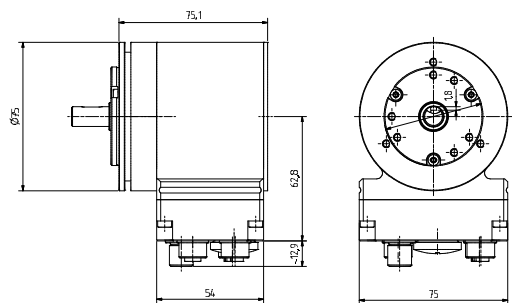
### Seal Pack

Sample CDV75



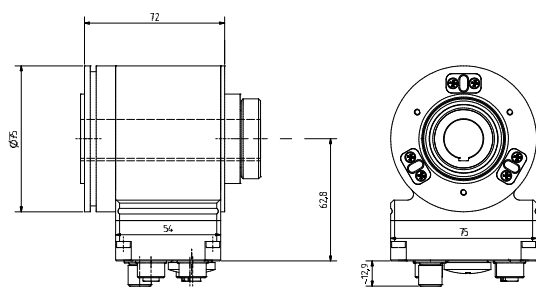
### Stainless Steel

Sample CDV75



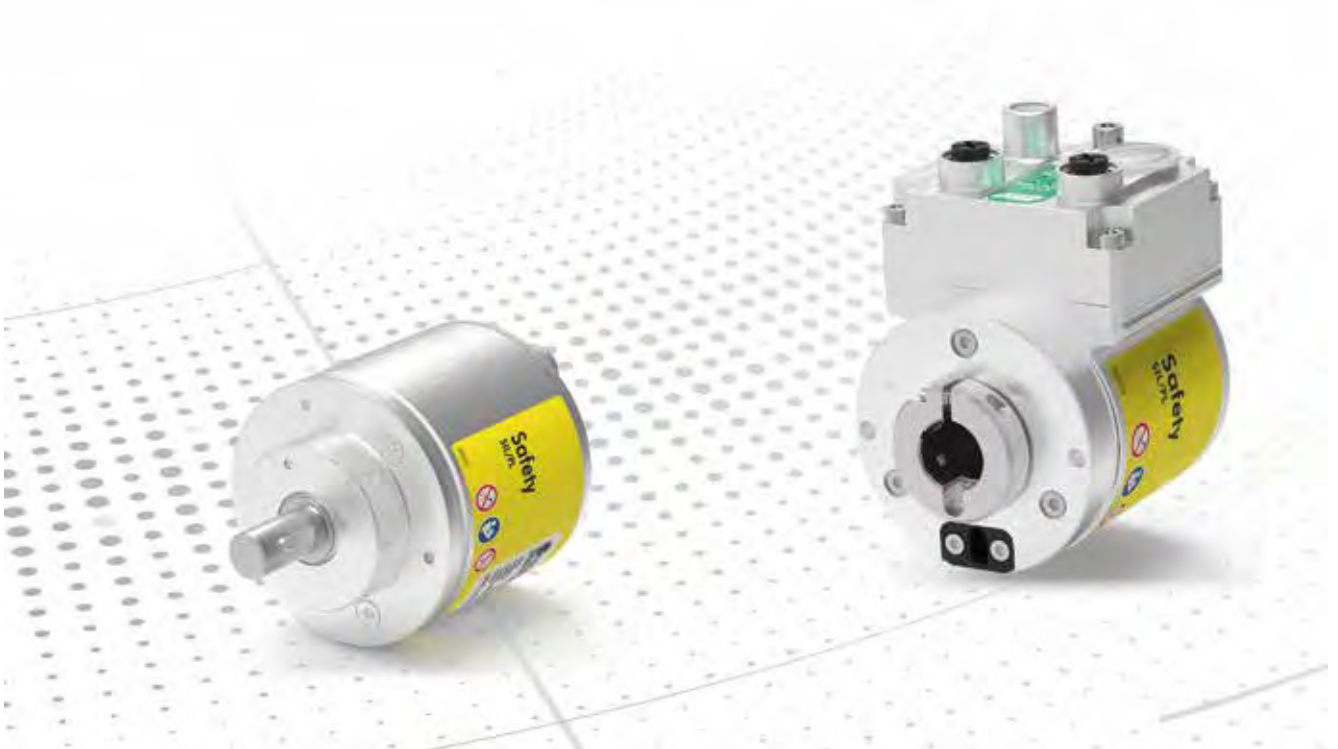
### Seawater-resistant Aluminum

Sample CDH75





## Rotary Encoders- Functional Safety - SIL2 / PLd



### Functional safety up to SIL2 / PLd

Safety functions that mainly ensure the safety of the machine itself are mostly specified with SIL2 resp. PLd. For these applications, TR-Electronic provides an optimized absolute rotary encoder system. With a compact size of 58 mm, these real multiturn devices can be fitted with solid, blind or hollow shaft - all three equipped with the form closure required for safety applications realized by groove and parallel key. Blind and hollow shafts are available for shaft diameters up to 15 mm. Position reading value is transmitted via the




secured protocol part directly into a safety certified control and can be used directly as "safe position" (SLP) for safety calculations.

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## Optical detection (E)

Product	CDV582M+FS2	CDH582M+FS2	CDS582M+FS2
			
Detection	Optical detection (E)	Optical detection (E)	Optical detection (E)
Single / multi	(M) Multi	(M) Multi	(M) Multi
Supply	10...30 VDC	10...30 VDC	10...30 VDC
Full resolution	28 bit	28 bit	28 bit
Steps per turn	8192	8192	8192
Number of turns	65536	65536	65536
Properties	Fast optical main detection	Fast optical main detection	Fast optical main detection
Shaft diameters available	10, 12, 14 mm; 1/4", 1/2", 3/8" with keyway	10, 12, 14, 15 mm; 1/4", 1/2", 3/8" with partial keyway	10, 12, 14, 15 mm; 1/4", 1/2", 3/8" with partial keyway
Connectors	Connectors radial, axial	Connectors radial	Connectors radial, axial
Ambient temperature	-20...+75°C	-20...+75°C	-20...+75°C
Protection class	IP 65	IP 54	IP 65
ATEX zone			
Interface			
Option, additional interfaces (on request)	<b>SSI</b> <b>INC</b>  <b>SIN / COS</b>	<b>SSI</b> <b>INC</b>  <b>SIN / COS</b>	<b>SSI</b> <b>INC</b>  <b>SIN / COS</b>
Weblink	<a href="http://www.tr-electronic.com/s/S018153">www.tr-electronic.com/s/S018153</a>	<a href="http://www.tr-electronic.com/s/S018153">www.tr-electronic.com/s/S018153</a>	<a href="http://www.tr-electronic.com/s/S018153">www.tr-electronic.com/s/S018153</a>
QR-Code			

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## Magnetic detection (M)

Product	CDV582MM+FS2	CDH582MM+FS2	CDS582MM+FS2
			
Detection	Magnetic detection (M)	Magnetic detection (M)	Magnetic detection (M)
Single / multi	(M) Multi	(M) Multi	(M) Multi
Supply	10...30 VDC	10...30 VDC	10...30 VDC
Full resolution	28 bit	28 bit	28 bit
Steps per turn	8192	8192	8192
Number of turns	65536	65536	65536
Properties	Dewfall proof	Dewfall proof	Dewfall proof
Shaft diameters available	10,12, 14 mm; 1/4", 1/2", 3/8" with keyway	10, 12, 14, 15mm; 1/4", 1/2", 3/8" with partial keyway	10, 12, 14, 15mm; 1/4", 1/2", 3/8" with partial keyway
Connectors	Connectors radial, axial	Connectors radial	Connectors radial, axial
Ambient temperature	-20...+75°C	-20...+75°C	-20...+75°C
Protection class	IP 65	IP 54	IP 65
ATEX zone			
Interfacew			
Option, additional interfaces (on request)	<b>SSI</b> <b>INC</b>  <b>SIN / COS</b>	<b>SSI</b> <b>INC</b>  <b>SIN / COS</b>	<b>SSI</b> <b>INC</b>  <b>SIN / COS</b>
Weblink	<a href="http://www.tr-electronic.com/s/S018153">www.tr-electronic.com/s/S018153</a>	<a href="http://www.tr-electronic.com/s/S018153">www.tr-electronic.com/s/S018153</a>	<a href="http://www.tr-electronic.com/s/S018153">www.tr-electronic.com/s/S018153</a>
QR-Code			

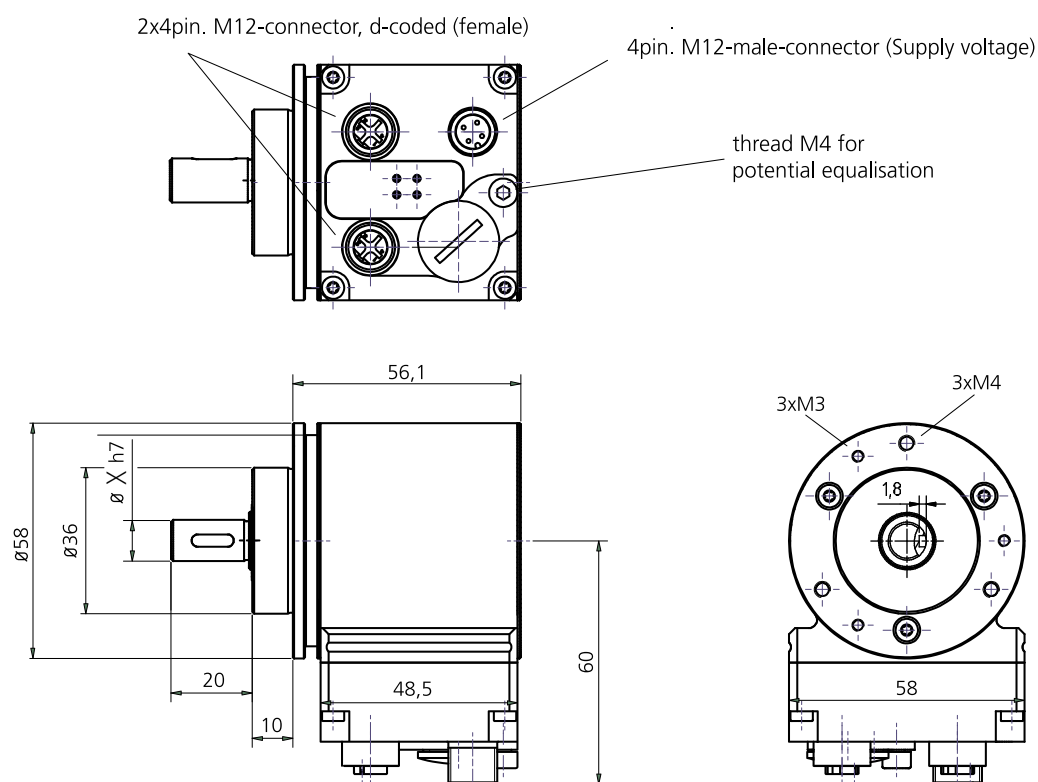
Can't find the right variant? Please contact us (info@tr-electronic.de)



# Dimensional Drawings

## CDV582+FS RADIAL

Absolute-Encoder CDV582M+FS, CDV582MM+FS

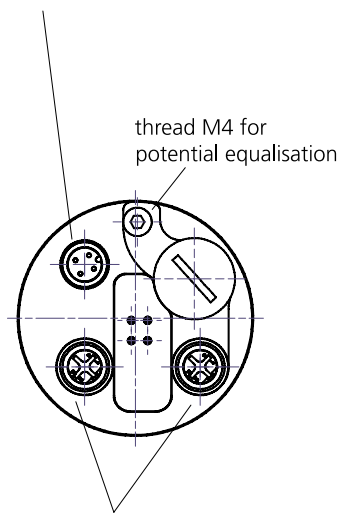


## Dimensional Drawings

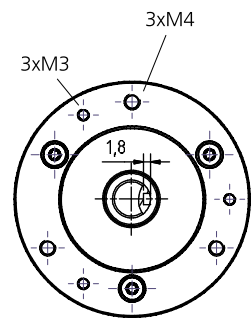
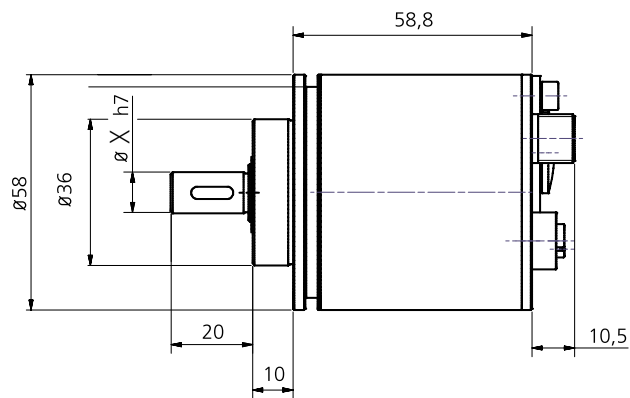
### CDV582+FS AXIAL

Absolute-Encoder CDV582M+FS, CDV582MM+FS

4pin. M12-male-connector (Supply voltage)



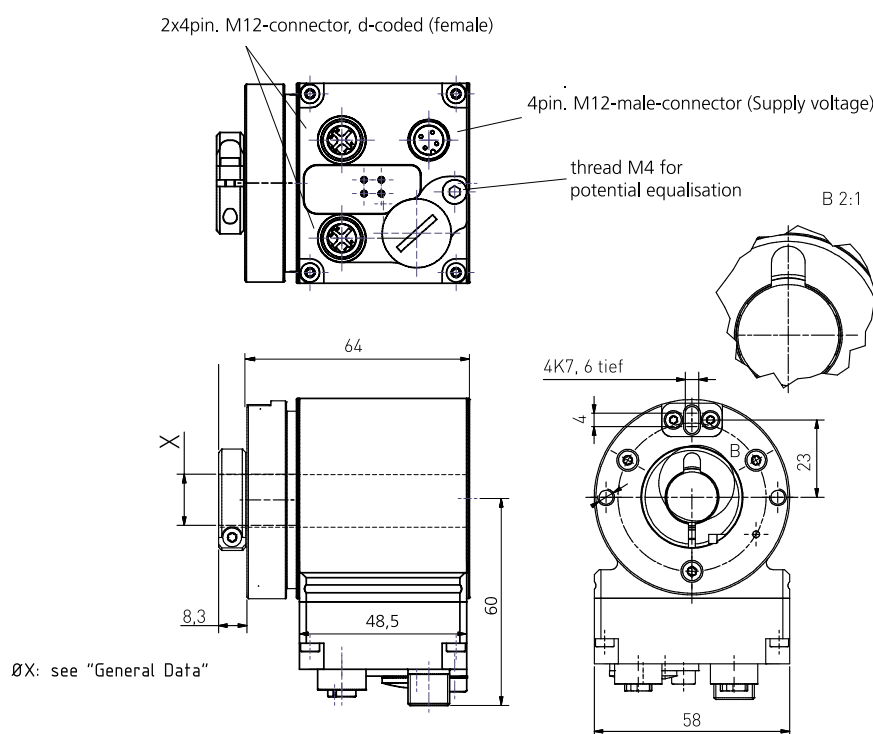
2x4pin. M12-connector, d-coded (female)



# Dimensional Drawings

## CDH582+FS RADIAL

Absolue-Encoder CDH582M+FS, CDH582MM+FS

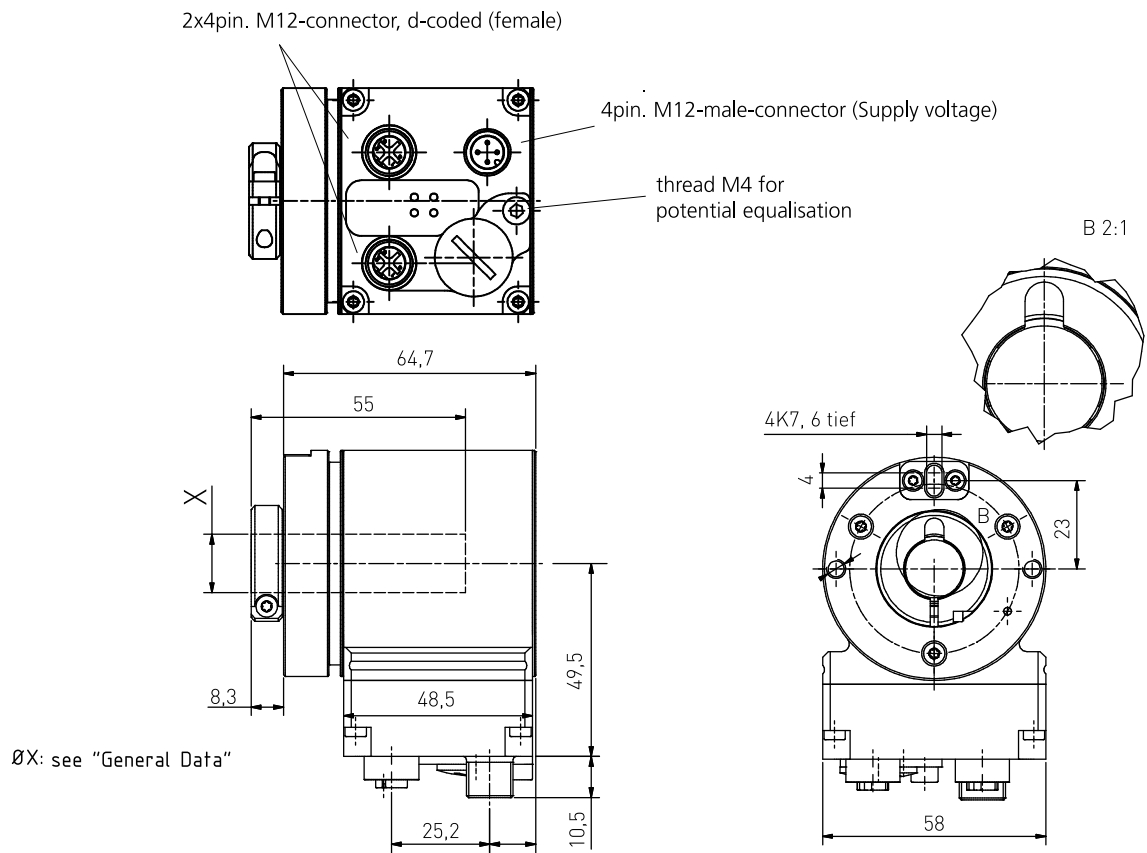


Missing dimensions, see drawing related to the order number

## Dimensional Drawings

### CDS582+FS RADIAL

Absolute-Encoder CDS582M+FS, CDS582MM+FS

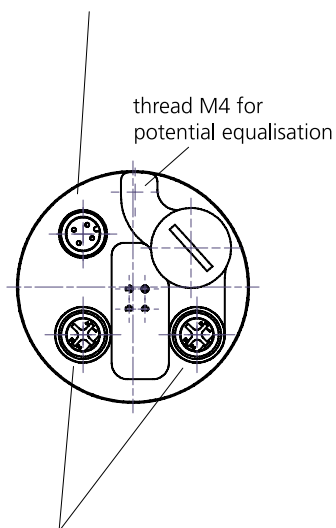


# Dimensional Drawings

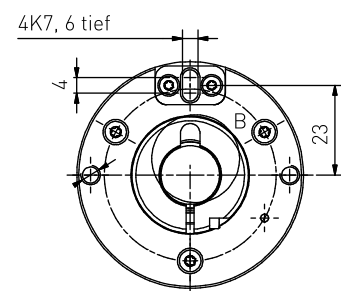
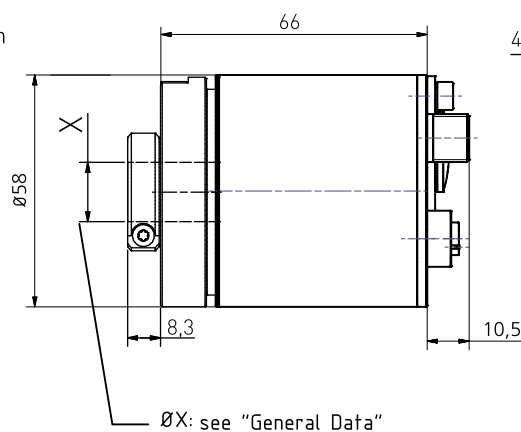
## CDS582+FS AXIAL

Absolue-Encoder CDS582M+FS, CDS582MM+FS

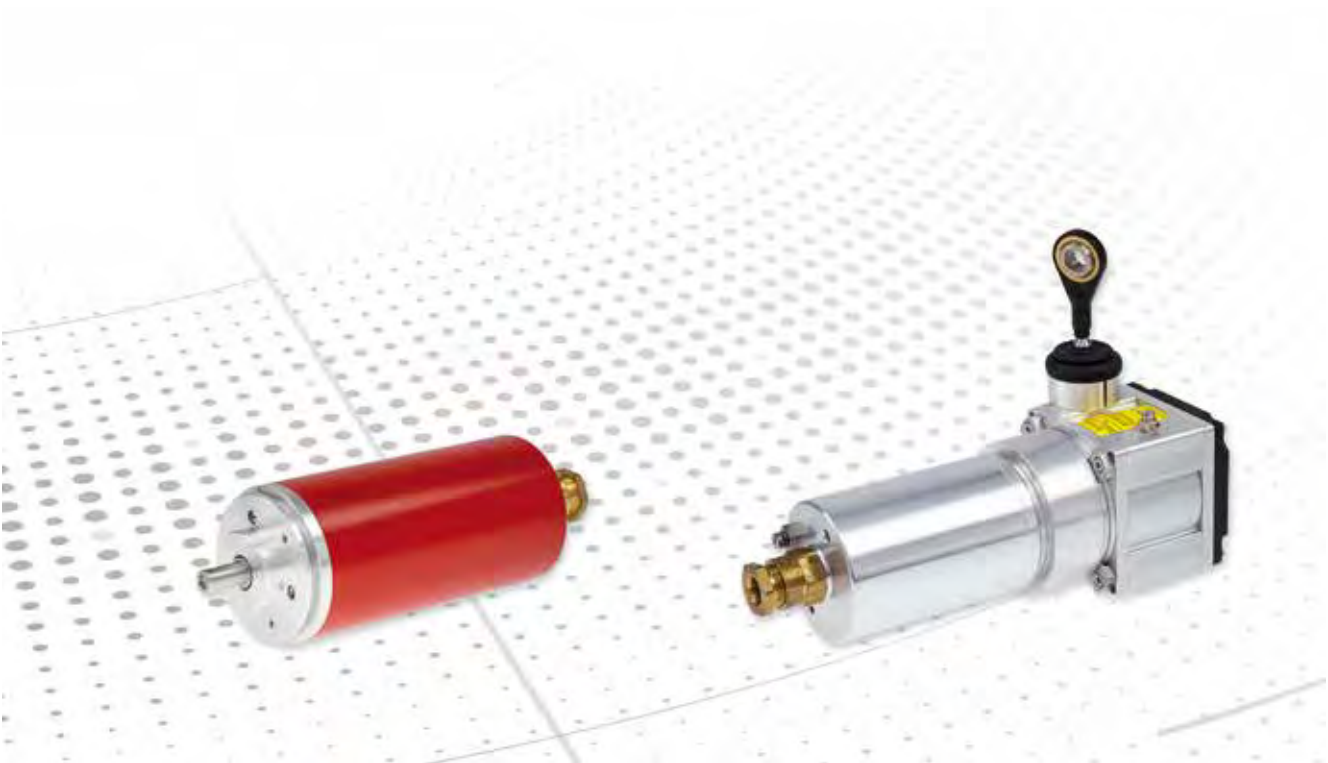
4pin. M12-male-connector (Supply voltage)



2x4pin. M12-connector, d-coded (female)



# ATEX - Zone 1/21



All our encoders that are suitable for use in zone 1/21.

The following pages show a selection from our families of absolute encoders that are suitable for use in zone 1/21.

---

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## Housing option for rotary encoders

Product	AEV70	AOV70	A_V70
			
Type	Housing option for rotary encoders	Housing option for rotary encoders	Housing option for rotary encoders - stainless steel
Single / multi	(M) Multi (S) Single	(M) Multi (S) Single	(M) Multi (S) Single
Supply	11...27 VDC	11...27 VDC	11...27 VDC
Full resolution	$\leq 33$ bit *	$\leq 36$ bit *	$\leq 36$ bit *
Steps per turn	$\leq 32768$ *	$\leq 262144$ *	$\leq 262144$ *
Number of turns	$\leq 256000$ *	$\leq 262144$ *	$\leq 262144$ *
Shaft diameters available	6...12mm	6...12mm	6...12mm
Connectors	Cable gland with ATEX-specified cable	Cable gland with ATEX-specified cable	Cable gland with ATEX-specified cable
Ambient temperature	-20...+60 °C	-20...+60 °C	-20...+60 °C
Protection class	IP65 (option IP67)	IP65 (option IP67)	IP65 (option IP67)
ATEX zone	1/21	1/21	1/21
Interface	<b>SSI</b> <b>INC</b> <b>Analog</b> <b>SIN / COS</b> <b>ASI</b> <b>PROFIBUS</b>	<b>SSI</b> <b>INC</b> <b>Analog</b> <b>SIN / COS</b> <b>ASI</b> <b>PROFIBUS</b>	<b>SSI</b> <b>INC</b> <b>Analog</b> <b>SIN / COS</b> <b>ASI</b> <b>PROFIBUS</b>
Option, additional interfaces (on request)	<b>Analog</b> <b>INC</b>	<b>Analog</b> <b>INC</b>	<b>Analog</b> <b>INC</b>
Weblink	<a href="http://www.tr-electronic.com/s/S008508">www.tr-electronic.com/s/S008508</a>	<a href="http://www.tr-electronic.com/s/S008508">www.tr-electronic.com/s/S008508</a>	<a href="http://www.tr-electronic.com/s/S008508">www.tr-electronic.com/s/S008508</a>
QR-Code			

\* depending on the interface

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## Absolute rotary encoder SIL3/PLe

Product	ADV88M	ADV88M
		
Type	Absolute rotary encoder SIL3/ PLe	Absolute rotary encoder SIL3/ PLe - stainless steel
Single / multi	(M) Multi	(M) Multi
Supply	11...27 VDC	11...27 VDC
Full resolution	28 bit	28 bit
Steps per turn	8192	8192
Number of turns	32768	32768
Shaft diameters available	10mm with groove	10mm with groove
Connectors	Cable gland axial	Cable gland axial
Ambient temperature	-20...+60 °C	-20...+60 °C
Protection class	IP65	IP65
ATEX zone	1/21	1/21
Interface	<b>SSI</b> <small>ETHERNET</small> <b>POWERLINK</b> <b>PROFINET</b>	<b>SSI</b> <small>ETHERNET</small> <b>POWERLINK</b> <b>PROFINET</b>
Option, additional interfaces (on request)	<b>INC</b>	<b>INC</b>
Weblink	<a href="http://www.tr-electronic.com/s/S011187">www.tr-electronic.com/s/S011187</a>	<a href="http://www.tr-electronic.com/s/S011187">www.tr-electronic.com/s/S011187</a>
QR-Code		



## Suggested Products

Order code	Steps per turn	Turns	Shaft / Flange	Connector position	Remark
<b>ATEX ADV88M-EPL (E) double detection, solid shaft, Powerlink</b>					
ADV88M-00002	8192	32768	10N/20, ZB36	Cable gland axial	II 2G Ex db IIC T6 II 2D Ex tb IIIC T80°C IP65
<b>ATEX ADV88M-EPL (E) double detection, solid shaft, Powerlink</b>					
ADV88M-00005	8192	32768	10N/20, ZB36	Cable gland axial	II 2G Ex db IIC T6 II 2D Ex tb IIIC T80°C IP65 stainless steel

For further product information simply enter the order number in the search field at [www.tr-electronic.com](http://www.tr-electronic.com).

### Further product information

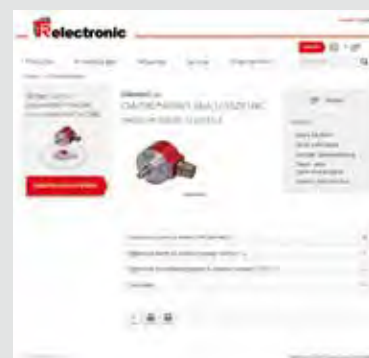
1. Enter order code into ...



2. Searchfield (top right) on [www.tr-electronic.com](http://www.tr-electronic.com)



3. Choose desired information

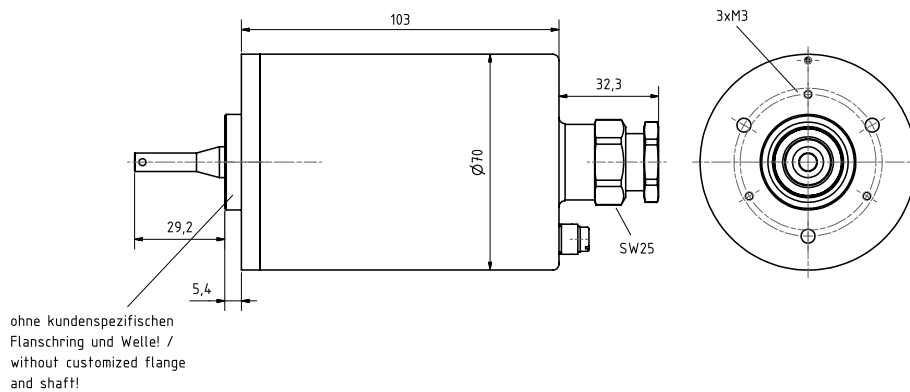


We will help you to select the most suitable products from the complete TR range. Please contact us ([info@tr-electronic.de](mailto:info@tr-electronic.de)).

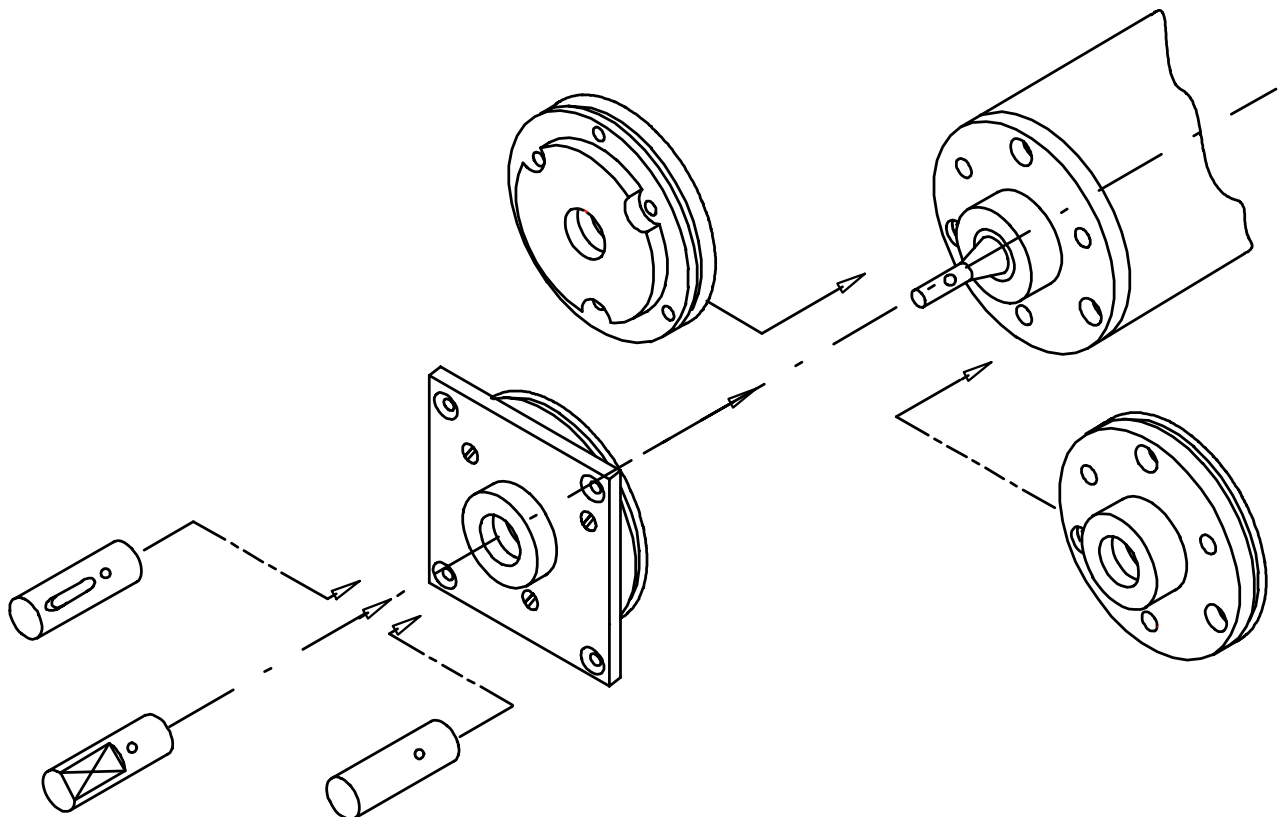
## Dimensional Drawings

### A\_V70 Basic device without flange / shaft

Flange / shaft can be chosen from the C\_\_65 family



### A\_V70 Modular flange / shaft assembly

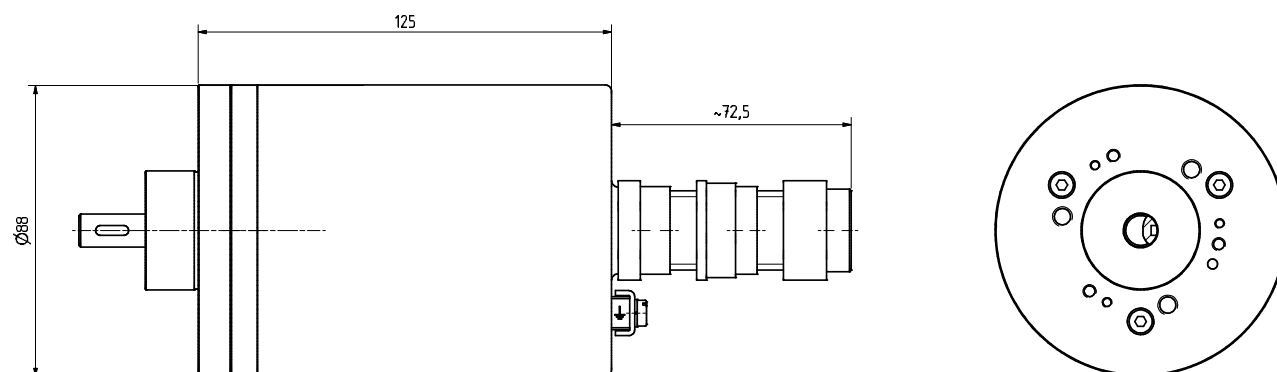


Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at [www.tr-electronic.com](http://www.tr-electronic.com) or on request.

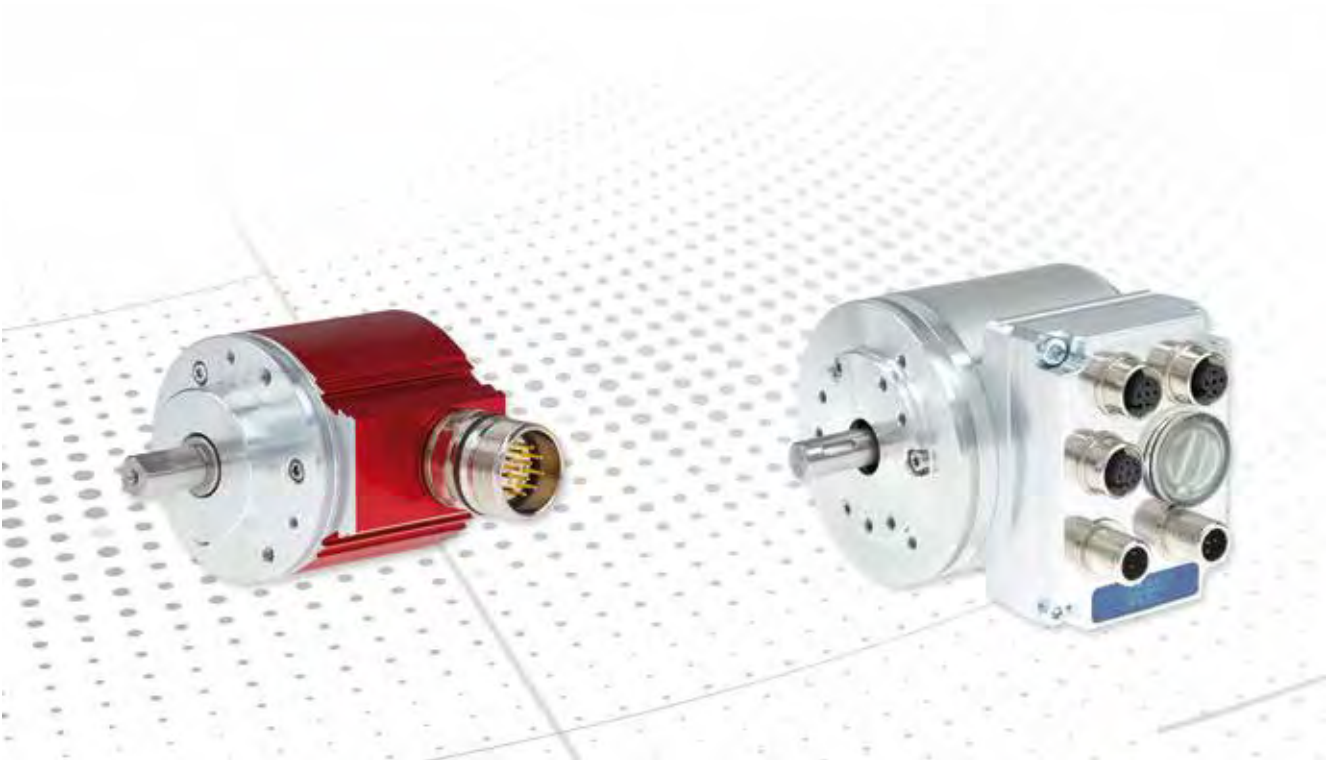
## Dimensional Drawings

### ADV88

ATEX zone 1/21, SIL3/PLe



# ATEX - Zone 2/22



All our encoders that are suitable for use in zone 2/22.













The following pages show a selection from our families of absolute encoders that are suitable for use in zone 2/22.

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# Optical 15 bit (E) Magnet detection (M)

Product	AEV65	CMV582	CMS582
			
Detection	Optical 15 bit (E)	Magnet detection (M)	Magnet detection (M)
Single / multi	(M) Multi (S) Single	(M) Multi (S) single	(M) Multi (S) single
Supply	11...27 VDC (A: 18...27VDC)	11...27 VDC (12...30 VDC)*	11...27 VDC (12...30 VDC)*
Full resolution	<= 33 bit	<= 25 bit *	<= 25 bit *
Steps per turn	32768	<= 8192 *	<= 8192 *
Number of turns	25600	<= 4096 *	<= 4096 *
Special			
Shaft diameters available	6...12 mm	6, 8, 10, 12, 14, 1/4", 3/8", 1/2"	6, 8, 10, 12, 14, 15, 1/4", 3/8", 1/2"
Connectors	Connectors axial or radial *	Connector axial or radial *	Connector axial or radial *
Ambient temperature	-20...+60 °C	-20...+75 °C	-20...+75 °C
Protection class	IP64	IP65	IP65
ATEX zone	2/22	Option 2/22	Option 2/22
Interface	<b>SSI</b> <b>Analog</b>	<b>SSI</b> <b>PROFINET</b>  <b>EtherCAT</b>  <b>EtherNet/IP</b>  <b>IO-Link</b> <b>EtherCAT</b>	<b>SSI</b> <b>PROFINET</b>  <b>EtherCAT</b>  <b>EtherNet/IP</b>  <b>IO-Link</b> <b>EtherCAT</b>
Option, additional interfaces (on request)			
Weblink	<a href="http://www.tr-electronic.com/s/S007151">www.tr-electronic.com/s/S007151</a>	<a href="http://www.tr-electronic.com/s/S013306">www.tr-electronic.com/s/S013306</a>	<a href="http://www.tr-electronic.com/s/S013307">www.tr-electronic.com/s/S013307</a>
QR-Code			

\* depending on the interface
























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## Optical 15 bit (E)

Product	CEV582	CEH582	CES582	
				
Detection	Optical 15 bit (E)	Optical 15 bit (E)	Optical 15 bit (E)	
Single / multi	(M) Multi (S) single	(M) Multi (S) single	(M) Multi (S) single	
Supply	11...27 VDC	11...27 VDC	11...27 VDC	
Full resolution	<= 33 bit *	<= 33 bit *	<= 33 bit *	
Steps per turn	<= 32768 *	<= 32768 *	<= 32768 *	
Number of turns	<= 256000 *	<= 256000 *	<= 256000 *	
Special				
Shaft diameters available	6, 8, 10, 12, 14, 1/4", 3/8", 1/2"	6, 8, 10, 12, 14, 15, 1/4", 3/8", 1/2"	6, 8, 10, 12, 14, 15, 1/4", 3/8", 1/2"	
Connectors	Connector axial or radial *	Connector radial	Connector axial or radial *	
Ambient temperature	-20...+75 °C	-20...+75 °C	-20...+75 °C	
Protection class	IP65	IP54	IP65	
ATEX zone	Option 2/22	Option 2/22	Option 2/22	
Interface	     	     	     	
Option, additional interfaces (on request)				
Weblink	<a href="http://www.tr-electronic.com/s/S013308">www.tr-electronic.com/s/S013308</a>	<a href="http://www.tr-electronic.com/s/S013312">www.tr-electronic.com/s/S013312</a>	<a href="http://www.tr-electronic.com/s/S013313">www.tr-electronic.com/s/S013313</a>	
QR-Code				

\* depending on the interface

# Optical 18 bit (O) Double detection (D)

COV582	COH582	COS582	CDV582+FS
			
Optical 16 bit (O)	Optical 18 bit (O)	Optical 18 bit (O)	Double detection (D)
(M) Multi (S) single	(M) Multi (S) single	(M) Multi (S) single	(M) Multi
11...27 VDC	11...27 VDC	11...27 VDC	11...27 VDC
<= 36 bit *	<= 36 bit *	<= 36 bit *	28 bit
<= 262144 *	<= 262144 *	<= 262144 *	8192
<= 262144 *	<= 262144 *	<= 262144 *	65536
			SIL3 / PL <sub>e</sub> ; SIL2 / PL <sub>d</sub>
6, 8, 10, 12, 14, 1/4", 3/8", 1/2"	6, 8, 10, 12, 14, 15, 1/4", 3/8", 1/2"	6, 8, 10, 12, 14, 15, 1/4", 3/8", 1/2"	10mm mit Nut
Connector axial or radial *	Connector radial	Connector axial or radial *	Connectors radial, axial
-20...+75 °C	-20...+75 °C	-20...+75 °C	-20...+75 °C
IP65	IP54	IP65	IP 65
Option 2/22	Option 2/22	Option 2/22	
      	      	      	
<a href="http://www.tr-electronic.com/s/S013314">www.tr-electronic.com/s/S013314</a>	<a href="http://www.tr-electronic.com/s/S013315">www.tr-electronic.com/s/S013315</a>	<a href="http://www.tr-electronic.com/s/S013316">www.tr-electronic.com/s/S013316</a>	<a href="http://www.tr-electronic.com/s/S018153">www.tr-electronic.com/s/S018153</a>
			

\* depending on the interface

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## Double detection (D)

Product	CDH582+FS	CD582+FS	CDV582MM+FS	
				
Detection	Double detection (D)	Double detection (D)	Double detection (D)	
Single / multi	(M) Multi	(M) Multi	(M) Multi	
Supply	11...27 VDC	11...27 VDC	11...27 VDC	
Full resolution	28 bit	28 bit	28 bit	
Steps per turn	8192	8192	8192	
Number of turns	65536	65536	65536	
Special	SIL3 / PLe; SIL2 / PLd	SIL3 / PLe; SIL2 / PLd	SIL3 / PLe; SIL2 / PLd	
Shaft diameters available	15mm mit Teilnut	15mm mit Teilnut	10mm mit Nut	
Connectors	Connectors radial	Connectors radial, axial	Connectors radial, axial	
Ambient temperature	-20...+75°C	-20...+75°C	-20...+75°C	
Protection class	IP 54	IP 54	IP 65	
ATEX zone				
Interface				
Option, additional interfaces (on request)	<b>SSI</b> <b>INC</b>	<b>SSI</b> <b>INC</b>	<b>SSI</b> <b>INC</b>	
Weblink	<a href="http://www.tr-electronic.com/s/S018153">www.tr-electronic.com/s/S018153</a>	<a href="http://www.tr-electronic.com/s/S018153">www.tr-electronic.com/s/S018153</a>	<a href="http://www.tr-electronic.com/s/S018153">www.tr-electronic.com/s/S018153</a>	
QR-Code				












## Double detection (D)

CDH582MM+FS	CDS582MM+FS	CDV75M	CDV75MM
			
Double detection (D)	Double detection (D)	Double detection (D)	Double detection (D)
(M) Multi	(M) Multi	(M) Multi	(M) Multi
11...27 VDC	11...27 VDC	11...27 VDC	11...27 VDC
28 bit	28 bit	28 bit	28 bit
8192	8192	8192	8192
65536	4096	32768	32768
SIL3 / PLe; SIL2 / PLd	SIL3 / PLe; SIL2 / PLd	SIL3 / PLe; SIL2 / PLd	SIL3 / PLe; SIL2 / PLd
15mm mit Teilnut	15mm mit Teilnut	10mm with keyway	10mm with keyway
Connectors radial	Connectors radial, axial	Connectors radial, cable glands radial (SSI)	Connectors radial, cable glands radial (SSI)
-20...+75°C	-20...+75°C	-20...+70 °C	-40...+65°C
IP 54	IP 54	IP 54	IP 65
		    	    
SSI      INC	SSI      INC	INC	INC
<a href="http://www.tr-electronic.com/s/S018153">www.tr-electronic.com/s/S018153</a>	<a href="http://www.tr-electronic.com/s/S018153">www.tr-electronic.com/s/S018153</a>	<a href="http://www.tr-electronic.com/s/S007271">www.tr-electronic.com/s/S007271</a>	<a href="http://www.tr-electronic.com/s/S007271">www.tr-electronic.com/s/S007271</a>
			

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## Double detection (D)

Product	CDH75M	ADV115
		
Detection	Double detection (D)	Double detection (D)
Single / multi	(M) Multi	(M) Multi (S) Single
Supply	11...27 VDC	11...27 VDC
Full resolution	28 bit	25 bit
Steps per turn	8192	8192
Number of turns	32768	256000
Special	SIL3 / PL <sub>e</sub> ; SIL2 / PL <sub>d</sub>	
Shaft diameters available	20mm with keyway	12, 14, 20
Connectors	Connectors radial, cable glands radial (SSI)	Cable gland
Ambient temperature	-20...+70 °C	0...+40 °C
Protection class	IP 54	IP65
ATEX zone		22
Interface	<b>SSI</b>    	<b>SSI</b> 
Option, additional interfaces (on request)	<b>INC</b>	<b>SSI</b> <b>INC</b>
Weblink	<a href="http://www.tr-electronic.com/s/S007272">www.tr-electronic.com/s/S007272</a>	<a href="http://www.tr-electronic.com/s/S008525">www.tr-electronic.com/s/S008525</a>
QR-Code		

## Suggested Products

Order code	Steps per turn	Turns	Shaft / Flange	Connector position	Remark
<b>ATEX AEV58-SSI (E) Optical 15 bit, solid shaft, SSI</b>					
AEV58M-00001	8192	4096	10FL/19,5 ZB36	Radial	ATEX zone 2 / 22
<b>ATEX AES58-SSI (E) Optical 15 bit, blind shaft, SSI</b>					
AES58M-00001	8192	4096	10H7 blind shaft	Radial	ATEX zone 2 / 22
<b>AEV65 SSI+ANALOG</b>					
AEV65M-00001	4096	4096	10FL/19,5 - ZB36	Connector radial	ATEX zone 2/22
<b>ATEX ADV75M-PB (D) Double detection, solid shaft, Profibus</b>					
ADV75M-00001	8192	32768	10Keyway/19,5 ZB50/D75 9XM4	Connector radial	ATEX zone 2/22
<b>ATEX ADV75M-PN (D) Double detection, solid shaft, Profinet</b>					
ADV75M-00002	8192	32768	10Keyway/19,5 ZB50/D75 9XM4	Connector radial	ATEX zone 2/22
<b>ATEX ADH75M-PB (D) Double detection, hollow shaft, Profibus</b>					
ADH75M-00001	8192	32768	20H7/Keyway slot for pin D4	Connector radial	ATEX zone 2/22
<b>ATEX ADH75M-PN (D) Double detection, hollow shaft, Profinet</b>					
ADH75M-00002	8192	32768	20H7/Keyway slot for pin D4	Connector radial	ATEX zone 2/22
<b>AEV115 Profibus</b>					
AEV115M-00001	4096	4096	20Keyway /40	Fieldbus hood	ATEX zone 22
<b>ADV115 Double encoder Profibus+SSI, SSI+INC</b>					
ADV115M-00001	8192 / 8192	4096 / 4096	20Keyway /40	Fieldbus hood	ATEX zone 22

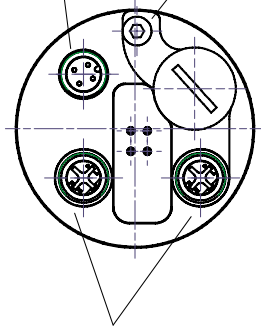
For further product information simply enter the order number in the search field at [www.tr-electronic.com](http://www.tr-electronic.com).

## Dimensional Drawings

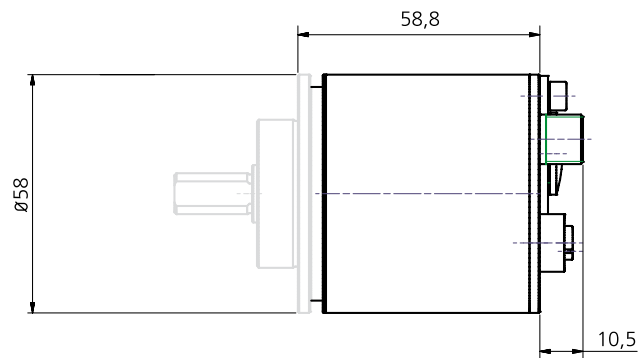
**A\_\_582 axial**  
ATEX zone 2/22

4pin. M12-male-connector (Supply voltage)

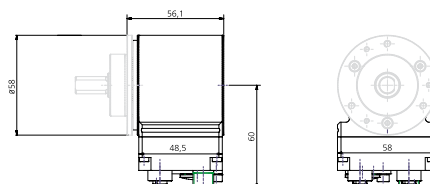
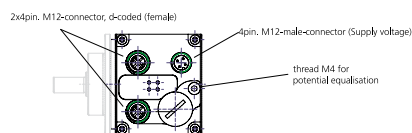
thread M4 for  
potential equalisation



2x4pin. M12-connector, d-coded (female)



**A\_\_582 radial**  
ATEX zone 2/22

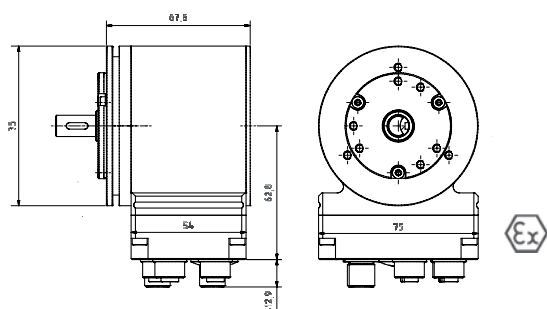


Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at [www.tr-electronic.com](http://www.tr-electronic.com) or on request.

## Dimensional Drawings

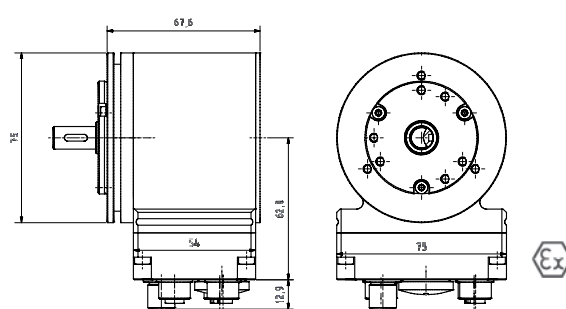
### ADV75-PB

ATEX zone 2/22 absolute encoder ADV75M - PB



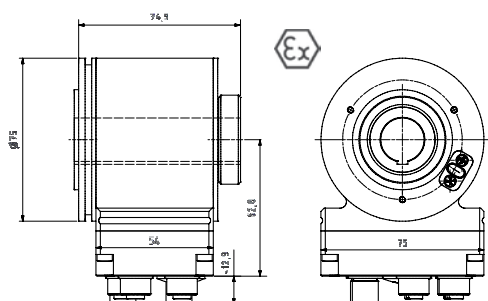
### ADV75-PN

ATEX zone 2/22 absolute encoder ADV75M - PROFINET / PROFIsafe



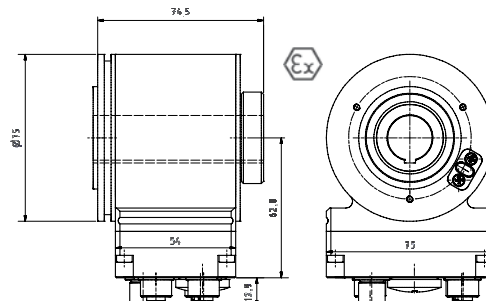
### ADH75-PB

ATEX absolute encoder ADH75M - PB



### ADH75-PN

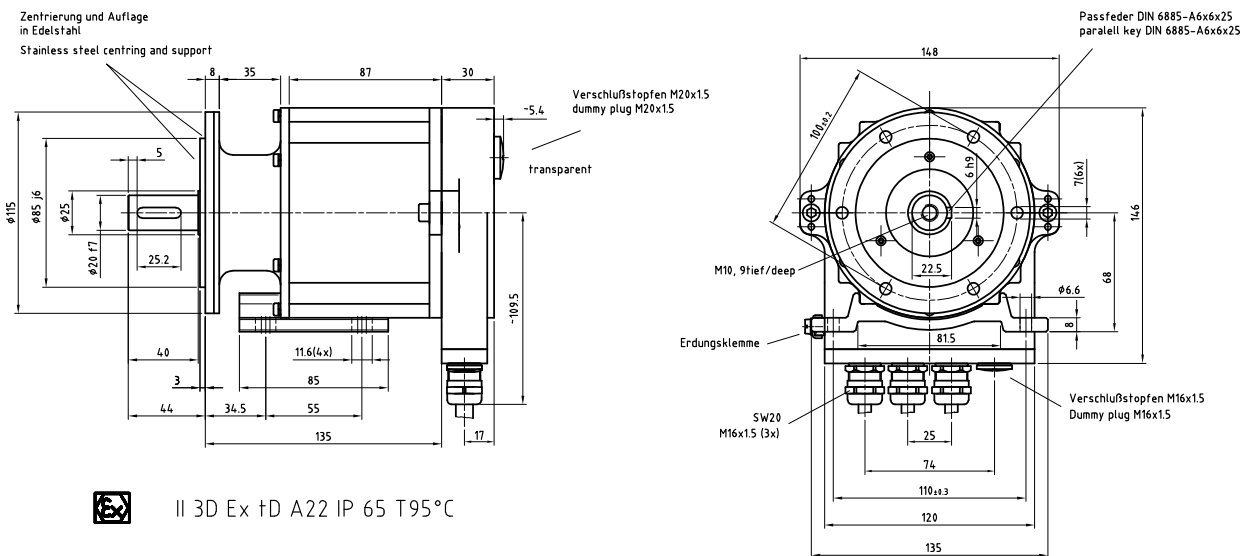
ATEX zone 2/22 absolute encoder ADH75M - PROFINET / PROFIsafe



# Dimensional Drawings

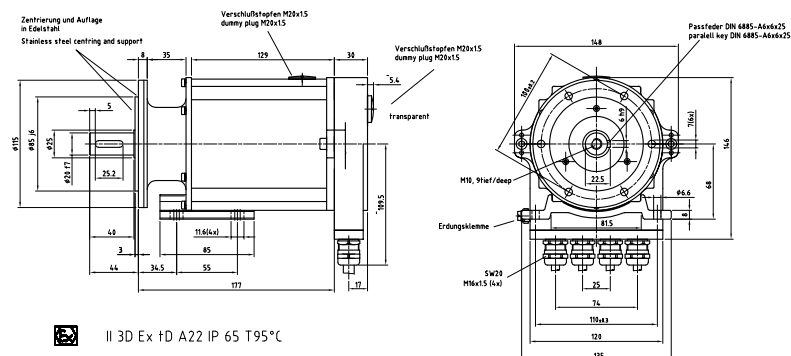
## AEV115

Connection hood same orientation as mounting foot



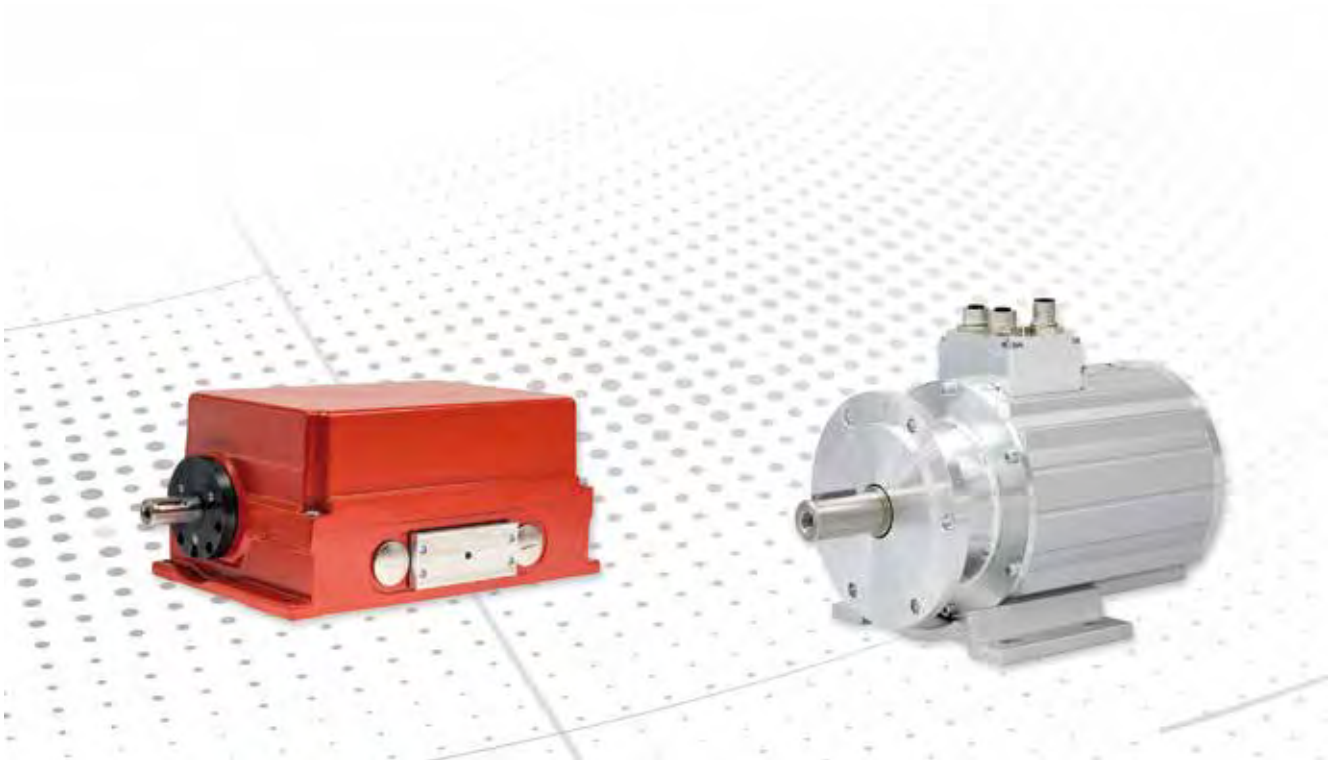
## ADV115

Connection hood same orientation as mounting foot





## Absolute Rotary Encoders - Heavy-Duty



### Absolute rotary encoders for the most demanding conditions

In crane installations, mining, oil and gas production, steelworks or in wind power plants, rotary encoders must perform their tasks reliably even under the most demanding environmental conditions and extreme mechanical influences. This demands particularly intelligent and robust design, as well as durable technology.

Heavy-duty absolute rotary encoders from TR-Electronic offer thick-walled housings made of aluminium or stainless steel and are equipped with heating or cooling elements if

required. Depending on the application, the housings are explosion-proof according to ATEX, as well as salt and acid resistant.















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## Stainless steel

Product	CEV84	CEV84 Field Bus	CEV84 Industrial Ethernet
			
Type	Stainless steel housing for C__58, I__58 [1.4305 (X12 Cr NiS 18 08 / 18 9)]	Stainless steel encoder [1.4305 (X12 Cr NiS 18 08 / 18 9)]	Stainless steel encoder [1.4305 (X12 Cr NiS 18 08 / 18 9)]
Technical data encoder	C__58, I__58	C__58, I__58	C__58, I__58
Shaft diameters available	6, 10, 12 mm	6, 10, 12 mm	6, 10, 12 mm
Connectors	M23 axial/radial	Fieldbus hood / cable glands radial	3 x M12 axial
Ambient temperature	-20...+70 °C (option -40...+85 °C*)	-20...+70 °C (option -40...+85 °C*)	-20...+70 °C (option -40...+85 °C*)
Protection class	IP68	IP68	IP68
ATEX zone			
Interface	<b>SSI</b> <b>Parallel</b>  <b>Analog</b> <b>Nocken</b>	   	      
Option, additional interfaces (on request)	<b>Analog</b> <b>INC</b>  <b>Parallel</b>	<b>SSI</b> <b>Parallel</b>  <b>Analog</b> <b>INC</b>	
Weblink	<a href="http://www.tr-electronic.com/s/5007190">www.tr-electronic.com/s/5007190</a>	<a href="http://www.tr-electronic.com/s/5007190">www.tr-electronic.com/s/5007190</a>	<a href="http://www.tr-electronic.com/s/5007190">www.tr-electronic.com/s/5007190</a>
QR-Code			










\*Depends on encoder and options (e.g. heating...) integrated.

Can't find the right variant? Please contact us ([info@tr-electronic.de](mailto:info@tr-electronic.de))

# Housing option for rotary encoders

## Encoder with protective housing

## Double encoder with protective housing

Product	C_V115 	AEV115 	DAG Housing 
Type	Housing option for rotary encoders C_58, I_58	Encoder with protective housing	Protective housing
Technical data encoder	C__58, C__65, I__58	8192 / 256000	C__58, C__65, CD_75, I__58
Shaft diameters available	12, 14, 20	12, 14, 20	20 with keyway
Connectors	Cable gland / connector	Cable gland	Cable gland, different industrial connection solutions
Ambient temperature	-20...+60 °C *	0...+40 °C	-20...+70 °C (option -40...+85 °C*)
Protection class	IP65 (option IP67)	IP65	IP65
ATEX zone	Option 22	22	
Interface	<b>SSI</b> <b>Analog</b> <b>Parallel</b> <b>Nocken</b>  <b>CANopen</b>	<b>SSI</b> 	 <b>ETHERNET POWERLINK</b> <b>EtherCAT</b> <b>SERCOS</b> <b>EtherNet/IP</b>
Option, additional interfaces (on request)	<b>Analog</b> <b>INC</b> <b>Nocken</b>	<b>SSI</b> <b>INC</b>	<b>Analog</b> <b>INC</b> <b>Nocken</b>
Weblink	<a href="http://www.tr-electronic.com/s/S008523">www.tr-electronic.com/s/S008523</a>	<a href="http://www.tr-electronic.com/s/S008524">www.tr-electronic.com/s/S008524</a>	<a href="http://www.tr-electronic.com/products/heavy-duty.html">http://www.tr-electronic.com/products/heavy-duty.html</a>
QR-Code			

\*Depends on encoder and options (e.g. heating...) integrated.

## Suggested Products

Order code	Steps per turn	Turns	Shaft / Flange	Connector position	Remark
<b>CEV84 - Ethernet/IP</b>					
CEV84M-10046	8192	4096	10FL19,5 ZB36	axial, 3 x M12	
<b>CEV84 - PROFINET</b>					
CEV84M-10049	8192	4096	10FL19,5 ZB36	axial, 3 x M12	
<b>CEV84 - EtherCAT</b>					
CEV84M-10050	8192	4096	10FL19,5 ZB36	axial, 3 x M12	
<b>CEV84 - Sercos</b>					
CEV84M-10054	8192	4096	10FL19,5 ZB36	axial, 3 x M12	
<b>CEV84 - Powerlink</b>					
CEV84M-10052	8192	4096	10FL19,5 ZB36	axial, 3 x M12	
<b>CEV115 SSI</b>					
CEV115M-01368	4096	4096	14 Keyway /33 ZB85	Cable gland, 10 m cable	
CEV115M-10021	4096	4096	20 Keyway /40 ZB85	M23 12 radial	Address 10 factory set
<b>CEV115 Profibus</b>					
CEV115M-10010	8192	4096	14 Keyway /33, ZB85	Fieldbus hood with 3 x PG 11 cable glands	
CEV115M-10005	8192	4096	14 Keyway /33, ZB85	Fieldbus hood with 3 x M16 cable glands	
<b>CEV115 Profibus + SSI</b>					
CEV115M-10024	4096	4096	20 Keyway /40 ZB85	Fieldbus hood with 3 x M16 cable glands	
<b>CEV115 Ethernet/IP</b>					
CEV115M-10055	8192	4096	14 Keyway /33 ZB85	3 x M12 radial	
CEV115M-10054	8192	4096	14 Keyway /33 ZB85	3 x M12, 1 x M23 radial	Heating integrated
<b>CEV115 Profinet</b>					
CEV115M-10060	8192	4096	20 Keyway /40 ZB85	3 x M12 radial	

For further product information simply enter the order number in the search field at [www.tr-electronic.com](http://www.tr-electronic.com).

## Suggested Products

Order code	Steps per turn	Turns	Shaft / Flange	Connector position	Remark
<b>CEV115 EtherCAT</b>					
CEV115M-10061	8192	4096	20 Keyway /40 ZB85	3 x M12 radial	
<b>CDV115 PB/SSI + SSI/INC</b>					
CDV115M-00002	4096/4096	4096/4096	20 Keyway /40 ZB85	Fieldbus hood with 4 x M16 cable glands	Encoder 1 Profibus + SSI Encoder 2 SSI + INC
<b>AEV115 Profibus</b>					
AEV115M-00001	4096	4096	20 Keyway /40 ZB85	Fieldbus hood with 3 x M16 cable glands	

For further product information simply enter the order number in the search field at [www.tr-electronic.com](http://www.tr-electronic.com).

### Further product information

1. Enter order code into ...



2. Searchfield (top right) on [www.tr-electronic.com](http://www.tr-electronic.com)



3. Choose desired information

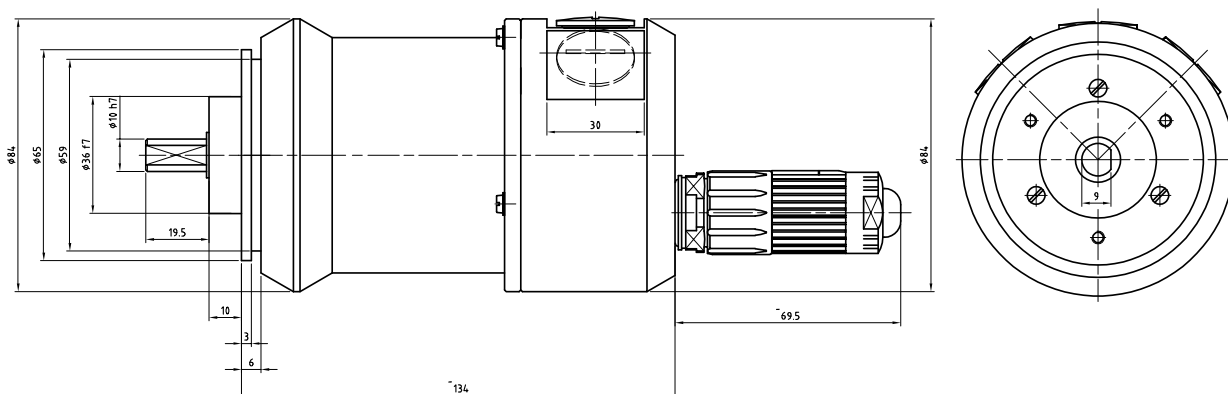


We will help you to select the most suitable products from the complete TR range. Please contact us ([info@tr-electronic.de](mailto:info@tr-electronic.de)).

# Dimensional Drawings

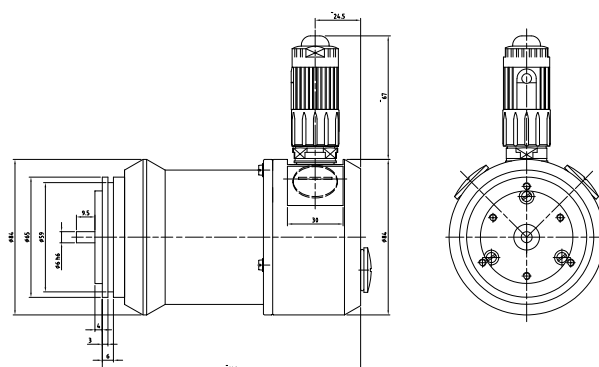
## CEV84

SSI, Analog, PAR - axial



## CEV84

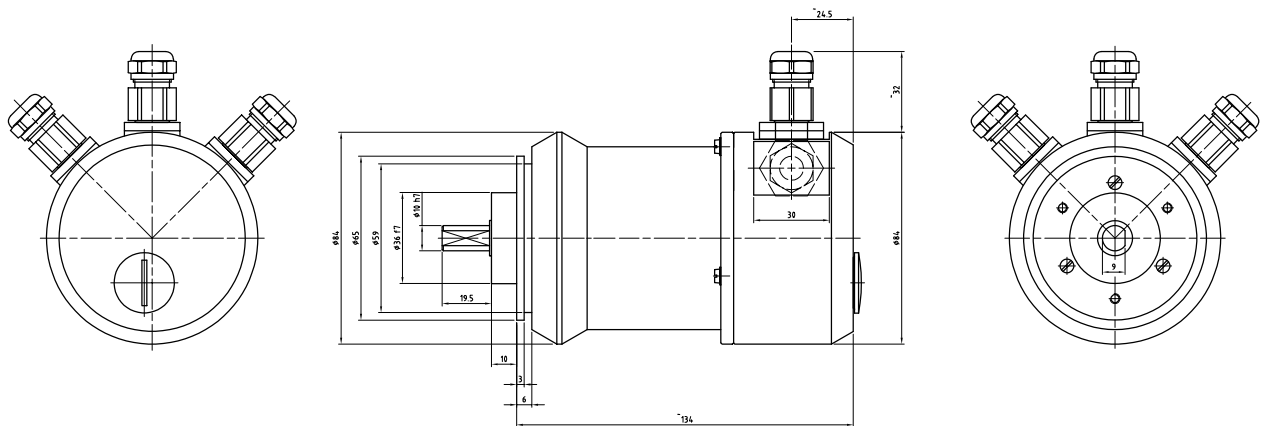
SSI, Analog, PAR - radial



## Dimensional Drawings

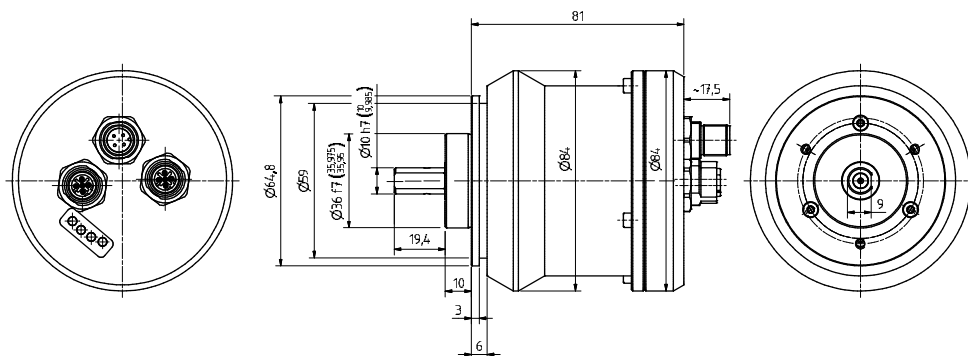
### CEV84 Fieldbus

CANopen, CAN DeviceNet, Profibus



### CEV84 Industrial Ethernet

EtherNet/IP, Sercos, EtherCAT, PROFINET IO, POWERLINK



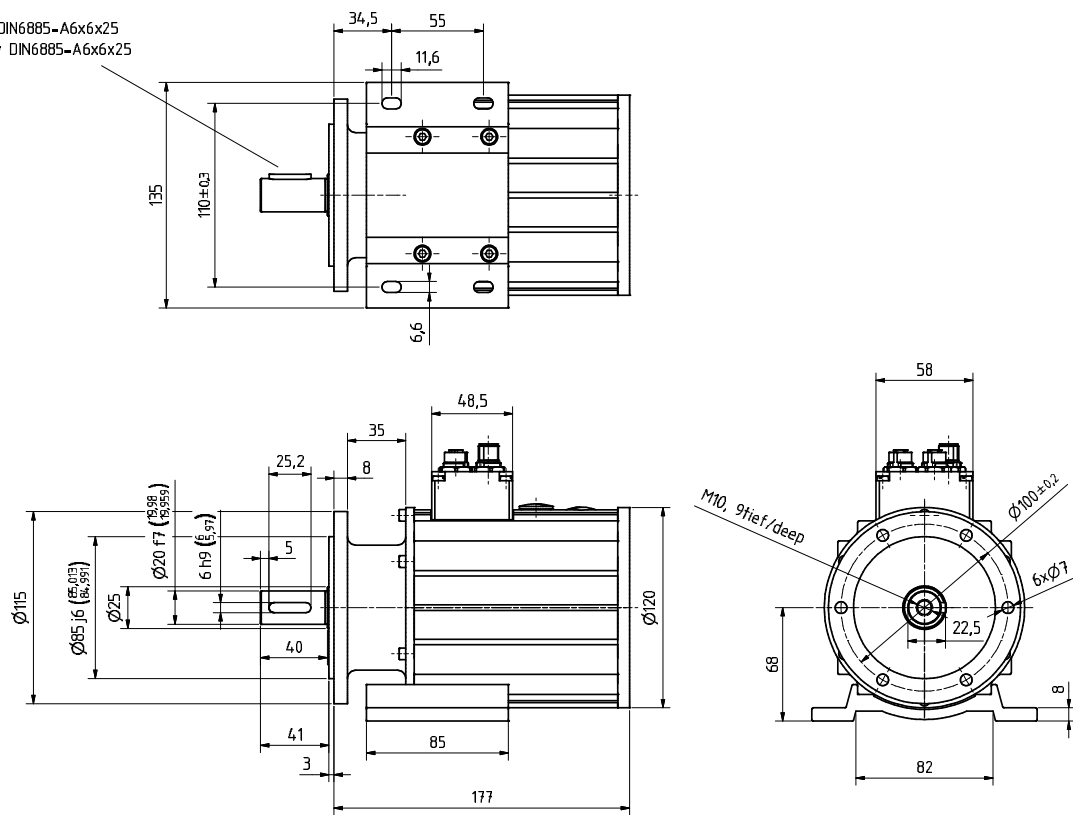


## Dimensional Drawings

### CEV115

Connector hood radial for all interfaces available in C\_\_582 series

Passfeder DIN6885-A6x6x25  
parallel key DIN6885-A6x6x25

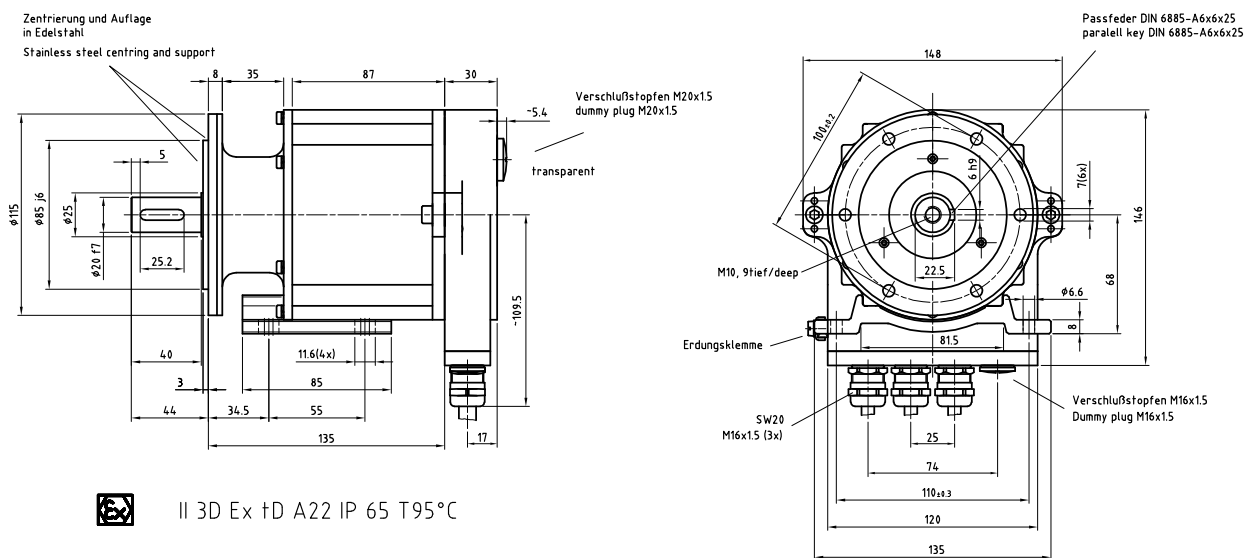




# Dimensional Drawings

## AEV115

Connection hood same orientation as mounting foot



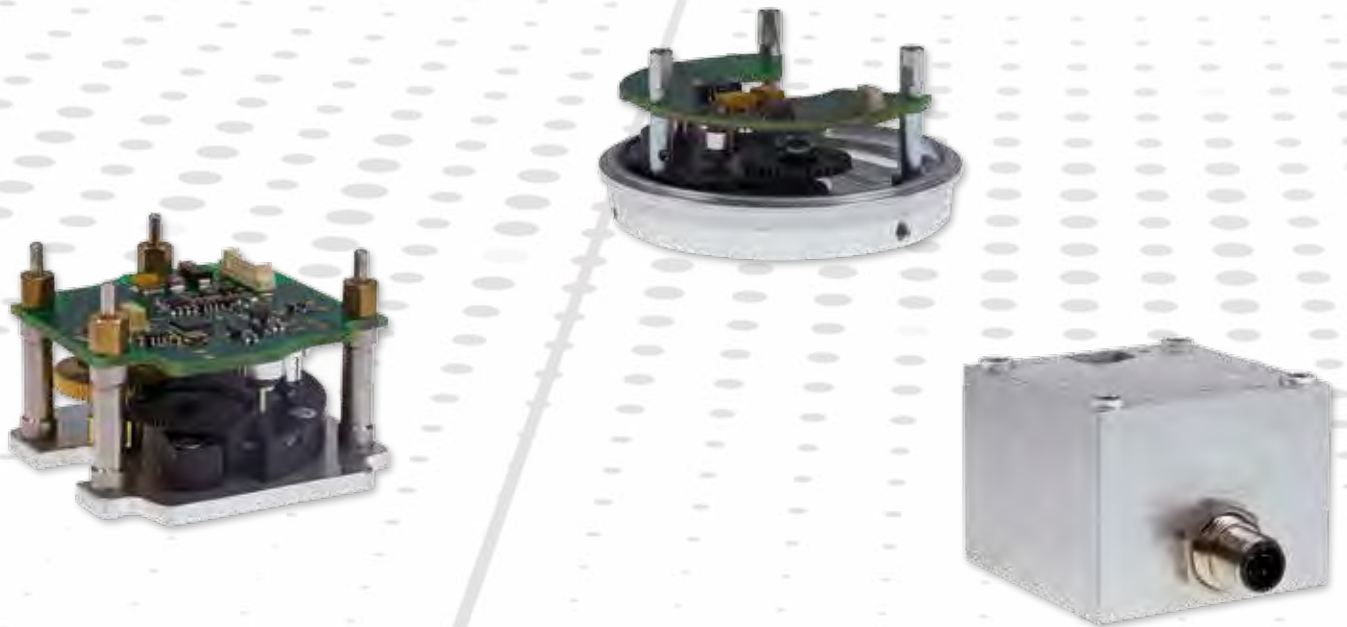
Connection hood same orientation as mounting foot





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## Customized Rotary Encoders



### Individually developed rotary encoders for your application

TR-Electronic has always had a fondness for exceptional solutions. Many innovations which have come about as special developments have subsequently been incorporated into our standard series. There are still applications where even the extremely wide range of standard solutions from TR-Electronic is not sufficient to fulfill a special task. TR-Electronic will work closely with you to develop highly specialized position measuring systems for such tasks. To do this we rely on different scanning technologies, interface know-how and our diverse experience in mechatronic designs.

Often such developments are created as motor feedback for positioning and drive solutions. The close collaboration allows component reductions, for example the second drive shaft is inserted directly into the rotary encoder so that it drives the scanning system or, vice-versa, our rotary encoder simultaneously acts as the B-shield for your motor. Additional characteristics (e.g. motor temperature...) can be directly acquired in the encoder and, for example transmitted via a customized protocol. We can generally also find the right solution for unusual installation situations - contact us!



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## Contents

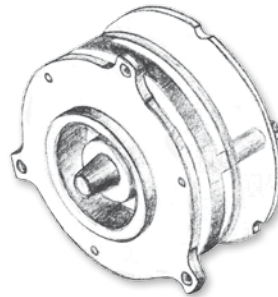
Kit encoder .....	210
10 steps .....	211

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# Kit Encoders – unlimited variations

## Individual encoder kit

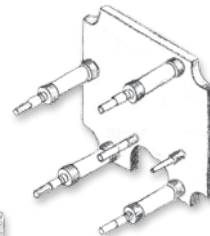
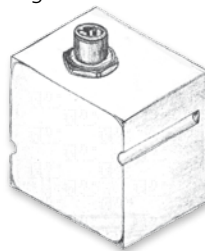
Each kit encoder is individual – it is uniquely customized, developed and built. An overview of all possible variations would result in an enormous catalog. These design sketches are intended to inspire you to set us a challenge. We would be delighted to develop optimization solutions for your application.



The shaft geometry can be optimally adapted to the mounting conditions of your drive.



As in the design sketch, the mounting can be done from behind, passing through the encoder housing. An extremely flat mounting flange is therefore also possible.



In this design the motor shaft is eccentrically inserted on the bottom of the housing. The housing is rectangular and is integrated seamlessly into your drive.

## Options

- \_ A possible additional option is a heating element or water cooling
- \_ The connection technology is individually adaptable
- \_ A wide variety of interfaces as well as combination interfaces from TR's extensive portfolio are possible, as well as customized interfaces and protocols

You can customize the mounting flange to suit your needs, for example. The encoder is mounted to the motor. Our mounting flange is also the new B end shield of the motor. The fixing holes can be located on the outside.

## Advantages

- \_ The number of components for your device remains small
- \_ Cost optimization of your manufacturing process thanks to ready-to-assemble delivery
- \_ The vibration resistance of the rotary encoders is adapted to your processes and components
- \_ Housing variants from IP00 to ATEX and impervious IP69K are possible. Resistance to special fluids is also possible.
- \_ Housings and flange materials can be selected from a wide range. Our experience ranges from universal aluminium to stainless steel and special plastics for insulated installation or for particularly aggressive environments.

# 10 steps to your individual rotary encoder

## 1. Joint coordination

Together we define the features of your Kit encoder and match your individual wishes and ideas with a possible design.

## 2. Integration of existing components

We deliver production-ready solutions. Where necessary and possible, we will design your rotary encoder so that existing components from your drive can be integrated. You will gain space and time, as well as saving money.

## 3. Housing type

The housing can be designed so that, for example, the mounting flange of the encoder is also the B end shield of your motor. Naturally you can also omit the housing entirely.

## 4. Housing design

For the housing design you can use standard designs or an individual design, which is manufactured precisely for your application.



## 5. Assembly

You can customize the mounting flange to suit your needs. An extremely flat mounting flange is possible, for example, or four instead of three fixing points.



## 6. Coupling

We transfer the rotary movement to the encoder with a coupling or directly via a gear wheel.



## 7. Seat of the shaft

The shaft is centrally located as standard. It can also be positioned eccentrically if required.



## 8. Interfaces



In addition to the interfaces already specified, further customized interfaces are possible on request.

## 9. Other options

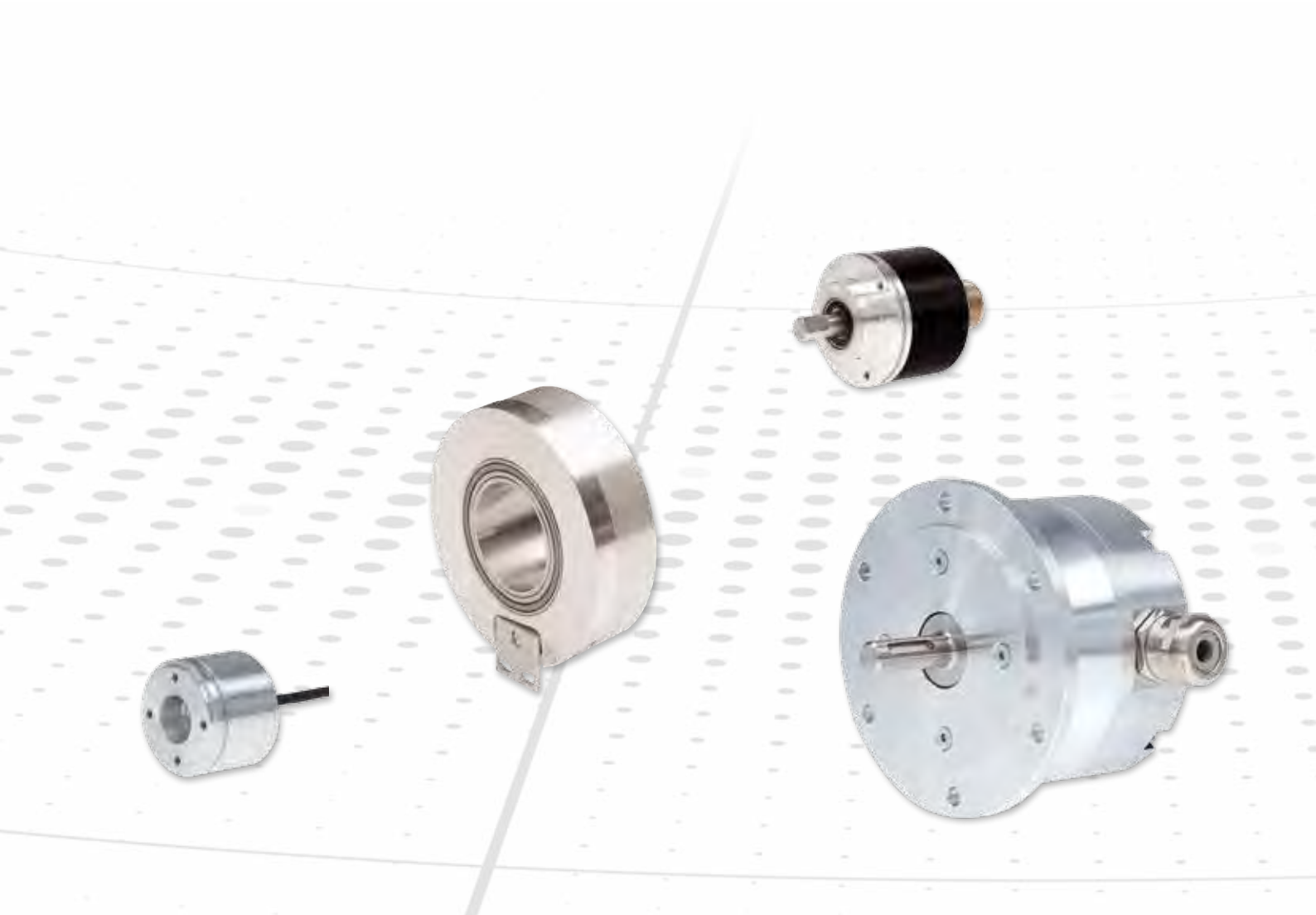
There are virtually no limits to your ideas. A heating element or water cooling is available, for example, or a stainless steel housing. An optional temperature sensor can be read out directly via the encoder interface.

## 10. Production-ready delivery

We adapt our logistics to the batch sizes of your production. We also design the transport packaging in the way most favorable for your production. Ready-to-install delivery enables you to optimize your production process. We will gladly implement special requests and requirements with you wherever possible.

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## Incremental Rotary Encoders



### Programmable, extremely resilient and more

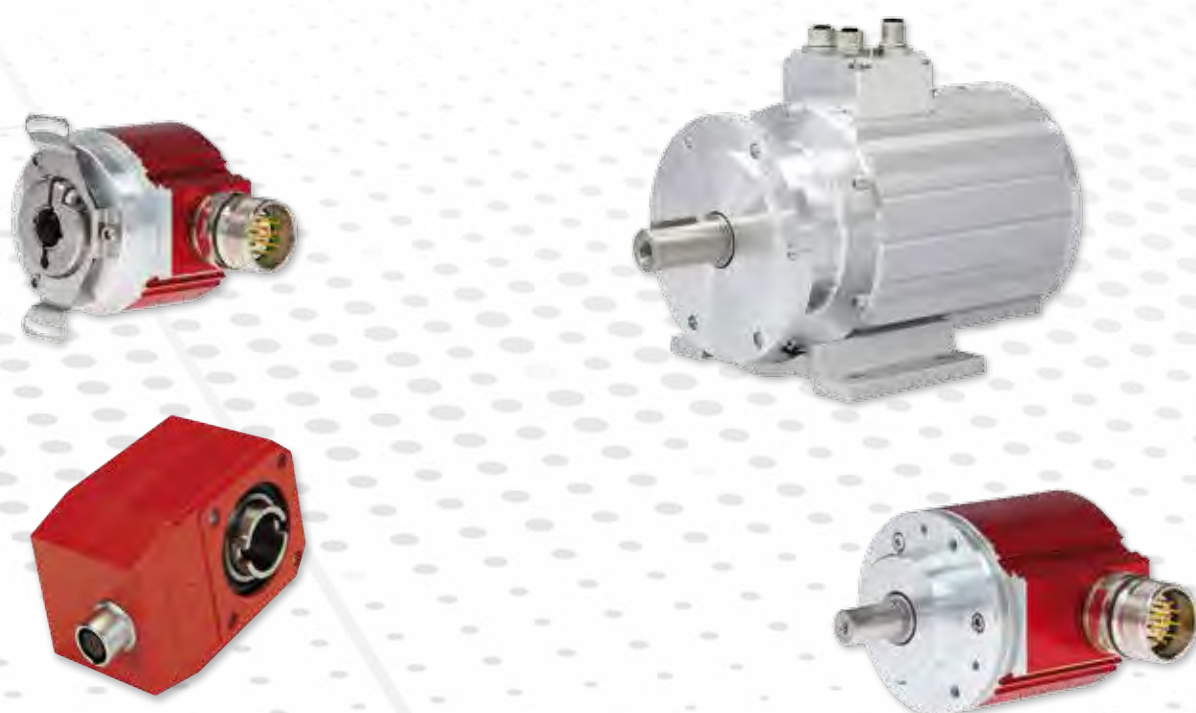
Incremental rotary encoders are used in machines and installations in different resolutions. Thanks to their simple design, incremental rotary encoders are more economical to manufacture than absolute rotary encoders. On the other hand, they only indicate position changes and cannot detect movements without a power supply.

In addition to our programmable all-rounder with 58 mm housing for almost all resolutions, our product portfolio

also includes a wide range of different sizes. In combination with hollow shafts, solid shafts of different diameters and a selection of flanges, you will find the right incremental rotary encoder for your machine's installation situation.

You will also find a multitude of housing options, e.g. ATEX-compliant housings and housings for use in aggressive media or for heavy mechanical stress (heavy-duty).

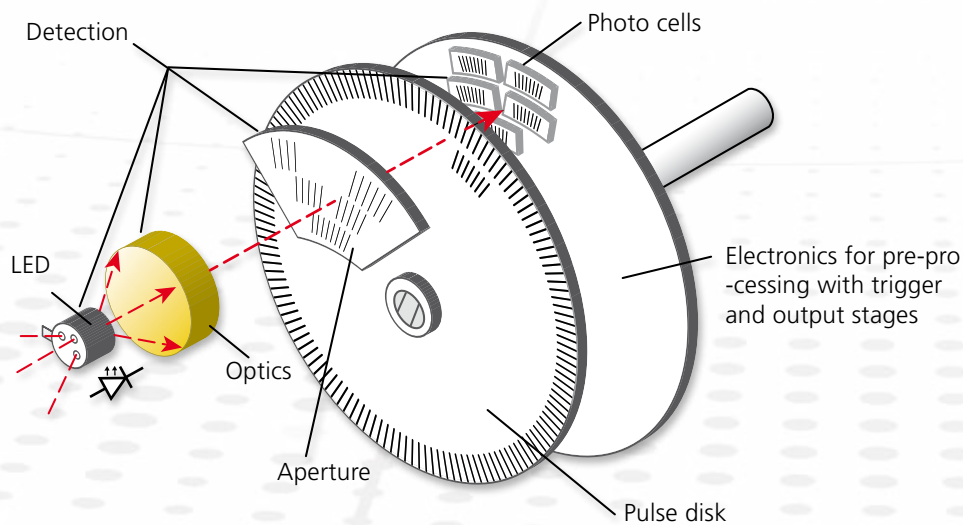




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## Pulse Encoder mode of operation

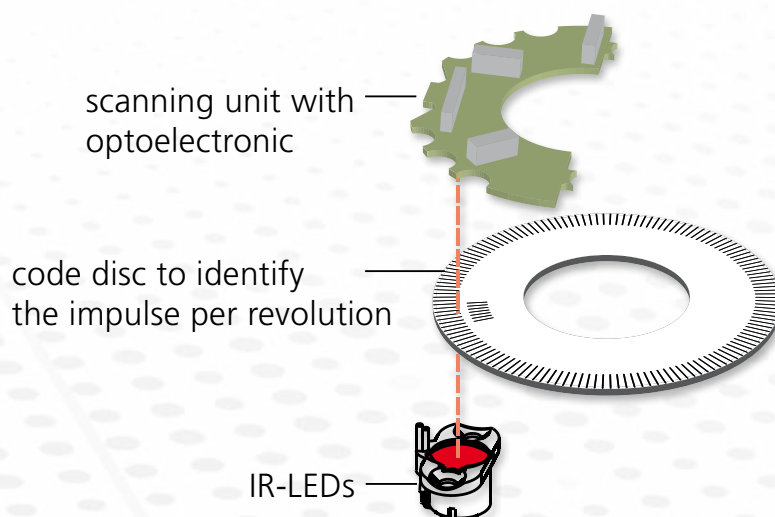


### Consistent mechanical concept

A rotary movement is processed in the incremental rotary encoder (also called a pulse encoder) and output in the form of an electrical signal. Angular increments are recorded via a pulse wheel with a fixed number of cycles per revolution. A scanning unit with integrated optoelectronics generates electrical signals and outputs pulses (measuring increments).

The resolution of the measuring system is defined by the number of light/dark segments (number of graduation marks per revolution) on the pulse wheel. For example, in the case of a pulse encoder with 1,000 graduation marks, a signal sequence of 1,000 pulses is output during one revolution. To evaluate the counting direction, a second signal sequence with a 90° phase offset is generated. A rev counter can be controlled with an additional zero pulse.

- \_ **Programmable rotary encoders**
- \_ **Non-programmable incremental rotary encoders**
- \_ **Solid shaft, hollow shaft, blind shaft design and type with integrated coupling**
- \_ **For \_\_ F36 with separate bearing**



## Programmable incremental encoders

### The all-rounder in a 58 mm housing

Our programmable incremental rotary encoders offer the optimal basis for every requirement and are available with solid shaft, continuous hollow shaft, blind shaft or integrated coupling. You can adapt the resolution of our programmable incremental encoders to your requirements using software.

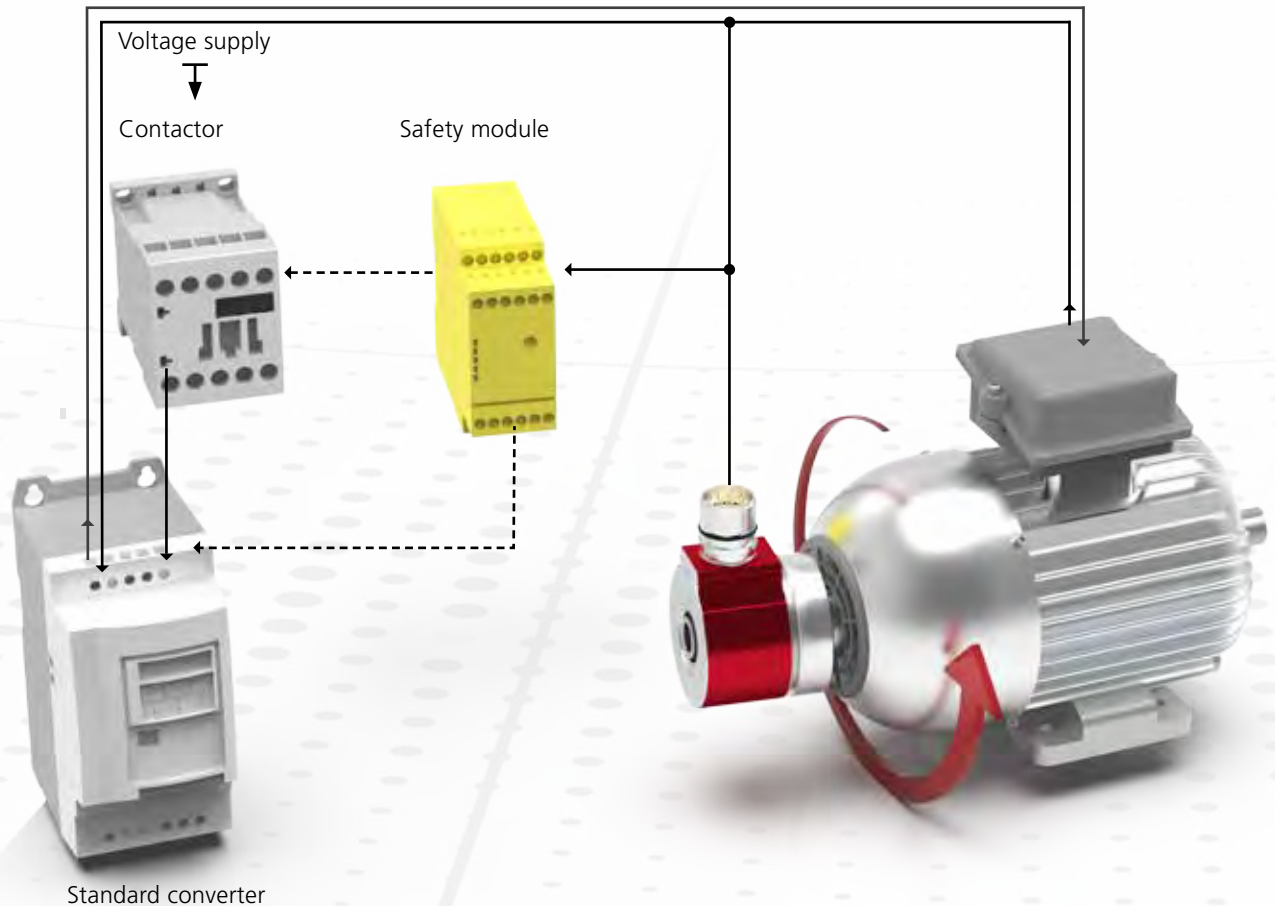
The new generation I\_\_58:2 offers wide range input of 4.5 ... 32 V DC and number of graduation marks up to 62,450 increments per revolution as well as a hollow shaft diameter up to 15 mm or ½".

## Non-programmable incremental rotary encoders with resolution determined at the factory

Our incremental rotary encoders with resolution preconfigured in the factory can also be used in all applications which require the basic functions of incremental position detection.

The resolution of these incremental rotary encoders is defined ex-factory by fitting a code disc with a defined number of graduation marks or the scanning electronics is configured for the required number of graduation marks. These incremental rotary encoders are available in different sizes from 24 mm to 120 mm. Naturally they are also available with different mechanical connections such as solid shaft, continuous hollow shaft, blind shaft or integrated coupling.

## Safe incremental rotary encoders



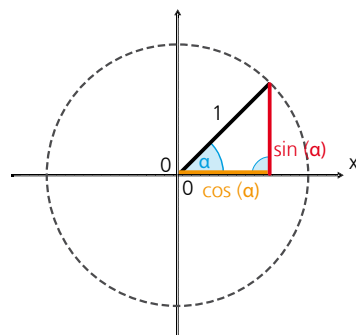
## Safe incremental rotary encoders

### Safe incremental rotary encoders

The solution doesn't always have to be a big one. An incremental rotary encoder is sufficient for the safe detection of speed, direction of rotation or standstill. The use of certified components considerably facilitates the validation of the complete application. TR-Electronic therefore offers the safety-certified incremental rotary encoder IE58+FS.

With sine-cosine interface, SIL3 or PLe is possible for specific safety functions. One of the reasons for this is that the transmission channel can be checked by means of a simple calculation from the signal: The following must apply at any time:  $\sin^2(t) + \cos^2(t) = 1$ . If the calculated value differs, the safety module can go into a safe status. With the TTL or HTL interface applications with SIL 2 or PLD are possible. The calculated value differs, the safety module can go into a safe status.

### SIN/COS



### TTL / HTL

With the TTL or HTL interface

## Proven technology with fully differential electronics

A further element of this high safety classification is the simple design with proven optical scanning with fixed resolution on the glass disk.

The signal paths are designed differentially. As a result the signal is immune to disturbance and failure of a driver can be reliably detected.

## Fixed resolutions ex-works

1.024, 2.048 and 4.096 periods per revolution,  
1 zero pulse, + differential (inverse) signals

## Solid shaft, blind shaft and continuous hollow shaft

**IV-58+FS:** 6 ... 12 mm, ¼', ½'

**IH-58+FS; IS-58+FS:** 8, 10, 12 mm, ¼', ½'

## Continuous form closure for the shaft connection

The form closure necessary for reliable measurement is produced by means of a groove in the shaft – with solid shaft rotary encoders the appropriate spring is included with delivery.

## Possible safety functions\*

- \_ SS1 (safe stop 1)
- \_ SS2 (safe stop 2)
- \_ SOS (safe operating stop)
- \_ SLS (safely-limited speed)
- \_ SLS (safely-limited speed)
- \_ SSR (safe speed range)
- \_ SSM (safe speed monitor)
- \_ SDI (safe direction)
- \_ SLA (safely limited acceleration)
- \_ SLP (safely limited position)

## Can be combined with a variety of commercially available safety modules

Depending on the required safety function, various commercially available safety modules can be used for the evaluation of TTL / HTL / sine-cosine signals.

## Perfect solution for both new systems and retrofits

Whether a new concept or an upgrade – thanks to the modular design with freely selectable safety modules, TR functionally safe rotary encoders can be used in the design of new systems or to upgrade existing machines and systems for current safety regulations.

## Full integration into the TR product range

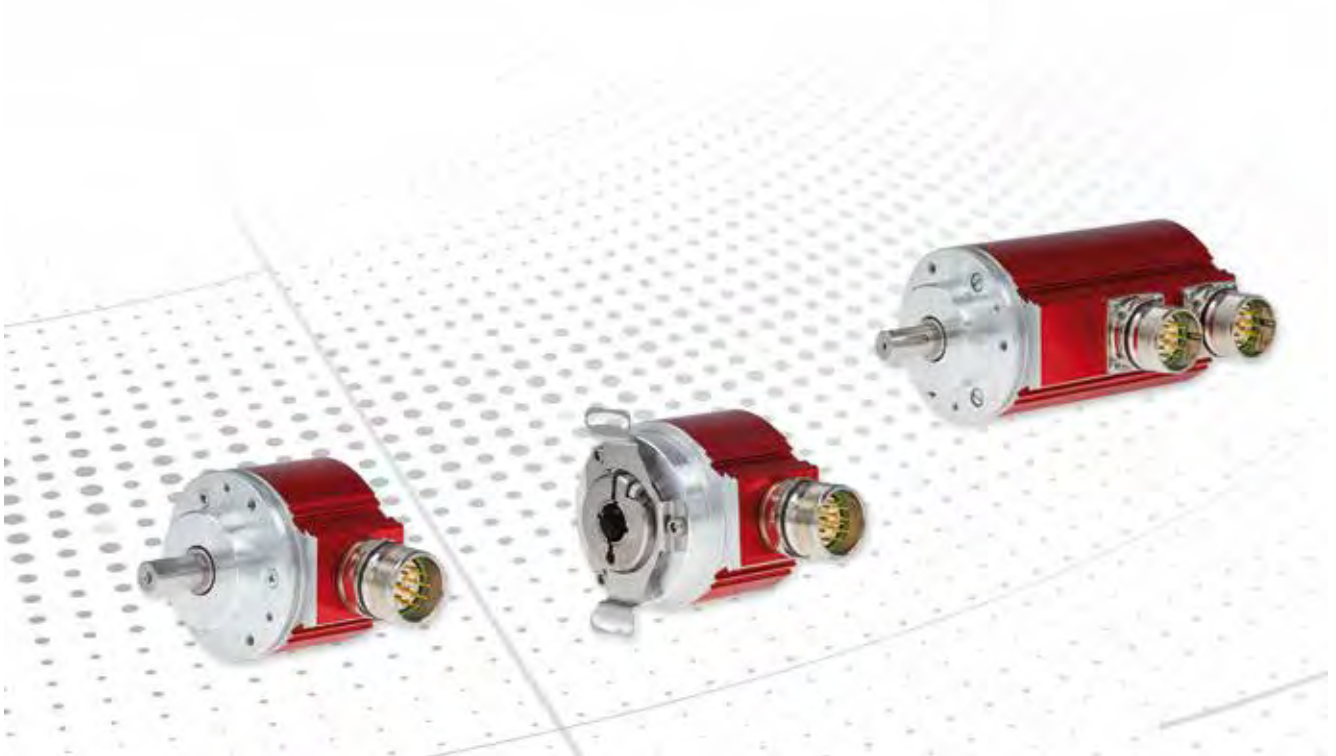
Especially for simpler, speed-based safety functions, IE-58+FS perfectly complement TR's range of absolute safety rotary encoders. Technically and commercially optimal solutions are thus available for almost all applications, from simple incremental rotary encoders through to efficient Industrial Ethernet Safety Encoders – from one source, in a cohesive design.

## ATEX Zone 2 / 22

IE-58+FS are optionally also available in the same design for application in potentially explosive atmospheres of Zones 2 and 22: AV-582+FS, AS-58+FS, AH-58+FS.

\*Depending on the safety module used

## Incremental Encoders - Family I\_\_58 - Housing 58 mm



### The all-rounder in a 58 mm housing

Our programmable incremental rotary encoders offer the optimal basis for every requirement and are available with solid shaft, continuous hollow shaft, blind shaft or integrated coupling. You adapt the resolution of our programmable incremental rotary encoders (size 58 mm) via software to meet your demands.

The new generation I\_\_58:2 has wide range input of 4,5..32 V DC and number of periods per turn up to 65,536. Additionally, it provides hollow and blind shaft diameters up to 15 mm resp. ½".

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## Up to 10,000 pulses

<b>Product</b>	IPV582	IPS582	IEV58:2
			
<b>Detection</b>	Magnetic coded disc (P)	Magnetic coded disc (P)	Optical (E)
<b>Supply</b>	24 VDC (4,5 ... 27)	24 VDC (4,5 ... 27)	24 VDC (4,5 ... 27)
<b>Steps per turn</b>	$\geq 2 \dots \leq 10000$	$\geq 2 \dots \leq 10000$	$\geq 2 \dots \leq 10000$
<b>Shaft diameters available</b>	6, 8, 10, 12, 14, 1/4", 3/8", 1/2"	6, 8, 10, 12, 14, 15, 1/4", 3/8", 1/2"	6, 8, 10, 12, 14, 1/4", 3/8", 1/2"
<b>Connectors</b>	Connector or cable	Connector or cable	Connector or cable
<b>Ambient temperature</b>	-25 .. +85°C	-25 .. +85°C	-40...+75 °C
<b>Protection class</b>	IP67 / shaft IP65	IP67 / shaft IP65	IP67 / shaft IP65
<b>ATEX zone</b>			
<b>Interface</b>	Square	Square	Square
<b>Weblink</b>	<a href="http://www.tr-electronic.com/p/K-IPV582-INC-1">www.tr-electronic.com/p/K-IPV582-INC-1</a>	<a href="http://www.tr-electronic.com/p/K-IPS582-INC-1">www.tr-electronic.com/p/K-IPS582-INC-1</a>	<a href="http://www.tr-electronic.com/s/5008480">www.tr-electronic.com/s/5008480</a>
<b>QR-Code</b>			

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# Up to 65,536 pulses

Product	IES58:2	IEH58:2	IOV58:2	
				
Detection	Optical (E)	Optical (E)	Optical (O)	
Supply	24 VDC (4,5 ... 27)	24 VDC (4,5 ... 27)	24 VDC (4,5 ... 27)	
Steps per turn	$\geq 2 \dots \leq 10000$	$\geq 2 \dots \leq 10000$	$\geq 2 \dots \leq 65536$	
Shaft diameters available	6, 8, 10, 12, 14, 15, 1/4", 3/8", 1/2"	6, 8, 10, 12, 14, 15, 1/4", 3/8", 1/2"	6, 8, 10, 12, 14, 1/4", 3/8", 1/2"	
Connectors	Connector or cable	Connector or cable	Connector or cable	
Ambient temperature	-40...+75 °C	-40...+75 °C	-40...+75 °C	
Protection class	IP67 / shaft IP65	IP67 / shaft IP65	IP67 / shaft IP65	
ATEX zone				
Interface	Square	Square	Square	
Weblink	<a href="http://www.tr-electronic.com/s/S008481">www.tr-electronic.com/s/S008481</a>	<a href="http://www.tr-electronic.com/s/S008482">www.tr-electronic.com/s/S008482</a>	<a href="http://www.tr-electronic.com/s/S008483">www.tr-electronic.com/s/S008483</a>	
QR-Code				



# Optical (O)

## Double detection (D)

			
Optical (O)	Optical (O)	Double detection (D)	Double detection (D)
24 VDC (4,5 ... 27)	24 VDC (4,5 ..27)	24 VDC (11 .. 28), 5V DC (+-5%)	24 VDC (11 ... 28), 5V DC (+-5%)
>= 2...<= 65536	>= 2...<= 65536	>= 2...<= 1024, 2048, 4096, 8192	>= 2...<= 1024, 2048, 4096, 8192
6, 8, 10, 12, 14, 15, 1/4", 3/8", 1/2"	6, 8, 10, 12, 14, 15, 1/4", 3/8", 1/2"	6, 8, 10, 12, 3/8"	8, 10, 11, 12
Connector or cable	Connector or cable	Connector or cable	Connector or cable
-40...+75 °C	-40...+75 °C	0...+60 °C	0...+60 °C
IP67 / shaft IP65	IP67 / shaft IP65	IP65	IP65
Square	Square	Square	Square
<a href="http://www.tr-electronic.com/s/S008484">www.tr-electronic.com/s/S008484</a>	<a href="http://www.tr-electronic.com/s/S008485">www.tr-electronic.com/s/S008485</a>	<a href="http://www.tr-electronic.com/s/S008486">www.tr-electronic.com/s/S008486</a>	<a href="http://www.tr-electronic.com/s/S008487">www.tr-electronic.com/s/S008487</a>
			

## Suggested Products

Order code	Steps per Turn	Channels	Shaft / Flange	Connector Position	Cable length	Remark
<b>IEV58:2</b>						
IEV582-00001	10.000*	HTL (K1/K2)+Inv.; K0+Inv.	10FL/19,5; ZB36 3xM3+3xM4	M23, 12 pin, radial		
IEV582-00002	10.000*	HTL (K1/K2)+Inv.; K0+Inv.	10FL/19,5; ZB36 3xM3+3xM4	M23, 12 pin, axial		
IEV582-00003	10.000*	HTL (K1/K2)+Inv.; K0+Inv.	6GL/10; ZB50	M23, 12 pin, axial		
IEV582-00005	10.000*	HTL (K1/K2)+Inv.; K0+Inv.	10FL/19,5; ZB36 3xM3+3xM4	cable radial, open end	2 m	
IEV582-00077	10.000*	HTL (K1/K2)+Inv.; K0+Inv.	10FL/19,5; ZB36 3xM3+3xM4	M23, 12 pin, radial		
IEV582-00099	50*	HTL (K1/K2)+Inv.; K0+Inv.	10FL/19,5; ZB36 3xM3+3xM4	M23, 12 pin axial		
IEV582-00019	10.000*	HTL (K1/K2)+Inv.; K0+Inv.	10FL/19,5; ZB50	M23, 12 pin, radial		
IEV582-00024	10.000*	HTL (K1/K2)+Inv.;	12NUT/25; ZB50	M12, 8 pin, radial		
IEV582-00023	10.000*	HTL (K1/K2)+Inv.; K0+Inv.	12NUT/25; ZB50	M23, 12 pin, radial		
IEV582-00007	10.000*	HTL (K1/K2)+Inv.; K0+Inv.	3/8" FL/22,3; ZB31,75 Sqr.	cable radial, open end	2 m	
IEV582-00022	10.000*	HTL (K1/K2)+Inv.;	6GL/10; ZB50	M12, 8 pin, radial		
IEV582-00006	10.000*	HTL (K1/K2)+Inv.; K0+Inv.	6GL/10; ZB50	cable radial, open end	2 m	
IEV582-00030	10.000*	HTL (K1/K2)+Inv.; K0+Inv.	6GL/10; ZB50	M23, 12 pin, radial		
IEV582-00093	250*	TTL (K1/K2)+Inv.; K0+Inv.	6GL/10; ZB50	M23, 12 pin, radial		
IEV582-00004	10.000*	HTL (K1/K2)+Inv.; K0+Inv.	8FL/19,5; ZB36 3xM3+3xM4	cable radial, open end	2 m	

For further product information simply enter the order number in the search field at [www.tr-electronic.com](http://www.tr-electronic.com).

## Suggested Products

Order code	Steps per Turn	Channels	Shaft / Flange	Connector Position	Cable length	Remark
<b>IES58:2</b>						
IES582-00005	10.000*	HTL (K1/K2)+Inv.; KO+Inv.	10H7	cable radial, open end	2 m	Torque support, clamping ring flange side
IES582-00007	10.000*	HTL (K1/K2)+Inv.; KO+Inv.	10H7	M23, 12 pin, radial		Torque support, clamping ring flange side
IES582-00024	2.048*	TTL (K1/K2)+Inv.; KO+Inv.	10H7	cable radial, open end	2 m	Torque support, clamping ring flange side, TTL
IES582-00026	1.024*	TTL (K1/K2)+Inv.; KO+Inv.	11H7	M23, 12 pin, radial		Torque support, clamping ring flange side, TTL
IES582-00006	10.000*	HTL (K1/K2)+Inv.; KO+Inv.	12H7	M23, 12 pin, radial		Torque support, clamping ring flange side
IES582-00018	1.024*	HTL (K1/K2)+Inv.; KO+Inv.	12H7	M12, 8 pin, radial		Torque support, clamping ring flange side, TTL
IES582-00034	1.024*	HTL (K1/K2)+Inv.; KO+Inv.	12H7	M12, 8 pin, radial		Torque support, clamping ring flange side, TTL
IES582-00008	10.000*	TTL (K1/K2)+Inv.; KO+Inv.	12H7	M23, 12 pin, radial		Torque support, clamping ring flange side, TTL
IES582-00027	2.500*	TTL (K1/K2)+Inv.; KO+Inv.	12H7	M23, 12 pin, radial		Torque support, clamping ring flange side, TTL
IES582-00029	4.096*	TTL (K1/K2)+Inv.; KO+Inv.	12H7	M12, 8 pin, radial		Torque support, clamping ring flange side, TTL
IES582-00004	10.000*	HTL (K1/K2)+Inv.; KO+Inv.	14H7	cable radial, open end	2 m	Torque support, clamping ring flange side
IES582-00003	10.000*	HTL (K1/K2)+Inv.; KO+Inv.	14H7	M23, 12 pin, radial		Torque support, clamping ring flange side
IES582-00001	10.000*	HTL (K1/K2)+Inv.; KO+Inv.	15H7	cable radial, open end	2 m	Torque support, clamping ring flange side
IES582-00002	10.000*	HTL (K1/K2)+Inv.; KO+Inv.	15H7	M23, 12 pin, radial		Torque support, clamping ring flange side

For further product information simply enter the order number in the search field at [www.tr-electronic.com](http://www.tr-electronic.com).

## Suggested Products

Order code	Steps per Turn	Channels	Shaft / Flange	Connector Position	Cable length	Remark
<b>IEH58:2</b>						
IEH582-00006	10.000*	HTL (K1/K2)+Inv.; K0+Inv.	1/2" H7	M23, 12 pin, radial		Torque support, clamping ring flange side
IEH582-00004	10.000*	HTL (K1/K2)+Inv.; K0+Inv.	10H7	M23, 12 pin, radial		Torque support, clamping ring flange side
IEH582-00008	10.000*	HTL (K1/K2)+Inv.; K0+Inv.	10H7	cable radial, open end	2 m	Torque support, clamping ring flange side
IEH582-00018	10.000*	HTL (K1/K2)+Inv.;	12H7	M12, 8 pin, radial		Torque support, clamping ring flange side
IEH582-00003	10.000*	HTL (K1/K2)+Inv.; K0+Inv.	12H7	M23, 12 pin, radial		Torque support, clamping ring flange side
IEH582-00007	10.000*	HTL (K1/K2)+Inv.; K0+Inv.	12H7	cable radial, open end	2 m	Torque support, clamping ring flange side
IEH582-00013	10.000*	HTL (K1/K2)+Inv.; K0+Inv.	12H7	M23, 12 pin, radial		Flange ring with pin, clamping ring flange side
IEH582-00037	4.096*	HTL (K1/K2)+Inv.; K0+Inv.	12H7	M23, 12 pin, radial		clamping ring flange side
IEH582-00045	10.000*	TTL (K1/K2)+Inv.; K0+Inv.	12H7	cable radial, open end	1 m	Torque support, clamping ring flange side
IEH582-00002	10.000*	HTL (K1/K2)+Inv.; K0+Inv.	14H7	M23, 12 pin, radial		Torque support, clamping ring flange side
IEH582-00009	10.000*	HTL (K1/K2)+Inv.; K0+Inv.	14H7	cable radial, open end	2 m	Torque support, clamping ring flange side
IEH582-00052	4.096*	HTL (K1/K2)+Inv.; K0+Inv.	14H7	cable radial, open end	1 m	Torque support, clamping ring flange side
IEH582-00043	10.000*	TTL (K1/K2)+Inv.; K0+Inv.	14H7	M23, 12 pin, radial		Torque support, clamping ring flange side
IEH582-00044	4.096*	TTL (K1/K2)+Inv.; K0+Inv.	14H7	M23, 12 pin, radial		Torque support, clamping ring flange side
IEH582-00001	10.000*	HTL (K1/K2)+Inv.; K0+Inv.	15H7	M23, 12 pin, radial		Torque support, clamping ring flange side
IEH582-00010	10.000*	HTL (K1/K2)+Inv.; K0+Inv.	15H7	cable radial, open end	2 m	Torque support, clamping ring flange side
IEH582-00005	10.000*	HTL (K1/K2)+Inv.; K0+Inv.	3/8" H7	M23, 12 pin, radial		Torque support, clamping ring flange side
IEH582-00011	10.000*	HTL (K1/K2)+Inv.; K0+Inv.	6H7	cable radial, open end	2 m	Torque support, clamping ring flange side
IEH582-00012	10.000*	HTL (K1/K2)+Inv.; K0+Inv.	8H7	cable radial, open end	2 m	Torque support, clamping ring flange side

For further product information simply enter the order number in the search field at [www.tr-electronic.com](http://www.tr-electronic.com).

## Suggested Products

Oder code	Steps per Turn	Channels	Shaft / Flange	Connector Position	Cable length	Remark
<b>IOV58:2</b>						
IOV582-00001	65.536*	TTL (K1/K2)+Inv.; K0+Inv.	10 key /19,5; ZB36 3xM3+3xM4	M23, 12 pin, radial		
IOV582-00007	65.536*	HTL (K1/K2)+Inv.;	10FL/19,5; ZB36 3xM3+3xM4	M12, 8 pin, radial		
IOV582-00009	65.536*	HTL (K1/K2)+Inv.;	12 key /25; ZB36 3xM3+3xM4	M12, 8 pin, radial		
IOV582-00005	65.536*	HTL (K1/K2)+Inv.;	6GL/10; ZB50	M12, 8 pin, radial		
IOV582-00046	64.000*	HTL (K1/K2)+Inv.; K0+Inv.	6GL/10; ZB50	cable radial, open end	2 m	

For further product information simply enter the order number in the search field at [www.tr-electronic.com](http://www.tr-electronic.com).

### Further product information

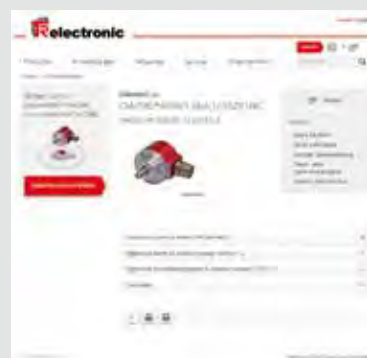
1. Enter order code into ...



2. Searchfield (top right) on [www.tr-electronic.com](http://www.tr-electronic.com)



3. Choose desired information



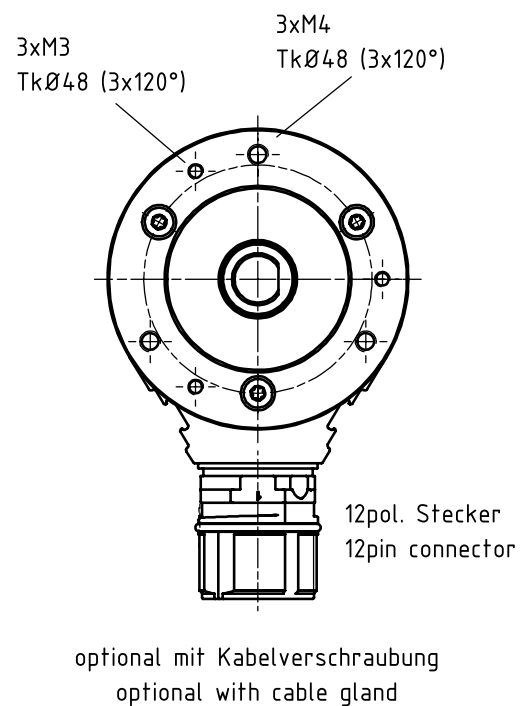
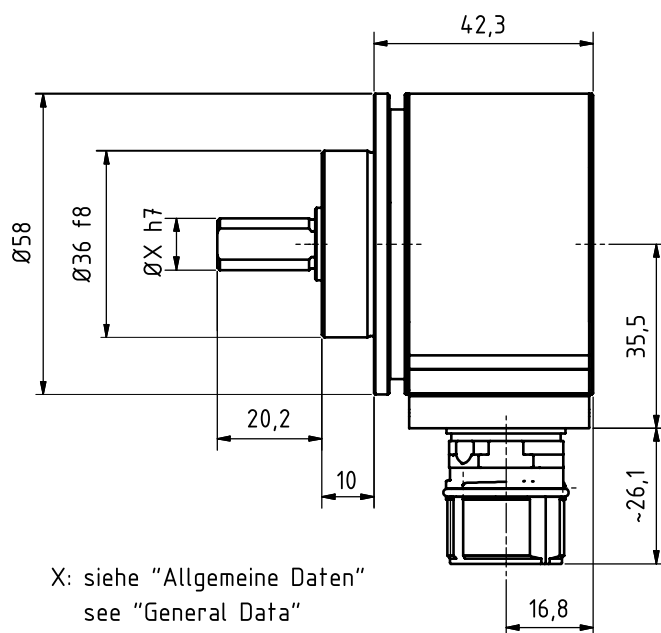
\* Programmable, preset

We will help you to select the most suitable products from the complete TR range. Please contact us ([info@tr-electronic.de](mailto:info@tr-electronic.de)).

## Dimensional Drawings

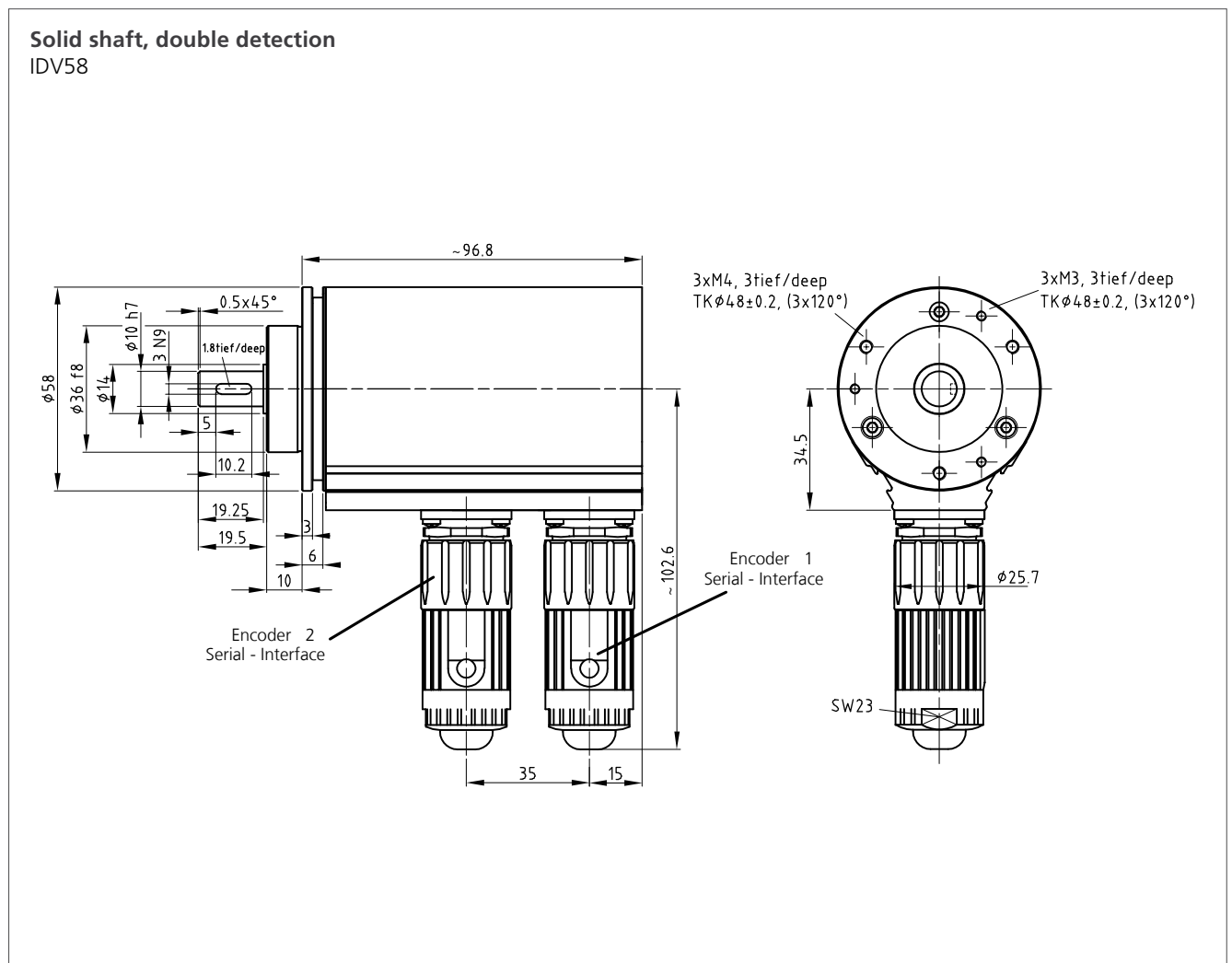
### Solid shaft

IEV58:2; IOV58:2





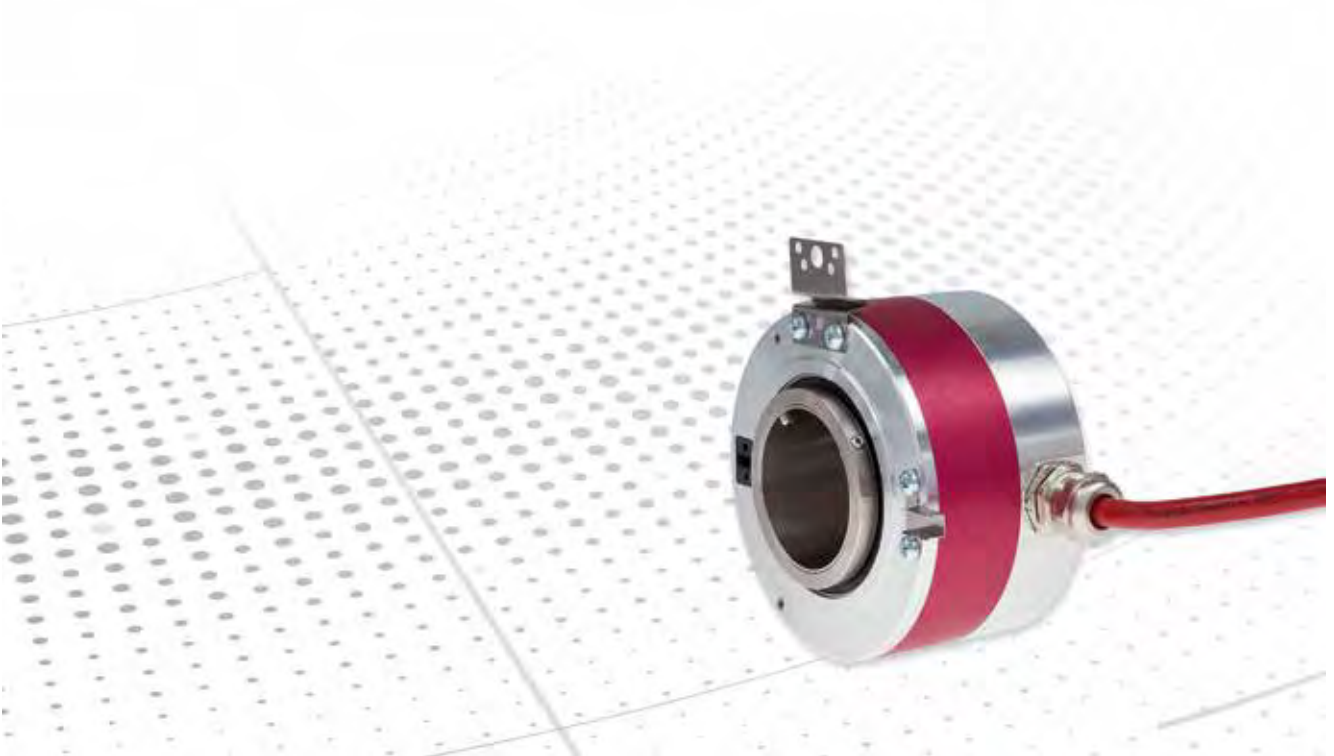
# Dimensional Drawings







## Incremental Rotary - Family I\_H110 - Housing 110 mm



### Programmable resolution with hollow shaft up to 50 mm in diameter

Programmable incremental encoders from family 110 fit big shaft diameters of up to 50 mm. You adapt the resolution of our programmable incremental rotary encoders via software to meet your demands.





Depending on the required resolution, IEH 110 with up to 8192 steps per turn or IOH 110 with up to 36,000 steps per turn fit your needs.

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### Contents

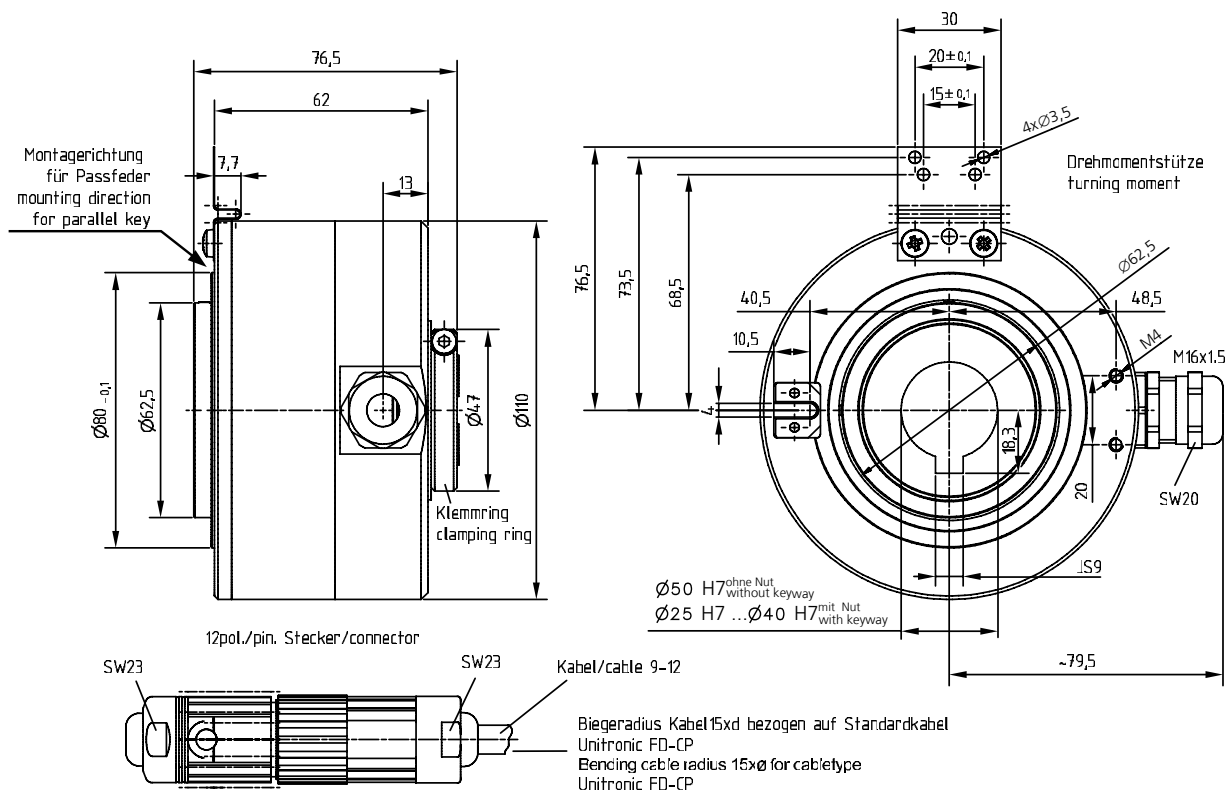
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Up to 8,192 pulses  
Up to 36,000 pulses

Product	IEH110	IOH110
		
Detection	Optical (E)	Optical (O)
Supply	24 VDC (11...27)	24 VDC (11...27)
Steps per turn	2 ... 8192	2 ... 36 000
Shaft diameters available	15, 28, 30, 35, 38, 40, 45, 50	15, 28, 30, 35, 38, 40, 45, 50
Connectors	Connector or cable	Connector or cable
Ambient temperature	0...+60°C (option -20...+70°C)	0...+60°C (option -20...+70°C)
Protection class	IP54	IP54
ATEX zone		
Interface	Square	Square
Weblink	<a href="http://www.tr-electronic.com/s/S008494">www.tr-electronic.com/s/S008494</a>	<a href="http://www.tr-electronic.com/s/S008495">www.tr-electronic.com/s/S008495</a>
QR-Code		

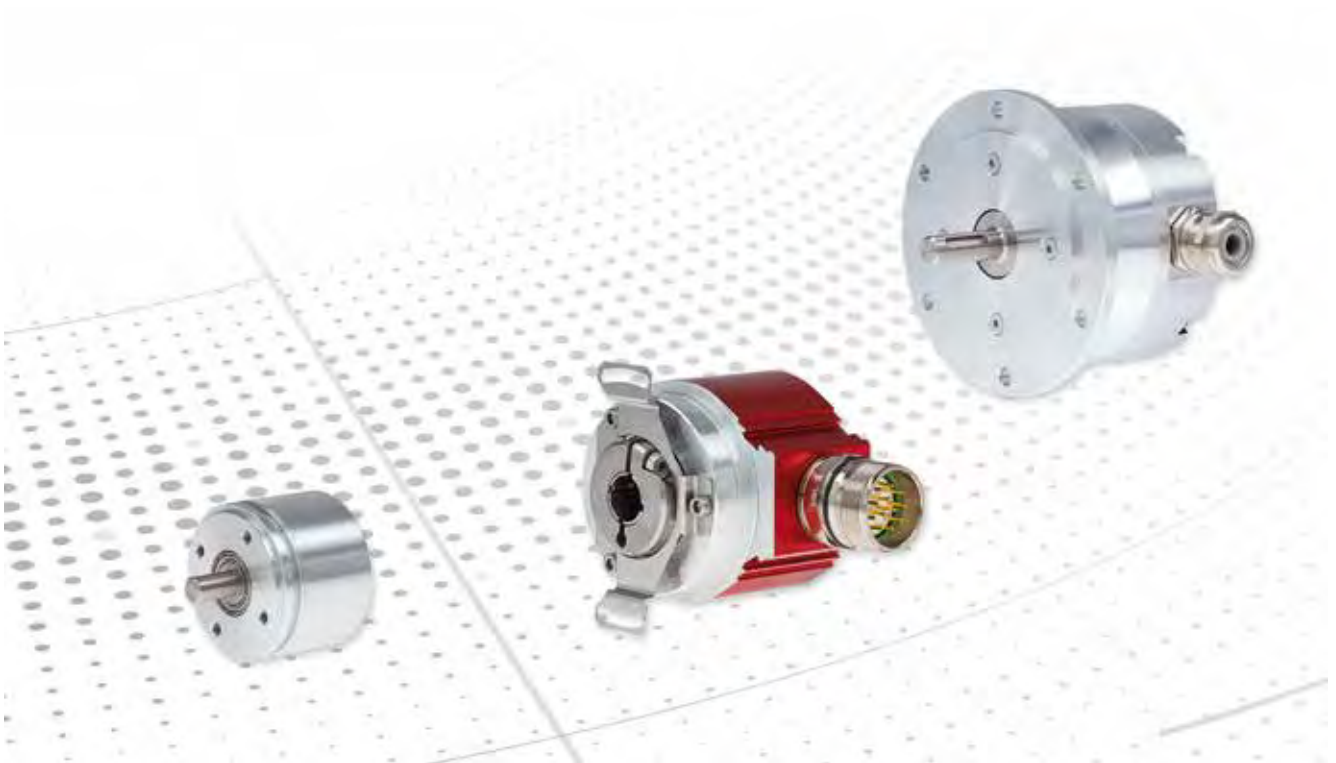
## Dimensional Drawings

### Hollow shaft IEH110; IOH110





## Incremental Rotary Encoders - Resolution Factory Set



### Resolution factory set

Our incremental rotary encoders with resolution preconfigured in the factory can be used in all applications which require the basic functions of incremental position detection.

The resolution of these incremental rotary encoders is set ex-factory by fitting a code disk with a defined number of lines respectively programming the detection electronic with the requested number of lines. These incremental

rotary encoders are available in different sizes from 24 mm - 130 mm. Of course they are also available with different mechanical connections such as solid shaft, continuous hollow shaft, blind shaft or integrated coupling.

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## Solid shaft

<b>Product</b>	IE35 	IMV36 	IE40 
<b>Detection</b>	Optical (E)	Magnet detection (M)	Optical (E)
<b>Supply</b>	11...27 VDC (5 VDC $\pm$ 5 %)	11...27 VDC (5 VDC $\pm$ 5 %)	11...27 VDC (5 VDC $\pm$ 5 %)
<b>Steps per turn</b>	1...3.600	8, 10, 16, 20, 25, 32, 40, 50, 64, 80, 100, 125, 128, 200, 250, 256, 400, 500, 512, 1024, 2048*	1...3.600
<b>Shaft diameters available</b>	4...6	See drawing	6
<b>Connectors</b>	Cable	Cable	Connector or cable
<b>Ambient temperature</b>	0...+80 °C	-40...+70 °C	0...+80 °C
<b>Protection class</b>	IP65	IP65	IP64
<b>Interface</b>	Square	Square	Square
<b>Weblink</b>	<a href="http://www.tr-electronic.com/s/S008423">www.tr-electronic.com/s/S008423</a>	<a href="http://www.tr-electronic.com/s/S008422">www.tr-electronic.com/s/S008422</a>	<a href="http://www.tr-electronic.com/s/S008424">www.tr-electronic.com/s/S008424</a>
<b>QR-Code</b>			

\*Others on request

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## Solid shaft

<b>Product</b>	IE58	IPV58	IE92V	
				
<b>Detection</b>	Optical (E)	Magnet detection (P)	Optical (O)	
<b>Supply</b>	11...27 VDC (5 VDC $\pm$ 5 %)	4,75 .... 27 VDC	11...27 VDC (5 VDC $\pm$ 5 %)	
<b>Steps per turn</b>	1...10.000	2...8192	9000, 10000, 18000	
<b>Shaft diameters available</b>	6, 10, inch based	6, 8, 10, 12, 14, 1/4", 3/8", 1/2"	10	
<b>Connectors</b>	Connector or cable	Connector or cable	Cable	
<b>Ambient temperature</b>	0...+70 °C (-20...+70 °C)	-25...+85°C	0...+80 °C	
<b>Protection class</b>	IP65	IP65	IP64	
<b>Interface</b>	Square / Sine-Cosine	Square / Sine-Cosine	Square	
<b>Weblink</b>	<a href="http://www.tr-electronic.com/s/S008425">www.tr-electronic.com/s/S008425</a>	<a href="http://www.tr-electronic.com/s/S018156">www.tr-electronic.com/s/S018156</a>	<a href="http://www.tr-electronic.com/s/S008431">www.tr-electronic.com/s/S008431</a>	
<b>QR-Code</b>				

\*Others on request



# Solid shaft Blind shaft

IV99	IS24	IS58U	IPS58
			
Optical (E)	Optical (E)	Optical (E)	Magnet detection (P)
11...30 VDC	11...27 VDC (5 VDC $\pm$ 5 %)	11...27 VDC (5 VDC $\pm$ 5 %)	4,75 .... 27 VDC
1024, 2048, 4096, 8192, 16384, 32768*	1...2.500	7, 10, 18, 20, 32, 40, 50, 60, 64, 100, 125, 128, 180, 200, 250, 300, 360, 400, 440, 500, 512, 700, 900, 1000, 1024, 1250, 1500, 1885, 2000, 2048, 2500, 2600, 3600, 4000, 4096*	2...8192
6...24 (with groove 10...24)	3...6H7	8H7, 10H7, 12H7	6, 8, 10, 12, 14, 15, 1/4", 3/8", 1/2"
Cable gland	Cable	Connector or cable	Connector or cable
-20...+80°C	0...+80 °C	-20...+85 °C	-25...+85°C
IP67	IP64	IP67	IP65
Square	Square	Square	Square / Sine-Cosine
<a href="http://www.tr-electronic.com/s/S008432">www.tr-electronic.com/s/S008432</a>	<a href="http://www.tr-electronic.com/s/S008420">www.tr-electronic.com/s/S008420</a>	<a href="http://www.tr-electronic.com/s/S008428">www.tr-electronic.com/s/S008428</a>	<a href="http://www.tr-electronic.com/s/S018157">www.tr-electronic.com/s/S018157</a>
			

\*Others on request

Can't find the right variant? Please contact us (info@tr-electronic.de)

## Blind shaft

Product	IS99	IMF36	IH58	
				
Detection	Optical (E)	Magnet detection (P)	Optical (E)	
Supply	11...30 VDC	11...27 VDC (5 VDC $\pm$ 5 %)	11...27 VDC (5 VDC $\pm$ 5 %)	
Steps per turn	1024, 2048, 4096, 8192, 16384, 32768	8, 10, 16, 20, 25, 32, 40, 50, 64, 80, 100, 125, 128, 200, 250, 256, 400, 500, 512, 1024, 2048	1...10.000	
Shaft diameters available	16G7 & 17JS8 (Cone)	See drawing	$\leq$ 12 H7	
Connectors	Cable gland	Cable	Connector or cable	
Ambient temperature	-20...+80°C	-40...+70 °C	0...+80 °C	
Protection class	IP67	IP65	IP64	
Interface	Square	Square / Sine-Cosine	Square / Sine-Cosine	
Weblink	<a href="http://www.tr-electronic.com/s/S008433">www.tr-electronic.com/s/S008433</a>	<a href="http://www.tr-electronic.com/s/S008421">www.tr-electronic.com/s/S008421</a>	<a href="http://www.tr-electronic.com/s/S008427">www.tr-electronic.com/s/S008427</a>	
QR-Code				

\*Others on request

## Hollow shaft

<p>IH20</p> 	<p>IH76A</p> 	<p>IH76B</p> 	<p>IH76V</p> 
<p>Optical (E)</p>	<p>Optical (E)</p>	<p>Optical (E)</p>	<p>Optical (O)</p>
<p>11...27 VDC (5 VDC <math>\pm</math> 5 %)</p>	<p>11...27 VDC (5 VDC <math>\pm</math> 5 %)</p>	<p>11...27 VDC (5 VDC <math>\pm</math> 5 %)</p>	<p>11...27 VDC (5 VDC <math>\pm</math> 5 %)</p>
<p>1, 25, 30, 200, 218, 360, 500, 900, 1000, 1024*</p>	<p>1...10.000</p>	<p>1...10.000</p>	<p>9000, 10000, 18000</p>
<p>20H7</p>	<p><math>\leq</math> 15H7</p>	<p><math>\leq</math> 28H7</p>	<p><math>\leq</math> 28H7</p>
<p>Connector or cable</p>	<p>Connector or cable</p>	<p>Connector or cable</p>	<p>Connector or cable</p>
<p>0...+60 °C (-20...+70 °C)</p>	<p>0...+80 °C</p>	<p>0...+80 °C</p>	<p>0...+80 °C</p>
<p>IP54 (option IP65)</p>	<p>IP64</p>	<p>IP64</p>	<p>IP64</p>
<p>Square</p>	<p>Square / Sine-Cosine</p>	<p>Square / Sine-Cosine</p>	<p>Square</p>
<p><a href="http://www.tr-electronic.com/s/S008418">www.tr-electronic.com/s/S008418</a></p>	<p><a href="http://www.tr-electronic.com/s/S008429">www.tr-electronic.com/s/S008429</a></p>	<p><a href="http://www.tr-electronic.com/s/S008429">www.tr-electronic.com/s/S008429</a></p>	<p><a href="http://www.tr-electronic.com/s/S008429">www.tr-electronic.com/s/S008429</a></p>
			

\*Others on request

Can't find the right variant? Please contact us ([info@tr-electronic.de](mailto:info@tr-electronic.de))



## Hollow shaft

Product	IH92V 	IH120 	IH120V 	
Detection	Optical (O)	Optical (E)	Optical (O)	
Supply	11...27 VDC (5 VDC $\pm$ 5 %)	11...27 VDC (5 VDC $\pm$ 5 %)	11...27 VDC (5 VDC $\pm$ 5 %)	
Steps per turn	9000, 10000, 18000	1024, 2500, 3600, 10000*	9000, 10000, 18000	
Shaft diameters available	20H7, 22H7	27...55H7	27...55H7	
Connectors	Cable	Cable	Cable	
Ambient temperature	0...+80 °C	0...+80 °C	0...+80 °C	
Protection class	IP64	IP52 (option IP65)	IP64	
Interface	Square	Square	Square	
Weblink	<a href="http://www.tr-electronic.com/s/S008430">www.tr-electronic.com/s/S008430</a>	<a href="http://www.tr-electronic.com/s/S008434">www.tr-electronic.com/s/S008434</a>	<a href="http://www.tr-electronic.com/s/S008434">www.tr-electronic.com/s/S008434</a>	
QR-Code				

\*Others on request

Can't find the right variant? Please contact us (info@tr-electronic.de)

# Hollow shaft

	IH92V 
	Optical (O)
	11...27 VDC (5 VDC $\pm$ 5 %)
	9000, 10000, 18000
	20H7, 22H7
	Cable
	0...+80 °C
	IP64
	Square
	<a href="http://www.tr-electronic.com/s/S008430">www.tr-electronic.com/s/S008430</a>
	

\*Others on request

Can't find the right variant? Please contact us ([info@tr-electronic.de](mailto:info@tr-electronic.de))

## Suggested Products

Order code	Steps per turn	Channels	Shaft / Flange	Connector position	Cable length	Remark
<b>IE24</b>						
216-00002	500	A,VA, B,VB, 0,VO	6GL9 ZB12	open End Cable gland AXIAL	2,000 m	
<b>IE58A</b>						
219-00059	1024	A,VA, B,VB, 0,VO	10FL/19,5 ZB36	M23 12P RADIAL		
219-00292	10000	A,VA, B,VB, 0,VO	6GL/10 ZB50	M23 12P AXIAL		
219-00590	10000	A,VA, B,VB, 0,VO	10FL/19,5 ZB36	M23 12P RADIAL		
219-01530	2048	A,VA, B,VB, 0,VO	10FL/19,5 ZB36	M23 12P RADIAL		
219-01634	2048	A,VA, B,VB, 0,VO	10FL/19,5 ZB36	M23 12P RADIAL		Sin/cos voltage
<b>IH20</b>						
240-00001	25	A, B	20H7 hollow shaft	LEMO 6P		
240-00005	1024	A,VA, B,VB, 0,VO	20H7 hollow shaft	BINDER 12P		
240-00148	1024	A,VA, B,VB, 0,VO	20H7 hollow shaft	open End cable gland RADIAL	5.000 m	
240-00161	1000	A,VA, B,VB, 0,VO	20H7 hollow shaft	LUMBERG 8P		
<b>IMF36</b>						
IMF36-00005	2048	A,VA, B,VB, 0,VO	bearing free	open End 1X M6 AXIAL	1.000 m	
IMF36-00012	2048	A,VA, B,VB, 0,VO	bearing free	SUBD 9P 1X M6 AXIAL	1.000 m	
<b>IMV36</b>						
IMV36-00016	2048	A,VA, B,VB, 0,VO	6GL/10,8 ZB33	open end cable gland axial	1,000 m	
IMV36-00025	2048	A,VA, B,VB, 0,VO	6GL/10,8 ZB33	open end cable gland axial	3,000 m	
<b>IS24</b>						
215-00002	500	A,VA, B,VB, 0,VO	4H7 blind shaft	open End Cable gland RADIAL	2.000 m	
<b>IS99</b>						
IS99-00001	2048	A,VA, B,VB, 0,VO	16G7 blind shaft	Cable gland M20x1,5 radial		
IS99-00003	1024	A,VA, B,VB, 0,VO	16G7 blind shaft	Cable gland M20x1,5 radial		
IS99-00004	1024	A,VA, B,VB, 0,VO	16G7 blind shaft	Cable gland M20x1,5 radial		

For further product information simply enter the order number in the search field at [www.tr-electronic.com](http://www.tr-electronic.com).

## Suggested Products

Order code	Steps per turn	Channels	Shaft / Flange	Connector position	Cable length	Remark
<b>IV99</b>						
IV99-00001	2048	A,VA, B,VB, 0,VO	11/32 ZB85	Cable gland M20x1,5 radial		
IV99-00002	1024	A,VA, B,VB, 0,VO	11/32 ZB85	Cable gland M20x1,5 radial		
IV99-00003	2048	A,VA, B,VB, 0,VO	11 keyway /32 ZB85	Cable gland M20x1,5 radial		Push Pull
<b>ADH130I</b>						
ADH130I-00001	1024	A, /A, B, /B	60H7 hollow shaft	M23 12 pin, code right	1,2 m	ATEX Zone 2/22

For further product information simply enter the order number in the search field at [www.tr-electronic.com](http://www.tr-electronic.com).

### Further product information

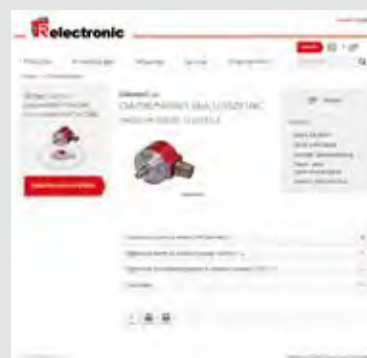
1. Enter order code into ...



2. Searchfield (top right) on [www.tr-electronic.com](http://www.tr-electronic.com)



3. Choose desired information



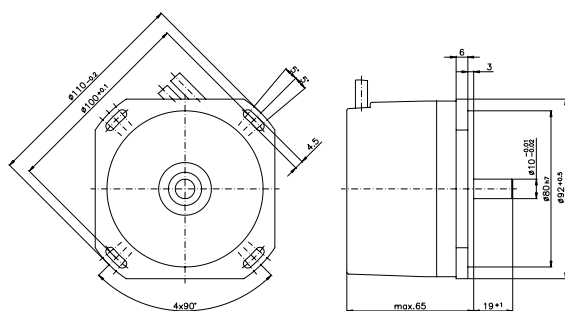
We will help you to select the most suitable products from the complete TR range. Please contact us ([info@tr-electronic.de](mailto:info@tr-electronic.de)).



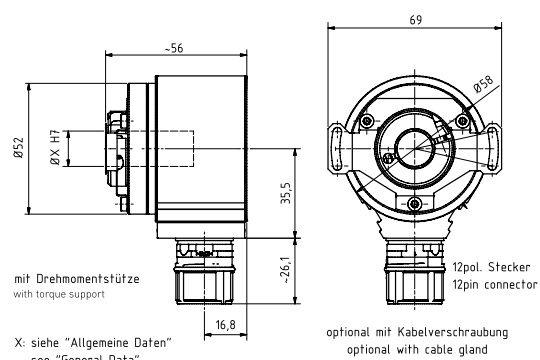


# Dimensional Drawings

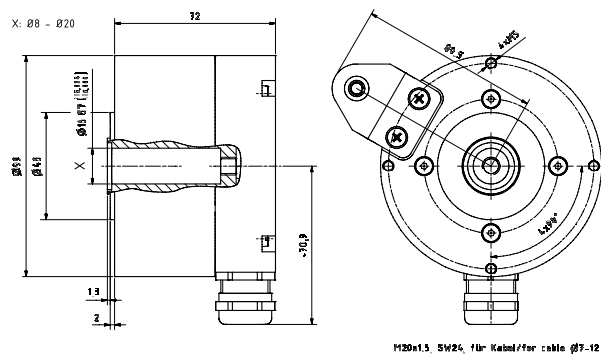
IE92V



IPS58

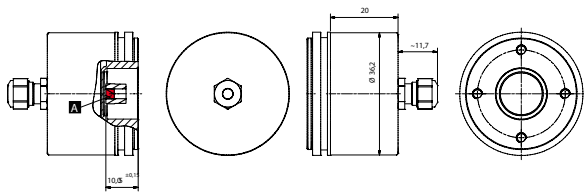


IS99

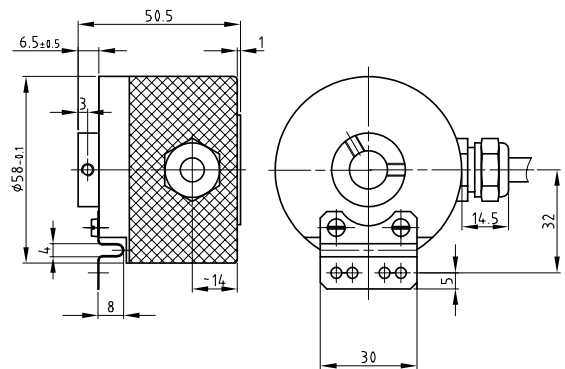


## Dimensional Drawings

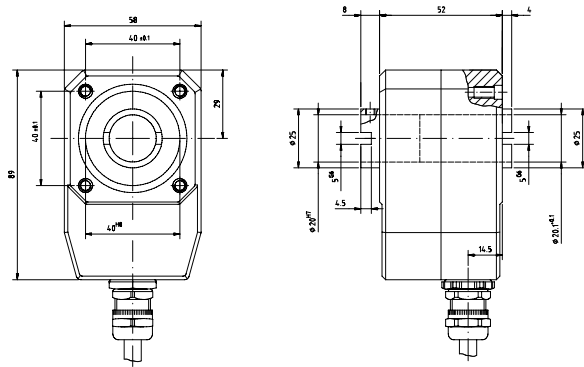
IMF36



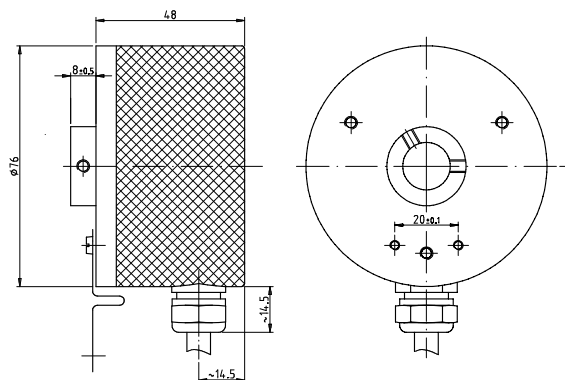
IH58



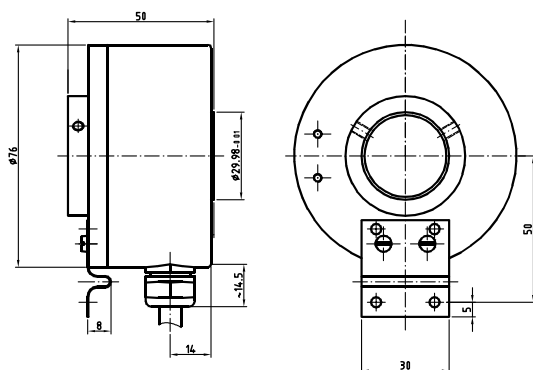
IH20



IH76A



IH76B



Technical drawing of a circular mechanical part, showing three views: front, side, and top.

**Front View (Left):** A circular flange with a central hole. The outer diameter is 65 mm. The inner hole has a diameter of 30 mm. The flange has a thickness of 6 mm. The mounting holes are spaced 60 mm apart.

**Side View (Middle):** A cylindrical body with a diameter of 65 mm. The flange has a thickness of 7 mm. The mounting holes are spaced 60 mm apart.

**Top View (Right):** A rectangular base with a width of 30 mm and a height of 65 mm. The mounting holes are spaced 60 mm apart. The flange has a thickness of 7 mm. The mounting holes are spaced 60 mm apart.

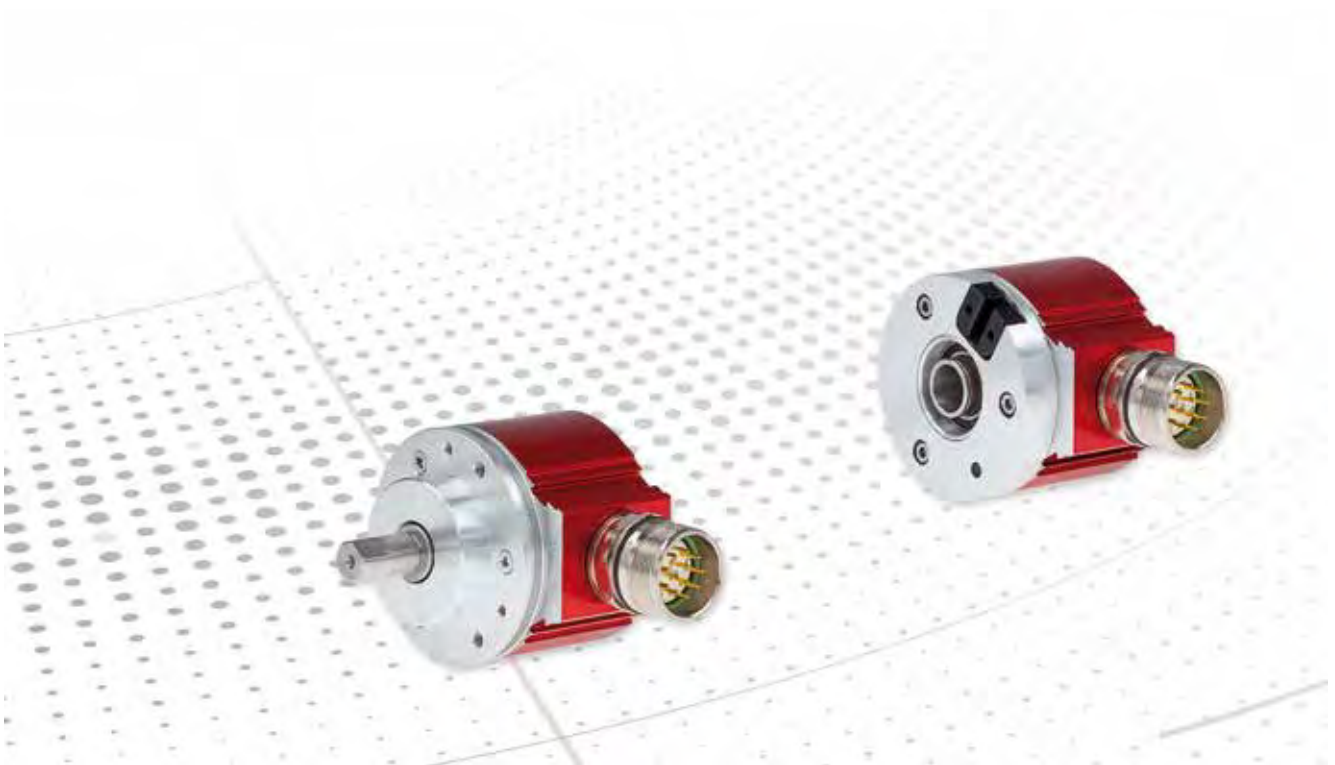
**Dimensions:**

- Outer diameter: 65 mm
- Inner hole diameter: 30 mm
- Flange thickness: 6 mm
- Mounting hole spacing: 60 mm
- Side view diameter: 65 mm
- Side view flange thickness: 7 mm
- Top view width: 30 mm
- Top view height: 65 mm
- Top view flange thickness: 7 mm
- Top view mounting hole spacing: 60 mm

Technical drawing of the Equipotential bonding conductor - Connection, 4 mm². The drawing includes a side view and a top view. The side view shows a cylindrical component with a diameter of 12.9 mm, a length of 12.9 mm, and a total length of 32.6 mm. It features a 1/2 x 1/8 inch thread and a 1/2 inch diameter. The top view shows a circular component with a diameter of 12.9 mm, a central hole of 12.9 mm, and a total diameter of 32.6 mm. It includes a 1/2 inch diameter hole and a 1/2 inch diameter hole. The drawing is labeled 'Equipotential bonding conductor - Connection, 4 mm²' and 'General Data'.

247

## Incremental rotary encoders – I\_58+FS - Housing 58 mm



### Safety-oriented incremental rotary encoder

For applications that require a safety classification according to SIL / PL, TR-Electronic provides the safety certified incremental encoder IE58-FS. The user can choose between square-wave signals (with TTL or HTL level) and sine-cosine interface. The rotary encoder is certified for applications with SIL 3 or PLe (depending on used safety module). The rotary encoder permits the operating modes SLS, SOS SSR, SDI and SSM in conjunction with an appropriate safety module. The encoders are not programmable; the resolution is provided safely and long term stable by the coded glass disk. 1024,

2048 and 4096 periods per revolution and a zero pulse may be selected. The signal paths are designed differentially. As a result the signal is immune to disturbance and failure of a driver can be reliably detected. The incremental rotary encoder is connected to the driving axis either with a solid shaft, blind shaft (IS58+FS) or a hollow shaft (IH58+FS). The form closure necessary for reliable measurement is implemented through a groove in the shaft - in the case of solid-shaft rotary encoders the appropriate spring is included in the scope of supply.

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## Solid shaft

<b>Product</b>	IE58+FS 	IH58+FS 	IS58+FS 
<b>Detection</b>	Optical	Optical	Optical
<b>Supply</b>	10...30 Vdc (SELV/PELV)	10...30 Vdc (SELV/PELV)	10...30 Vdc (SELV/PELV)
<b>Steps per turn</b>	1.024, 2.048, 4.096	1.024, 2.048, 4.096	1.024, 2.048, 4.096
<b>Shafts available</b>	10 mm Solid shaft with keyway/Groove	12 mm hollow shaft with keyway	12 mm blind shaft with keyway
<b>Connectors</b>	M23 12-pin, M12 8-pin, cable, radial or axial	M23 12-pin, M12 8-pin, cable, radial	M23 12-pin, M12 8-pin, cable, radial or axial
<b>Ambient temperature</b>	-40 ... +85 °C	-40 ... +85 °C	-40 ... +85 °C
<b>Protection class</b>	IP65	IP65	IP65
<b>possible Safety functions*</b>	SS1, SS2, SLS, SOS SSR, SDI, SSM, SLA	SS1, SS2, SLS, SOS SSR, SDI, SSM, SLA	SS1, SS2, SLS, SOS SSR, SDI, SSM, SLA
<b>maximum SIL/PL*</b>	SIL3, PLe	SIL3, PLe	SIL3, PLe
<b>Interface</b>	Sinus/Cosinus   Inkremental	Sinus/Cosinus   Inkremental	Sinus/Cosinus   Inkremental
<b>Weblink</b>	<a href="http://www.tr-electronic.com/s/S011005">www.tr-electronic.com/s/S011005</a>	<a href="http://www.tr-electronic.com/s/S011007">www.tr-electronic.com/s/S011007</a>	<a href="http://www.tr-electronic.com/s/S011008">www.tr-electronic.com/s/S011008</a>
<b>QR-Code</b>			

\*depending on safety box used

Can't find the right variant? Please contact us ([info@tr-electronic.de](mailto:info@tr-electronic.de))

## Suggested Products

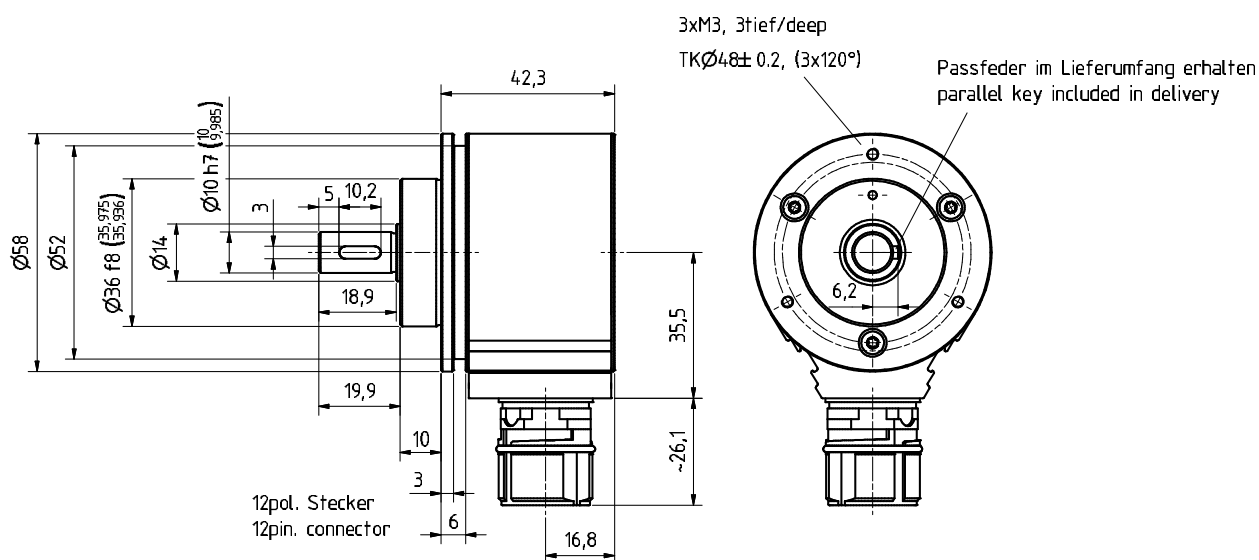
Order code	Steps per turn	Channels	Shaft / Flange	Connector position	Cable length	Remark
<b>IH58+FS</b>						
IH58-00001	1024	(K1/K2)+Inv; K0 + Inv	12H7/Keyway;	M12, 23 pin, radial		HTL
IH58-00002	1024	(K1/K2)+Inv; K0 + Inv	12H7/Keyway;	M12, 23 pin, radial		SIN/COS
IH58-00003	1024	(K1/K2)+Inv; K0 + Inv	12H7/Keyway;	M12, 23 pin, radial		TTL
IH58-00004	2048	(K1/K2)+Inv; K0 + Inv	12H7/Keyway;	M12, 23 pin, radial		SIN/COS
IH58-00005	2048	(K1/K2)+Inv; K0 + Inv	12H7/Keyway;	M12, 23 pin, radial		TTL
IH58-00006	2048	(K1/K2)+Inv; K0 + Inv	12H7/Keyway;	M12, 23 pin, radial		HTL
IH58-00007	4096	(K1/K2)+Inv; K0 + Inv	12H7/Keyway;	M12, 23 pin, radial		SIN/COS
IH58-00008	4096	(K1/K2)+Inv; K0 + Inv	12H7/Keyway;	M12, 23 pin, radial		TTL
IH58-00009	4096	(K1/K2)+Inv; K0 + Inv	12H7/Keyway;	M12, 23 pin, radial		HTL
<b>IV58+FS</b>						
IV58-00001	1024	(K1/K2)+Inv; K0 + Inv	10 Keyway /19,5; ZB36/D58	M12, 23 pin, radial		HTL
IV58-00002	1024	(K1/K2)+Inv; K0 + Inv	10 Keyway /19,5; ZB36/D58	M12, 23 pin, radial		SIN/COS
IV58-00003	1024	(K1/K2)+Inv; K0 + Inv	10 Keyway /19,5; ZB36/D58	M12, 23 pin, radial		TTL
IV58-00004	2048	(K1/K2)+Inv; K0 + Inv	10 Keyway /19,5; ZB36/D58	M12, 23 pin, radial		SIN/COS
IV58-00005	2048	(K1/K2)+Inv; K0 + Inv	10 Keyway /19,5; ZB36/D58	M12, 23 pin, radial		TTL
IV58-00006	2048	(K1/K2)+Inv; K0 + Inv	10 Keyway /19,5; ZB36/D58	M12, 23 pin, radial		HTL
IV58-00007	4096	(K1/K2)+Inv; K0 + Inv	10 Keyway /19,5; ZB36/D58	M12, 23 pin, radial		SIN/COS
IV58-00008	4096	(K1/K2)+Inv; K0 + Inv	10 Keyway /19,5; ZB36/D58	M12, 23 pin, radial		TTL
IV58-00009	4096	(K1/K2)+Inv; K0 + Inv	10 Keyway /19,5; ZB36/D58	M12, 23 pin, radial		HTL

For further product information simply enter the order number in the search field at [www.tr-electronic.com](http://www.tr-electronic.com).

# Dimensional Drawings

## IE58+FS

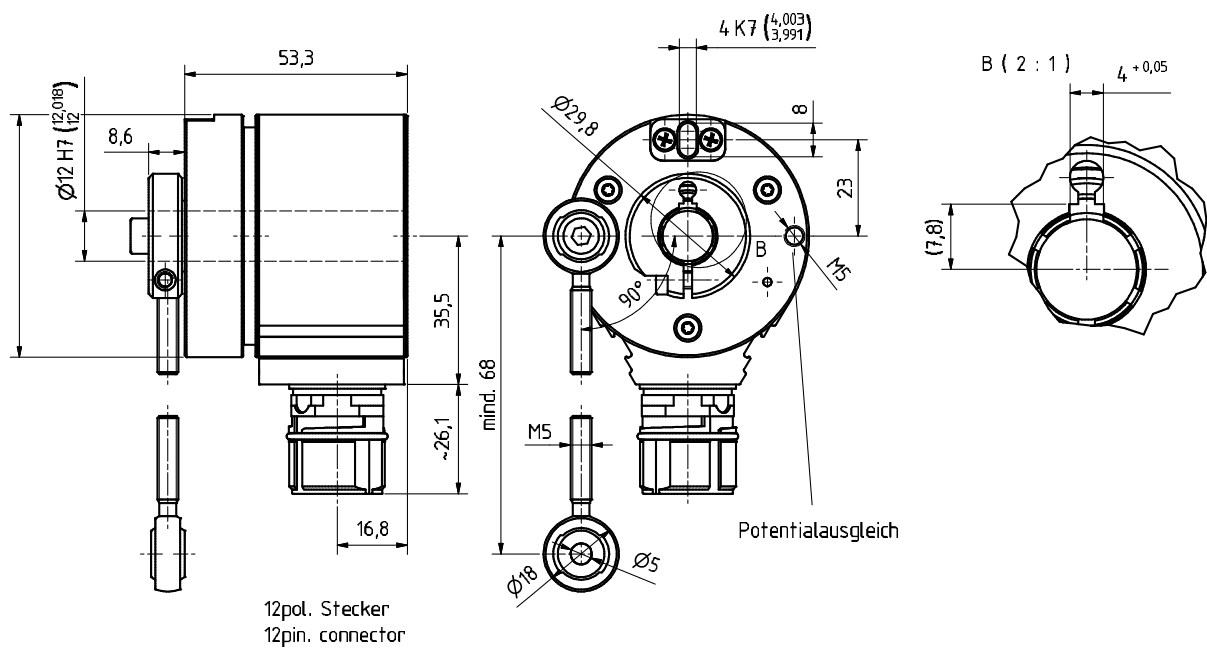
Incremental encoder with solid shaft - up to SIL3/Plc



## Dimensional Drawings

### IH58+FS

Incremental encoder with hollow shaft - up to SIL3/Ple

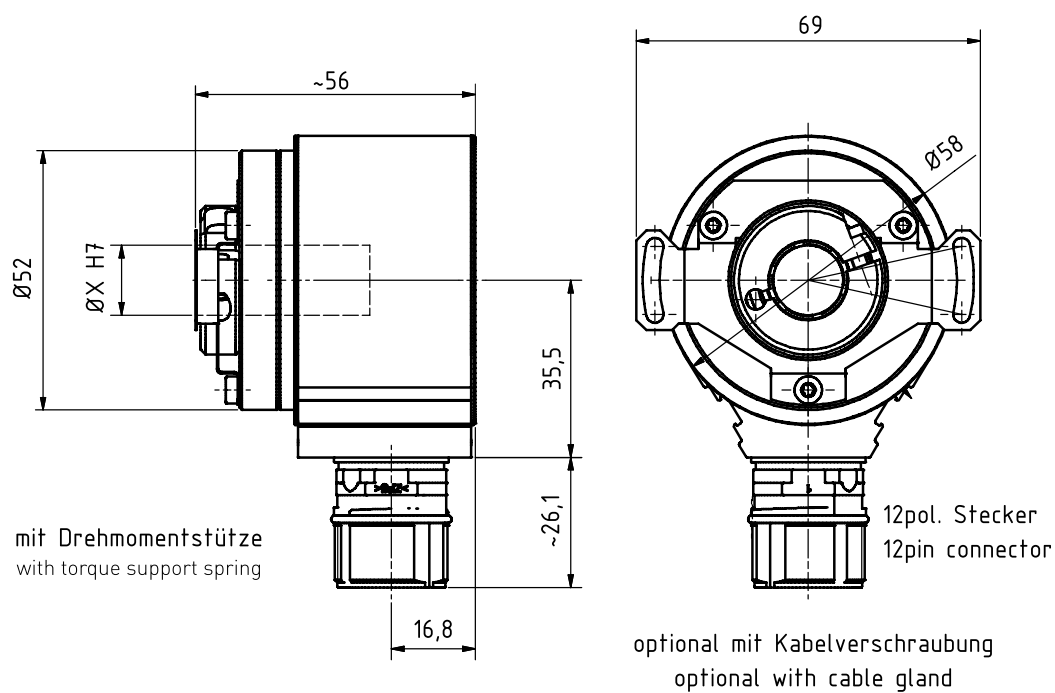




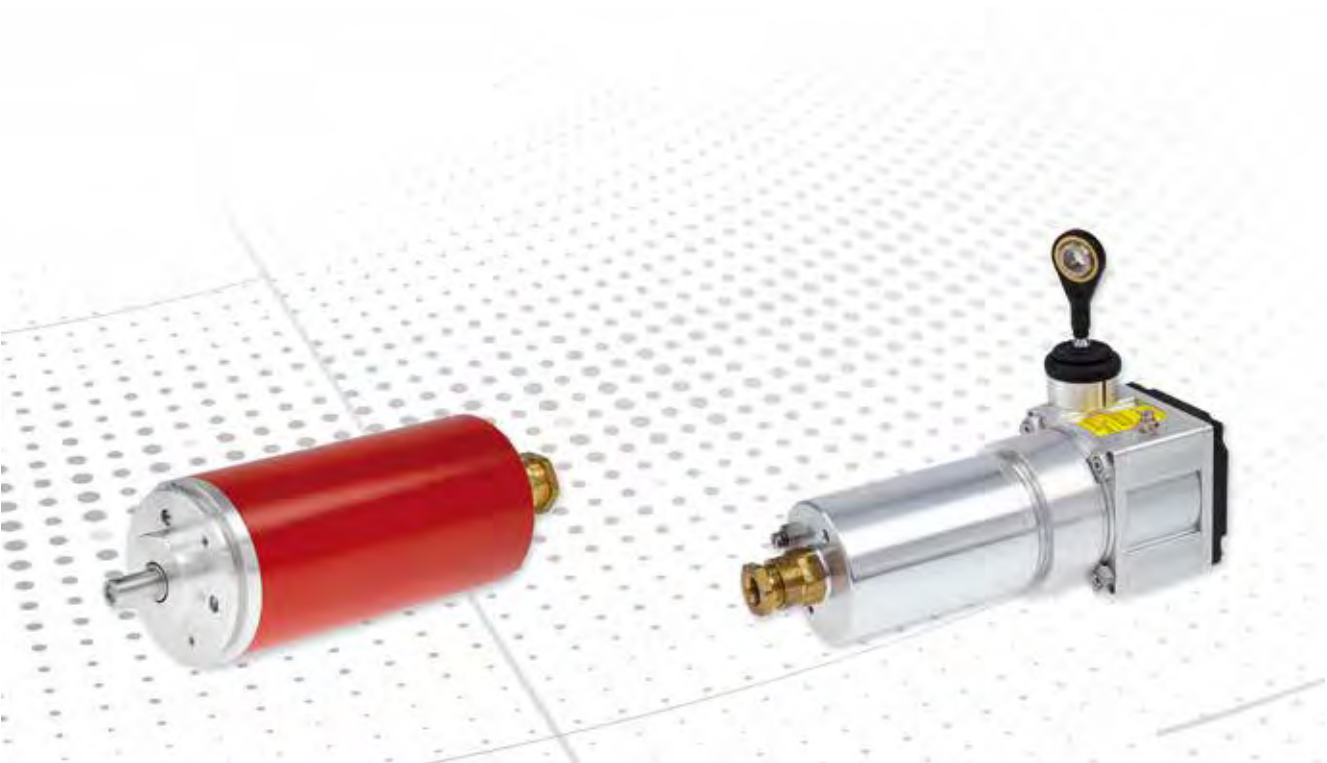
## Dimensional Drawings

### IS58+FS

Incremental encoder with blind shaft - up to SIL3/PLd



# Incremental Encoders - ATEX - Zone 1/21



## Protective housing for ATEX-zone 1/21 for rotary encoders I\_\_58



The following pages show a selection from our families of incremental encoders that are suitable for use in zone 1/21.

---

### Contents

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## Housing option for rotary encoders

Product	A_V70 
Type	Housing option for rotary encoders
Technical data encoder	See rotary encoders C__58 / I__58
Shaft diameters available	6...12mm
Connectors	Cable gland with ATEX-specified cable
Ambient temperature	-20...+60 °C
Protection class	IP65 (option IP67)
ATEX zone	1/21
Interface	<b>INC</b> <b>SIN / COS</b>
Option, additional interfaces (on request)	
Weblink	<a href="http://www.tr-electronic.com/s/S008508">www.tr-electronic.com/s/S008508</a>
QR-Code	

# Suggested Products

Order code	Steps per Turn	Channels	Shaft / Flange	Connector Position	Cable length	Remark
<b>AEV70I</b>						
AEV70I-10001	3000*	HTL (K1/K2)+Inv.; K0+Inv.	12 Key/24; ZB45 D98	cable radial, open end	10 m	II 2G Ex db IIC T6 II 2D Ex tb IIIC T80°C IP65

For further product information simply enter the order number in the search field at [www.tr-electronic.com](http://www.tr-electronic.com).

## Further product information

1. Enter order code into ...
2. Searchfield (top right) on [www.tr-electronic.com](http://www.tr-electronic.com)
3. Choose desired information



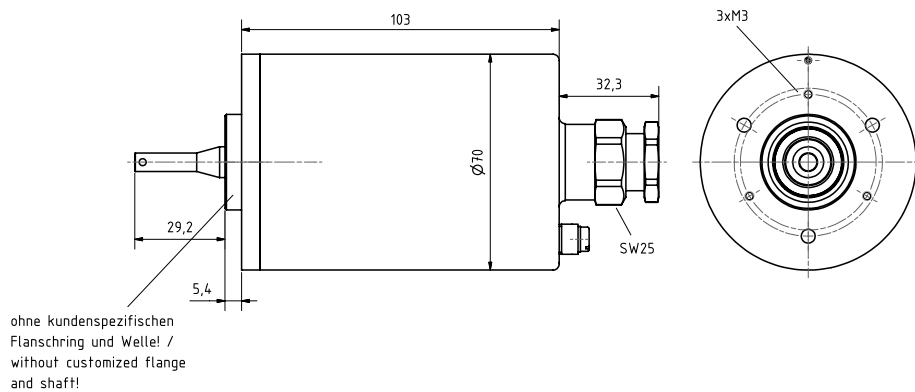
\* Programmable, preset

We will help you to select the most suitable products from the complete TR range. Please contact us ([info@tr-electronic.de](mailto:info@tr-electronic.de)).

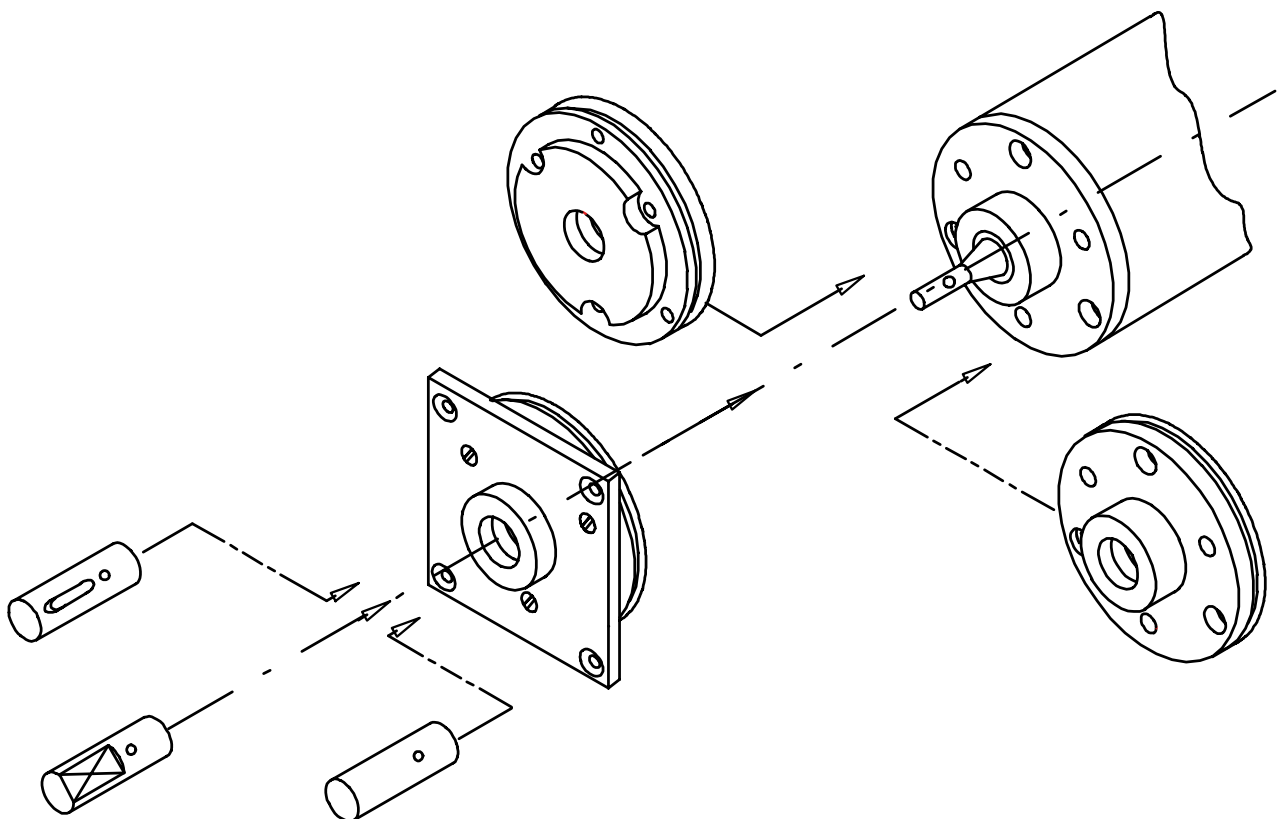
## Dimensional Drawings

### A\_V70 Basic device without flange / shaft

Flange / Shaft can be chosen from the C\_\_65 family



### A\_V70 Modular flange / shaft assembly



# Incremental Encoders - ATEX - Zone 2/22



All our encoders that are suitable for use in zone 2/22.

The following pages show a selection from our families of incremental encoders that are suitable for use in zone 2/22.

---

## Contents

Products.....	259
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# 58 mm

Product	AEV58I:2 	AES58I:2 	AEH58I:2 
Detection	Optical (E)	Optical (E)	Optical (E)
Supply	24 VDC (4,5 .. 32)	24 VDC (4,5 .. 32)	24 VDC (4,5 .. 32)
Steps per turn	$\geq 2 \dots \leq 10000$	$\geq 2 \dots \leq 10000$	$\geq 2 \dots \leq 10000$
Shaft diameters available	6, 8, 10, 12, 14, 1/4", 3/8", 1/2"	6, 8, 10, 12, 14, 15, 1/4", 3/8", 1/2"	6, 8, 10, 12, 14, 15, 1/4", 3/8", 1/2"
Connectors	Connector or cable	Connector or cable	Connector or cable
Ambient temperature	-30...+75 °C	-30...+75 °C	-30...+75 °C
Protection class	IP67 / shaft IP65	IP67 / shaft IP65	IP67 / shaft IP65
ATEX zone	2/22	2/22	2/22
Interface	Square	Square	Square
Weblink	<a href="http://www.tr-electronic.com/s/5008488">www.tr-electronic.com/s/5008488</a>	<a href="http://www.tr-electronic.com/s/5008489">www.tr-electronic.com/s/5008489</a>	<a href="http://www.tr-electronic.com/s/5008490">www.tr-electronic.com/s/5008490</a>
QR-Code			





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58 mm

Product	AOV58I:2	AOS58I:2	AOH58I:2	
				
Detection	Optical (O)	Optical (O)	Optical (O)	
Supply	24 VDC (4,5 .. 32)	24 VDC (4,5 .. 32)	24 VDC (4,5 .. 32)	
Steps per turn	$\geq 2 \dots \leq 65536$	$\geq 2 \dots \leq 65536$	$\geq 2 \dots \leq 65536$	
Shaft diameters available	6, 8, 10, 12, 14, 1/4", 3/8", 1/2"	6, 8, 10, 12, 14, 15, 1/4", 3/8", 1/2"	6, 8, 10, 12, 14, 15, 1/4", 3/8", 1/2"	
Connectors	Connector or cable	Connector or cable	Connector or cable	
Ambient temperature	-30...+75 °C	-30...+75 °C	-30...+75 °C	
Protection class	IP67 / shaft IP65	IP67 / shaft IP65	IP67 / shaft IP65	
ATEX zone	2/22	2/22	2/22	
Interface	Square	Square	Square	
Weblink	<a href="http://www.tr-electronic.com/s/S008492">www.tr-electronic.com/s/S008492</a>	<a href="http://www.tr-electronic.com/s/S008493">www.tr-electronic.com/s/S008493</a>	<a href="http://www.tr-electronic.com/s/S008491">www.tr-electronic.com/s/S008491</a>	
QR-Code				



115 mm  
130 mm

<p>A_V115I</p> 	<p>ADH130I</p> 
<p>Housing option for rotary encoders</p>	<p>Double (D)</p>
<p>See rotary encoders I__58</p>	<p>11...30VDC</p>
<p>See rotary encoders I__58</p>	<p>1024</p>
<p>12, 14, 20</p>	<p>40, 45, 50, 55, 60 H7</p>
<p>Cable gland / connector</p>	<p>Cable</p>
<p>-20...+60 °C</p>	<p>-20...+60°C</p>
<p>IP65 (option IP67)</p>	<p>IP65</p>
<p>Option 22</p>	<p>2/22</p>
<p>See data encoder integrated</p>	<p>Square</p>
<p><a href="http://www.tr-electronic.com/s/S008523">www.tr-electronic.com/s/S008523</a></p>	<p><a href="http://www.tr-electronic.com/s/S011358">http://www.tr-electronic.com/s/S011358</a></p>
	

## Suggested Products

Order code	Steps per Turn	Channels	Shaft / Flange	Connector Position	Cable length	Remark
<b>AEVI582</b>						
AEV58I2-00001	600*	HTL (K1/K2)+Inv.; K0+Inv.	10FL/19,5; ZB36 3xM3+3xM4	cable radial, open end	5 m	Ex II 3G Ex nAc IIC T5 Ex II 3D Ex tc IIIC T97°C IP65
AEV58I2-00002	10.000*	HTL (K1/K2)+Inv.; K0+Inv.	10FL/19,5; ZB36 3xM3+3xM4	M23, 12 pin, radial		Ex II 3G Ex nAc IIC T5 Ex II 3D Ex tc IIIC T97°C IP65
AEV58I2-00003	4.096*	HTL (K1/K2)+Inv.; K0+Inv.	12 Key / 25; ZB36 3xM3+3xM4	M23, 12 pin, radial		Ex II 3G Ex nAc IIC T5 Ex II 3D Ex tc IIIC T97°C IP65
<b>ADH130I</b>						
ADH130I-00001	1024	HTL (K1/K2)+Inv.	60H7/key-way hollow shaft	M23, 12 pin, radial	1,2 m	II 3G Ex nAc IIC T4X II 3D Ex tc IIIC T135°CIP64X

For further product information simply enter the order number in the search field at [www.tr-electronic.com](http://www.tr-electronic.com).

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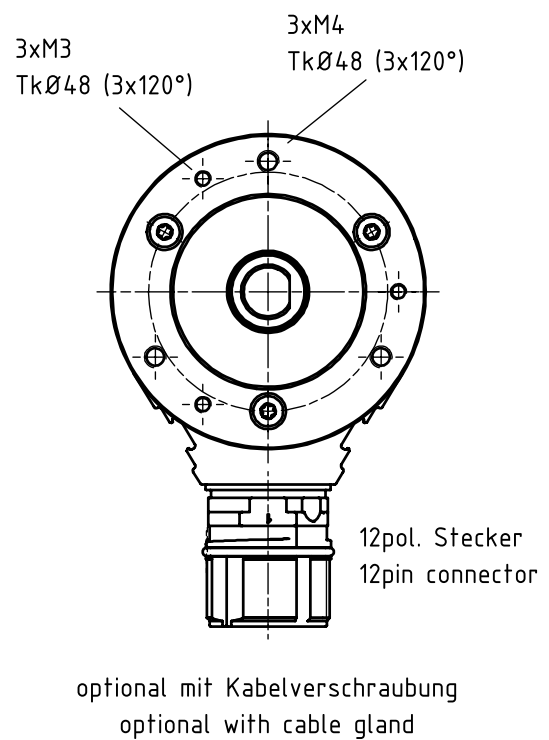
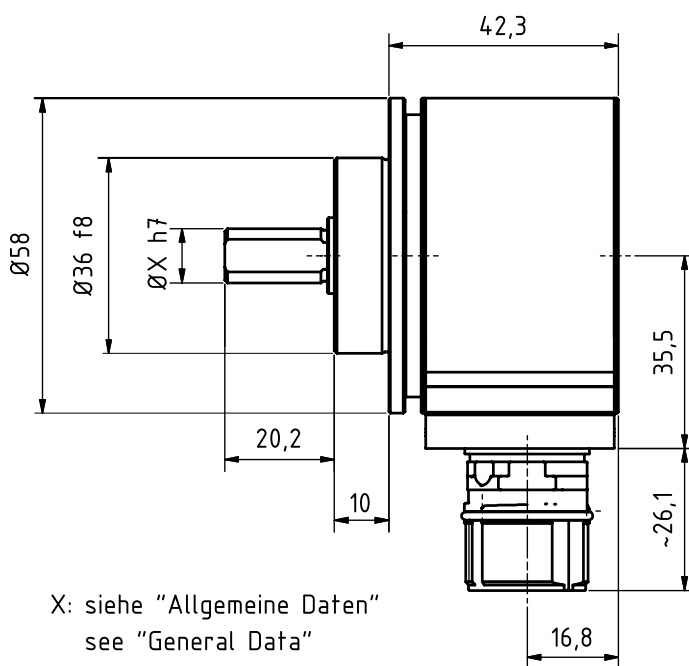


\* Programmable, preset

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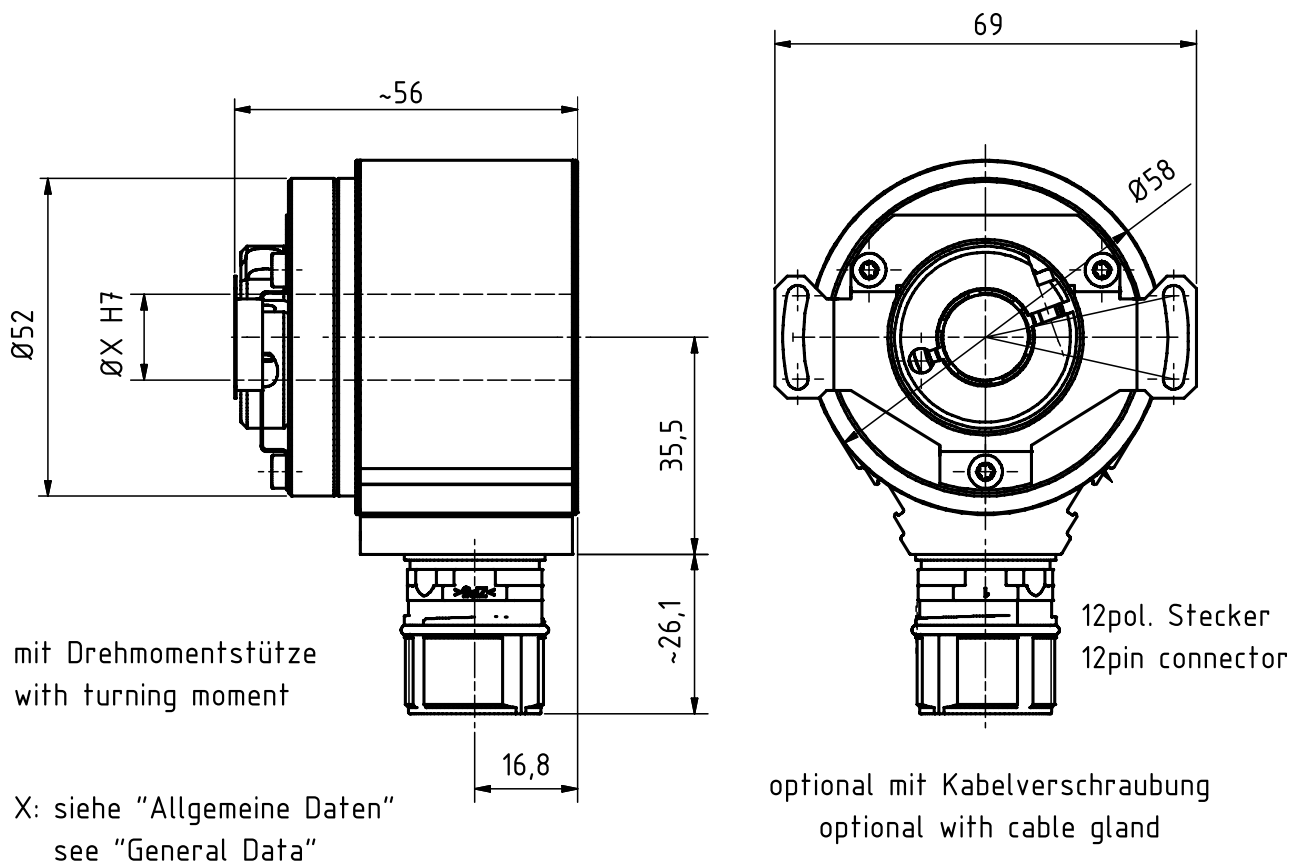
## Dimensional Drawings

AEV58I:2; AOV58I:2

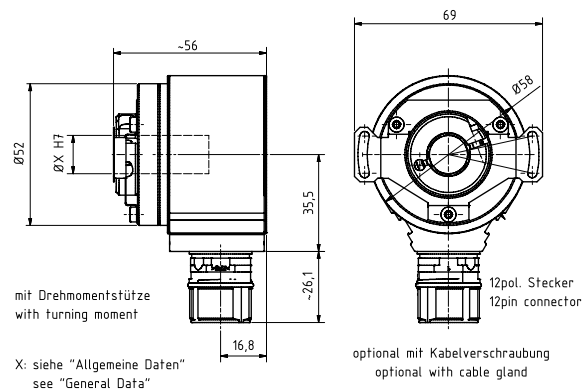


## Dimensional Drawings

AEH58I:2; AOH58I:2



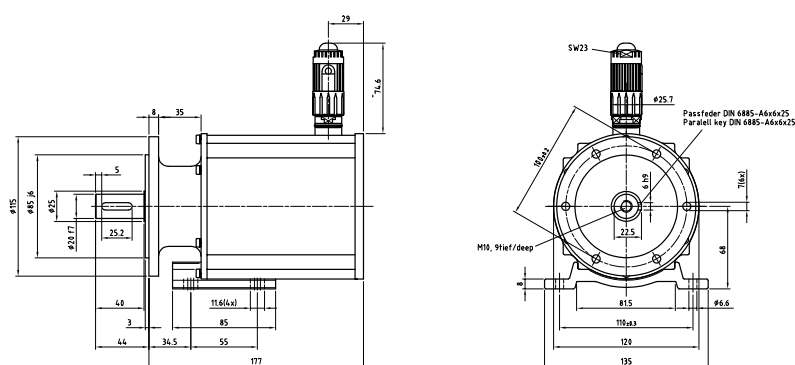
AE58I:2; AOS58I:2



## Dimensional Drawings

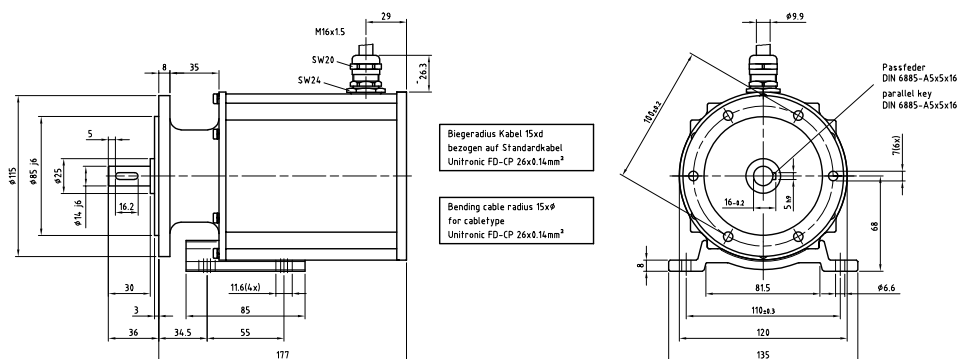
### A\_V115I

1 x M23 12 pin radial

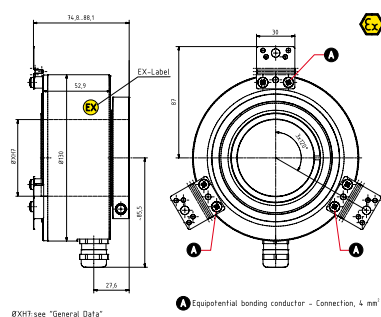


### A\_V115I

1 x Cable gland radial



### ADH130I



## Incremental Rotary Encoder - Heavy-Duty



### Resolution factory set

In crane installations, mining, oil and gas production, steelworks or in wind power plants, rotary encoders must perform their tasks reliably even under the most demanding environmental conditions and extreme mechanical influences. This demands particularly intelligent and robust design, as well as durable technology.

Heavy-duty incremental rotary encoders from TR-Electronic fulfil the specific demands of different surroundings (depending on execution).





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### Contents

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# Solid shaft

## Blind shaft

Product	IV99	IS99
		
Detection	Optical (E)	Optical (E)
Supply	11...30 VDC	11...30 VDC
Steps per turn	1024, 2048, 4096, 8192, 16384, 32768*	1024, 2048, 4096, 8192, 16384, 32768*
Shaft diameters available	6...24 (with groove 10...24)	16G7 & 17JS8 (Cone)
Connectors	Cable gland	Cable gland
Ambient temperature	-20...80 °C	-20...80 °C
Protection class	IP67	IP67
Interface	Square	Square
Weblink	<a href="http://www.tr-electronic.com/s/S008432">www.tr-electronic.com/s/S008432</a>	<a href="http://www.tr-electronic.com/s/S008433">www.tr-electronic.com/s/S008433</a>
QR-Code		

\*Others on request

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## Suggested Products

Order code	Steps per turn	Channels	Shaft / Flange	Connector position	Cable length	Remark
<b>IV99</b>						
IV99-00001	2048	A,VA, B,VB, 0,VO	11Glatt/32 ZB85	Cable gland M20x1,5 radial		
IV99-00002	1024	A,VA, B,VB, 0,VO	11Glatt/32 ZB85	Cable gland M20x1,5 radial		
IV99-00003	2048	A,VA, B,VB, 0,VO	11 keyway /32 ZB85	Cable gland M20x1,5 radial		Push Pull
<b>IS99</b>						
IS99-00001	2048	A,VA, B,VB, 0,VO	16G7 blind shaft	Cable gland M20x1,5 radial		
IS99-00003	1024	A,VA, B,VB, 0,VO	16G7 blind shaft	Cable gland M20x1,5 radial		
IS99-00004	1024	A,VA, B,VB, 0,VO	16G7 blind shaft	Cable gland M20x1,5 radial		

For further product information simply enter the order number in the search field at [www.tr-electronic.com](http://www.tr-electronic.com).

### Further product information

1. Enter order code into ...



2. Searchfield (top right) on [www.tr-electronic.com](http://www.tr-electronic.com)



3. Choose desired information

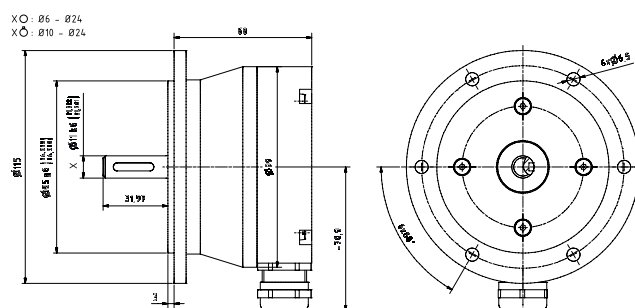


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# Dimensional Drawings

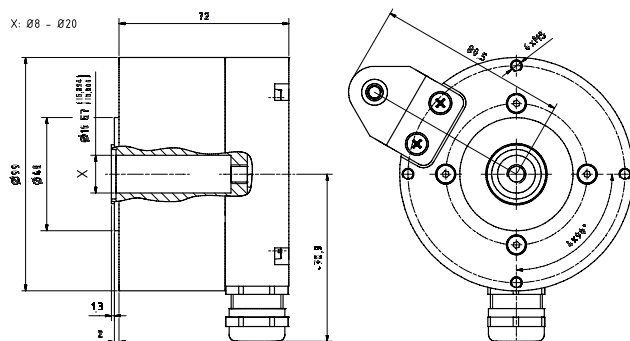
## IV99



M20x1.5 SW24, fdr Kabel/for cable Ø7-12

Vollständige Abmaße siehe Vorschlagsprodukt /  
Complete dimensions see product offering

## IS99



M20x1.5 SW24, fdr Kabel/for cable Ø7-12

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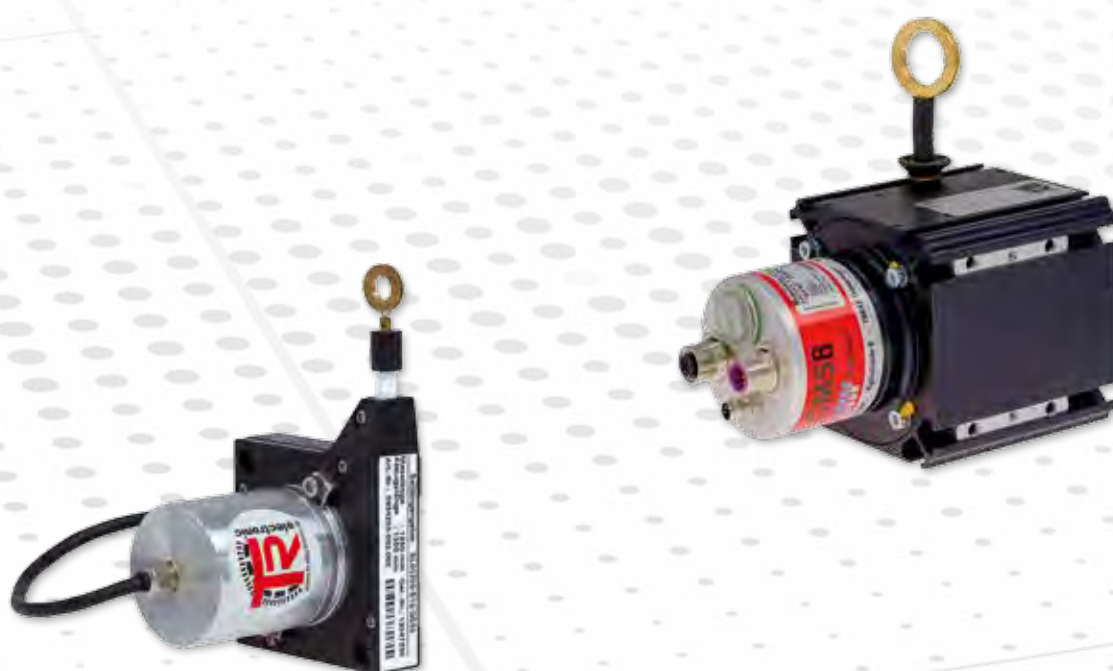
## Wire-actuated Encoders



### Wire-actuated encoders with absolute rotary encoders or incremental rotary encoders

Wire-actuated encoders from TR-Electronic are the universally applicable, efficient and safe solution for recording linear movements in the warehousing and logistics sectors, for example, as well as in stage technology and many other applications. Their fundamental advantage lies in the particularly compact installation space: The wire on the measuring drum is only unwound when movement takes place, while the measuring range remains free until unwinding.

Wire-draw encoders by TR-Electronic are equipped with absolute or incremental rotary encoders and fit the specific encoder series perfectly. Three classes fulfill specific needs for different mechanical loads, duty cycle, service life, resolution or reproducibility. We combine the wide variety of interfaces of our absolute and incremental encoders with different solutions to measure linear movements to fit exactly into your application.



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## Contents

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# Wire-actuated Encoders



## Linear position measurement with rotary encoders

Wire actuated encoders by TR-Electronic are equipped with absolute or incremental rotary encoders and fit the specific encoder series perfectly. Three classes fulfill specific needs for different mechanical loads, duty cycle, service life, resolution resp. reproducibility.

### Industrial

These wire length encoders are designed for many years of use with a high activity rate. With a large number of options,

the system can be adapted to many applications. Those wire draw mechanics are available and approved for applications in explosive atmospheres.

### Standard

The WDS is suitable for normal automation tasks.

### Basic

The WPS is cost-effective product for simple measuring applications with lower accuracy requirements. In terms of precision it is compatible with our rotary encoders with magnetic scanning.



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## Contents

Products.....	273
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# Application: basic

# Application: standard

Product	WPS size 88 mm	SL00 size 55 mm	SL00 size 80 mm
			
Application	Basic	Standard	Standard
Available measurement lengths (m)	2,3; 5	1,25	3
Suits encoder series	58	36	58
Diameter of measurement wire	0,45 mm	0,45 mm	0,55 mm
Measurement wire made from	Stainless steel, covered with polyamide	Stainless steel, 1.4401	Stainless steel, 1.4401
Housing of drum	Plastic, PA 6 GF 30	Plastic, Noryl	Plastic, Noryl
Housing of spring			
Ratio	238,8 mm/turn. (typ.)	150 mm/turn (typ.)	230 mm/turn (typ.)
Options available			
Protection class	IP65	IP50	IP50
ATEX zone			
Interface	<b>Analog</b>	<b>SSI</b>  <b>Analog</b>    <b>CANopen</b>  <b>CAN</b>   <b>IO-Link</b>	<b>SSI</b>  <b>Analog</b>    <b>CANopen</b>  <b>CAN</b>   <b>IO-Link</b>
Option, additional interfaces (on request)			
Weblink	<a href="http://www.tr-electronic.com/s/5006900">www.tr-electronic.com/s/5006900</a>	<a href="http://www.tr-electronic.com/s/S020790">www.tr-electronic.com/s/S020790</a>	<a href="http://www.tr-electronic.com/s/5006900">www.tr-electronic.com/s/5006900</a>
QR-Code			































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## Application: standard

Product	SL00 size 130 mm 	WDS size 60 mm 	WDS size 85 mm 	
Application	Standard	Standard	Standard	
Available measurement lengths (m)	5	1,6	2,5	
Suits encoder series	58	58	58	
Diameter of measurement wire	0,55 mm	0,45 mm	1,2 mm	
Measurement wire made from	Stainless steel, 1.4401	Stainless steel, covered with polyamide	Stainless steel, covered with polyamide	
Housing of drum	Plastic, Noryl	Aluminium anodized	Aluminium anodized	
Housing of spring				
Ratio	385 mm/turn (typ.)	150,12 mm/turn (typ.)	199,92 mm/turn. (typ.)	
Options available				
Protection class	IP50	IP65	IP65	
ATEX zone				
Interface	<b>SSI</b> <b>Analog</b>   <b>CANopen</b> <b>CAN</b>   <b>EtherCAT</b> <b>EtherNet/IP</b>  	<b>SSI</b> <b>Analog</b>   <b>CANopen</b> <b>CAN</b>   <b>EtherCAT</b> <b>EtherNet/IP</b>  	<b>SSI</b> <b>Analog</b>   <b>CANopen</b> <b>CAN</b>   <b>EtherCAT</b> <b>EtherNet/IP</b>  	
Option, additional interfaces (on request)				
Weblink	<a href="http://www.tr-electronic.com/s/S006901">www.tr-electronic.com/s/S006901</a>	<a href="http://www.tr-electronic.com/s/S006902">www.tr-electronic.com/s/S006902</a>	<a href="http://www.tr-electronic.com/s/S010790">www.tr-electronic.com/s/S010790</a>	
QR-Code				












# Application: standard

# Application: industrial

WDS size 96 mm	WDS size 115 mm	WDS size 200 mm	SL30 size 80 mm
			
Standard	Standard	Standard	Industrial
2; 3	5; 7; 10; 15	30	2; 3
58	58 65 75	58 65 75	58 65 75 81 84
0,80 mm	0,45 mm	0,80 mm	1,35 mm
Stainless steel, covered with polyamide	Stainless steel, covered with polyamide	Stainless steel, covered with polyamide	Stainless steel, 1.4401
Aluminium anodized	Aluminium anodized	Aluminium anodized	Aluminium anodized
			Plastic
260,2 mm/turn (typ.)	315,23 mm/turn (typ.)	500,21 mm/turn (typ.)	200 mm/turn (typ.)
Single or double deflection pulleys			-30...+80 °C, wire brush, different deflection pulleys, bellow, fixed ball joint
IP65	IP65	IP65	IP65
<b>SSI</b> <b>Analog</b>   <b>CANopen</b> <b>CAN</b>   <b>EtherNet/IP</b>  	<b>SSI</b> <b>Analog</b>   <b>CANopen</b> <b>CAN</b>   <b>EtherNet/IP</b>  	<b>SSI</b> <b>Analog</b>   <b>CANopen</b> <b>CAN</b>   <b>EtherNet/IP</b>  	<b>SSI</b> <b>Analog</b>   <b>CANopen</b> <b>CAN</b>   <b>EtherNet/IP</b>  
<a href="http://www.tr-electronic.com/s/S006903">www.tr-electronic.com/s/S006903</a>	<a href="http://www.tr-electronic.com/s/S006904">www.tr-electronic.com/s/S006904</a>	<a href="http://www.tr-electronic.com/s/S006905">www.tr-electronic.com/s/S006905</a>	<a href="http://www.tr-electronic.com/s/S006906">www.tr-electronic.com/s/S006906</a>
			





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## Application: industrial

Product	WDS size 115 mm „Longlife“ 	SL30 size 130 mm 	SL30 size 190 mm 	
Application	Industrial	Industrial	Industrial	
Available measurement lengths (m)	5	5; 10; 15; 20; 25; 30	40; 50; 60	
Suits encoder series	58	58 65 75 81 84	58 65 75 81 84	
Diameter of measurement wire	1,0 mm	0,81 mm	1,35 mm	
Measurement wire made from	Stainless steel, covered with polyamide	Stainless steel, 1.4401	Stainless steel, 1.4401	
Housing of drum	Aluminium anodized	Aluminium anodized	Aluminium anodized	
Housing of spring		Plastic	Plastic	
Ratio	315,23 mm/turn (typ.)	333,21 mm/turn (typ.)	491,5 mm/turn (typ.)	
Options available	Single deflection pulleys	-30...+80 °C, wire brush, different deflection pulleys, bellow, fixed ball joint	-30...+80 °C, wire brush, different deflection pulleys, bellow, fixed ball joint	
Protection class	IP65	IP65	IP65	
ATEX zone				
Interface	<b>SSI</b> <b>Analog</b>   <b>CANopen</b> <b>CAN</b>    <b>EtherNet/IP</b>  	<b>SSI</b> <b>Analog</b>   <b>CANopen</b> <b>CAN</b>    <b>EtherNet/IP</b>  	<b>SSI</b> <b>Analog</b>   <b>CANopen</b> <b>CAN</b>    <b>EtherNet/IP</b>  	
Option, additional interfaces (on request)	<b>SSI</b> <b>Analog</b>	<b>SSI</b> <b>Analog</b>	<b>SSI</b> <b>Analog</b>	
Weblink	<a href="http://www.tr-electronic.com/s/S006904">www.tr-electronic.com/s/S006904</a>	<a href="http://www.tr-electronic.com/s/S006907">www.tr-electronic.com/s/S006907</a>	<a href="http://www.tr-electronic.com/s/S006908">www.tr-electronic.com/s/S006908</a>	
QR-Code				



## Application: industrial ATEX

	SL30 ATEX size 80 mm	SL30 ATEX size 130 mm
		
	Industrial ATEX	Industrial ATEX
	2; 3	10; 25
	58 65 70 75 115	58 65 70 75 115
	1,35 mm	0,81 mm
	Stainless steel, 1.4401	Stainless steel, 1.4401
	Aluminium anodized	Aluminium anodized
	Plastic	Plastic
	200 mm/turn (typ.)	333,21 mm/turn (typ.)
	-30...+80 °C, wire brush, different deflection pulleys, bellows, fixed ball joint	-30...+80 °C, wire brush, different deflection pulleys, bellows, fixed ball joint
	IP65	IP65
	2	2
	<div> <div>SSI</div> <div>INTERBUS</div> <div>Analog</div> <div>DRIVE-CLIQ</div> <div>PROFIBUS</div> <div>CANopen</div> <div>CAN</div> <div>ETHERCAT</div> <div>EtherNet/IP</div> <div>ETHERNET POWERLINK</div> <div>IO-Link</div> </div>	<div> <div>SSI</div> <div>INTERBUS</div> <div>Analog</div> <div>DRIVE-CLIQ</div> <div>PROFIBUS</div> <div>CANopen</div> <div>CAN</div> <div>ETHERCAT</div> <div>EtherNet/IP</div> <div>ETHERNET POWERLINK</div> <div>IO-Link</div> </div>
	<a href="http://www.tr-electronic.com/s/S006909">www.tr-electronic.com/s/S006909</a>	<a href="http://www.tr-electronic.com/s/S006910">www.tr-electronic.com/s/S006910</a>
		

# Suggested Products

Order code	Name	Measurement range	Interface	Remark
Standard WDS size 85mm				
CMW58M-00008	CMW58M*4096/4096 V000 SSI SLG*ME2,5M	2,50 m	SSI	
CMW58M-00009	CMW58M*4096/4096 PBS-DP SLG/ME2,5M	2,50 m	PROFIBUS DP	
CM-W582M-00002	CMW582M*8192/4096 EPN SLG*ME2,5M	2,50 m	PROFINET IO	
Standard WDS size 96mm				
CM-W582M-00006	CMW582M*8192/4096 EPN ME 2M	2,00 m	PROFINET IO	radial, connector points down, B10: 450.000 cycles
CM-W582M-00008	CMW582M*4096/4096 EIP ME 2M	2,00 m	Ethernet/IP	axial, B10: 450.000 cycles
CM-W582M-00016	CMW582M*4096/4096 EPN ME 2M	2,00 m	PROFINET IO	axial, B10: 450.000 cycles
CM-W582M-00021	CMW582M*8192/4096 ETC SLG ME 2M	2,00 m	EtherCAT	radial, connector points down, B10: 450.000 cycles
CM-W582M-00026	CMW582M*8192/4096 EPN ME 2M	2,00 m	PROFINET IO	radial, connector points up, B10: 450.000 cycles

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## Suggested Products

Order code	Name	Measurement range	Interface	Remark
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### Standard WDS size 115mm

CM-W582M-00010	CMW582M*8192/4096 EPN SLG*ME 5M	5,00 m	PROFINET IO	radial, connector points down, B10: 450.000 cycles
CM-W582M-00014	CMW582M*8192/4096 ETC SLG*ME 5M	5,00 m	EtherCAT	axial, B10: 450.000 cycles
CM-W582M-00018	CMW582M*8192/4096 EPN ME 5M	5,00 m	PROFINET IO	radial, connector points right, B10: 450.000 cycles
CM-W582M-00022	CMW582M*8192/4096 EPN ME 5m+ULR	5,00 m	PROFINET IO	radial, connector points up, with pulley, B10: 450.000 cycles
CM-W582M-00023	CMW582M*8192/4096 EPN ME 5m+DUR00	5,00 m	PROFINET IO	radial, connector points left, with double pulley, B10: 450.000 cycles
CM-W582M-00025	CMW582M*8192/4096 EPN ME 7,5m+ULR	7,50 m	PROFINET IO	
CMW58M-00002	CMW58M*4096/4096 PBS-DP SLG/ME5M	5,00 m	PROFIBUS DP	
CMW58M-00041	CMW58M*2048/4096 V000 CAN/OPEN ME 0-5M	5,00 m	CAN/OPEN	
CMW58M-00063	CMW58M*4096/4096 SSI SLG*ME5,0m	5,00 m	SSI	
CMW58M-00068	CMW58M*4096/4096 SSI ME5M+ULR	5,00 m	SSI	With single pulley
CEW582M-00011	CEW582M*8192/4096 EPN ME 5m+ULR	5,00 m	PROFINET IO	With single pulley
CMW58M-00076	CMW58M*4096/4096 PB SLG/ME5M DUR00	5,00 m	PROFIBUS DP	With double pulley
CEW582M-00012	CEW582M*8192/4096 EPN ME 5m+DUR00	5,00 m	PROFINET IO	With double pulley
CMW58M-00077	CMW58M*4096/4096 PB SLG/ME5M DUR90	5,00 m	PROFIBUS DP	With double pulley, 90°

### Standard SL00 size 130mm

CM-W582M-00003	CMW582M*8192/4096 EPN SL00_GS130	5,00 m	PROFINET IO	
CMW58M-00056	CMW58M*4096/4096 SSI SL130 5M	5,00 m	SSI	

### Standard SL00 size 80mm

CMW58M-00055	CMW58M*4096/4096 SSI SL80 3M	3,00 m	SSI	
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### Industrial WDS size 115mm

CM-W582M-00024	CMW582M*8192/4096 EPN ME 5m+ULR	5,00 m	PROFINET IO	radial, connector points up, with pulley, B10: 1,5 mio cycles
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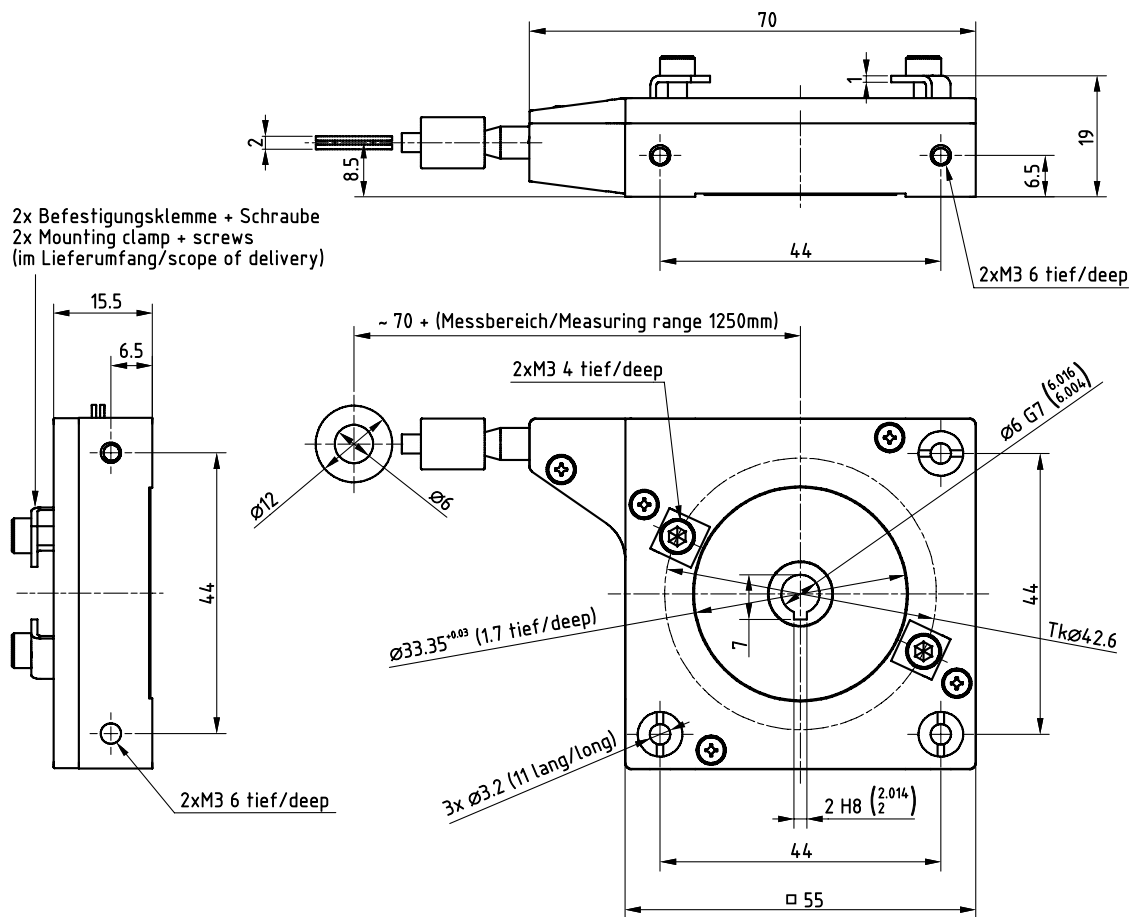
## Suggested Products

Order code	Name	Measurement range	Interface	Remark
<b>Industrial SL30 size 80mm</b>				
CEW58M-00020	CEW58M*4096/4096 V000 PROFIBUS *SL3002	2,00 m	PROFIBUS DP	
CEW58M-00127	CEW58M*8192/4096 V000 PROFIBUS *SL3003	3,00 m	PROFIBUS DP	
CEW58M-00132	CEW58M*8192/4096 V000 SSI SL3002	2,00 m	SSI	
CEW58M-00140	CEW58M*8192/4096 V000 SSI SL3003	3,00 m	SSI	
CEW58M-00171	CEW58M*8192/4096 V000 ETHERCAT *SL3003	3,00 m	EtherCAT	
CEW58M-00215	CEW58M*4096/4096 EIP SL3002	2,00 m	ETHERNET IP	
CEW58M-00221	CEW58M*8192/4096 V000 ETHERCAT *SL3002	2,00 m	EtherCAT	
CEW58M-00241	CEW58M*8192/4096 EIP SL3003	3,00 m	ETHERNET IP	
CM-W582M-00001	CMW582M*8192/4096 EPN SL3003	3,00 m	PROFINET IO	
<b>Industrial SL30 size 190mm</b>				
CEW58M-00115	CEW58M*4096/4096 V000 PROFIBUS *SL3050	50,00 m	PROFIBUS DP	
<b>Industrial SL30 size 130mm</b>				
CEW58M-00008	CEW58M*8192/4096 V000 PROFIBUS *SL3015	15,00 m	PROFIBUS DP	
CEW58M-00019	CEW58M*8192/4096 V000 SSI SL3005	5,00 m	SSI	
CEW58M-00022	CEW58M*4096/4096 V000 PROFIBUS *SL3020	20,00 m	PROFIBUS DP	
CEW58M-00029	CEW58M*8192/4096 V000 PROFIBUS *SL3010	10,00 m	PROFIBUS DP	
CEW58M-00065	CEW58M*8192/4096 V000 SSI SL3015	15,00 m	SSI	
CEW58M-00068	CEW58M*4096/4096 V000 SSI SL3030	30,00 m	SSI	
CEW58M-00092	CEW58M*8192/4096 V000 PROFIBUS *SL3025	25,00 m	PROFIBUS DP	
CEW58M-00134	CEW58M*8192/4096 V000 PROFIBUS *SL3005	5,00 m	PROFIBUS DP	
CEW58M-00141	CEW58M*8192/4096 V000 ETHERCAT *SL3010	10,00 m	EtherCAT	
CEW58M-00148	CEW58M*8192/4096 V000 SSI SL3020	20,00 m	SSI	
CEW58M-00156	CEW58M*8192/4096 V000 ETHERCAT *SL3005	5,00 m	EtherCAT	
CEW58M-00229	CEW58M*8192/4096 V000 SSI SL3010	10,00 m	SSI	
CEW58M-00231	CEW58M*8192/4096 V000 SSI SL3025	25,00 m	SSI	
CEW58M-00242	CEW58M*8192/4096 EIP SL3005	5,00 m	Ethernet/IP	
<b>Basic WPS size 88mm</b>				
CMW58M-00048	CMW58M*4096/256 V000 ANALOG*ME5M „KIT“	5,00 m	ANALOG CURRENT	

For further product information simply enter the order number in the search field at [www.tr-electronic.com](http://www.tr-electronic.com).

We will help you to select the most suitable products from the complete TR range. Please contact us ([info@tr-electronic.de](mailto:info@tr-electronic.de)).



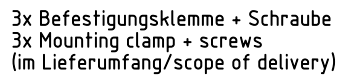


[www.tr-electronic.com](http://www.tr-electronic.com)

www.tr-electronic.com



Wire draw box SL00, 5.0 m, 130 mm

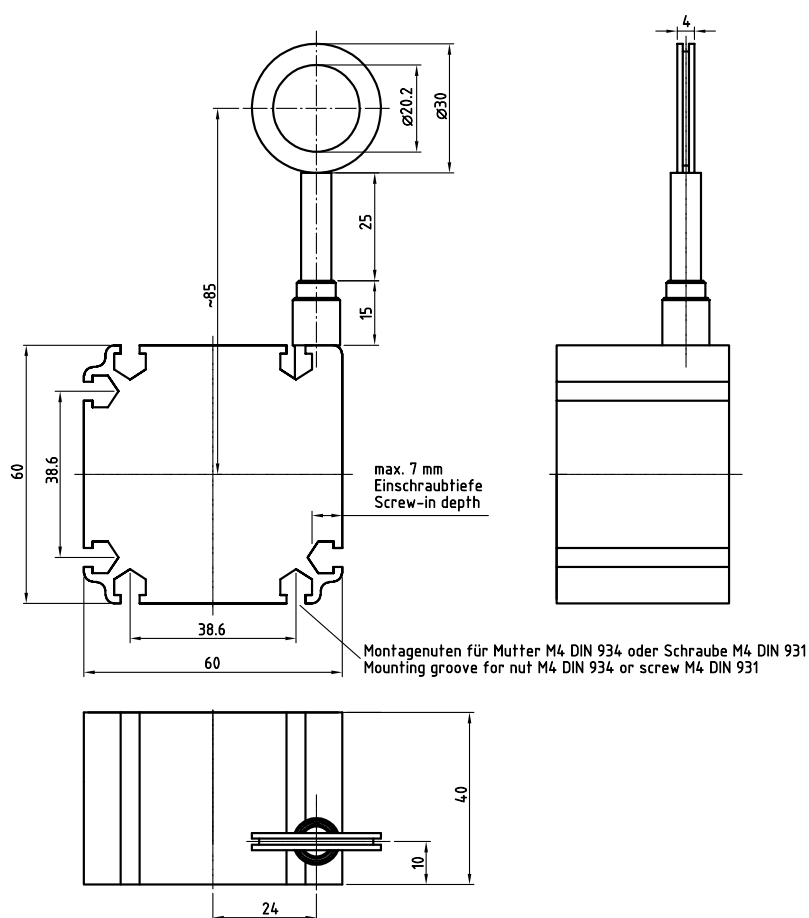




# Dimensional Drawings

## WDS - 1600 mm

Wire draw box WDS-1600-P60, 1.6 m, 60 mm



**Variante mit Umlenkrolle**  
Version with deflection roller

3x DIN965-M8x8  
Seitenschraube  
Countersunk-head screw

M6 (Luz.)

3x DIN7A-A6-3

Feststellschraube  
Locking screw

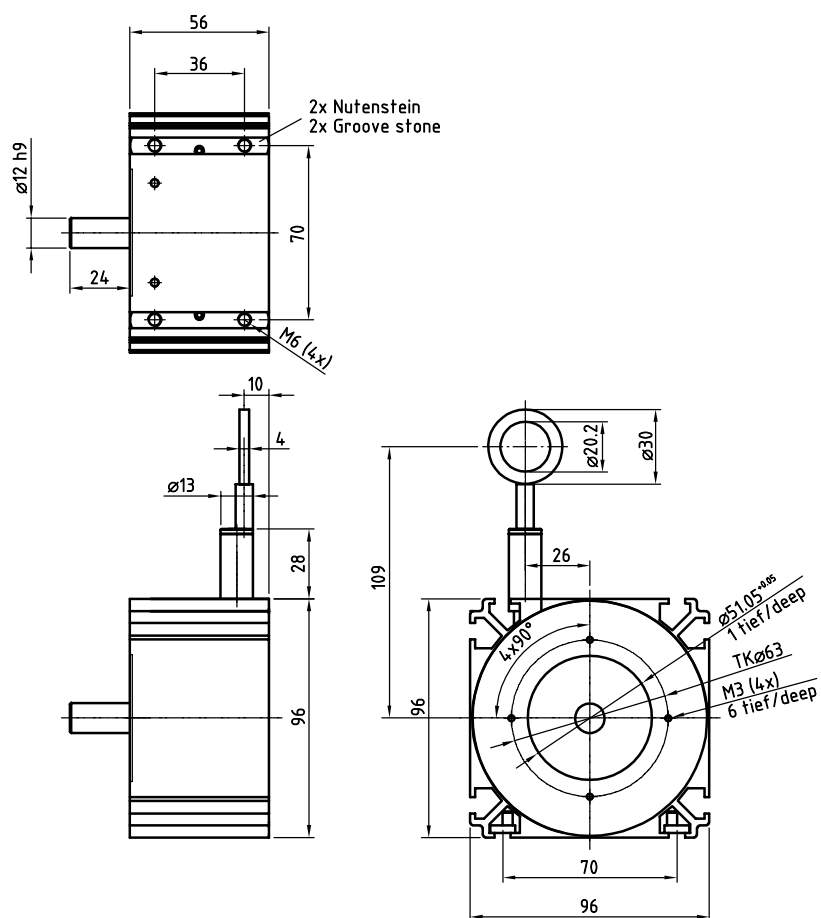
Nutenstein verschiebar, auf gezeigter Position vormontiert.  
Groove stone movable, pre assembled to drawn position.

Dimensions:  
108  
28  
39.5  
11  
Ø22  
Ø14  
Ø17  
7 R 1A  
7 R 1A  
85.2  
94  
29.9  
36  
105  
Ø14  
M6 (Luz.)  
46.4  
Nutenstand/Groove distance Ø<sub>max</sub>  
85  
Nutenstand/Groove distance Ø<sub>min</sub>

# Dimensional Drawings

## WDS - 2000 mm

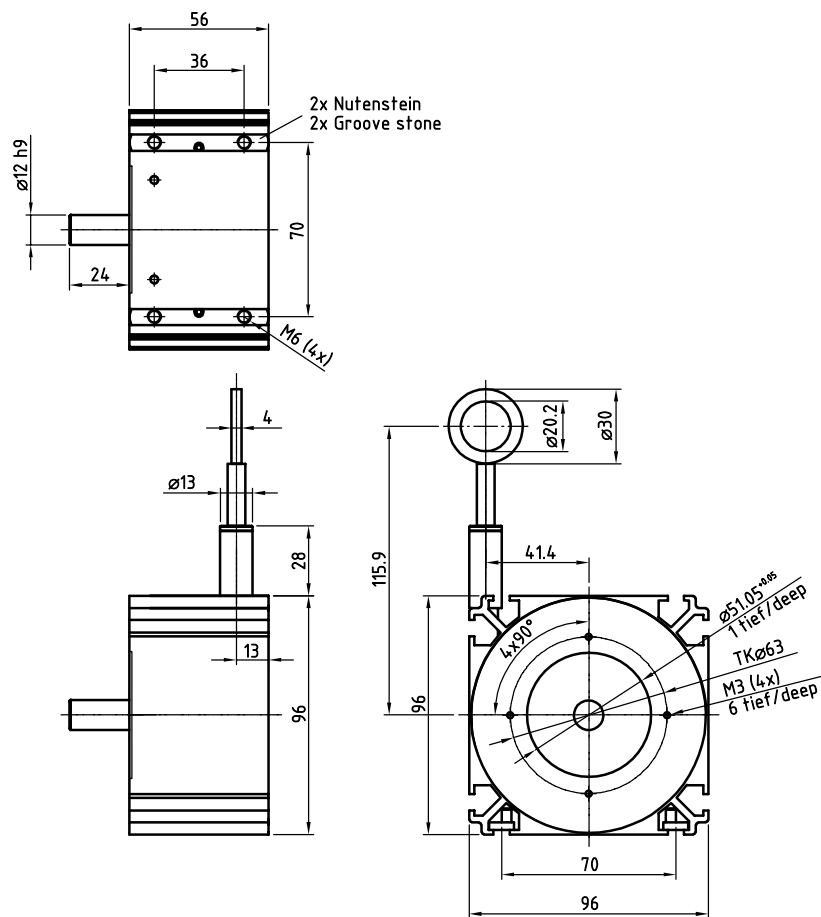
Wire draw box WDS-2000-P96, 2.0 m, 96 mm



## Dimensional Drawings

### WDS - 3000 mm

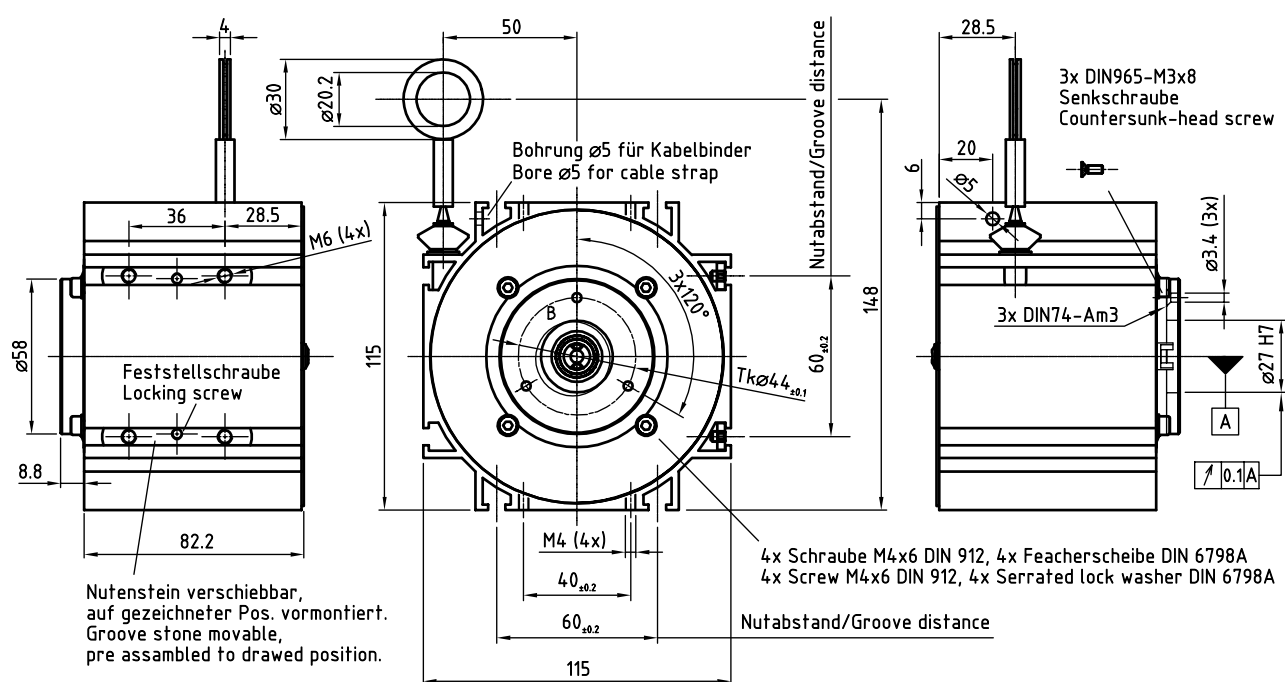
Wire draw box WDS-3000-P96, 3.0 m, 96 mm



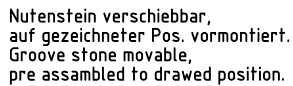
# Dimensional Drawings

## WDS - 5000 mm

Wire draw box WDS-5000-P115, 5.0 m, 115 mm



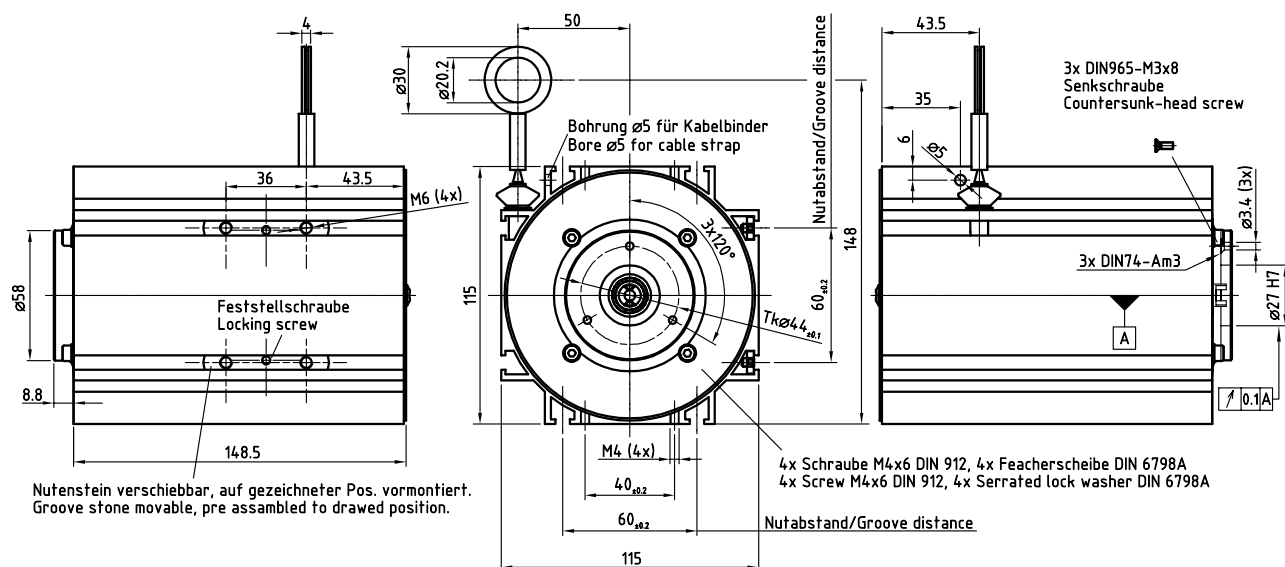
Wire draw box WDS-7500-P115, 7.5 m, 115 mm



# Dimensional Drawings

## WDS - 10000 mm

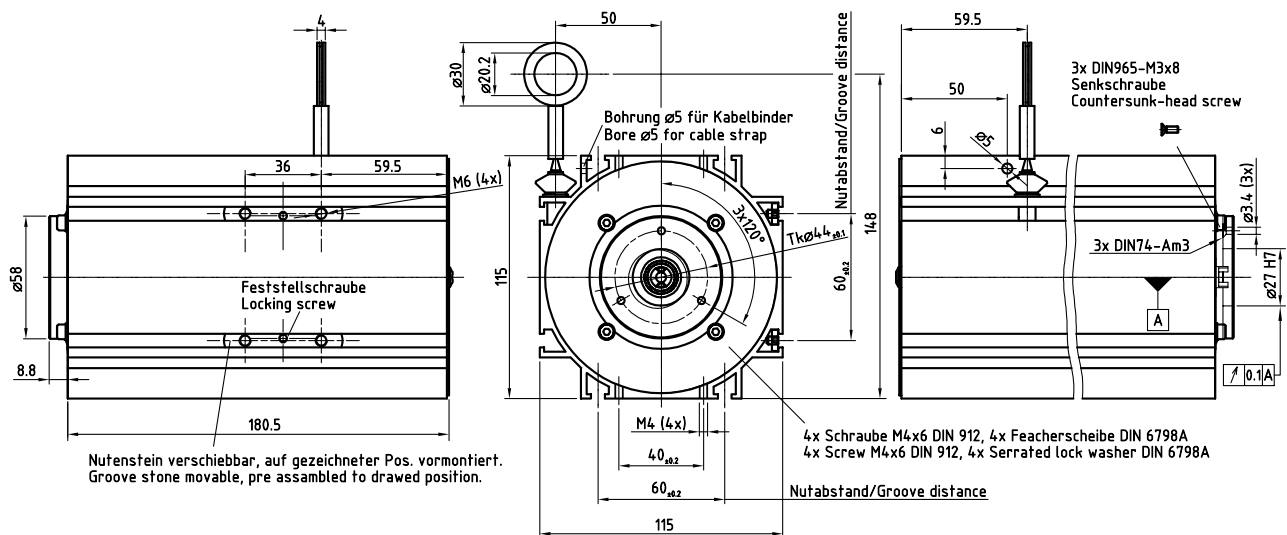
Wire draw box WDS-10000-P115, 10.0 m, 115 mm



## Dimensional Drawings

### WDS - 15000 mm

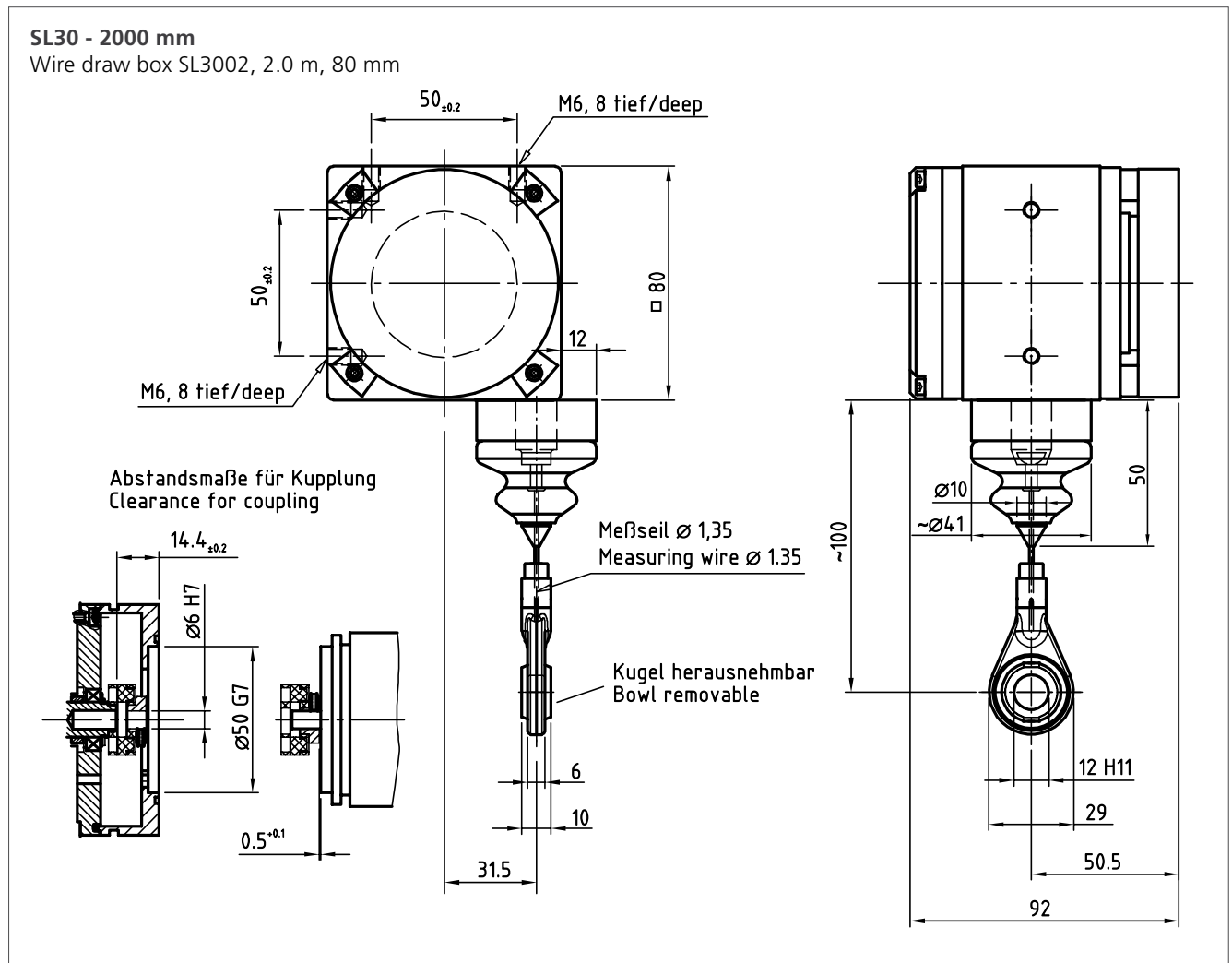
Wire draw box WDS-15000-P115, 15.0 m, 115 mm







## Dimensional Drawings



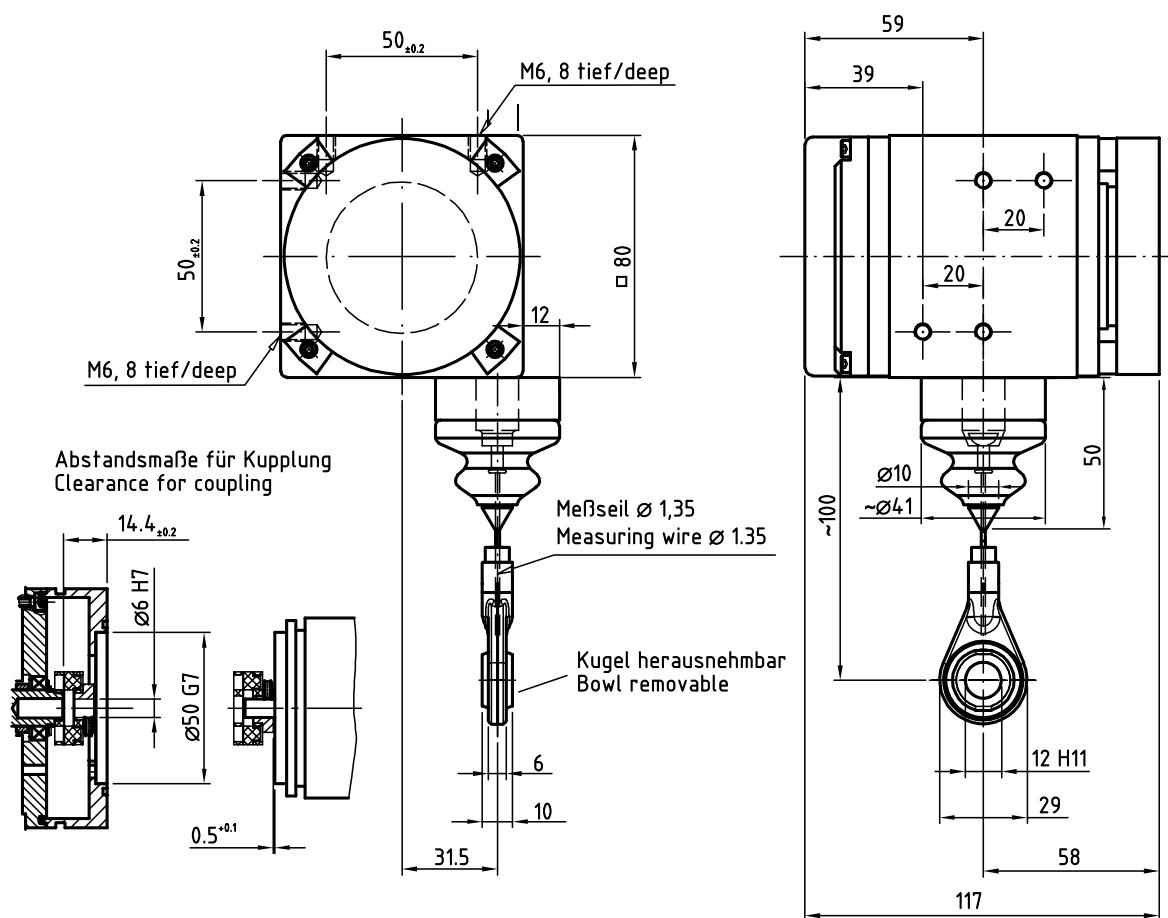
Shown is only wire draw box without encoder

Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at [www.tr-electronic.com](http://www.tr-electronic.com) or on request.

## Dimensional Drawings

### SL30 - 3000 mm

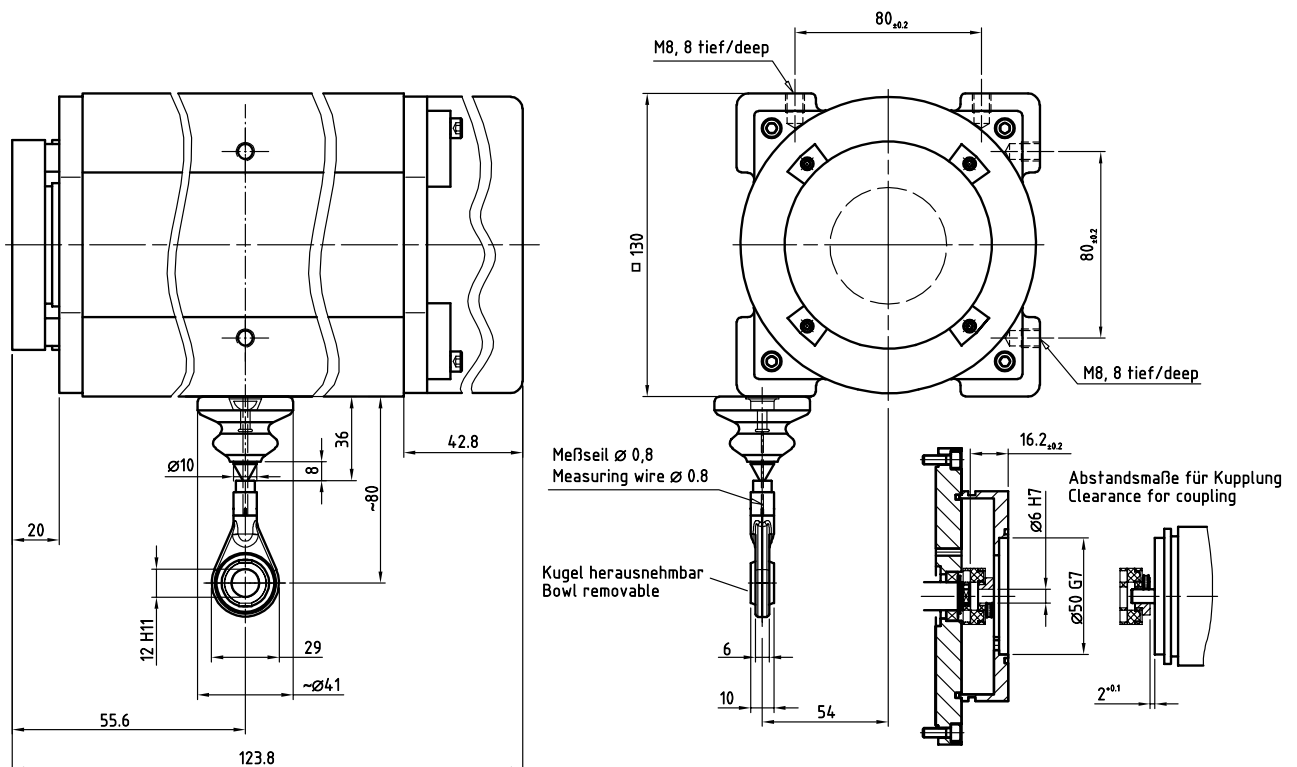
Wire draw box SL3003, 3.0 m, 80 mm



## Dimensional Drawings

### SL30 - 5000 mm

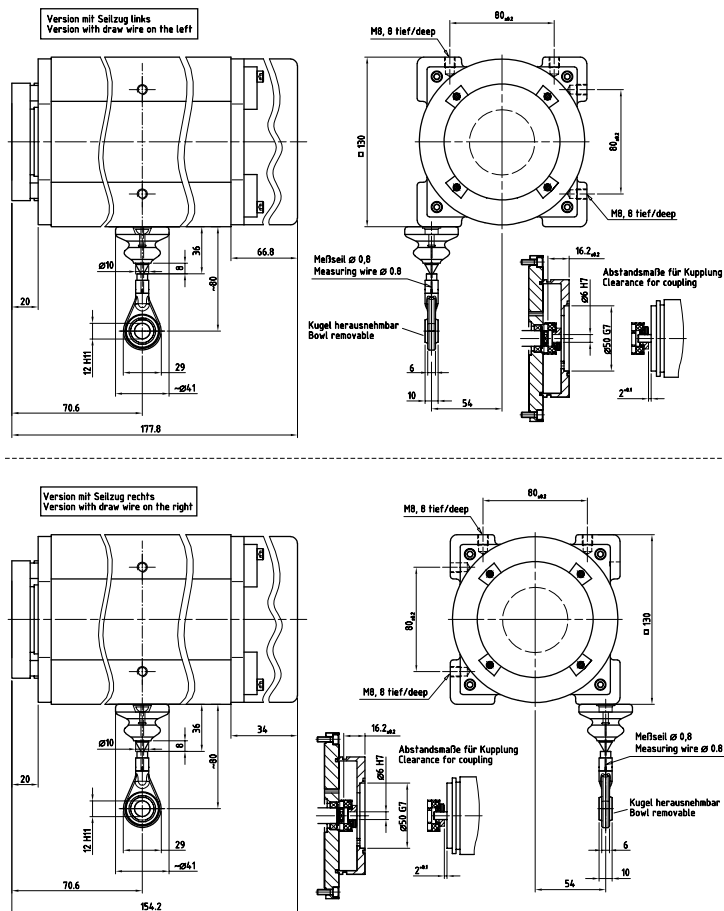
Wire draw box SL3005, 5.0 m, 130 mm



# Dimensional Drawings

**SL30 - 10000 mm**

Wire draw box SL3010, 10.0 m, 130 mm



**Version mit Seilzug links**  
Version with draw wire on the left

Technical drawing showing the front and side views of the Version mit Seilzug links. Dimensions include: 80<sub>A2</sub>, 80<sub>A1</sub>, 16.2<sub>A2</sub>, 16.2<sub>A1</sub>, 12 H11, 29, ~24.1, 66.8, 207.8, 85.6, 20, 10, 6, 54, 10, 2<sup>41</sup>, 16.2<sub>A2</sub>, 16.2<sub>A1</sub>, 12 H11, 29, ~24.1, 66.8, 207.8, 85.6, 20, 10, 6, 54, 10, 2<sup>41</sup>. Labels include: M8, 8 tief/deep, Meßseil ø 0.8, Measuring wire ø 0.8, Kugel herausnehmbar, Bowl removable, Abstandsmaße für Kupplung, Clearance for coupling.

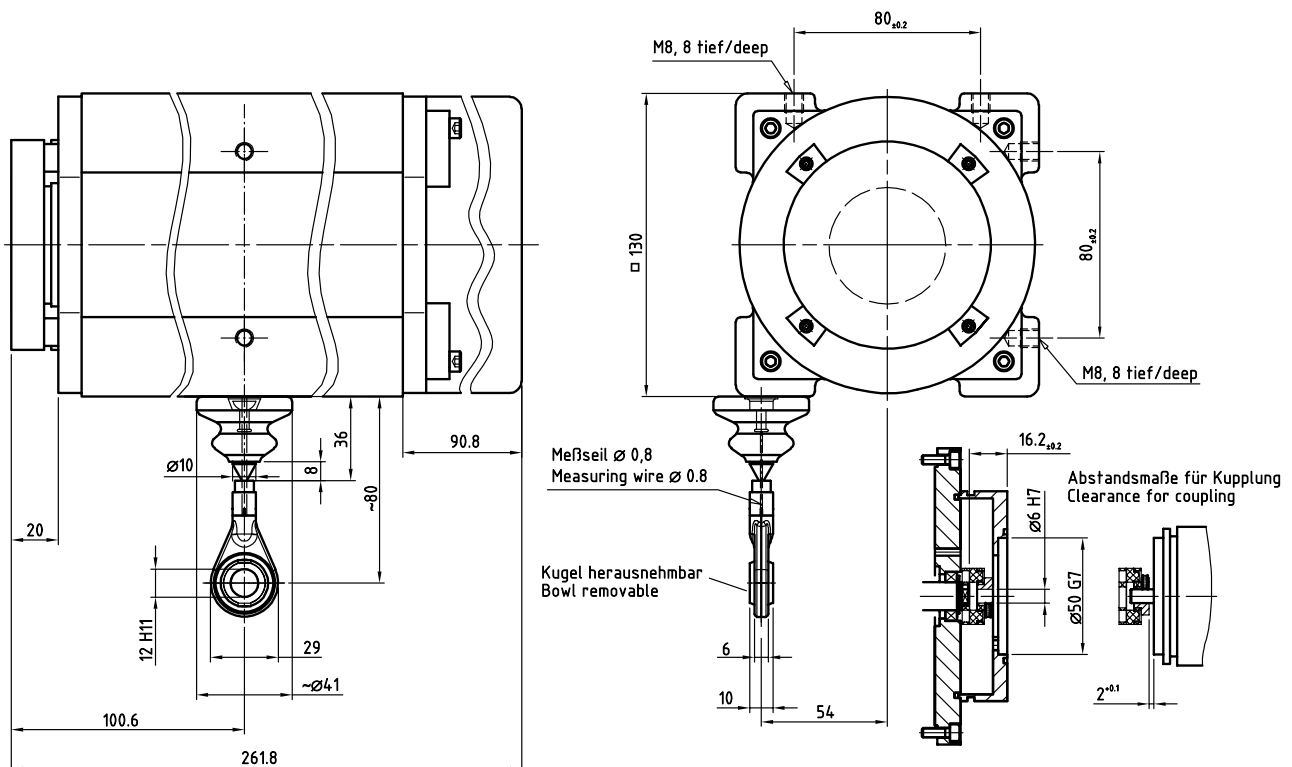
**Version mit Seilzug rechts**  
Version with draw wire on the right

Technical drawing showing the front and side views of the Version mit Seilzug rechts. Dimensions include: 80<sub>A2</sub>, 80<sub>A1</sub>, 16.2<sub>A2</sub>, 16.2<sub>A1</sub>, 12 H11, 29, ~24.1, 58, 208.2, 85.6, 20, 10, 6, 54, 10, 2<sup>41</sup>, 16.2<sub>A2</sub>, 16.2<sub>A1</sub>, 12 H11, 29, ~24.1, 58, 208.2, 85.6, 20, 10, 6, 54, 10, 2<sup>41</sup>. Labels include: M8, 8 tief/deep, Meßseil ø 0.8, Measuring wire ø 0.8, Kugel herausnehmbar, Bowl removable, Abstandsmaße für Kupplung, Clearance for coupling.

## Dimensional Drawings

### SL30 - 20000 mm

Wire draw box SL3020, 20.0 m, 130 mm



Version mit Seilzug links  
Version with draw wire on the left

[www.tr-electronic.com](http://www.tr-electronic.com)

300

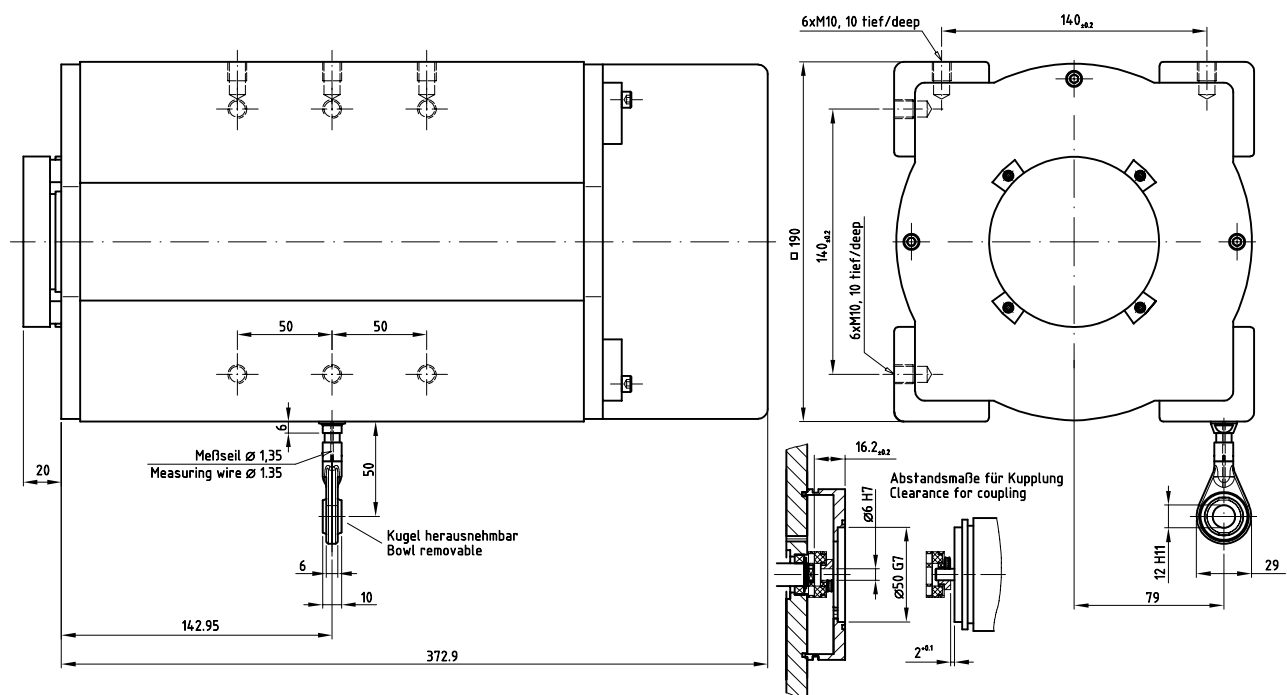




## Dimensional Drawings

### SL30 - 40000 mm

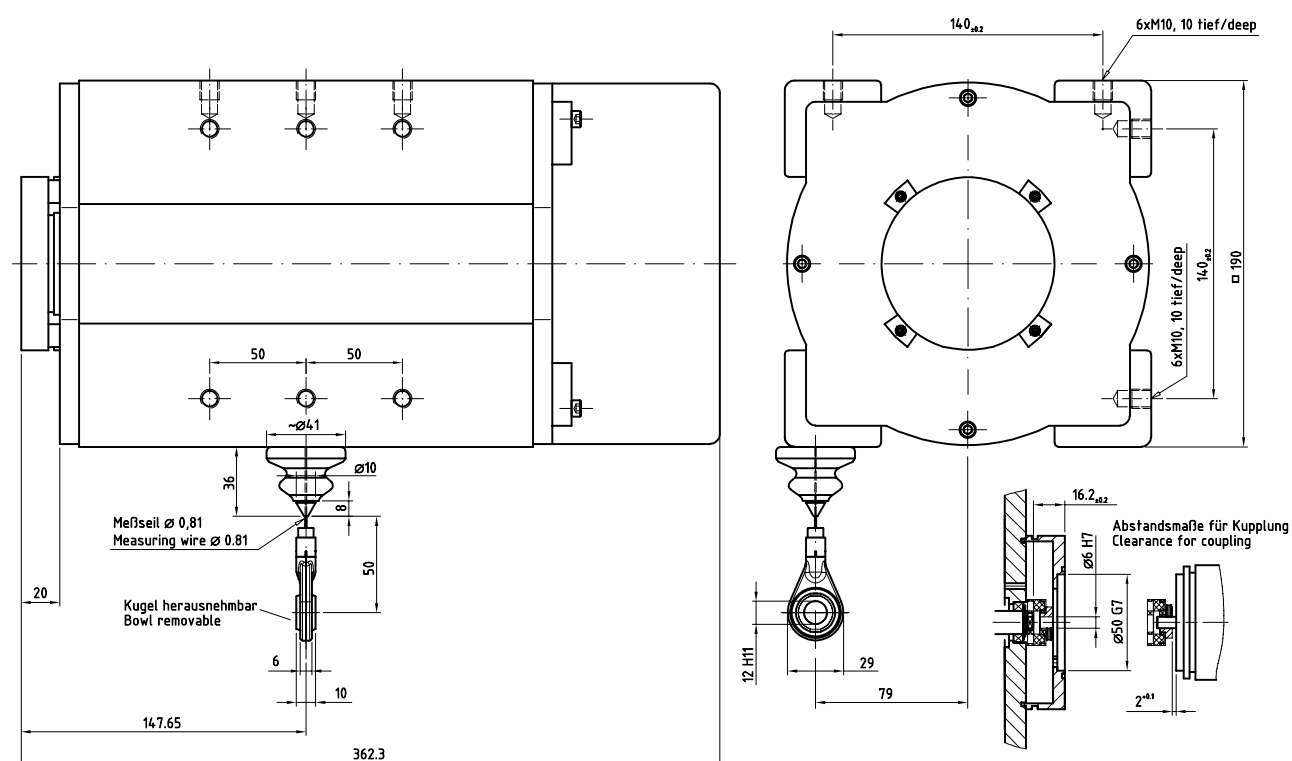
Wire draw box SL3040, 40.0 m, 190 mm



# Dimensional Drawings

## SL30 - 50000 mm

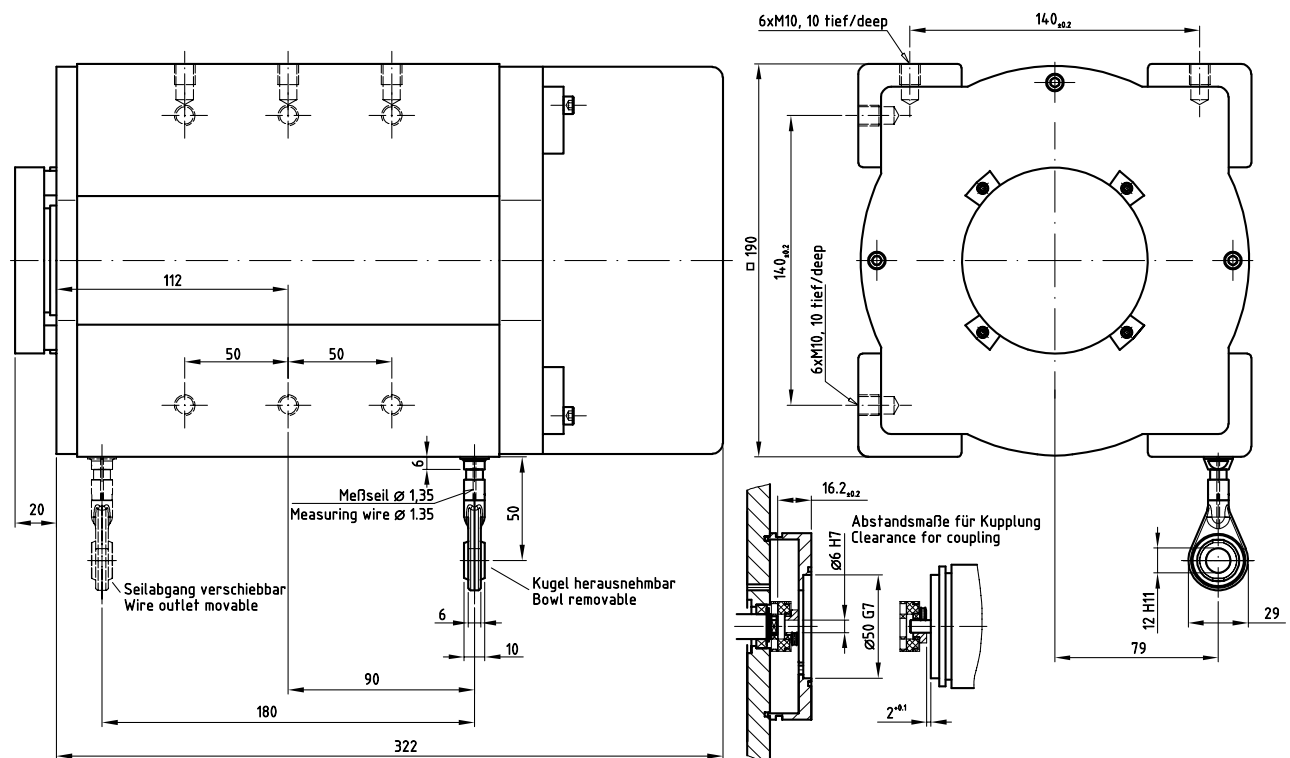
Wire draw box SL3050, 50.0 m, 190 mm



## Dimensional Drawings

### SL30 - 60000 mm

Wire draw box SL3060, 60.0 m, 190 mm



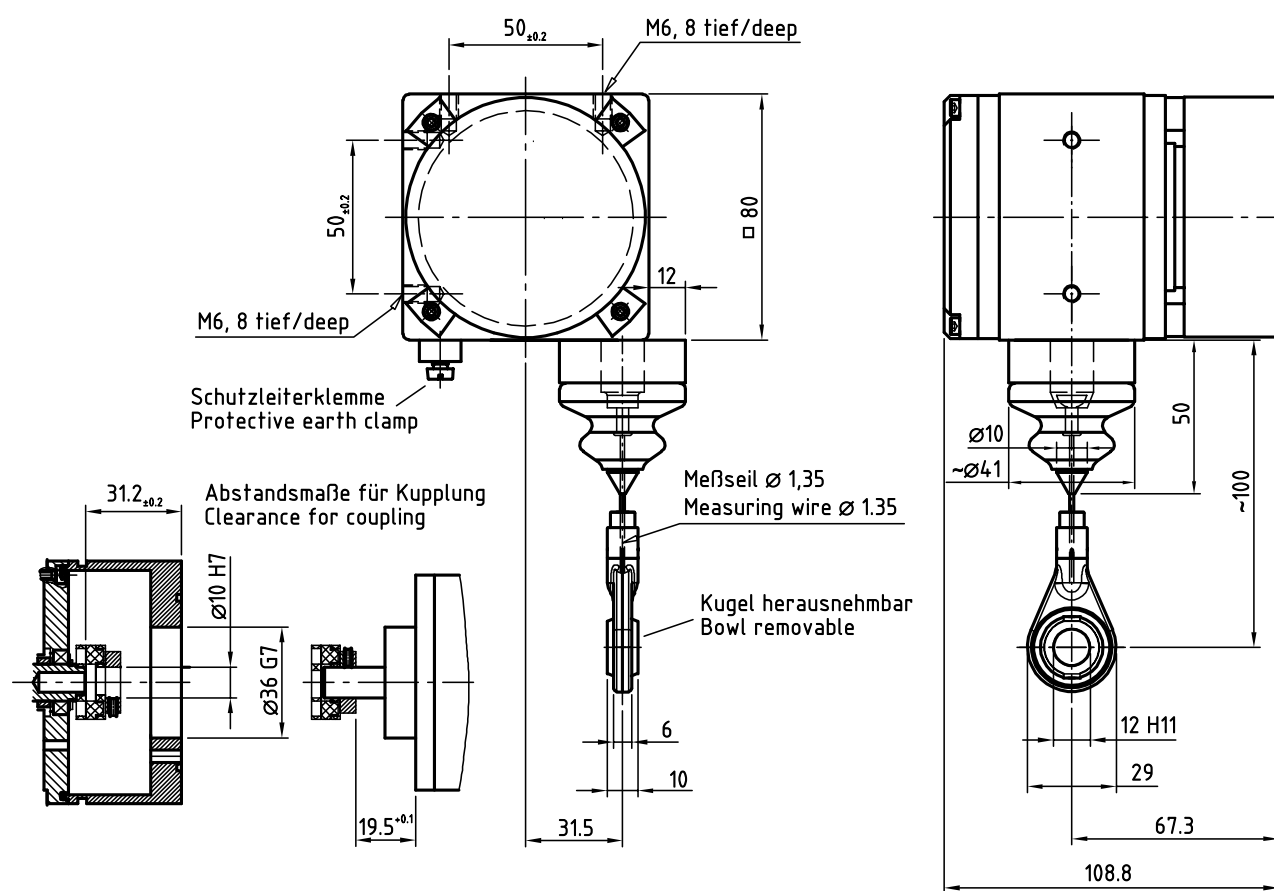
Shown is only wire draw box without encoder

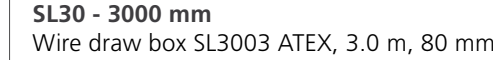
Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at [www.tr-electronic.com](http://www.tr-electronic.com) or on request.

# Dimensional Drawings

## SL30 - 2000 mm

Wire draw box SL3002 ATEX, 2.0 m, 80 mm



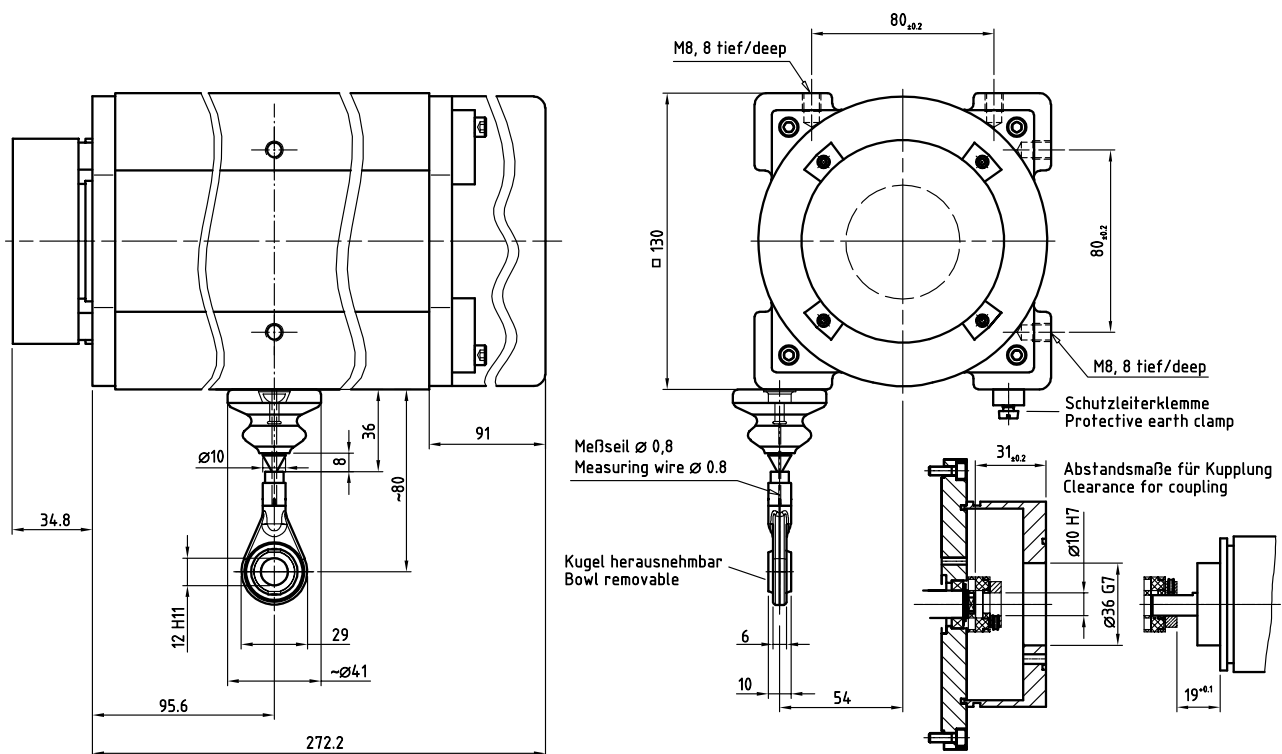




## Dimensional Drawings

### SL30 - 25000 mm

Wire draw box SL3025 ATEX, 25.0 m, 130 mm



Shown is only wire draw box without encoder

Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at [www.tr-electronic.com](http://www.tr-electronic.com) or on request.



## Dimensional Drawings

### Ball joint

Standard for SL30, SL30 ATEX



### Alternative rope ends

On request for SL30, SL30ATEX



### Wire outlet

With bellow; SL30, SL 30 ATEX



### Brush attachment

Option for SL30, SL 30 ATEX



### Compressed air attachment

Option for SL30, SL 30 ATEX



## Dimensional Drawings

### Guide pulley

Option for SL30, SL 30 ATEX



### Double guide pulley

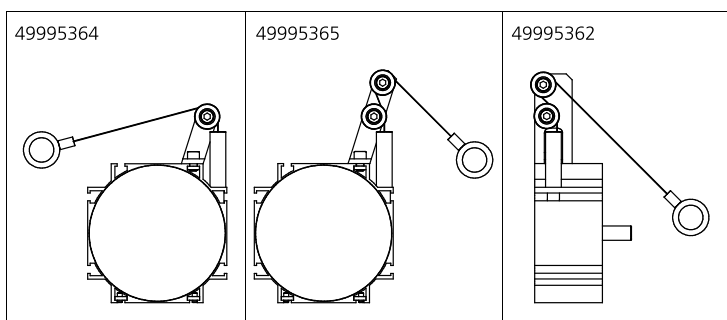
Option for SL30, SL 30 ATEX



## Dimensional Drawings

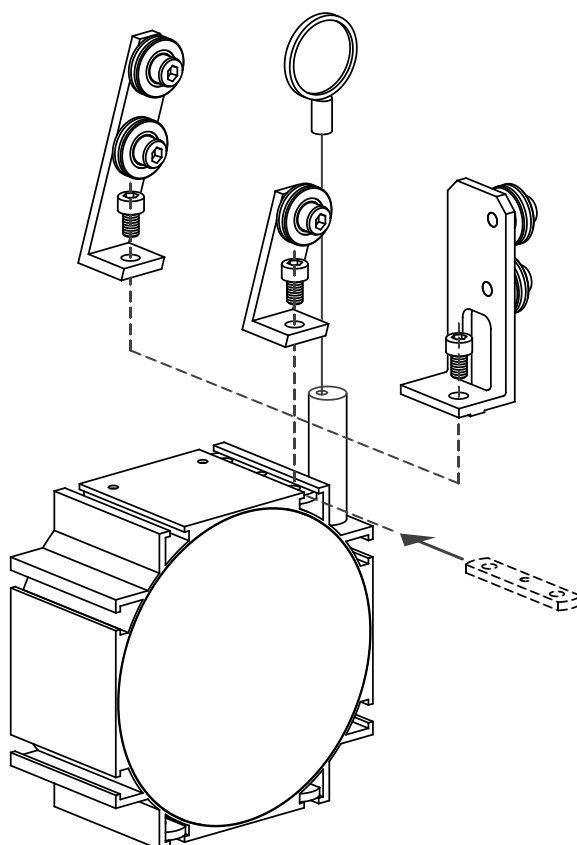
### Guide Pulleys for WDS size 115 „Standard“

For rope diameter 0,45 mm



### Guide Pulleys for WDS

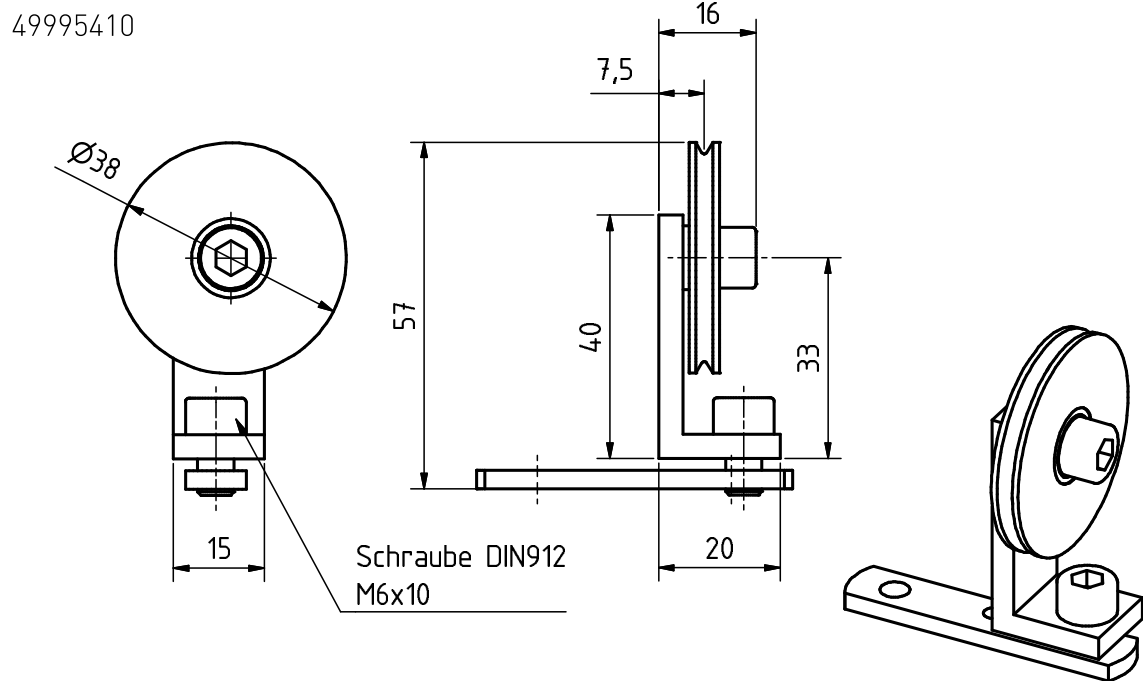
Assembly



## Dimensional Drawings

### Guide Pulleys for WDS size 115 „Industrial“

For rope diameter 1 mm





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# Linear Encoders



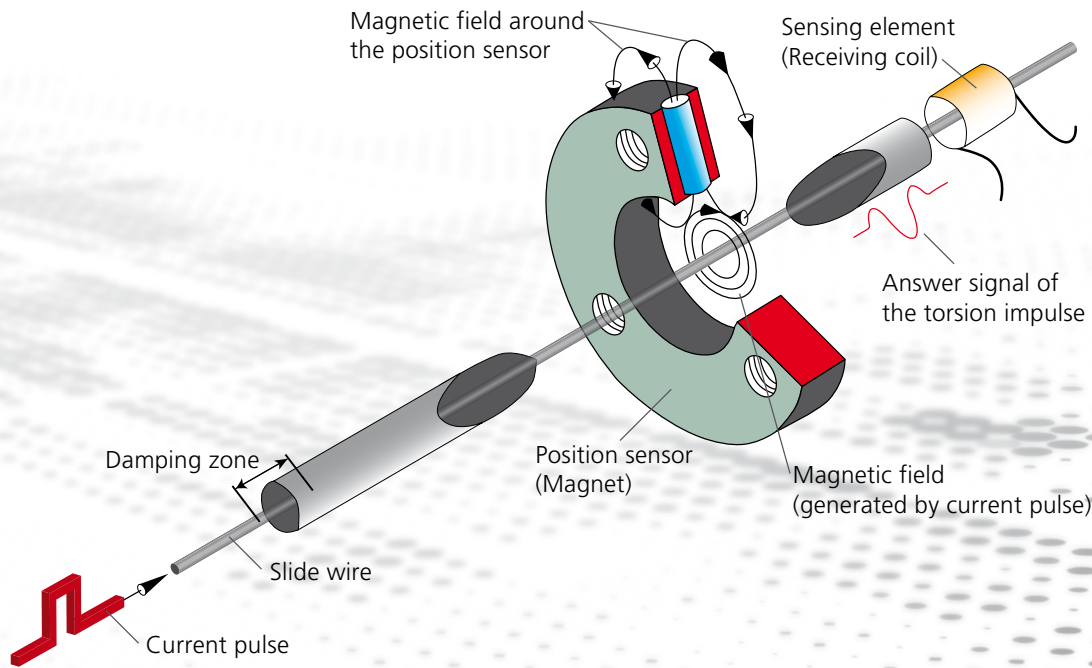


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# Magnetostriction



## Functional description

The magnetostrictive linear encoders of TR capture linear movements and convert them into electrical output signals. This measuring principle is based on a travel time delay measurement.

Current pulses are sent through a magnetostrictive wire, positioned inside a protective tube, creating a ring-shaped magnetic field around the wire. A non-contact permanent magnet serves as a position sensor, touching the waveguide with its magnetic field. The magnetic field created by the current pulses generates a magnetostriction at the point of

measurement due to the two differently aligned magnetic fields. The resulting torsion pulse spreads out from the position sensor with constant ultrasonic speed, moving along the waveguide in both directions.

The time difference between the transmission of the torsion pulse and its arrival at the sensing element at the detector head is converted electronically into a distance proportional signal, which is provided either as a digital or analog output signal.



LMP146



LMR48



LMP30



## Contents

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## Linear encoder with magnetostriction - how to find the perfect fit

### The right type for your application

Linear absolute position measurement systems (magnetostriction) measure linear movements without tear or wear, even in aggressive media.

Direct integration into hydraulic cylinders by using pressure proof tube housings made from stainless steel.

**e.g.: LMRI46**



For use in chemical aggressive surroundings or for liquid level measurement in food and beverage or galvanic industry, you find linear encoders in housings made of polypropylene. Linear encoders in profile housing can be easily mounted to machines and appliances. We have available versions with guided magnet and those with flat housing without guiding track. All systems are capable for detection of multiple magnets. That means that position of several magnets can be detected with one single measurement device.

**e.g.: LMP30**



Cascadeable linear-absolute position sensors in profile housing measure strokes of up to 20 m. They are used e.g. in roller cutters or as wear free vertical axis in automated storage systems.

**e.g.: LMC55 (modular setup)**



### Power that fulfils your needs

Different basic detection units fulfil efficiently various requirements on resolution and precision.

#### Industrial

- \_ Resolution 1  $\mu$
  - \_ Stroke up to 4000 mm
  - \_ Direct interfaces, Fieldbus and Industrial Ethernet
- e.g.: LMPI46**



#### Standard

- \_ Resolution 0,01 mm
  - \_ Stroke up to 3.000 mm
  - \_ Direct interfaces (SSI, Analog), CAN
- e.g.: LMR534**



#### Basic

- \_ Resolution 0,1 mm
  - \_ Stroke up to 2.500 mm
  - \_ Direct interfaces
- e.g.: LMP48**



## Three Measuring Systems in One – LMR70



### Triple-redundant linear absolute measurement system provides longterm availability even with difficult access

What sounds like a child's naive wish is a clear demand for automated solutions where the technical facilities are extremely difficult to access. Applications in power plant technology and in locks and weirs "sink" the technology into machine rooms below the waterline. They are therefore difficult to access. Even the long service life that has been established in this industry is not long enough for system lifecycles that last several years without requiring maintenance. TR-Electronic has developed the LMR 70 for these applications. The linear-absolute position measuring system works just like its simpler colleagues, touch-free and low on wear and tear with magnetostriction. It has been designed for direct installation in hydraulic cylinders - the stainless steel pipe withstands constant pressures of up to 400 bar and pressure peaks of 600 bar.

The diameter of the pipe and the available flange threads are compatible with the standard. It is the larger evaluation unit with a diameter of 70 mm that reveals what is special about

this system: there are 3 sensor elements working at the same time within a single system. Each has its own connection for supply voltage and signal output from the power supply via the sensor wire and receiving coil to the output driver - everything is installed three times.

Each of the three systems works alone. If more than one are active at the same time they synchronize - the magnetic field builds up at the same time so that the systems do not interfere with each other.

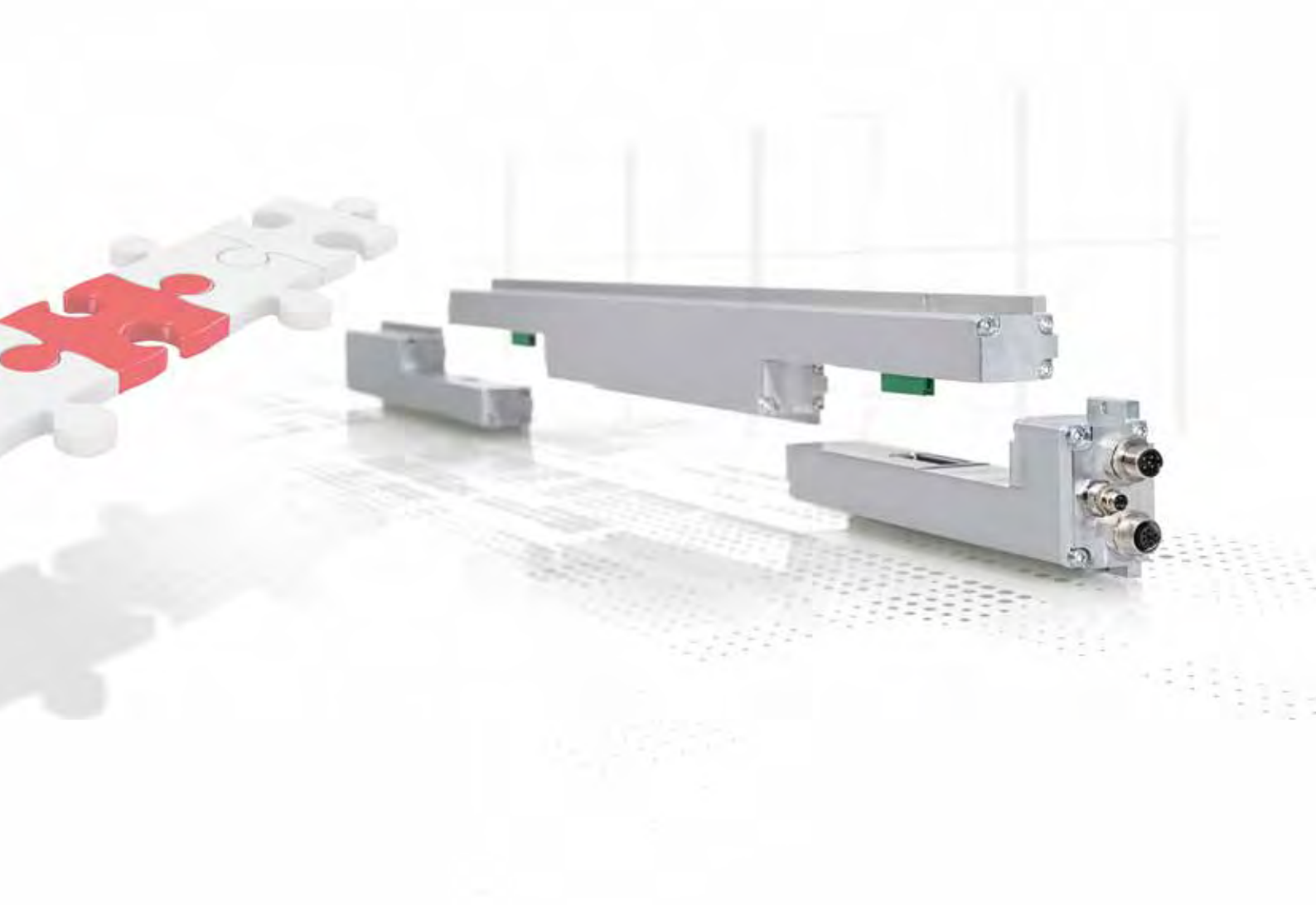
Each user decides for himself whether to operate the measuring systems on their own or to increase reliability with triangulation or a "2 from 3" evaluation.

The measuring values are output via the tried and trusted robust analog interface; transmission as a 4 ... 20 mA current is advantageous for extended systems.

The LMR 70 measuring systems measure up to 2 m.

The analog interface resolves 12 or 16 bits. The internal reproducibility is 5 µm.

## Contact-Free and Wear-Free scanning up to 20 m – LMC55



### Measure reliably over long distances

Wire-actuated encoders are subject to wear, and 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, magnetostrictive measuring systems are limited in their measuring length, and glass scales are unaffordable with increasing measurement lengths.

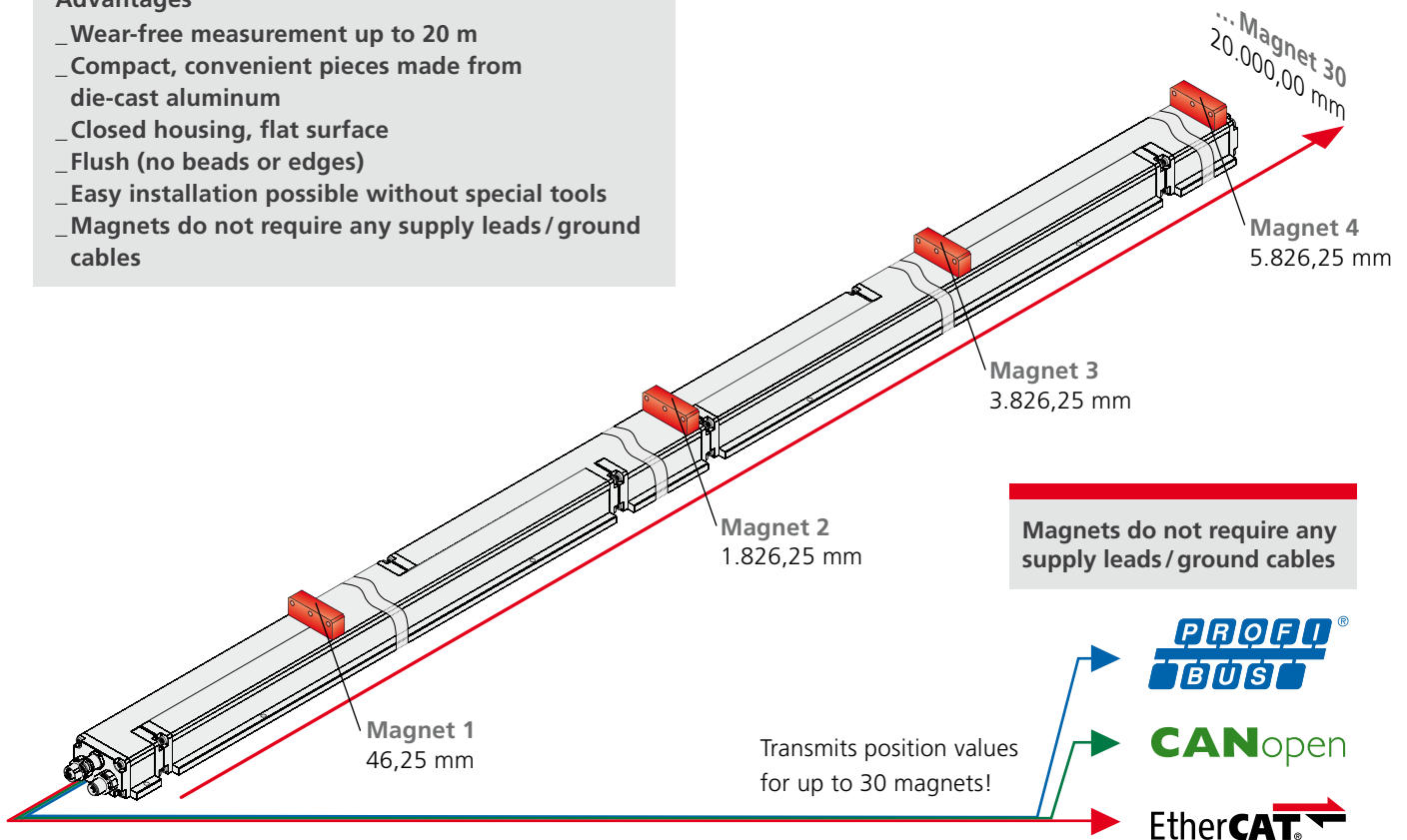
With LMC55 we have closed this gap: up to 30 positions are acquired simultaneously. The moving part is a passive magnet, which does not require power supply. The measuring system is only assembled to the full measuring length in

the machine, and the individual parts are convenient (with a length of 2 m) to transport and store. The final measuring length is defined in situ by connecting the intermediate elements together to the desired overall length. Up to 20 m absolute position detection is supplied as standard (special lengths on request).

The flat housing of the actual measuring system can be installed flush with the floor. As it has no beads, product residues cannot stick to it. The actual positions are output to the control via PROFIBus, EtherCAT or CANopen. Quick activation is ensured with a little technical skill and standard tools. Other interfaces are available on request.

#### Advantages

- \_ Wear-free measurement up to 20 m
- \_ Compact, convenient pieces made from die-cast aluminum
- \_ Closed housing, flat surface
- \_ Flush (no beads or edges)
- \_ Easy installation possible without special tools
- \_ Magnets do not require any supply leads / ground cables



Magnets do not require any supply leads / ground cables

**PROFI**  
**BUS**

**CANopen**

**EtherCAT**

## Features

- \_ 5/100 mm precise, absolute, contact-free position measurement
- \_ Short cycle time: 10 ms ~ 4 ms
- \_ Multiple measurement of up to 30 positions simultaneously
- \_ Reliable, tight system with protection class IP65
- \_ Can be installed in any position (automatic addressing)
- \_ Device foot for mounting using holes or clamping shoes

#### Fields of application

- \_ Pneumatic workstations
- \_ Reel cutter
- \_ Event technology
- \_ Transfer vehicles

- \_ Replaces easily soiled, optical axes e.g. in profile cutting machines
- \_ Wear-free Y-axis in high-rack warehouse (replaces wire-actuated encoder) and much more.

#### Reliably tight – easy installation

- \_ Flat surface without beads or edges, plane joint
- \_ Features stable extruded aluminium profile
- \_ Device foot for mounting using existing holes or clamping shoes

## Explanation of the individual modules – LMC55

### Explanation of the individual modules

#### Master

This contains the intelligence of the measuring system, manages the individual modules and offers connection options for the respective output interface.  
Connection options: Slave type 1, or end element type 1.

#### Slave type 1

This is suitable for connection to a master system, or forms the intermediate element in conjunction with two type 2 slaves.

#### Slave type 2

This forms the intermediate element in conjunction with two type 1 slaves.

#### End element type 1

This is suitable for connection to a master system, or forms the end element in conjunction with a type 2 slave.

#### End element type 2

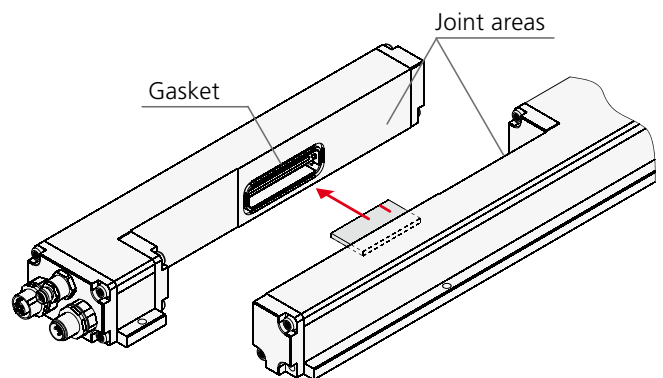
The type 2 end component forms the end element in conjunction with a type 1 slave.

### Correct configuration before measurement

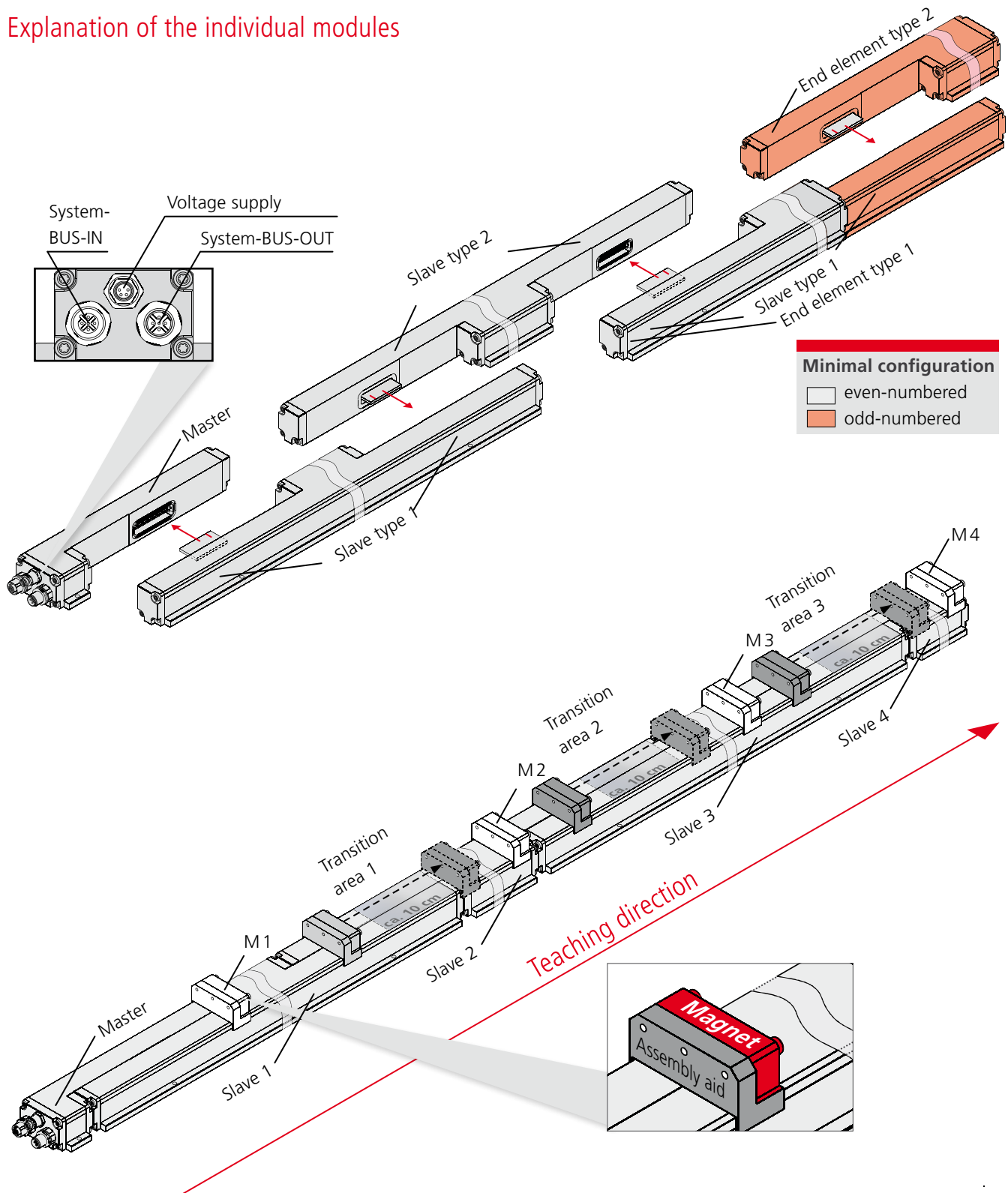
Before the measuring system can be operated, e.g. on PROFIBUS, the mechanically installed individual components, the so-called slaves, must first be detected using the teach-in function.

The slaves are mounted side by side to form transition areas, which form the basis for the detection. Each slave has two transition areas, one at the beginning and one at the end. An exception is formed by the slave after the master and the end elements (only one transition area).

At the time of teaching only one magnet may be located in the same transition area. The teaching procedure is performed starting from the master towards the end. The teaching activity or end of the teaching process can be monitored via the status byte. The exact teaching status is indicated by the device-specific diagnosis.



## Explanation of the individual modules



## Linear Encoder - Magnetostriction - Tube Housing



### The universal standard for absolute position detection.

Linear absolute encoders for touchless measurement (based on magnetostriction) sense linear absolute movements without wear or tear, even in aggressive media. Pressure-proof protection tubes made from stainless steel allow direct integration into hydraulic cylinders. For easy exchange of the sensing element, choose the version "H" with detached protective tube - the tube remains in the cylinder, the system stays pressurized. Depending on the interface, multiple detection is possible. Depending on mechanical design, the

measurement systems are fully integrated into hydraulic cylinders or are accessible from the outside. Linear encoders are available with a large number of interfaces beginning with direct analogue output up to high speed industrial ethernet.

A special device is the triple-redundant LMR70 - three independent measurement systems in one tube guarantee longterm availability for applications with difficult access.

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### Contents

















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# LMRI46

# LMRS34

# LMRB48

Product	LMRI46	LMRS34	LMRB48
			
Mechanic execution	(R) Tube, (H) detachable tube	(R) Tube	(R) Tube
Range	50...4000 mm*, in steps	50...3000 mm, in steps	50...2500 mm*, in steps
Size	46	34	48
Supply voltage	24 VDC, -20...+10 %*	24 VDC, -20...+10 %*	12..24 VDC, +- 10%
Resolution	0,001 mm	0,01 mm	0,05 mm
Linearity defect	typical $\pm 30 \mu\text{m}$ $\pm 50 \mu\text{m}$ < 1000 mm $\pm 0,1\text{mm}$ 1000 mm-1500 mm $\pm 0,15 \text{ mm}$ > 1500 mm	$\leq \pm 0,015 \%$ FS (min $\pm 50 \mu\text{m}$ )	$\pm 0,04 \%$ + 1 LSB
Reproducibility	0,005 mm	$\leq \pm 0,005 \%$ FS (min $\pm 10 \mu\text{m}$ )	
Hysteresis	typical < 10 $\mu\text{m}$ < 20 $\mu\text{m}$ < 1000 mm 0,1mm 1000 mm-1500 mm 0,15 mm > 1500 mm		0,1 mm
Temperature coefficient			
Ambient temperature	-20...+70 °C; 0...+70 °C	-40...+80 °C	-40...+85 °C
Protection class	IP65	IP67	IP65, option IP69K
Options	Multimagnet*, tube tip support		
Orientation	Any desired	Any desired	Any desired
Material	Cr/Ni-Alloy	Cr/Ni-Alloy	Cr/Ni-Alloy
Maximum pressure	600 bar, static	400 bar static, 450 bar peak	450 bar, static
Interface	<b>SSI</b>  <b>Analog</b>    <b>CANopen</b>   	<b>SSI</b>  <b>Analog</b> 	<b>SSI</b>  <b>Analog</b>
Weblink	<a href="http://www.tr-electronic.com/s/S011361">www.tr-electronic.com/s/S011361</a>	<a href="http://www.tr-electronic.com/s/S018151">www.tr-electronic.com/s/S018151</a>	<a href="http://www.tr-electronic.com/s/S007102">www.tr-electronic.com/s/S007102</a>
QR-Code			
















\*depends on interface

Can't find the right variant? Please contact us ([info@tr-electronic.de](mailto:info@tr-electronic.de))

LMRB48/46



LMRB27

LMRB27

Product	LMRB48/46	LMRB27	LMRB27 Analog 12 bit	
				
Mechanic execution	(R) Tube	(R) Tube	(R) Tube	
Range	50...2500 mm, in steps	50...2000 mm, in steps	50...2000 mm, in steps	
Size	48	27	27	
Supply voltage	12..24 VDC, +- 10%	24 VDC, -20...+10 %	24 VDC, -20...+10 %	
Resolution	0,05 mm	0,1 mm	12 bit (> 0,1 mm)	
Linearity defect	± 0,04 % + 1 LSB	± 0,20 mm (ML ≤ 2000 mm)	± 0,20 mm (ML ≤ 2000 mm)	
Reproducibility		0,1mm	0,1mm	
Hysteresis	0,1 mm	0,1mm (ML ≤ 2000 mm)	0,1mm (ML ≤ 2000 mm)	
Temperature coefficient				
Ambient temperature	-40...+85 °C	-20...+70 °C; 0...+70 °C	-20...+70 °C; 0...+70 °C	
Protection class	IP65, option IP69K	IP65	IP65	
Options				
Orientation	Any desired	Any desired	Any desired	
Material	Cr/Ni-Alloy	Cr/Ni-Alloy	Cr/Ni-Alloy	
Maximum pressure	450 bar, static	600 bar, static	600 bar, static	
Interface	<b>Analog</b>	<b>SSI</b>  <b>Analog</b>        	<b>Analog</b>	
Weblink	<a href="http://www.tr-electronic.com/s/S010986">www.tr-electronic.com/s/S010986</a>	<a href="http://www.tr-electronic.com/s/S011927">www.tr-electronic.com/s/S011927</a>	<a href="http://www.tr-electronic.com/s/S011928">www.tr-electronic.com/s/S011928</a>	
QR-Code				

\* depends on interface

# LMR70

	LMR70
	
	(R) Tube
	50...2000 mm
	70 (triple redundant)
	24 VDC, -20...+20 %
	12 bit or 16 bit
	± 0,10 mm ≤ 1500 mm ± 0,15 mm > 1500 mm
	0,04mm
	0,02 mm ≤ 1500 mm 0,1 mm > 1500 mm
	-40...+85 °C
	IP65
	Tube tip support
	Any desired
	Cr/Ni-Alloy
	600 bar, static
	<b>Analog</b>
	<a href="http://www.tr-electronic.com/s/S008380">www.tr-electronic.com/s/S008380</a>
	

## Suggested Products

Ordering code	Name	Remark	Measurement length	Tube length	Resolution
---------------	------	--------	--------------------	-------------	------------

### LMRI46 Analog

339-00009	LMRI_46*250 ANA_U+JUSTAGE	Voltage, 16 bit, cable gland, 2 m, open end	250,00 mm	340,00 mm	16 BIT;
339-00057	LMRI_46*480 ANA_I+JUSTAGE	Current, 16 bit, cable gland, 2 m, open end	480,00 mm	570,00 mm	16 BIT;
339-00062	LMRI_46*200 ANA_I+JUSTAGE	Current, 16 bit, 8pin	200,00 mm	290,00 mm	16 BIT;
339-00217	LMRI_46*200 ANA_I+JUSTAGE	Current, 16 bit, 8pin	200,00 mm	290,00 mm	16 BIT;
339-00435	LMRI_46*677 ANA_I+JUSTAGE	Current, 16 bit, multipin connector	677,00 mm	767,00 mm	16 BIT;
339-00436	LMRI_46*323 ANA_I+JUSTAGE	Current, 16 bit, multipin connector	323,00 mm	413,00 mm	16 BIT;

### LMRI46 EtherCAT

339-00041	LMRI_46*200 ETC	R 0,005 MM 2x4pinM12 1x4pinM8, 2 magnets	200,00 mm	290,00 mm	0,005 mm
339-00432	LMRI_46*1950 ETC	R 0,005 MM 2x4pinM12 1x4pinM8, 2 magnets	1920,00 mm	2040,00 mm	0,005 mm

### LMRI46 PROFIBUS

339-00030	LMRI_46*1050 PB	R 0,001 MM 2x4pinM12 1x4pinM8	1050,00 mm	1140,00 mm	0,001 mm
339-00061	LMRI_46*200 PB	R 0,001 MM 2x4pinM12 1x4pinM8	200,00 mm	290,00 mm	0,001 mm
339-00063	LMRI_46*600 PB	R 0,001 MM 2x4pinM12 1x4pinM8	600,00 mm	690,00 mm	0,001 mm

### LMRI46 PROFINET

339-00008	LMRI_46H*550 EPN	R 0,005 MM 2x4pinM12 1x4pinM8	550,00 mm	640,00 mm	0,005 mm
339-00034	LMRI_46*200 EPN	R 0,005 MM 2x4pinM12 1x4pinM8	200,00 mm	290,00 mm	0,005 mm
339-00064	LMRI_46*300 EPN	R 0,005 MM 2x4pinM12 1x4pinM8	300,00 mm	390,00 mm	0,005 mm
339-00437	LMRI_46*600 EPN	R 0,005 MM 2x4pinM12 1x4pinM8	600,00 mm	690,00 mm	0,005 mm

### LMRI46 SSI

339-00002	LMRI_46H*605 SSI	R 0,001 mm, cable gland, 5 m, open end	605,00 mm	695,00 mm	0,001 mm
339-00013	LMRI_46*204 SSI	R 0,005 mm, M23, 12 pin	204,00 mm	294,00 mm	0,005 mm
339-00026	LMRI_46*1055 SSI	R 0,001 mm, cable gland, 3m, open End	1055,00 mm	1150,00 mm	0,001 mm
339-00055	LMRI_46*755 SSI	R 0,002 mm, cable gland, 7 m, open end	755,00 mm	845,00 mm	0,002 mm
339-00068	LMRI_46*495 SSI	R 0,001 mm, cable gland, 5m, open End	495,00 mm	585,00 mm	0,001 mm

For further product information simply enter the order number in the search field at [www.tr-electronic.com](http://www.tr-electronic.com).

We will help you to select the most suitable products from the complete TR range. Please contact us ([info@tr-electronic.de](mailto:info@tr-electronic.de)).

## Suggested Products

Ordering code	Name	Remark	Measurement length	Tube length	Resolution
<b>LMR70 Analogue</b>					
335-00001	LMR_70*180 ANA_I+JUSTAGE		180,00 mm	264,00 mm	16 BIT;
<b>LMRB27 Profibus</b>					
341-00003	LMRB_27*300 PB	Cable sensor - connection terminal 2 m	300,00 mm	393,00 mm	0,1 mm

For further product information simply enter the order number in the search field at [www.tr-electronic.com](http://www.tr-electronic.com).

### Further product information

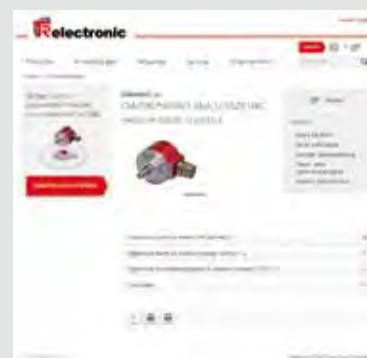
1. Enter order code into ...



2. Searchfield (top right) on [www.tr-electronic.com](http://www.tr-electronic.com)



3. Choose desired information

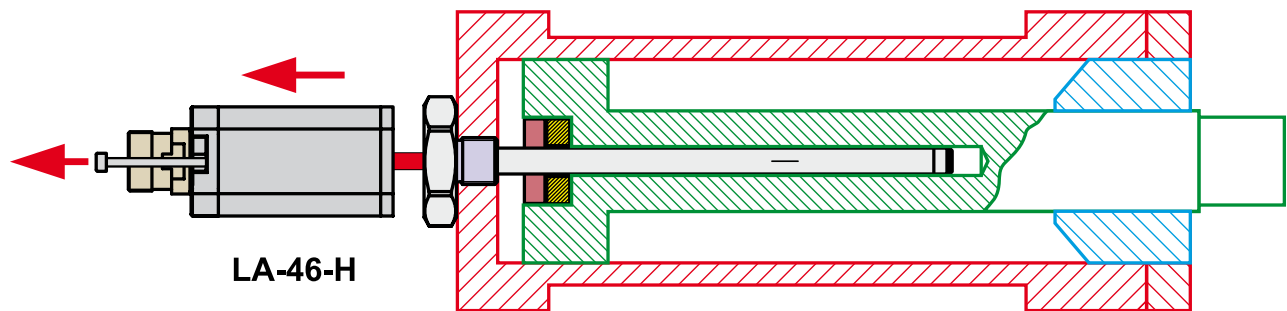


We will help you to select the most suitable products from the complete TR range. Please contact us ([info@tr-electronic.de](mailto:info@tr-electronic.de)).

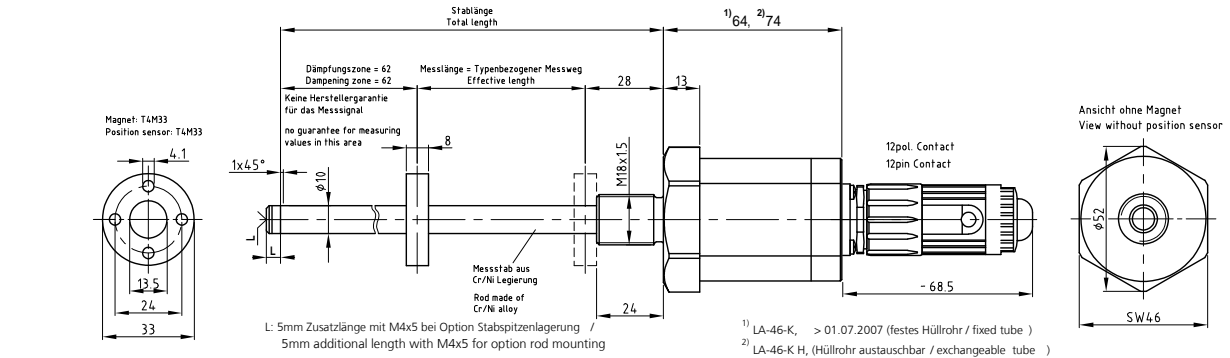
## Dimensional Drawings

### Detachable tube (H) (option for LA46 / LMRI46)

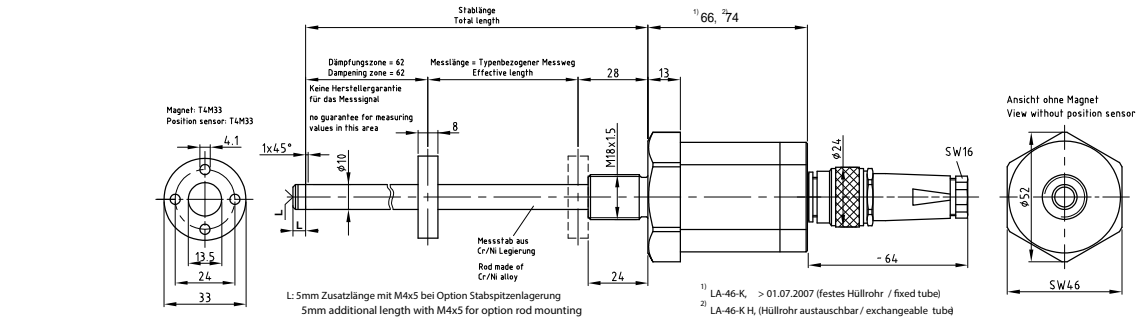
Tube resides in cylinder, oil stays pressurized. Change in length, see following drawings



### LA, LMRI 46 SSI



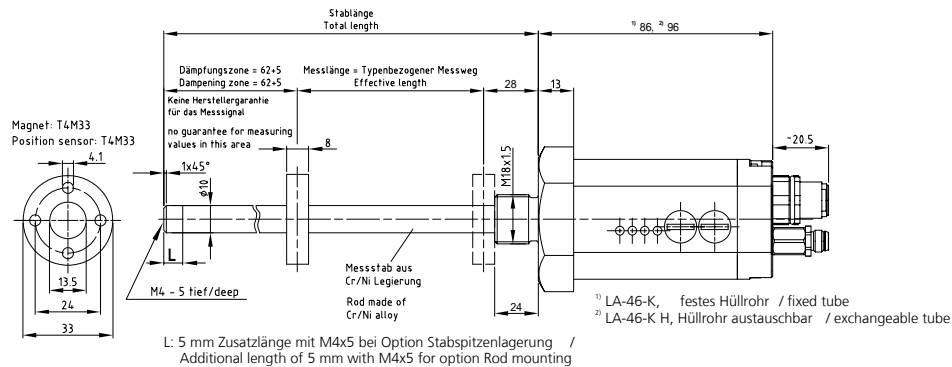
### LA, LMRI 46 Analog



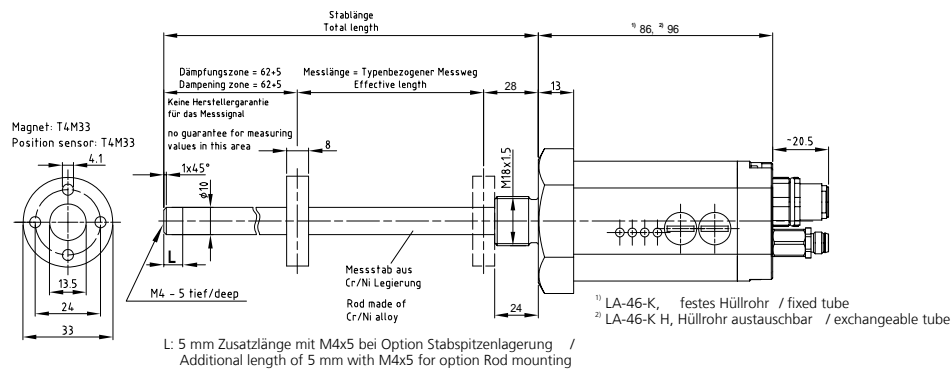


## Dimensional Drawings

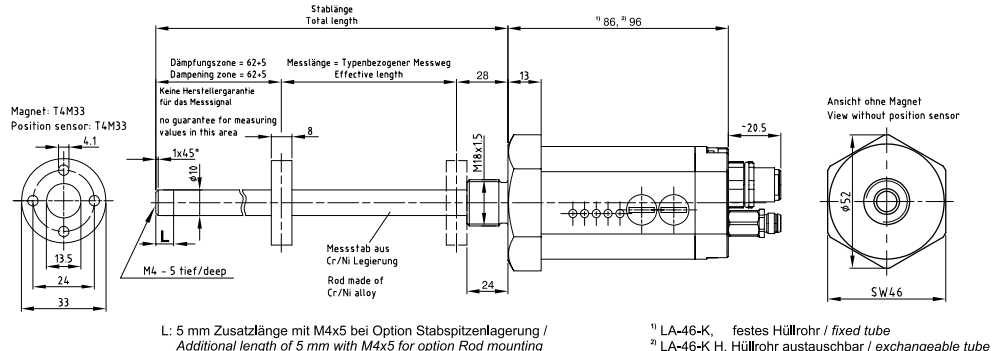
### LA, LMRI 46 POWERLINK EPL



### LA, LMRI 46 EtherNet/IP EIP



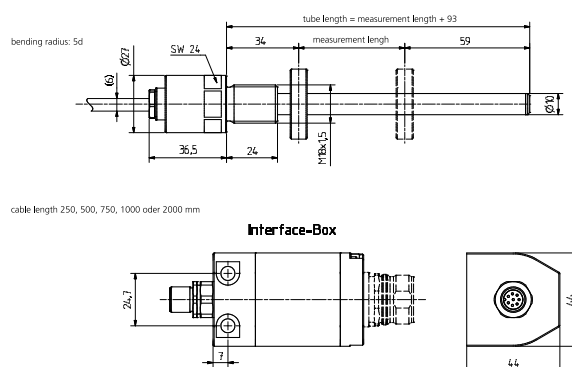
### LA, LMRI 46 Sercos ES3



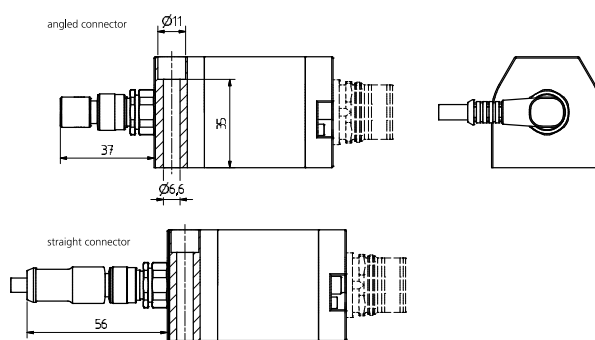


# Dimensional Drawings

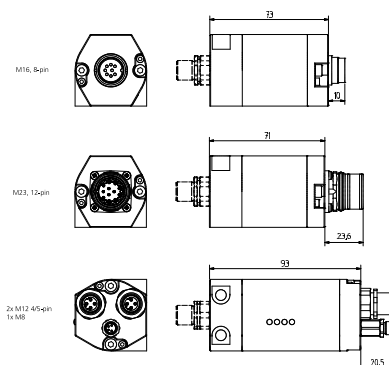
## LMRB27 Sensorhead



## LMRB27 Interface Box

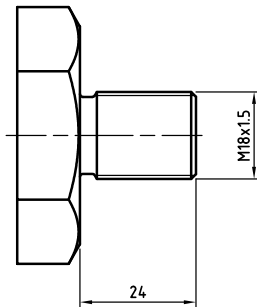


## LMRB27 Connections

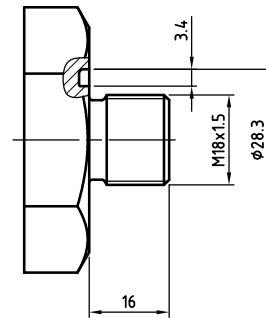


## Dimensional Drawings

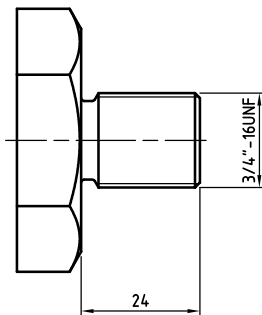
**LA, LMRI 46 Flange type M18 x 1,5**  
O-Ring gasket in thread undercut



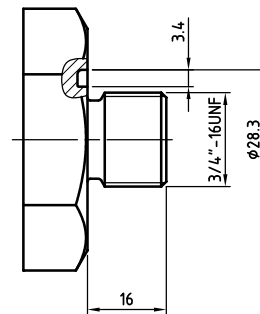
**LA, LMRI 46 flange type M18 x 1,5 with groove (LA46/42)**  
O-Ring gasket in addl. groove



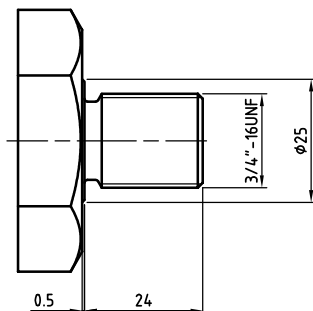
**LA, LMRI 46 flange type 3/4" - 16UNF**  
O-Ring gasket in thread undercut



**LA, LMRI 46 flange 3/4" - 16UNF with groove (LA46/42)**  
O-Ring gasket in addl. groove

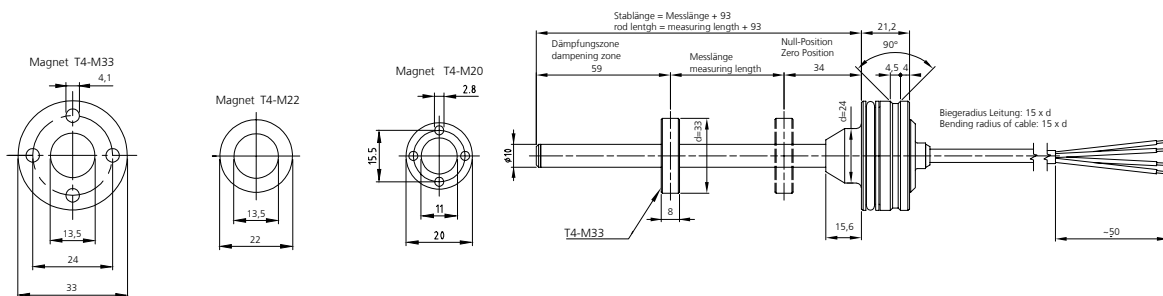


**LA, LMRI 46 flange type 3/4" - 16UNF with chamfer**  
Chamfer on flange

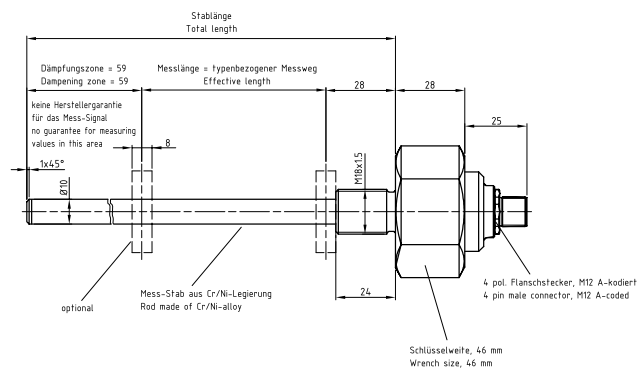


# Dimensional Drawings

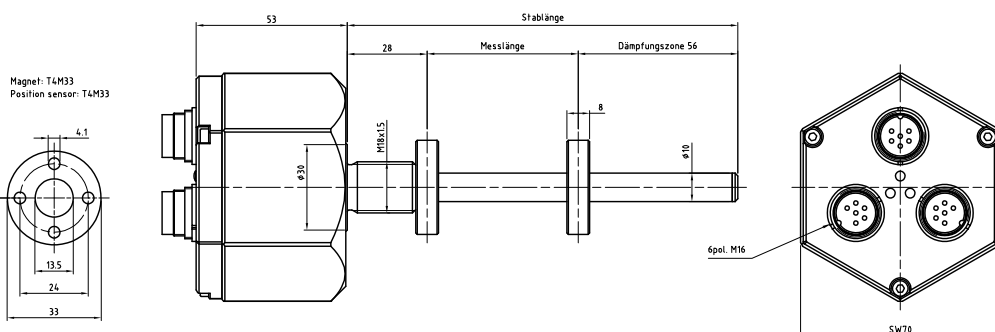
## LMR 48 SSI, Analog, CAN SSI, ANA, CAN



## LMR 48/46 Analog ANA



## LMR 70 Analog, triple-redundant For applications with difficult access



## Linear Encoder - Magnetostriction - Profile Housing



The universal standard for absolute position detection.

Linear absolute encoders for touchless measurement (based on magnetostriction) sense linear absolute movements without wear or tear. Depending on the interface, multiple detection is possible. Families LP46 and LMP48 are suitable for magnet sliders and can guide the magnet. Family LMP30 is flat; magnets are to be guided by customer-side mechanics. Linear encoders are available with a large number of interfaces beginning with direct analogue output up to high speed industrial ethernet.

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Products.....	337
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# LMPI46

# LMP30

# LMPB48

Product			
Mechanic type	(P) Profile	(P) Profile	(P) Profile
Range	50...4000 mm*, in steps	50...4000 mm*, in steps	30...3000 mm*, in steps
Size	46	30	48
Supply voltage	24 VDC, -20...+10 % *	24 VDC, -20...+10 % *	24 VDC +- 20%; 9...36 VDC *
Resolution	0,001 mm	0,01mm *	0,05 mm
Linearity defect	typical $\pm 15 \mu\text{m}$ $\pm 30 \mu\text{m} < 1000 \text{ mm}$ $\pm 0,1 \text{ mm } 1000 \text{ mm}-1500 \text{ mm}$ $\pm 0,15 \text{ mm} > 1500 \text{ mm}$	$\pm 0,15 \text{ mm} \leq 1500 \text{ mm}$ $\pm 0,20 \text{ mm} > 1500 \text{ mm}$	$< 0,01 \% \text{ FS}, \geq 60 \mu\text{m}$ $\pm 0,1 \% \text{ FS} *$
Reproducibility	0,005 mm	0,005 mm *	$< 0,005 \% \text{ FS} \geq 50 \mu\text{m}$ $\pm 0,1 \% \text{ FS} *$
Hysteresis	typical $< 6 \mu\text{m}$ $< 15 \mu\text{m} < 1000 \text{ mm}$ $0,1 \text{ mm } 1000 \text{ mm}-1500 \text{ mm}$ $0,15 \text{ mm} > 1500 \text{ mm}$	$0,02 \text{ mm} \leq 1500 \text{ mm}$ $0,1 \text{ mm} > 1500 \text{ mm}$	$\pm 0,1 \% \text{ FS} *$
Temperature coefficient	$< 8 \mu\text{m}/^\circ\text{C} \leq 500 \text{ mm}$ $< 15 \text{ ppm}/^\circ\text{C} > 500 \text{ mm} *$	$< 8 \mu\text{m}/^\circ\text{C} \leq 500 \text{ mm}$ $< 15 \text{ ppm}/^\circ\text{C} > 500 \text{ mm} *$	100 ppm/°C
Ambient temperature	-20...+70 °C; 0...+70 °C	-20...+70 °C; 0...+70 °C	-40...+75 °C; -20...+75°C
Protection class	IP65	IP65	IP67
Options	Multimagnet*, ATEX-zone 2/22,	Multimagnet*	
Orientation	Any desired	Any desired	Any desired
Material	Aluminum extruded profile	Aluminum extruded profile	Aluminum extruded profile
Interface	<b>SSI</b>  <b>Analog</b>    <b>CANopen</b>  <b>POWERLINK</b>  	<b>SSI</b>  <b>Analog</b>  <b>ISI</b>    <b>POWERLINK</b> <b>CANopen</b>	<b>SSI</b> <b>CANopen</b> <b>Analog</b>
Weblink	<a href="http://www.tr-electronic.com/s/5011362">www.tr-electronic.com/s/5011362</a>	<a href="http://www.tr-electronic.com/s/5008395">www.tr-electronic.com/s/5008395</a>	<a href="http://www.tr-electronic.com/s/5008396">www.tr-electronic.com/s/5008396</a>
QR-Code			

\*depends on interface

Can't find the right variant? Please contact us ([info@tr-electronic.de](mailto:info@tr-electronic.de))

## Suggested Products

Ordering code	Name	Remark	Measurement length	Tube length	Resolution
---------------	------	--------	--------------------	-------------	------------

### Linear encoder profile housing SSI LMP30 SSI

322-00112	LMP_30*150 SSI	0,5 m cable, M23 12 pin, including mating plug	150,00 mm	290,00 mm	0,05 mm
322-00166	LMP_30*300 SSI	0,5 m cable, M23 12 pin, including mating plug	300,00 mm	440,00 mm	0,01 mm
322-00250	LMP_30*500 SSI	0,5 m cable, M23 12 pin, including mating plug	500,00 mm	640,00 mm	0,01 mm
322-00148	LMP_30*1000 SSI	0,5 m cable, M23 12 pin, including mating plug	1.000,00 mm	1.140,00 mm	0,01 mm

### Linear encoder profile housing Analogue LMP30 A

322-00392	LMP_30*300 ANA_I	3,0 m cable, open end	300,00 mm	440,00 mm	12 BIT
322-00209	LMP_30*1000 ANA_I	3,0 m cable, open end	1.000,00 mm	1.140,00 mm	12 BIT

### Linear encoder profile housing Profibus LMP30 PB

322-00098	LMP_30*150 PB	2x M12, 1 x M8	150,00 mm	271,00 mm	0,005 mm
322-00290	LMP_30*300 PB	2x M12, 1 x M8	300,00 mm	421,00 mm	0,005 mm
322-00056	LMP_30*500 PB	2x M12, 1 x M8	500,00 mm	621,00 mm	0,005 mm
322-00055	LMP_30*750 PB	2x M12, 1 x M8	750,00 mm	871,00 mm	0,005 mm
322-00072	LMP_30*1000 PB	2x M12, 1 x M8	1.000,00 mm	1.121,00 mm	0,005 mm

### Linear encoder profile housing Profinet LMP30 PN

322-00452	LMP_30*150 EPN	2x M12, 1 x M8	150,00 mm	271,00 mm	0,005 mm
322-00412	LMP_30*1000 EPN	2x M12, 1 x M8	1.000,00 mm	1.121,00 mm	0,005 mm

### Linear encoder profile housing Powerlink LMP30 ETC

322-00413	LMP_30*300 ETC	2x M12, 1 x M8	300,00 mm	421,00 mm	0,005 mm
322-00454	LMP_30*500 ETC	2x M12, 1 x M8	500,00 mm	621,00 mm	0,005 mm

### Linear encoder profile housing EtherCAT LMP30 ETC

322-00462	LMP_30*150 ETC	2x M12, 1 x M8	150,00 mm	271,00 mm	0,005 mm
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### Linear Encoder Profilgehäuse Powerlink LMP30 EPN

322-00471	LMP_30*750 EPN	2x M12, 1 x M8	750,00 mm	871,00 mm	0,005 mm
322-00519	LMP_30*500 EPN	2x M12, 1 x M8	500,00 mm	621,00 mm	0,005 mm

For further product information simply enter the order number in the search field at [www.tr-electronic.com](http://www.tr-electronic.com).

\* depends on interface

## Suggested Products

Ordering code	Name	Remark	Measurement length	Tube length	Resolution
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### Linear encoder profile housing Powerlink LMP30 ETC

322-00549	LMP_30*1000 ETC	2x M12, 1 x M8	1.000,00 mm	1.121,00 mm	0,005 mm
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### Linear Encoder Profilgehäuse Powerlink LMP30 EPN

322-00560	LMP_30*300 EPN	2x M12, 1 x M8	300,00 mm	421,00 mm	0,005 mm
322-00667	LMP_30*1150 EPN	2x M12, 1 x M8	1150,00 mm	1.271,00 mm	0,005 mm

### Linear encoder profile housing Powerlink LMP30 EPL

322-00318	LMP_30*150 EPL_2	2x M12, 1 x M8	150,00 mm	271,00 mm	0,005 mm
322-00174	LMP_30*300 EPL_2	2x M12, 1 x M8	300,00 mm	421,00 mm	0,005 mm
322-00321	LMP_30*500 EPL_2	2x M12, 1 x M8	500,00 mm	621,00 mm	0,005 mm
322-00178	LMP_30*750 EPL_2	2x M12, 1 x M8	750,00 mm	871,00 mm	0,005 mm
322-00180	LMP_30*1000 EPL_2	2x M12, 1 x M8	1.000,00 mm	1.121,00 mm	0,005 mm

### Linear encoder profile housing SSI LMPB48 SSI

333-00003	LMP_48*750 SSI	1x M12, 12 pin	750,00 mm	839,00 mm	0,01 mm
333-00102	LMP_48*910 SSI	1xM12, 8pin	910,00 mm	999,00 mm	0,01 mm
333-00023	LMP_48*1000 SSI	1xM12, 8pin	1.000,00 mm	1.089,00 mm	0,01 mm
333-00101	LMP_48*1900 SSI	1xM12, 8pin	1.900,00 mm	1.989,00 mm	0,01 mm

### Linear encoder profile housing Analogue LMPB48 A

333-00140	LMP_48*30 ANALOG	1x M12, 4 pin	30,00 mm	119,00 mm	0,01 mm
333-00007	LMP_48*150 ANALOG	1x M12, 4 pin	150,00 mm	239,00 mm	12 BIT
333-00008	LMP_48*200 ANALOG	1x M12, 4 pin	200,00 mm	289,00 mm	12 BIT
333-00006	LMP_48*350 ANALOG	1x M12, 4 pin	350,00 mm	439,00 mm	12 BIT
333-00005	LMP_48*500 ANALOG	1x M12, 4 pin	500,00 mm	589,00 mm	12 BIT

For further product information simply enter the order number in the search field at [www.tr-electronic.com](http://www.tr-electronic.com).

# Suggested Products

Ordering code	Name	Remark	Measurement length	Tube length	Resolution
Linear encoder profile housing CAN LMPB48 CAN					
333-00001	LMP_48*750 CAN OPEN	1x M12, 5 pin	750,00 mm	839,00 mm	0,05 mm
Linear encoder profile housing Analogue LMPB48 A					
333-00009	LMP_48*1250 ANALOG	1x M12, 4 pin	1.250,00 mm	1.339,00 mm	12 BIT
Linear encoder profile housing CAN LMPB48 CAN					
333-00017	LMP_48*300 CAN OPEN	1x M12, 5 pin	300,00 mm	389,00 mm	0,05 mm
333-00099	LMP_48*800 CAN OPEN	1x M12, 5 pin	800,00 mm	889,00 mm	0,05 mm

For further product information simply enter the order number in the search field at [www.tr-electronic.com](http://www.tr-electronic.com).

## Further product information

1. Enter order code into ...
2. Searchfield (top right) on [www.tr-electronic.com](http://www.tr-electronic.com)
3. Choose desired information



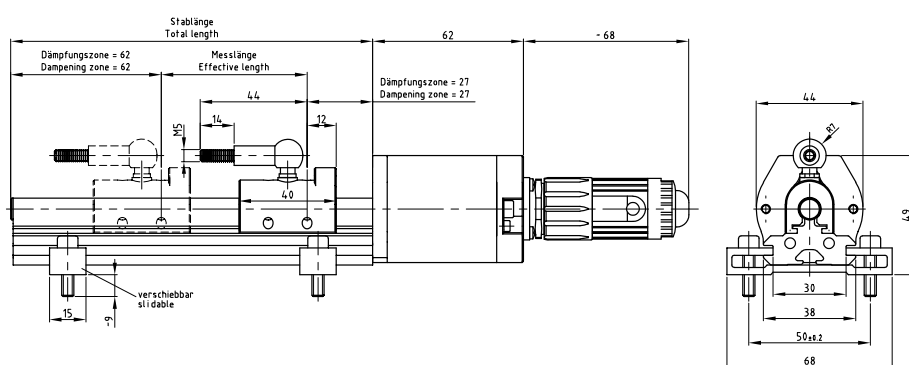
\* depends on interface

We will help you to select the most suitable products from the complete TR range. Please contact us ([info@tr-electronic.de](mailto:info@tr-electronic.de)).

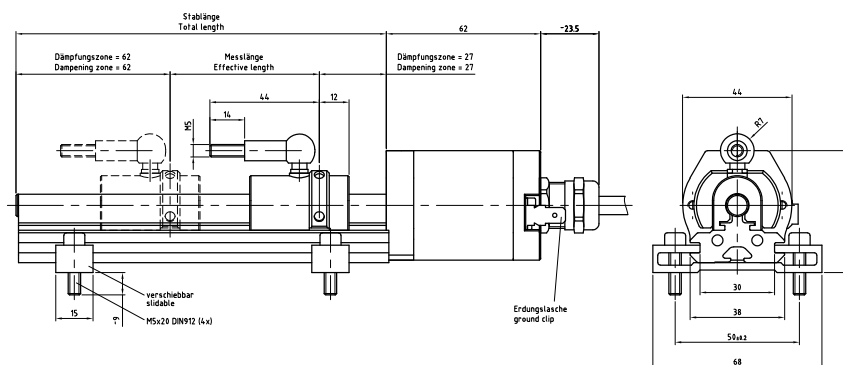


# Dimensional Drawings

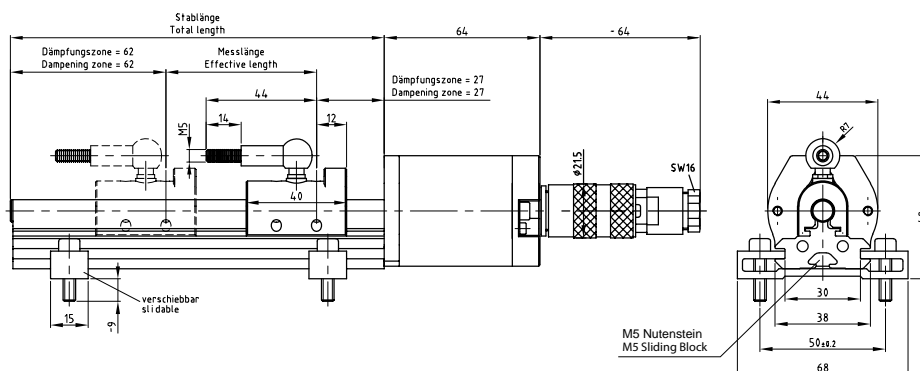
## LMPI 46 SSI



## LP46 SSI ATEX

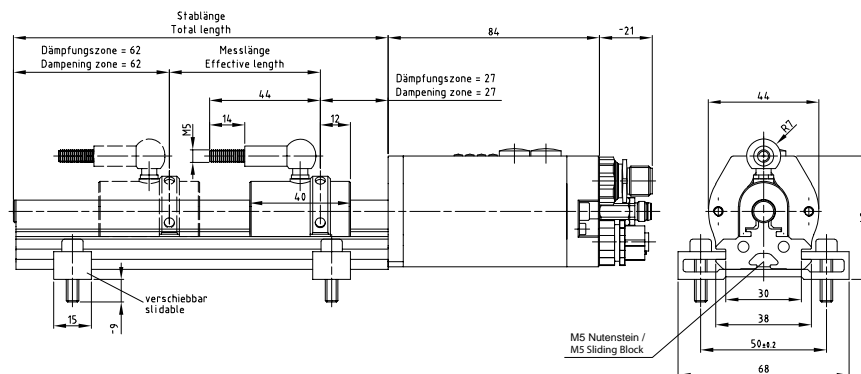


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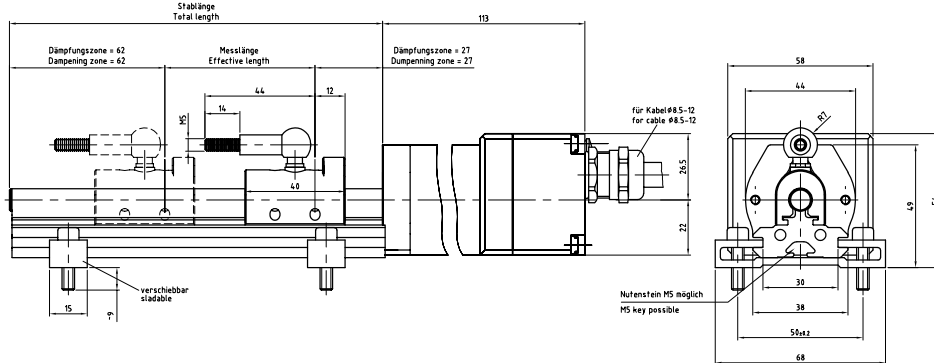


## Dimensional Drawings

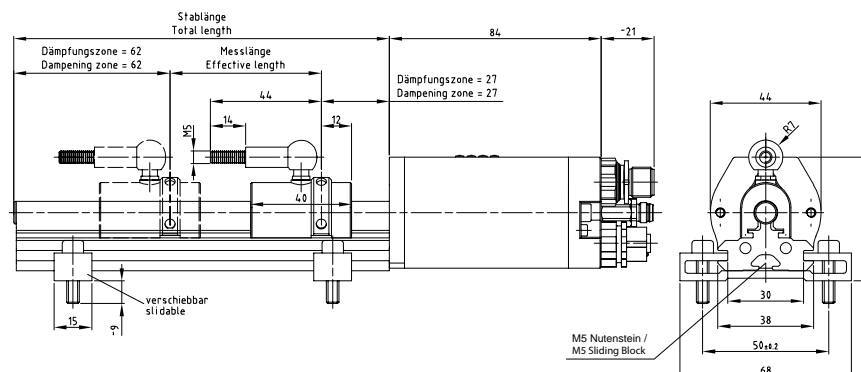
### LMPI 46 Profibus, CANopen PB, CO



### LMPI 46 CAN DeviceNet DN



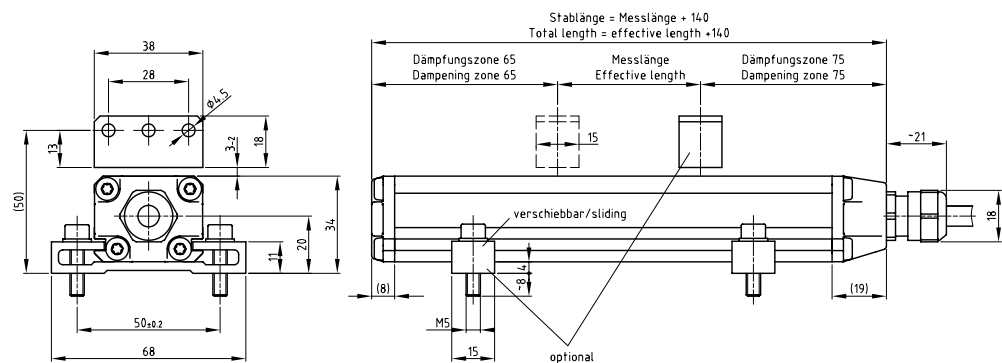
### LMPI 46 EtherCAT, PROFINET IO ETC, EPN



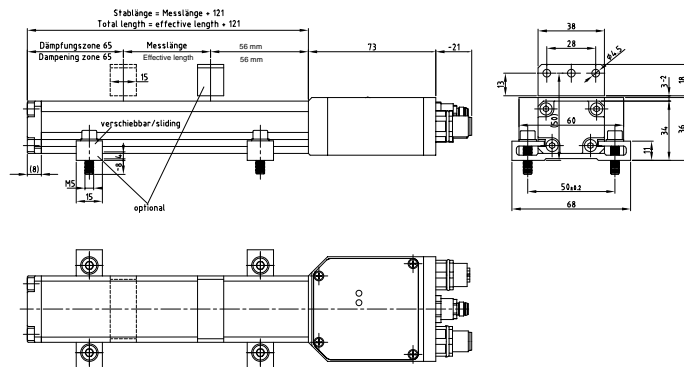


# Dimensional Drawings

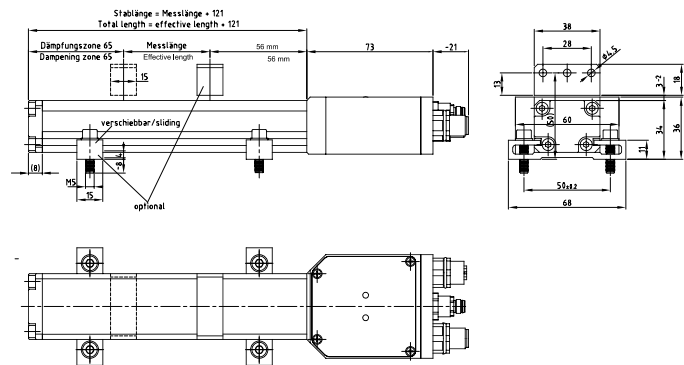
## LMP30 Incremental Serial ISI



## LMP30 Profibus PB

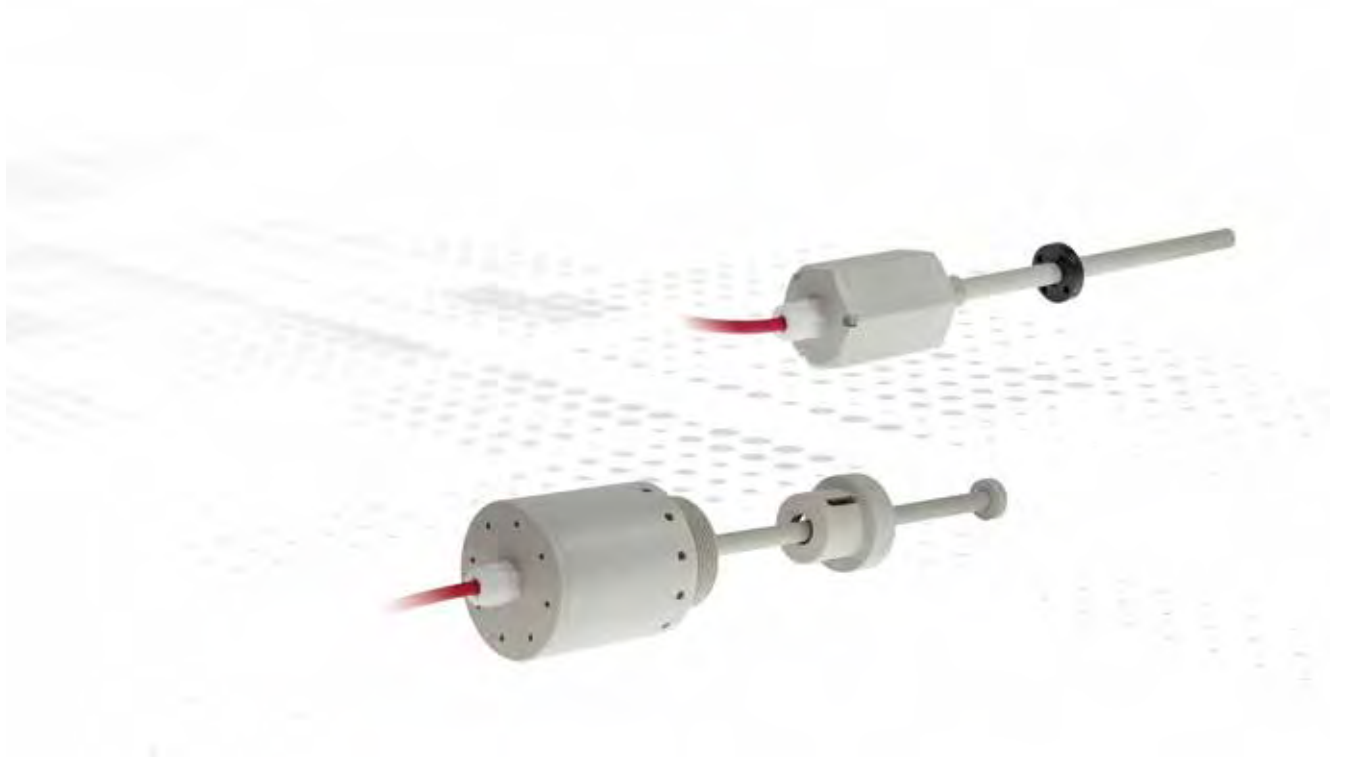


## LMP30 CANopen CO





## Linear Encoder with Plastic Housing



### For aggressive surroundings

Linear absolute encoders for touchless measurement (based on magnetostriction) sense linear absolute movements without wear or tear. For especially aggressive surroundings, TR provides the series LA 50 and 80 in plastic housing. The full measurement system is housed in Polypropylene (PP) or, on request, in Polytetrafluorethylene (PTFE). These materials withstand most liquids in industrial applications. Series LA 50 is optimized for liquid level measurement. It is mounted with a tube thread acc. DIN 259 (Size R2) inserted into process

vessels. The float cannot be lost due to a mechanical block at the end of the tube. The Series LA 50 can be used similarly to the standard range LA 46. With different magnets available, it can be used for precise position measurement in aggressive surroundings.





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# LA50

# LA80

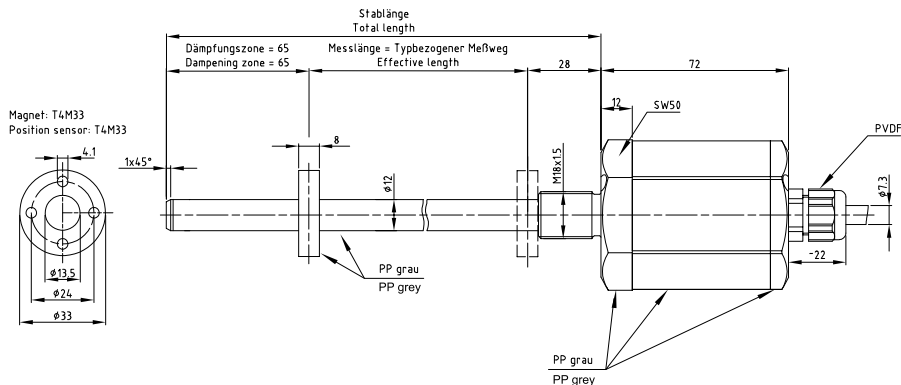
Product	LA50	LA80
		
Mechanic type	(R) Tube (plastic)	(R) Tube (plastic)
Range	100 ... 1000 mm (in steps)	100 ... 1000 mm (in steps)
Size	50	80
Supply voltage	24 VDC, -20...+10 %	24 VDC, -20...+10 %
Resolution	0,001 mm	0,01 mm
Linearity deviation	± 0,10 mm	< 0,05 %
Reproducibility	0,005 mm	0,01 mm
Hysteresis	0,02 mm	0,1 mm
Temperature coefficient	< 8 µm/°C *	< 8 µm/°C *
Ambient temperature	-20...+70 °C; 0...+70 °C	-20...+70 °C; 0...+70 °C
Protection class	IP68	IP67
Options		
Orientation	Any desired	Any desired (when used as level sensor: vertical)
Material	PP (option PTFE)	PP (option PTFE)
Interface	<b>SSI</b> <b>Analog</b>	<b>SSI</b> <b>Analog</b>
Weblink	<a href="http://www.tr-electronic.com/s/S008501">www.tr-electronic.com/s/S008501</a>	<a href="http://www.tr-electronic.com/s/S008502">www.tr-electronic.com/s/S008502</a>
QR-Code		

\*depends on Measurement Length and Interface

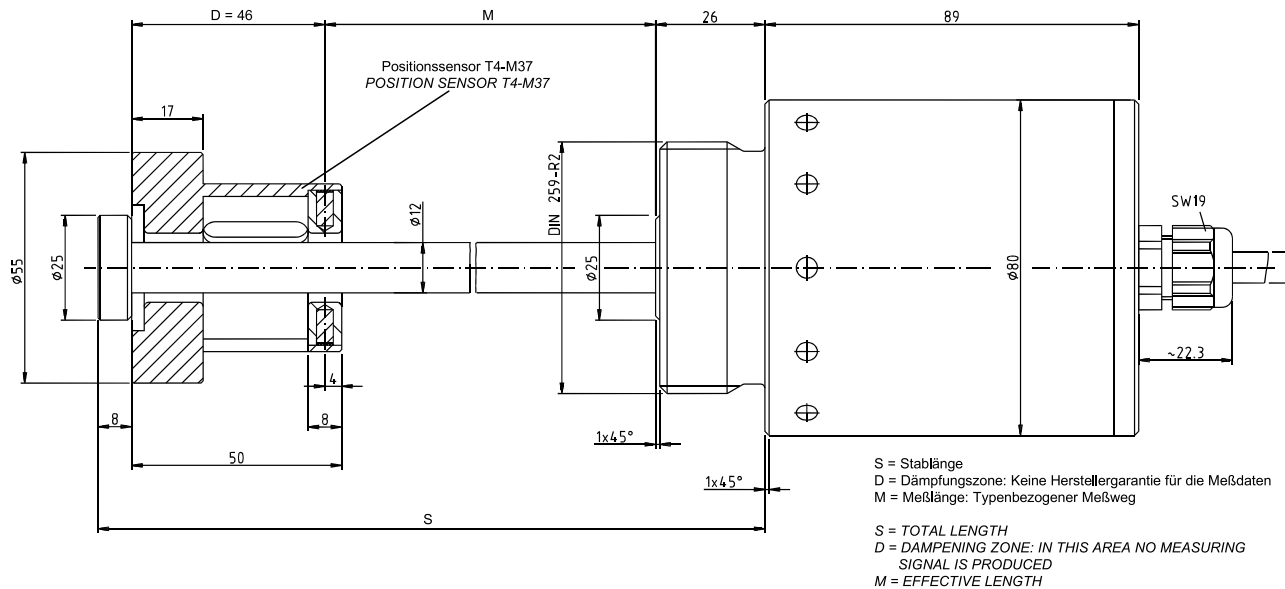
Can't find the right variant? Please contact us ([info@tr-electronic.de](mailto:info@tr-electronic.de))

Dimensional Drawings

LA50 SSI, Analog  
SSI, ANA



LA80 SSI, Analog  
SSI, ANA



S = Stablänge  
D = Dämpfungszone: Keine Herstellergarantie für die Meßdaten  
M = Messlänge: Typenbezogener Meßweg

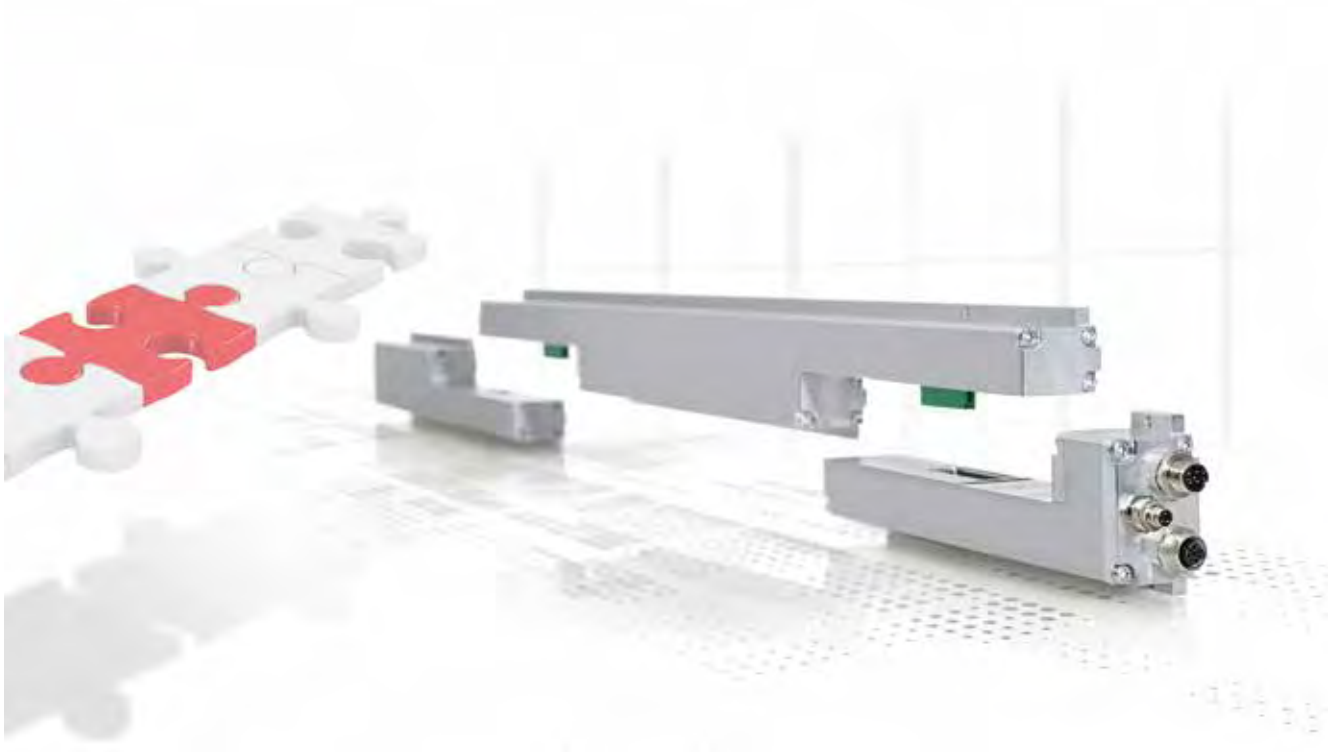
S = TOTAL LENGTH  
D = DAMPENING ZONE: IN THIS AREA NO MEASURING  
SIGNAL IS PRODUCED  
M = EFFECTIVE LENGTH

Meßlänge M (mm) EFFECTIVE LENGTH M (mm)	Stablänge S (mm) TOTAL LENGTH S (MM)	Zykluszeit (ms) CYCLE (ms)	Meßlänge M (mm) EFFECTIVE LENGTH M (mm)	Stablänge S (mm) TOTAL LENGTH S (MM)	Zykluszeit (ms) CYCLE (ms)
100	180	1,5	600	680	1,5
150	230	1,5	650	730	1,5
200	280	1,5	700	780	1,5
250	330	1,5	750	830	1,5
300	380	1,5	800	880	1,5
350	430	1,5	850	930	1,5
400	480	1,5	900	980	1,5
450	530	1,5	950	1030	1,5
500	580	1,5	1000	1080	1,5
550	630	1,5	-	-	-





## Cascadable Linear Encoders



### Measure reliably over long distances

Wire-actuated encoders are subject to wear; 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, magnetostrictive measuring systems are limited in their measuring, and glass scales are unaffordable from certain measurement lengths. For those applications, TR-Electronic provides the patented cascadeable linear measurement system LMC55:

The final measuring length is defined in situ by connecting the intermediate elements together to the desired overall length. Up to 20 m absolute position detection is supplied as standard (special lengths on request).








- \_ Wear-free measurement up to 20 m
- \_ Compact, convenient pieces made from strand-cast aluminium
- \_ Closed housing, flat surface
- \_ Flush (no beads or edges)
- \_ Easy installation possible without special tools
- \_ Magnets do not require any supply leads

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## Cascadable, 20 m length

Product	LMC55 
Supply voltage	24 VDC, -20 ... +10 %
Current consumption, no load	24 ... 30 VDC
_ Master system	< 60 mA
_ Single component	< 90 mA
Measuring principle	magnetostrictive
Measuring length, standard	5 ... 20 m
Resolution	0,05 mm
Linearity deviation	< 0,02 %, $\pm 0,20$ mm / modul
Reproducibility	0,05 mm
Hysteresis	0,1 mm
Material - Measuring body	Aluminium extruded profile
Cycle time, internal	$\leq 2$ ms
Optional magnets	30
Magnet - Minimum distance	100 mm
Working temperature	0 ... +70 °C
Working temperature optional	-20 ... +70 °C
Storage temperature, dry	-30 ... +85 °C
Protection class	IP65
Stray magnetic field	< 3 mT
Measuring reference	Measuring plane
Interface (others on request)	    
Weblink	<a href="http://www.tr-electronic.com/s/5008458">www.tr-electronic.com/s/5008458</a>
QR-Code	

# Suggested Products

Ordering code	Article description	Range
<b>LMC55 Master</b>		
326M-00001	PROFIBUS	
326M-00002	CANopen	
326M-00003	EtherCAT	
326M-00004	Ethernet / IP	

For further product information simply enter the order number in the search field at [www.tr-electronic.com](http://www.tr-electronic.com).

## Further product information

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2. Searchfield (top right) on [www.tr-electronic.com](http://www.tr-electronic.com)
3. Choose desired information

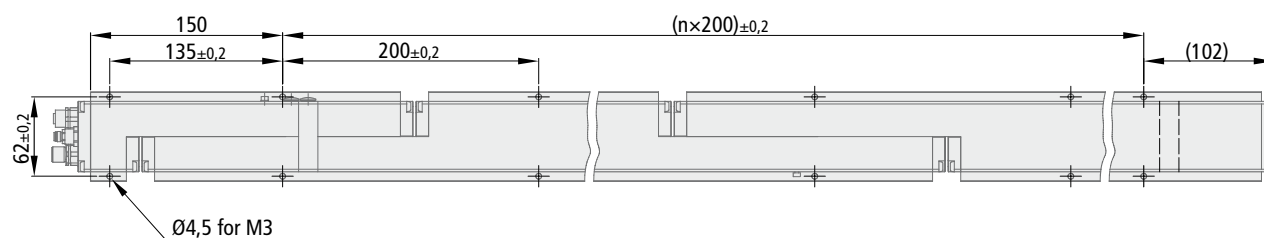


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# Dimensional Drawings

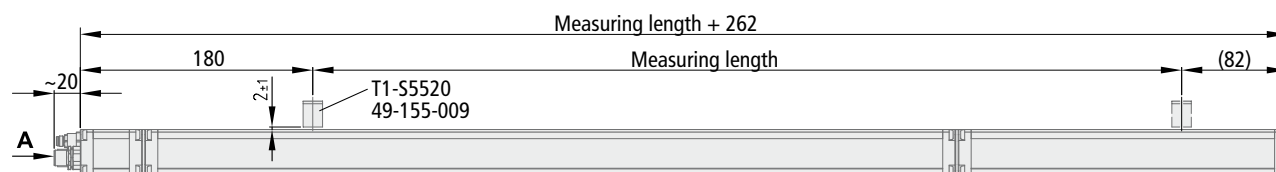
## LMC55 top view

\_CANopen  
\_PROFIBUS  
\_EherCAT



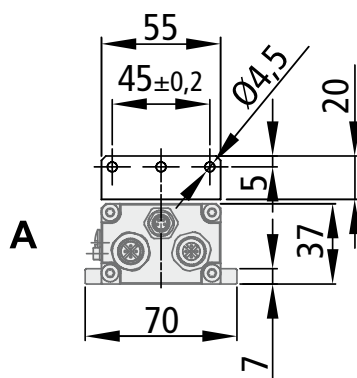
## LMC55

Example with magnet



## LMC55 Connectors

\_CANopen  
\_PROFIBUS  
\_EherCAT



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## Glass Scale/Transformation



### High-resolution absolute position sensors with glass scale

The TR measurement systems of the LT product family work on the principle of photoelectric scanning of an absolute coded glass scale. A sensor array scans several tracks that contain high resolution measurement information on the 3D coordinates and angular position between the glass scale and the scanning unit.

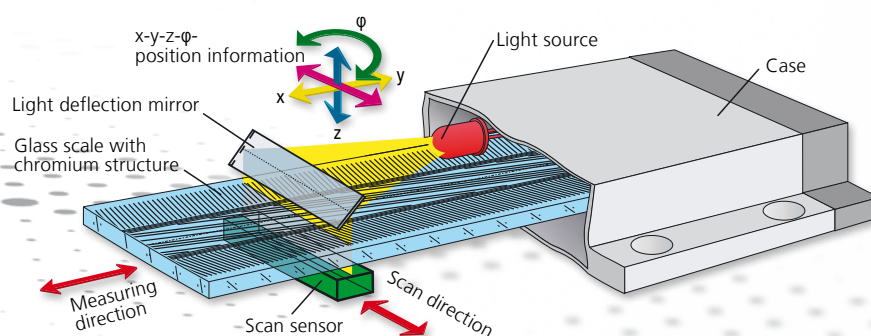
Evaluating the measurement signals, the coded measurement position is determined by the sensor signal and thanks to the additional measurement information, guidance and adjustment errors are completely corrected.

With a smallest measurement step of 0.1  $\mu\text{m}$  our transformation measurement systems are especially suitable for applica-

tions with high demands on resolution and accuracy.

Due to their robust construction, they find their application even in machines with strong vibrations. With absolute detection, no more referencing is necessary – even when using only the incremental interface, controls can benefit from the virtual referencing.

On request, the measurement system sends a number of incremental signals that represent the absolute position value read by the sensor. The counter in the control is loaded with the absolute position information without any mechanical movement of the axis. As detection is absolute, the only limitation in travel speed is given by mechanics with approx.



10 m/s. The measurement system always provides valid measurement values.

Our measurement systems of the LT series are available in following versions:

- Features measuring slide, also features several sensing heads within the same system, e.g. for the positioning of several cutting blades in paper cutters.
- Features mechanically non-interacting measuring axis, suitable for application in running production.
- With special protective housing for heavy-duty applications, e.g. directly on rolling production lines.

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# Linear Encoders - Transformation (Glass Scale)



## The rugged, absolute glass scale for precise measurement directly on your manufacturing line

High-resolution glass scales made by TR-Electronic work even in the harsh conditions of a manufacturing facility. Due to the internal absolute detection, a current absolute reading value is available shortly after power up and without any mechanical referencing. With the feature “virtual referencing”, even systems that use only the incremental track can take full advantage of absolute measurement. Different executions fit different applications.

**LT-S** - Measurement system with sliders, that can hold multiple sliders on one glass track. This system is mechanically compatible with incremental scales of other manufacturers.

With optional inlets for sealing air, this measurement system can be used in dusty surroundings.

**LT-PI** - The rugged version for normal production applications. Either as a probe sensing system or with a spring-loaded probe. This is the system for accurate measurement in your machine.

**LT-RV** - In extreme conditions, the protective housing of LT-RV keeps the electronics safe even with strong vibration and shock.

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# Slider

## Touch probe

### Heavy-duty touch probe

Product	LT-S	LT-PI	LT-RV
			
Mechanic execution	Slider	Encapsulated touch rod probe measurement system	Heavy-duty touch rod probe measurement system
Range	140 ... 3040 mm (steps of 100 mm)	100, 200 mm	400, 520 mm (up to 800 mm on request)
Reproducibility	< 0,2µm	< 0,2µm	< 0,2µm
Supply	24 VDC (8...30)	24 VDC (8...30)	24 VDC (8...30)
Resolution	0,1µm, 0,2µm, 0,5µm, 1µm, 2µm, 5µm, 10µm	0,1µm, 0,2µm, 0,5µm, 1µm, 2µm, 5µm, 10µm	0,1µm, 0,2µm, 0,5µm, 1µm, 2µm, 5µm, 10µm
Division incremental signal	0,4µm, 1µm, 2µm, 4µm, 10µm, 20µm, 40 µm	0,4µm, 1µm, 2µm, 4µm, 10µm, 20µm, 40 µm	0,4µm, 1µm, 2µm, 4µm, 10µm, 20µm, 40 µm
Signal level incremental	TTL, HTL	TTL, HTL	TTL, HTL
Division sin/cos	10µm, 20µm, 40µm	10µm, 20µm, 40µm	10µm, 20µm, 40µm
Ambient temperature	0°C...65°C (option -20°C...65°C )	-10 ... +60°C	0 °C...40 °C (option -10...+60°C)
Protection class	IP53	IP66	IP65
Options	Multiple sliders, sealing air	Spring loaded sensing probe	
Maximim speed	10 m/s	10 m/s	10 m/s
Orientation	Any desired	Any desired	Any desired
Interface	<b>SSI</b>	<b>SSI</b>	<b>SSI</b>
Option, additional interfaces (on request)	<b>INC</b>	<b>INC</b>	<b>INC</b>
Weblink	<a href="http://www.tr-electronic.de/f/TR-VLT-TI-GB-0200">www.tr-electronic.de/f/TR-VLT-TI-GB-0200</a>	<a href="http://www.tr-electronic.de/f/TR-VLT-TI-GB-0300">www.tr-electronic.de/f/TR-VLT-TI-GB-0300</a>	<a href="http://www.tr-electronic.de/f/TR-VLT-TI-GB-0400">www.tr-electronic.de/f/TR-VLT-TI-GB-0400</a>
QR-Code			

Can't find the right variant? Please contact us (info@tr-electronic.de)

## Suggested Products

Ordering code	Name	Remark	Measurement length	Tube length	Resolution
<b>LT-S Slider measurement system</b>					
3200-00025	LT140-S SSI		140 mm	3 m cable, connector M23 12 pin	0,1 µm
3200-00180	LT140-S SSI		140 mm	3 m cable, connector M23 12 pin	0,1 µm
3200-00108	LT240-S SSI		240 mm	3 m cable, connector M23 12 pin	0,1 µm
3200-00002	LT340-S SSI		340 mm	3 m cable, connector M23 12 pin	0,1 µm
3200-00004	LT440-S SSI		440 mm	3 m cable, connector M23 12 pin	0,1 µm
3200-00021	LT540-S SSI		540 mm	3 m cable, connector M23 12 pin	0,1 µm
3200-00135	LT640-S SSI		640 mm	3 m cable, connector M23 12 pin	0,1 µm
3200-00005	LT740-S SSI		740 mm	3 m cable, connector M23 12 pin	0,1 µm
3200-00007	LT840-S SSI		840 mm	3 m cable, connector M23 12 pin	0,1 µm
3200-00142	LT940-S SSI		940 mm	3 m cable, connector M23 12 pin	0,1 µm
3200-00001	LT1040-S SSI		1.040 mm	3 m cable, connector M23 12 pin	0,1 µm
3200-00014	LT1140-S SSI		1.140 mm	3 m cable, connector M23 12 pin	0,1 µm
3200-00149	LT1240-S SSI		1.240 mm	3 m cable, connector M23 12 pin	0,1 µm
3200-00152	LT1340-S SSI		1.340 mm	3 m cable, connector M23 12 pin	0,1 µm
3200-00153	LT1440-S SSI		1.440 mm	3 m cable, connector M23 12 pin	0,1 µm
3200-00154	LT1540-S SSI		1.540 mm	3 m cable, connector M23 12 pin	0,1 µm

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## Suggested Products

Ordering code	Name	Remark	Measurement length	Tube length	Resolution
<b>LT-S Slider measurement system</b>					
3200-00155	LT1640-S SSI		1.640 mm	3 m cable, connector M23 12 pin	0,1 µm
3200-00156	LT1840-S SSI		1.840 mm	3 m cable, connector M23 12 pin	0,1 µm
3200-00157	LT2040-S SSI		2.040 mm	4 m cable, connector M23 12 pin	0,1 µm
3200-00160	LT2240-S SSI		2.240 mm	4 m cable, connector M23 12 pin	0,1 µm
3200-00161	LT2440-S SSI		2.440 mm	4 m cable, connector M23 12 pin	0,1 µm
3200-00163	LT2840-S SSI		2.840 mm	4 m cable, connector M23 12 pin	0,1 µm
3200-00171	LT3040-S SSI		3.040 mm	4 m cable, connector M23 12 pin	10,0 µm

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### Further product information

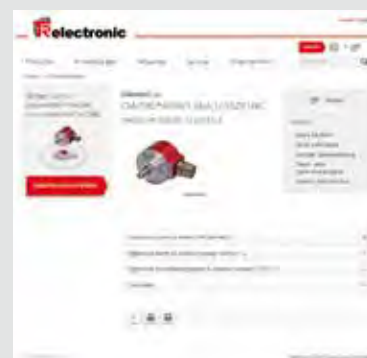
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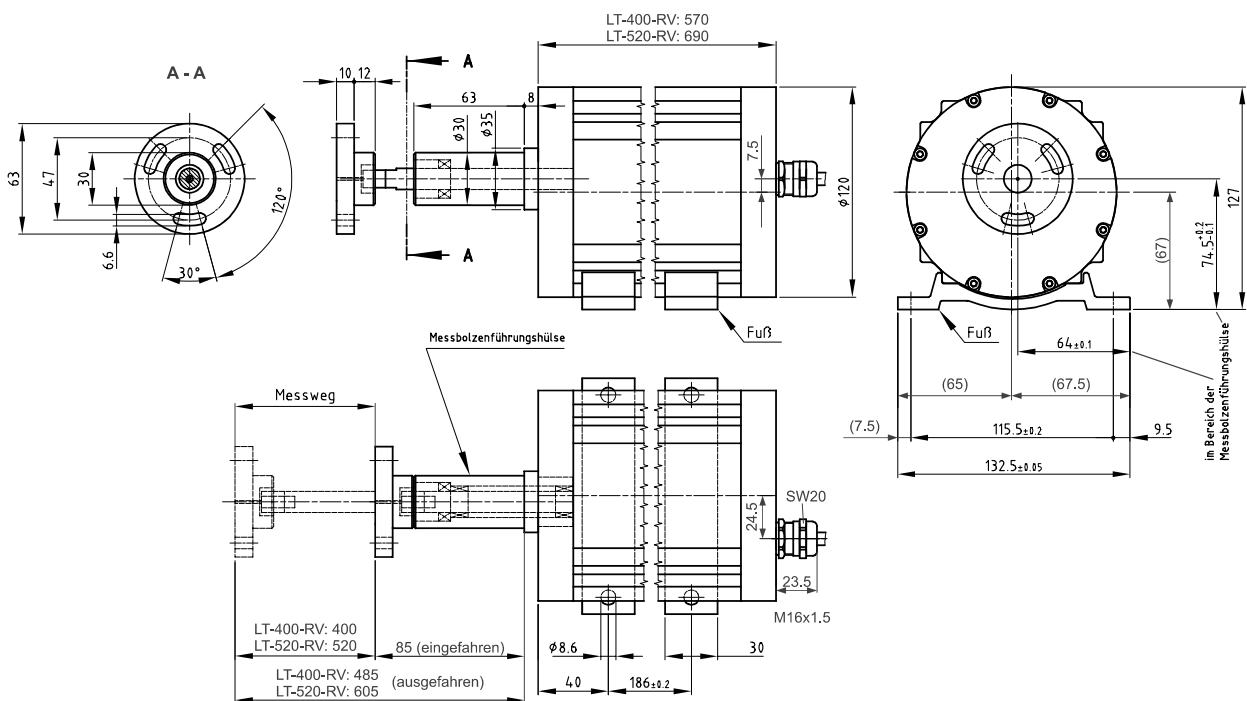


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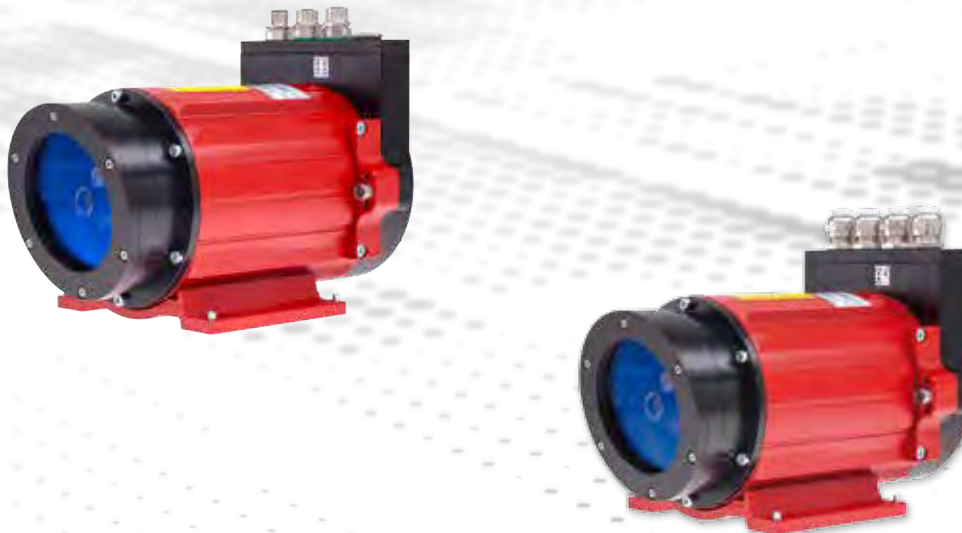
# Dimensional Drawings

## LT-RV Heavy-duty touch probe



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## Laser Distance Measuring Systems

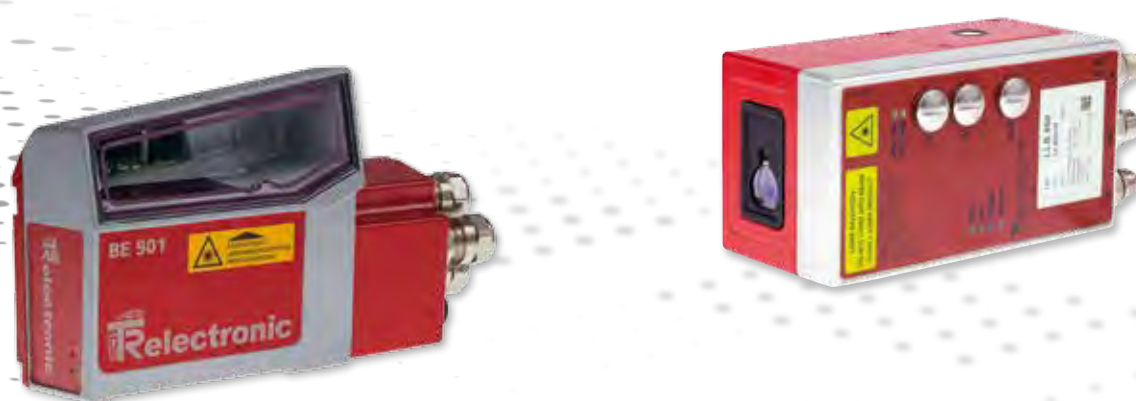


### Measurement over long distances without contact and fast enough for closed-loop control

Laser distance measuring systems from TR-Electronic are powerful optical sensors, which enable measurement of long distances without contact. The measuring system comprises a laser light source, light collector, electronic evaluation and data interface.

Our laser distance measuring systems enable absolute and wear-free measurement of long distances up to 240 m, which can then be output via SSI, field bus interface or industrial ethernet. Our barcode positioning systems even enable an absolute measuring distance of 10,000 meters. In addition: Using our in-house laser reference measuring

section we can compare our laser measuring systems of up to 240 m with a reference system and also linearize them accordingly. We can thus achieve an absolute repeatability of  $\pm 1$  mm at speeds which are commonplace in high-rack warehouses.

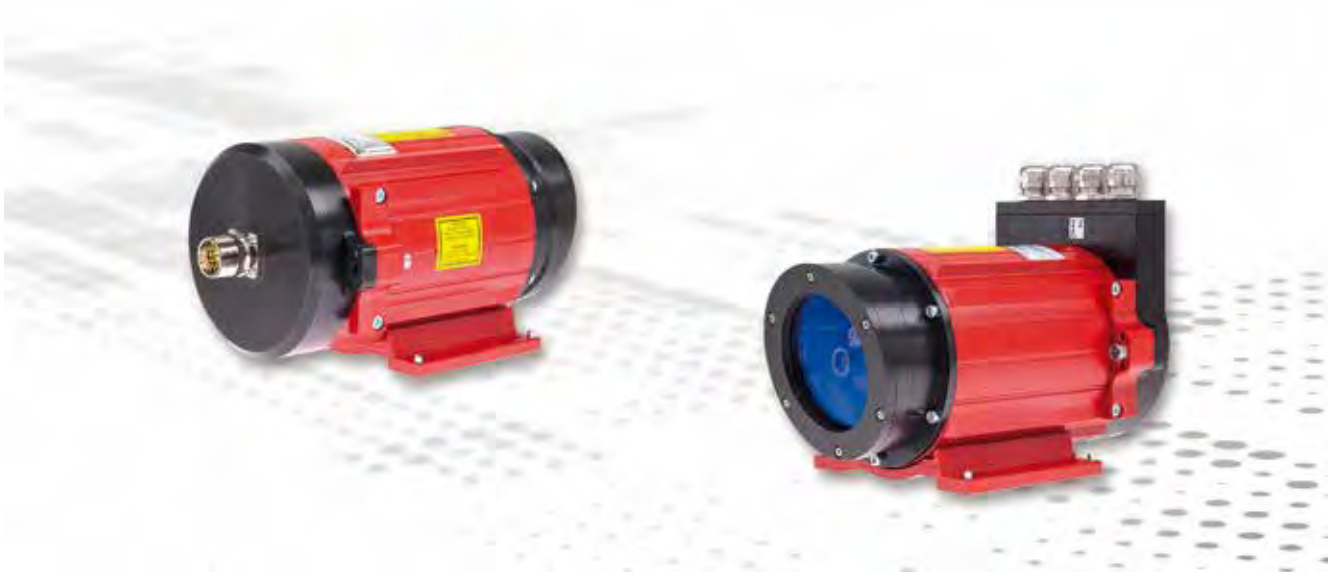


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# Laser Distance Measuring Systems – LE200



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

Particularly in the area of modern warehouse setups, such as shelf-stacking devices, transfer belts and crane systems, a powerful, decentralized measuring and control system for simple project processing and quick configuration makes all the difference. Movements up to 240 m are recorded with the LE-200 laser distance measuring device. The visible red light laser facilitates setup and adjustment of the measuring system. A continuous light beam is used during operation. With just 1 millisecond of measuring cycle time, the LE-200 can be directly used for position control.

- \_ Robust design
- \_ Records linear movement patterns
- \_ Contact-free and wear-free distance measurement
- \_ Distances up to 125 m, 170 m, 195 m, 240 m
- \_ Flexible programming
- \_ Option with Integrated heating
- \_ Option with high-temperature Laser diode for 70°C ambient temperature
- \_ Option with external cooling for 100°C ambient temperature
- \_ Customized adaptations upon request























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## Position detection for closed loop application up to 240 m

Product	LE200	LE200 – long range
		
Supply voltage	18 ... 27 VDC	18 ... 27 VDC
_ Integrated heating	24 ... 30 VDC	24 ... 30 VDC
Current consumption, no load	< 350 mA	< 350 mA
_ Integrated heating	< 2,5 A	< 2,5 A
Measuring range	0,2 – 125 m	0,2 – 170 m, 195 m, 240 m
Linearity deviation (12 m, standard)	±3 mm	±3 mm
Reproducibility	±2 mm	±2 mm
Light source	Laser diode, red light	Laser diode, red light
Wave length $\lambda$	670 nm	670 nm
Radiant power	Pmax < 1 mW	Pmax < 1 mW
Laser protection class	2	2
Measurand output/refresh rate	1.000 values / s	1.000 values / s
Integration time	1 ms	1 ms
Working temperature	0 ... +50 °C	0 ... +50 °C
Working temperature (+ heating)	-30 ... +50 °C	-30 ... +50 °C
Storage temperature	-20 ... +75 °C (dry)	-20 ... +75 °C (dry)
Protection class	IP65	IP65
Vibration	<50m/s <sup>2</sup> , sine 50 ... 2,000 Hz	<50m/s <sup>2</sup> , sine 50 ... 2,000 Hz
Shock	<300m/s <sup>2</sup> , half sine 11 ms Hz	<300m/s <sup>2</sup> , half sine 11 ms Hz
Interface (others on request)	        	        
Weblink	<a href="http://www.tr-electronic.com/s/S007232">www.tr-electronic.com/s/S007232</a>	<a href="http://www.tr-electronic.com/s/S007232">www.tr-electronic.com/s/S007232</a>
QR-Code		

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## Suggested Products

Ordering code	Range	Delivery
<b>LE200 SSI</b>		
2200-04002	50 m	with reflector 200 × 200 mm
2200-01002	170 m	with reflector panel 554 × 480 mm
2200-02002	195 m	with reflector panel 554 × 480 mm
2200-03002	240 m	with reflector panel 554 × 480 mm
2200-00002	125 m	with reflector 200 × 200 mm
<b>LE200 PROFIBUS+SSI</b>		
2200-04102	50 m	with reflector 200 × 200 mm
2200-01102	170 m	with reflector panel 554 × 480 mm
2200-02102	195 m	with reflector panel 554 × 480 mm
2200-03102	240 m	with reflector panel 554 × 480 mm
2200-00102	125 m	with reflector 200 × 200 mm
<b>LE200 Interbus S</b>		
2200-01202	170 m	with reflector panel 554 × 480 mm
2200-00202	125 m	with reflector 200 × 200 mm
<b>LE200 CANopen</b>		
2200-04302	50 m	with reflector 200 × 200 mm
2200-01302	170 m	with reflector panel 554 × 480 mm
2200-02302	195 m	with reflector panel 554 × 480 mm
2200-03302	240 m	with reflector panel 554 × 480 mm
2200-00302	125 m	with reflector 200 × 200 mm
<b>LE200 DeviceNET</b>		
2200-04402	50 m	with reflector 200 × 200 mm
2200-02402	195 m	with reflector panel 554 × 480 mm
2200-03452	240 m	with reflector panel 554 × 480 mm
2200-00402	125 m	with reflector 200 × 200 mm
<b>LE200 Ethernet/IP</b>		
2200-01702	170 m	with reflector panel 554 × 480 mm
2200-02752	195 m	with reflector panel 554 × 480 mm
2200-03702	240 m	with reflector panel 554 × 480 mm
2200-00702	125 m	with reflector 200 × 200 mm

For further product information simply enter the order number in the search field at [www.tr-electronic.com](http://www.tr-electronic.com).

## Suggested Products

Ordering code	Range	Delivery
<b>LE200 PROFINET</b>		
2200-04802	50 m	with reflector 200 × 200 mm
2200-01802	170 m	with reflector panel 554 × 480 mm
2200-02802	195 m	with reflector panel 554 × 480 mm
2200-03802	240 m	with reflector panel 554 × 480 mm
2200-00802	125 m	with reflector 200 × 200 mm
<b>LE200 EtherCAT</b>		
2200-00902	125 m	with reflector 200 × 200 mm

For further product information simply enter the order number in the search field at [www.tr-electronic.com](http://www.tr-electronic.com).

### Further product information

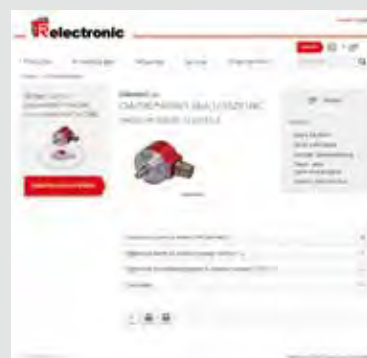
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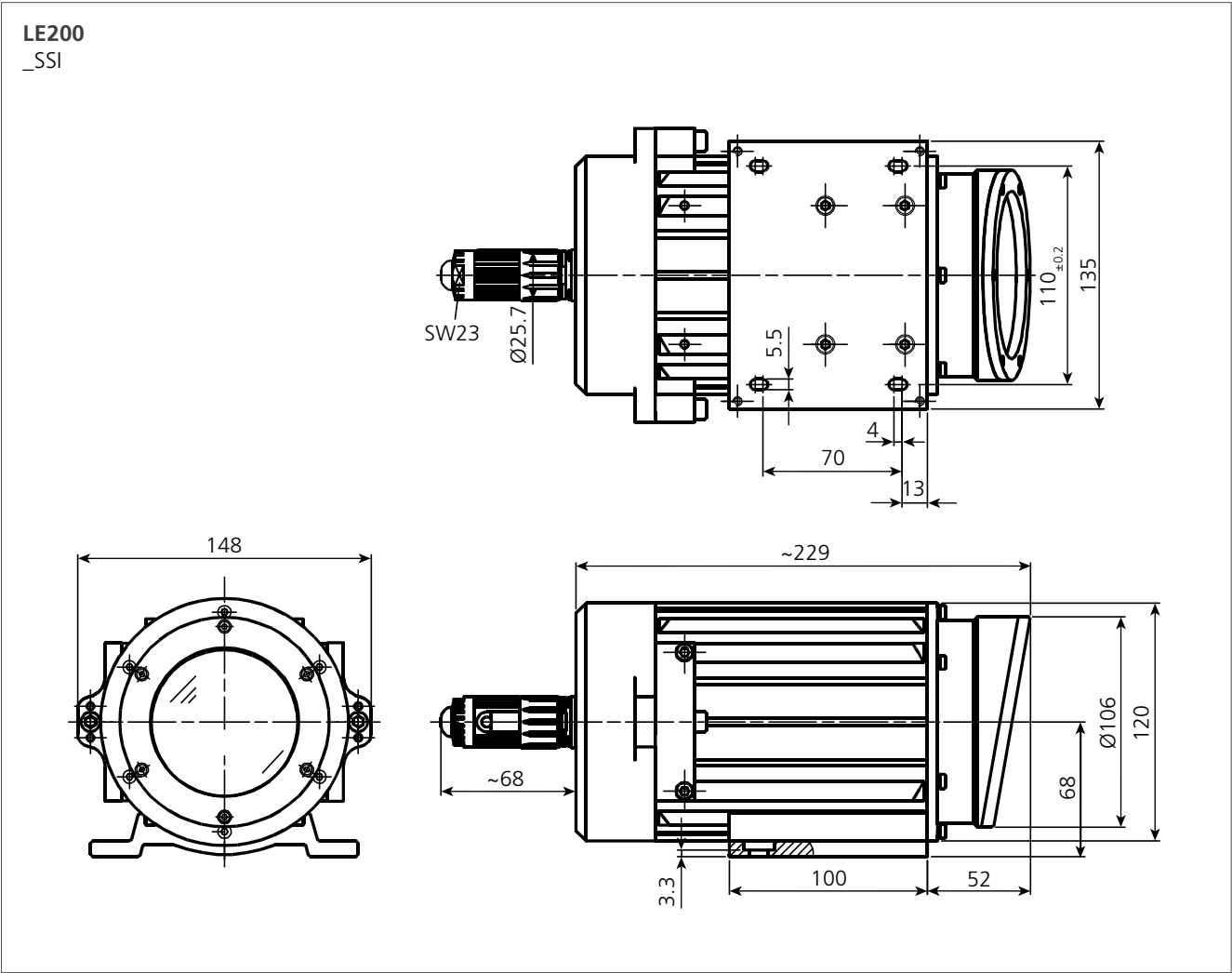


3. Choose desired information



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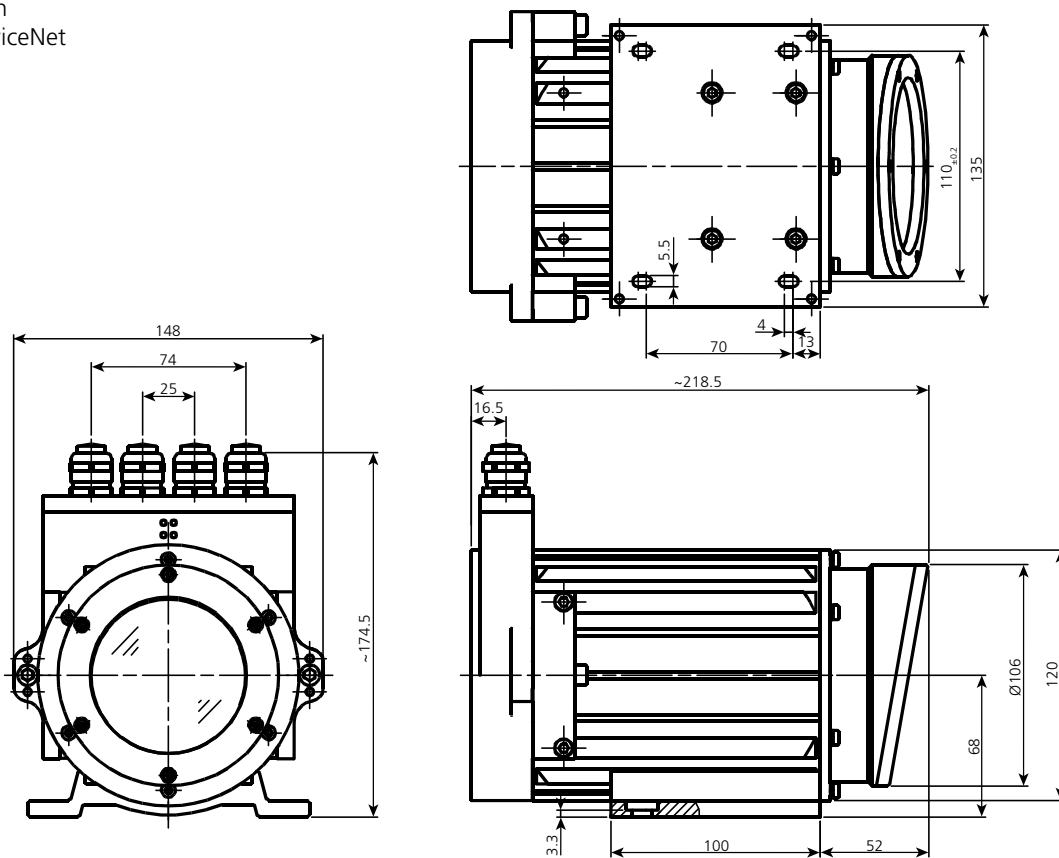
# Dimensional Drawings



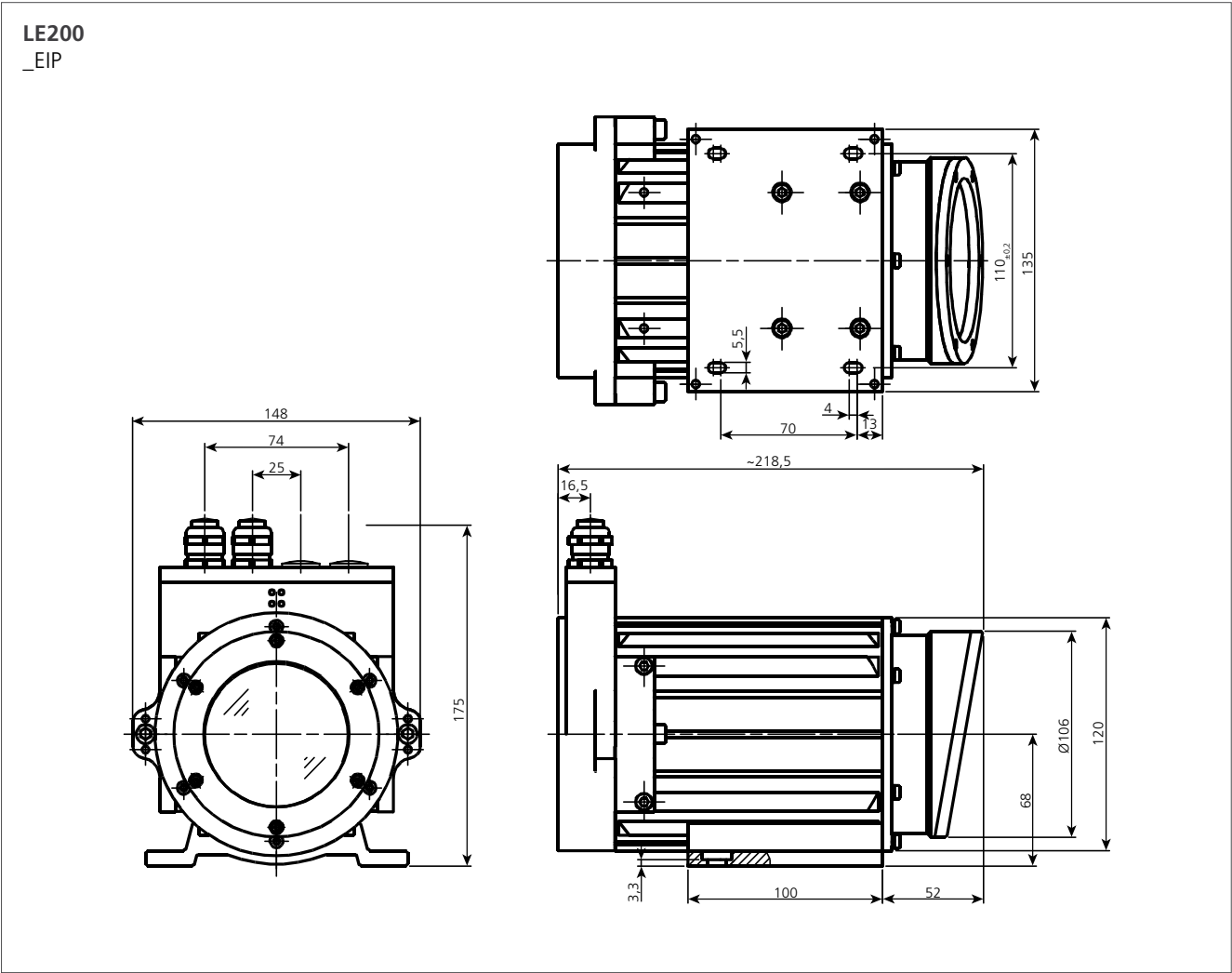
## Dimensional Drawings

### LE200

\_PROFIBUS+SSI  
\_INTERBUS  
\_CANopen  
\_CAN DeviceNet



# Dimensional Drawings

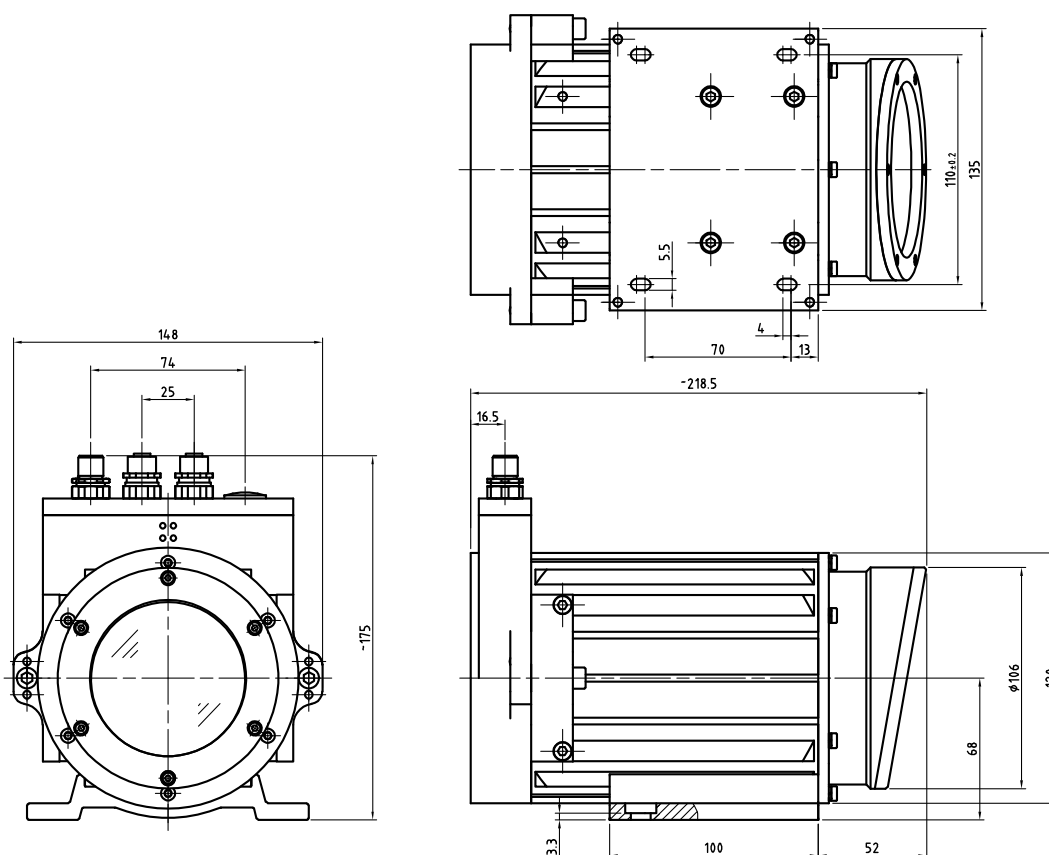


## Dimensional Drawings

**LE200**

\_EPN

\_ETC



## Laser Distance Measuring Systems – LLB65 / LLB500



### Non-contact measurement on natural surfaces

Laser distance measuring systems LLB65 and LLB500 can measure up to 65 m on natural surfaces without a special target plate. The measuring time and the maximum speed of the target depend on the surface. LLB500 can measure up to 500 m with a target plate.

- \_ Analog, SSI and PROFIBUS-DP interface
- \_ RS232 -, RS422 - - interface
- \_ Detection of positions
- \_ Non-contact distance measurement
- \_ Distance measurements on natural surfaces:
  - \_ 0,05 m up to approx. 65 m
  - \_ LLB500 with reflector panel up to 500 m
- \_ Programmable
- \_ Option with integrated heating








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## Position detection up to 65 m

Product	LLB65 (H) - A	LLB65 - PB	LLB500 (H)-A
			
Supply voltage	9 ... 30 VDC	13 ... 30 VDC	9 ... 30 VDC
_ Integrated heating	24 ... 30 VDC	–	24 ... 30 VDC
Current consumption, no load	< 0,6 A	< 0,6 A	< 0,6 A
_ Integrated heating	< 2,5 A	–	< 2,5 A
Measuring range	typically 0,05 m ... 65 m	typically 0,05 m ... 65 m	With target plate: 0,5 m ... 500 m Without target plate: 0,05 m ... 65 m
Linearity deviation (12 m, standard)	0,1 mm	0,1 mm	0,1 mm
Reproducibility	±1,5 mm ... ±3 mm at 2	±1,5 mm ... ±3 mm at 2	±1,0 mm ... ±3 mm at 2
Time for a measurement	typically 0,3 ... 4 s	typically 0,3 ... 4 s	typically 0,15 ... 4 s
Light source	Laser diode, red light	Laser diode, red light	Laser diode, red light
Laser protection class	2	2	2
Mass	690 g, 720 g (with heating)	950 g	690 g, 720 g (with heating)
Working temperature	-10 ... +50 °C	-10 ... +50 °C	-10 ... +50 °C
Working temperature (+ heating)	-40 ... +50 °C	–	-40 ... +50 °C
Storage temperature	-40 ... +70 °C (dry)	-40 ... +70 °C (dry)	-40 ... +70 °C (dry)
Protection class	IP65	IP65	IP65
Vibration	<50m/s², sine 50 ... 2,000 Hz	<50m/s², sine 50 ... 2,000 Hz	<50m/s², sine 50 ... 2,000 Hz
Shock	<300m/s², half sine 11 ms Hz	<300m/s², half sine 11 ms Hz	<300m/s², half sine 11 ms Hz
Addl. Interfaces	RS232, RS422, digital outputs		RS232, RS422, digital outputs
Interface (others on request)	<b>Analog</b>	<b>Analog</b> 	<b>SSI</b> <b>Analog</b>
Weblink	<a href="http://www.tr-electronic.com/f/LLB65-A-1-GB-1">www.tr-electronic.com/f/LLB65-A-1-GB-1</a>	<a href="http://www.tr-electronic.com/f/LLB65-PB-1-GB-1">www.tr-electronic.com/f/LLB65-PB-1-GB-1</a>	<a href="http://www.tr-electronic.com/f/LLB500-A-1-GB-1">www.tr-electronic.com/f/LLB500-A-1-GB-1</a>
QR-Code			

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## Position detection up to 500 m

Product	LLB500-PB	LLB500F (H)-A
		
Supply voltage	13 ... 30 VDC	9 ... 30 VDC
_ Integrated heating	–	24 ... 30 VDC
Current consumption, no load	< 0,6 A	< 0,6 A
_ Integrated heating	–	< 2,5 A
Measuring range	With target plate: 0,5 m ... 500 m Without target plate: 0,05 m ... 65 m	With target plate: 0,5 m ... 500 m Without target plate: 0,05 m ... 65 m
Linearity deviation (12 m, standard)	0,1 mm	0,1 mm
Reproducibility	±1,5 mm ... ±3 mm at 2	±1,0 mm ... ±3 mm at 2
Time for a measurement	typically 0,3 ... 4 s	typically 0,004 ... 4 s
Light source	Laser diode, red light	Laser diode, red light
Laser protection class	2	2
Mass	950 g	690 g, 720 g (with heating)
Working temperature	-10 ... +50 °C	-10 ... +50 °C
Working temperature (+ heating)	–	-40 ... +50 °C
Storage temperature	-40 ... +70 °C (dry)	-40 ... +70 °C (dry)
Protection class	IP65	IP65
Vibration	<50m/s², sine 50 ... 2,000 Hz	<50m/s², sine 50 ... 2,000 Hz
Shock	<300m/s², half sine 11 ms Hz	<300m/s², half sine 11 ms Hz
Addl. Interfaces	Digital outputs	RS232, RS422, digital outputs
Interface (others on request)	<b>Analog</b> 	<b>SSI</b> <b>Analog</b>
Weblink	<a href="http://www.tr-electronic.com/f/LLB500-PB-1-GB-1">www.tr-electronic.com/f/LLB500-PB-1-GB-1</a>	<a href="http://www.tr-electronic.com/f/LLB500-A-1-GB-1">www.tr-electronic.com/f/LLB500-A-1-GB-1</a>
QR-Code		

Can't find the right variant? Please contact us (info@tr-electronic.de)

## Suggested Products

Ordering code	Interface
<b>LLB65 - 65 m without target panel (Option up to 80m)</b>	
LLB65-00100	PROFIBUS ( $\pm 1,5$ mm)
LLB65-00101	PROFIBUS ( $\pm 3$ mm)
LLB65-00600	Analog ( $\pm 1,5$ mm)
LLB65-00601	Analog ( $\pm 3$ mm)
LLB65-00610	Analog ( $\pm 1,5$ mm) with heating
LLB65-00611	Analog ( $\pm 3$ mm) with heating
<b>LLB500 - 65 m without target panel (Option up to 80m), 500 m with target panel. Target panel not included</b>	
LLB500-00100	PROFIBUS ( $\pm 1,5$ mm)
LLB500-00101	PROFIBUS ( $\pm 3$ mm)
LLB500-00600	SSI + Analog ( $\pm 1,0$ mm)
LLB500-00601	SSI + Analog ( $\pm 3$ mm)
<b>Target panel for LLB 500</b>	
49500040	210 x 297mm, aluminium, red

Für mehr Produkt-Informationen tragen Sie einfach die Bestellnummer in das Suchfeld auf [www.tr-electronic.de](http://www.tr-electronic.de) ein.

### Further product information

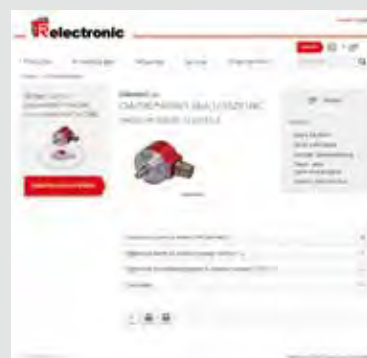
1. Enter order code into ...



2. Searchfield (top right) on [www.tr-electronic.com](http://www.tr-electronic.com)

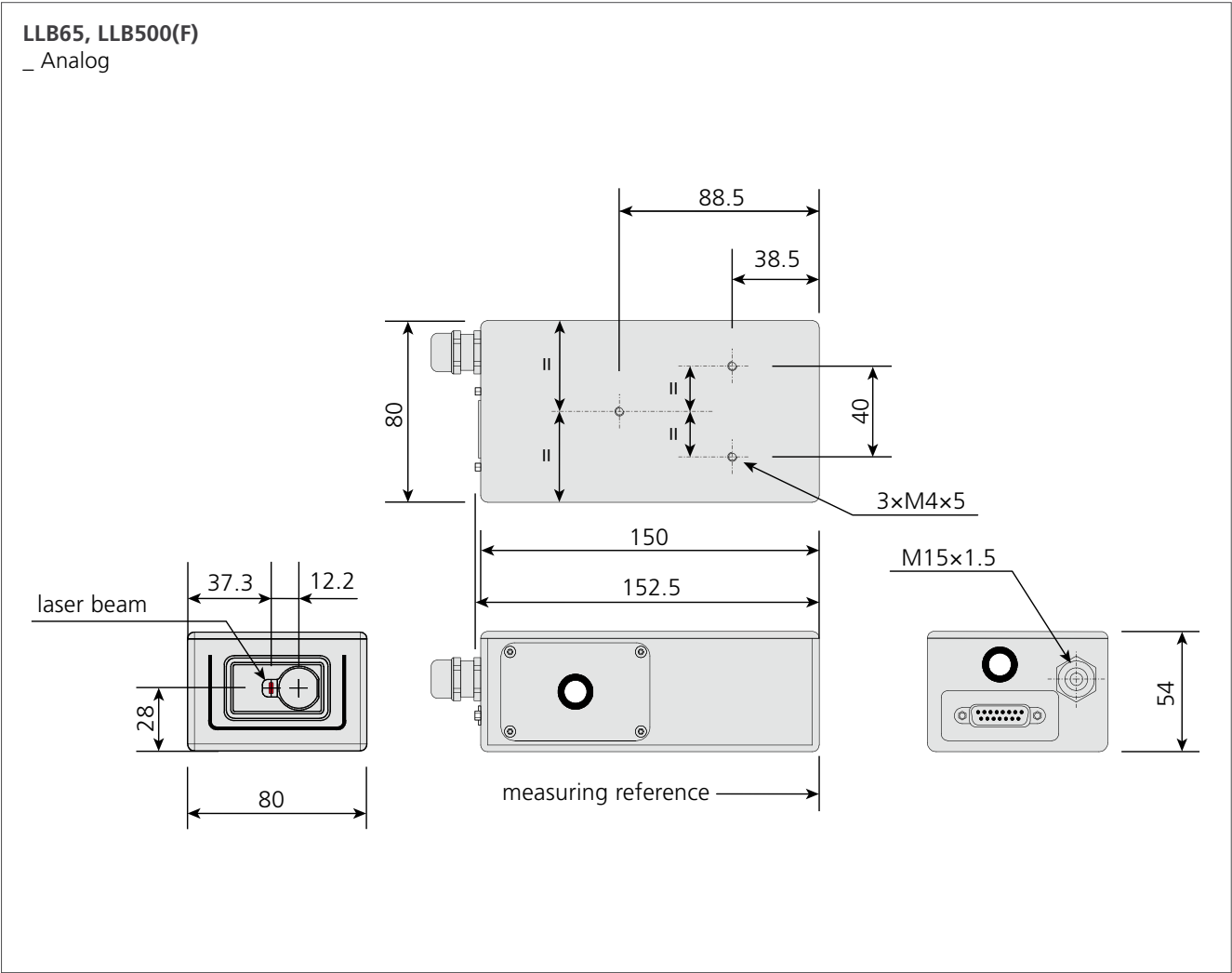


3. Choose desired information



We will help you to select the most suitable products from the complete TR range. Please contact us ([info@tr-electronic.de](mailto:info@tr-electronic.de)).

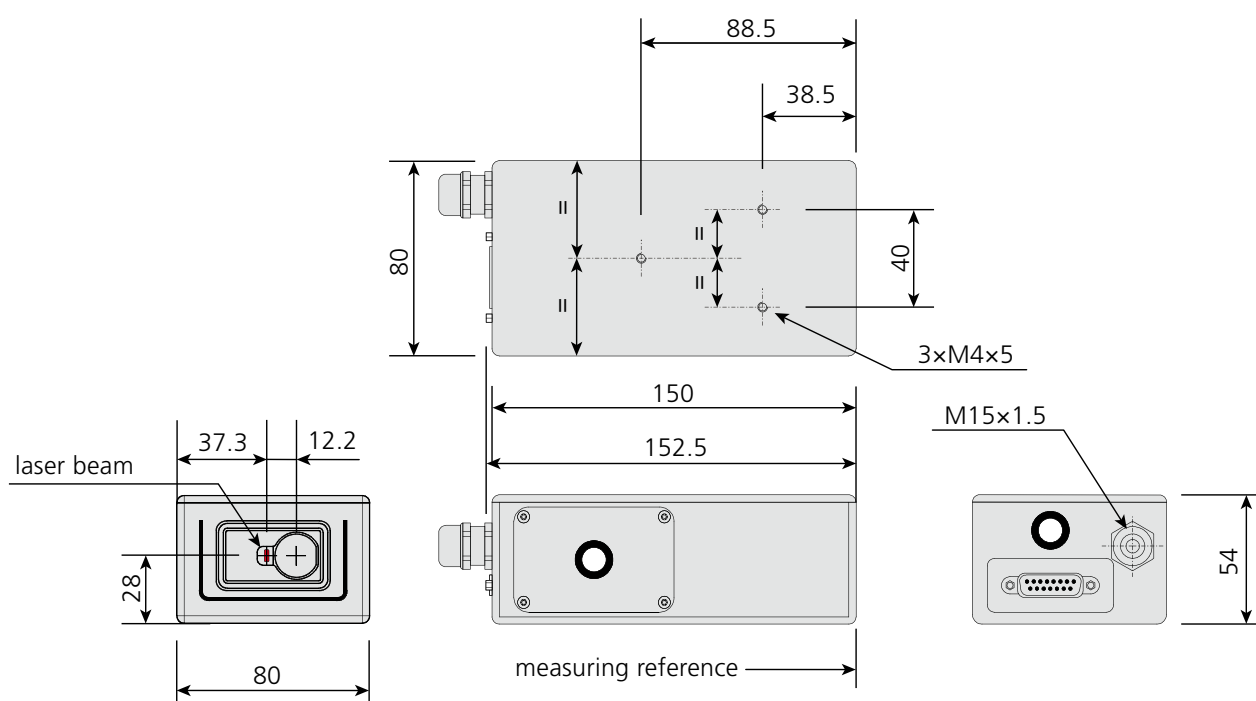
# Dimensional Drawings



## Dimensional Drawings

**LLB65, LLB500(F)**

\_ Analog



## Barcode Positioning System – BE901



### Non-contact measurement up to 10 km

Barcode positioning systems of type BE-901 are optical measuring systems which use visible red laser light to determine the position of the BE-90 relative to a permanently mounted barcode tape. Typically the BE-901 is mounted on a (rail-) guided vehicle, whose position is to be determined. The position information is determined to within a millimeter using the information of the fixed barcode tape and made available to the primary system.






- \_ Interfaces: SSI und PROFIBUS
- \_ Easy installation and activation
- \_ Movements (curved systems)
- \_ Non contact position measurement
- \_ Position detection up to 10,000 m
- \_ Parameterizable via USB

---

### Contents

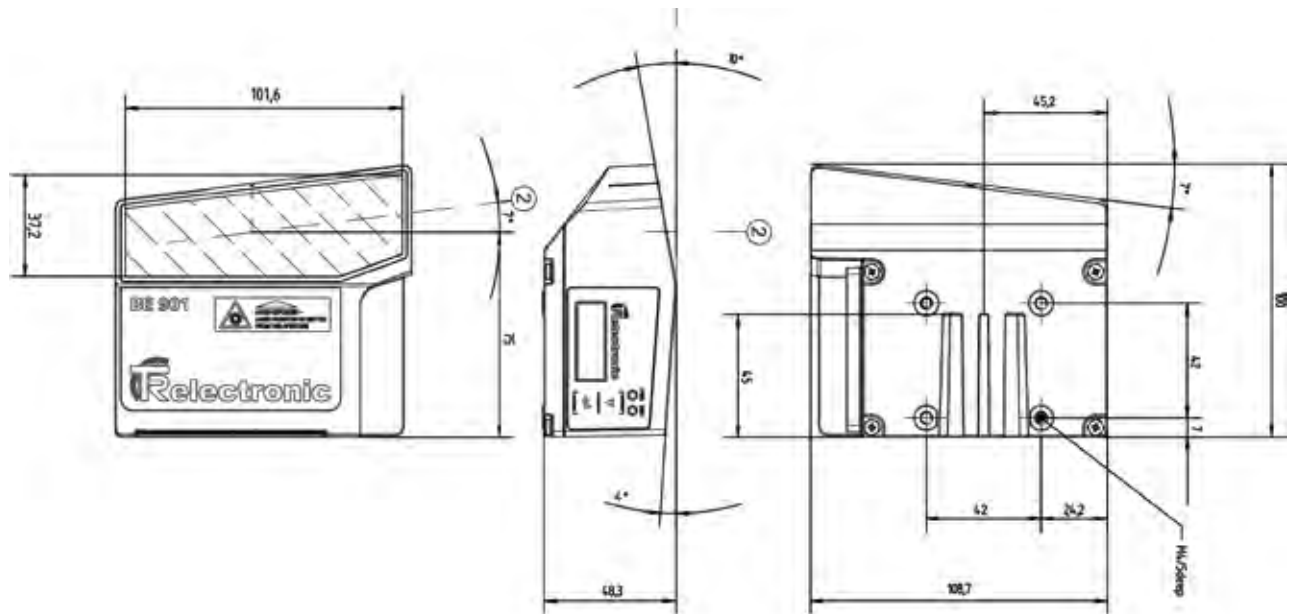
Products.....	379
Dimensional Drawings.....	380

# Barcode Positioning System

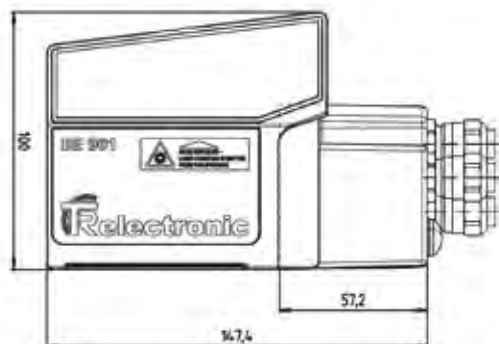
Product	BE901 - SSI	BE901 - PB
		
Supply voltage	10 ... 30 VDC	10 ... 30 VDC
Power consumption	3,2 W	5 W
Range	10.000 m	10.000 m
Scanning rate		
Reproducible accuracy		
Integration time		
Measurement value output	500 values/sec.	500 values/sec.
Scanning depth	90 ... 170 mm	90 ... 170 mm
Light source	Laser diode, 655 nm	Laser diode, 655 nm
Housing	Die-cast aluminium	Die-cast aluminium
Mass	580 g without connection block	580 g without connection block
Working temperature	-5...+50 °C	-5...+50 °C
Working temperature (+ heating)	-35 ... +50 °C	-35 ... +50 °C
Air humidity	max. 90% rel. humidity	max. 90% rel. humidity
Protection class	IP65	IP65
Vibration		
Service Interface	USB	USB
Interface (others on request)	<b>SSI</b>	
Weblink	<a href="http://www.tr-electronic.com/s/S011970">http://www.tr-electronic.com/s/S011970</a>	<a href="http://www.tr-electronic.com/s/S011969">http://www.tr-electronic.com/s/S011969</a>
QR-Code		

## Dimensional Drawings

**BE901**  
\_SSI, \_PB



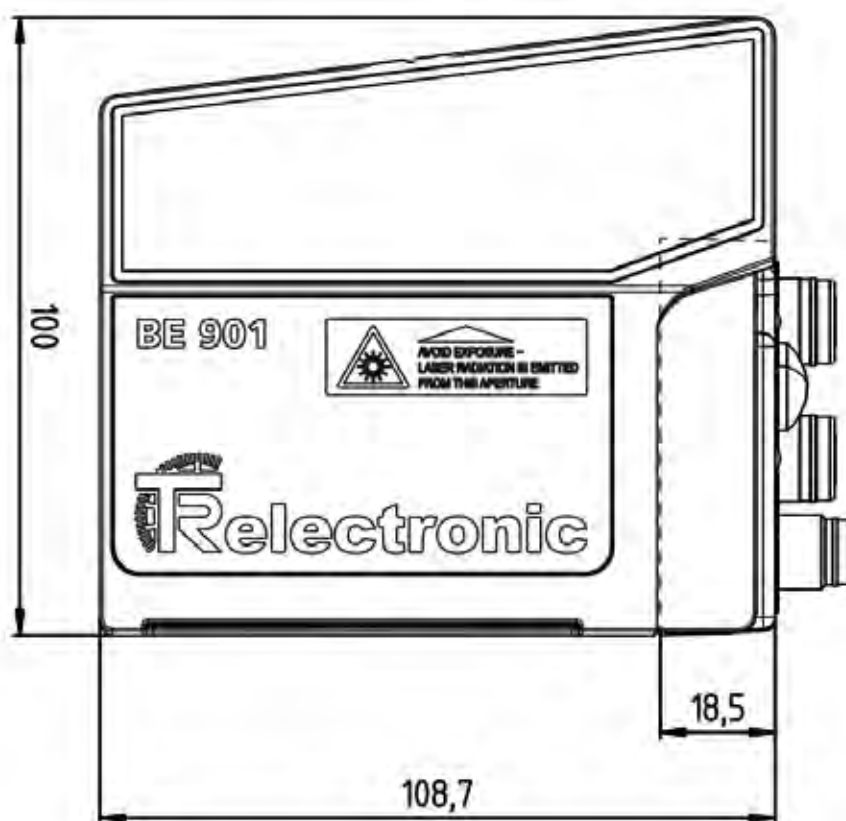
**BE 901 + Connection hood**  
Cable glands





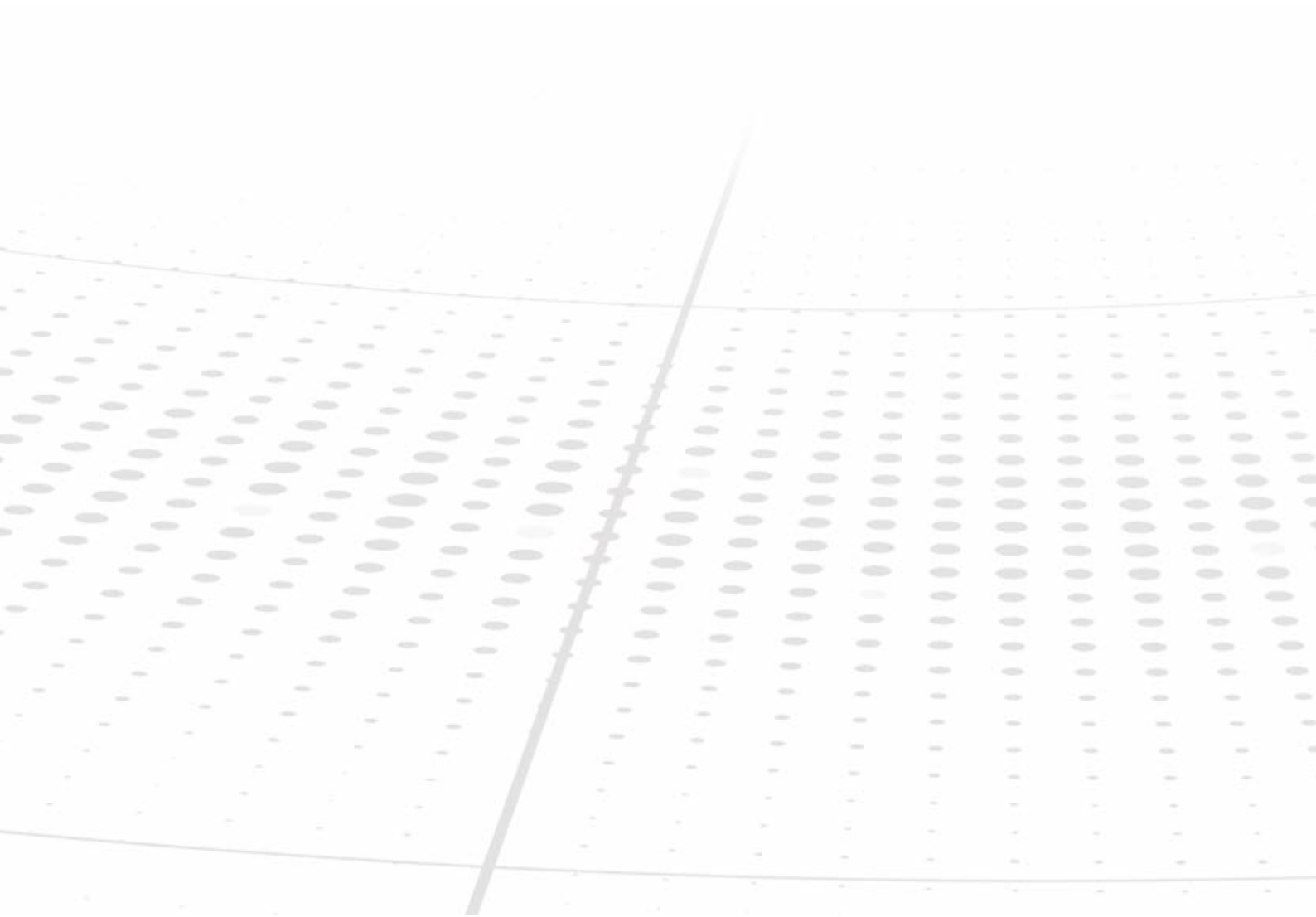
## Dimensional Drawings

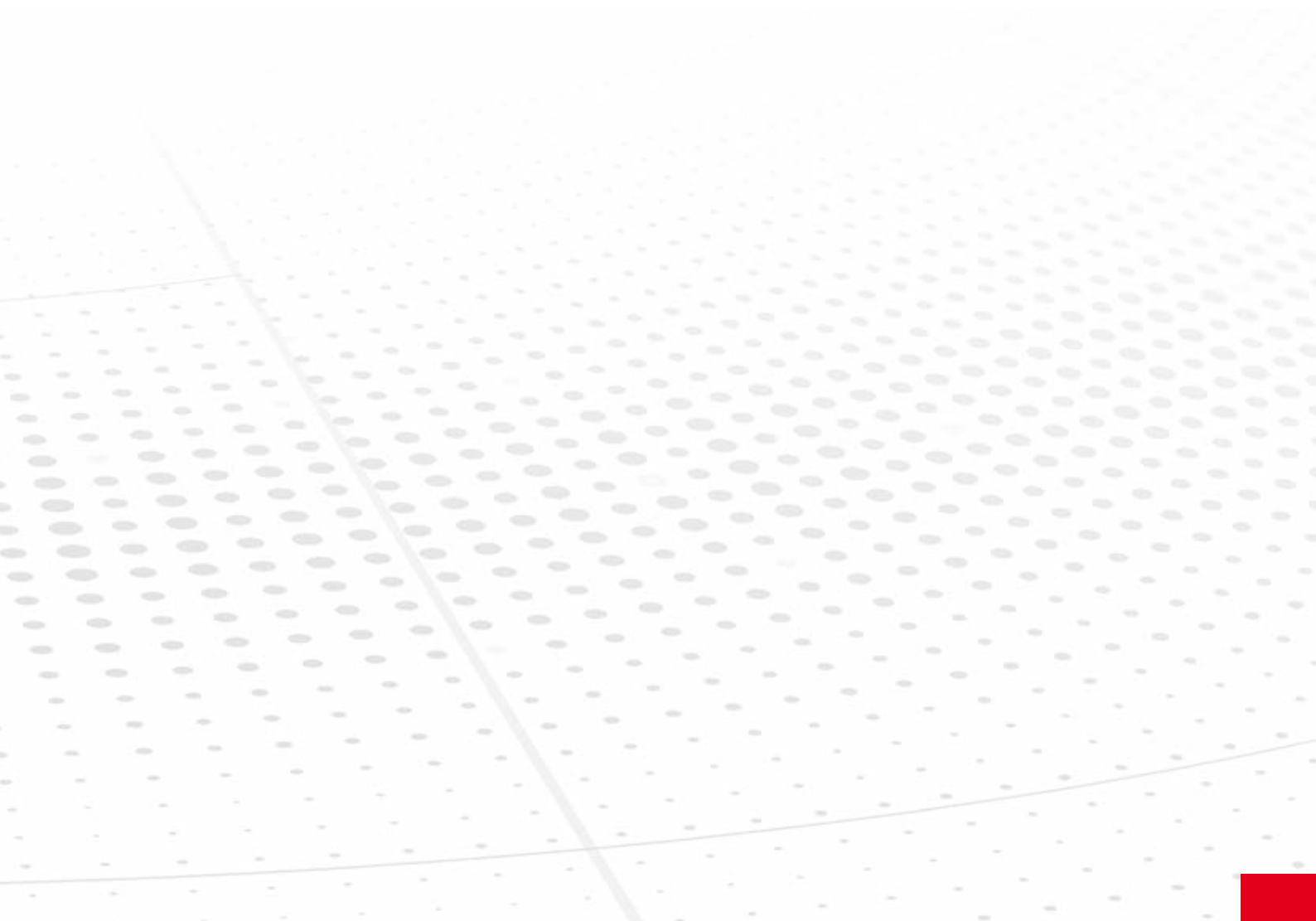
BE 901 + Connection hood  
M12



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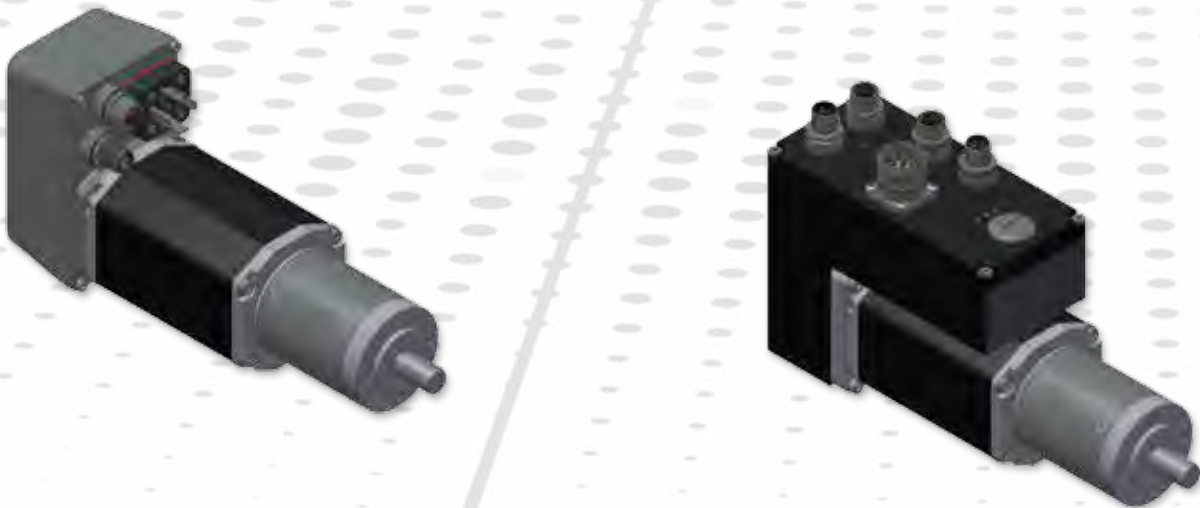
# Motion





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## Motion – Intelligent Compact Drives



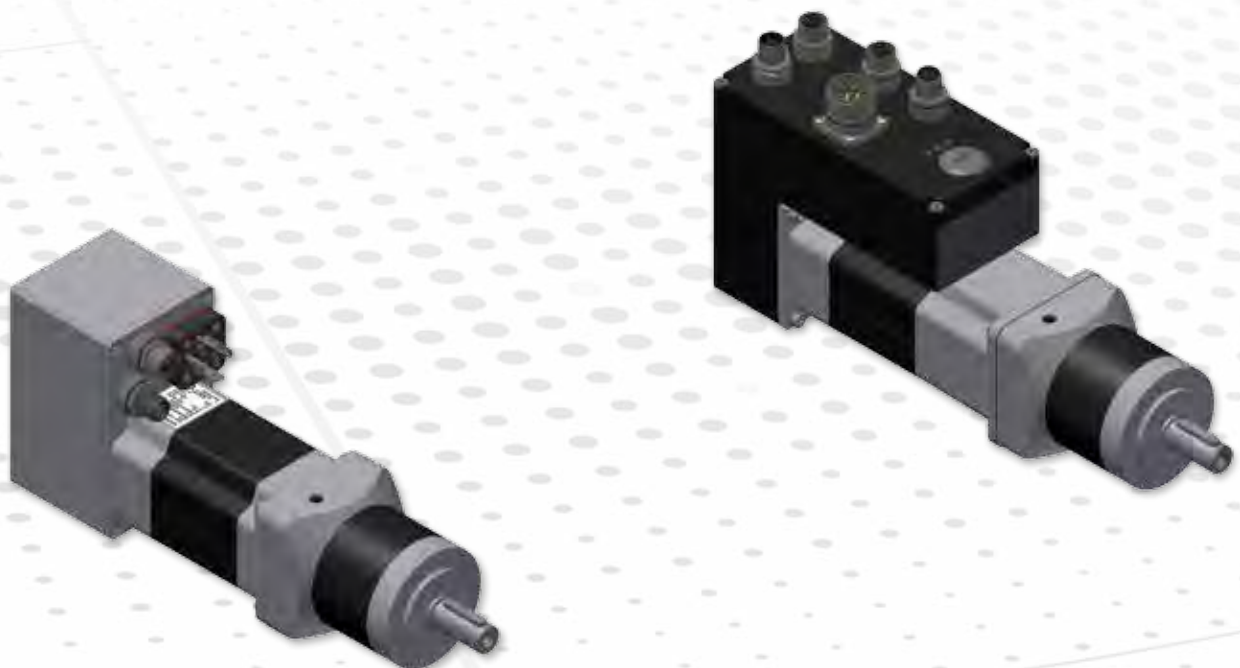
### Intelligent compact drives integrate absolute rotary encoder, motor and control technology

Different batch sizes, huge product diversity, the individualization of production and maximum cost efficiency are central requirements of modern production processes. In order to cope with these requirements, secondary functions are increasingly being electromechanically automated in machines and systems, in addition to primary processes.

TR-Electronic's fieldbus-capable encoTRive compact drives make this possible – in machine construction and machine tools as well as in the packaging, press, woodworking, glass, printing, plastic and textile industries. These compact drives have no external electronics. They integrate actuator,

sensor and control technology in one housing: control logic, position, speed and torque controller, power electronics and absolute rotary encoder. These compact drives can communicate with the PLC via fieldbus. Further components such as transmission, holding brakes or I/Os may be added, depending on the application.

On the basis of the encoTRive communication and controller platform, both simple control applications and complex machine processes can be automated efficiently and consistently with different drive types – simply, flexibly and cost-effectively.



**Possible combinations:**

In addition to these standard types, we can combine electronic, motor, gearbox and special optional accessories to fulfill your requests. We find a solution for every application – from standard gear to high precision, high load gear.



## encoTRive - a brief overview

### Actuating Drive

#### As auxiliary drive for adjusting ...

- \_ dimensions
- \_ guide rails
- \_ stops
- \_ valves, dampers and sliders

#### For use in ...

- \_ folding machines
- \_ thermoforming machines
- \_ cardboard gluing machines
- \_ component mixing systems

P

1,000 min<sup>-1</sup> per s

20 ms

1–2°

without

1,000 h

### Positioning Drive

#### As auxiliary or main drive for ...

- \_ cyclic format adjustments
- \_ dynamic rough settings
- \_ fine adjustments
- \_ speed

#### For use in ...

- \_ woodworking machines
- \_ package ejection machines
- \_ profile measuring machines
- \_ X-ray analyzing devices

#### Controller structure

Dynamics

Real time

Accuracy

Inputs and outputs

Lifetime

## Performance

### Processing Drive

#### As main drive for ...

- \_ precise positioning
- \_ a synchronized and cyclic transfer
- \_ sensor coupled position measurement
- \_ application optimized portal systems

#### For use in ...

- \_ accurate grinding machines
- \_ inspection machines
- \_ tool controlling modules
- \_ tire testing facilities

#### PID

10,000 min<sup>-1</sup> per s

2 ms

20 arcmin

programmable

30,000 h

from ... up to ...



## Contents

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## TR-Electronic – Helps You to Face the Challenges of Market

TR-Electronic – Helps You to Face the Challenges of Knowing and reacting to the demands of the market is the key to success. Today, innovative drive technology has to transfer technology trends and specific user requirements into new products. Aspects like mechatronics, electronics and software must be custom-fit and industry-sector-specific. The challenges is to increase machine productivity, while simplifying the design and operation.

In combination with automation technology, the encoTRive intelligent positioning and actuating drives maximise the innovative potential of modern machinery or retrofiting. Our encoTRive integrates and tunes all important required electrical, electronic and mechanical components. encoTRive is a fully functional drive unit ready to be connected.

The advantage of using decentralized drive technology is felt when realizing modular concepts, retrofits, making acquisitions or when used in machines and equipment where large measurements occur. Both aspects of innovation – automation and integration – enable progressive machine concepts. Besides the already automated main processes, the auxiliary

functions have to be electromotive automated. This demands new and integrated drive technology concepts. Standardization and fieldbus systems play a dominant role.

To create a perfect combination of innovation, increased performance and flexibility, you have to be able to choose from a variety of multiple drive configurations and you must be able to make optimal changes between those configurations. For this purpose, we designed and adapted the variety of the individual encoTRive models. The wide range of applications go from simple tasks for the actuating drives up to complex highly accurate tasks for positioning drives.

### Decentralized Drive Technology with encoTRive

The name encoTRive is the brand for our complete drive technology product line. It is derived from the two components **absolute Encoder and DRive**, modified and exchanged with our company abbreviation **TR**.

**Integration** is the first trademark. Enclosed are the power and positioning electronics, zero voltage safe encoder, fieldbus technology and gear. It is also available with optional holding brake and different I/O.

**Variant Diversity** is the second trademark. This is due to the diverse electronic functionality, numerous gear ratios and a wide range of gear types. Further options include radial or axial shaft, solid or hollow shaft, a moderate backlash or backlash-free. This is accomplished by using a planetary, worm or special gears.

**Cross-Range Compatibility** is the third trademark. All series are based on a common software platform. Only the MD and MP series differ in their absolute encoder and electronics. However, they use an identical platform and use the same electric motor and gear box.

### MD 300, Version PROFIBUS





Individual models are constructed for application categories. For automation tasks with different requirements we offer drives with optimal performance levels.

- \_ **Actuating Drive MA** (Stellantriebe)
- \_ **Positioning Drive MP** (Positionierantriebe)
- \_ **Drive in Core Process MD** (Prozessantriebe)

This structure is supported by a standard platform in the implementation of firmware, interfaces and bus. In practice

this means, there is considerably less effort in engineering and maintenance. System costs and installation times decrease as well. Available bus systems are: PROFIBUS, PROFINET and CANopen, enhanced through busses based on newer EtherNet technologies.

The encoTRive series opens with its standard decentralized concept, a new level of automation technology that applies all mechanical engineering applications, in particular in industries like packaging, press, wood, glass, print, plastics, textile and machine tools.

## Series Features

- \_ design according to application classification
- \_ implementing software platform
- \_ position measurement with fail-safe multi turn absolute encoder
- \_ integration into a mechatronic system
- \_ variant diversity through modularity
- \_ operating modes, positioning and speed control
- \_ control completely decentralized within the drive

## Working Features

- \_ high resolution, 1.024 or 4.096 steps per revolution
- \_ long range, 4.096 or 65.536 revolutions
- \_ precise positioning up  $\pm 2$  increments
- \_ smooth running even at low speed
- \_ limitable with software limit switch
- \_ set parameters according to bus standards

## Design of MD, MP and MA series

Based on its standard products, TR also develops customer- and application-specific drives. The series range from simple modifications, for example in plug connectors, to drives with new drive motors and additional bus interfaces.

- 10 different electric motors
- 11 gear types (axial and rectangular shaft output)

### Electronics and drives of the MD series

The absolute encoder and the electronics are arranged in extension of the motor axis and on the side of the motor.

The connector cover accommodates not only the bus interface but also the application module for PROFIBUS and PROFINET.

There is 1 standard M23 connector for power, logic and holding brake. In addition, there are 4 M12 connectors for bus IN/OUT and digital I/O. A sixth connector serves for communication with a PC featuring an RS-232 interface.



### Electronics and drives of the MP series

The absolute encoder and the electronics are arranged in extension of the motor axis.

The electronics is simpler in its design and features less functionality than the MD series. The electronics housing is smaller as well. As a result, there is less output power during continuous operation. During intermittent operation or short-time operation, the same output and the same torque are available, but they are limited to shorter make and cycle times.



### Electronics and drives of the MA series

The electronics is especially configured for short-time operation and moderate intermittent operation. The electric motors are brushed DC motors.

The absolute encoder and the electronics of the MA 025 are arranged in extension of the output shaft of the gear. The measurement involves the position of the gear shaft. The series features two defined types each with a driving torque of 2 and 4 Nm.

The absolute encoder and the electronics of the MA xxx (-055/-100/-130) are attached to the electric motor. This series features different power stages, torques and gear types.



### **Detachably mounted gears with coupling and clamping hub**

Most of the precision gears are mounted to the electric motor such that they can be detached. This is the most flexible solution for project businesses, special machine building, and medium-size series.

Gear types range from economy planetary gears to low-backlash servo gears. Driving torques of up to 180 Nm are accessible for reinforced gears.







### **Non-detachably mounted gear with direct connection**

All simple gears are permanently mounted to the electric motor. Coupling, clamping hub, gearbox flange and gearbox bearing are not applicable. For this purpose, the shaft of the electric motor features a pinion which couples directly to the first stage of the gear.























The gear types available are planetary gears and worm gears. The output direction of the gear shaft of drives with worm gear is set to one of the four possible directions.



# Collection of drive series

	Electronics <b>MA</b>	<b>MP</b>	<b>MD</b>	
<b>DC</b> (brushed)  <b>PROFIBUS</b> <b>CANopen</b> <b>PROFINET</b> <b>EtherCAT</b>	 MAxxx S			
<b>EC</b> (electronically commutated)  <b>PROFIBUS</b> <b>PROFINET</b> <b>CANopen</b> <b>EtherCAT</b>		 MP xxx		
<b>EC</b> (electronically commutated)  <b>PROFIBUS</b> <b>PROFINET</b> <b>CANopen</b> <b>EtherCAT</b>		 MP 200  MP 220/280	 MD 300	

## Possible component combinations

Motors	Gears	
 055  100  130	Simple gears	
	Standard	Reinforced
 060  100  140  180	 SG 80 H   SG 80 WL1	 PLG 63   SGF 120 H   SGF 120 WL1
 200  without break with break   220  without break with break   280  without break with break	Precision gears	
	Standard	Reinforced
	 PLE 60   WPLE 60	 PLE 80   WPLE 80

## Process drive MD 300

The MD 300 series features comprehensive electronic functions and high-quality gears. Various gear series are available in several overall sizes and reductions.



The drives that can be configured based on these gears can be used as process drives or as auxiliary drives when special requirements must be met with regard to electronics, accuracy and mechanical flexibility.

This type series is particularly suited for special machine building where machine configurations are constantly changing, from quantities of 1 piece to medium-size series.



### Fits perfect

- \_ for precise positioning
- \_ for cyclic and pulsed positioning
- \_ for simultaneous use of decentralized I/Os
- \_ in machine tools
- \_ in inspection machines
- \_ in special machines

Technical data		MD 300	
Nominal voltage	VDC	24	48
Nominal torque S1 (S3)	Nm	0.60 (1.10)	0.60 (1.10)
Nominal power S1 (S3)	W	136 (178)	273 (357)
Nominal speed S1 (S3)	min <sup>-1</sup>	2,175 (1,550)	4,350 (3,100)
Nominal current S1 (S3)	A	8.0	7.6
Inertia torque	g cm <sup>2</sup>	512 (612 with holding brake)	
Electric motor		EC, electronically commutated motor	
_ Technology		IP 54, motor shaft IP 41	
_ Protection class			
Encoder		Absolute encoder, multi turn	
_ Technology		0.35° / 1,024 steps per revolution	
_ Positioning resolution		65,536 revolutions	
_ Positioning range		±0.7° / ±2 steps	
_ Positioning accuracy			
Gear		Planetary gear / angular planetary gear	
_ Type		3 ... 512	
_ Reductions		up to 44 (70) Nm, reinforced up to 120 (192) Nm	
_ Torques S1 (S3)			
Interfaces		 (V0/V1)  (IO)           CANopen (402)	
		RS-232, logic I/O module, limit switch	
Options		Holding brake, hand-held operator panel	
Brake chopper		Power 50 W, pulse energy 35 Ws	

### Definitions

#### S1

Continuous operation

#### S3

Intermittent operation

25 %, 10 min

Make time 2.5 min

Cycle time 10 min

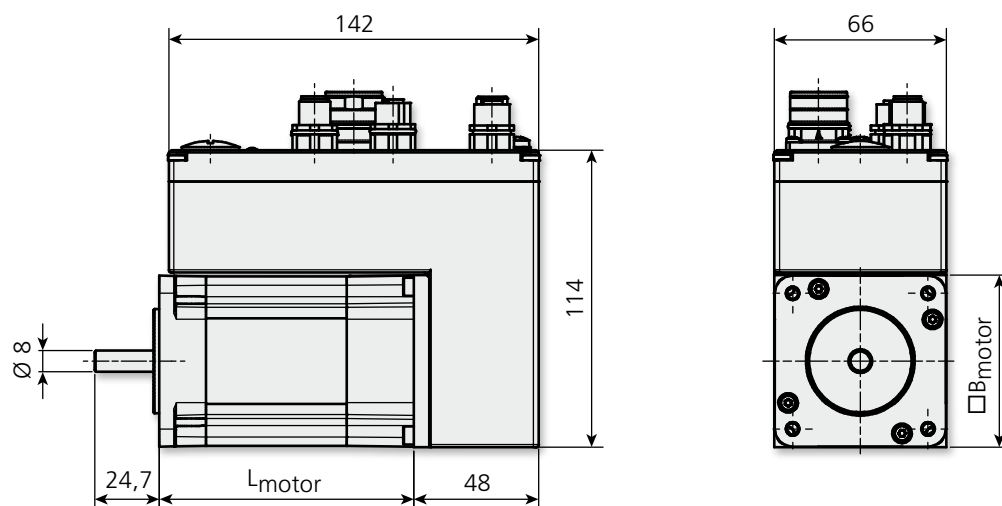
Max. torque 1.10 Nm

### True absolute encoder

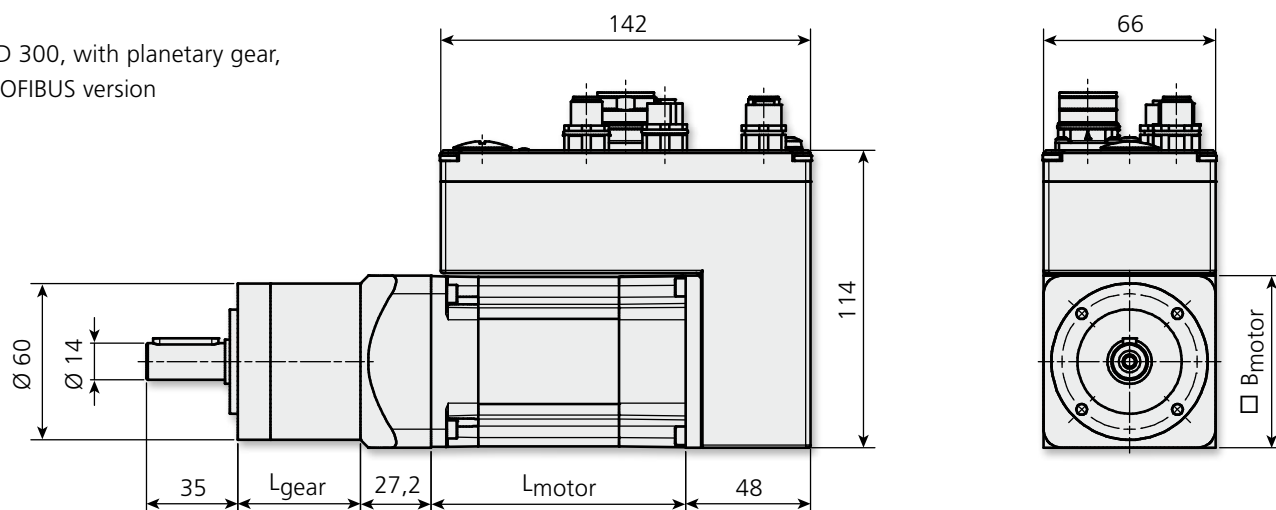
Fail-safe position information through electromechanical principle of measurement

# Drawings

MD 300, without gear,  
PROFIBUS version



MD 300, with planetary gear,  
PROFIBUS version



Motor design

Brake	L <sub>motor</sub>	B <sub>motor</sub>
no	97,6 mm	□ 66 mm
yes	132 mm	□ 67 mm

PLE 60 gear design

Gear stages	L <sub>gear</sub>
1	47 mm
2	59,5 mm
3	72 mm

Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at [www.tr-electronic.com](http://www.tr-electronic.com) or on request.

[www.tr-electronic.com](http://www.tr-electronic.com)

# Positioning drive MP 200

The MP 200 series features numerous electronic functions and high-quality gears. Various gear series are available in several overall sizes and reductions.






The drives that can be configured based on these gears can be used as positioning drives or as auxiliary drives when special requirements must be met with regard to accuracy and mechanical flexibility.

This type series is particularly suited for special machine building where machine configurations are constantly changing, from quantities of 1 piece to medium-size series.



**Fits perfect**

- \_ for demanding positioning
  - \_ for precise format setting
  - \_ for high-precision pulsed positioning
- \_ in transfer lines
  - \_ in testing devices
  - \_ in special machines

Technical data		MP 200	
Nominal voltage	VDC	24	48
Nominal torque S1 (S3)	Nm	0.40 (1.10)	0.40 (1.10)
Nominal power S1 (S3)	W	91 (178)	182 (357)
Nominal speed S1 (S3)	min <sup>-1</sup>	2,175 (1,550)	4,350 (3,100)
Nominal current S1 (S3)	A	5.2	4.8
Inertia torque	g cm <sup>2</sup>	512 (612 with holding brake)	
Electric motor		EC, electronically commutated motor	
_ Technology		IP 54, motor shaft IP 41	
_ Protection class			
Encoder		Absolute encoder, multi turn	
_ Technology		0.088° / 4,096 steps per revolution	
_ Positioning resolution		65,536 revolutions	
_ Positioning range		±0.7° / ±8 steps	
_ Positioning accuracy			
Gear		Planetary gear / angular planetary gear	
_ Type		3 ... 512	
_ Reductions		up to 44 (70) Nm, reinforced up to 120 (192) Nm	
_ Torques S1 (S3)			
Interfaces		<div><div> (V0/V1)</div><div> (IO)</div></div> <div> (402)</div> <div></div>	
Options		<div>Holding brake</div> <div></div>	

**Definitions**

**S1**  
Continuous operation

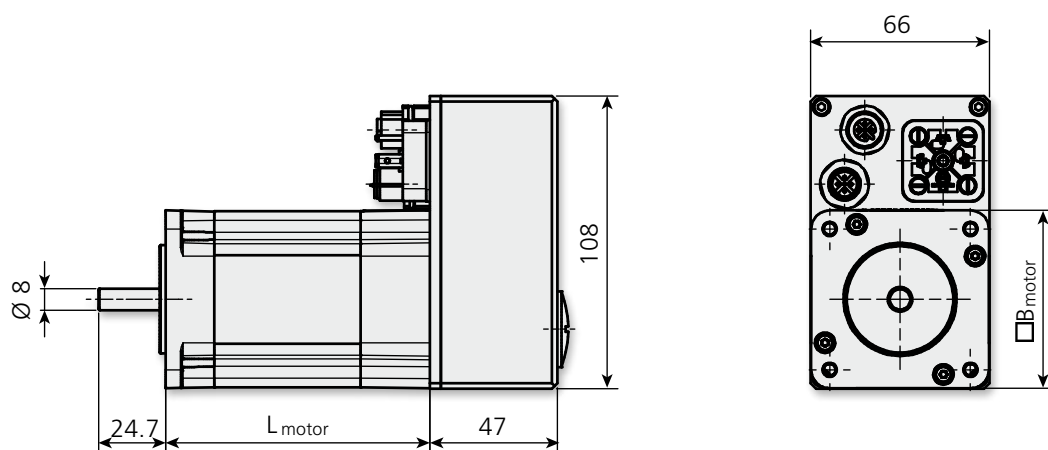
**S3**  
Intermittent operation  
25 %, 4 min  
Make time 1 min  
Cycle time 4 min  
Max. torque 1.10 Nm

**True absolute encoder**  
Fail-safe position information through electromechanical principle of measurement

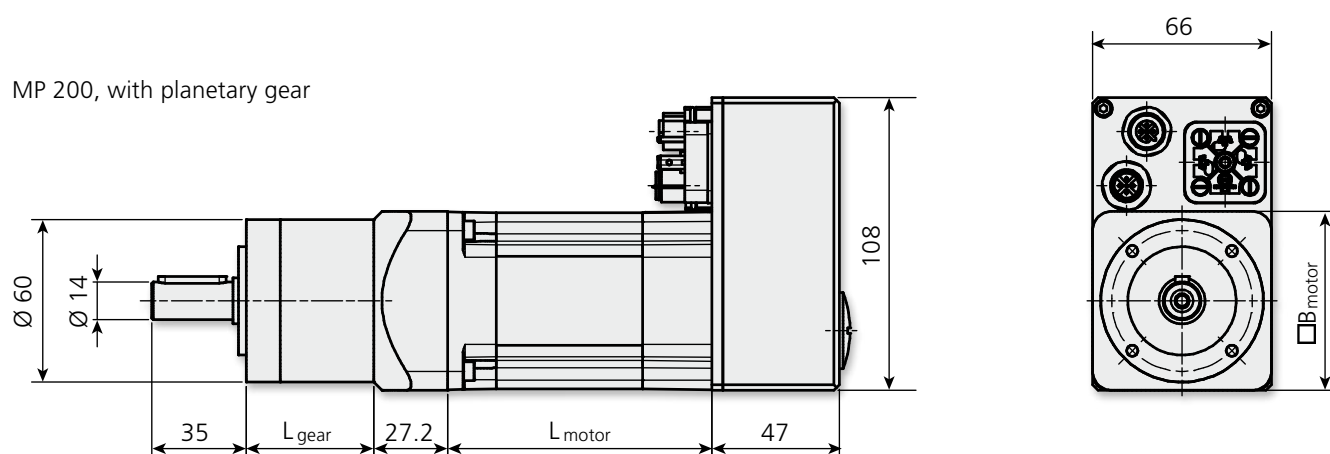


# Drawings

MP 200, without gear



MP 200, with planetary gear



Motor design

Type series	L <sub>motor</sub>	B <sub>motor</sub>
no	97,6 mm	□ 66 mm
yes	132 mm	□ 67 mm

PLE 60 gear design

Gear stages	L <sub>gear</sub>
1	47 mm
2	59,5 mm
3	72 mm

Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at [www.tr-electronic.com](http://www.tr-electronic.com) or on request.

[www.tr-electronic.com](http://www.tr-electronic.com)





## Positioning drive MP 220 / 280

MP 280 complements the MP 200 series with a model with a peak torque of 2 Nm. MP 220 is a much shorter version of the MP 200 with standard torque. MP220 / 280 can be offered with the same gearbox as the MP 200 series - only the motor-side geometry is adapted to the modified motors. With MP 280, applications are in reach that require a high torque during short time. As with the MP-200, many gearbox types are available: The perfect solution for special machine construction or for use in machines with multiple applications.



### Fits perfect

- \_ vertical positioning
- \_ acceleration of heavy loads
- \_ to overcome initial friction
- \_ woodworking machines
- \_ packaging machines
- \_ in assembly and handling units

Technical data		MP 220	MP 280
Nominal voltage	VDC	48	48
Nominal torque S1 (S2)	Nm	0,40 (1,4)	0,40 (2,0)
Nominal power S1 (S2)	W	167 (586)	167 (837)
Nominal speed S1 (S2)	min <sup>-1</sup>	4.000 (4.000)	4.000 (4.000)
Nominal current S1 (S2)	A	4,5 (16)	4,5 (20)
Inertia torque	g cm <sup>2</sup>	360	700
Electric motor		EC, electronically commutated motor IP 54, motor shaft IP 41	
_ Technology			
_ Protection class			
Encoder		Absolute encoder, multi turn 0.088° / 4,096 steps per revolution 65,536 revolutions ±0.7° / ±8 steps	
_ Technology			
_ Positioning resolution			
_ Positioning range			
_ Positioning accuracy			
Gear		Planetary gear / angular planetary gear 3 ... 512 up to 44 (70) Nm, reinforced up to 120 (192) Nm	
_ Type			
_ Reductions			
_ Torques S1 (S3)			
Interfaces		 (V0/V1)   (IO)	
Options		Holding brake 	

### definition

#### S1

Continuous operation

#### S2

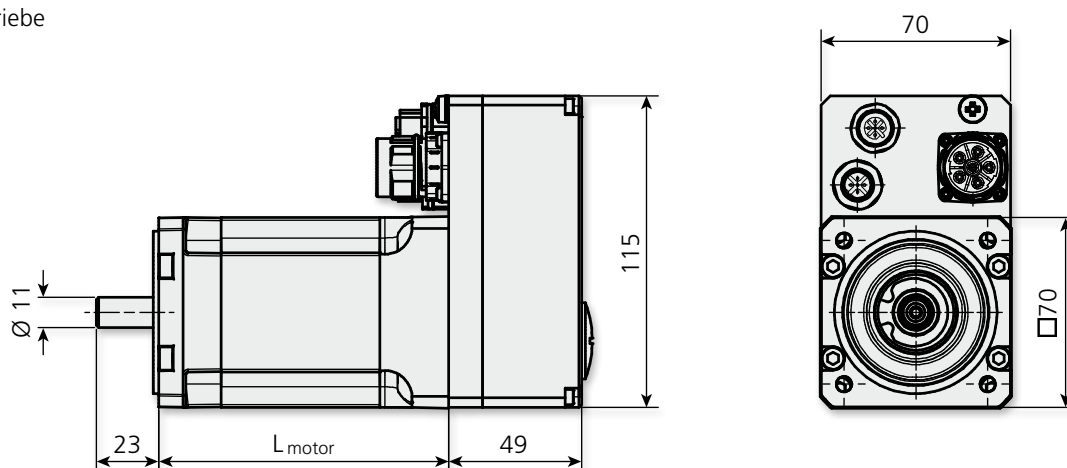
short-time operation  
2 min

### True absolute encoder

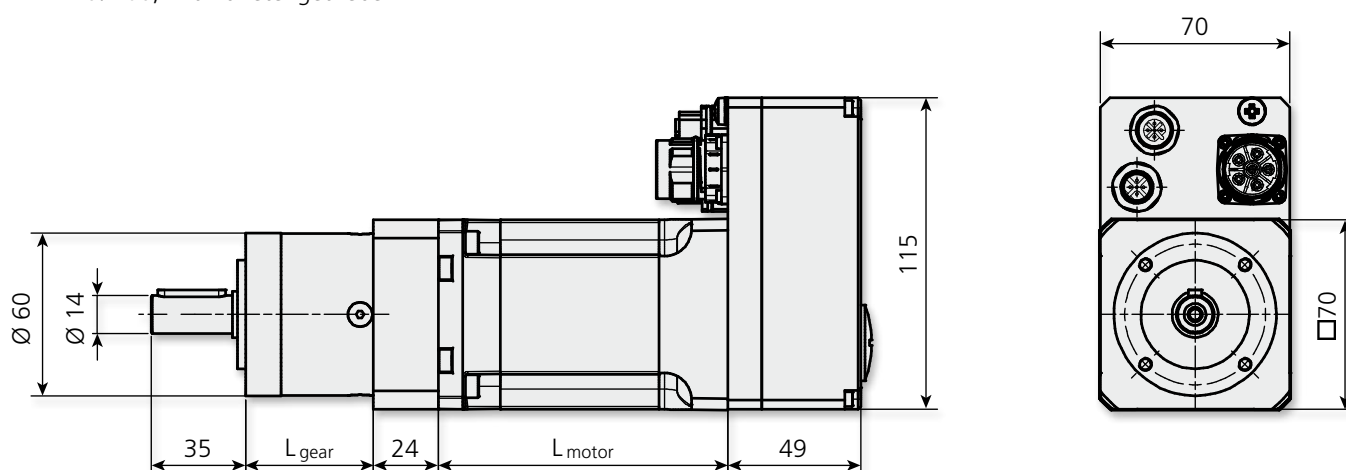
Fail-safe position information  
through electromechanical  
principle of measurement

# Drawings

MP 220/280, ohne Getriebe



MP 220/280, mit Planetengetriebe



Motor design MP 220

break	L <sub>motor</sub>
yes	108,5 mm
no	75,5 mm

Motor design MP 280

break	L <sub>motor</sub>
yes	140 mm
no	107 mm

PLE 60 gear design

Gear stages	L <sub>gear</sub>
1	47 mm
2	59,5 mm
3	72 mm

Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at [www.tr-electronic.com](http://www.tr-electronic.com) or on request.

[www.tr-electronic.com](http://www.tr-electronic.com)

# Positioning drive MP xxx (-060, -100, -140, -180)




The MP xxx series is characterized by numerous electronic functions and simple gears. The gears available are planetary and worm gears in several overall sizes and reductions. The drives that can be configured based on these gears can be used as positioning drives or as auxiliary drives when simple requirements must be met with regard to electronics and mechanics. This type series is particularly suited for mass production with defined drive configurations.



## Fits perfect

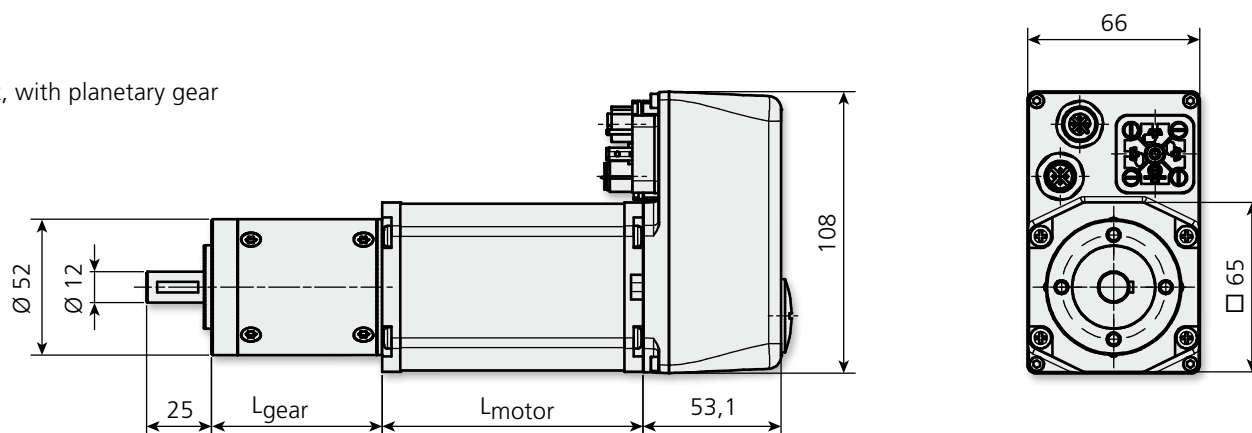
- \_ for easy positioning
- \_ for coarse format setting
- \_ for high-precision constant travel

- \_ in handling systems
- \_ in assembly devices
- \_ in special machines

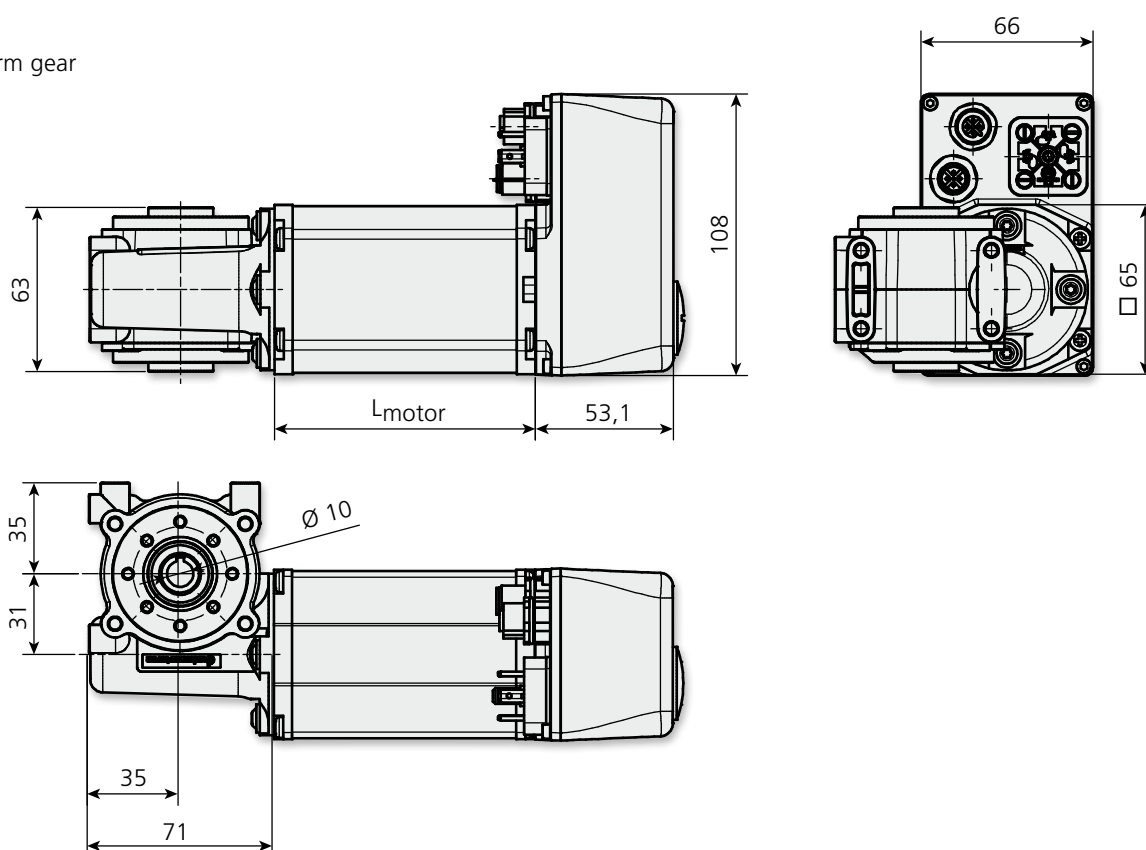
Technical data		MP 060	MP 100	MP 140	MP 180
Nominal voltage	VDC	24	24	42	24
Nominal torque S1	Nm	0.17	0.26	0.40	0.49
Nominal power S1	W	55	84	120	166
Nominal speed S1	min <sup>-1</sup>	3,080	3,090	2,860	3,240
Nominal current S1	A	4.0	5.6	4.5	9.5
Inertia torque	gcm <sup>2</sup>	72	128	172	129
<b>Electric motor</b> _ Technology _ Protection class		EC, electronically commutated motor with neodymium magnet IP 50			
<b>Encoder</b> _ Technology _ Positioning resolution _ Positioning range _ Positioning accuracy		Absolute encoder, multi turn 0.088° / 4,096 steps per revolution 65.536 revolutions ±0.7° / ±8 steps			
<b>Gear</b> _ Type _ Reductions _ Torques S1 (S3)		Planetary gear / worm gear 4.5 ... 512/5 ... 75, reinforced 3 ... 710 / 8 ... 80 up to (24/10) Nm, reinforced up to (100/30) Nm			
Interfaces		 (V0/V1)  (IO)                                              CANopen (402)			
Options		Special voltages for large production series 			

# Drawings

MP xxx, with planetary gear



MP xxx, with worm gear



Motor design

Type series	L <sub>motor</sub>
MP 060	75 mm
MP 100	100 mm
MP 140	125 mm
MP 180	118 mm

PLG 52 gear design

Gear stages	L <sub>gear</sub>
1	50 mm
2	65,5 mm
3	80,5 mm

Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at [www.tr-electronic.com](http://www.tr-electronic.com) or on request.

[www.tr-electronic.com](http://www.tr-electronic.com)


# Servo drive MA xxx (-055, -100, -130)

The MA xxx series is characterized by simple electronic functions and simple gears. The gears available are planetary and worm gears in several overall sizes and reductions. The drives are designed for occasional adjustment tasks when simple requirements must be met with regard to electronics, mechanics and service life. The MA xxx series is particularly suited for mass production with defined drive configurations.



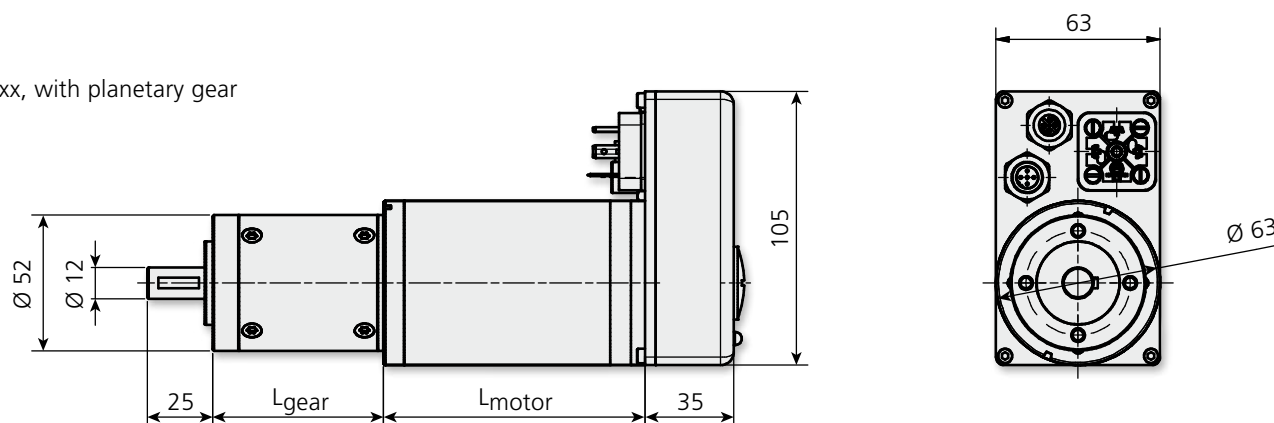
**Fits perfect**

- \_ for setting stops
  - \_ for positioning guide rails
  - \_ for aligning spray nozzles
- \_ in woodworking machines
  - \_ in packaging machines
  - \_ in coating machines

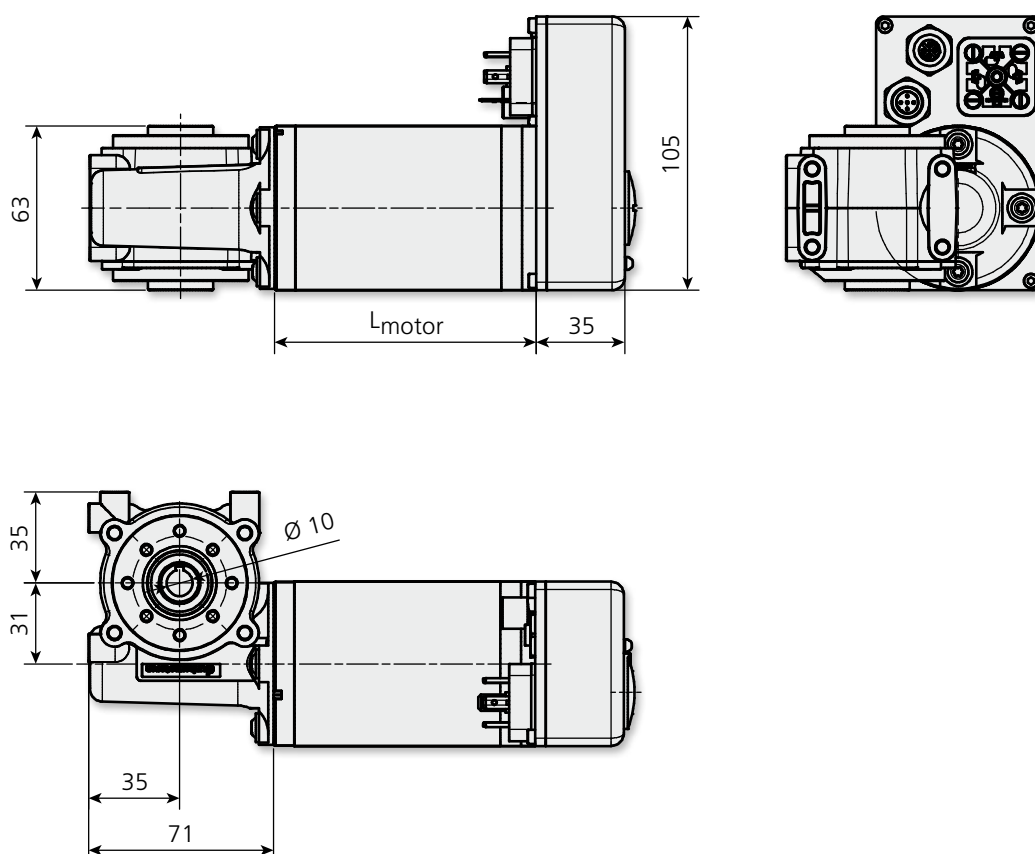
Technical data		MA 055	MA 100	MA 130
Nominal voltage	VDC	24	24	48
Nominal torque S1	Nm	0.14	0.27	0.32
Nominal power S1	W	44	86	107
Nominal speed S1	min <sup>-1</sup>	3,000	3,050	3,750
Nominal current S1	A	2.7	4.9	4.5
Inertia torque	gcm <sup>2</sup>	400	750	750
Electric motor		DC, brushed motor IP 50		
_ Technology				
_ Protection class				
Encoder		Absolute encoder, multi turn 0.088° / 4,096 steps per revolution 65,536 revolutions ±0.7° / ±8 steps		
_ Technology				
_ Positioning resolution				
_ Positioning range				
_ Positioning accuracy				
Gear		Planetary gear / worm gear 4.5 ... 512/5 ... 75, reinforced 3 ... 710 / 8 ... 80 up to (24/10) Nm, reinforced up to (100/30) Nm		
_ Type				
_ Reductions				
_ Torques S1 (S3)				
Interfaces		PROFI <sup>®</sup> BUS <sup>®</sup> (V0/V1) PROFI <sup>®</sup> NET <sup>®</sup> (IO) CANopen (402) EtherCAT <sup>®</sup>		
Options		Special voltages for large production series 		

# Drawings

MA xxx, with planetary gear



MA xxx, with worm gear



Motor design

Type series	L <sub>motor</sub>
MA 055	95 mm
MA 100	125 mm
MA 130	125 mm

PLG 52 gear design

Gear stages	L <sub>gear</sub>
1	50 mm
2	65,5 mm
3	80,5 mm

Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at [www.tr-electronic.com](http://www.tr-electronic.com) or on request.

[www.tr-electronic.com](http://www.tr-electronic.com)

# Precision Gears for MD 300, MP 200 / 220 / 280

## Planetary Gear PLE 60

Permanent Operation/Periodic Duty up to 44/70 Nm

The PLE 60 is the perfect economical alternative to servo planetary gears. The motor and gear are connected with a detachable coupling and clamping hub. Friction losses are negligible. The gear is suitable for all applications in where it is adequate to have a backlash of approximately 15 arcmin.

### Features

- \_ low backlash (10-12-15 arcmin), (1-2-3)-stage
- \_ high level of efficiency (96-94-90 %), (1-2-3)-stage
- \_ high admissible shaft forces (600/500) N, (axial/radial)
- \_ high short-term overload factor 1,60
- \_ arbitrary mounting position
- \_ lifetime lubrication



up to 44/70 Nm

## Angular Planetary Gear WPLE 60

Permanent Operation/Periodic Duty up to 44/70 Nm

The WPLE 60 is the 90° angle version to the PLE 60. The motor and gear are connected with a detachable coupling and clamping hub. Friction losses are negligible. A bevel gear 1:1 is in front of the PLE 60.

### Features

- \_ low backlash, (16-18-21 arcmin), (1-2-3)-stage
- \_ high level of efficiency (94-92-88 %), (1-2-3)-stage
- \_ high admissible shaft forces (600/500) N, (axial/radial)
- \_ high short term overload factor 1,60
- \_ arbitrary mounting position
- \_ lifetime lubrication



up to 44/70 Nm

## Harmonic Drive gear HFUC-14

Continuous / intermittent torque up to 7.8 / 28 Nm

The HFUC-14 is a backlash-free precision gear and is non-detachably connected to the motor. It is ideally suited for applications where the backlash of servo gears is insufficient. The angular tolerance is determined by the torsional stiffness.

### Features

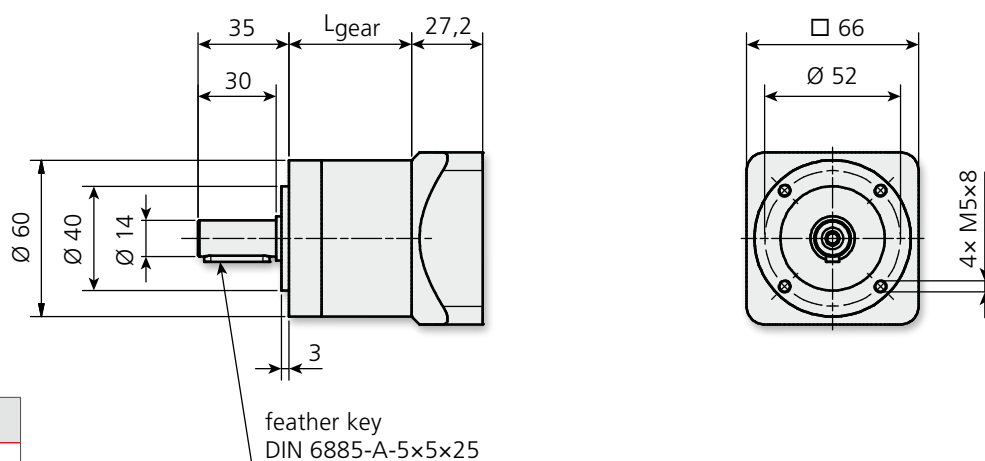
- \_ 4 different reductions  $i = (30 \dots 100)$
- \_ high load-dependent efficiency
- \_ high allowed radial force 1.500 N
- \_ short-term overload 100 %
- \_ any installation position
- \_ lifetime lubrication



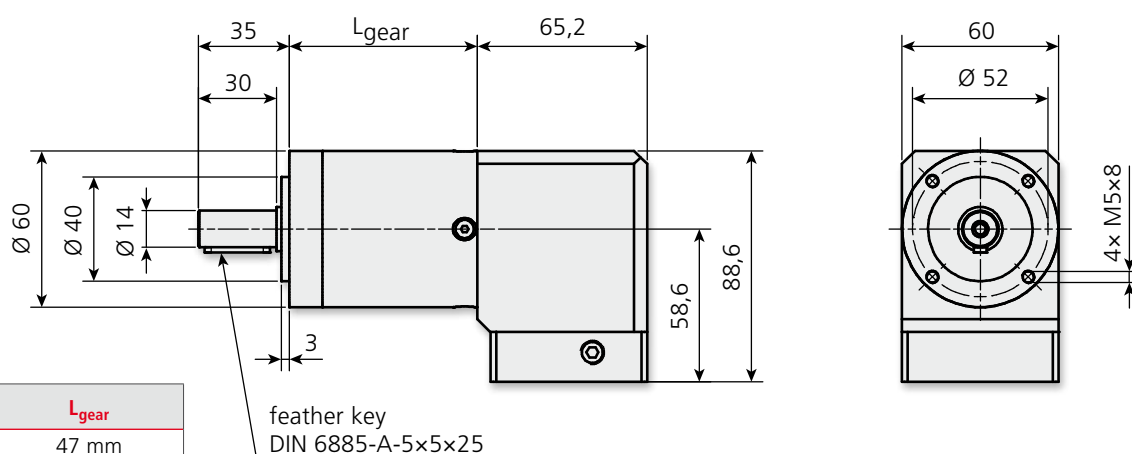
Backlash-free



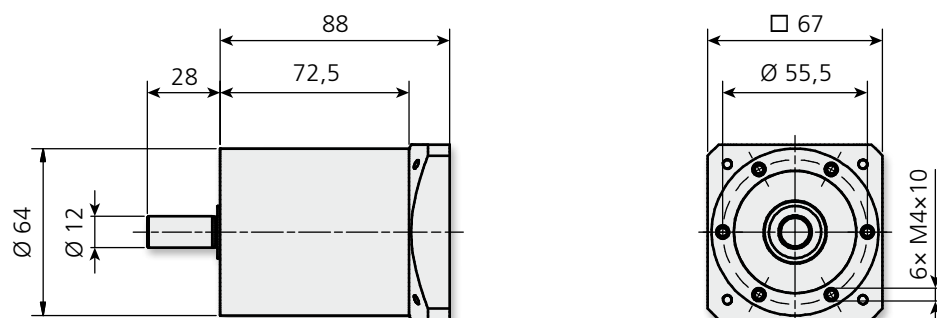
# Drawings



Gear stages	L <sub>gear</sub>
1	47 mm
2	59,5 mm
3	72 mm



Gear stages	L <sub>gear</sub>
1	47 mm
2	59,5 mm
3	72 mm



---

## Enhanced Precision Gears for MD 300, MP 200 / 220 / 280

### Planetary Gear PLE 80

Permanent Operation/Periodic Duty up to 130/208 Nm

The PLE 80 is the perfect economical alternative to servo planetary gears. The motor and gear are connected with a detachable coupling and clamping hub. Friction losses cannot be neglected. The gear is suitable for all applications where it is adequate to have a backlash of approximately 15 arcmin.

#### Features

- \_ low backlash (7-9-11 arcmin), (1-2-3)-stage
- \_ high level of efficiency (96-94-90 %), (1-2-3)-stage
- \_ high admissible shaft forces, (1.200/950 N), (axial-radial)
- \_ high short term overload factor 1,60
- \_ arbitrary mounting position
- \_ lifetime lubrication



130/208 Nm

---

### Angular Planetary gear WPLE 80

Permanent Operation/Periodic Duty up to 130/208 Nm

The WPLE 80 is the 90° angle version to the PLE 80. The motor and gear are connected with a detachable coupling and clamping hub. Friction losses can not be neglected. A bevel gear 1:1 is in front of the PLE 80. The gear backlash increases by an angle part of 6 arcmin.

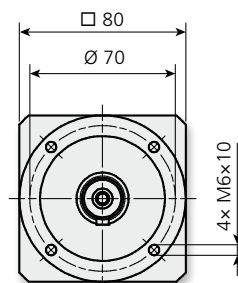
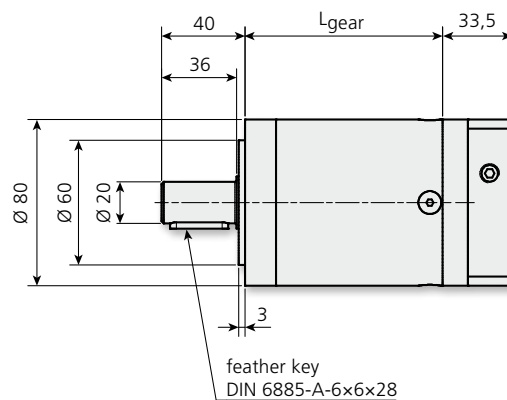
#### Features

- \_ low backlash (13-15-17 arcmin), (1-2-3)-stage
- \_ high level of efficiency (94-92-88 %), (1-2-3)-stage
- \_ high admissible shaft forces, (1.200/950 N), (axial-radial)
- \_ high short term overload factor 1,60
- \_ arbitrary mounting position
- \_ lifetime lubrication

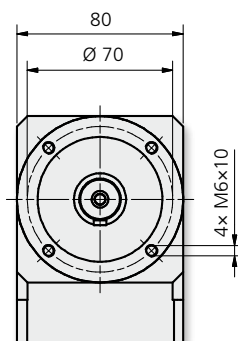
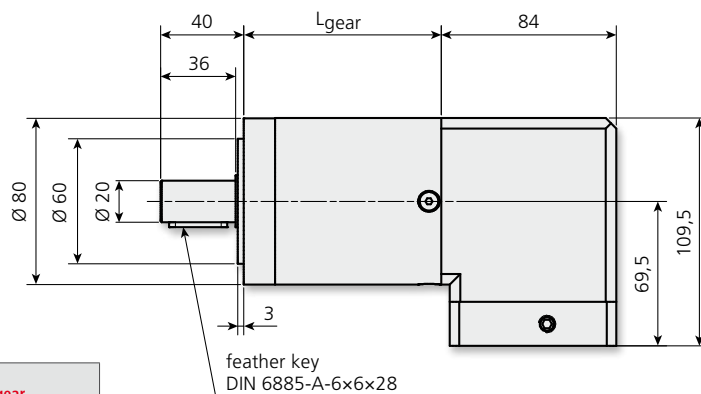


bis 130/208 Nm

# Drawings



Gear stages	$L_{\text{gear}}$
1	60,5 mm
2	77,5 mm
3	95 mm



Gear stages	$L_{\text{gear}}$
1	60,5 mm
2	77,5 mm
3	95 mm

## Simple gears for MP xxx, MA xxx

### Planetary gear PLG 52

Continuous torque up to 24 Nm

The PLG 52 is a gear with simple circumferential backlash and is non-detachably connected to the motor. It is suitable for any application in which the circumferential backlash is approx. 1° and the startup frequency does not have to meet special requirements. Friction losses can be neglected.

#### Features

- \_ backlash (1-1-1,5)°, (1-2-3) -stage
- \_ level of efficiency (90-81-73) %, (1-2-3) -stage
- \_ admissible shaft forces, (300/350) N, (axial/radial)
- \_ output shaft with double ball bearing
- \_ arbitrary mounting position
- \_ lifetime lubrication



up to 24 Nm

### Worm gear SG 80, with solid shaft

Continuous torque up to 10 Nm

The SG 80 is a worm gear with one-sided shaft and is non-detachably connected to the motor. It is suitable for applications with confined installation spaces and low circumferential backlash requirements. Friction losses can be neglected.

#### Features

- \_ backlash 1°
- \_ level of efficiency (70...25) % bei 1.500 min<sup>-1</sup>
- \_ admissible shaft forces, (300/350) N, (axial/radial)
- \_ output shaft offset by 31 mm
- \_ arbitrary mounting position
- \_ lifetime lubrication



up to 10 Nm

### Worm gear SG 80 H

Continuous torque up to 10 Nm

The SG 80 H is the hollow shaft version of the SG 80 and is non-detachably connected to the motor. It is push-fitted and excellently suitable for applications with highly confined installation spaces and low circumferential backlash requirements. Friction losses can be neglected.

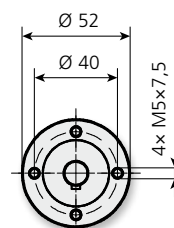
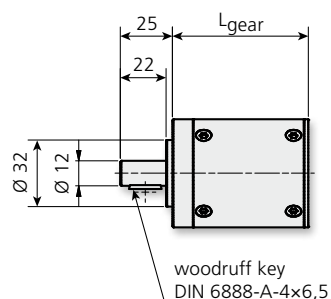
#### Features

- \_ backlash 1°
- \_ level of efficiency (70...25) % bei 1.500 min<sup>-1</sup>
- \_ admissible shaft forces, (300/350) N, (axial/radial)
- \_ output shaft offset by 31 mm
- \_ arbitrary mounting position
- \_ lifetime lubrication

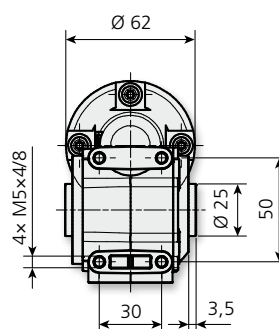
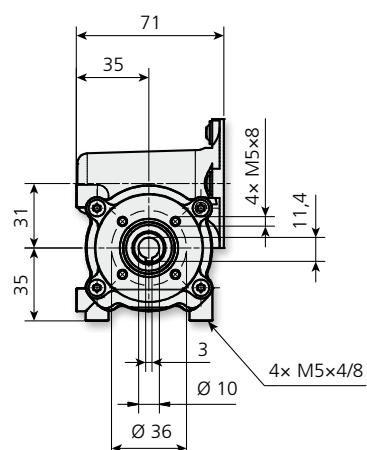
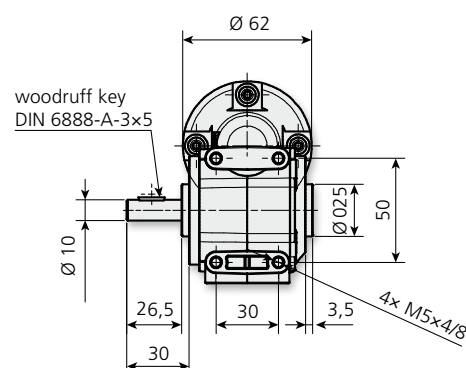
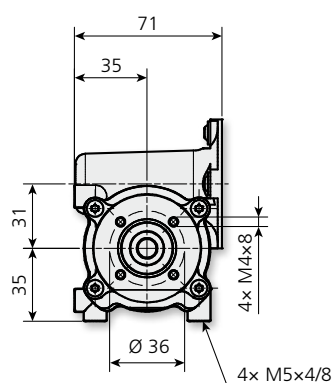


up to 10 Nm

# Drawings



Gear stages	L <sub>Gear box</sub>
1	50 mm
2	65,5 mm
3	80,5 mm



## Reinforced simple gears for MP xxx, MA xxx

### Planetary gear PLG 63

Continuous torque up to 100 Nm

The PLG 63 is a gear with simple circumferential backlash and is non-detachably connected to the motor. It is suitable for any application in which the circumferential backlash is approx. 1° and the startup frequency does not have to meet special requirements. Friction losses can be neglected.

#### Features

- \_ circumferential backlash (1-1.5)°, (1-2-3) stages
- \_ efficiency (90-81-73) %, (1-2-3) stages
- \_ allowed shaft forces, (800/800) N, (axial/radial)
- \_ output shaft with double ball bearing
- \_ any installation position
- \_ lifetime lubrication



up to 100 Nm

---

### Worm gear SGF 120, with solid shaft

Continuous torque up to 30 Nm

The SGF 120 is a worm gear with one-sided shaft and is non-detachably connected to the motor. It is particularly suited for applications with confined installation spaces and low circumferential backlash requirements. Friction losses can be neglected.

#### Features

- \_ circumferential backlash 1°
- \_ efficiency (70 ... 25) % at 1.500 min<sup>-1</sup>
- \_ allowed shaft forces, 300/500 N, (axial/radial)
- \_ output shaft offset by 31 mm
- \_ any installation position
- \_ lifetime lubrication



up to 30 Nm

---

### Worm gear SGF 120 H

Continuous torque up to 30 Nm

The SGF 120 H is the hollow shaft version of the SGF 120 and is non-detachably connected to the motor. It is push-fitted and excellently suitable for applications with highly confined installation spaces and low circumferential backlash requirements. Friction losses can be neglected.

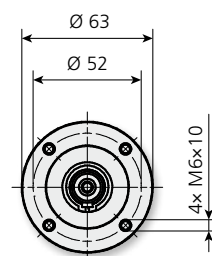
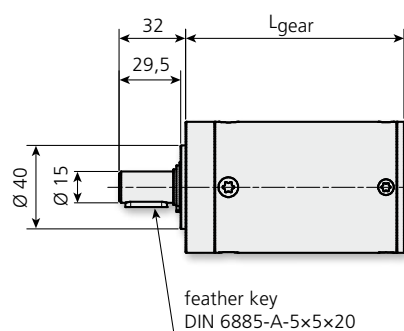
#### Features

- \_ circumferential backlash 1°
- \_ efficiency (70 ... 25) % at 1.500 min<sup>-1</sup>
- \_ allowed shaft forces, 300/500 N, (axial/radial)
- \_ output shaft offset by 31 mm
- \_ selectable orientation
- \_ lifetime lubrication

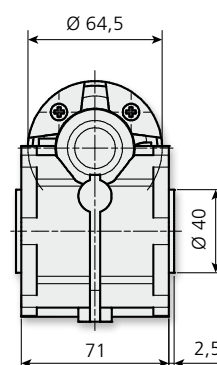
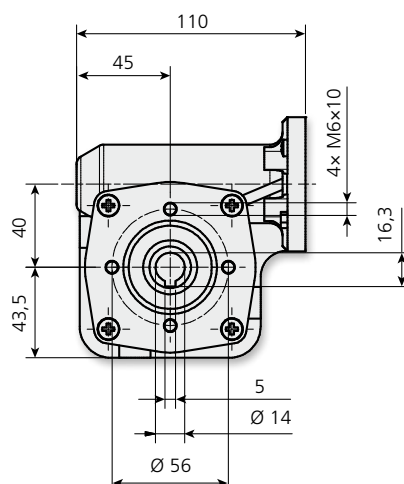
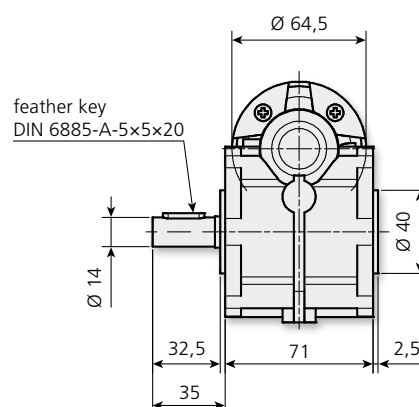
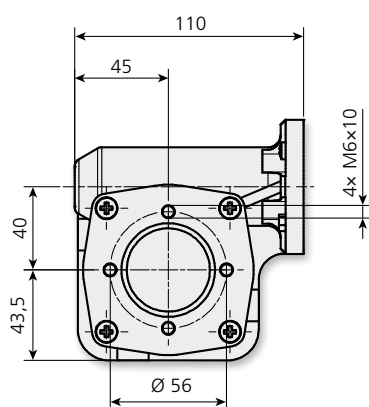


up to 30 Nm

# Drawings



Gear stages	$L_{gear}$
1	62,5 mm
2	83 mm
3	105 mm



# Interfaces

## PROFIBUS



The drive version with PROFIBUS DP is based on the device profile PROFIdrive V3.0 and is assigned to application class 3 - position drive with decentralized positioning control (single axis point-to-point). The device profile V3.0 allows free configuration of process data telegrams as an essential enhancement to V2.0 with a fixed pre-defined telegram structure.

The appropriate communication profile is PROFIBUS DP VO/V1 with cyclic and acyclic data traffic. All common bit rates are accessible and get adjusted automatically based on a bus analysis. In the case a drive has a digital input, a hand-held device can be connected. Simple processing operations are possible without any bus connection. If the bus is in operation, the input is for connecting hardware limit switches, or together with digital output, they serve as logical I/O module at the PROFIBUS.

### Features

- \_ positioning and speed control
- \_ cyclic and acyclic communication according to PROFIBUS DP VO/V1
- \_ free configurable process data telegrams according to device profile PROFIdrive V3.0
- \_ voltage failure-safe update possibility

## PROFINET



The encoTRive drives with PROFINET use the same device profile PROFIdrive V3.0 as PROFIBUS DP. When migrating from PROFIBUS to PROFINET, the control logic and the PZD configuration remain the same. Logical programming adjustments do not occur. The range of PROFIBUS functions is fully integrated into PROFINET. PROFINET offers some additional functions. There is an alarm telegram in case of trouble when the cycle times are too low and there are more addressable nodes.

The projecting is carried out with the same tools used for PROFIBUS. Together with the identical program and processing logic, the change from PROFIBUS to PROFINET is solely a matter of the communication technology.

### Features

- \_ no bus termination necessary
- \_ address assignment via software
- \_ the protocol analysis can be done with freely available Ethernet tools (for example with Wireshark™)
- \_ the topology is simplified by star, lines, tree and ring structures as well as arbitrary hybrid forms

### Technical Communication Data

Communication profile	PROFIBUS - DP	PROFINET-IO
Range of functions	DP-V0 and DP-V1	Conformance Class A, Real Time Class1
Device profile	Profidrive V3.0, Application Class 3	
Transfer	cyclic (process data), acyclic (alarm and time uncritical parameters)	
Process data configuration	free or over standard protocols	
Max. participants	max. 96	>1000
Terminating resistance	MD: internal, MP/MA: external	needless



## Function blocks for PROFIBUS and PROFINET

The available demo function blocks allow commissioning any drive type without having to know the parameter features and the telegram sequences.

The interfaces of the individual function blocks are identical for Profibus and Profinet.

	Description
Parameter PIV	Function block for parameterizing individual parameters using the cyclic PIV channel (parameter identification value)
Parameter DPV1	Function block for parameterizing individual parameters using the acyclic data channel (DPV1)
Control PCD	Function block for commissioning and activating the drive using the cyclic PCD channel (processdata)
Demo Control PCD	Demo program for using the Control PCD function block to cyclically approach two positions in positioning mode

## CANopen

### CANopen

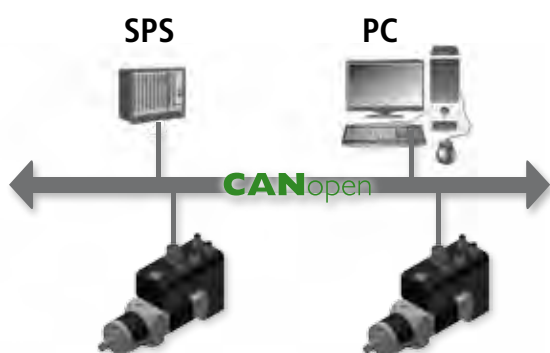
The drive version with CANopen is based on the device profile CiA DSP 402 – drives and motion control. The device profile permits a free configuration of process telegrams through PDO mapping of application objects. Available are 4 RxPDO and 4 TxPDO.

The associated communication profile is CiA DS 301 – CANopen application layer and communication profile.

CANopen defines, for distributed industrial automation systems, a standardized protocol based on CAN. All common bit rates are accessible and set over a DIP-switch. The fast exchange of process data uses a process data object (PDO), the access to the entries within the object directory happens over service data object (SDO). All drive specific information is summed up within the object directory.

### Features

- \_ installation of the GSD (ML) file within the projecting tool
- \_ positioning and speed control
- \_ cyclic and acyclic communication with PDO/SDO
- \_ free configurable process data telegram according to the communication profile CiA DS 301
- \_ each transmission direction with up to 4 PDOs



### Technical Communication Data

Communication profile	CANopen
Device profile	CiA DS 301-DP
Geräteprofil	CiA DSP 402
Address range	0 ... 127
Address adjustment	hardware, DIP-switch
Bitrates	10/20/50/100/125/250/ 500/800/1.000 kBit/s
Process data configuration	free or over standard protocols
Terminating resistance	MD: internal, MP/MA: external
Transfer	cyclic (PDO), acyclic (SDO)

# Electrical and mechanical accessories

## EncoTRive-Control-Device-Tool (EDT)

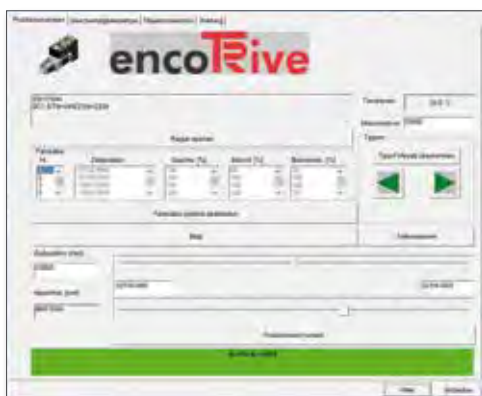
EDT is the parameterization and diagnosis tool for all drives of the EncoTRive product family. It is accessed via predefined interfaces. In case of PROFIBUS, these interfaces are the Hilscher Master Class 1/2, Siemens CP5xxx and other interface cards. In addition, a PC can be connected to the MD type series via an integrated interface converter (RS-232).

The elements of the user interface are subdivided into logical subgroups. The user interface can therefore be controlled intuitively. There are two menu items for **positioning** and **speed control** modes which easily allow starting traveling operations. At the same time, current actual values are displayed, such as position and velocity.

A table consisting of the objects of the object directory lists the cyclic parameters in different colors. The control word and the status word are broken down to bit level. This allows free access to both the individual state transitions and the resulting states. The individual actions are directly performed at the level of the status machine. The command order can be defined as desired.

### Technical data

- \_ parameterization and diagnosis tool
- \_ connection options to PC via RS-232 or interface cards
- \_ intuitive user interface
- \_ input of position and velocity
- \_ freely accessible state transitions



### Converter PC-USB to CANopen for the EDT

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The PC-USB to CANopen converter enables the connection to CANopen networks via an USB interface. The converter is ideal for mobile use due to its compact plastic housing.



#### Technical Data

- \_ transmission rate up to 1 Mbit/s
- \_ connection to PC over USB 1.1, compatible to USB 2.0
- \_ connection to CAN-Bus over D-Sub, 9-pole according to CiA® 102
- \_ voltage supply over USB
- \_ CAN specification 2.0A (11-Bit-ID) and 2.0B (29-Bit-ID)
- \_ time-stamp resolution approx. 42 µs

## Electrical and mechanical accessories

### PROFIBUS hand-held operator panel for MD drives

The hand-held operator panel is connected to the M12 plug connectors of the digital I/Os. It allows executing simple drive functions without bus connection, for example, on initial commissioning or during service work. It is designed as a portable component and features a 5 m long connecting cable.

When it is fitted without bus connection or when PROFIBUS communication is interrupted, the hand-held panel automatically obtains control change rights. Monitoring algorithms ensure that the control change rights are assigned either only to the hand-held operator panel or only to the PROFIBUS master.

The hand-held operator panel holds the control change rights until either an acknowledgement is made via the control or a restart is carried out.

#### Features

- \_ jog into positive or negative direction up to the software limit switch
- \_ Indicator for software limit min., max. and reference
- \_ setting a reference point
- \_ fault acknowledgement



### Demo kit and function block for S7 (PROFIBUS, PROFINET)

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The demo kits contain all components required for fast commissioning. For this purpose, the power supply unit and the drive are already pre-wired. Commissioning only requires that the bus lines be established by means of configurable plug connectors.



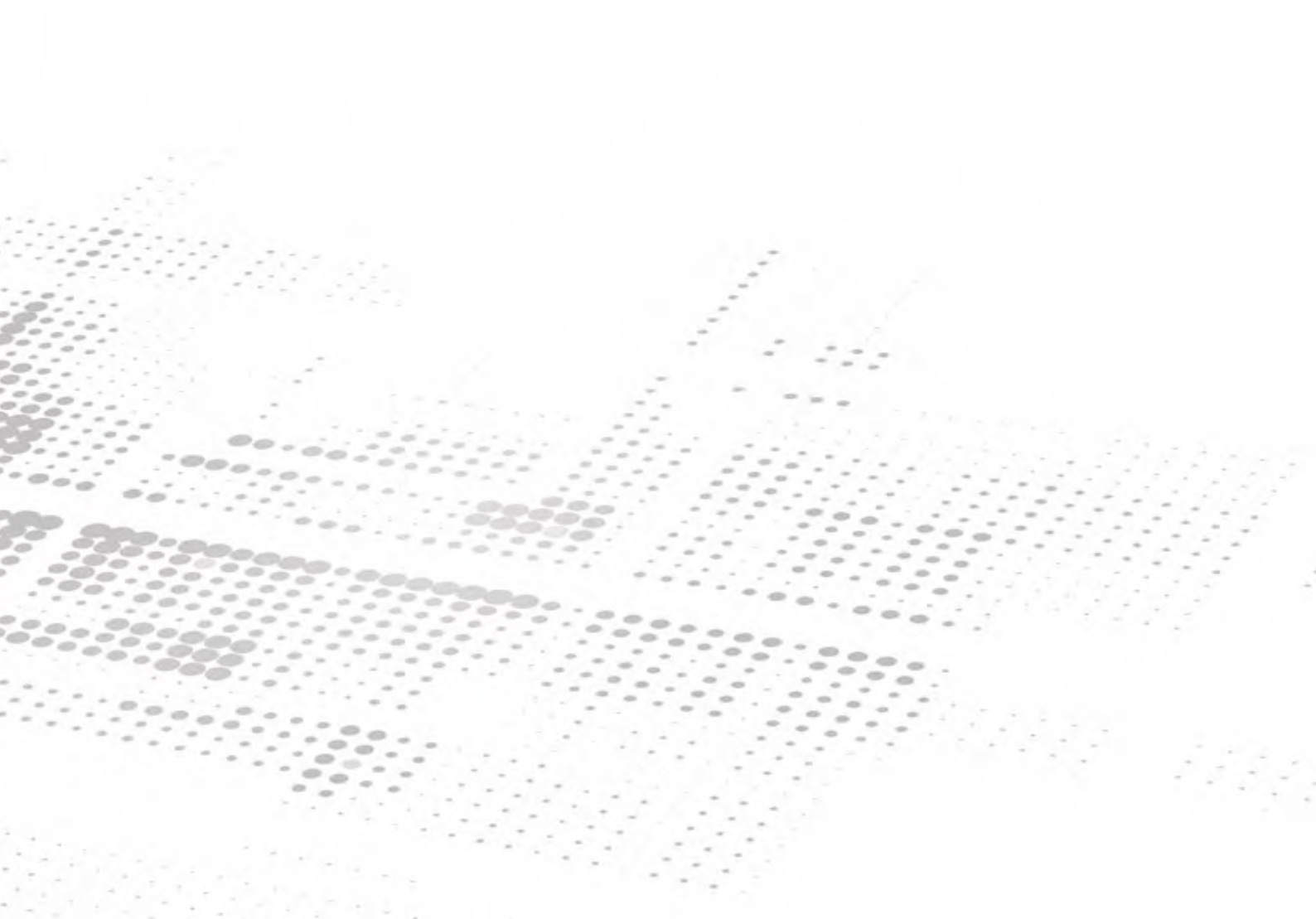
#### EncoTRive demo kit contents

- \_ encoTRive as chosen
- \_ wired power supply unit  
230/110 VAC at 24/48 VDC
- \_ configurable connector set
- \_ RS-232 connecting cable
- \_ Bus cable
- \_ PC-USB to CANopen adapter,  
including driver
- \_ demo function blocks
- \_ encoTRive Device Tool (EDT)
- \_ documentation

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# Accessories



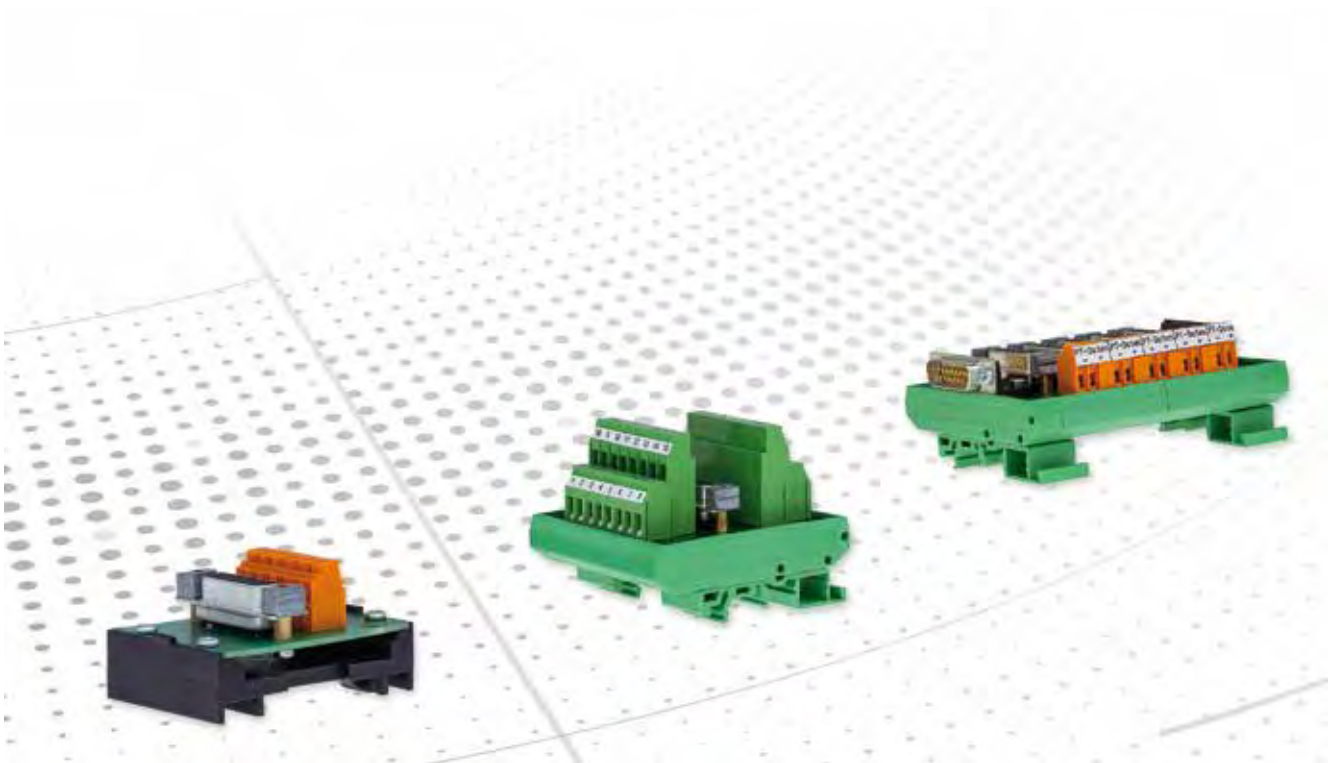


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## Programming Tools



### Electronic helpers for configuration and connection

If you use TR-Electronic measuring technology with fieldbuses or industrial ethernet, you can configure these measuring systems conveniently with the relevant tools provided by your control system (e.g. Simatic Manager...). The necessary files (EDS/GSD/XML...) can be found on our website at any time: For an increasing number of devices (including the article numbers specified in this catalog as "Suggested Products") you can simply enter the article number in the search field on our website. You will then find everything you need

in the "Setup File" in the Download area for this device. Setup packages are available for the various interfaces in the Service and Download area (in the chapter GSD-/EDS-/XML files). Further information on finding the software for your specific model can be found in the package. Of course you can also obtain the suitable files for your devices from your usual contact.

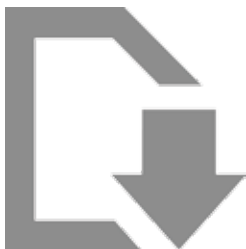











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## Software

Product	GSD-/EDS-/XML-Files 	TR-Winprog 
Group	Software	Software
Description	Load the software packages for your fieldbus or industrial ethernet system from our homepage - anytime you want	Programming tool for sensors made by TR-Electronic with direct interfaces
Suitable software		
Operating system		
Technology		
Transferred signals		
Interface	       	<b>SSI</b> <b>ISI</b>  <b>Analog</b> <b>Parallel</b>
Weblink	<a href="http://www.tr-electronic.com/service/downloads/file-download.html">www.tr-electronic.com/service/downloads/file-download.html</a>	<a href="http://www.tr-electronic.com/service/downloads/software.html">www.tr-electronic.com/service/downloads/software.html</a>
QR-Code		

# Adapter Switch cabinet module

Product	PC-Adapter V5	PT 6	PT 6 N	
				
Group	Adapter	Switch cabinet module	Switch cabinet module	
Description	Connects PC with programming interface of sensors made by TR-Electronic. Galvanically isolated	Connects programming adapter with programming lines and supply	Connects programming adapter with programming lines and supply - defined voltage levels on PT+/PT- when no programming tool is connected	
Suitable software	TRWINprog			
Operating system	WIN 95 se ... WIN 10			
Technology	USB (HID)			
Transferred signals		PT +, PT-, UB, GND	PT +, PT-, UB, GND	
Interface				
Weblink	<a href="http://www.tr-electronic.com/f/TR-V-TI-GB-0092">www.tr-electronic.com/f/TR-V-TI-GB-0092</a>	<a href="http://www.tr-electronic.com/f/TR-V-TI-GB-0020">www.tr-electronic.com/f/TR-V-TI-GB-0020</a>	<a href="http://www.tr-electronic.com/f/TR-V-TI-GB-0030">www.tr-electronic.com/f/TR-V-TI-GB-0030</a>	
QR-Code				

## Switch cabinet module

PT 100		PT 15/2		SSI/ISI simple		SSI/ISI triple	
Switch cabinet module	Switch cabinet module	Switch cabinet module	Switch cabinet module	Switch cabinet module	Switch cabinet module	Switch cabinet module	Switch cabinet module
Similar to PT 6 N, but for up to 5 sensor systems	Connects programming adapter with programming lines and supply. Other sensor lines are bypassed			To daisy chain into sensor lines using SubD 15 connectors		Similar to SSI/ISI simple, but for up to 3 encoder lines	
5 x PT +, PT-, UB, GND	PT +, PT-, UB, GND and signal lines (clamping block)	PT +, PT-, UB, GND and signals for SSI/ISI (SubD 15)	3 x PT +, PT-, UB, GND and signals for SSI/ISI (SubD 15)				
<a href="http://www.tr-electronic.com/f/TR-V-TI-GB-0040">www.tr-electronic.com/f/TR-V-TI-GB-0040</a>	<a href="http://www.tr-electronic.com/f/TR-V-TI-GB-0060">www.tr-electronic.com/f/TR-V-TI-GB-0060</a>	<a href="http://www.tr-electronic.com/f/TR-V-TI-GB-0070">www.tr-electronic.com/f/TR-V-TI-GB-0070</a>	<a href="http://www.tr-electronic.com/f/TR-V-TI-GB-0050">www.tr-electronic.com/f/TR-V-TI-GB-0050</a>				
							

## Suggested Products

Order code	Description	Items delivered	For TR-software
<b>PC-Adapter</b>			
490-00313	PC-Adapter V5 (USB-HID), WIN8	PC-Adapter, plug power adaptor, switch cabinet module PT6, ribbon cable SubD15, suitcase, software on DVD	TRWINprog
490-00310	PC-Adapter V4 (USB-COM), WIN-XP	PC-Adapter, plug power adaptor, switch cabinet module PT6, ribbon cable SubD15, suitcase, software on DVD	TRWINprog, EPROGW32, LTProg
<b>Switch cabinet module</b>			
490-00101	PT 6	Switch cabinet module	
490-00107	PT 6 N	Switch cabinet module	
490-00103	PT 100	Switch cabinet module	
490-00105	PT 15/2	Switch cabinet module	
490-00106	SSI/ISI simple	Switch cabinet module	
490-00104	SSI/ISI triple	Switch cabinet module	
<b>Software</b>			
490-01001	Programming tools, EDS-/GSD-/XML-files for products made by TR-Electronic	DVD	

For further product information simply enter the order number in the search field at [www.tr-electronic.com](http://www.tr-electronic.com).

### Further product information

1. Enter order code into ...



2. Searchfield (top right) on [www.tr-electronic.com](http://www.tr-electronic.com)



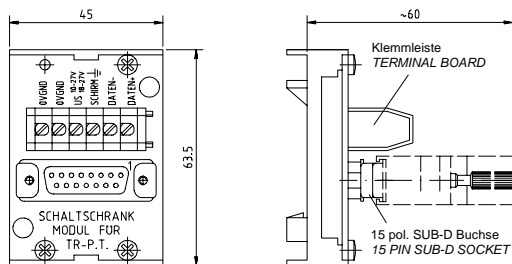
3. Choose desired information



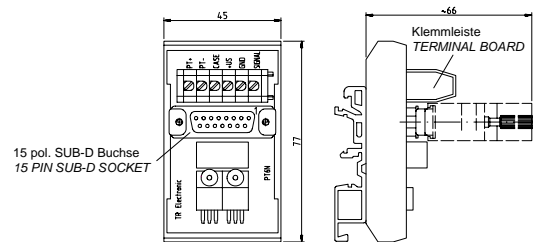
We will help you to select the most suitable products from the complete TR range. Please contact us ([info@tr-electronic.de](mailto:info@tr-electronic.de)).

# Dimensional Drawings

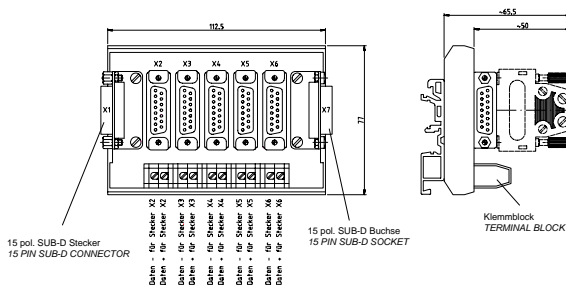
PT 6



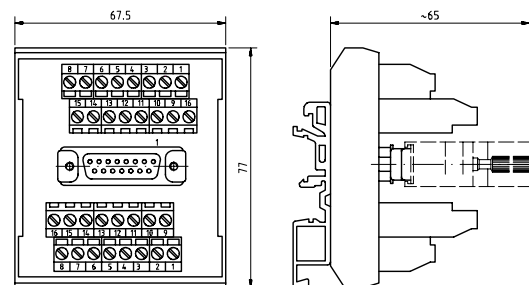
PT 6 N



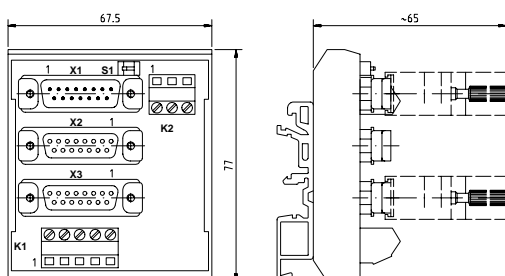
PT 100



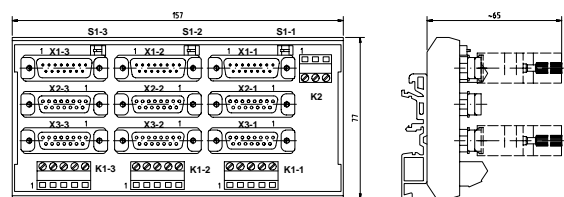
PT 15/2



SSI/ISI simple

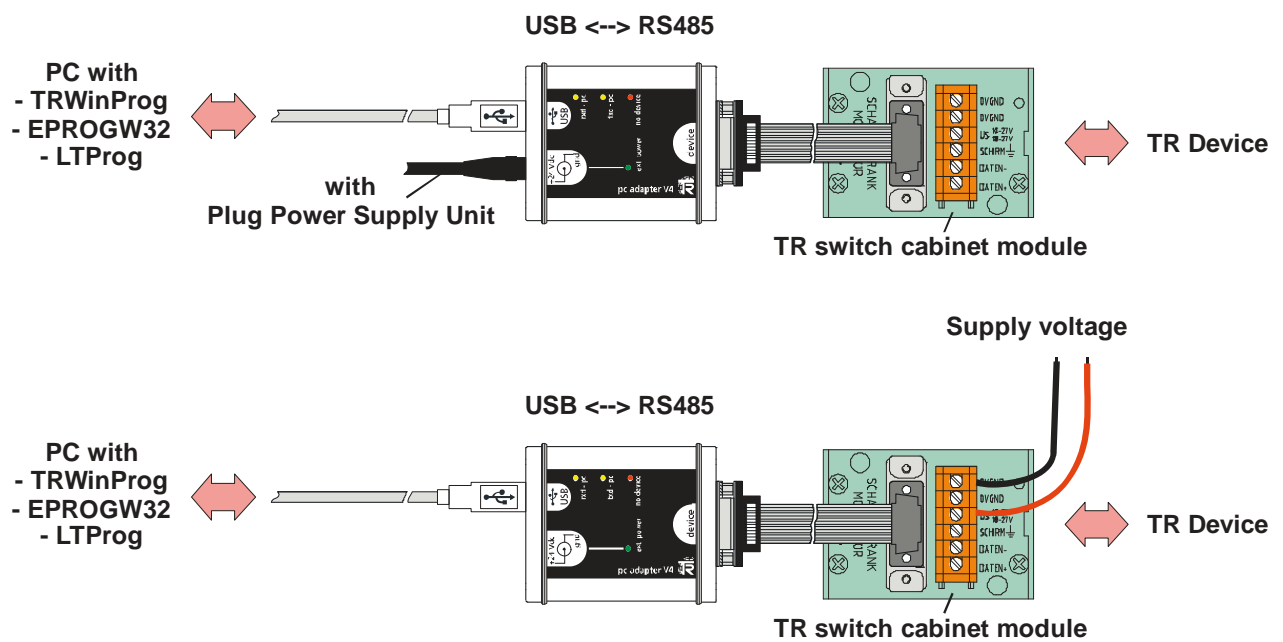


SSI/ISI triple



## Dimensional Drawings

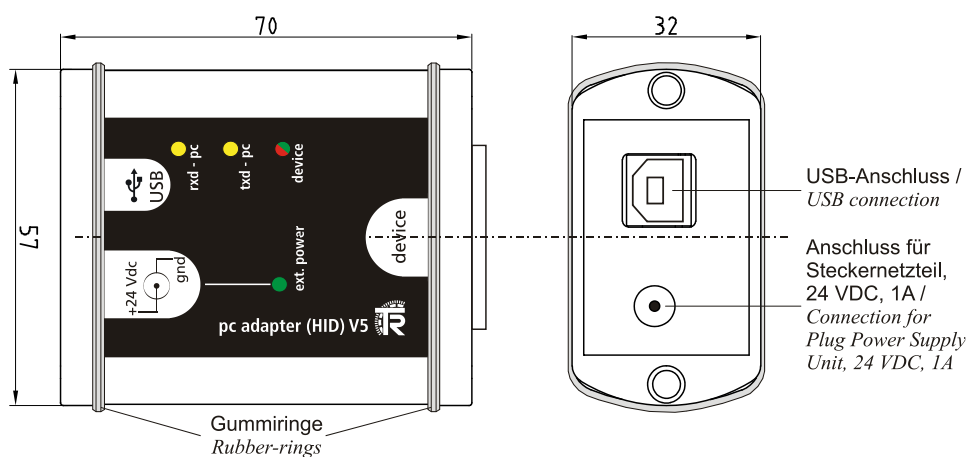
### PC-Adapter V4 / V5 Connections



## Dimensional Drawings

### PC-Adapter V4 / V5

#### Dimensions



# Accessories - Electronic Accessories - Signal Processing



## Signal processing

Many tasks can be solved with standard interfaces, from a simple incremental signal through to high speed industrial ethernet. However, sometimes it is the little helpers that enable a quick and effective solution to be achieved - from the distribution of an incremental signal to a number of control systems through to the transmission of encoder values from one fieldbus to another. We present a few of these aids on

the following pages. Do you have an idea, which you cannot implement? We are confident that we can find the right solution for it!

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## Contents

Products.....	429
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# Converter

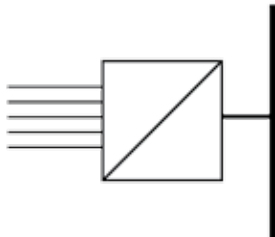
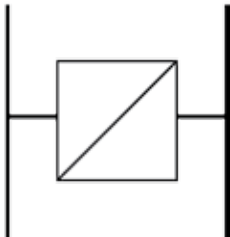



Product	PU 10	PU 20	PU 30
			
Group	Converter	Converter	Converter
Description	SSI -> Parallel	Parallel -> SSI	2 x SSI -> Parallel
Suitable software			
Technology	Master (produces SSI Clock) or listening mode (uses external SSI Clock)	Chechsum as option	2 x PU 10, Output channels galvanically isolated
Transferred signals	32 bit	28 bit	32 bit
Interface	<b>SSI</b> <b>Parallel</b>	<b>SSI</b> <b>Parallel</b>	<b>SSI</b> <b>Parallel</b>
Weblink	<a href="http://www.tr-electronic.de/f/TR-VAK-TI-GB-0060">www.tr-electronic.de/f/TR-VAK-TI-GB-0060</a>	<a href="http://www.tr-electronic.de/f/TR-VAK-TI-GB-0070">www.tr-electronic.de/f/TR-VAK-TI-GB-0070</a>	
QR-Code			

Can't find the right variant? Please contact us ([info@tr-electronic.de](mailto:info@tr-electronic.de))







## Converter

Product	IT 10 	IV 20 	IV 30 	
Group	Converter	Converter	Converter	
Description	Incremental -> 2 x incremental divided up to 1:4096	Incremental -> 6 x incremental	Incremental -> 6 x incremental	
Suitable software				
Technology	Galvanically isolated, signal levels can be chosen for each output	Input / output side galvanically isolated, signal levels can be chosen for each output	All input / output galvanically isolated, signal levels can be chosen for each output	
Transferred signals	A, A/, B, B/, 0, 0/	A, A/, B, B/, 0, 0/	A, A/, B, B/, 0, 0/	
Interface	<b>INC</b>	<b>INC</b>	<b>INC</b>	
Weblink	<a href="http://www.tr-electronic.de/f/TR-VAK-TI-GB-0080">http://www.tr-electronic.de/f/TR-VAK-TI-GB-0080</a>	<a href="http://www.tr-electronic.de/f/TR-VAK-TI-GB-0090">http://www.tr-electronic.de/f/TR-VAK-TI-GB-0090</a>	<a href="http://www.tr-electronic.de/f/TR-VAK-TI-GB-0091">http://www.tr-electronic.de/f/TR-VAK-TI-GB-0091</a>	
QR-Code				

# Converter

fieldbus interface	fieldbus bridge	AnalogBox	TA-MINI-UNI
			
Converter	Converter	Converter	Display
Transmits encoder signals from direct interfaces into fieldbusses	Transmits signals from one fieldbus into another	16 x Analog in for PROFINET or EtherCAT	Programmable display for SSI or TR-specific programming interfaces
			TRWINprog
Fieldbus slave with sensor input	Data input via one fieldbus slave and output via another fieldbus slave		
		16 x 0..10V; 0(4)...20mA	8 digit - depending on encoder/ display configuration
			<a href="http://www.tr-electronic.de/f/TR-V-TI-GB-0301">http://www.tr-electronic.de/f/TR-V-TI-GB-0301</a>
			

# Display

Product	FOD 10	ADP010	ADP001
			
Group	Display	Display	Display
Description	Display for fiber optic I/O	Programmable Display for SSI for front panel installation. Min/max memory, encoder scaling, offset...	Programmable Display for SSI for DIN-rail installation. Min/max memory, encoder scaling, offset...
Suitable software			
Operating system			
Technology	Decimal point is transmitted via FO telegram, alternatively with soldering bridge.	With addl. Analogue output	With addl. Analogue output
Transferred signals	6 digit + decimal point		
Interface	<b>LWL</b>	<b>SSI</b> <b>Analog</b>	<b>SSI</b> <b>Analog</b>
Weblink	<a href="http://www.tr-electronic.de/f/TR-V-TI-GB-0320">www.tr-electronic.de/f/TR-V-TI-GB-0320</a>	<a href="http://www.tr-electronic.de/f/TR-V-TI-GB-0341">www.tr-electronic.de/f/TR-V-TI-GB-0341</a>	<a href="http://www.tr-electronic.de/f/TR-V-TI-GB-0340">www.tr-electronic.de/f/TR-V-TI-GB-0340</a>
QR-Code			

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## Suggested Products

Order code	Description	Items delivered	For TR-software
<b>Converter for absolute signals</b>			
491-00002	PU 10 - SSI -> Parallel		
492-00001	PU 20 - Parallel -> SSI		
491-00100	PU 30 - 2x SSI -> Parallel		
<b>Converter for incremental signals</b>			
490-00007	IT 10 - 1 x INC -> 2 x INC with divider		
490-00006	IV 20 - 1 x INC -> 6 x INC		
493-00100	IV 30 - 1 x INC -> 6 x INC, galvanically isolated, input level RS 422		
493-00101	IV 30 - 1 x INC -> 6 x INC, galvanically isolated, input level HTL		
<b>Display</b>			
485-80020	TA - MINI - UNI		
485-00230	ADP 010 - front panel installation		
485-00220	ADP 001 - DIN Rail		

For further product information simply enter the order number in the search field at [www.tr-electronic.com](http://www.tr-electronic.com).

### Further product information

1. Enter order code into ...



2. Searchfield (top right) on [www.tr-electronic.com](http://www.tr-electronic.com)



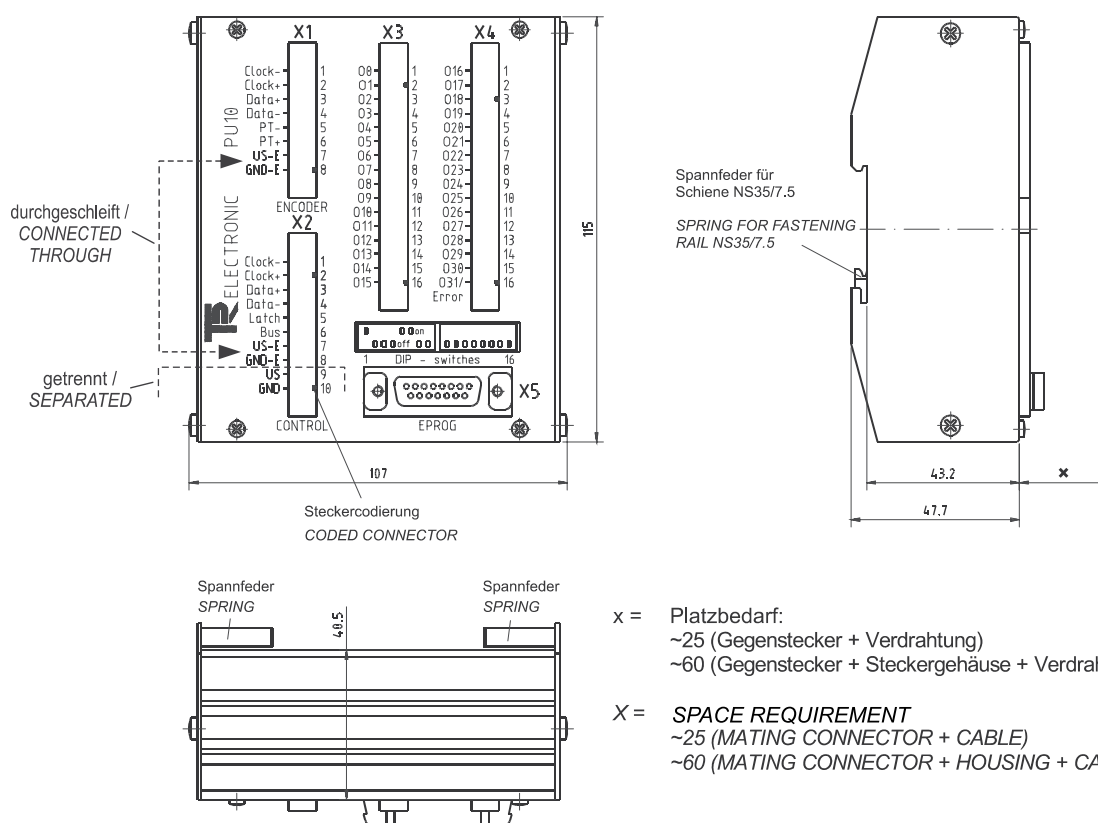
3. Choose desired information



We will help you to select the most suitable products from the complete TR range. Please contact us ([info@tr-electronic.de](mailto:info@tr-electronic.de)).

# Dimensional Drawings

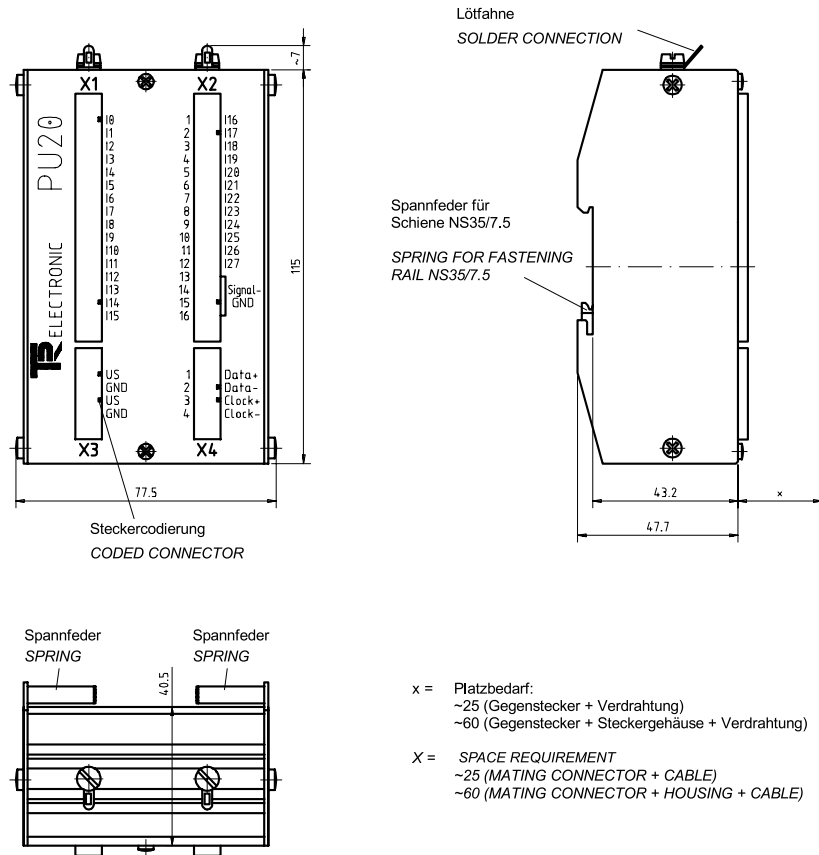
**PU 10**  
SSI -> Parallel



## Dimensional Drawings

### PU 20

Parallel -> SSI

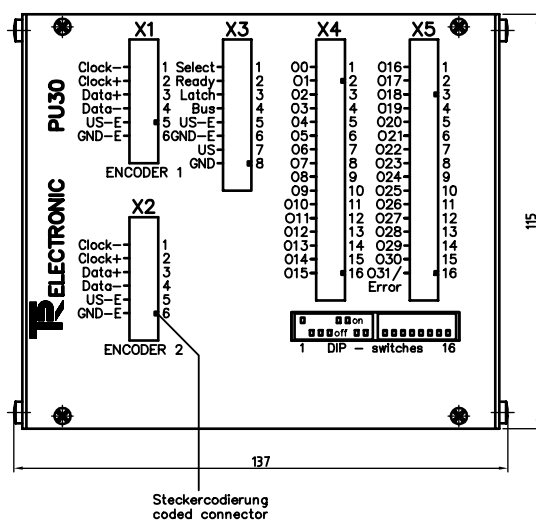




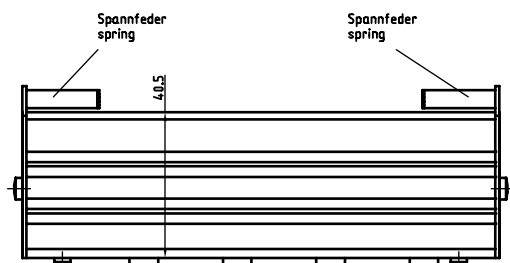
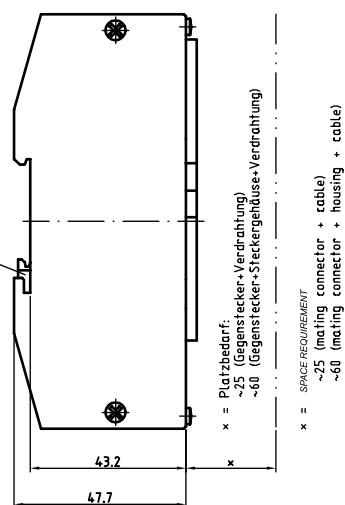
# Dimensional Drawings

## PU 30

2 x SSI -> Parallel



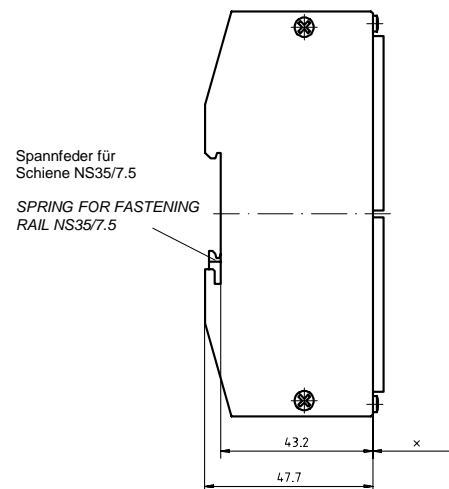
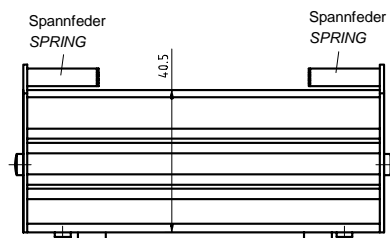
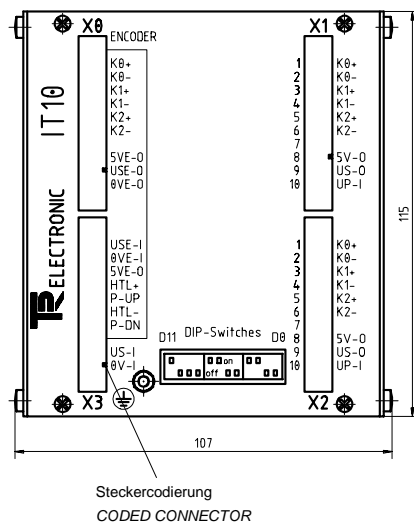
Spannfeder für  
Schiene NS35/7.5  
spring for fastening  
rail NS35/7.5



## Dimensional Drawings

### IT 10

Incremental -> 2 x Incremental divided up to 1:4096

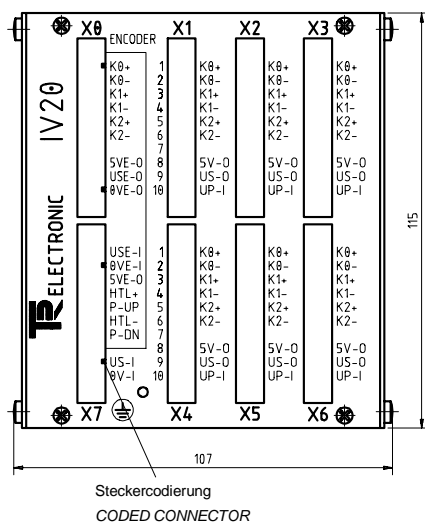


- x = Platzbedarf:  
~25 (Gegenstecker + Verdrahtung)  
~60 (Gegenstecker + Steckergehäuse + Verdrahtung)
- X = SPACE REQUIREMENT  
~25 (MATING CONNECTOR + CABLE)  
~60 (MATING CONNECTOR + HOUSING + CABLE)

# Dimensional Drawings

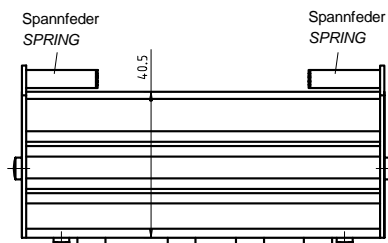
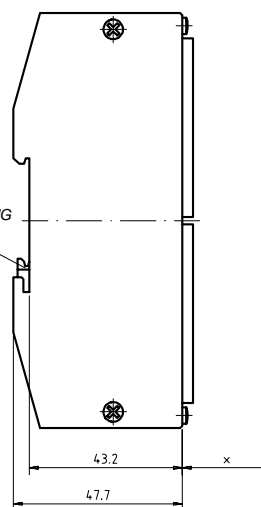
## IV 20

Incremental -> 6 x Incremental



Spannfeder für  
Schiene NS35/7.5

SPRING FOR FASTENING  
RAIL NS35/7.5

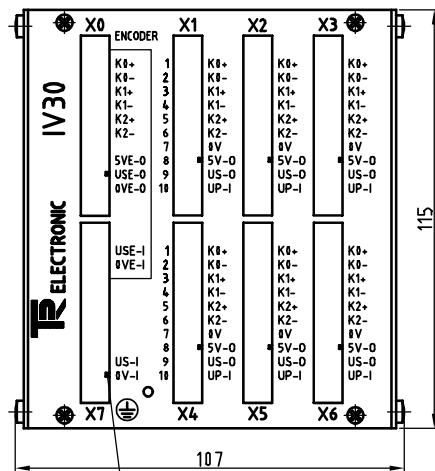


- x = Platzbedarf:  
~25 (Gegenstecker + Verdrahtung)  
~60 (Gegenstecker + Steckergehäuse + Verdrahtung)
- X = SPACE REQUIREMENT  
~25 (MATING CONNECTOR + CABLE)  
~60 (MATING CONNECTOR + HOUSING + CABLE)

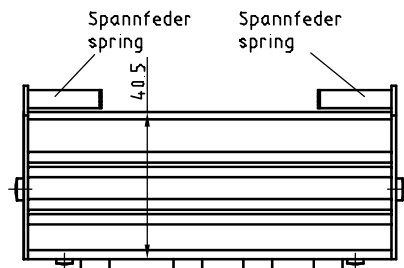
## Dimensional Drawings

### IV 30

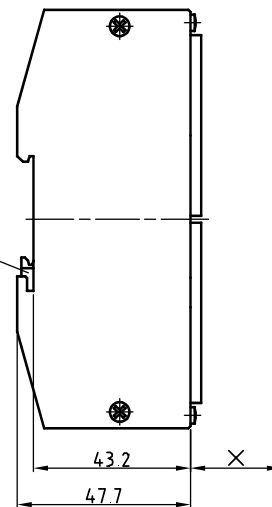
Incremental -> 6 x Incremental



Steckerkodierung  
coded connector



Spannfeder für  
Schiene NS35/7.5  
spring for fastening  
rail NS35/7.5



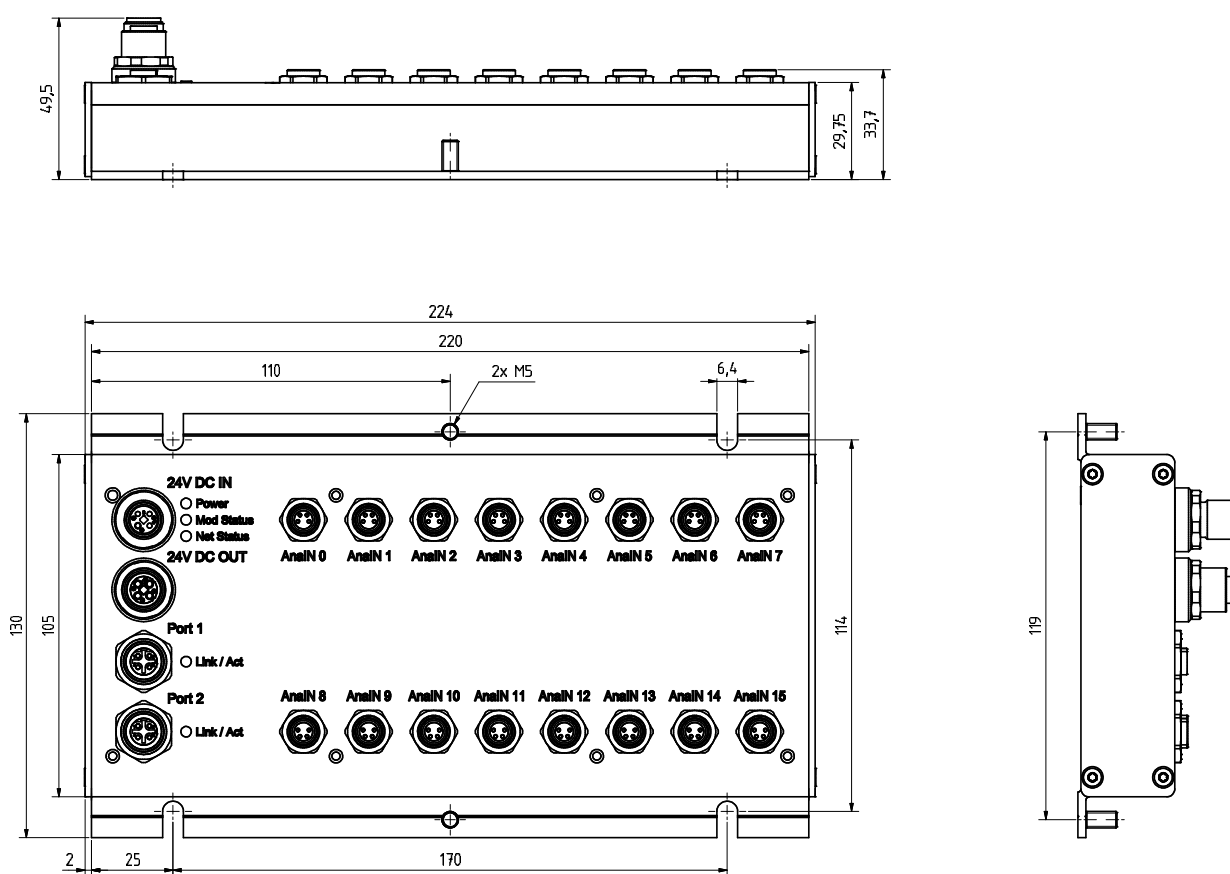
- × = Platzbedarf:  
~25 (Gegenstecker+Verdrahtung)  
~60 (Gegenstecker+Steckergehäuse+Verdrahtung)

- × = SPACE REQUIREMENT  
~25 (mating connector + cable)  
~60 (mating connector + housing + cable)

# Dimensional Drawings

## AnalogBox

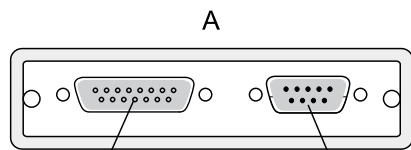
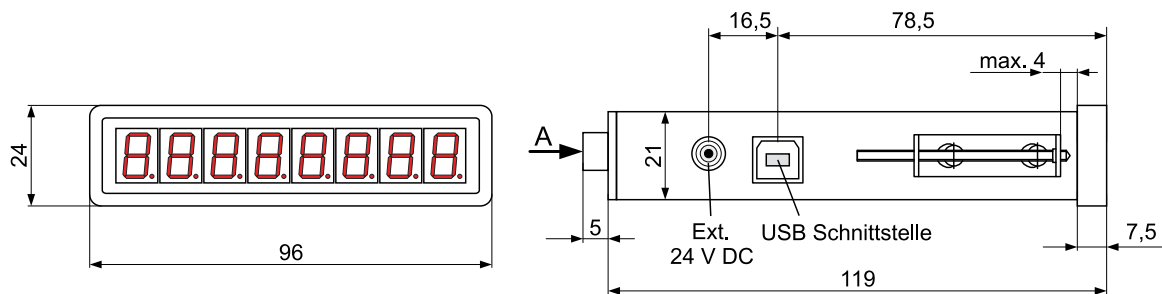
16xAnalog -> EPN / ETC



## Dimensional Drawings

### TA-MINI-UNI

Programmable display



D-SUB  
15-pol. Buchse

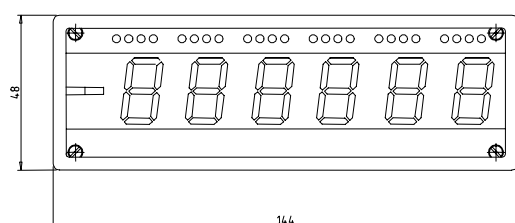
D-SUB  
9-pol. Stecker

- PC-Adapter, RS485
- PT-100, RS485
- Slave-Anzeige, RS485
- LLB, RS232

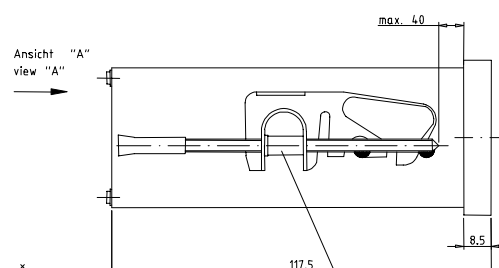
- Geräteanbindung
- TRWinProg, RS485
  - Eprog, RS485
  - LTProg, RS485
  - LLB, RS422
  - SSI

# Dimensional Drawings

## FOD 10 Display for FiberOptic I/O

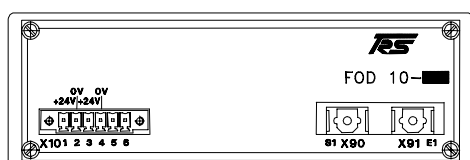


~60 (mating connector+housing+cable)  
~25 (mating connector + cable)  
x = needed height:  
~60 (Gegenseiter-Steckergehäuse-Verdrahtung)  
~25 (Gegenseiter-Verdrahtung)  
x = Platzbedarf:



Befestigungsspannen zur Montage abnehmbar  
clamps for assembly removable

Ansicht "A"  
view "A"

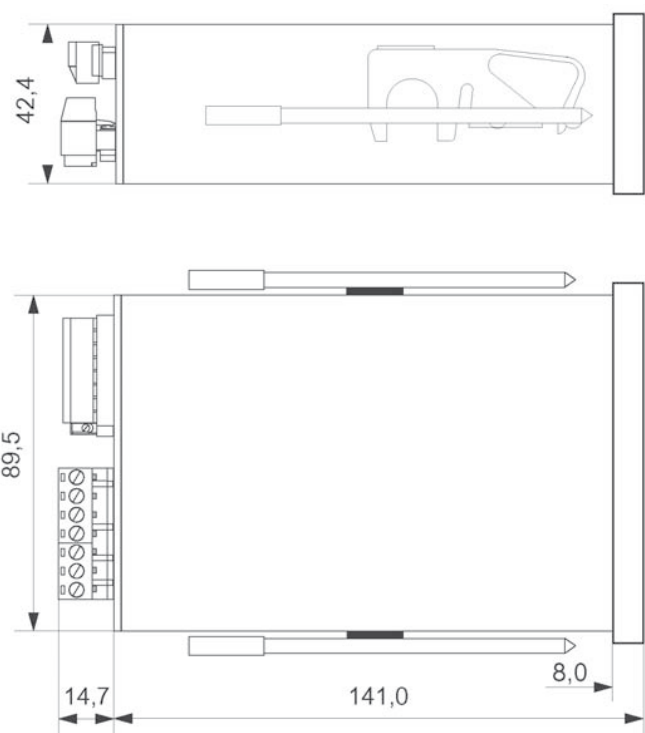
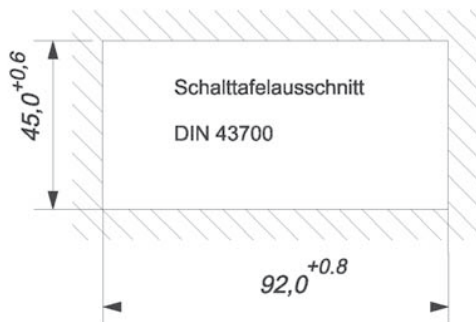
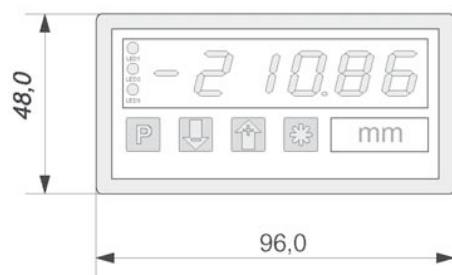


Die Befestigung erfolgt von hinten mittels  
seitlich angebrachten Befestigungsspannen  
Mounting is done from rear using the clamps  
which are attached at the sides of the case

## Dimensional Drawings

### ADP010

Programmable Display for SSI for front panel installation

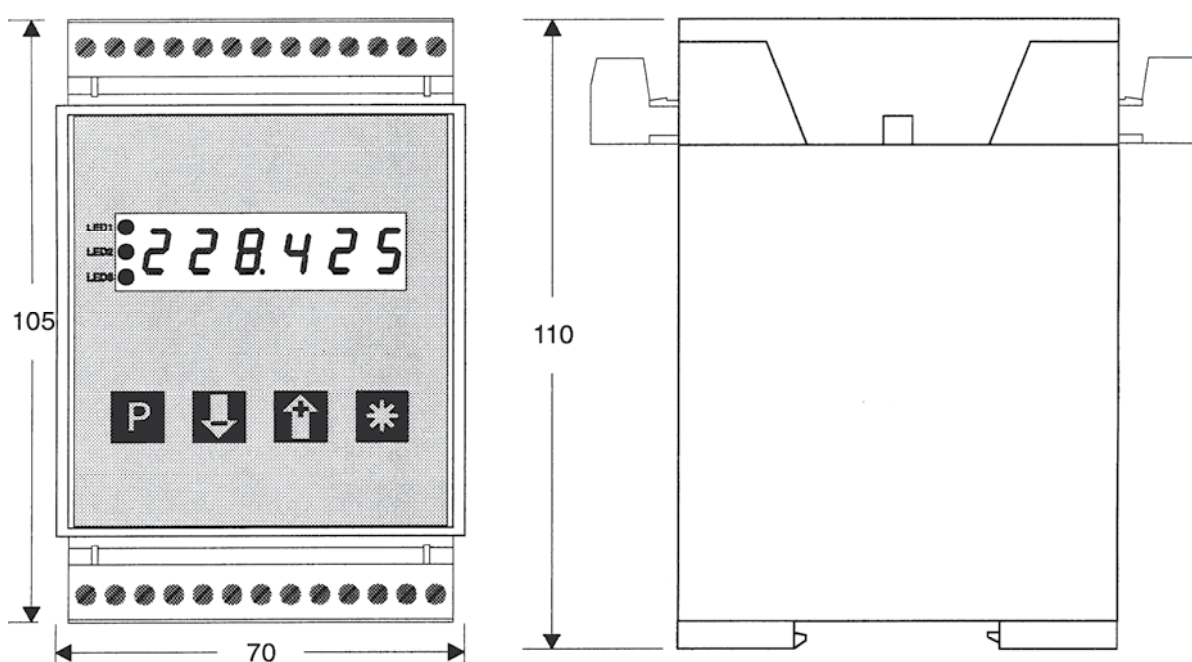




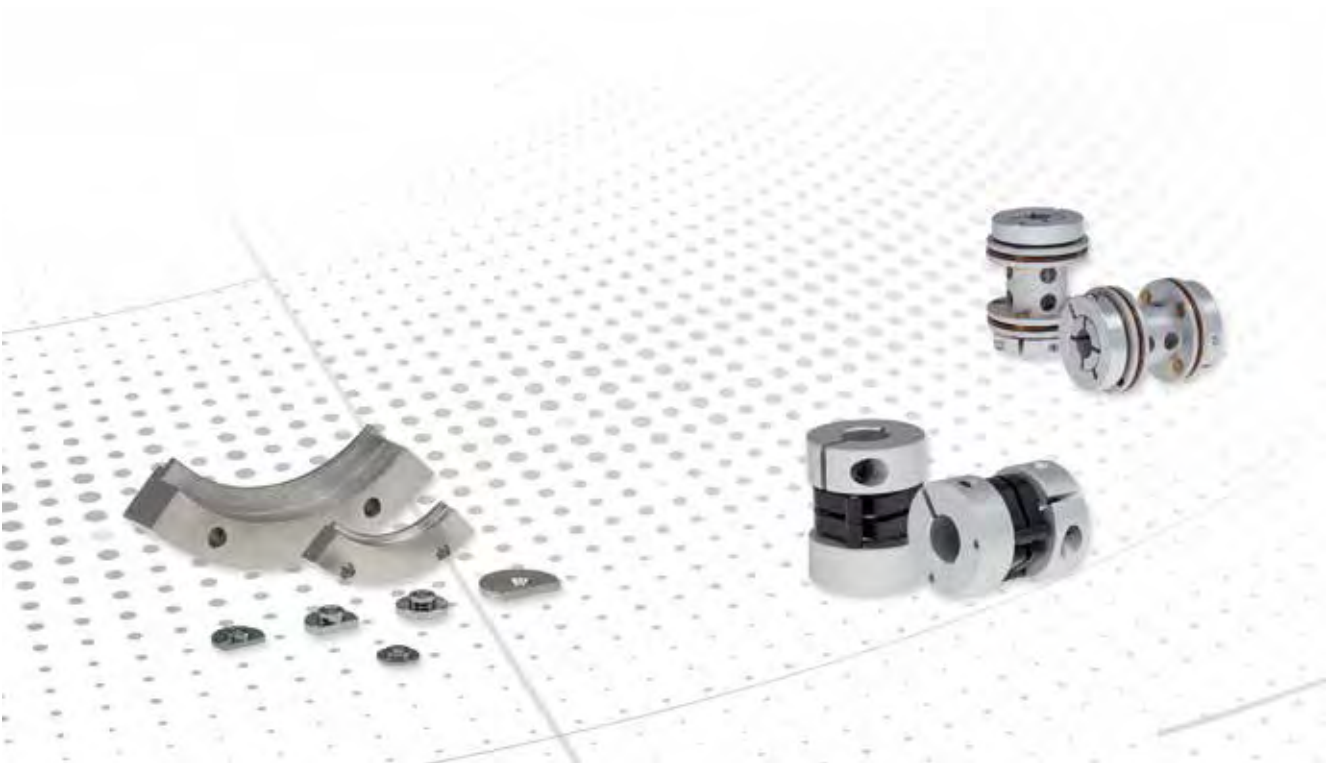
## Dimensional Drawings

### ADP001

Programmable Display for SSI for DIN-rail installation



# Accessories for Rotary Encoders



## Makes the encoder fit into your application







TR-Electronic rotary encoders can be integrated seamlessly into different environments. You can obtain suitable couplings, clamping shoes and other mounting aids from us. We provide an overview in the following pages. We are confident that we will find the right accessory for your mounting task.

---

## Contents

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# Couplings

<b>Product</b>	Coupling CPS Standard	Coupling CPS Compact	Coupling CPS Impuls Plus
			
<b>Group</b>	Couplings	Couplings	Couplings
<b>Description</b>	The perfect choice for common-practice shaft encoders. This line provides an outstanding combination of precision and minimal restoring forces.	Compact Short axial design. This line is specially designed for encoder applications where the coupling must be integrated into an axially limited installation space.	A product line for maximum measuring system resolution. It is perfect for shaft encoders whose high resolution is ensured by fine-tuned signal sequences per revolution.
<b>Shaft diameters</b>	4...20 mm in Steps	6...20 mm in Steps	4...20 mm in Steps
<b>Ordering</b>	CPS 8.1, CPS 10.1, CPS 15.1	CPS 9.1, CPS 14.1	CPS 8.2, CPS 9.2, CPS 10.2, CPS 14.2, CPS 15.2
<b>Weblink</b>	<a href="http://www.tr-electronic.de/f/TR-V-TI-GB-0410">www.tr-electronic.de/f/TR-V-TI-GB-0410</a>	<a href="http://www.tr-electronic.de/f/TR-V-TI-GB-0410">www.tr-electronic.de/f/TR-V-TI-GB-0410</a>	<a href="http://www.tr-electronic.de/f/TR-V-TI-GB-0410">www.tr-electronic.de/f/TR-V-TI-GB-0410</a>
<b>QR-Code</b>			

Can't find the right variant? Please contact us ([info@tr-electronic.de](mailto:info@tr-electronic.de))

# Couplings

## Bearing modules






<b>Product</b>	Coupling CPS Industry 	Coupling SED 	Coupling EKN 	
<b>Group</b>	Couplings	Couplings	Couplings	
<b>Description</b>	A product line for rugged industrial encoders with large shaft diameters.	The bellows compensates for angular errors between drive and encoder shaft.	This coupling enables good decoupling in the event of vibrations of the drive shaft.	
<b>Shaft diameters</b>	10...40 mm in Steps	6, 8, 10, 12 mm	6, 8, 10, 12 mm	
<b>Ordering</b>	CPS 22.1, CPS 22.2 CPS 23.1, CPS 23.2 CPS 30.1, CPS 30.2	Accessory	Accessory	
<b>Weblink</b>	<a href="http://www.tr-electronic.de/f/TR-V-TI-GB-0410">www.tr-electronic.de/f/TR-V-TI-GB-0410</a>	<a href="http://www.tr-electronic.de/f/TR-V-TI-GB-0410">www.tr-electronic.de/f/TR-V-TI-GB-0410</a>	<a href="http://www.tr-electronic.de/f/TR-V-TI-GB-0420">www.tr-electronic.de/f/TR-V-TI-GB-0420</a>	
<b>QR-Code</b>				

# Couplings








## Bearing modules

<p>Coupling GEL</p> 	<p>Bearing-Module 58</p> 	<p>Bearing-Module 65</p> 	<p>Bearing-Module 100</p> 
Couplings	Bearing modules	Bearing modules	Bearing modules
<p>The GEL coupling bridges large distances between drive and encoder shaft.</p>	<p>Bearing module 58 serves as a collar bearing for our 58 mm encoders, to absorb increased bearing load. A typical application is the use of rotary encoders with chain, pulley and friction wheels.</p>	<p>Bearing module 65 serves as a collar bearing for our 65 mm encoders, to absorb increased bearing load. A typical application is the use of rotary encoders with chain, pulley and friction wheels.</p>	<p>Bearing module 100 serves as a collar bearing for our 100 mm encoders, to absorb increased bearing load. A typical application is the use of rotary encoders with chain, pulley and friction wheels.</p>
10, 12, 14 mm	10, 12 mm	See shaft range type 65	See shaft range type 65
Accessory	As option with an encoder -> pre-assembled or for retrofitting	As option with an encoder -> pre-assembled or for retrofitting	As option with an encoder -> pre-assembled or for retrofitting
<a href="http://www.tr-electronic.de/f/TR-V-TI-GB-0430">www.tr-electronic.de/f/TR-V-TI-GB-0430</a>	<a href="http://www.tr-electronic.de/f/TR-V-TI-GB-0439">www.tr-electronic.de/f/TR-V-TI-GB-0439</a>	<a href="http://www.tr-electronic.de/f/TR-V-TI-GB-0440">www.tr-electronic.de/f/TR-V-TI-GB-0440</a>	<a href="http://www.tr-electronic.de/f/TR-V-TI-D-0441">www.tr-electronic.de/f/TR-V-TI-D-0441</a>
			

## Bearing modules

<b>Product</b>	Absorber flange 58 	Absorber flange 65 	Absorber module 65	
<b>Group</b>	Bearing modules	Bearing modules	Bearing modules	
<b>Description</b>	The absorber flange decouples the Cxx-58 measuring system at 10g from impacts and vibrations from 60 Hz when mounted horizontally and from 900 Hz when mounted vertically. This variant can be used wherever the usual arrangement of 6 mm shaft, 50 mm centering collar is used.	The absorber flange decouples the Cxx-65 measuring system at 10g from impacts and vibrations from 350 Hz when mounted horizontally. This variant can be used wherever the usual arrangement of 6 mm shaft, 50 mm centering collar is used.	The absorber flange decouples the Cxx-65 measuring system from impacts and vibrations. The encoder shaft is decoupled from the drive shaft with the EKN bellows coupling, which is ordered separately.	
<b>Shaft diameters</b>	6 mm	6 mm	6, 8, 10, 12 mm	
<b>Ordering</b>	As option with an encoder -> pre-assembled	As option with an encoder -> pre-assembled	As option with an encoder -> pre-assembled	
<b>Weblink</b>	<a href="http://www.tr-electronic.com/f/TR-V-TI-GB-0463">www.tr-electronic.com/f/TR-V-TI-GB-0463</a>	<a href="http://www.tr-electronic.com/f/TR-V-TI-GB-0462">www.tr-electronic.com/f/TR-V-TI-GB-0462</a>	<a href="http://www.tr-electronic.de/f/TR-V-TI-GB-0460">www.tr-electronic.de/f/TR-V-TI-GB-0460</a>	
<b>QR-Code</b>				

# Bearing modules Installation

Absorber module 100	Mounting Brackets	Clamps	Deflection pulleys for wire actuated encoders
			
Bearing modules	Installation	Installation	Installation
The absorber flange decouples the Cxx-100 measuring system from impacts and vibrations. The encoder shaft is decoupled from the drive shaft with the EKN bellows coupling, which is ordered separately.	Clamping shoes are adapted to the outer diameter of the encoder and fully engage in the circumferential groove of the encoder flange.	Servo-clamps are universally usable and engage over a small area of the circumferential groove of the encoder flange.	Deflection pulleys guide the measurement wire safely and precisely even with changing pull-off angles. Fits our wire-actuated encoders type WDS
6, 8, 10, 12 mm			
As option with an encoder -> pre-assembled	Accessory	Accessory	As option with an encoder -> pre-assembled or for retrofitting
<a href="http://www.tr-electronic.de/f/TR-V-TI-GB-0461">www.tr-electronic.de/f/TR-V-TI-GB-0461</a>	<a href="http://www.tr-electronic.de/f/TR-V-TI-GB-0400">www.tr-electronic.de/f/TR-V-TI-GB-0400</a>	<a href="http://www.tr-electronic.de/f/TR-V-TI-GB-0400">www.tr-electronic.de/f/TR-V-TI-GB-0400</a>	<a href="http://www.tr-electronic.de/f/TR-ECE-TI-DGB-0254">www.tr-electronic.de/f/TR-ECE-TI-DGB-0254</a>
			

## Suggested Products

Order code	Type	Parameter	Dimensions
<b>Coupling Standard CPS 8, no form closure, 1 coupling element</b>			
34000090	CPS 8/1 6/5	For shaft diameter from/to	6mm / 5mm
34000053	CPS 8/1 6/6	For shaft diameter from/to	6mm / 6mm
34000054	CPS 8/1 6/10	For shaft diameter from/to	6mm / 10mm
34000104	CPS 8/1 8/10	For shaft diameter from/to	8mm / 10mm
34000197	CPS 8/1 10/10	For shaft diameter from/to	10mm / 10mm
<b>Coupling Standard CPS 10, no form closure, 1 coupling element</b>			
34000075	CPS 10/1 10/10	For shaft diameter from/to	10mm / 10mm
34000325	CPS 10/1 12/12	For shaft diameter from/to	12mm / 12mm
34000172	CPS 10/1 6/6	For shaft diameter from/to	6mm / 6mm
34000077	CPS 10/1 6/10	For shaft diameter from/to	6mm / 10mm
<b>Coupling Standard CPS 15, no form closure, 1 coupling element</b>			
34000151	CPS 15/1 6/6	For shaft diameter from/to	6mm / 6mm
34000031	CPS 15/1 6/10	For shaft diameter from/to	6mm / 10mm
34000206	CPS 15/1 6/12	For shaft diameter from/to	6mm / 12mm
34000334	CPS 15/1 6/14	For shaft diameter from/to	6mm / 14mm
34000231	CPS 15/1 6/20	For shaft diameter from/to	6mm / 20mm
34000320	CPS 15/1 8/12	For shaft diameter from/to	8mm / 12mm
34000050	CPS 15/1 10/10	For shaft diameter from/to	10mm / 10mm
34000061	CPS 15/1 10/12	For shaft diameter from/to	10mm / 12mm
34000230	CPS 15/1 10/16	For shaft diameter from/to	10mm / 16mm
34000021	CPS 15/1 10/20	For shaft diameter from/to	10mm / 20mm
34000062	CPS 15/1 12/12	For shaft diameter from/to	12mm / 12mm
34000029	CPS 15/1 12/20	For shaft diameter from/to	12mm / 20mm
<b>Coupling Standard CPS 15, with form closure, 1 coupling element</b>			
34000307	CPS 15/1 10N/10N	For shaft diameter from/to	10mm (key) / 10mm (key)
34000166	CPS 15/1 10N/18N	For shaft diameter from/to	10mm (key) / 18mm (key)
34000349	CPS 15/1 14N/20N	For shaft diameter from/to	14mm (key) / 20mm (key)
<b>Coupling Compact CPS 9, no form closure, 1 coupling element</b>			
34000087	CPS 9/1 5/10	For shaft diameter from/to	5mm / 10mm
34000100	CPS 9/1 6/6	For shaft diameter from/to	6mm / 6mm
34000038	CPS 9/1 6/10	For shaft diameter from/to	6mm / 10mm
34000035	CPS 9/1 8/10	For shaft diameter from/to	8mm / 10mm
34000025	CPS 9/1 10/10	For shaft diameter from/to	10mm / 10mm

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## Suggested Products

Order code	Type	Parameter	Dimensions
<b>Coupling Compact CPS 9, no form closure, 2 coupling elements</b>			
34000339	CPS 9/2 6/8	For shaft diameter from/to	6mm / 8mm
34000338	CPS 9/2 6/10	For shaft diameter from/to	6mm / 10mm
34000290	CPS 9/2 10/10	For shaft diameter from/to	10mm / 10mm
<b>Coupling Compact CPS 14, no form closure, 1 coupling element</b>			
34000178	CPS 14/1 6/20	For shaft diameter from/to	6mm / 20mm
34000308	CPS 14/1 8/10	For shaft diameter from/to	8mm / 10mm
34000140	CPS 14/1 10/10	For shaft diameter from/to	10mm / 10mm
34000270	CPS 14/1 10/12	For shaft diameter from/to	10mm / 12mm
34000188	CPS 14/1 12/12	For shaft diameter from/to	12mm / 12mm
<b>Coupling Compact CPS 14, with form closure, 1 coupling element</b>			
34000332	CPS 14/1 12N/20N	For shaft diameter from/to	12mm (key) / 20mm (key)
34000167	CPS 14/1 14N/22N	For shaft diameter from/to	14mm (key) / 22mm (key)
<b>Coupling Compact CPS 14, no form closure, 2 coupling elements</b>			
34000358	CPS 14/2 6/10	For shaft diameter from/to	6mm / 10mm
34000354	CPS 14/2 6/20	For shaft diameter from/to	6mm / 20mm
34000068	CPS 14/2 10/10	For shaft diameter from/to	10mm / 10mm
34000207	CPS 14/2 10/14	For shaft diameter from/to	10mm / 14mm
34000352	CPS 14/2 10/15	For shaft diameter from/to	10mm / 15mm
34000293	CPS 14/2 10/22	For shaft diameter from/to	10mm / 22mm
34000147	CPS 14/2 12/13	For shaft diameter from/to	12mm / 13mm
<b>Coupling Compact CPS 14, with form closure, 2 coupling elements</b>			
34000233	CPS 14/2 10N/14N	For shaft diameter from/to	10mm (key) / 14mm (key)
<b>Coupling Impuls Plus CPS 8, no form closure, 2 coupling elements</b>			
34000162	CPS 8/2 6/6	For shaft diameter from/to	6mm / 6mm
34000006	CPS 8/2 10/10	For shaft diameter from/to	10mm / 10mm
34000304	CPS 8/2 10/10	For shaft diameter from/to	10mm / 10mm
34000224	CPS 8/2 10/7	For shaft diameter from/to	10mm / 7mm

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# Suggested Products

Order code	Type	Parameter	Dimensions
Coupling Impuls Plus CPS 10, no form closure, 2 coupling elements			
34000093	CPS 10/2 5/4	For shaft diameter from/to	5mm / 4mm
34000092	CPS 10/2 5/5	For shaft diameter from/to	5mm / 5mm
34000055	CPS 10/2 6/6	For shaft diameter from/to	6mm / 6mm
34000072	CPS 10/2 6/10	For shaft diameter from/to	6mm / 10mm
34000266	CPS 10/2 6/12	For shaft diameter from/to	6mm / 12mm
34000298	CPS 10/2 8/8	For shaft diameter from/to	8mm / 8mm
34000048	CPS 10/2 8/10	For shaft diameter from/to	8mm / 10mm
34000291	CPS 10/2 9/10	For shaft diameter from/to	9mm / 10mm
34000044	CPS 10/2 10/10	For shaft diameter from/to	10mm / 10mm
34000343	CPS 10/2 10/11	For shaft diameter from/to	10mm / 11mm
34000026	CPS 10/2 10/12	For shaft diameter from/to	10mm / 12mm
34000027	CPS 10/2 12/12	For shaft diameter from/to	12mm / 12mm
Coupling Impuls Plus CPS 10, with form closure, 2 coupling elements			
34000198	CPS 10/2 10N/10N	For shaft diameter from/to	10mm (key) / 10mm (key)
34000326	CPS 10/2 10N/12N	For shaft diameter from/to	10mm (key) / 12mm (key)
34000034	CPS 10/2 12N/12N	For shaft diameter from/to	12mm (key) / 12mm (key)

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## Suggested Products

Order code	Type	Parameter	Dimensions
<b>Coupling Impuls Plus CPS 15, no form closure, 2 coupling elements</b>			
34000022	CPS 15/2 10/10	For shaft diameter from/to	10mm / 10mm
34000161	CPS 15/2 4/18	For shaft diameter from/to	4mm / 18mm
34000091	CPS 15/2 6/6	For shaft diameter from/to	6mm / 6mm
34000060	CPS 15/2 6/8	For shaft diameter from/to	6mm / 8mm
34000058	CPS 15/2 6/10	For shaft diameter from/to	6mm / 10mm
34000263	CPS 15/2 6/11	For shaft diameter from/to	6mm / 11mm
34000045	CPS 15/2 6/12	For shaft diameter from/to	6mm / 12mm
34000254	CPS 15/2 6/14	For shaft diameter from/to	6mm / 14mm
34000102	CPS 15/2 6/15	For shaft diameter from/to	6mm / 15mm
34000250	CPS 15/2 7/12	For shaft diameter from/to	7mm / 12mm
34000084	CPS 15/2 8/10	For shaft diameter from/to	8mm / 10mm
34000208	CPS 15/2 8/12	For shaft diameter from/to	8mm / 12mm
34000237	CPS 15/2 8/18	For shaft diameter from/to	8mm / 18mm
34000262	CPS 15/2 8/8	For shaft diameter from/to	8mm / 8mm
34000194	CPS 15/2 9/10	For shaft diameter from/to	9mm / 10mm
34000081	CPS 15/2 10/11	For shaft diameter from/to	10mm / 11mm
34000064	CPS 15/2 10/12	For shaft diameter from/to	10mm / 12mm
34000057	CPS 15/2 10/14	For shaft diameter from/to	10mm / 14mm
34000078	CPS 15/2 10/16	For shaft diameter from/to	10mm / 16mm
34000108	CPS 15/2 10/18	For shaft diameter from/to	10mm / 18mm
34000039	CPS 15/2 10/20	For shaft diameter from/to	10mm / 20mm
34000217	CPS 15/2 11/11	For shaft diameter from/to	11mm / 11mm
34000356	CPS 15/2 11/15	For shaft diameter from/to	11mm / 15mm
34000355	CPS 15/2 11/16	For shaft diameter from/to	11mm / 16mm
34000306	CPS 15/2 11/17	For shaft diameter from/to	11mm / 17mm
34000330	CPS 15/2 12/11	For shaft diameter from/to	12mm / 11mm
34000047	CPS 15/2 12/12	For shaft diameter from/to	12mm / 12mm
34000096	CPS 15/2 12/14	For shaft diameter from/to	12mm / 14mm
34000345	CPS 15/2 12/16	For shaft diameter from/to	12mm / 16mm
34000109	CPS 15/2 12/18	For shaft diameter from/to	12mm / 18mm
34000242	CPS 15/2 12/20	For shaft diameter from/to	12mm / 20mm
34000323	CPS 15/2 14/14	For shaft diameter from/to	14mm / 14mm
34000229	CPS 15/2 20/20	For shaft diameter from/to	20mm / 20mm

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## Suggested Products

Order code	Type	Parameter	Dimensions
<b>Coupling Impuls Plus CPS 15, with form closure, 2 coupling elements</b>			
34000219	CPS 15/2 6N/12N	For shaft diameter from/to	6mm (key) / 12mm (key)
34000218	CPS 15/2 8N/10N	For shaft diameter from/to	8mm (key) / 10mm (key)
34000132	CPS 15/2 10N/10N	For shaft diameter from/to	10mm (key) / 10mm (key)
34000350	CPS 15/2 10N/11N	For shaft diameter from/to	10mm (key) / 11mm (key)
34000063	CPS 15/2 10N/12N	For shaft diameter from/to	10mm (key) / 12mm (key)
34000105	CPS 15/2 10N/14N	For shaft diameter from/to	10mm (key) / 14mm (key)
34000069	CPS 15/2 10N/15N	For shaft diameter from/to	10mm (key) / 15mm (key)
34000336	CPS 15/2 10N/16*N	For shaft diameter from/to	10mm (key) / 16mm (key)
34000173	CPS 15/2 10N/19N	For shaft diameter from/to	10mm (key) / 19mm (key)
34000088	CPS 15/2 10N/20N	For shaft diameter from/to	10mm (key) / 20mm (key)
34000139	CPS 15/2 11N/11N	For shaft diameter from/to	11mm (key) / 11mm (key)
34000086	CPS 15/2 12N/12N	For shaft diameter from/to	12mm (key) / 12mm (key)
34000148	CPS 15/2 12N/14N	For shaft diameter from/to	12mm (key) / 14mm (key)
34000251	CPS 15/2 12N/16N	For shaft diameter from/to	12mm (key) / 16mm (key)
34000070	CPS 15/2 14N/14N	For shaft diameter from/to	14mm (key) / 14mm (key)
34000278	CPS 15/2 14N/16N	For shaft diameter from/to	14mm (key) / 16mm (key)
34000213	CPS 15/2 14N/20N	For shaft diameter from/to	14mm (key) / 20mm (key)
<b>Coupling Industry CPS 22, no form closure, 1 coupling element</b>			
34000253	CPS 22/1 6/22	For shaft diameter from/to	6mm / 22mm
34000299	CPS 22/1 10/10	For shaft diameter from/to	10mm / 10mm
34000280	CPS 22/1 10/16	For shaft diameter from/to	10mm / 16mm
34000315	CPS 22/1 12/25	For shaft diameter from/to	12mm / 25mm
34000324	CPS 22/1 14/23	For shaft diameter from/to	14mm / 23mm

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Order code	Type	Parameter	Dimensions
<b>Coupling Industry CPS 22, no form closure, 2 coupling elements</b>			
34000316	CPS 22/2 10/10	For shaft diameter from/to	10mm / 10mm
34000238	CPS 22/2 10/14	For shaft diameter from/to	10mm / 14mm
34000313	CPS 22/2 10/19	For shaft diameter from/to	10mm / 19mm
34000043	CPS 22/2 10/20	For shaft diameter from/to	10mm / 20mm
34000171	CPS 22/2 10/25	For shaft diameter from/to	10mm / 25mm
34000111	CPS 22/2 14/16	For shaft diameter from/to	14mm / 16mm
34000257	CPS 22/2 20/22	For shaft diameter from/to	20mm / 22mm
<b>Coupling Industry CPS 22, with form closure, 1 coupling element</b>			
34000243	CPS 22/1 15N/20N	For shaft diameter from/to	15mm (key) / 20mm (key)
34000244	CPS 22/1 20N/20N	For shaft diameter from/to	20mm (key) / 20mm (key)
<b>Coupling Industry CPS 22, with form closure, 2 coupling elements</b>			
34000193	CPS 22/2 8N/30N	For shaft diameter from/to	8mm (key) / 30mm (key)
34000346	CPS 22/2 10N/15N	For shaft diameter from/to	10mm (key) / 15mm (key)
34000314	CPS 22/2 10N/20N	For shaft diameter from/to	10mm (key) / 20mm (key)
34000189	CPS 22/2 10N/30N	For shaft diameter from/to	10mm (key) / 30mm (key)
<b>Coupling Industry CPS 23, no form closure, 2 coupling elements</b>			
34000271	CPS 23/2 8/20	For shaft diameter from/to	8mm / 20mm
<b>Coupling Industry CPS 23, no form closure, 1 coupling element</b>			
34000303	CPS 23/1 8/25	For shaft diameter from/to	8mm / 25mm
<b>Coupling Industry CPS 23, no form closure, 2 coupling elements</b>			
34000180	CPS 23/2 8/30	For shaft diameter from/to	8mm / 30mm
<b>Coupling Industry CPS 23, no form closure, 1 coupling element</b>			
34000310	CPS 23/1 10/18	For shaft diameter from/to	10mm / 18mm
34000142	CPS 23/1 10/30	For shaft diameter from/to	10mm / 30mm
34000099	CPS 23/1 12/28	For shaft diameter from/to	12mm / 28mm

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## Suggested Products

Order code	Type	Parameter	Dimensions
<b>Coupling Industry CPS 23, no form closure, 2 coupling elements</b>			
34000200	CPS 23/2 10/12	For shaft diameter from/to	10mm / 12mm
34000076	CPS 23/2 10/15	For shaft diameter from/to	10mm / 15mm
34000247	CPS 23/2 10/20	For shaft diameter from/to	10mm / 20mm
34000143	CPS 23/2 12/12	For shaft diameter from/to	12mm / 12mm
34000279	CPS 23/2 12/20	For shaft diameter from/to	12mm / 20mm
34000032	CPS 23/2 20/20	For shaft diameter from/to	20mm / 20mm
<b>Coupling Industry CPS 23, with form closure, 1 coupling element</b>			
34000209	CPS 23/1 12N/20N	For shaft diameter from/to	12mm (key) / 20mm (key)
34000245	CPS 23/1 14N/20N	For shaft diameter from/to	14mm (key) / 20mm (key)
34000204	CPS 23/1 15N/20N	For shaft diameter from/to	15mm (key) / 20mm (key)
<b>Coupling Industry CPS 23, with form closure, 2 coupling elements</b>			
34000079	CPS 23/2 10N/25N	For shaft diameter from/to	10mm (key) / 25mm (key)
34000357	CPS 23/2 12N/10N	For shaft diameter from/to	12mm (key) / 10mm (key)
34000327	CPS 23/2 12N/20N	For shaft diameter from/to	12mm (key) / 20mm (key)
34000196	CPS 23/2 14N/14N	For shaft diameter from/to	14mm (key) / 14mm (key)
34000331	CPS 23/2 16N/20N	For shaft diameter from/to	16mm (key) / 20mm (key)
34000328	CPS 23/2 18N/14N	For shaft diameter from/to	18mm (key) / 14mm (key)
34000305	CPS 23/2 20N/20N	For shaft diameter from/to	20mm (key) / 20mm (key)
34000329	CPS 23/2 28N/14N	For shaft diameter from/to	28mm (key) / 14mm (key)
<b>Coupling Industry CPS 30, no form closure, 1 coupling element</b>			
34000080	CPS 30/1 12/14	For shaft diameter from/to	12mm / 14mm
34000098	CPS 30/1 12/38	For shaft diameter from/to	12mm / 38mm
34000337	CPS 30/1 38/10	For shaft diameter from/to	38mm / 10mm
<b>Coupling Industry CPS 30, no form closure, 2 coupling elements</b>			
34000318	CPS 30/2 10/20	For shaft diameter from/to	10mm / 20mm
34000347	CPS 30/2 10/30	For shaft diameter from/to	10mm / 30mm
34000267	CPS 30/2 12/12	For shaft diameter from/to	12mm / 12mm

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## Suggested Products

Order code	Type	Parameter	Dimensions
<b>Coupling Industry CPS 30, with form closure, 1 coupling element</b>			
34000285	CPS 30/1 14N/15N	For shaft diameter from/to	14mm (key) / 15mm (key)
<b>Coupling Industry CPS 30, with form closure, 2 coupling elements</b>			
34000344	CPS 30/2 10N/16N	For shaft diameter from/to	10mm (key) / 16mm (key)
<b>Coupling SED</b>			
34000073	SED 10090 A	For shaft diameter from/to	6mm / 6mm
34000007	SED 10090 A	For shaft diameter from/to	6mm / 10mm
34000074	SED 10090 A	For shaft diameter from/to	8mm / 8mm
34000008	SED 10090 A	For shaft diameter from/to	10mm / 10mm
34000019	SED 10090 A	For shaft diameter from/to	10mm / 12mm
34000009	SED 10090 A	For shaft diameter from/to	12mm / 12mm
34000065	SED 1450 A	For shaft diameter from/to	6mm / 10mm
34000018	SED 1450 A	For shaft diameter from/to	10mm / 10mm
<b>Coupling EKN</b>			
34000164	EKN20/32	For shaft diameter from/to	6mm / 6mm
34000191	EKN20/32	For shaft diameter from/to	6mm / 8mm
34000165	EKN20/32	For shaft diameter from/to	6mm / 10mm
34000177	EKN20/32	For shaft diameter from/to	6mm / 12mm
34000169	EKN20/32	For shaft diameter from/to	10mm / 10mm
34000170	EKN20/32	For shaft diameter from/to	12mm / 12mm
<b>Coupling GEL</b>			
34000182	GEL 500 / S	For shaft diameter from/to	10mm / 10mm
34000183	GEL 500 / S	For shaft diameter from/to	10mm / 12mm
34000181	GEL 500 / S	For shaft diameter from/to	10mm / 14mm
34000184	GEL 500 / S	For shaft diameter from/to	12mm / 12mm
34000185	GEL 500 / S	For shaft diameter from/to	12mm / 14mm
34000186	GEL 500 / S	For shaft diameter from/to	14mm / 14mm
<b>Bearing-Module 58</b>			
85900077	Bearing-Modul 58	Shaft diameter	10mm
85900078	Bearing-Modul 58	Shaft diameter	12mm

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## Suggested Products

Order code	Type	Parameter	Dimensions
<b>Bearing-Module 65</b>			
85900035	Bearing-Modul 65		Shaft adapter / flange ring not included.
<b>Bearing-Module 100</b>			
85900033	Bearing-Modul 100		Shaft adapter / flange ring not included.
<b>Mounting brackets</b>			
49110002	Clamping claw typ A	Flange diameter / diameter at groove	65mm / 61mm
49110005	Clamping claw typ A	Flange diameter / diameter at groove	65mm / 59mm
49110008	Clamping claw typ A	Flange diameter / diameter at groove	58mm / 54mm
49110003	Clamping claw typ C	Flange diameter / diameter at groove	100mm / 93mm
<b>Clamps</b>			
49115002	Clamp type A (round with shoulder)	See Drawing	D1: 11 mm
49115004	Clamp type A (round with shoulder)	See Drawing	D1 : 14 mm
49115003	Clamp type B (with flat, without shoulder)	See Drawing	D1: 22 mm
49115001	Clamp type C (with flat, with shoulder)	See Drawing	D1: 14 mm, A2: 5 mm
49115005	Clamp type C (with flat, with shoulder)	See Drawing	D1: 14 mm, A2: 3,2 mm
<b>Deflection pulleys for wire-actuated encoders</b>			
49995364	Pulley, simple	Suits ME-WDS	
49995365	Pulley, double	Suits ME-WDS	
49995362	Pulley, double 90°	Suits ME-WDS	

For further product information simply enter the order number in the search field at [www.tr-electronic.com](http://www.tr-electronic.com).



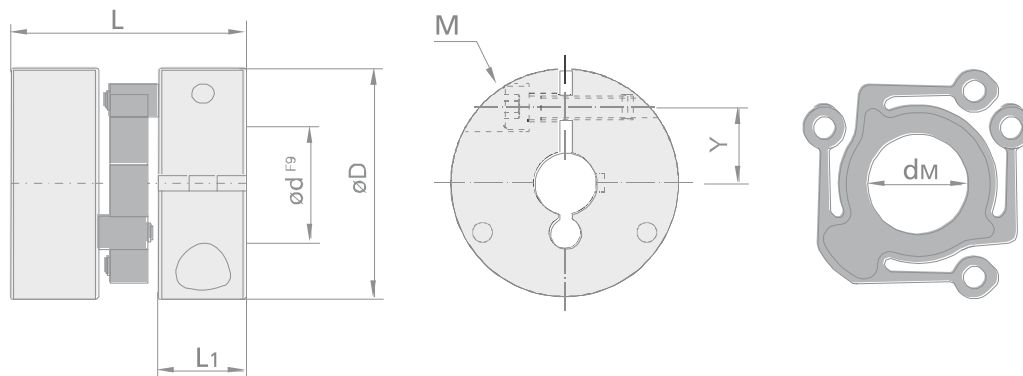
## Dimensional Drawings

### Coupling CPK Materials



## Dimensional Drawings

Coupling CPK

Coupling CPK  
Dimensions

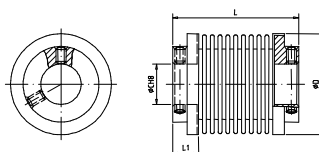
C P S	Characteristic data						Dimensions in mm										weight	inertia
	torque M (Nm)		max. power (kw)	max. displacement			geometry					clamping screw						
	max.	duration		standard value	radial Vr (mm)	axial Va (mm)	angle Vw (°)	outside Ø D <sup>(1)</sup>	nominal length L	boring Ø d max.	plate breadth L <sub>t</sub>	element boring Ø d <sub>m</sub> <sup>(1)</sup>	size	length	distance Y	starting torque M (Nm)		
8/1	0.7	0.3	0.03	0.4	0.3	1.5	19	16.3	10	5.6	7	UNC 2		6	6.4	0.4	8	8
8/2	1.4	0.6	0.05	0.4	0.3	1	19	20.3	10	5.6	7	UNC 2					9	9
9	1	0.7	0.05	0.5	0.3	1	25	19	12.7	7.0	10.2	M 2.5	12	8	0.7	20	20	
9/1	1	0.7	0.05			1.5		20.5										
9/2	2	1.4	0.1			1.0		26										
10/1	1	0.7	0.05	1	0.3	1.5	25	25.5	12	9.5	10.2	M 3	12	7.7	1.3	25	20	
10/2	2	1.4	0.1			1		31								30	30	
14	3	2	0.1	1	0.3	1	37	21		7.0	14	M 3	12	14	1.3	50	100	
14/1	3	2	0.1		0.5	1.5		24	22							50	100	
14/2	6	4	0.2		0.5	1		32								60	110	
15/1	3	2	0.1	1	0.5	1.5	37	30	20	10	14	M 4	16	12.4	3	60	110	
15/2	6	4	0.2			1		38								70	120	
22	10	7	0.5	1.5	0.5	1	56	35	34	12	18	M 5	20	21	5.7	180	800	
22/1	10	7	0.5		0.7	1.5		39								180	800	
22/2	18	14	1		0.7	1		51								200	900	
23/1	10	7	0.5	1.5	0.7	1.5	56	44.5	30	15	18	M 6	25	19.3	8	220	920	
23/2	18	14	1			1		57								240	1020	
30	22	15	0.75	2	0.5	1	75	50.5	18	28.5	M 8	30	25	24	500	3800		
30/1	22	15	0.75		1	1.5		57							40	500	3800	
30/2	44	30	1.5		1	1		73								500	3800	

<sup>1)</sup> If shaft has  $d \leq d_m - 2 \times$ , radial displacement must be taken into account.

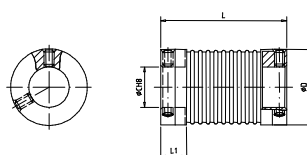
# Dimensional Drawings

## Coupling SED

Typ SED 10090 A



Typ SED 1450 A



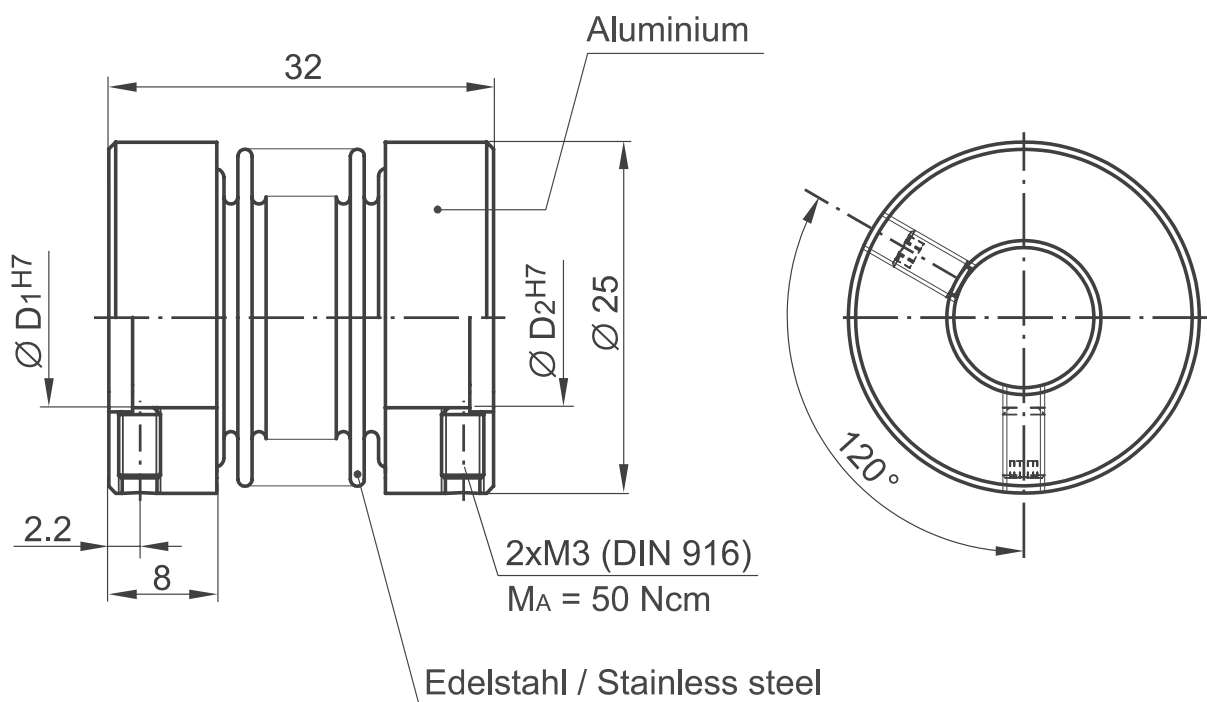
## Coupling SED Dimensions

Type	hole-Ø	article-No.
SED 10090 A	6/6	34-000-073
SED 10090 A	6/10	34-000-007
SED 10090 A	8/8	34-000-074
SED 10090 A	10/10	34-000-008
SED 10090 A	10/12	34-000-019
SED 10090 A	12/12	34-000-009

Type	hole-	article-No.
SED 1450 A	6/10	34-000-065
SED 1450 A	10/10	34-000-018

# Dimensional Drawings

Coupling EKN



Coupling EKN  
Dimensions

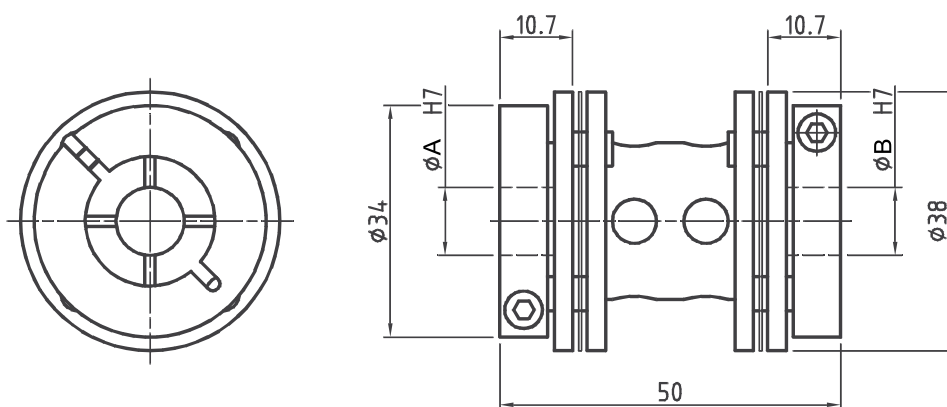
Type	$\varnothing D_1 H7$	$\varnothing D_2 H7$	#
EKN 20/32	6	6	34 000 164
	6	8	34 000 191
	6	10	34 000 165
	6	12	34 000 177
	10	10	34 000 169
	12	12	34 000 170

Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at [www.tr-electronic.com](http://www.tr-electronic.com) or on request.

## Dimensional Drawings

Coupling GEL

Typ  
GEL-500-S



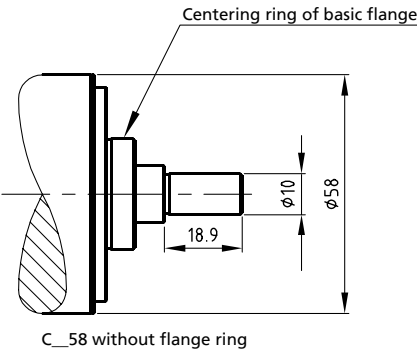
Coupling GEL  
Dimensions

Type	ØA H7	ØB H7	Article – NR
GEL-500-S	10	14	34-000-181
	10	10	34-000-182
	10	12	34-000-183
	12	12	34-000-184
	12	14	34-000-185
	14	14	34-000-186

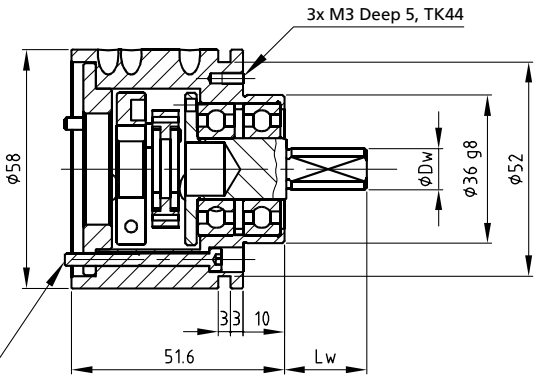
# Dimensional Drawings

## Bearing-Module 58

Encoder to be connected  
(not included)



## Bearing-Modul

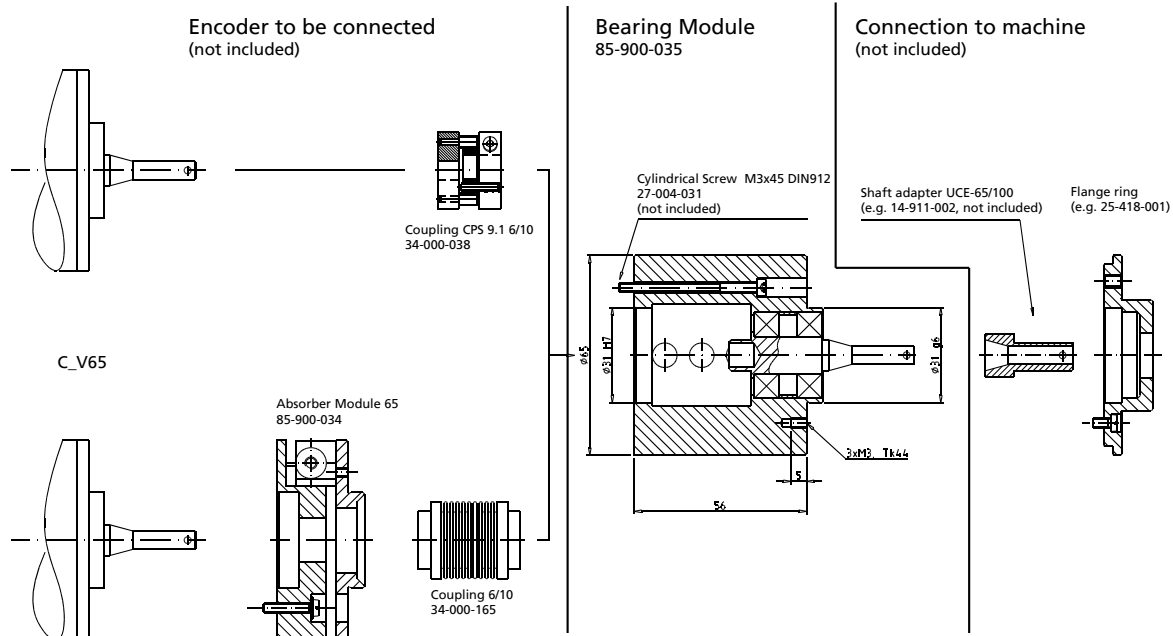


Cylindrical Screw M3 x 35 DIN 912  
27-004-086  
(3 pc. included)

Art-Nr.	Dw	Lw	Remark
85-900-077	$\phi 10$	20mm	with flat 1mm
85-900-078	$\phi 12$	25mm	without flat

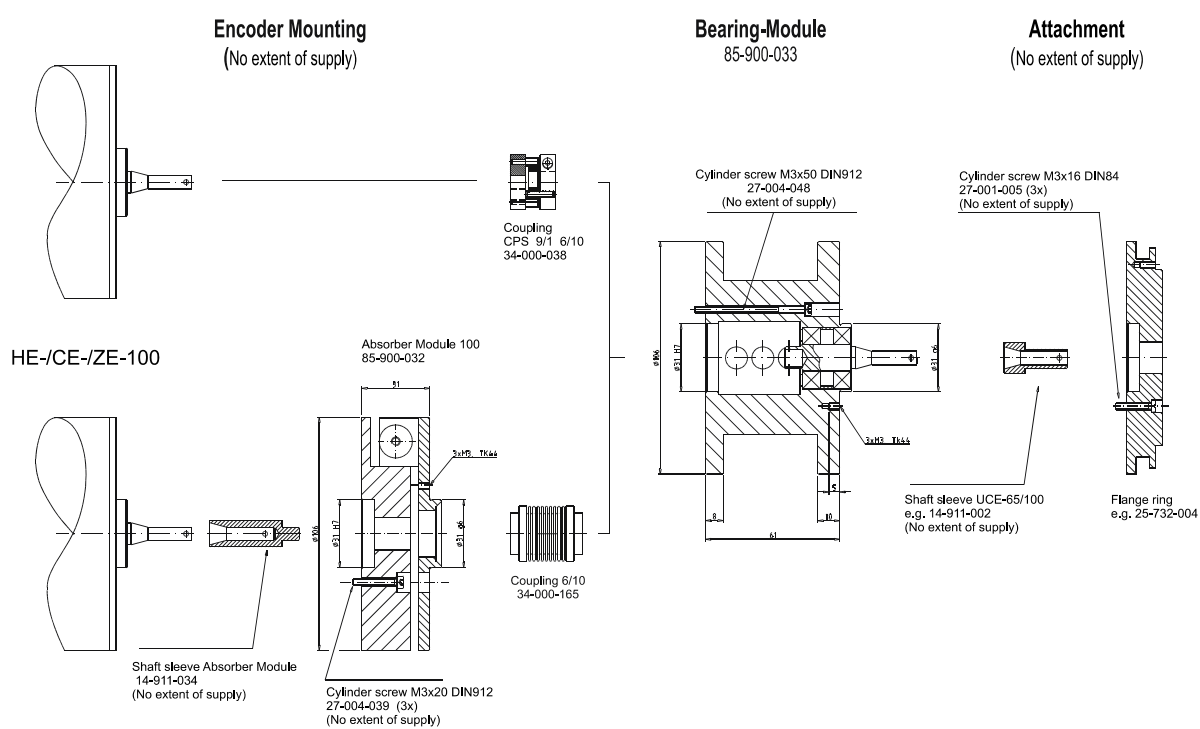
# Dimensional Drawings

## Bearing-Module 65



# Dimensional Drawings

## Bearing-Module 100

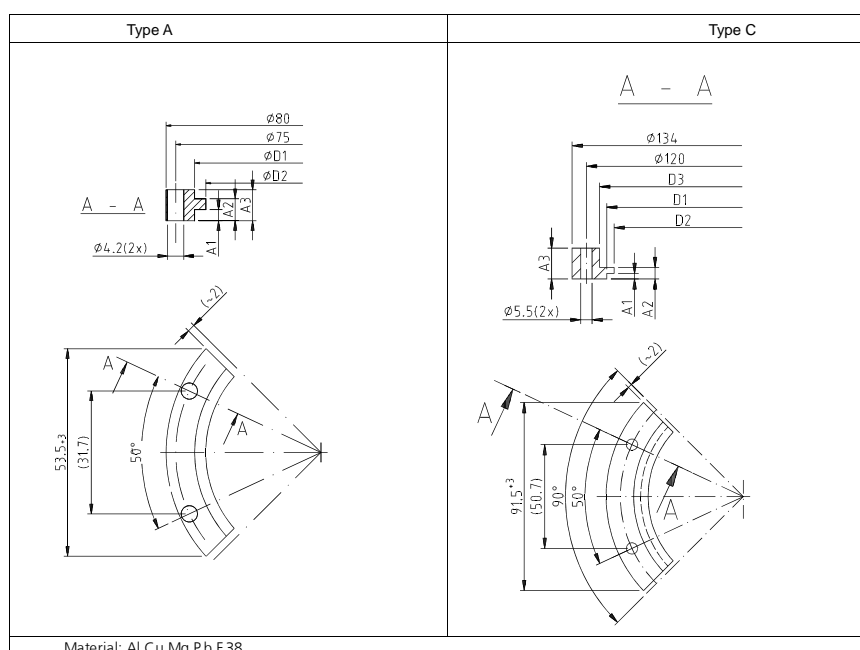


Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at [www.tr-electronic.com](http://www.tr-electronic.com) or on request.



# Dimensional Drawings

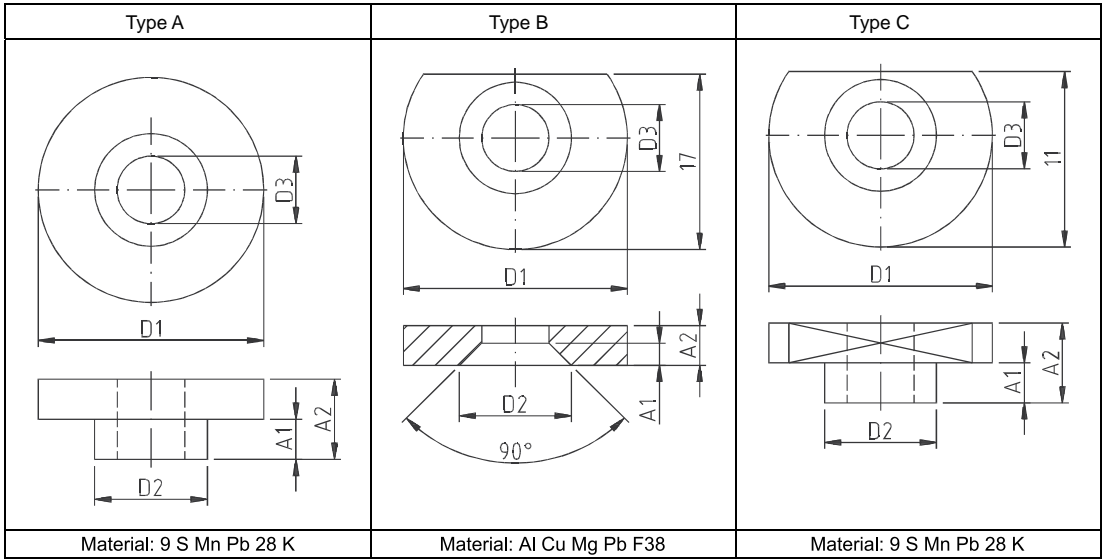
## Mounting brackets



Type	Ø D1	Ø D2	Ø D3	A1	A2	A3	#
A	65,2 ± 0,1	61,5 ± 0,1	----	1,9 -0,1	3,7 -0,1	6	49 110 002
A	65,2 ± 0,1	59,5 ± 0,1	----	2,9 -0,1	5,7 -0,1	8	49 110 005
A	58,2 ± 0,1	54,5 ± 0,1	----	1,9 -0,1	3,8 -0,1	6,7	49 110 008
C	100,2 ± 0,1	93,2 ± 0,1	107,1 ± 0,1	2,7 -0,1	5,6 -0,1	15	49 110 003

# Dimensional Drawings

## Clamps



Type	Ø D1	Ø D2	Ø D3	A1	A2	Article-No
A	11	7	4,2	1,3	2,5	49-115-002
A	14	7	4,2	2,5	5	49-115-004
B	22	6,6	3,4	1,6	2,5	49-115-003
C	14	7	4,2	2,5	5	49-115-001
C	14	7	4,2	1,5	3,2	49-115-005



## Accessories for Linear Encoders



### Linear encoders

TR-Electronic linear encoders can be integrated seamlessly into different environments. Magnet rings, floats, magnet sliders; clamps and spacers help to fit the magnetostrictive encoders into your application. Additional reflectors for our laser-based measurement systems allow bigger targets in case the vehicle does not move only in measurement direction. We provide an overview in the following pages. We are confident that we will find the right accessory for your mounting task.

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### Content

Products.....	473
Suggested Products.....	478
Dimensional Drawings.....	480

# Magnets

<b>Product</b>	Magnet ring LA/LMR	Open magnet ring LA/LMR	Magnet with cut
			
<b>Group</b>	Magnets for linear encoder	Magnets for linear encoder	Magnets for linear encoder
<b>Description</b>	Closed magnet rings for linear encoders for integration into hydraulic cylinders	Open magnet ring for LA/LMR	For LA, LMR, LP, LMP (except LMP30)
<b>Dimensions</b>	See drawings chapter	See drawings chapter	See drawings chapter
<b>Ordering</b>	Accessory or delivery option included with encoder	Accessory or delivery option included with encoder	Accessory or delivery option included with encoder
<b>Weblink</b>	<a href="http://www.tr-electronic.de/f/TR-V-TI-GB-0500">www.tr-electronic.de/f/TR-V-TI-GB-0500</a>	<a href="http://www.tr-electronic.de/f/TR-V-TI-GB-0500">www.tr-electronic.de/f/TR-V-TI-GB-0500</a>	<a href="http://www.tr-electronic.de/f/TR-V-TI-GB-0500">www.tr-electronic.de/f/TR-V-TI-GB-0500</a>
<b>QR-Code</b>			

Can't find the right variant? Please contact us ([info@tr-electronic.de](mailto:info@tr-electronic.de))

## Magnets

<b>Product</b>	Magnet slider 	Block magnet 	Float 	
<b>Group</b>	Magnets for linear encoder	Magnets for linear encoder	Magnets for linear encoder	
<b>Description</b>	For LA46, LMP46	For LMP30, LMC 55, fits as well LA46, LMP48	For LA, LMR	
<b>Dimensions</b>	See drawings chapter	See drawings chapter	See drawings chapter	
<b>Ordering</b>	Accessory or delivery option included with encoder	Accessory or delivery option included with encoder	Accessory or delivery option included with encoder	
<b>Weblink</b>	<a href="http://www.tr-electronic.de/f/TR-V-TI-GB-0500">www.tr-electronic.de/f/TR-V-TI-GB-0500</a>	<a href="http://www.tr-electronic.de/f/TR-V-TI-GB-0500">www.tr-electronic.de/f/TR-V-TI-GB-0500</a>	<a href="http://www.tr-electronic.de/f/TR-V-TI-GB-0500">www.tr-electronic.de/f/TR-V-TI-GB-0500</a>	
<b>QR-Code</b>				

# Installation

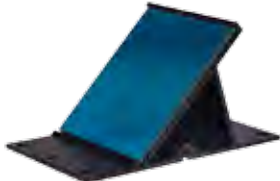


Double clamping bracket	Double clamping bracket, stainless steel	Distance mounting bracket	Connector LMC
			
Mounting accessories for linear encoders	Mounting accessories for linear encoders	Mounting accessories for linear encoders	Mounting accessories for linear encoders
For LP, LMP	For LP, LMP	For LP46, LMP48 - raises the measurement level to fit different existing surroundings	For LMC 55
See drawings chapter	See drawings chapter	See drawings chapter	
Accessory or delivery option included with encoder	Accessory or delivery option included with encoder	Accessory or delivery option included with encoder	Spare
<a href="http://www.tr-electronic.de/f/TR-V-TI-GB-0500">www.tr-electronic.de/f/TR-V-TI-GB-0500</a>	<a href="http://www.tr-electronic.de/f/TR-V-TI-GB-0500">www.tr-electronic.de/f/TR-V-TI-GB-0500</a>	<a href="http://www.tr-electronic.de/f/TR-V-TI-GB-0500">www.tr-electronic.de/f/TR-V-TI-GB-0500</a>	
			

Can't find the right variant? Please contact us ([info@tr-electronic.de](mailto:info@tr-electronic.de))

## Installation Reflectors

<b>Product</b>	Assembly aid 	Reflector sheet 	Reflector board 	
<b>Group</b>	Mounting accessories for linear encoders	Laser range finders	Laser range finders	
<b>Description</b>	For LMC 55	For LE 200 with range up to 120 m	For LE 200 with range of 175 m and above	
<b>Dimensions</b>	Fits magnet T1-5520	200 x 200 mm - 749 x 914 mm	554 x 480 mm - 1108 x 960 mm	
<b>Ordering</b>	Accessory	Accessory / spare (1 sheet 200 x 200 is included with delivery)	Accessory / spare (1 board 554 x 480 is included with delivery)	
<b>Weblink</b>		<a href="http://www.tr-electronic.de/f/TR-ELE_BA_DGB-0018">www.tr-electronic.de/f/TR-ELE_BA_DGB-0018</a>	<a href="http://www.tr-electronic.de/f/TR-ELE_BA_DGB-0018">www.tr-electronic.de/f/TR-ELE_BA_DGB-0018</a>	
<b>QR-Code</b>				



	Reflector sheet	Deflection mirror 
	Laser range finders	Laser range finders
	For LLB 500 for use with ranges longer than 65 m	Deviates lightbeam 90°
	200 x 200 mm - 749 x 914 mm	80 x 145 x 76,5 mm
	Accessory (reflector is NOT included in LLB 500)	Accessory
	<a href="http://www.tr-electronic.de/f/TR-ELE-BA-DGB-0021">www.tr-electronic.de/f/TR-ELE-BA-DGB-0021</a>	<a href="http://www.tr-electronic.de/f/TR-V-TI-GB-0550">www.tr-electronic.de/f/TR-V-TI-GB-0550</a>
		

## Suggested Products

Order code	Typ	Material	Dimensions
<b>Magnet ring</b>			
49155004	T4M20	Aluminum	D=20mm
49155005	T4M22	Aluminum	D=22mm
49155016	T4M33	Plastic	D=33mm
<b>Magnet ring, open</b>			
49155006	T3U46	PPE 30% glass fiber	D=63,5mm
49155003	T4U3820	PPE 30% glass fiber	20,2 x 38 mm
<b>Block magnet</b>			
49155009	T1-S5520 (for LMC55) - distance max 3 mm	Plastic	20 x 55 mm
49155032	T2-S5520N (for LMC55) - distance max 8 mm	Plastic	20 x 55 mm
49155015	T1-S3818 (for LMP30)	Plastic	18 x 38 mm
<b>Magnet slider</b>			
85917013	with ball joint arm		See chapter drawings
<b>Float</b>			
49915080	K4-M51	1.4571	D=51mm
<b>Clamping bracket</b>			
49917001	For LP, LMP	Aluminum	11,2 x 68 mm
85917002	Same as 49917001, but incl. 2 x clamping bracket, 4 x screw and flat washer		11,2 x 68 mm
49917057	For LP, LMP	Stainless steel	9,1 x 68 mm
<b>Spacer</b>			
49917081	For LP, LMP		5 mm
49917082	For LP, LMP		10 mm
49917083	For LP, LMP		12 mm

For further product information simply enter the order number in the search field at [www.tr-electronic.com](http://www.tr-electronic.com).

## Suggested Products

Order code	Typ	Material	Dimensions
<b>Reflector sheet</b>			
49500046	For LE 200, max. range <= 125 m	Plastic	200 x 200 mm
49500048	For LE 200, max. range <= 125 m	Plastic	200 x 300 mm
49500047	For LE 200, max. range <= 125 m	Plastic	749 x 914 mm
<b>Reflector board</b>			
49500032	For LE 200, max. range > 125 m*	Plastic	554 x 480 mm
49500034	For LE 200, max. range > 125 m, with bores*	Plastic	554 x 480 mm
49500036	For LE 200, max. range > 125 m*	Plastic	720 x 693 mm
19500037	For LE 200, max. range > 125 m*	Plastic	1108 x 960 mm
49500039	For LE 200, max. range > 125 m (recommended for distances up to 130 m)*	Plastic	200 x 200 mm
<b>Target panel</b>			
49500040	For LLB500, range 65...500m	Aluminum	210 x 297 mm
<b>Deviation mirror</b>			
49500033	For LE	Aluminum, Glass	80 x 145 x 76,5 mm

For further product information simply enter the order number in the search field at [www.tr-electronic.com](http://www.tr-electronic.com).

### Further product information

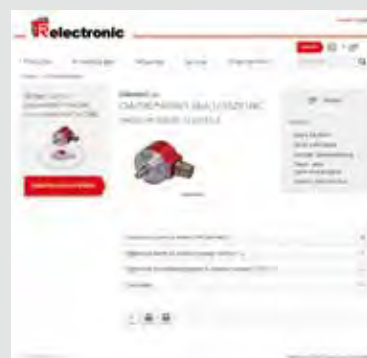
1. Enter order code into ...



2. Searchfield (top right) on [www.tr-electronic.com](http://www.tr-electronic.com)



3. Choose desired information

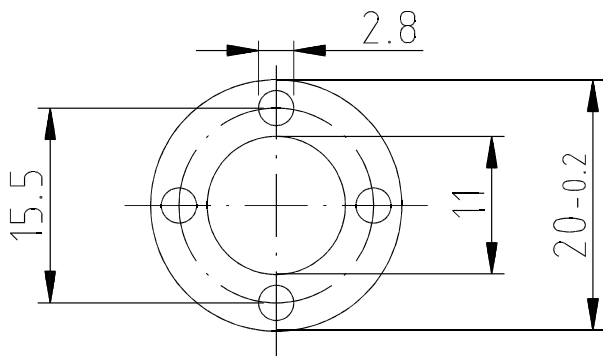


\*Devices LE 200 >125 m are adjusted to reflectors >125 m. Even with shorter distance measured, use reflectors >125 m.

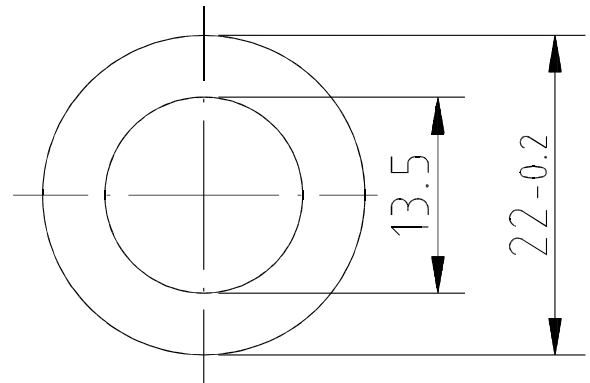
We will help you to select the most suitable products from the complete TR range. Please contact us ([info@tr-electronic.de](mailto:info@tr-electronic.de)).

## Dimensional Drawings

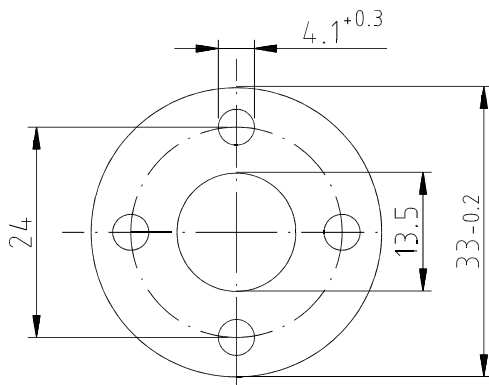
**Magnet ring**  
49155004



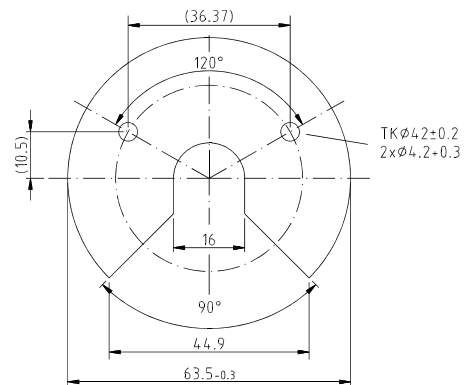
**Magnet ring**  
49155005



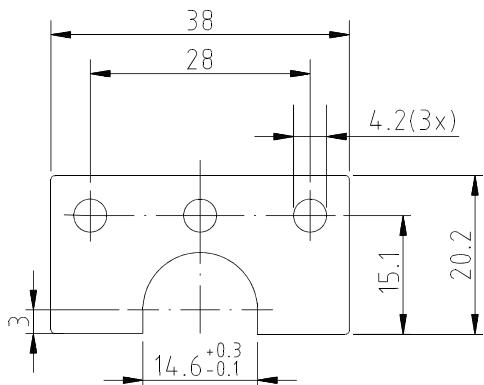
**Magnet ring**  
49155016



**Magnet ring, open**  
49155006



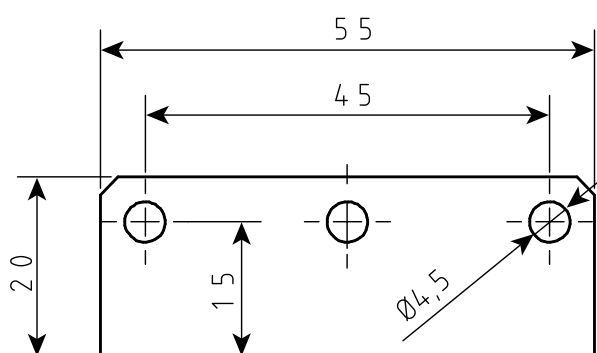
**Magnet ring, open**  
49155003



## Dimensional Drawings

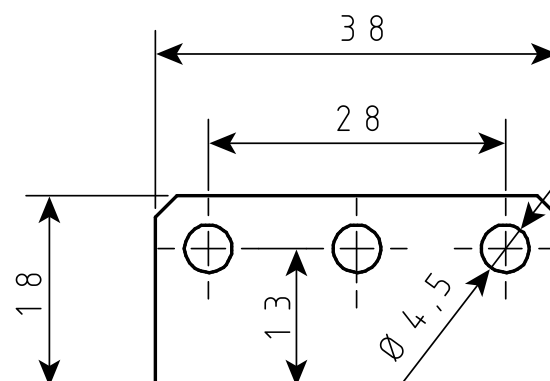
### Block magnet

49155009 (distance 3 mm) / 49155032 (distance 8 mm)



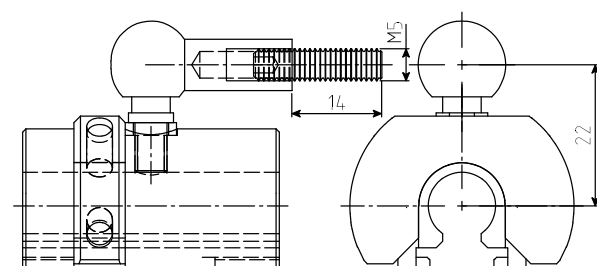
### Block magnet

49155015



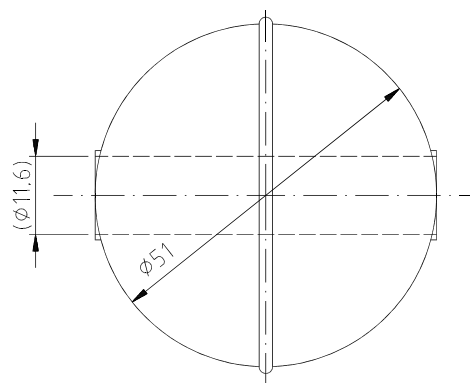
### Magnet slider

85917013



### Float

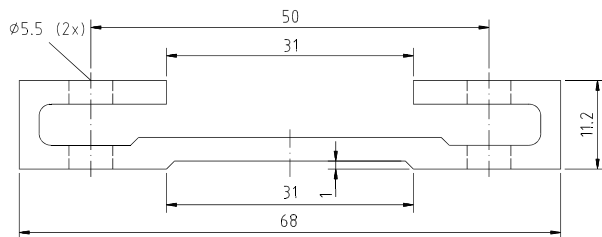
49915080



## Dimensional Drawings

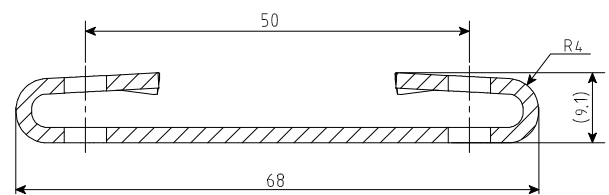
### Clamping bracket

49917001, as kit incl. screws: 85917002



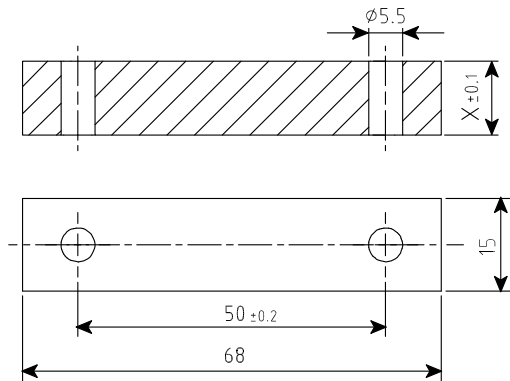
### Clamping bracket

49917057



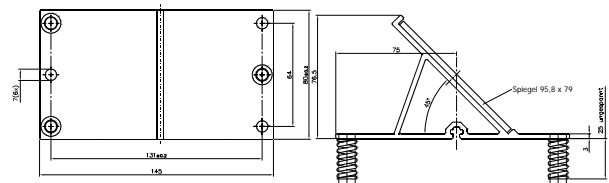
### Spacer

49917081 (X=5mm), ...82 (X=10mm), ... 83 (X=12mm)



### Deviation mirror for LE

49500033



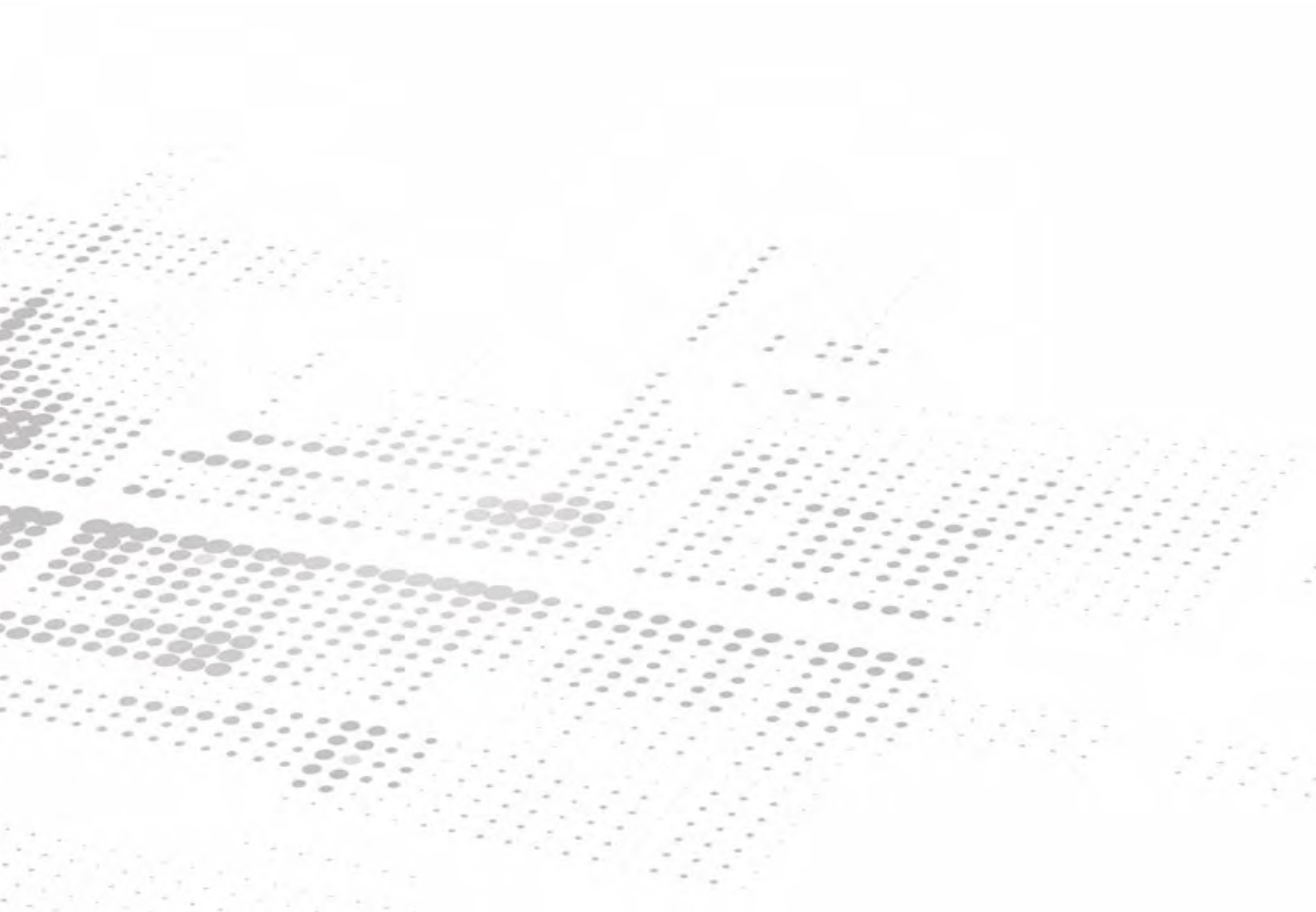


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# TRsystems



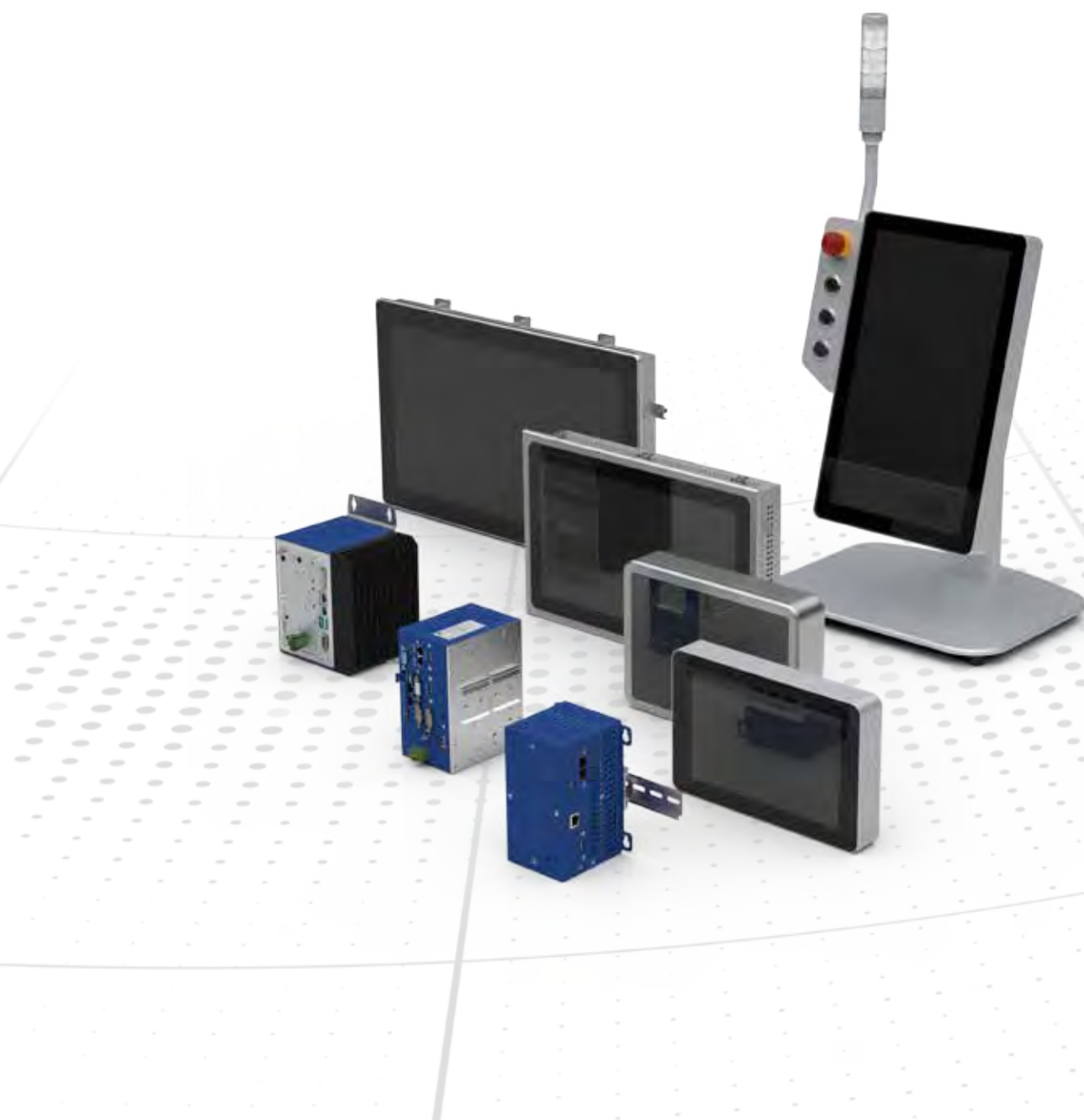




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## TR – innovative and successful

Our customers' constantly new requirements and challenges have shaped TRsystems over 25 years.

We complete a large number of production steps ourselves in our flexible production facilities, we develop the electronics ourselves and the housings and mounts are designed by our own design engineering department.

### TRsystems Trossingen & Pforzheim

TRsystems combines a variety of business activities relating to industrial automation.

**TRsystems Components and Systems** develops and manufactures industrial control and communication systems. In addition to the standard product range comprising industrial PCs, industrial controllers and I/O systems, customer-specific industrial and electronic products are a focus of production for TRsystems.

## We provide: Measurement and control systems for automation technology

When industrial processes need to run smoothly and reliably, measurement and control solutions from TR play their part. When a theater curtain goes up, for example, TR systems monitor the complex stage technology. People and machines work safely together and the audience enjoys a perfect production. Wind energy plants generate energy with maximum efficiency thanks to optimally aligned rotor blades - controlled by TR solutions.

**OEM developments** are a further focus of the TRsystems development department. Projects that have already been executed by TRS provide smart metering solutions for efficient energy usage and fair charging, enable remote monitoring for water supply networks or ensure comfort through intelligent heating automation.

As a service provider, **TRsystems Automation** optimizes press lines for new levels of performance.

**TRsystems Pforzheim**, with the brand name **UNIDOR**, stands for special know-how in pressing and punching processes and for many years has been an established name for die safety and increased efficiency for punching manufacturers and users.

In press lines for the automotive industry TR sensors guarantee safe forming of the body components. In logistics TR measuring systems enable smooth transport of goods, e.g. in conveying systems and high racks. TR control and measuring modules control and monitor pumps for drinking water supply, regulate correct feeding of pellets in wood-fueled installations or help to detect faults in a punching machine at an early stage.

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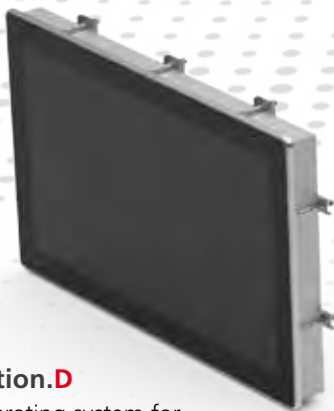
## Series overview



**notion.A**  
Operating system for arm-mounted installation



**notion.B**  
Automation system  
for cabinet installation



**notion.D**  
Operating system for  
dynamic mounting



**notion.C**  
Operating system for  
cabinet/console mounting



**notion.E**  
Exclusive customer systems



**notion.H**  
Operating system for hygienic applications

## notion.A



### notion.A – Operating system and arm mounting

The **notion.A** device model was developed for the operation of machines and systems, where the machine operator or line supervisor requires a direct view of the workpiece or medium. Thanks to the close proximity of the device they can observe processes via the user interface of the application software and directly intervene in the production process. Typically, the device is fixed to a supporting arm with a VESA-75/100 mount.

The electrical connection technology varies from conventional connectors through to sturdy M12 plug connectors. The environmental requirements are usually very high in the installation area of the device. Often the atmosphere contains lubricants or cleaning agents which require a device protection class of IP65 or higher. Measures have also been put in place that enable **notion.A** to withstand exceptional mechanical stresses of vibration and shock.

The fanless and easy-to-clean **notion.A** comes with display sizes from 10.1" to 21.5" and a touch system that supports multi-finger operation. The housing can be equipped with 22.5 mm control elements such as emergency stop buttons or signal and indicating lamps.

#### **notion.A** supports the applications

- \_ **notion.computer**
- \_ **notion.terminal**
- \_ **notion.tablet**
- \_ **notion.client**
- \_ **notion.PLC**
- \_ **notion.APP**

## notion.B

notion.B200



notion.B300



notion.B310



### notion.B – Automation system for cabinet / console mounting

**notion.B200** is ideal for power-hungry and computation-intensive automation tasks. Control functions of PLCs with field bus extension as well as image processing can be successfully implemented in industrial environments with constant vibration and shock load conditions.

With **notion.B300** you can also create simple remote maintenance and IT access via the system operator's infrastructure.

**notion.B310** provides a control in accordance with IEC 61131-3 with integrated field buses such as CANOpen and EtherCAT.

Selectable storage media such as uSD, SSD or HDD enable complex data acquisition within the PLC even without a network connection.

The fanless and displayless **notion.B** has all interfacing capabilities necessary to connect to the usual industrial

infrastructure with operating and automation systems from all manufacturers.

#### Field bus options supported

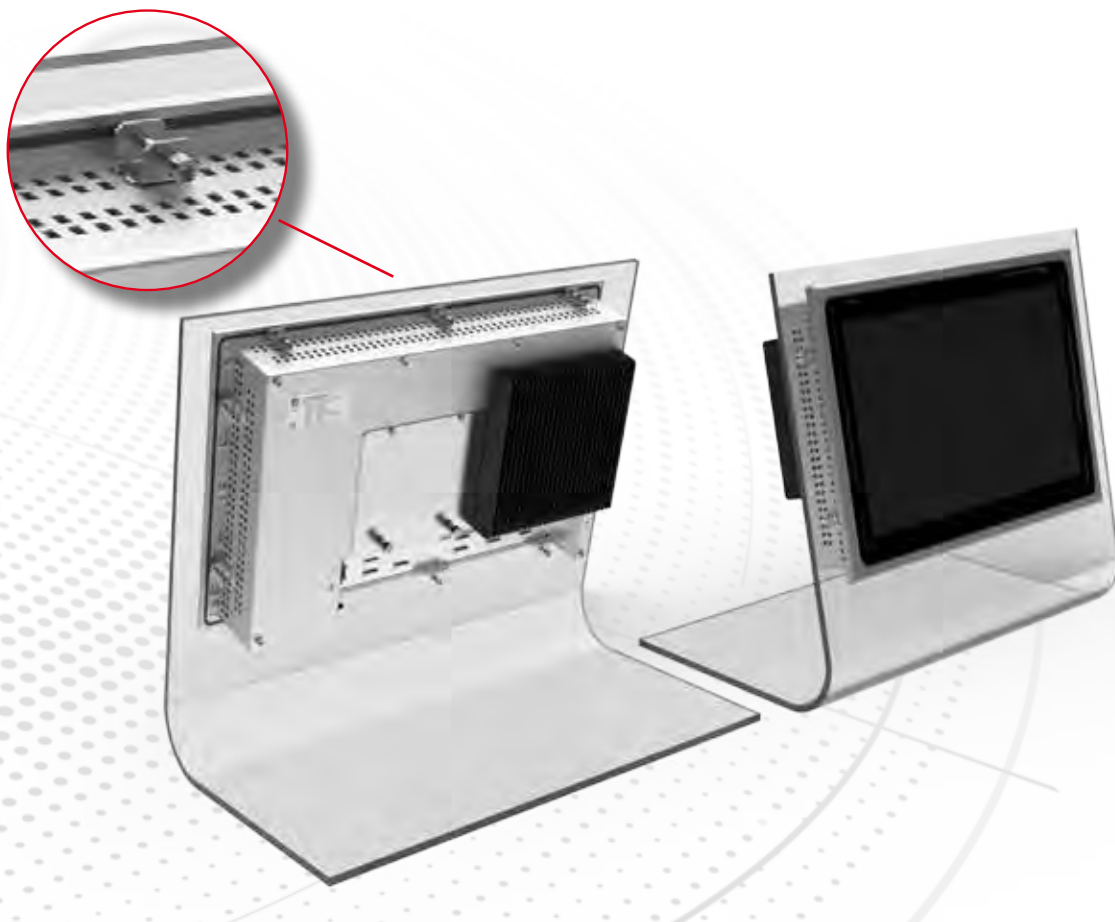
- \_ EtherCAT (**notion.B310**)
- \_ CANopen (**notion.B310**)
- \_ PROFIBUS (**notion.B200**, **notion.B300**)
- \_ PROFINET (**notion.B200**, **notion.B300**)

#### notion.B supports the applications

- \_ **notion.computer**
- \_ **notion.tablet**
- \_ **notion.PLC**



## notion.C



### notion.C – Operating system for cabinet/console mounting

The **notion.C** device model is particularly suitable for installation in control panels and cabinets. This device model is known on the market as a "panel PC".

The device is installed in a cabinet cutout or console housing (19" installation frame) provided for this purpose and clamped at the back with mounting elements.

The impervious IP65 front unit provides the necessary protection. Lubricants and cleaning agents have no impact on the system's long service life.

The fanless **notion.C** is available with display sizes from 256.5 mm (10.1") to 546.1 mm (21.5") and a touch system that supports multi-finger operation.

\_ **notion.computer**  
 \_ **notion.terminal**  
 \_ **notion.tablet**  
 \_ **notion.client**  
 \_ **notion.PLC**  
 \_ **notion.APP**

**notion.C** supports the applications

## notion.D



### notion.D – Operating system for dynamic mounting

With the **notion.D** device model you can keep all your options open: Enclosed on all sides with the specified protection class and VESA 75/100-compliant rear mount, **notion.D** can be mounted directly on the machine like a **notion.A**.

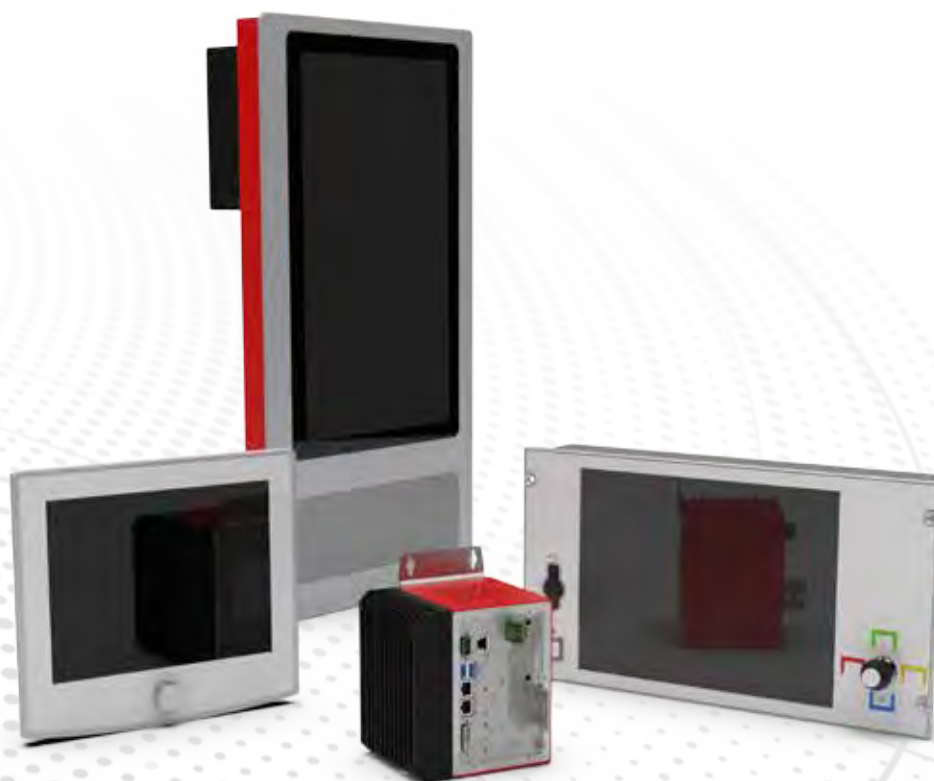
The same device can also be directly mounted in a console, front panel or device support like a **notion.C**. The fanless and easy-to-clean **notion.D** has a display size of 546.1 mm (21.5"), a touch system that supports multi-finger operation and a protection class up to IP54.

**notion.D** supports the applications

- \_ **notion.computer**
- \_ **notion.terminal**
- \_ **notion.tablet**
- \_ **notion.client**
- \_ **notion.APP**



## notion.E



### notion.E – Exclusive customer systems

With the **notion.A**, **notion.B**, **notion.C**, **notion.D** or **notion.H** device platforms we can fulfill many requirements from our modular system. You haven't found the right version?

Then we can certainly provide a solution tailored exclusively for you from existing and specially developed technology modules.

That's why we have called this series **notion.E** – developed exclusively for you.

From slim to heavy-duty, from modest to eye-catching – we can develop the control, operating or visualization solution for your latest series of machines or systems.

**notion.E** offers exclusive and innovative ideas, extensions and additions.

Replacement devices/retrofits can also be provided with **notion.E**. Most of our technologies have a long-term availability of more than 10 years.

Let's talk about it!

---

notion.H



## notion.H – Operating system for hygienic applications

The **notion.H** device model is ideal for hygienic applications. Typical applications are food processing, beverage filling as well as pharmaceutical and cosmetic production systems.

The aluminium housing can withstand even harsh environmental conditions. It is water-tight (IP65) and is mounted on a supporting arm with a VESA-75 mount or directly on the machine. Sturdy M12 connectors ensure that the high tightness requirements are also fulfilled during device cleaning.

The fanless **notion.H** has a display size of 256.5 mm (10.1") and a touch system that supports multi-finger operation. This touch operation works even in wet and dirty environments.

**notion.H** supports the applications

\_ **notion.computer**

\_ **notion.terminal**

\_ **notion.tablet**

\_ **notion.client**

\_ **notion.APP**

# The performance levels / functionalities of **notion.ABC**

## **notion.computer**

**notion.computer** devices reflect the full capability of industrial PC systems with their x86 core. They offer all conceivable operating systems and application possibilities. Power-hungry applications in particular are no problem for **notion.computer**. Even existing control applications can usually be ported to this platform with minimum effort.

## **notion.tablet**

**notion.tablet** stands for slim, efficient control and operation on the basis of ARM processors. Modern, controller-based control systems work perfectly on this contemporary platform. Adapted operating systems get the most out of optimized hardware. Quick start-up makes its use attractive for small machines with a high switching on and off frequency. Optional static mass storage devices without moving components facilitate use under the most demanding conditions. The lower power consumption in comparison to **notion.computer** enables flatter, smaller devices.

## **notion.terminal**

**notion.terminal** is **notion** without the computing power. With the same design and resistance against environmental influences, the **notion.terminal** brings the look and feel of **notion** in cases where a PC-based hardware is already introduced, for example, and there are currently no plans to switch to a 100 % solution with **notion**. Do you wish to secure your control technology in the control cabinet? Then **notion.terminal** can also be perfectly adapted to **notion.B** control modules. **notion.terminal** and the PC core connect via DVI, VGA, USB or KVM stream (LAN or USB). And because both are from a single source, you always benefit from the most up-to-date transmission technologies and highest reliability even in large systems.

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## notion.client



### notion.client

The **notion.client** functionality provides a versatile and efficient remote control for common remote client connections. Visualization and touch operation for automation systems and IT systems from all manufacturers is possible.

Paired with the operating systems in the series **notion.A**, **notion.C**, **notion.D** or **notion.H**, you can display, switch and operate any number of configurations on the operating system under the most difficult industrial conditions via **WEB** (<http://> or <https://>), **RDP** (Remote Desktop Protocol) or **VNC** (Virtual Network Computing).

The original display screen is automatically scaled on **notion.client**. Older screen formats (e.g. 4:3) or different screen resolutions can be used immediately either in the same format or full screen mode, without any software changes.

The integrated softkey board supports simple data input for your applications. The automatic connection monitoring indicates a possible interruption in the connection to the server system at any time. Interrupted connections are automatically restored as soon as the server system is available again. The set connections are also re-established during start-up or after restarting – the system can be operated immediately.

This is made possible by the combination of industry-compliant hardware and a specially tailored operating system – assembled for you under the name **notion.client**.

## notion.APP



previously: WEB visualization



new: notion.APP visualization

Dedicated visualization systems, which are only suitable for one controller family, are a thing of the past.

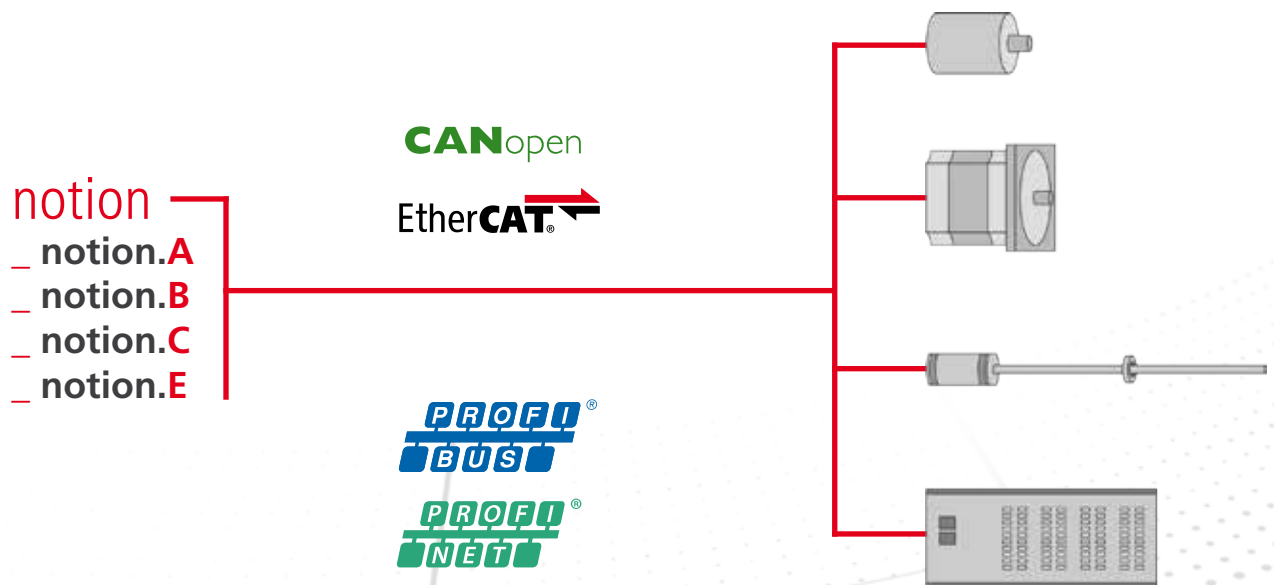
**notion.APP** is the barrier-free way to implement slim and ergonomic operating and visualization interfaces for almost any modern controller platform. For this we rely on Android Studio, well known in the software world, which you can use free of charge.

We have already adapted the necessary libraries to our **notion** world. We will gladly support you in the initial stages with examples or even a workshop, whether at our premises

or yours – this can also be geared very specifically to your desired automation application.

The prerequisite is our modern controller platform, which will make your process image or variables accessible for reading and writing using current IT standards – so basically all in compliance with Industry 4.0.

## notion.PLC



## notion.PLC-CODESYS<sup>1</sup>

The high-performance control **notion.PLC-CODESYS<sup>1</sup>** with integrated visualization is one of the most cutting-edge controls according to IEC 61131-3 for your machine or system.

The capability of **notion.PLC-CODESYS<sup>1</sup>** is scalable and can be adapted to different performance requirements.

With multi-core support and Industry 4.0 communication, even power-hungry automation tasks can be implemented cost-effectively with smart device technology.

The special Industry 4.0 features enable very simple and efficient networking with IT and APP technologies. Common smartphone apps can represent and further process the automation data in cutting-edge form.

**notion.PLC-CODESYS<sup>1</sup>** can be configured on **notion** systems which are designed for the applications **notion.computer** and **notion.tablet**.

Different form factors such as cabinet installation or a highly integrated control panel combination directly on the machine are possible.

### Field bus connection

- \_ EtherCAT
- \_ CANopen

### Scalability

- \_ Single Core
- \_ Multi Core

<sup>1</sup>CODESYS is a registered trademark of 3S-Smart Software Solutions GmbH, Kempten

## notion.PLC-S5-945<sup>2</sup>

The **notion.PLC-S5-945** functionality emulates a hardware PLC with real-time behavior.

The PLC program runs on a **notion.computer**. As **notion.PLC-S5-945** behaves like an original **SIMATIC<sup>2</sup>** PLC, in addition to the S5 programming software for Windows the original **STEP5<sup>2</sup>** programming tool can also be used.

Are you still running applications on **SIMATIC-S5<sup>2</sup>** and are you looking for the right hardware to continue operating your system sustainably? With **notion.PLC-S5-945** you can transfer the existing program to a contemporary platform.

Online connections can be serial, via Ethernet or directly on the Windows operating system of **notion.computer**.

**notion.PLC-S5-945** can be configured on **notion** systems which are designed for

**notion.computer** applications.

Cabinet installation can be used as a traditional retrofit solution, or alternatively a highly integrated controller-operating panel combination is possible directly on the machine.

### Field bus connection

\_ PROFIBUS

## notion.PLC-S7-416<sup>2</sup>

The **notion.PLC-S7-416** functionality emulates a hardware PLC with real-time behavior.

The PLC program runs on a **notion.computer**. **notion.PLC-S7-416** behaves like an original **SIMATIC<sup>2</sup>** PLC. In addition to the S7 programming software for Windows®, the original **STEP7<sup>2</sup>** programming tool or **TIA Portal<sup>2</sup>** can also be used. Online connections can be serial, via Ethernet, via PROFIBUS, via PROFINET or directly on the Windows operating system of **notion.computer**.

Configuration and diagnosis of PROFIBUS or PROFINET are also possible with the original **STEP7<sup>2</sup>** tool or **TIA Portal<sup>2</sup>**. The program of an S7 hardware PLC or a Siemens **WinAC SoftSPS<sup>2</sup>** including **PROFIBUS<sup>2</sup>** or **PROFINET** configuration can be transferred to **notion.PLC-S7-416**. Data exchange occurs via S7 for Windows, the **SIMATIC<sup>2</sup>** Manager or via **TIA Portal<sup>2</sup>** from Siemens.

**notion.PLC-S7-416** can be configured on **notion** systems which are designed for **notion.computer** applications.

### Field bus connection

\_ PROFIBUS

\_ PROFINET

<sup>2</sup>registered trademarks of Siemens AG Munich and Berlin



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## TR-Automation

### Retrofit and Setup of New Plants



#### Our Automation Team – Competent consulting through years of experience

Our TR-Automation team of TR-Electronic GmbH offers competent consulting in press and plant construction from more than 20 years of experience with one of the largest manufacturers in the area of hydraulic machine and plant construction in the world.

**We have a lot of know-how in the areas of:**

- \_ Project management – planning and implementation
- \_ Construction:
  - \_ Hydraulics and mechanics
  - \_ Electrical engineering
  - \_ Control technology
- \_ Controls – concept and implementation
- \_ Software development
- \_ Visualisation – concept and implementation
- \_ Remote maintenance – update and support
- \_ After-sales service





We use our experience and the accumulated knowledge to fulfill your requirements in the best projects.  
We will support you from planning and development to performance, commissioning and production support.

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## Your press plant at the cutting edge of technology



You would like to upgrade or modernize your press plant in a retrofit project: What you need is comprehensive specialist knowledge and many years of experience renovating and optimizing challenging press plants.

As an expert for retrofit projects, the TR Automation Business Unit of the TR Group is your competent partner for modernizing and overhauling press plants. Use our extensive know-how of hydraulic and mechanical presses, blank loaders and automation systems through to cutting systems and internal high-pressure forming plants (IHU). With your retrofit project, you get to benefit from an all-round carefree package that covers electro-construction, hydraulics & pneumatics, mechanics, programming and service.

The TR-Automation team of experts takes you step-by-step through the retrofit or renovation of individual machines and systems in the press plant or of entire press lines. We guarantee maximum transparency and orient ourselves completely to your specific requirements - from project planning and realization through to starting the system on site and subsequent training of your employees. For top-modern machines and systems in a press plant at the cutting edge of technology offering the best performance and efficiency.



## Hydraulic and mechanical presses

- \_ Tryout presses
- \_ Multicurve presses
- \_ Transfer presses
- \_ Press lines
- \_ Single-action and multiple-action draw presses  
(ram and ram cushion, die cushion, blank holder)

## Blank loaders

The problem-free feeding of blanks is key to the production performance of the forming system. The design of the blank feed is also known as the blank loader. The blank material used, the stack form and range of parts involved influence both the concept design of the blank loader and the production performance of the press. Blank washing systems and blank lubricating systems can be integrated into the plant as required.

TR-Automation takes over overhauling or the complete redesign of the blank loader in your forming system. We modernize the individual components of the blank loader and ensure smooth interaction - the best foundation for optimal functioning presses and efficient production processes.

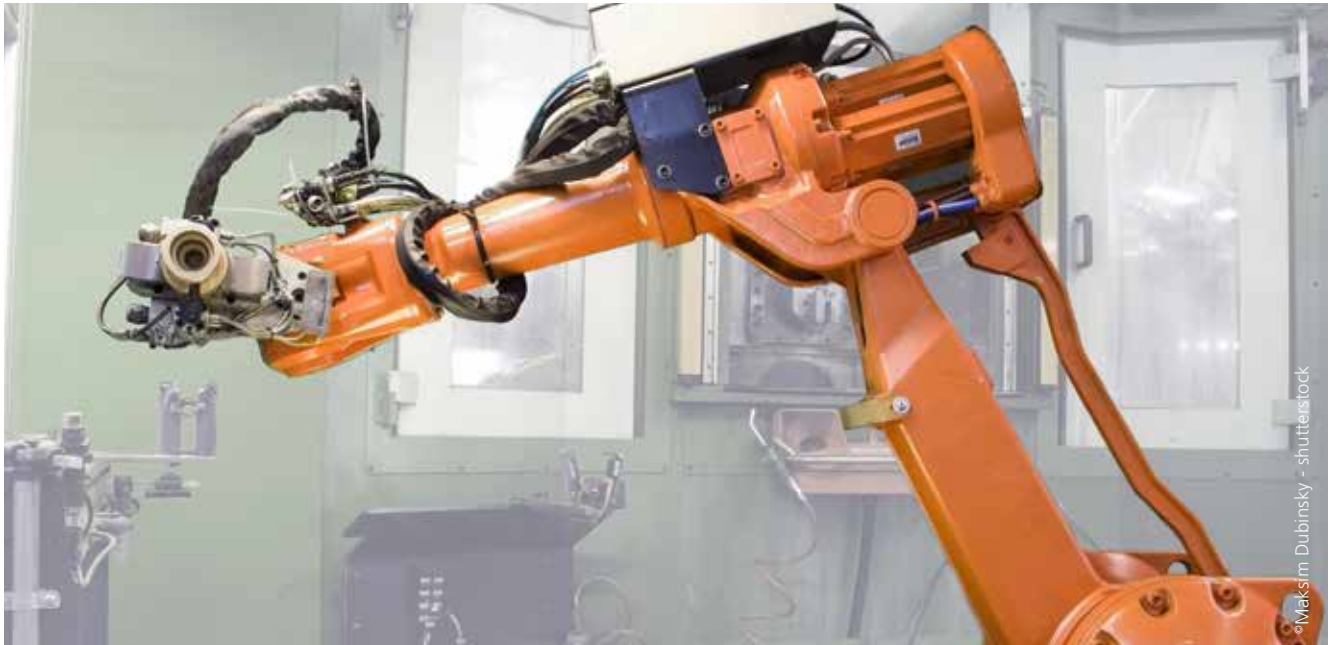
## Cutting systems

Blank production is the basis for the quality of the subsequent production processes, e.g. in car-body assembly in the automotive industry. The exterior skin parts particularly place high demands on the surface quality of the supplied blanks.

TR-Automation takes over the overhaul or modernization of your coil systems or cutting systems. We update the individual components of the coil system and ensure they work together smoothly. This not only increases the precision and throughput of your cutting systems, but also gives you greater availability at the same level of safety - a perfect basis for trouble-free, highly-efficient production in three-shift operations.

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# Your press plant at the cutting edge of technology



## Automation systems

Even automation systems in press plants start to get old at some point in time. With modern transfer systems, feeders, robots, blank loaders, turners and orientation stations, speedbar modules and stacking systems, which are integrated seamlessly into the overall system and tuned to function perfectly together, we ensure that your production processes experience a measurable boost in efficiency. And we can also take over the renovation of individual components or complete automation systems in your presses and press lines.

## IHU systems

In Internal-High-Pressure Forming (IHU), metallic tubes or hollow parts are formed in closed forming tools by way of internal pressure. For the production processes to be as efficient as possible and to achieve a high-level of availability and maximum throughput, what you need for these complex techniques is that the individual components of the IHU system are at the state of the art and work together seamlessly. TR-Automation modernizes your existing IHU systems to include cutting edge technology and coordinates each module to work perfectly in tune with the system as a whole.



## Range of services of machine & system retrofits



- \_ Consulting
  - \_ Recording and analysis of the actual condition
  - \_ Process optimization
- \_ Project management
  - \_ Specifications management
  - \_ Development of specifications
  - \_ Project planning
  - \_ Risk and hazard analysis
- \_ Construction and development of the different areas
  - \_ Electro
  - \_ Hydraulics/Pneumatics
  - \_ Mechanics
  - \_ Programming
- \_ On-site assembly and installation
- \_ On-site commissioning
  - \_ System-specific documentation
  - \_ Training of your operating and maintenance personnel during the handover phase
- \_ CE marking
- \_ Service
  - \_ Training
  - \_ Production supervision
  - \_ Support
  - \_ Remote maintenance

---

# Retrofit-services



For presses and press lines, blank loaders, automation systems, coil systems or IHU systems: to ensure smooth production processes, you need optimal-functioning electrics with control systems, sensors and actuators, convenient visualization solutions and comprehensive safety systems. TR-Automation analyzes your electrics system in the press plant to reveal any weaknesses and by modernizing specific areas ensures that the control of all of the systems functions as simply, trouble-free and efficiently as possible.

## Programming

- \_ Programmable safety control (PPS)
- \_ Storage-programmable control (SPS)
- \_ Visualization
- \_ Operation and preselection panel (BVT), two-hand operating points, panel PC, touch-panel
- \_ Controller
  - \_ Ram position control
  - \_ Ram pressure regulator
  - \_ Ram force regulator
  - \_ Ram speed control
  - \_ Ram parallel control, Ram synchronizer
  - \_ Intelligent pre-control of ram
  - \_ Limitation control of ram
- \_ Ram cushion position control
- \_ Ram cushion pressure regulator
- \_ Die cushion position control
- \_ Die cushion pressure control
- \_ Blank holder pressure control, blank holder fine adjustment
- \_ Intelligent pump control
- \_ Electrical drive control in automation systems
- \_ Path control
- \_ Individual control and regulation algorithms
- \_ Individually adjustable number of axes
- \_ Setpoint selection
- \_ NC controls
  - \_ Continuous path control systems
  - \_ Path generators



## Electro

- \_ Programmable safety control (PPS)
- \_ Storage-programmable control (SPS)
- \_ Cabinets and boxes:  
Control cabinet, engine cabinet, terminal box, industry PC, control lines, power cable, bus lines: Safetybus p, ProfiSafe, Profinet, EtherCAT, Ethernet, Profibus
- \_ Visualization  
Operation and pre-selection panel (BVT), two-hand operating points, panel PC, visualization, touch-panel, operating panel, keyboard
- \_ Sensors and actuators  
Sensor signals: pressure, speed, path, position, force, valve position, rotary encoder, actuator signals: valve, hydraulic valve, proportional valve, servo-valve, motor, electric motor
- \_ Controller
- \_ Machines and personal protection  
Protective casing, doors, gates, lift gates, light barriers, emergency off switches, emergency stop

## Hydraulics / Pneumatics

- \_ Sealing valves
- \_ Sealing cylinders
- \_ Checking/ overhauling storage
- \_ Replacing valves and units
- \_ Redesign of valve blocks and other components

## Mechanics

In order to achieve powerful, efficient, highly available and safe production processes in the press area, you need reliable mechanical components in your production systems.

We take over retrofitting your mechanical systems - for example the cams, guides and head pieces. In addition, we help you with the complete relocation or the set-up and dismounting of systems and machines. This minimizes downtimes and we can give you the security that your production systems will be functioning optimally immediately after re-installation.



---

## Range of services



A retrofit serves as a replacement for components that are no longer available. A process optimization can also be carried out, i.e. productivity is increased. In comparison to purchasing a new system a cost optimization also takes place, as the existing system is only upgraded and retrofitted. In many cases the machine can be used more flexibly after a retrofit. The retrofit of a machine has a higher internal acceptance, as the machines and systems are generally well known.

## TR-Electronic projects at a glance

- \_ Adaptive control, ZIM-project
- \_ Continuous path control for feeder automation
- \_ Care and maintenance of Müller-Weingarten control systems
- \_ Blank holder fine adjustment to mechanical production presses
- \_ Brake test stand
- \_ Casing jack for offshore installations
- \_ Diecasting machines
- \_ Hydraulic presses for toolmaking
- \_ Hydraulic production presses
- \_ IHU systems
- \_ Mechanical presses
- \_ Multicurve presses
- \_ Blank loaders - destacking feeders, conveyor belts, washers, lubrication units, centering station
- \_ Press with parallelism control
- \_ Press with accumulator supply
- \_ Robot automation / coupling and integration into system control
- \_ Cutting systems – belt conveyor, press, stacking system
- \_ Stretch forming presses
- \_ Transfer presses
- \_ Die cushion pre-acceleration
- \_ Die cushion pressure control



## Overview of TR-Automation references



- \_ Airbus Deutschland GmbH, Nordenham-Einswarden
- \_ Allgaier AEF S.à.r.l, France
- \_ Allgaier Werke GmbH, Utingen
- \_ Audi AG, Neckarsulm
- \_ BMW AG, Munich Dingolfing
- \_ Erdöl-Erdgas Workover GmbH, Salzwedel
- \_ G. Siempelkamp GmbH & Co. KG, Krefeld
- \_ GEDIA Gebrüder Dingerkus GmbH, Attendorn
- \_ Hörnlein Umformtechnik GmbH & Co., Schwäbisch Gmünd
- \_ Knorr-Bremse AG, Munich
- \_ Läßle Automotive GmbH, Teublitz
- \_ Magna Drive Automotive Industries of America Inc., USA
- \_ Magna International Stanztech GmbH, Heilbad Heiligenstadt
- \_ Magna Sonora Forming Technology, Mexico
- \_ Magnetto Automotive Deutschland GmbH, Treuen
- \_ Opel AG, Rüsselsheim
- \_ Schuler SMG GmbH & Co. KG, Esslingen
- \_ SMF GmbH & Co. KG, Ahlen
- \_ Strothmann Machines & Handling GmbH, Schloß Holte Stukenbrock
- \_ ThyssenKrupp System Engineering GmbH, Wadern-Lockweiler
- \_ Tower Automotive, Zwickau
- \_ TU Dresden, IFD
- \_ University of Stuttgart IFU
- \_ VDL Nedcar, The Netherlands
- \_ Volkswagen AG, Wolfsburg
- \_ Werkzeugbau Leipzig GmbH, Leipzig

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## TRsystems GmbH, Unidor System Division in Pforzheim



### Company history

#### **1948 – Establishment of Kiefer KG, watch and metal goods factory, Pforzheim**

Creation of the UNiDOR brand name. Through automation of punching processes. In-house development of the first tool protection systems (UN series) and optical sensors.

#### **1971 – Sale to Thurn and Taxis**

Further development of systems, driven by constantly new challenges. Introduction of the first force monitoring systems. Creation of the APS system, development of the first axis automations (stroke adjustments; ram adjustments).

#### **1990 – Acquisition by the Prym Group**

Further development of the APS system, first industrial PC systems are used. Customer-specific solutions are increasingly implemented.

#### **1996 – Acquisition by TR-Electronic GmbH**

Creation of the Aplus system. In 2000 creation of the compactPRESS system. 2012 integration into TRsystem GmbH.

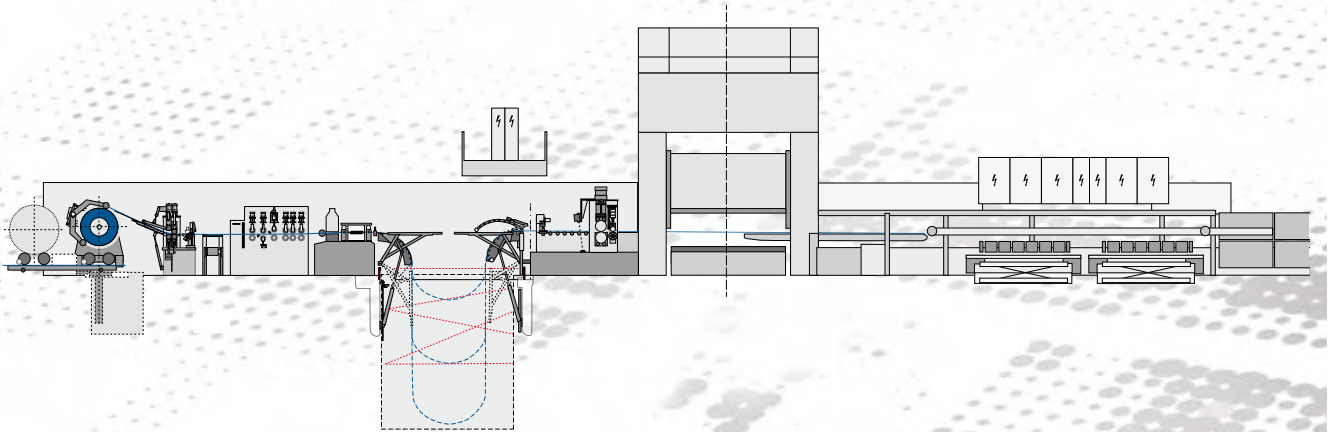
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## unidor is more than the sum of its products



### We provide: Products for perfect punching and forming

Together. Quality products in cutting-edge technology are one thing. Our longstanding experience in process optimization for punching and forming is another. So don't just see us as a supplier of systems, retrofits, components and sensors, but also as a team of experts with extensive practical experience and plenty of optimization ideas.

We want to work with you to establish a status in production, machine and tool. We will then produce an expert's report to show how the complexity of your products, productivity and quality can be increased with existing resources and new concepts.

See us as experts who will work with you in close partnership to create opportunities to get more out of production, and to produce more efficiently and reliably with your machines and tools.

### From UNiDOR you can expect an integrated all-round package

From neutral expert advice to prompt delivery and installation of the optimal technology, as well as long-term and consistent after-sales service. Use our forums and presentations to remain constantly up to date. Let us seek optimal solutions in a long-term partnership and inspire each other to constantly push the limits of the possible.





## Technology leader and quality from the very start

Forwards. The future of punching and forming is changing rapidly: it is becoming more complex, faster, more precise, with complete documentation, up to the highest number of strokes. Innovative product requirements by your customers and continuous cost pressure force you to take product and tool to the limits of feasibility on a daily basis.

It is therefore becoming increasingly important to visualize the punching and forming process, in order to optimize and precisely control every work step on this basis. Precise understanding of the process is essential to fulfill the customer's requirement for perfect production and quality products and to create the technological lead that will secure orders today and, even more, tomorrow. UNiDOR provides perfect products, an abundance of ideas and a range of services to meet this need. From special sensors to monitoring devices and user-friendly, universal measuring systems, we have exactly the equipment that you need to have punching & forming permanently under control, both in detail and overall. With our products you can be sure of reliably managing

the production process even at the limit of technical capabilities, and of always achieving excellent results with maximum cost-efficiency.

# Retrofits

## Consult us

### In mechanical engineering

Together with our competent mechanical specialists we will ensure a compact mechanical, hydraulic and electrical upgrade of your machine.

- \_ Brief interruption in operation
- \_ No structural modifications (foundations)
- \_ Expenditure can be written off immediately

### Anyone who needs cost efficiency, needs us

- \_ Current machine status
- \_ Expertise in general electrical overhauls
  - Switch cabinet + control panel
- \_ Control PLC S7 (as HardPLC or SoftPLC)
- \_ compactPRESS starLINE or ecoLINE
- \_ Complete electrical equipment + installation
- \_ Handover + acceptance with safety check
- \_ Training + service + spare parts

### Refurbishment, general overhaul, modernization - many names for the same objective

Presses and punches are durable capital goods, whose life cycle goes beyond the control, peripheral equipment, actuators and sensors. Why always think about buying a new machine, when you can still earn a lot of money with the old one, at modest costs!

This solution also has tax advantages, because overhauled machines can be written off more quickly! Modernization costs can be depreciated immediately.

An overhauled punching press will enhance the image which you present to customers and ultimate buyers just as much as a new one! The performance and look of a perfectly overhauled punching press is in no way inferior to a new one!



# Systems

## compactPRESS – the process monitoring system for punching and forming technology

A wide variety of controls ensure the broad range of functionality and universality of compactPRESS. Everything that is important for an optimal and continuous production process is displayed, reported and monitored by compactPRESS with the utmost precision. compactPRESS, comprehensive insurance for machines and tools.

### compactPRESS

- \_ is your all-round assistant for practically everything, a professional for measuring, controlling and rationalizing punching & forming. Ultra-fast up to the highest number of strokes,
- \_ protects your machines and dies, ensures regular maintenance and service, manages, logs and archives all production and quality data,
- \_ offers simple touch-pad operation that everyone can easily understand. Icons instead of buttons guide and inform the operator in every situation. Knowing what's going on has never been easier,
- \_ is based on an extremely reliable IPC. The best solution for continuous machine-level operation in harsh conditions,
- \_ displays what is going on in the machine and die directly at the machine or via a central control panel. No matter where your machine is producing, you have everything in view at all times,
- \_ understands all analog or digital sensors and combines them as required, functionally, logically or mathematically,
- \_ as a standalone system primarily in retrofitting or as PLC subsystem of a control in the initial equipment,
- \_ increases the availability of tool and machine and ensures greater transparency, particularly in critical production processes with difficult materials.

However, the immense range of functionality and performance of compactPRESS is determined by the extremely flexible controls. Controls are software-based action and functional units, special „tools“ for all tasks and applications in punching & forming.

The controls determine the numerous features for visualizing, measuring, optimizing, monitoring and logging. With the compactPRESS controls you always know exactly what is going on; production processes, machine and die become so transparent that they take you to the limits of the possible. Whatever the task in hand, with compactPRESS you will find the right control or controls. Each of the many controls is designed for a specific task. Tasks which you can easily solve in many areas by means of parameterization.

In conjunction with specific sensors you now have a set of tools that will provide you with comprehensive support in all customer requirements for greater complexity, precision, productivity and quality, defining entirely new production dimensions in punching and forming.

After an overview of all currently available controls for ecoline+starline, we will provide detailed examples of our own controls and show practical applications.

Two software packages, compactPRESS ecoline and compactPRESS starline, are available. Ecoline is the entry-level class, starline is the high-end performance class. Upward compatibility for data and variables from ecoline to starline is guaranteed.

compactPRESS understands all sensors, regardless of whether digital or analog sensor signals are involved. The same applies for a wide range of absolute rotary encoders, whose inputs are easy to parameterize.

This also applies for digital and analog outputs.

Ample scope for convenient I/O handling.



## Software for model series 169



Fig. 1

### Side panel

Important displays can be dragged from the main screen onto the side panel using „Drag and Drop“. If more displays are configured than can be shown on the side panel simultaneously, you can scroll the desired display up and down with your finger (Fig. 1, red arrow) (device example: Notion).

### Graphic programming of the envelope curve

Beginning, end, maximum and minimum limit of the envelope curve (Fig. 2 & 3) can be programmed with a finger click. To do this, select the tool icon in the individual curve display of an analog channel.

After selecting the respective icon, the desired limits can be changed by dragging with the finger.

Fig. 2

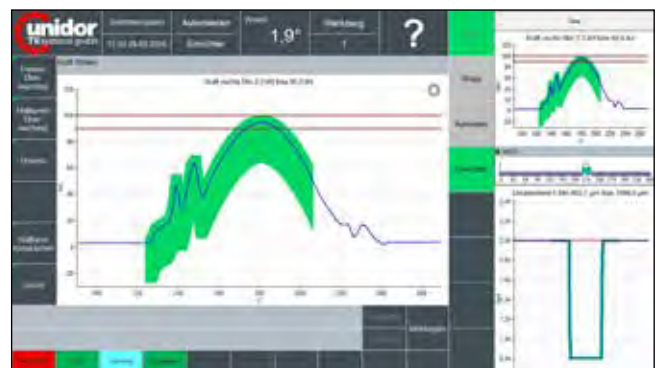


Abb. 3





# Controls

## Basic Controls

The heart of every compactPRESS is the integrated smartPLC. It links the controls, coordinates the timing and organizes all processes of compactPRESS.

Visualization and parameterization of the controls occur in the control itself, depending on the function and task. The real-time core guarantees correct execution of all time-relevant tasks. All controls included in this group organize and manage compactPRESS.

## Digital Controls

This group includes all controls for digital signal processing. All common digital sensors may be used as signal transmitters.

## Analog Controls

This group includes all controls for analog signal processing. Special analog sensors are increasingly used in punching and forming technology, and compactPRESS provides the optimal evaluation.

## Measuring Controls

This group includes all controls which continuously measure and monitor the supplied material and the production process. Important controls for quality optimization and comprehensive QA certification.

## Process Controls

This group includes all controls relating to the production process. Intelligent controls which leave nothing to chance, from material supply through to product selection.

## Management Controls

This group includes all controls which manage data, information and actions: Tool log, maintenance organization, import and export, automatic action timing ...

## Interface Controls

This group includes all controls which guarantee simple and safe communication between compactPRESS and peripheral systems.

## OEM Controls

This group includes all controls which ensure problem-free connection of external equipment (OEM systems).

## Tool Controls

This group includes all controls which produce variable products completely automatically with intelligent tools. Ideally suited for automating die controls.

## Position Controls

This group includes all controls which can be used as position encoders in compactPRESS.



## The right control for every task, a wide selection

<b>Basic Controls</b>	
User administration	System log-on, user identification
Die management	Creation of up to 1000 tools, configuration, saving and backup of tool data
Message management	Internal information, warnings, error display, acknowledgement and deletion
Color management	Free color design of cP screens
Language management	Language file and language selection
System setting	System management, language selection, machine type, machine ID, date/time
Help system	Context-sensitive help for all processes
<b>Digital Controls</b>	
Cam switchgear	Up to 128 cams assignable
Tool protection	Up to 64 digital tool protection devices
Counter	Up to 32 universal counters, counting pulse source is freely selectable
Positioning	Up to 8 positioning axes (multi-turn encoder): ram, strip inlet, feed etc.
<b>Analog Controls</b>	
Force angle	Up to 32 channels for machine and tool force
PSA (Piezo Signal Analysis)	Up to 20-channel individual measurement in the tool for force and deformation
Double blank (slug) monitoring	Up to 32 channels for double blank or slug detection. UT measurement and more
Structure-borne sound	Up to 32 channels for structure-borne sound
<b>Measuring Controls</b>	
Analog feed measurement	Measurement of feed travel, strip position in tool
Strip width measurement	Check strip material for parallelism, curvature, etc.
Strip thickness measurement	Absolute measurement of strip thickness
Part measurement	Measure 100 % parts in the process: height, thickness, diameter, angle etc.
Dimensional check	Check parts in the feed phase
<b>Process Controls</b>	
TDC stop	Controlled stop at TDC (top dead center)
Stroke adjustment	Automatic adjustment of stroke height
Stroke table	Stroke-dependent angle correction
Ram adjustment and display	Automatic adjustment of the ram axis
External die change	Automatic transfer of the tool number from higher-level systems
Sorting	Intelligent separation of bad parts (shift register principle)
External error message	Records all external errors or faults, as binary or 1 from n coded messages

<b>µBDE</b>	Operating and production data for central EDP
Management Controls	
Notebook	Prolog, space for any information on machine and tool
Data import and data export	Import drawings and export cP docs to any host systems
Archiving of process data	Export of information and data in Excel csv or QS-Stat format
Maintenance & service	Interactive management and schedule for functions and actions
<b>Interface Controls</b>	
Lubricating system control	Programming, visualization and measurement of lubricant quantity
Open OPC interface	OPC client for communication with peripheral systems
<b>Feed interfaces</b>	Transfer of feed parameters, display of values and control buttons
Zehnder & Sommer	
Indramat	
Bosch Rexroth	
P.A. Automation	
Esitron	
<b>Interfaces for PLC control</b>	For communication with S7-PLC (hard or soft PLC)
Profibus	
Profinet	
IBH Netlink	
<b>Tool Controls</b>	
Tool-dependent PLC	Customized signal combination
Die control	Order-dependent calculation of die control and feeds
Cylinder monitoring	Cylinder control with limit position monitoring
Servo positioning	Up to 4 axes in the tool
<b>Position Controls</b>	
Rotary	Recording of X axis in 0.1°
Linear	Recording of X axis in 0.01 mm
Temporal	Recording of X axis in 200 µsec
Virtual encoder	Simulation of a rotary encoder via an input signal

# powerPRESS with S7-PLC & starLINE

## powerPRESS, the complete automation solution

**powerPRESS** is operation, control (PLC) and compactPRESS in one: An integrated automation concept for all machines for punching & forming.

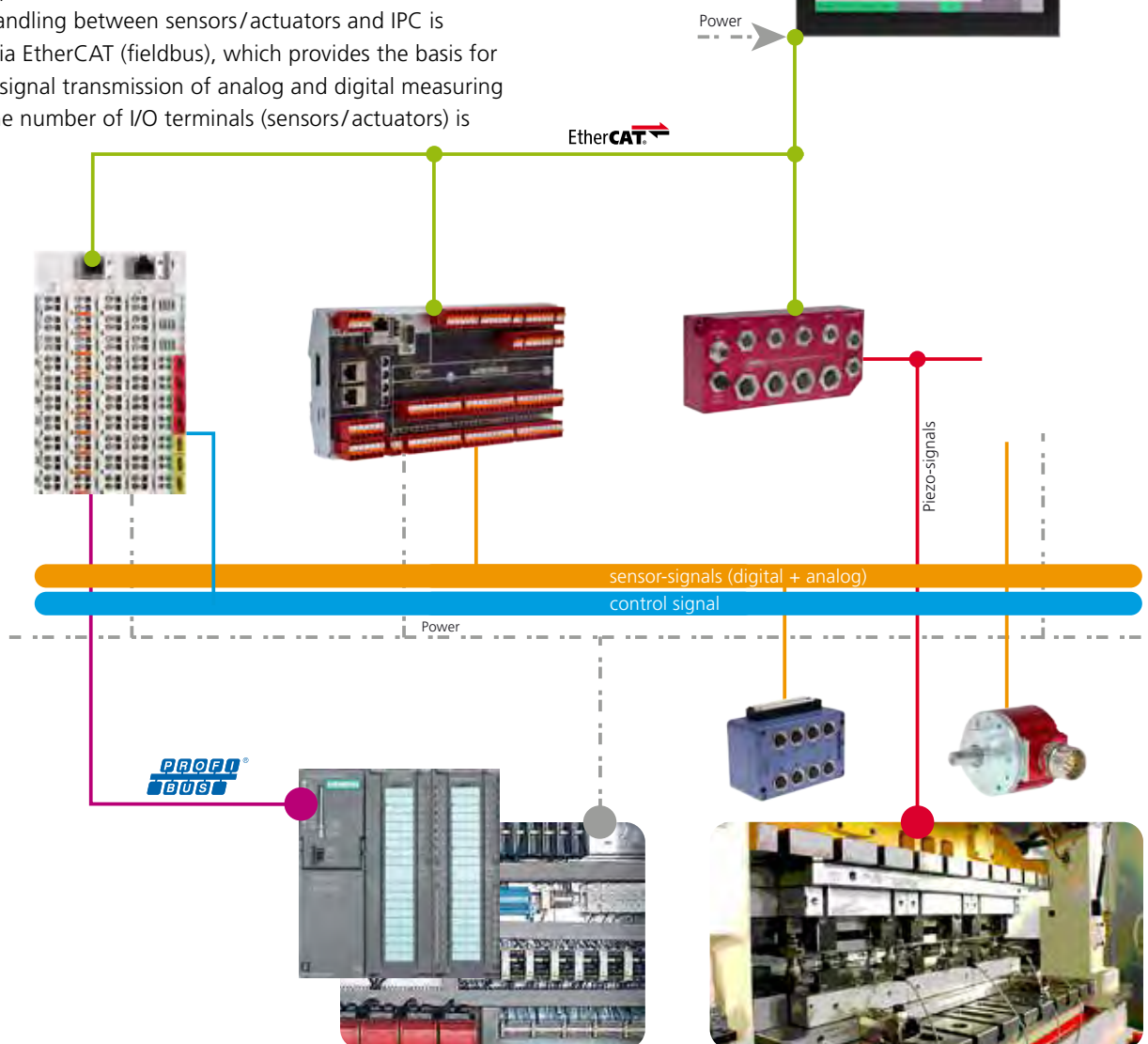
**powerPRESS** not only boasts excellent technology, but also impresses through its economical use of just a few hardware components: A touch display for the machine operation and compactPRESS visualization, an IPC for the PLC (S7), the drive and compactPRESS: In short, an **"all-in-one" automation solution** par excellence.

The I/O handling between sensors/actuators and IPC is enabled via EtherCAT (fieldbus), which provides the basis for ultra-fast signal transmission of analog and digital measuring values. The number of I/O terminals (sensors/actuators) is scalable.

### Model series 169



### Panel PC 15,0"



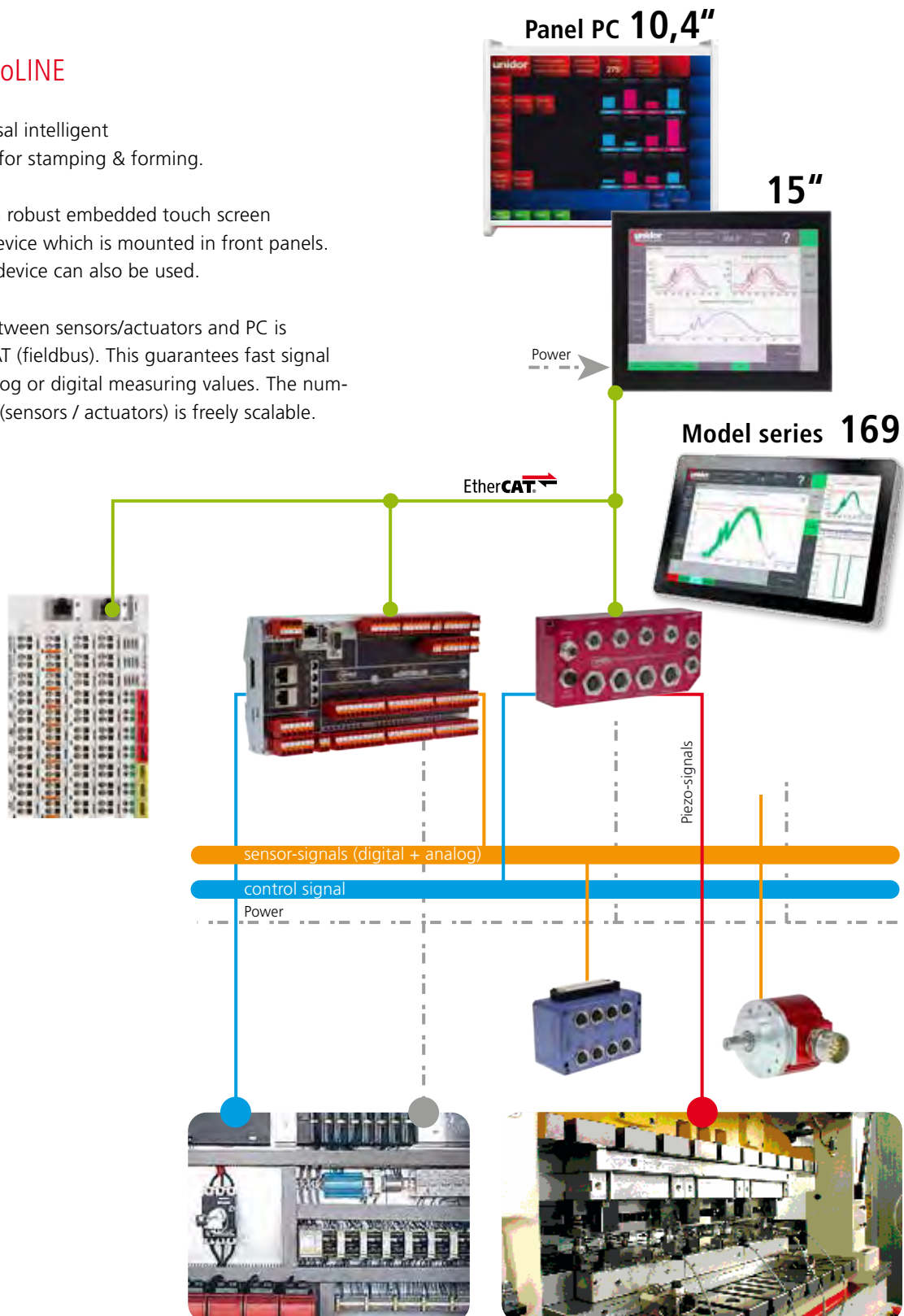
# The medium compactPRESS: ecoLINE

## The medium ecoLINE

**ecoLINE**, for universal intelligent process monitoring for stamping & forming.

**ecoLINE** based on a robust embedded touch screen PC, a 15" built-in device which is mounted in front panels. The 10.4" desktop device can also be used.

The I/O handling between sensors/actuators and PC is enabled via EtherCAT (fieldbus). This guarantees fast signal transmission of analog or digital measuring values. The number of I/O terminals (sensors / actuators) is freely scalable.



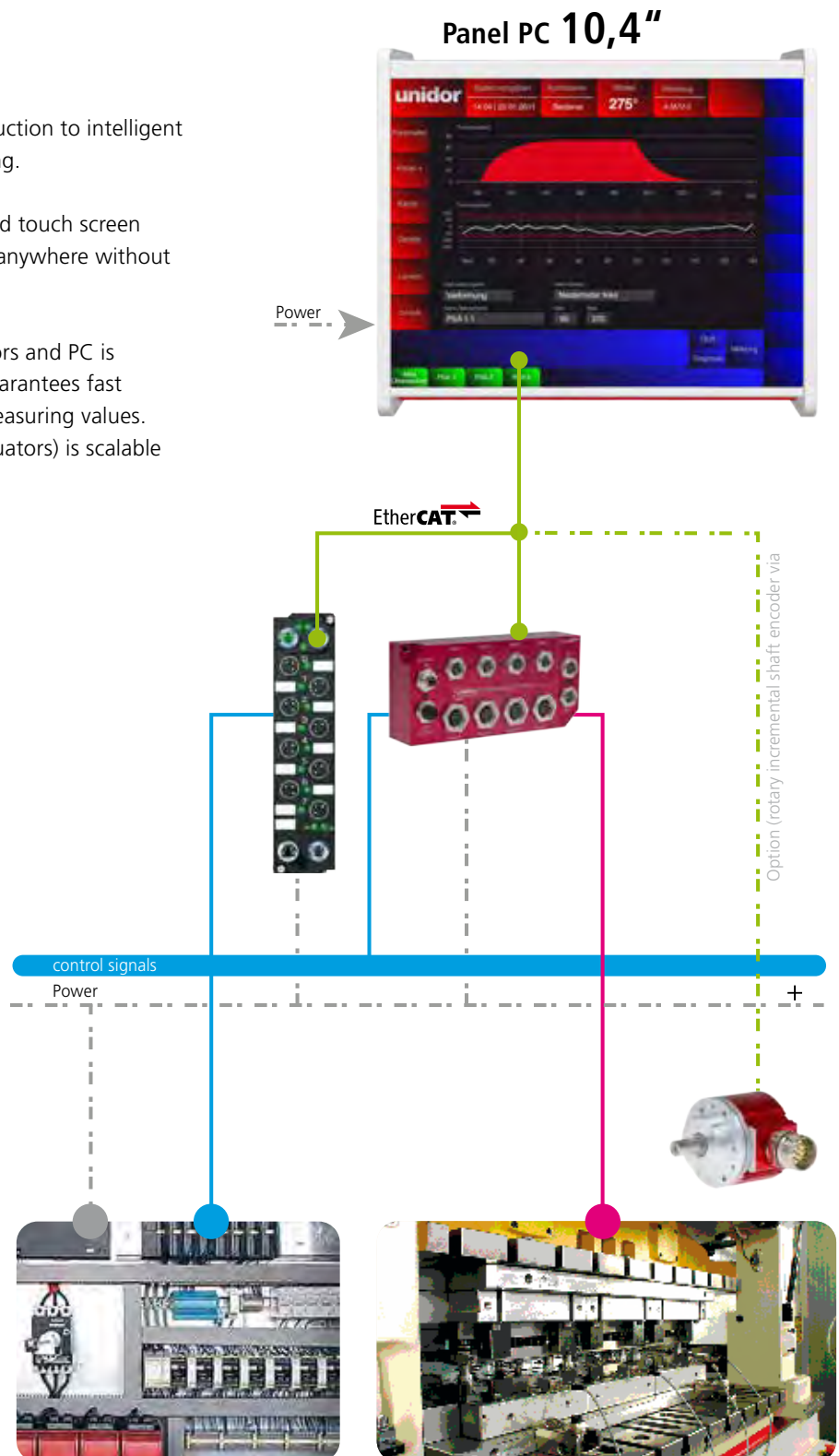
# The small compactPRESS: smartLINE

## The small smartLINE

**smartLINE** is the perfect, low-cost introduction to intelligent process monitoring for stamping & forming.

**smartLINE** is based on a robust embedded touch screen PC, a 10.4" desktop device which will fit anywhere without the need for mounting.

The I/O handling between sensors/actuators and PC is enabled via EtherCAT (fieldbus), which guarantees fast signal transmission of analog or digital measuring values. The number of I/O terminals (sensors/actuators) is scalable within limits.





## Components / standalone devices

### ioCONTROLLER

This is suitable for all automation tasks which cannot be performed with a PLC or only with significant cost/effort, or which are simply too slow for a PLC.

With its robust hardware and simple system integration the ioCONTROLLER can be seamlessly integrated into any PLC project. It performs all special tasks which a PLC cannot, precisely and ultra-fast.

The ioCONTROLLER begins where the PLC ends and opens up a whole new spectrum of opportunities for many interesting and creative automation ideas.

We give a few examples to show where and how the ioCONTROLLER can support the machine control, enabling entirely new options for greater productivity, quality and transparency in production.



### Analog-IN box

To supplement compactPRESS control systems, UNIDOR also offers input modules. The analog box imports up to 16 analog inputs (0 ... 10 V, 0/4 ... 20 mA) and transmits them via EtherNet/IP or PROFINET. The box is supplied with voltage via specially coded M12 plug connectors. This effectively excludes confusion with the bus cables.

The voltage supply is looped through, so that several modules can be interconnected directly in series.

The bus is connected via standard-compliant M12 plug connectors. The sensors are connected via M8 and are also directly supplied via these connections. The analog box can also be used directly in the field with this equipment.



---

## Components / standalone devices

### LVCpro 02-S charge amplifier

**New - now also suitable for quasi-static measuring processes such as servo / hydraulic presses.**

With the newly designed, compact charge amplifier cassette LVCpro 02-S, a multi-channel measurement of the press force can be performed cost-effectively using piezo sensors. An evaluation can be carried out by any higher-level control with an analog input, e.g. Unidor systems (power-PRESS & compactPRESS) or external PC and PLC systems.

#### Applications

For machines and devices, for measuring dynamic and quasi-static forces, primarily in press manufacture. The necessary piezo sensors are prefabricated in different designs and supplied by Unidor.



### PSA 4ec

The PSA ec4 piezo signal amplifier is a perfect 4-channel amplifier specially for piezo sensors, such as pressure, force, acceleration or torsion sensors in all technical applications and areas.

The robust aluminium housing and the high IP67 protection class qualify the use of the PSA in industrial environments in particular and guarantee continuously safe operation.



The EtherCAT®-compatible PSA has 4 analog precision piezo measuring channels (charge amplifiers) including two digital inputs and outputs. The intelligent charge amplifiers are triggered via EtherCAT® with PLC or PC. The extremely low drift of the input stage and the digital processing of the charge signal enable not only very precise, but also quasi-static measurements.



## Tool and machine protection

Connect, switch on and control and monitoring of tool and machine begins straight away: all very simple.

### Tool protection – smartDIE-PRO 6

**6-channel digital tool protection with learning function (Teach-In) and graphic event viewer**

Safe hardware, safe software. This dual safety concept ensures maximum system availability and trouble-free operation. Redundant, error-tolerance data storage management and intelligent power control ensure an extremely safe system.

All at a price that will convince you of our tool monitoring entry-level system.



### Tool and machine protection – PKM 2.000

Continuous monitoring and display of press force. The force is detected with piezo sensors on the machine or tool. The evaluation system has two channels. In case of overload the system is switched off. Replacement for Imco devices. Direct exchange possible.



---

# Overview of sensors

## Sensors

Right at the heart of the action, sensors convert mechanical quantities such as ...

- \_ Force
- \_ Pressure
- \_ Sound
- \_ Vibrations
- \_ Travel
- \_ Positions
- \_ Movement

... into digital or analog signals.

These form the basis for exact visualization, optimization, measurement, monitoring and logging of all punching and forming processes.

Our sensors have been specially designed for punching and forming.

Unidor provides a wide range of sensors in different designs, complete with the appropriate mounting equipment.

## Digital single-beam sensors



GD\_L



LS 05



LAS 3

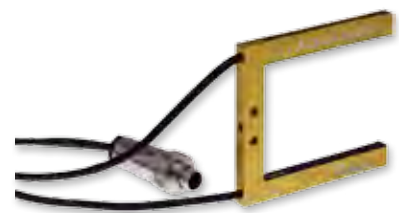
## Digital multi-beam sensors



LAV



LAG



LAG-M

## Reflex scanners



GM



ORS 250



ORS 400-W

## Analog sensors



GD-AH



A-LAS



LAG M40

## Digital, inductive sensors



ZT 52



ZT 400



ZT 410

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## Overview of sensors

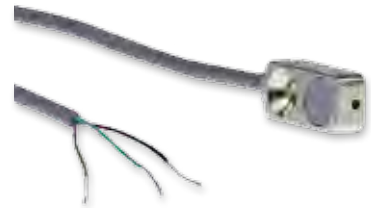
### Analog eddy-current sensors



WSD 70



WSD S2/10 S



WSD S2/10 M-F

### Piezoelectrical sensors



JZT 127



PSA 20



QMD

### Other sensors



Tracer GM 04



OKT 40



Structure-borne sound KSS

## Connection boxes

### Digital connection boxes



**8-channel tool protection box**  
ZT 2013 (ZT 213/72/8)



**4-channel tool protection box**  
ZT 2013 (ZT 213/7/4)



**ND (12/8/4)**

### Analog connection boxes



**D-AE-WSS-24**  
8-channel for WSD-sensors



**Distributor box**  
8-channel, M12, 5-pole



**Actuator/sensor box**  
ASD 4/0/8, 8-channel

### EtherCAT fieldbus connection boxes – EtherCAT box



**EP1018-0001**  
8 digital inputs, M8



**EP2008-0001**  
8 digital outputs, M8



**EP3174-0002**  
4 analog inputs, M12,  $\pm 10$  V

---

## Services / project management



### Sales

#### Pre-Sales Services

Pre-sales services, in-depth consultation, the development of individual proposals, planning services and the individual requirements of the customer are analyzed and integrated into the project.

#### After-Sales Services

Our sales representatives aim to continue to support their customers after the sale, to ensure customer satisfaction.

### Service

- \_ 3 locations in Germany
- \_ Highly motivated service technicians
- \_ Telephone support/remote maintenance

We implement our "Everything from one source" concept, which includes comprehensive service. Our trained staff will be at your disposal quickly and flexibly in all areas – around the clock, including weekends.





### Ready for all requirements

Our range of services also includes the inspection of electrical systems and equipment. We want you to be able to continuously rely on the solutions that we have developed for you in daily practice. You will benefit from the same expertise and reliability that we apply in our numerous projects.

And what's more: You can also rely on our experienced staff to ensure the regular maintenance and service of your systems – to support or replace your own personnel.

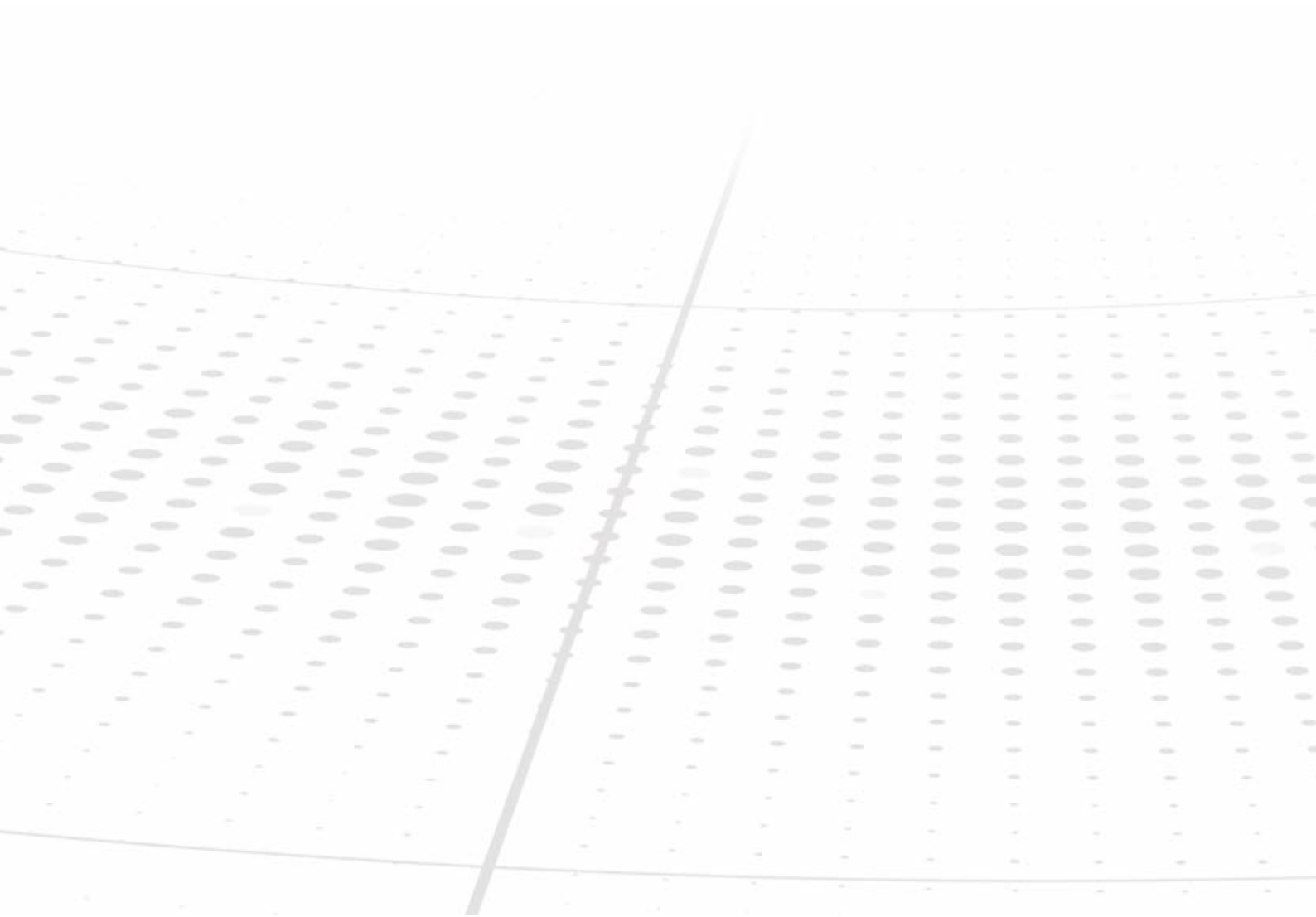
As always – our service offering is entirely based on your requirements.

### Training

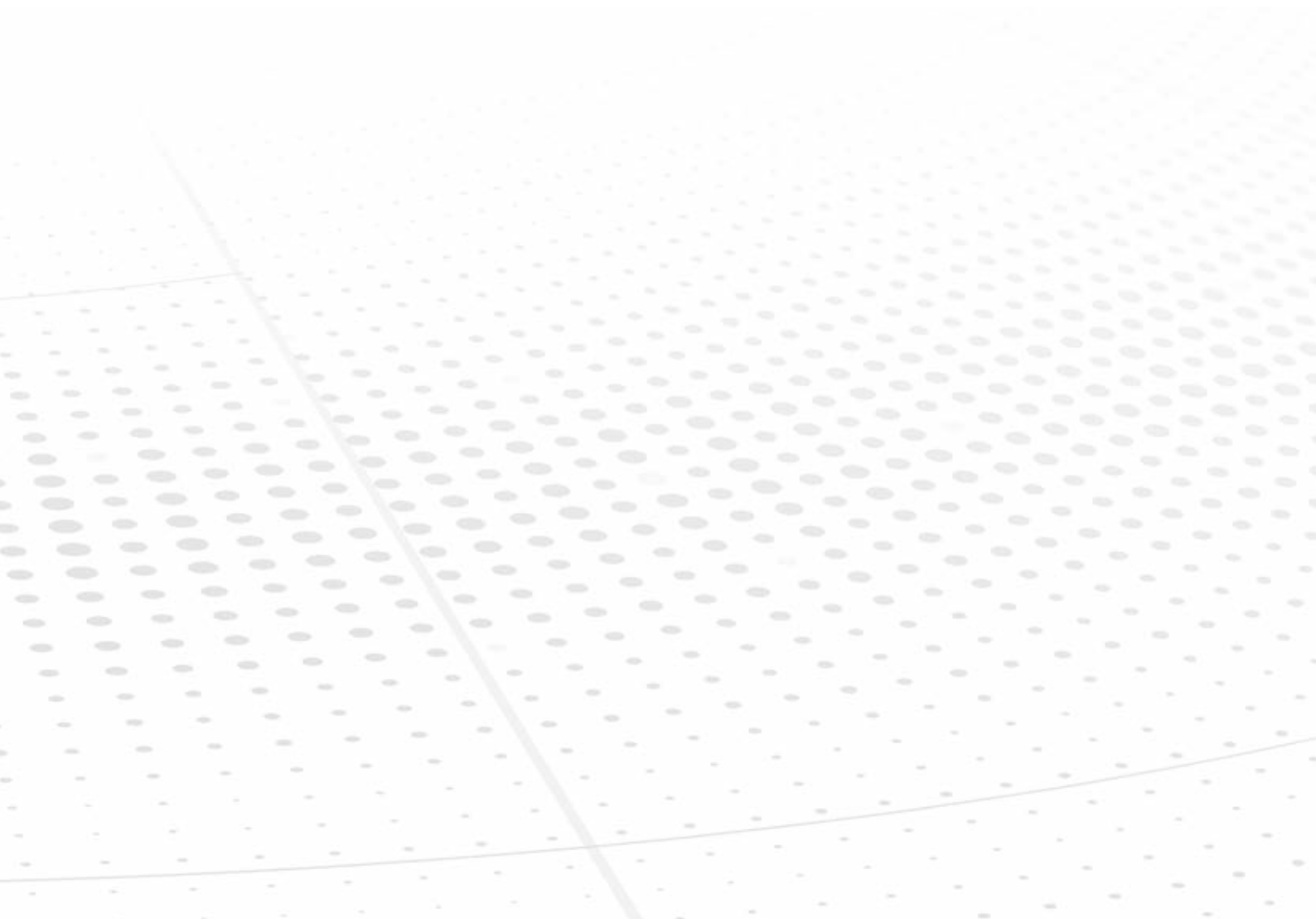
Your employees are an important factor for your company's success. They must be supported and challenged, so that they can develop their full potential through the acquisition of additional qualifications and in-depth knowledge. Unidor offers: Individual training on site; directly at the machine or in customized workshops at our Pforzheim and Lüdenscheid locations.

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# TR Information







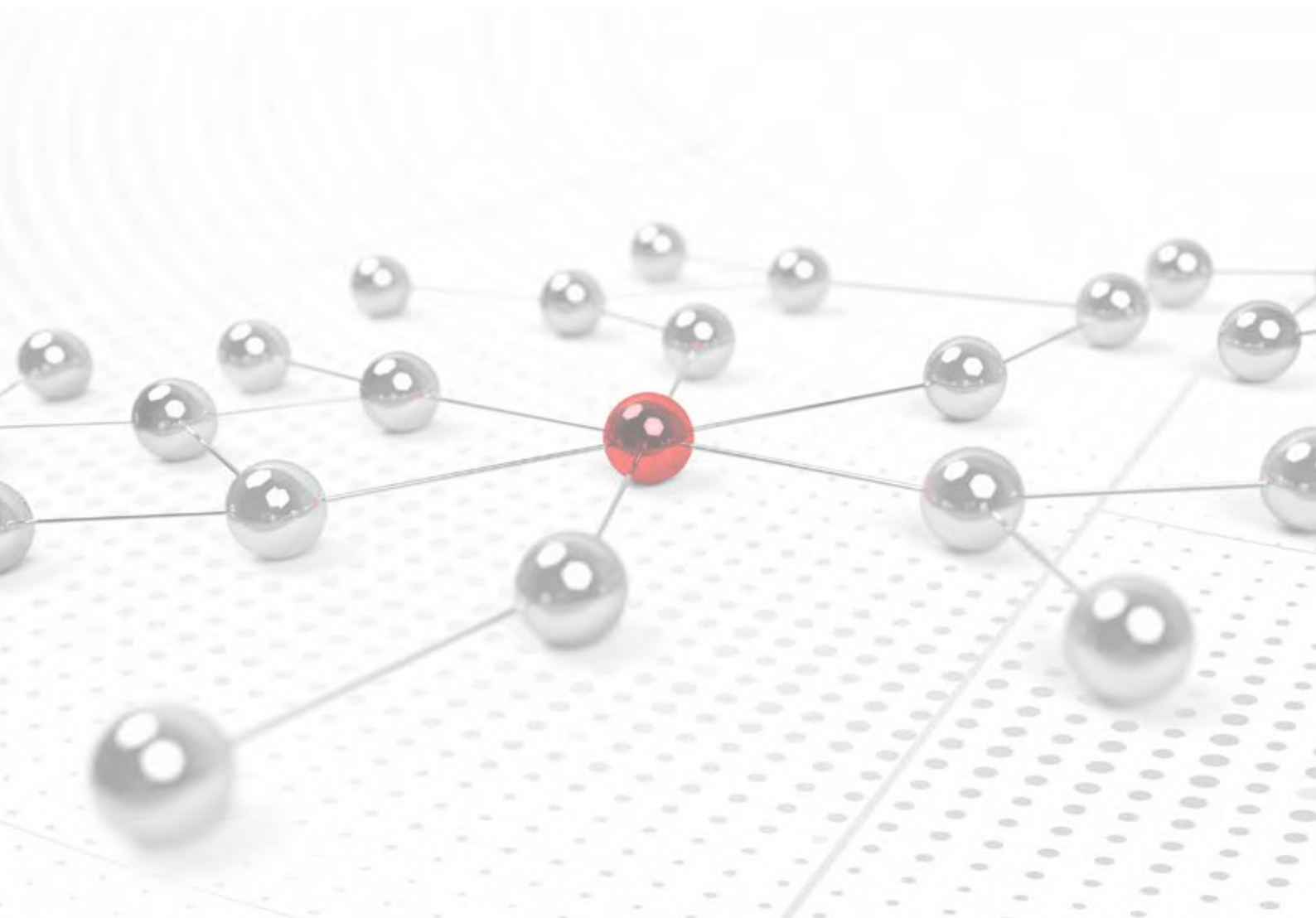
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# Interfaces



## Different applications require different solutions

The result of almost three decades of development and production is evident. Reliability, ease of installation and a wide variety of interfaces are the result.

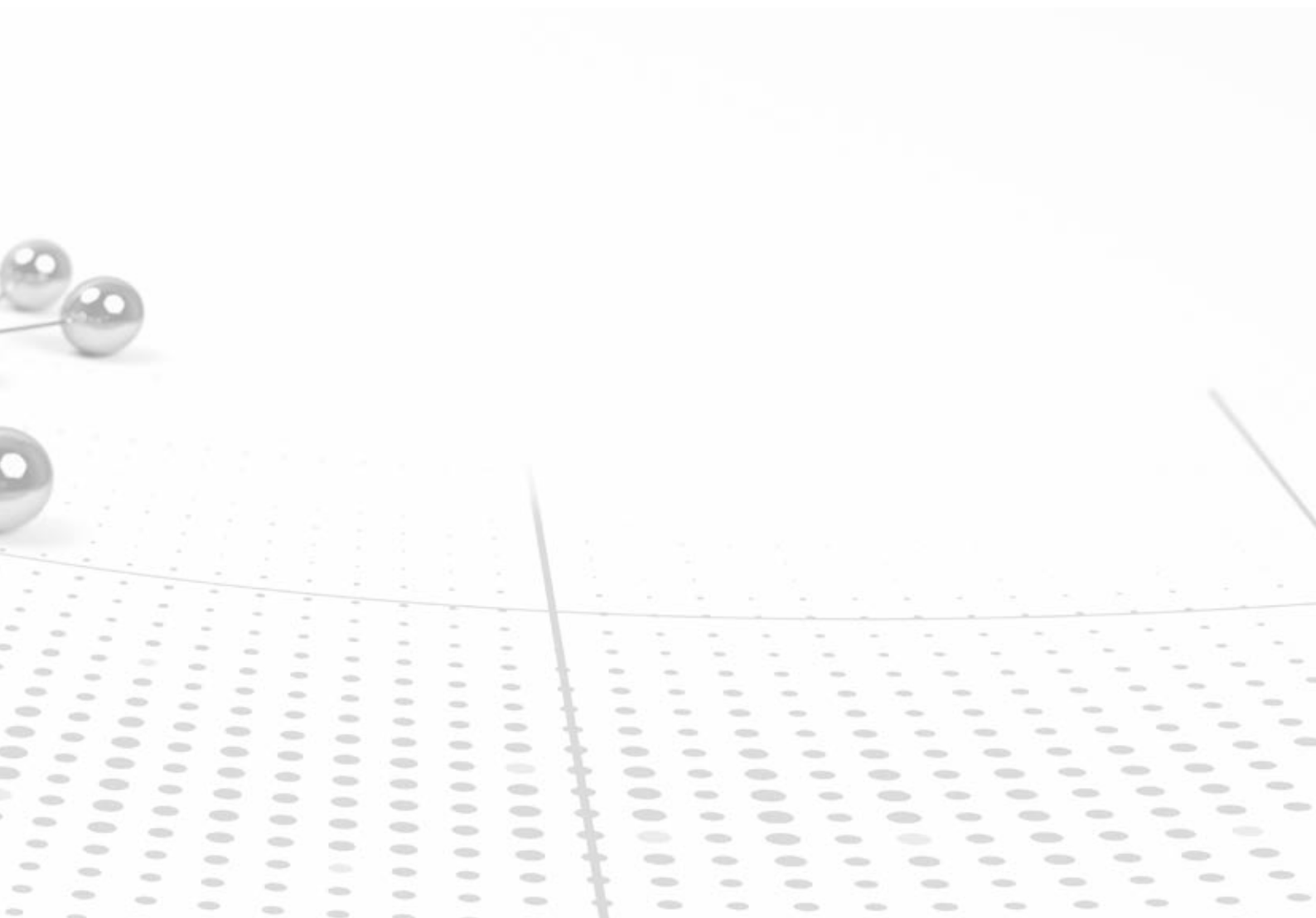
You benefit not only from the highest technical standard in production, but also the highest reliability of our devices. As is the norm with TR-Electronic, the C \_\_ 58 also offers a wide variety of interfaces, some of which can even be combined to enable special applications. These can be specifically matched to the field and frequency of application. Which interface is ultimately used largely depends on the

control technology used.

Efficiency, safety, speed and scope of functions are the important factors. Let our sales team advise you on your own individual solution!

### We offer you

- \_ modular design concepts
- \_ everything from one source
- \_ a large number of possible combinations
- \_ adaptation of the scope of functions to the interface



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## Special bits (SSI, Parallel)

TR-Electronic rotary encoders in the C\_\_58 series are mainly programmable. The following terms are used in connection with different interfaces. To see which function is actually implemented in a rotary encoder, please refer to the product description in the quotation or order confirmation.

### Transferable special bits

Max. eight parallel special bits can be defined, the default setting is always 0V. Fewer parallel special bits can also be used to fulfill the requirements of customized device versions. The number of special bits depends on the selected settings and the number of clock pulses sent. These are added in the protocol after the lowest value data bit. The possible functions for the special bits are specified below. The output level for a function event can be defined by selecting active high/ active low.

### Overspeed

The Overspeed is set if the set speed (programmable: 30 – 6,000 rpm) is exceeded.

### Limit switch

The switch-on and switch-off points for the four possible limit switches are set in the Limit switch. They are set as long as the position is at or above the switch-on point. "Rotating" limit switches can also be implemented, where the switch-on point is greater than the switch-off point.

### Move up, Move down

This is a combination of directional display and standstill monitor. These are set when the position moves in the relevant direction and deleted once the position has remained unchanged for 50 ms.

The motion detection has a hysteresis for suppressing vibrations. This is one step in relation to the resolution of the central disk. After a reversal of the running direction a distance corresponding to the hysteresis must be traveled as a minimum, before a movement or direction change is indicated. The hysteresis applies equally for Move up and Movement signals.

### Moved up

This is set if Move up is set, and deleted if Move down is set.

### Even parity, error parity

The Parity bit serves as control bit for error detection during data transfer. The parity represents the checksum of the bits in the SSI data word. If the SSI data word contains an odd number of ones, the Even parity special bit is = "1" and changes the checksum to even parity. The Parity or Error parity special bit must therefore always be defined last. It is calculated from all preceding bits. Therefore only a single parity special bit is possible. By selecting inverted parity we get odd parity or odd Error parity.

The Error parity corresponds to the normal parity, if no measuring system error is present. If errors are present it is inverted. This saves the additional transfer of an encoder error.

### Static/ Dynamic error (watchdog)

As long as the position data can be measured and transmitted error-free, the Static error special bit is deleted and the Dynamic error special bit delivers a rectangular frequency of 250 Hz. If errors are present the Static error is set and the Dynamic error remains at an undefined level.

### Movement

This special bit is set as long as Go up or Go down is set.

## Control of the following special bits is possible

- \_ Overspeed
- \_ Limit switches
- \_ Move up/down
- \_ Moved up
- \_ Static and dynamic error (watchdog)
- \_ Movement
- \_ Even parity, error parity

## Scaling parameters (SSI, Parallel)

The output resolution of the measuring system can be changed using the scaling parameters. The measuring system supports the gear function for rotary axes. The number of steps per revolution and the ratio of numerator revolutions/denominator revolutions may be a decimal. The position value output is calculated with a zero point correction, the counting direction set and the gear parameter entered.

### Closed measuring section

The length in revolutions of the closed measuring section is any whole number in the range from 1 to 256,000. For example, for rotating applications or for decimal codes, a measuring range of the power of 2 can be unfavorable. Powers of 2 such as 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1,024, 4,096 ... cannot be precisely matched to the application, as one is dependent on the value of the powers of two.

### Procedure for linear axes (forward and backward traversing movements)

The parameter "denominator revolutions" can be programmed as a fixed value of "1" for linear axes. The parameter "numerator revolutions" is programmed slightly higher than the required number of revolutions. This ensures that the measuring system does not generate an actual value jump (zero transition) if the travel is slightly exceeded. For the sake of simplicity the full revolution range of the measuring system can also be programmed.

### Numerator / denominator

These are required if the number of steps per revolution or the ratio of numerator revolutions/denominator revolutions must be a decimal. This is referred to as a gear function. This is used for rotary axes.

In contrast to the closed measuring section the transmitter programming can be adapted even more precisely to the application.

More on the topic of scaling parameters

– Encoder Programming (TR - E - BA - GB - 0011)

[www.tr-electronic.com/f/TR-E-BA-GB-0011](http://www.tr-electronic.com/f/TR-E-BA-GB-0011)

Access information even faster:  
Simply scan the QR code.



## Synchronous serial interface

This interface enables synchronous serial transfer of the measuring system position. Use of the RS422 interface for transfer allows sufficiently high transfer rates to be achieved with a cable length of max. 500 m (with 100 kHz). The measuring system receives a clock pulse train from the data receiver (control) and responds with the current position value, which is serially transferred synchronously with the sent clock pulse.

The data signals Data+ and Data- are sent with cable transmitters (RS422). To protect against damage due to faults, potential differences or polarity reversal, the clock pulse signals Clock Pulse+ and Clock Pulse- are received with optocouplers. A parity or checksum can be added in order to detect defective transmissions.

The serial data is transferred without ground reference, as the voltage difference between two corresponding cables. The receiver only evaluates the difference between both cables, so that common mode noise on the transmission lines does not cause a distortion of the useful signal. The simplest additional measure is double read-in, where the data bits are repeated after 26 clock pulses of a train.

### More on SSI

– Encoder Programming (TR - ECE - BA - DGB - 0039)  
[www.tr-electronic.com/f/TR-ECE-BA-DGB-0039](http://www.tr-electronic.com/f/TR-ECE-BA-DGB-0039)

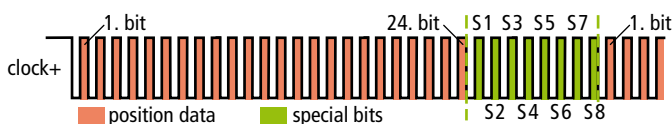
Access information even faster:  
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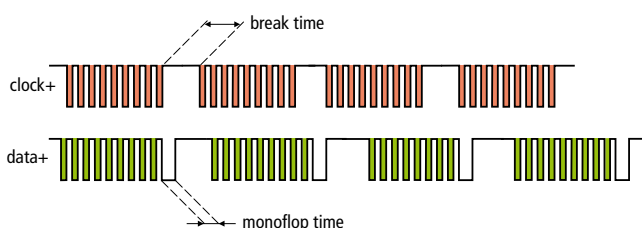
## programmable parameters

- \_ Total resolution, number of steps/revolution
- \_ Output code (Binary, Gray, BCD)
- \_ Output format (standard, fir tree, SSI+CRC, 26-bit repetition, variable number of data bits)
- \_ Negative values (preceding sign + value, complement on two)
- \_ SSI or parallel special bits
- \_ V/R (counting direction), preset (electronic adjustment)

### Example of transmission of special bits with 24 bit position information



### Transfer example for Clock Pulse+ and Data+



# Parallel

## Parallel interface

In the parallel interface the digital position value is transmitted in parallel, i.e. there is a separate physical line for each signal bit. In addition to the pure signal lines there are also status and control lines, which (optionally, if required) activate individual additional functions in the encoder or contain their output signals.

Different codes can be used for converting the digital position value into a signal image.

The functions actually implemented in the encoder are dependent on the encoder family and the selected physical interface, among other things (number of possible lines, volume of the plug connector). Depending on the set-up, some of the functions accessible via the signal line are also programmable.

Not all functions are available with all encoder types. See programming instructions and operating manuals for the respective devices in this regard.

Parallel interfaces are now often replaced by SSI or field bus interfaces. C\_\_58 single-turn rotary encoders with parallel interface are available for retrofits or special automation concepts. If a multi-turn device with parallel interface is required, a simple and compact solution can be achieved with a C\_\_58M SSI and an SSI Parallel PU 10 signal converter.

### More on Parallel

\_CE\_58 Parallel User Manual

[www.tr-electronic.com/f/TR-ECE-BA-DGB-0083](http://www.tr-electronic.com/f/TR-ECE-BA-DGB-0083)

Access information even faster:  
Simply scan the QR code.



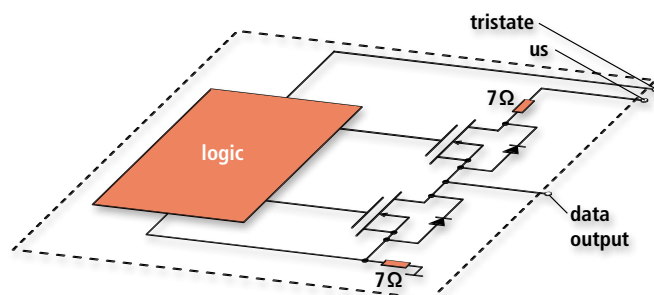
## Parallel – programmable parameters

- \_ Total resolution
- \_ Number of steps/revolution
- \_ Output code (Binary, Gray, BCD)
- \_ Output of special bits (overspeed, limit switches and many more)

## Output of the following special bits is possible

- \_ Overspeed
- \_ Limit switches
- \_ Move up/down
- \_ Moved up
- \_ Even parity, error parity
- \_ Static and dynamic error (watchdog)
- \_ Movement

## Output of the following special bits is possible



## Analog interface

Even in the early stages of automation, sensors were equipped with an analog interface. This interface is correspondingly widespread. And rotary and linear encoders with an analog interface are still used, even in the age of Industrial Ethernet.

TR-Electronic also offers many options for this inherently simple interface. This enables superb solutions for very specific problems. The various functions of analog interfaces can be integrated depending on the device family and are also available in their full spectrum for customer-specific solutions.

### Position

Usually the position value is suitably scaled and output as an analog value.

For normal industrial applications, basic magnetic samples are used in conjunction with a 12-bit D/A conversion for rotary encoders. For higher requirements on accuracy and resolution rotary encoders with optical scanning are used in conjunction with a 16-bit D/A converter.

### Speed

Alternatively an analog output can also generate a velocity/speed-proportional output signal (e.g. for velocity feedback in multiple-loop controller concepts). Depending on the required resolution and accuracy, at low speeds in particular very high-resolution basic encoders are used, where e.g. the time base can be set depending on the desired working range.

### Voltage

The desired output signal is output proportionally as voltage. Different ranges are normal, such as e.g. 0 ... 10V, -10 ... +10V, as well as 0 ... 5V. The subsequent electronics loads the voltage source in the sensor and must have a minimal internal resistance (usually 1 kOhm), so that the sensor can deliver the voltage. At transfer and line resistors a voltage

More on the subject of analog interfaces  
\_ User Manual CM\_58

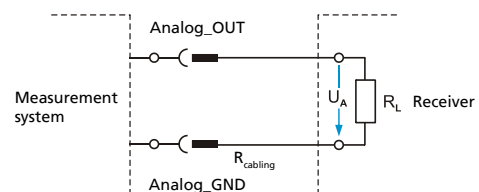
[www.tr-electronic.com/f/TR-ECE-BA-DGB-0083](http://www.tr-electronic.com/f/TR-ECE-BA-DGB-0083)

Access information even faster:  
Simply scan the QR code.

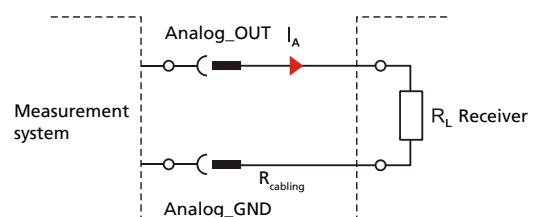


drops off according to the current produced, resulting in a deviation between output signal and the signal measured by the subsequent electronics.

### Current

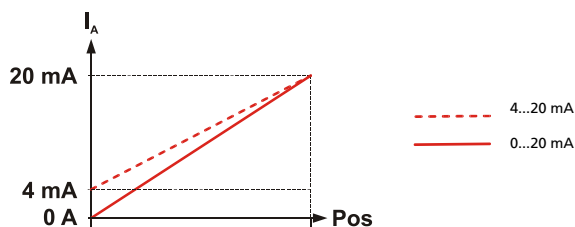


The desired output signal is supplied proportionally as current. The sensor is a signal-proportional current source, which drives a current through the measuring circuit. The subsequent electronics must not exceed a minimal internal resistance ("burden") (usually 500 Ohm), as otherwise the current cannot be driven by the sensor. As the current is the same at all points in the (unbranched) circuit, line losses are not noticeable in the measuring signal. Line losses are equalized by the sensor (up to a maximum total burden). Normal ranges are 0 ... 20 mA and 4 ... 20 mA. "Live zero"





For current output in particular the zero value is often not defined as 0 mA, but as 4 mA. This enables the subsequent electronics to determine a cable break: If no current is flowing, no sensor is connected or the line is interrupted. Normal range: 4 ... 20 mA



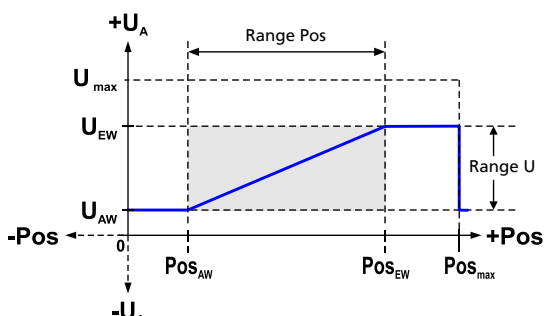
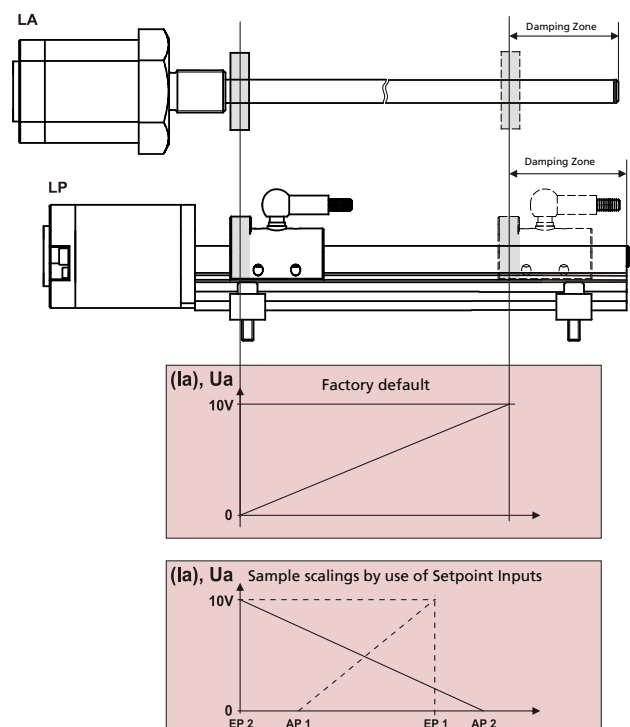
### Current sink

This special version of the analog interface uses only a 2-wire connection line. The subsequent electronics supplies the sensor with a fixed voltage (typ. 24 V) via the measuring lines. The sensor now varies the flowing current proportionally to the position or speed signal in a range between 4 and 20 mA. The sensor obtains its own supply from the measuring current, i.e. for the sensor to work, a minimal current of just 4 mA flows.

### Scaling

The position or speed measuring range is translated into the display range of the output electronics. Usually the analog signals are produced by a 12-bit converter, but for special applications 16-bit converters are also available. For multi-turn rotary encoders in particular it is useful to limit the output range to suit the planned application and thus to optimally utilize the resolution.

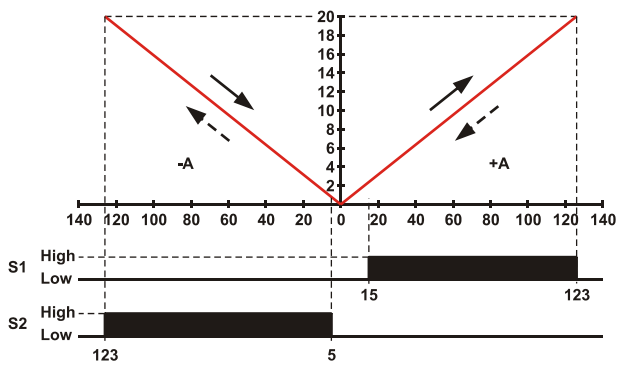
Normally the key points of the scaling are defined in the software. Depending on the application, however, it is also possible to provide potentiometers for setting. For linear encoders a very simple scaling using setpoint inputs has become established: In the respective limit positions the setpoint input for the lower/upper end is activated and the output signal is scaled in this range. The scaling is permanently stored in the sensor and is available immediately on voltage return.



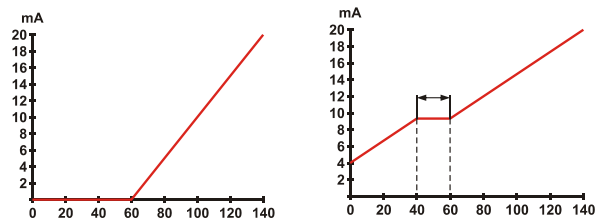
## Characteristic curves

In addition to the linear assignment of position to output signal characteristic curves are also possible:

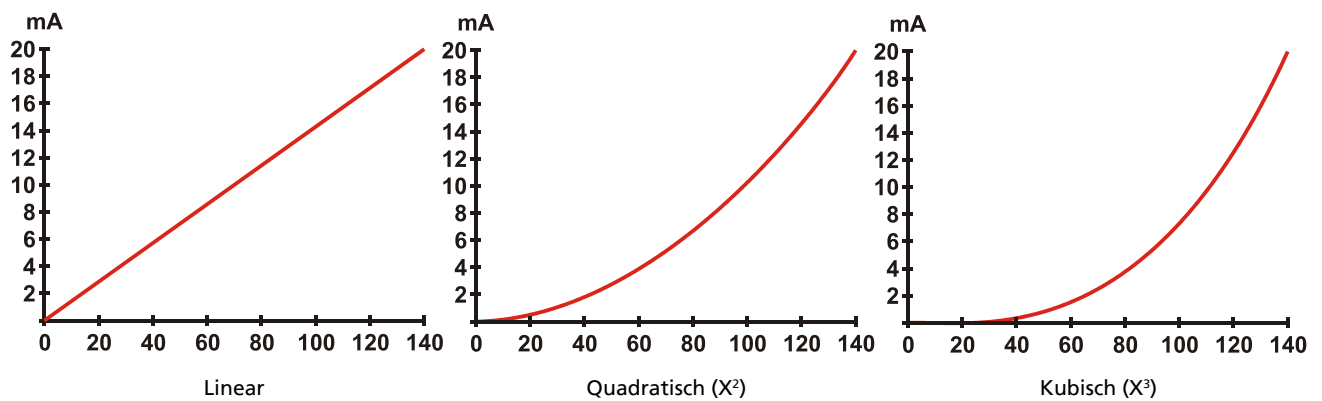
- Symmetrical characteristic curves, in which the output values increase about a central position in both deflection directions, also in conjunction with additional digital outputs for a direction indication



- Dead zones, also within the deflection range other



- Polynomials of 2nd and 3rd order



These special characteristic curves are used in customized sensors e.g. for joysticks, speed selectors or operating switches

## Mode of operation – Cam group

Cam groups are generally used in applications where actuators must be precisely controlled with fixed assignment to the machine position, e.g. in packaging machines. In mechanical groups this is achieved by connecting adjustable cam disks to the machine drive.

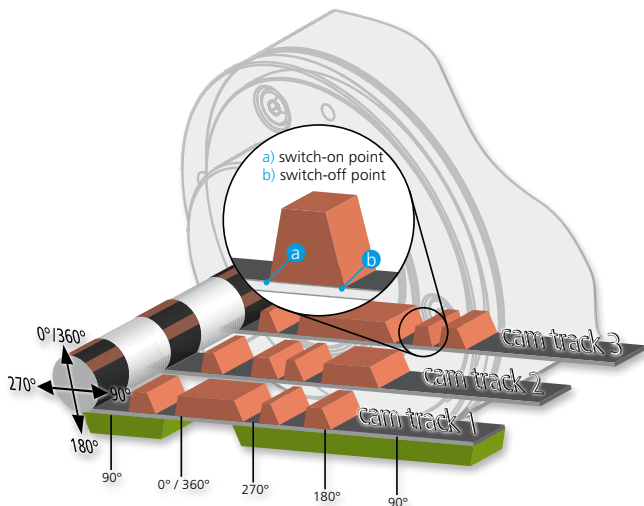
Save for their function, electronic cam groups do not have much in common with mechanical cam groups. Each cam track output by an electronic cam group corresponds to a mechanical cam disk. The cyclically output cam signals for controlling the actuators correspond, from a functional perspective, to the mechanical pulses of the rotating cams. The number of cam tracks, the number of cams/track, as well as the relevant switching on and off points, can be programmed individually.

### CE\_58 special variants with cam group

- \_ Parallel interface with 32 tracks and 4 cams each
- \_ CANopen interface with 8 tracks and 1 cam each
- \_ SSI interface with 4 tracks and 1 cam each

### Customer-specific modifications such as

- \_ dynamic cams (compensation of dead times)
- \_ displacement of cams
- \_ overlapping/circumferential cams
- \_ output to different interfaces
- \_ teach-in function
- \_ zero offset and much more



- Normal cams, max. 32 cam tracks with 8 cams each
- Circumferential cams

# Process Field Bus-Interfaces



## PROFIBUS

PROFIBUS is a continuous, open, digital communication system with a broad range of applications, particularly in manufacturing and process automation. PROFIBUS communication is based on the international standards IEC 61158 and IEC 61784. The application and engineering aspects are defined in the PROFIBUS User Organization guidelines. These serve to fulfil the user requirements for a manufacturer independent and open system where the communication between devices from different manufacturers is guaranteed without modification of the devices.

The PROFIBUS User Organisation has implemented a special profile for encoders. The profile describes the connection of rotary, angular and linear encoders with single turn or multi turn resolution to the DP. Two device classes define the basic and additional functions, e.g. scaling, alarm management and diagnosis.

In addition to device classes 1 and 2 defined in the profile, the measuring systems also support additional TR-specific functions.

### benefits and advantages

- \_ DP communication protocol (cyclical data exchange, station, module and channel specific diagnosis)
- \_ Connection variants (cable gland or plug connector)
- \_ up to 1,200 m cable length

## Programmable parameters

- \_ Total resolution
- \_ Number of steps/revolution (standard or extended)
- \_ PUO encoder profile parameters (counting direction switching, caling function etc.)
- \_ Output code (Binary, Gray, capped Gray)
- \_ TR-specific functions (gear, speed output)

## Safety transmission

For the communication of safety controls with safety-oriented peripheral devices, e.g. rotary encoders with SIL3/PLC certification, transmission with the PROFIsafe protocol extension offers a transmission standard which builds a safe communication on the basis of the unsafe Profibus. Saved actual values of sensors are transmitted directly to the corresponding controls, where they are available for safe evaluation. The PROFIsafe protocol is available on PROFIBUS and PROFINET. The protocol is certified and may be used for safety functions with requirement up to SIL3/PLC.

## Drive technology

For drives, the PROFIdrive standard combines the necessary communication procedures and standardizes them. Drives which support the PROFIdrive standard should communicate so similarly across different manufacturers that an adaptation is possible without any problem. The compact drives from TR-Electronic uniformly support the PROFIdrive standard, i.e. the same software can control different series without making changes to the programming. (Except for device-dependent parameters). The PROFIdrive standard is available for PROFIBUS and PROFINET.



### CANopen

The CANopen field bus was developed by the CiA and has been standardized as European standard EN 50325 since the end of 2002. CANopen uses layer 1 and 2 of the CAN standard originally developed for use in cars (ISO 11898-2) as a transmission technology. These are extended in automation technology by the recommendations of the CiA Industrial Association in respect of plug assignment, transmission rates and applications.

CiA has developed the CAL standard (CAN Application Layer) for the application layer. The CANopen communication profile was developed first of all together with "building instructions" for device profiles, in which the common denominator of all device profiles is defined with the structure of the object directory and the general coding conventions.

The CANopen communication profile (documented in

CiA DS 301) regulates how devices exchange data with each other. A distinction is made between real time data (e.g. position value) and parameter data (e.g. counting direction). CANopen assigns appropriate communication elements to these data types, which are completely different in character.

#### programmable parameters

- \_ Counting direction, scaling function, preset adjustment
- \_ Total measuring length in steps
- \_ Revolutions, numerator/denominator
- \_ Speed resolution
- \_ Layer Setting Services (LSS) = Node ID and baud rate
- \_ Maximum 8 cams

### Drive technology

For drives, the CiA standard CAN DS 402 combines the communication parameters between drive and control. The compact drives from TR-Electronic support CiA DS 402 in all series.

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### DeviceNet

DeviceNet was developed by Rockwell Automation and the ODVA as an open field bus standard, based on the CAN protocol and is standardized in the European standard EN 50325-4. Specification and maintenance of the DeviceNet standard is regulated by the ODVA. DeviceNet, along with ControlNet and EtherNet/IP, belongs to the family of CIP-based networks.

The CIP (Common Industrial Protocol) forms a common application layer for these 3 industrial networks. DeviceNet, ControlNet and EtherNet/IP are therefore well matched to one another and present the user with a graduated communication system for the physical layer (EtherNet/IP), cell layer (ControlNet) and field layer (DeviceNet).

DeviceNet is an object-oriented bus system and operates according to the resource-saving producer - consumer (publish-subscribe) principle. Simple I/O messages have virtually no overheads and often do not need a send request.

The terminals can send data event or time controlled,

without additional interim storage. The periphery indicates its requirement for data receipt as a "consumer" and sends its data as a "producer". Each device can be both a data consumer and a data producer, and a producer can operate any number of consumers.

#### programmable parameters

- \_ Direction of rotation
- \_ Output code (Binary/Gray)
- \_ Measurement length in steps
- \_ Measurement length in revolutions, only multi-turn measuring system
- \_ Preset adjustment via the bus
- \_ Preset value 1/2
- \_ 7 Special outputs

# Industrial Ethernet interfaces



## PROFINET

PROFINET is the innovative open standard for Industrial Ethernet and satisfies all requirements of automation technology. A publicly accessible specification was also introduced, which was published by the IEC (IEC/PAS 62411) in 2005 and has been part of the IEC 61158 and IEC 61784 standards since 2003. PROFINET is supported by "PROFIBUS International" and the "INTERBUS Club".

Profinet has a modular concept, so that the user can select the functionality himself. Profinet CBA and Profinet IO are available. These essentially differ because of the type of data exchange, in order to fulfil the speed requirements.

Different performance levels are defined. In PROFINET data which is not time-critical, such as e.g. parameter data, configuration data and connection information, is transferred via the standard data channels based on TCP/UDP and IP. This means that the automation level can also be connected to other networks.

For the transmission of time-critical process data PROFINET distinguishes between three real-time classes (RT Class 1 to 3), which differ in their performance.

### benefits and advantages

- \_ IO communication protocol (cyclic / acyclic data
- \_ exchange of record data = read / write services)
- Exact synchronization of all nodes
- \_ Up to 100 m cable length (between two nodes)
- \_ Real-time classes (RT Class) 1 to 3

## Safety transmission

For the communication of safety controls with safety-oriented peripheral devices, e.g. rotary encoders with SIL3/PLe certification, transmission with the PROFI-safe protocol extension offers a transmission standard which builds a safe communication on the basis of the unsafe Profibus. Saved actual values of sensors are transmitted directly to the corresponding controls, where they are available for safe evaluation. The PROFI-safe protocol is available on PROFIBUS and PROFINET. The protocol is certified and may be used for safety functions with requirement up to SIL3/PLe.



## POWERLINK

Unlike other real time capable Industrial Ethernet systems POWERLINK is a completely software-based solution, which complies 100 % with Ethernet standard IEEE 802.3. Through this conformity and the renunciation of manufacturer-specific hardware, POWERLINK can guarantee that all advantages and the flexibility of Ethernet technology can also be utilized in this real time protocol.

Users can therefore use the same standardized hardware components and diagnostic tools as before. In order to achieve these real-time capabilities POWERLINK uses a mixed polling and time slot process, in which only a single node may send at any given time.

### benefits and advantages

- \_ IO communication protocol (cyclic / acyclic data
- \_ exchange of record data = read / write services)
- Exact synchronization of all nodes
- \_ Up to 100 m cable length (between two nodes)
- \_ Real-time classes (RT Class) 1 to 3

## Safety transmission

For the communication of safety controls with safety-oriented peripheral devices, e.g. rotary encoders with SIL3/PLe certification, transmission with the openSAFETY protocol extension offers safe transmission over any bus systems. TR-Electronic uses the OPENSafety protocol in conjunction with the lower level POWERLINK transmission for safety-oriented rotary encoders with SIL3/PLe.

open   
**SAFETY**

## EtherNet/IP

EtherNet/IP was developed by Rockwell Automation and the ODVA as an open field bus standard, based on the Ethernet Industrial Protocol and is standardized in the international standards IEC 61158: Type 2 and IEC 61784-1: CP 2/2 Type 2. The ODVA is responsible for the specification and maintenance of the EtherNet/IP standard.

Like ControlNet and DeviceNet, it belongs to the family of CIP (Common Industrial Protocol)-based networks.

DeviceNet, ControlNet and EtherNet/IP are therefore well coordinated and provide the user with a graduated communication system for the control level (EtherNet/IP), cell level (ControlNet) and field level (DeviceNet).

## programmable parameters

- \_ Total resolution ( $\leq 25$  bits,  $\leq 36$  bits)
- \_ Number of steps / revolution (standard, extended)
- \_ Number of revolutions (standard, extended)
- \_ EtherNet/IP parameters = scaling, counting direction, reset value

## Ethernet for Control and Automation Technology

EtherCAT is a real-time Ethernet technology and is particularly suitable for communication between control systems and peripheral devices such as e.g. I/O systems, drives, sensors and actuators.

EtherCAT was developed in 2003 and is available as an open standard. The "EtherCAT Technology Group" (ETG) user association was established for the further development of this technology.

EtherCAT is a publicly accessible specification, which was published by the IEC (IEC/Pas 62407) in 2005.

It is part of ISO 15745-4. This part was integrated into the forthcoming new editions of the international field bus

standards IEC 61158 (Protocols and Services), IEC 61784-2 (Communication Profiles) and IEC 61800-7 (Drive Profiles and Communication).

### programmable parameters

- \_ Counting direction, scaling function, preset adjustment
- \_ Total measuring length in steps
- \_ Numerator/denominator revolutions
- \_ Speed resolution
- \_ Layer Setting Services (LSS) = Node ID and baud rate

## Safety transmission

The "Functional Safety over EtherCAT" protocol (FSoE) enables the communication of safety controls with safety-oriented peripheral devices, e.g. rotary encoders with SIL3/PLe certification. The actual values of safety-oriented sensors are thus directly available in certified safety controls with EtherCAT.

Safety over  
EtherCAT<sup>®</sup>

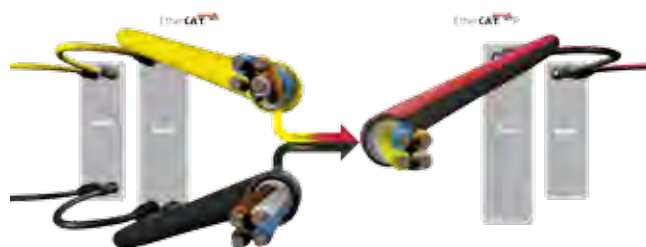
## Single cable solution

EtherCAT P (EtherCAT + Power) is an addition to the EtherCAT technology on the cabling level. P stands for power and enables one to use the standard 4-wire Ethernet cable not only for data, but also for two electrically isolated, individually switchable 24V/3A power supplies.

Potential error sources while connecting devices are reduced, too: M8 connectors specially designed for EtherCAT P prevent false connections via mechanical coding and provide reliable connectivity.

[Source: <https://www.ethercat.org/en/ethercat-p.html> ]

EtherCAT<sup>®</sup>P





## Sercos III



Sercos3 is the third generation of the sercos interface series according to IEC/EN 61491 and based upon Ethernet standard IEEE 802.3 and has been submitted to the IEC (International Electric/Electrotechnical Commission) for global standardization, thus becoming part of the international standards IEC 61800-7, IEC 61784 and IEC 61158.

The vision of a real-time, non-proprietary communication solution permeates the world of industrial automation. Different types of automation devices have to be network-enabled in an easy and consistent way: sercos III is an open and IEC-compliant universal bus for Ethernet-based real-time communication.

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## DRIVE-CLiQ

Powerful single and multi axis servo applications require high-resolution, high-speed encoder systems and high-performance transmission technology between the frequency converter and the sensors for field control, speed and position control. The SINAMICS drive system from Siemens uses the open DRIVE-CLiQ standard for position feedback.

TR-Electronic provides DRIVE-CLiQ interface in the most recent generations of machine integration encoders.



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## IO-Link



IO-Link adds a digital transmission protocol to the well established three-wire-connection for sensors. Existing, low cost point-to-point cabling between decentralized connector boxes and the specific sensors thus provide much more functionality so that even more complex sensor data (e.g. position values of absolute encoders) may be transmitted. Same channel can be used for parameterization of the sensors. With this interface, encoders made by TR-Electronic perfectly fit into proven machine- and facility configurations, where IO-Link masters are already in use.

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# TR-Electronic – your partner in automation

## Rotary encoders

### Absolute encoder, incremental rotary encoder, wire-actuated encoder

Rotary encoders with optical and magnetic scanning functions 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 a comprehensive range of accessories.

## Linear encoders

### Linear absolute measuring systems, laser displacement measurement

Linear encoders register linear motions in machines, tools and systems according to the specific requirements of 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

### Servo drives, compact drives, process 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. These drives are configured to meet customer requirements and can be freely combined with a precision gear, holding brake and I/O. Values of up to 4,350 rpm and a 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 for 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 retrofitting**

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

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

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