

The Catalog





Editorial

Dear Customers,

Thank you for more than 30 years of loyalty!
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.

Yours



Klaus Tessari, Managing Director





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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 34).

OR

You have a technical problem and are looking for a sensor solution: Open to the "Application" chapter (from page 24) 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 190). Simply contact us and put us to the test. TR is near you, wherever you are in the world (see page 476).

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



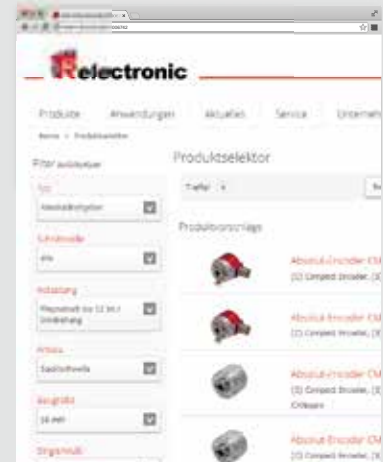
2.a) Scan QR code



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.de.

Here you will find data sheets

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

Further product information

1. Enter order code into ...



Bestellnummer	Umdrehung	Wellen
CMV58-A		
_ CMV585-00011	1,000	@10h7

2. Searchfield (top right) on 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).

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

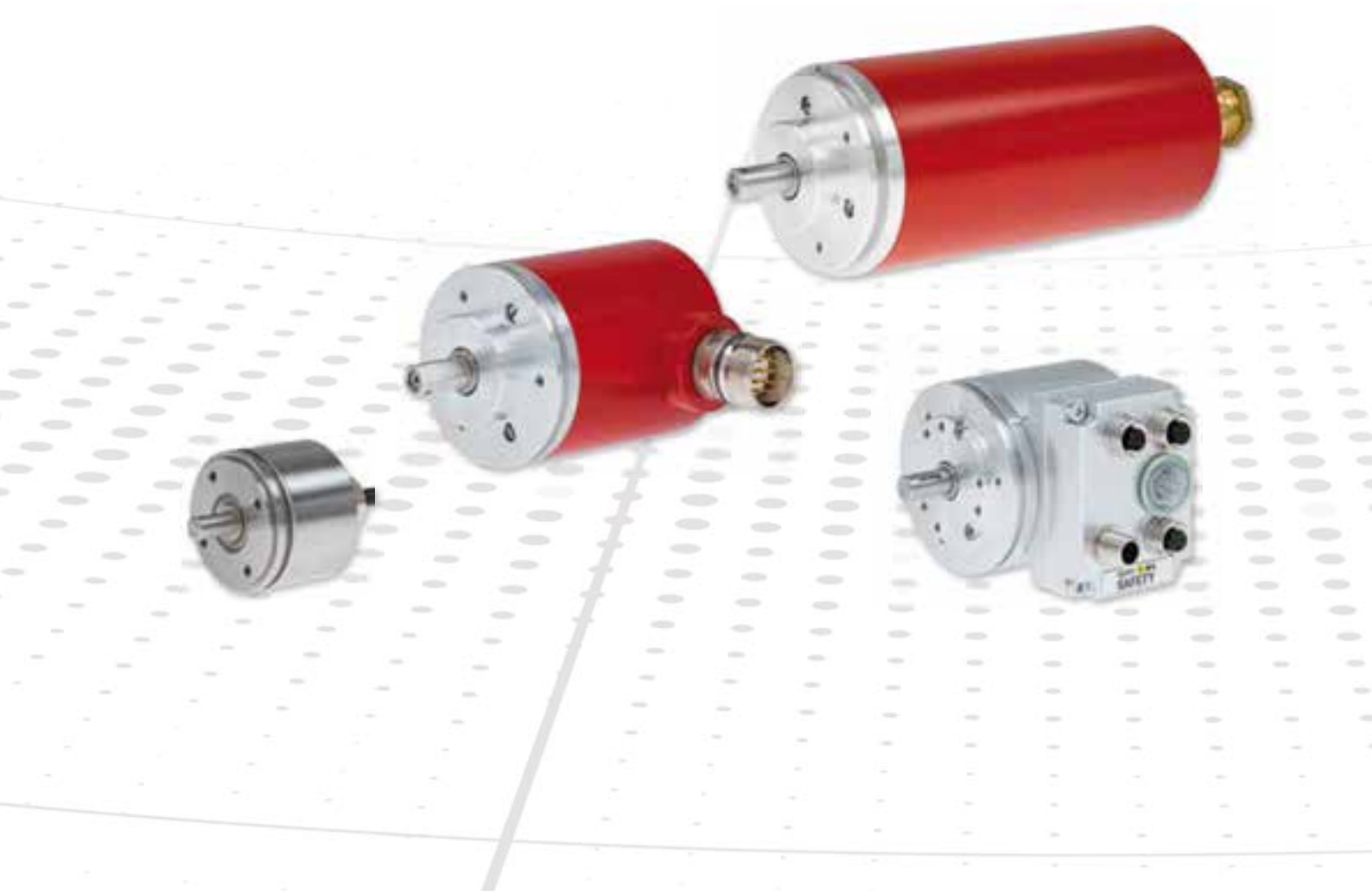


experience and the fresh inspiration provided by qualified new employees ensures a competitive advantage in terms of the functionality, quality and cost efficiency of our product range, both today and in the future.

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



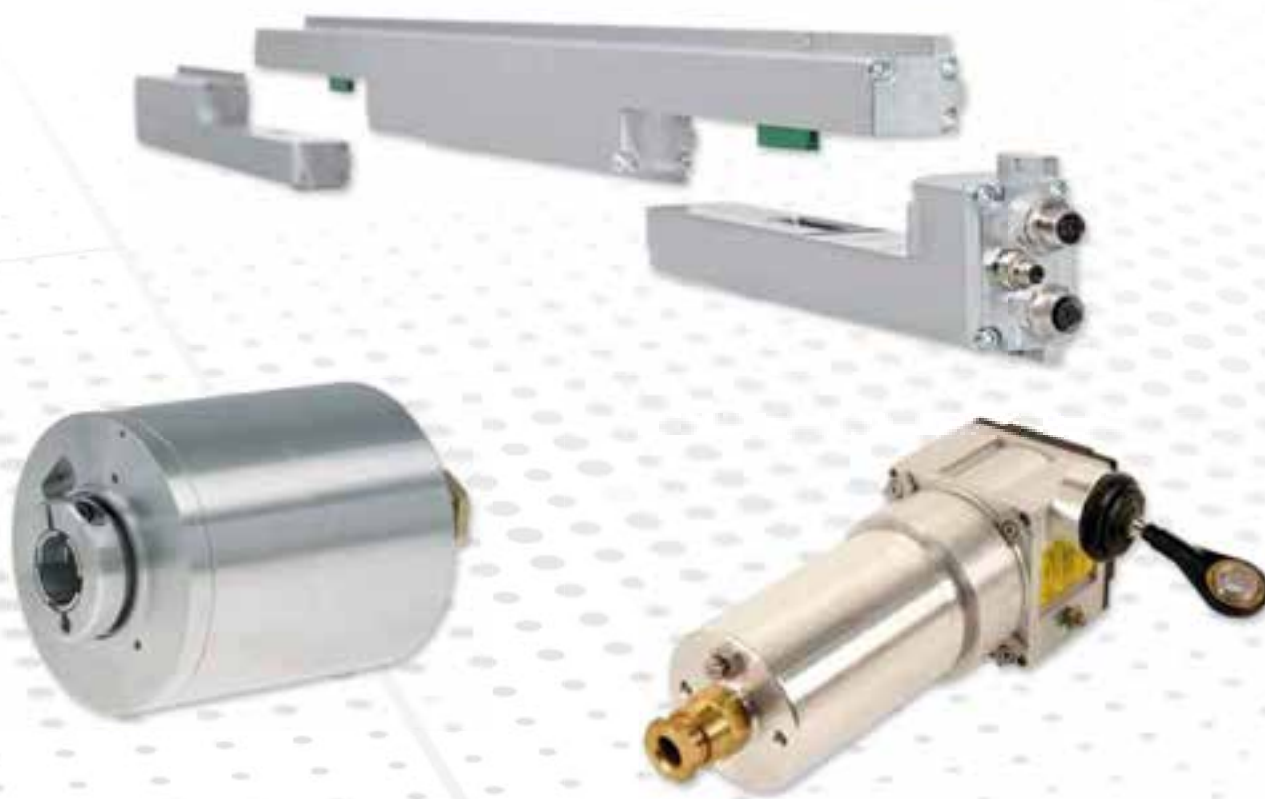
TR expertise



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

SIL 3 absolute rotary encoder and functional safety – system and personal protection

Many applications in automation technology demand 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 sizes from 75mm with hollow shaft or solid shaft. Standard interfaces such as Double SSI, PROFIsafe over PROFIBUS or PROFIsafe over PROFINET, or Open-Safety over Powerlink guarantee optimum 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-efficient solution.

Previous solution

In the past, absolute rotary encoders with additional incremental signals were often used for applications with high safety requirements. The incremental signals were used to monitor the position values. However, when the systems were switched on there was a safety deficiency, as only one absolute value was available. If this value was incorrect, for example due to loss of data for the adjustment value, this could not be detected.

Certified solution

The CD_75 M absolute rotary encoder records the revolution information by means of mechanical transmission without a battery-buffered rev counter. The development, technology and production of these devices are certified by TÜV. They are used in systems which require Safety Integrity Level 3 (SIL 3: IEC 61508 / EN 62061) or Performance Level e (PL e: EN ISO 13849 -1).

Integrated safety with CD_75M

Modern system concepts often require that people and machines share the same work area. The transfer of workpieces and tools, the shared use of transport infrastructure or special operating states such as commissioning, maintenance and setup are all possible. Different areas require different types of protection. These monitoring tasks generally place greater demands on technology. The respective functions are designed as safety functions with the required SIL/PL.

Safe speed

Usually the necessary operator safety is achieved through a defined reduction in the movement speed. If an electronic solution is required, adequate safe speed information is necessary. This enables implementation of the safety functions "Safety Limited Speed-SLS" and "Safe Speed Monitor-SSM". The CD_75M delivers the safe speed information directly to the safety control via a secure bus protocol.

Safe absolute position without referencing

By setting a preset value, the actual value of the output rotary encoder can be set to any value within the maximum measurement range. The displayed position can thus be set to a machine reference position purely electronically. The offset value is stored in the rotary encoder. Setting a preset value is a safety-relevant process. The resulting actual value jump could lead to uncontrolled machine movements, e.g. when using a controller. A preset may therefore only be executed when the relevant system part is at a safe standstill. The preset is already locked in the rotary encoder and can only be activated via a special bit in the secure protocol part.



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 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). The flat housing of the actual measuring system can be

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

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

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.

Interface combinations

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

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

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.

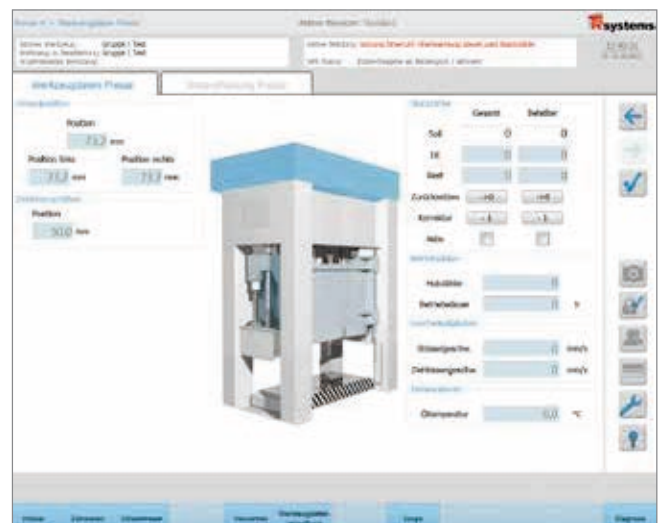
Individual visualization systems

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.



Monitoring of presses and punches

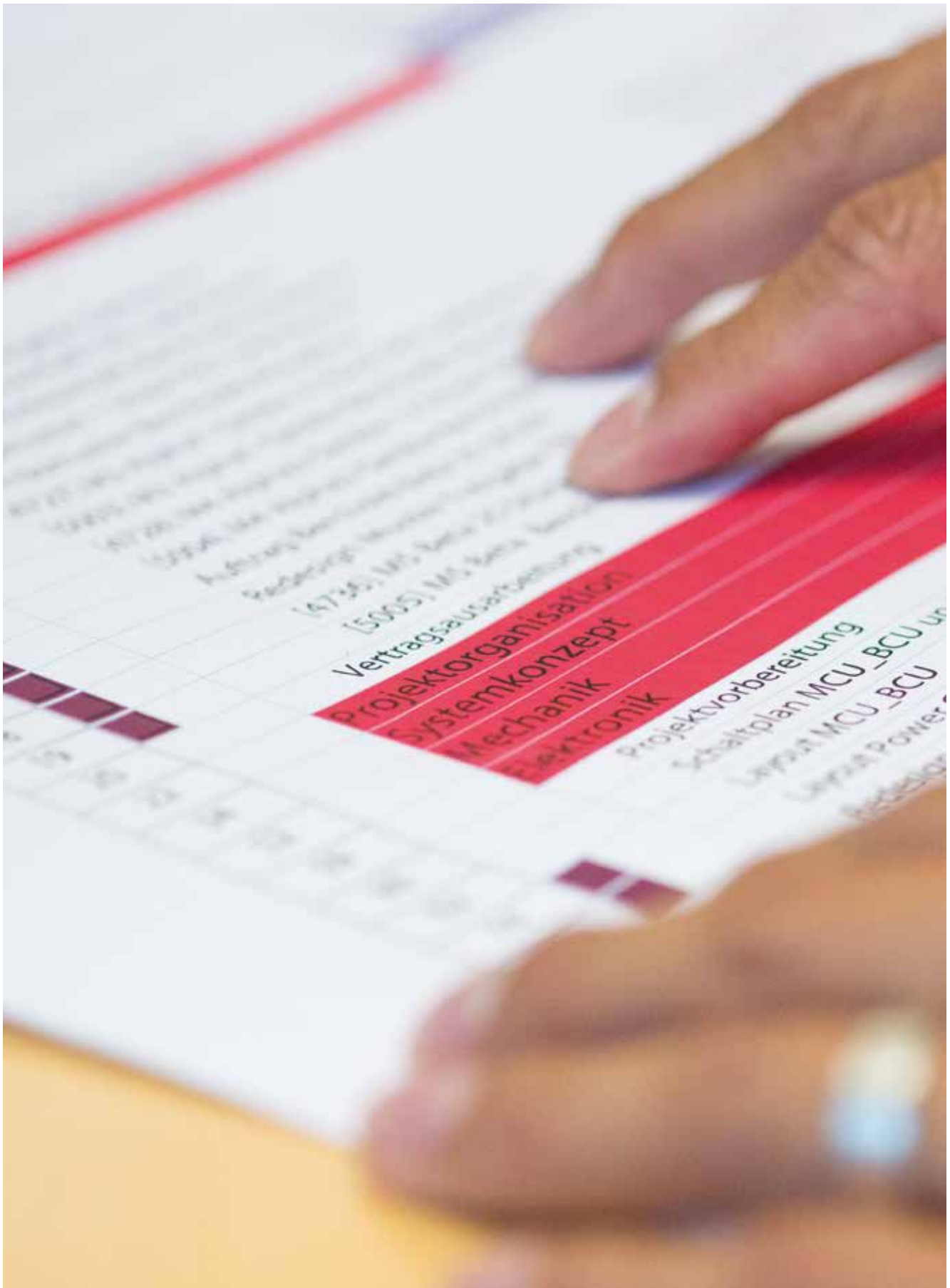
Deformations and material damage can mean the end for the system. It must therefore operate safely within defined load limiting ranges.

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-/PLe-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 specialist

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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

_ Linear encoders (magnetostriction)	Page 282
_ Draw-wire encoders	Page 240
_ Laser distance measurement.....	Page 328
_ Industrial PC	Page 448

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.





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 34
_ Incremental rotary encoders	Page 194
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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)

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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 34
- _ Heavy-duty absolute rotary encoders Page 176
- _ High-resolution linear measuring systems Page 320
- _ Sensors for punching and forming processes Page 470

All information and data can be found at:
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 282
- _ Decentralized positioning drives Page 346

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 34
_ Safety rotary encoders.....	Page 154
_ Decentralized positioning drives	Page 346

All information and data can be found at:
www.tr-electronic.com/applications/renewable-energies

Access information even faster:
by scanning the QR code.





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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 34
- _ Programmable incremental rotary encoders Page 198
- _ Decentralized positioning drives Page 346

All information and data can be found at:
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

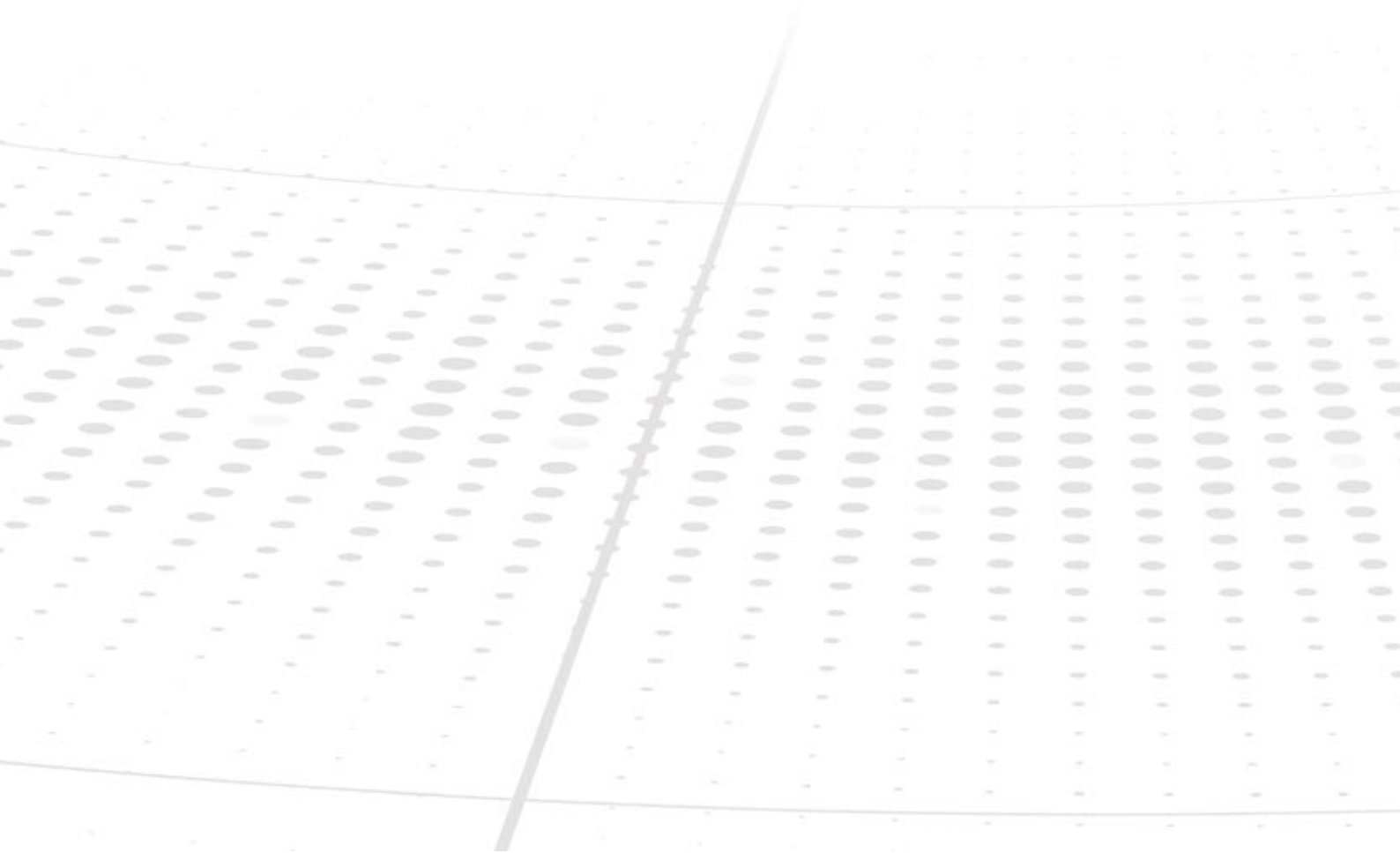
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All information and data can be found at:
[www.tr-electronic.com/applications/
plastics-processing](http://www.tr-electronic.com/applications/plastics-processing)

Access information even faster:
by scanning the QR code.



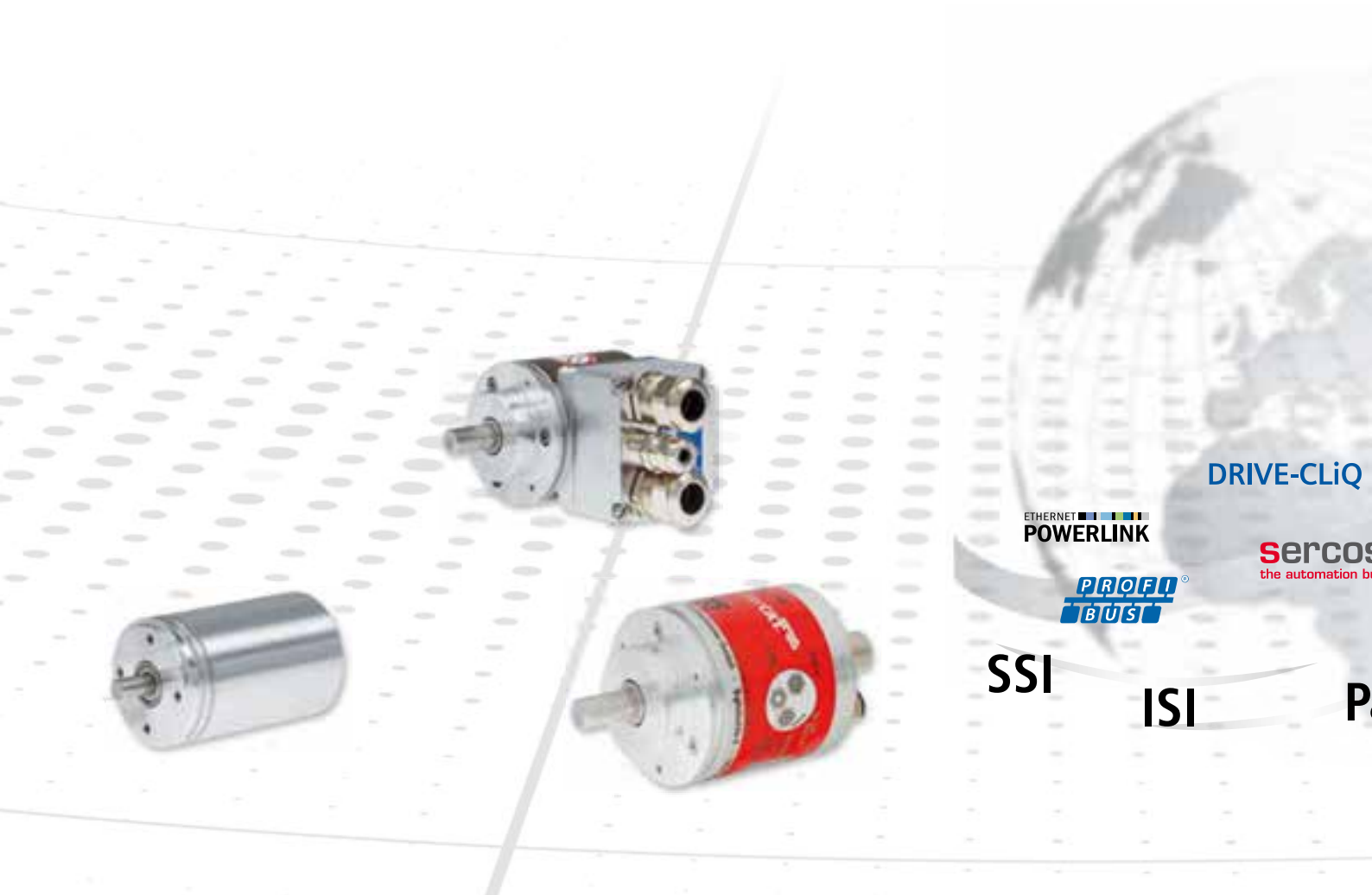
Rotary Encoders



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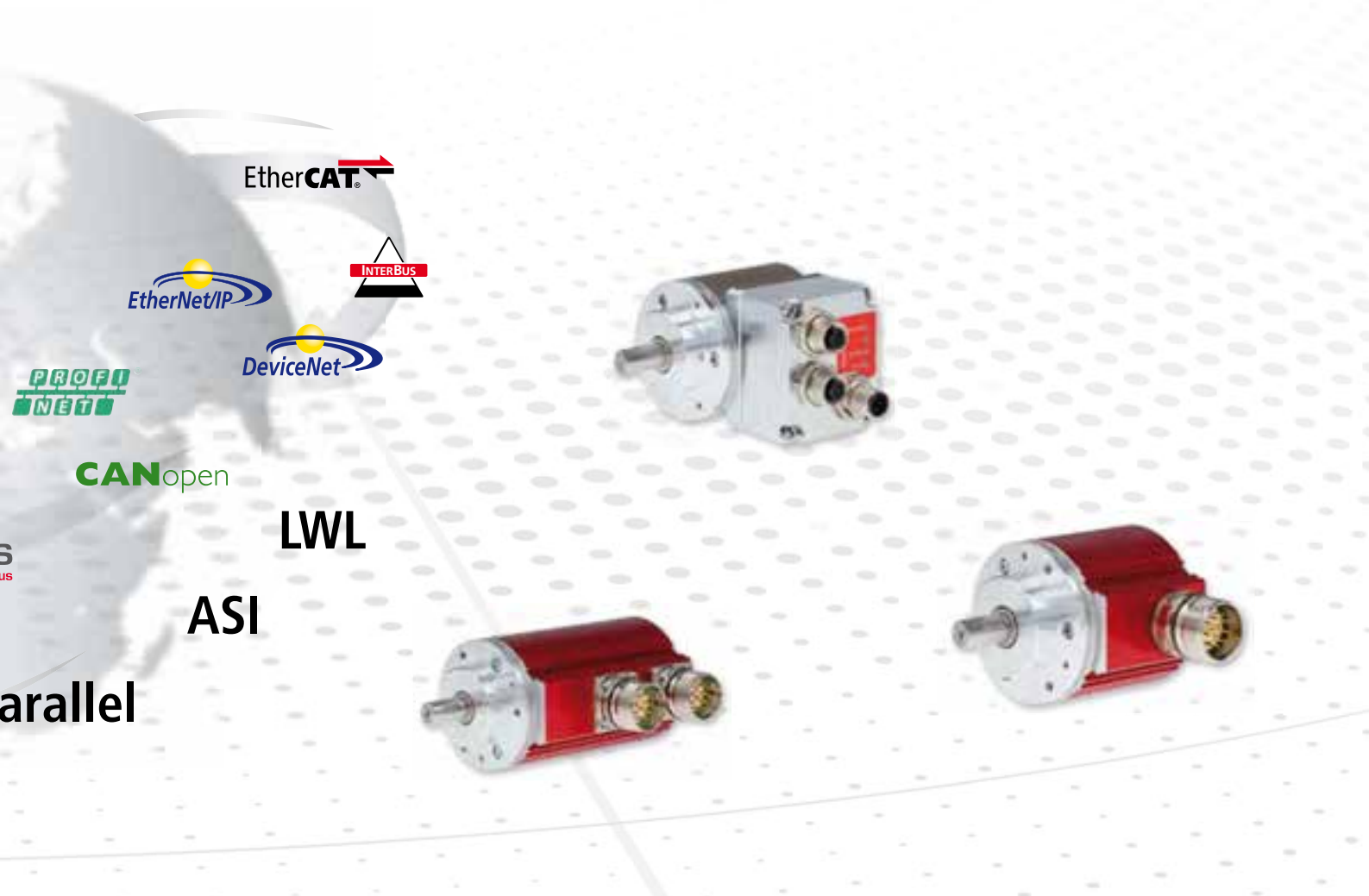
Absolute Rotary Encoders



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 SIL3-approved absolute rotary encoders ensure the necessary safety.

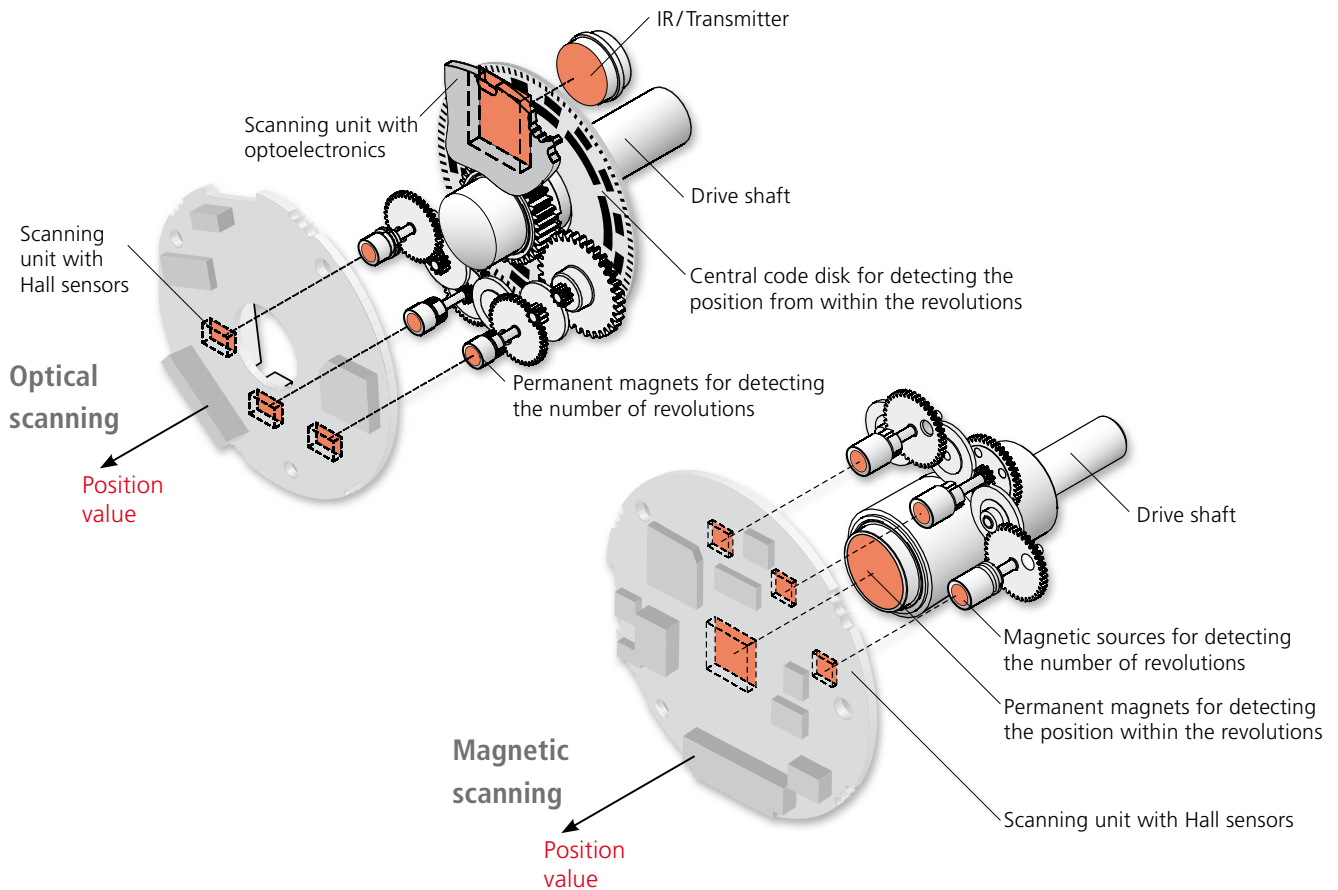
In addition to high-quality rotary encoders for almost every application, we also offer extensive accessories such as programming tools, displays and assembly components for quick and simple implementation and seamless integration into your processes.



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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



Hollow shaft



Integrated coupling



Blind 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 an sample of the numerous mounting possibilities in the following overview.

Important: not all possible combinations will be shown.

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

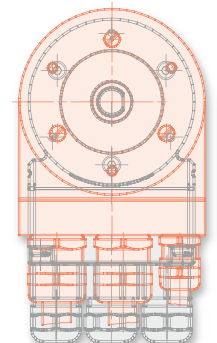
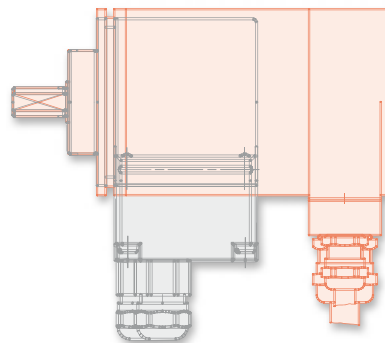
In special engineering applications, it has been proven that the use of cable from a roll to connect field devices saves costs. The cables will be cut and connected when installed. The fieldbus hood of the 65 mm series offers comfortable connection space. Less bend in the cable and a generous clamping 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



CD_75 M

The double rotary encoder system with hollow shaft and multi-turn detection fulfill the requirement of EN 615081*. The use of certified individual components makes it easier for the system integrator to fulfill the safety requirements of the entire application, for example within the event technology, storage and logistic technology and wind energy. The use of our SIL3-certified safety absolute rotary encoder liberates the user from the obligation to prove functional safety for this positioning sensor separately.

With certified components the strict safety guidelines will be met. The double rotary encoders CD_75 M are available with hollow and solid shaft. They are approved for applications according to SIL3 or PLe. For local motor feedback, there is an optional rectangle or sine/cosine incremental output available. Different resolutions can be chosen (period/revolution).



*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.

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 monitoring¹ – An unsafe electrical axial synchronization can be made safe by using a certified SIL3/PLe rotary encoder with an externally attached safety system.

Shaft control¹ – Rotation through overload or a twist-off will be detected through a SIL3/PLe rotary encoder with an external safety system.

Advantage of certified components

The basic safety standard IEC 61508² 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 SIL3 or PLe has been given by independent specialists.

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



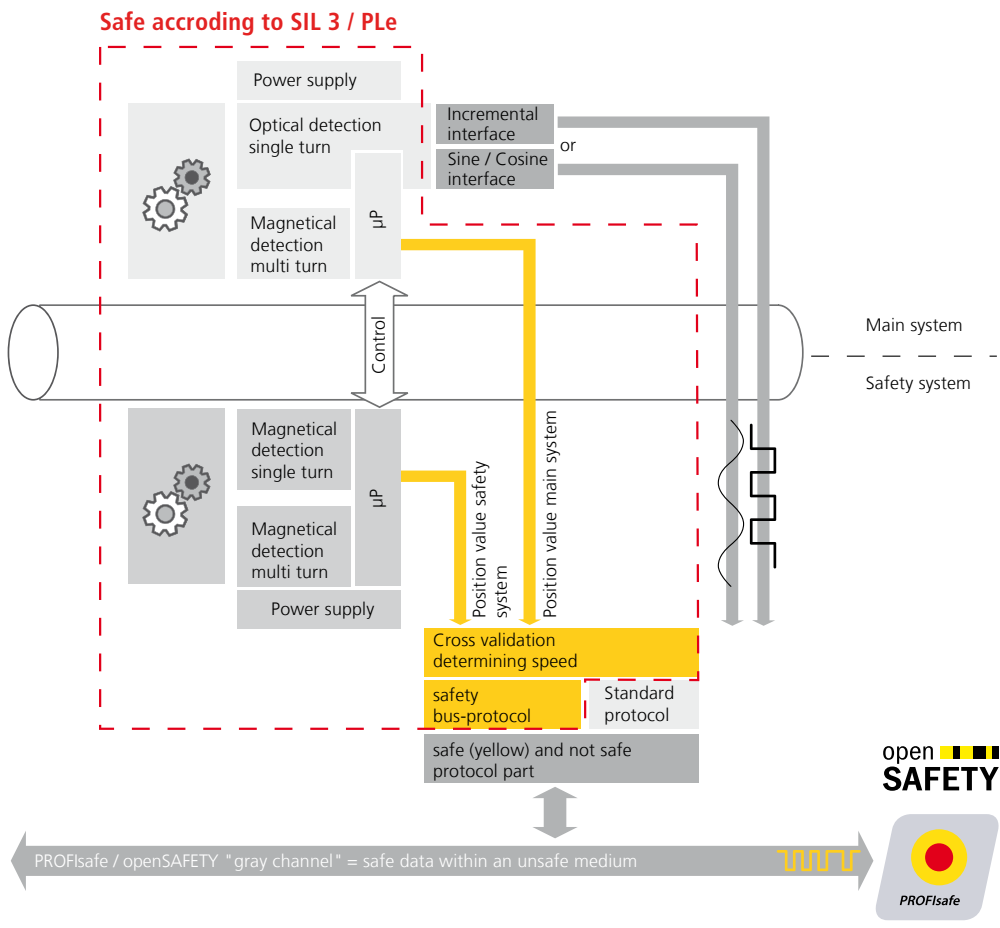
SIL and PL – two scales for safety

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). Our safety rotary encoders are certified according to PL “e”, the highest performance level.

Safety rotary encoders

SIL 3/PLe



Rotary encoder, safe according to SIL 3/PLe

Within the revolution in system one the shaft position is detected with an optical single-turn encoder. The revolutions are detected over mechanically attached satellites. This gives the absolute positioning value of measurement system one. For system two, the revolution position is transferred via magnetic central detection, and the revolutions are detected with magnetic equipped satellites. This gives the absolute positioning value of measurement system two. The CPUs give each other signs of life.

The optical detection gives out incremental signals. It can be switched between rectangle and sine/cosine outputs with various resolutions. For safety reasons, the resolutions of the measurement systems are not programmable.



Certification, PROFIBUS

SIL CL 3 according to IEC 61508 PL e according to EN ISO 13849-1

PROFIBUS/PROFIsafe: certification has been awarded to the PROFIBUS (PI certificate Z01522), the PROFIsafe conformance (PI certificate Z20031) as well as the fulfillment of the safety standards (TÜV Rheinland, 01/205/5015/10).

2xSSI



open 
SAFETY

ETHERNET 
POWERLINK



Certification, PROFINET

SIL CL 3 according to IEC 61508 PL e according to EN 61800-5-2

PROFINET/PROFIsafe: certification has been awarded to the PROFINET (PI certificate Z10472), the PROFIsafe conformance (PI-Zertifikat Z20068) as well as the fulfillment of the safety standards (TÜV Rheinland, 01/205/5221/12).



Certification, POWERLINK

SIL CL3 to IEC 61508, PL e to EN 61800-5-2

POWERLINK/openSAFETY: certification has been awarded to the POWERLINK (PI certificate 1000022), the openSAFETY conformance (PI certificate 14000100) as well as the fulfillment of the safety standards (TÜV Rheinland, 01/205/5424.00/14).

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

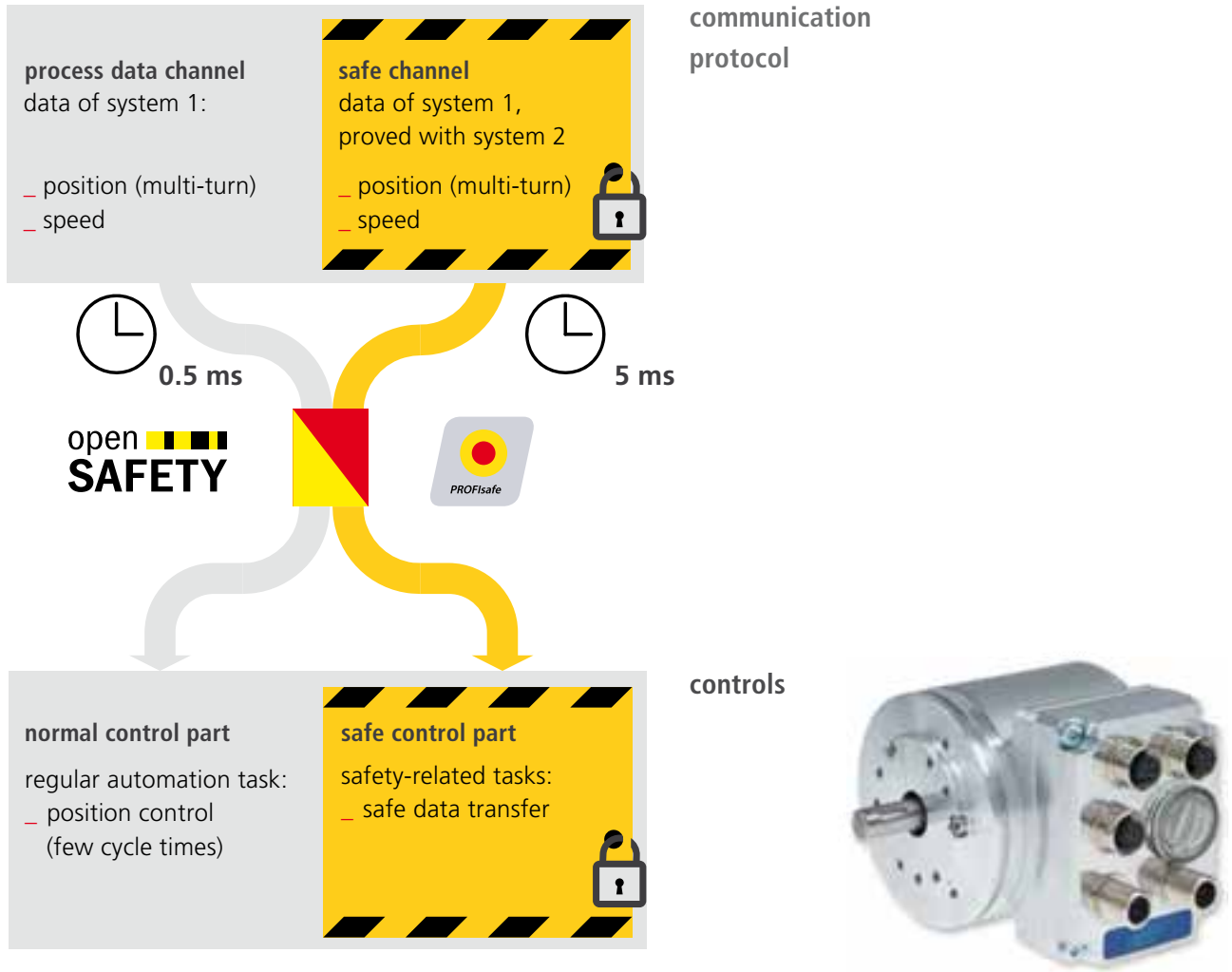
wrong due to data loss or an adjustment value, it couldn't be detected.

Certified solution

The absolute rotary encoder CD_75 M 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. They are used in plants and equipment requiring safety integrity level 3 (SIL3: IEC 61508/EN 62061) or a performance level e (PL e: EN ISO 13849 -1). The CD_75 PROFIsafe additionally gives out safe speed values.

*German Association for Technical Inspection

Communication and preset



Communication with safety bus system

The actual values will be transferred via safety bus system. Within the safe protocol part the actual value and the speed will be transferred. These values are also available over not safe normal PROFIBUS/PROFINET telegrams. Therefore, safe and normal control parts have access to it. Certified are the bus interface, the bus compliance, as well as the fulfilling of the safety standards.

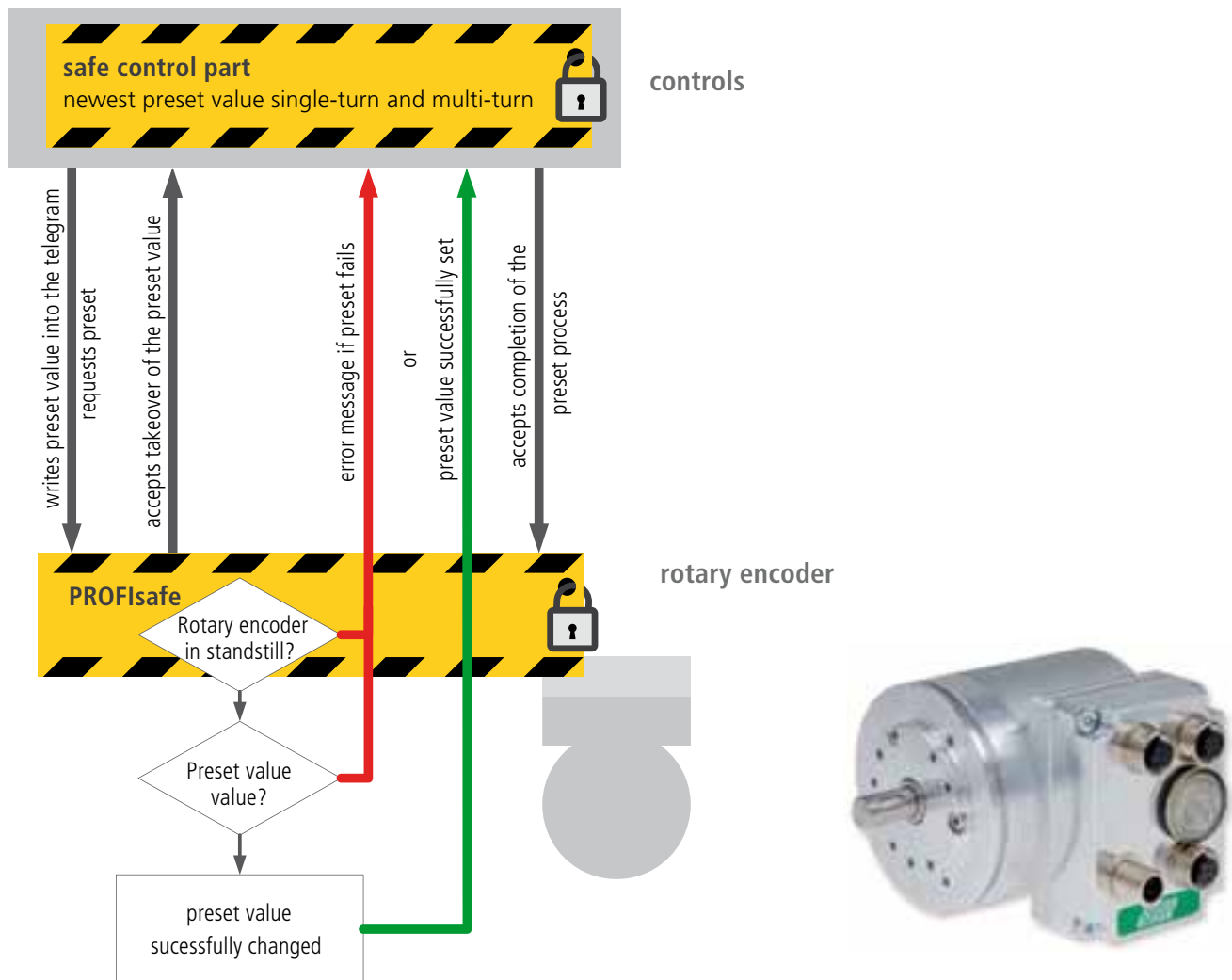
The actual values for position and speed are transferred in two slots:

For safe transmission the actual position values of both rotary encoder systems are compared. If the difference is smaller

than the adjusted control window, the rotary encoder value does count as safe. The safe actual position value and the derived safe speed value will be transferred over the secured telegram.

The part of the control taking on the safety-related tasks can process these values.

The actual position value and the calculated speed of the main rotary encoder are directly transferred within the unsecured process data channel. Usually, this channel is processed more often by the controller. Normal automation processes can access actual position values more often.

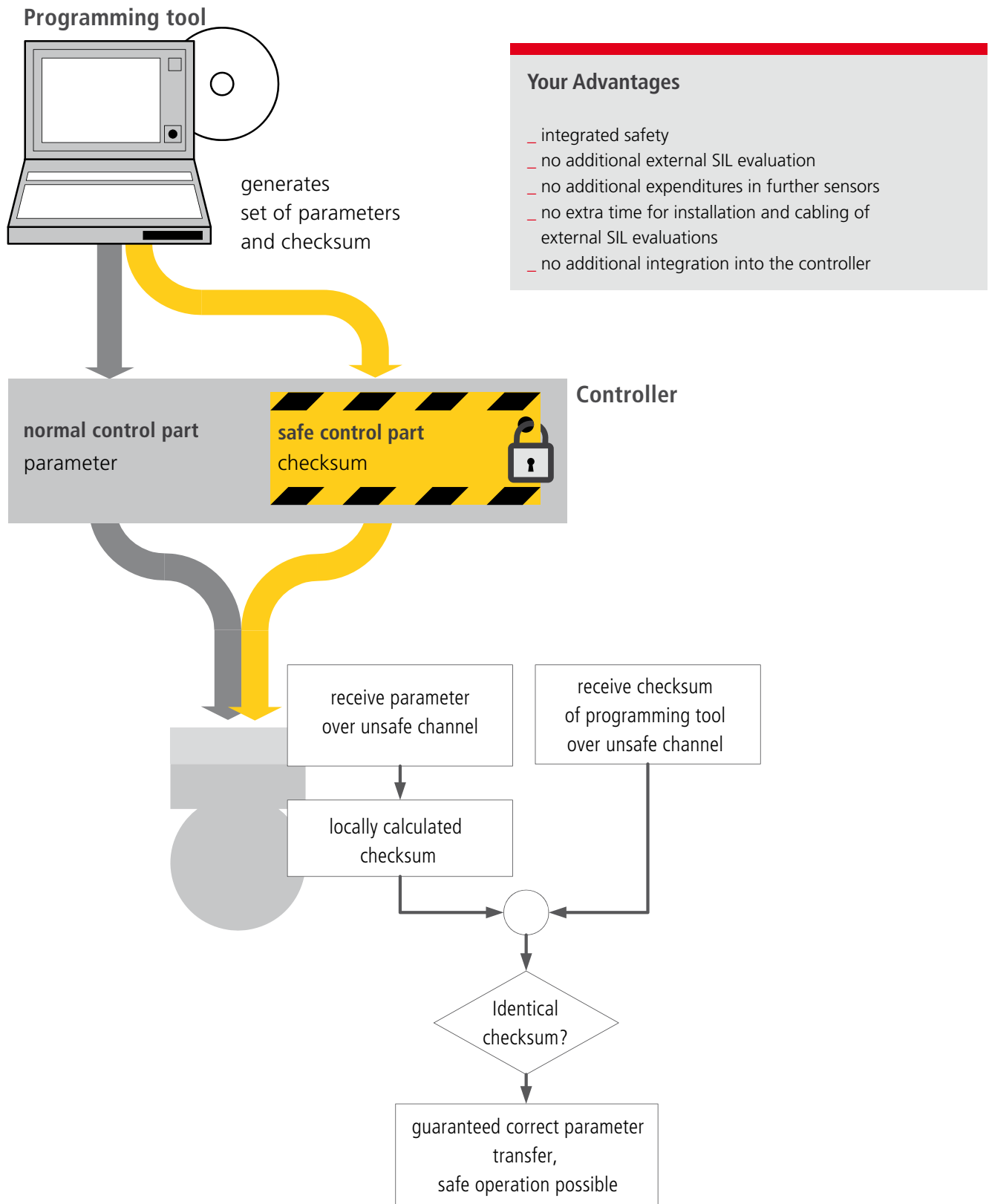


Preset via safety bus system

By setting a preset value, the actual issued value of the rotary encoder can be placed arbitrarily at a value within the maximum measurement range. With this, the shown position can be placed electronically at a machine referencing position. The offset value will be saved within the rotary encoder. Setting a preset value is a safety-relevant process. A jump of the actual value, for example using a controller, can lead to an uncontrolled movement of the machine. Therefore, setting a preset value can only be done when the relevant machine part is still. The preset is already locked within the rotary encoder and can only be activated via a special part within the safe protocol part.

Even if all preconditions of the controller are fulfilled, the preset will only be executed when the rotary encoder shaft stands still. Further measures have to be taken into account. The controller can start the preset process only when the related drives are secured against running. It is recommended to lock the preset process from the controller through further safety measures (for example key switches, password prompts, etc).

Parameterization via safety bus system



Parameterization

Parameters are transferred over the bus each time the machine starts up. This set of parameters will be saved over a checksum:

Reading value difference

Permissible difference between the rotary encoder values of system 1 and system 2.

Standstill tolerance

To trigger a preset process, the rotary encoder must be still. Depending on the drive, it is necessary to specify its tolerance range.

Direction of rotation

Positive count direction clockwise/counterclockwise.

Integration time

Time base of the speed calculation. Long integration times enable high resolution measurements at a low rotary speed. A short integration time shows speed changes faster: well suited for high rotation speeds and great dynamics. Information is a multiple of the cycle time of the rotary encoder system: For process data channel (unsecured) 5 ... 500 ms, for safe channel 50 ... 500 ms.

Integrated safety – CD_75M

For numerous industrial applications such as presses, cranes and robots, it is important to exactly capture the movement exactly in position and speed. These movements always have the potential to be accompanied by a hazard. Therefore, working stations, positions and speed are always controlled. In general, controls like this require a higher standard of technology. The relevant functions are interpreted as safety functions with necessary SIL / PL. For positioning sensors, the following methods of secured data are possible.

Secured Speed Data

Secured speed data is needed to allow access to a usually dangerous area where tasks such as maintenance or start-up work have to be done.

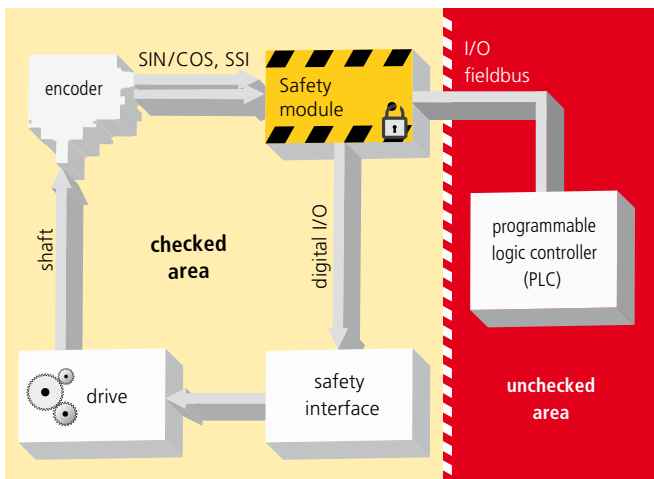
The CD_75M delivers safe position information which is used in a controller to realize secured maximum speed (SLS: Safely Limited Speed).

Safe Position

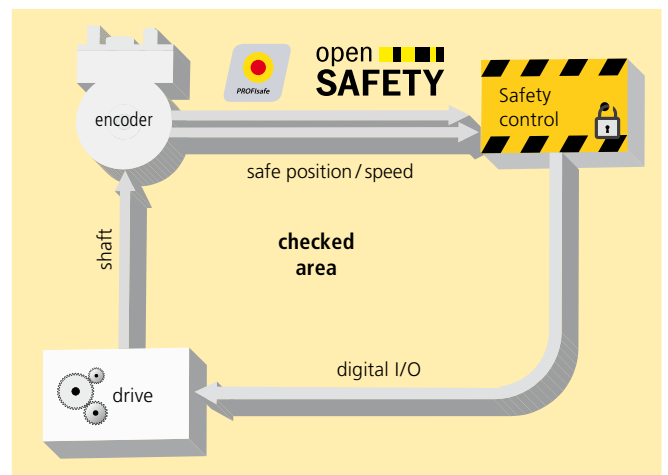
A safety function needs reliable position information when different safety requirements must be determined in different areas. With this information, for example, a "Safe Direction – SDI" can be realized, or other safety parameters in relation to the position can be determined. The CD_75M sends the safe position information directly over PROFIBUS, PROFINET, Powerlink or safely via PROFIsafe or openSAFETY protocol within the safety control.

Conventional Standard versus Integrated Safety

Conventional Standard



Integrated Safety with CD_75M



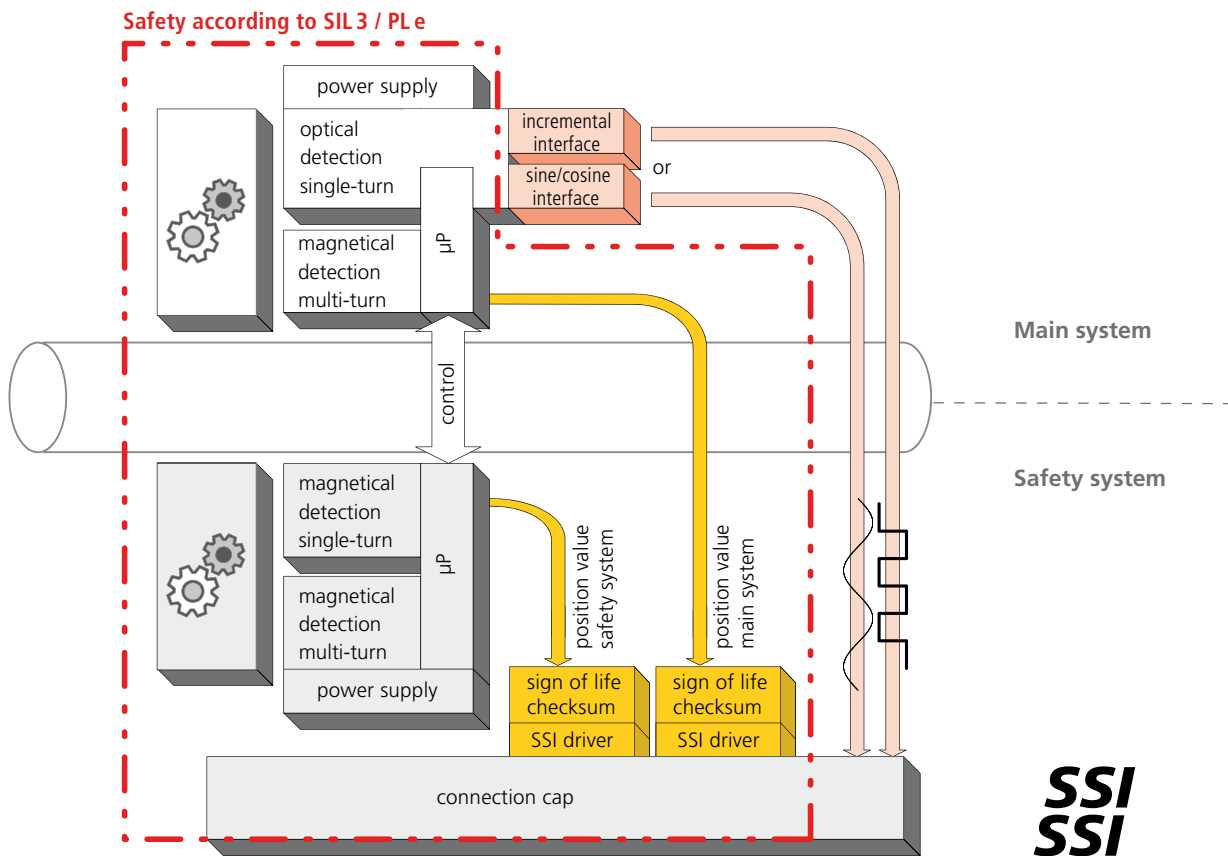
Conventional Standard

The tests of the signals are done in a safety module. Depending on the features of the rotary encoder, the safety module can identify the safe speed or single/multi-turn position. The safety module decides based on the parameters of limited values and functions whether the status of the machine is safe and the drive keeps running or whether it has to stop. The safety function is solely restricted to this part of the plant. If real positioning and speed values requested (e.g. controller), a second rotary encoder is needed. Both, the controller as well as the safety module, have to be correctly programmed and parameterized. For individual plant parts, this technology can be retrofitted. The rotary encoders used don't have to be certified. They only have to fulfill the requirements of the producer of the safety modules.

Integrated Safety with CD_75M

The measurement values of safe speed and safe multi-turn position are determined within the certified rotary encoder. They are transmitted over a safe bus system to an equally certified safety module. Therefore, the safe sensor values are available for each controller of the entire machine or plant. This enables intelligent safety conditions where humans and machines share the work environment without mechanical safety devices. Work areas can be divided into different zones with adjusted safety requirements. Position and speed values are available for either safety applications over a secured channel or for normal automation functions over an unsecured channel. Therefore, a rotary encoder for position feedback is unnecessary. Due to the integration of the PLC a safe operation with a large range of functions can be guaranteed.

Safety according to SIL 3 / PL e with 2 × SSI



The determined position values will be enhanced with status information and checksum. These position values will be distributed on separate SSI interfaces. It is the task of the sequential electronics to determine the accuracy of the measurement values by comparing both values. Hereby, additional information provided within the SSI telegram is helpful. The SSI telegram also transfers an error bit of the other system; therefore it is possible to determine that you have to look for an error within the rotary encoder (the other system reports the error) or in the cable (the other system reports no error).

Both systems transfer the actual position value in an enhanced SSI telegram.

Error bit

The error bit of both systems is shown in both SSI channels. Therefore, if there is a malfunction in one of the SSI channels the error can be transferred into the other channel without issue. Hence, the diagnosis of both systems can be determined even when only one channel is operational.

Checksum

An 8 bit CRC checksum will be calculated from all user data within the SSI telegram and will then be put into the SSI telegram. Secured data: MT and ST data, error bits, sign of life counter. Hamming distance = 3: two incorrect data bits will safely be recognized.

Sign of life counter

The sign of life counter will be incremented with each detection process of the rotary encoder system. The incremented sign of life counter makes sure, up to the latest telegram, that the latest transferred data comes out of a new position detection.

If SSI requests happen faster than the internal detection (500 µs master channel, 500 µs safety channel), the position data and the sign of life counter remain unchanged.

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 x SSI)
- _ optionally as incremental rotary encoder
- _ optional separate bearing (completely free from wear and tear)
- _ magnetic scanning

Area of application

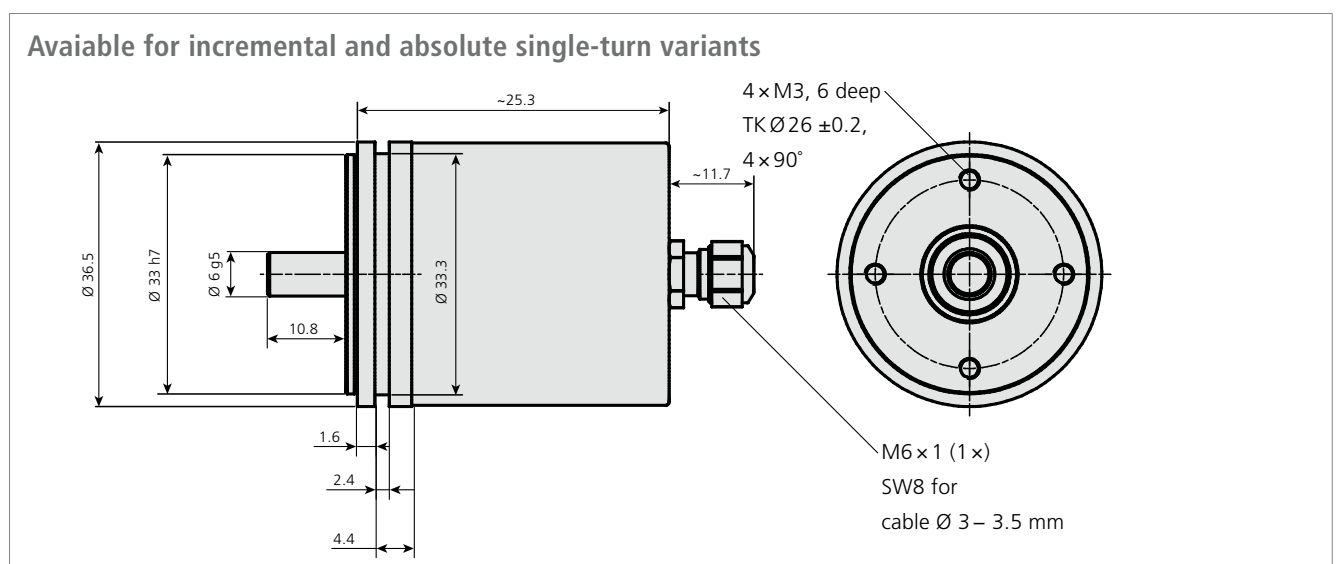
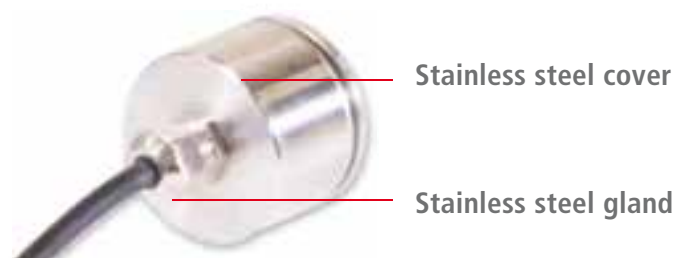
This standard applies to the IP protection classes for electrical fittings in road vehicles.



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)



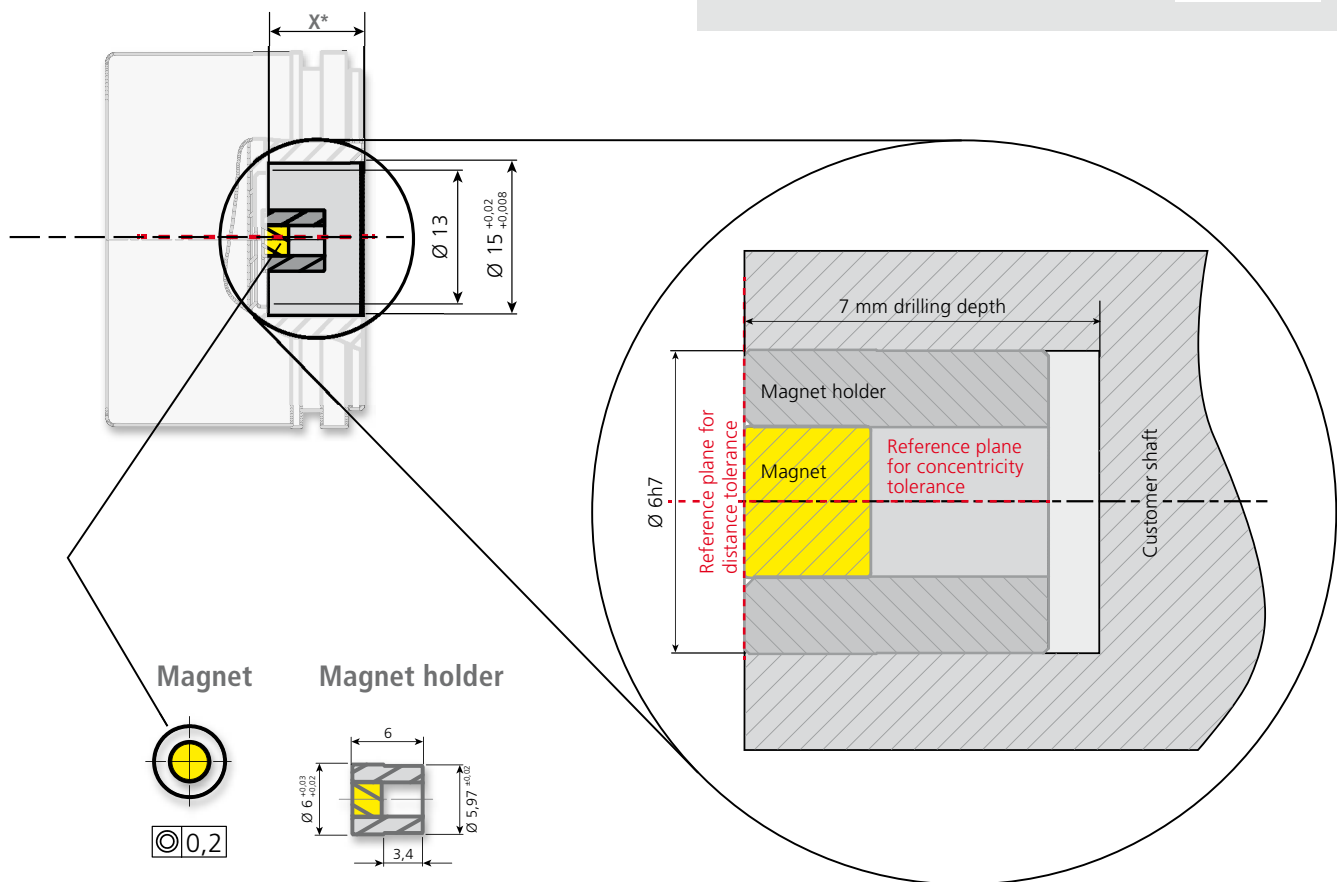
Assembly of a magnet holder

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



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**

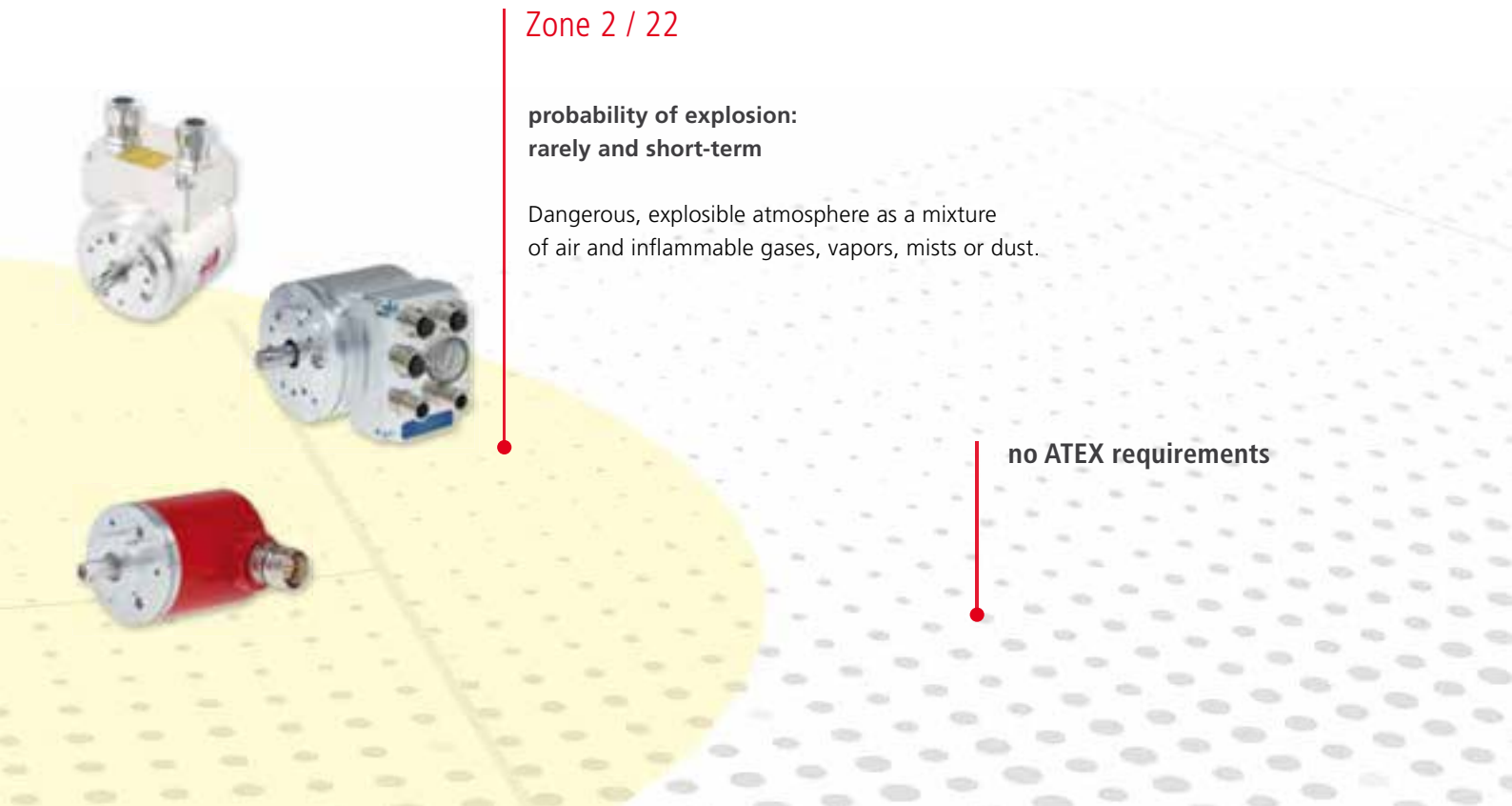
Dangerous, explosible atmosphere as a mixture of air and inflammable gases, vapors, mists or dust.



Classification into EX zones

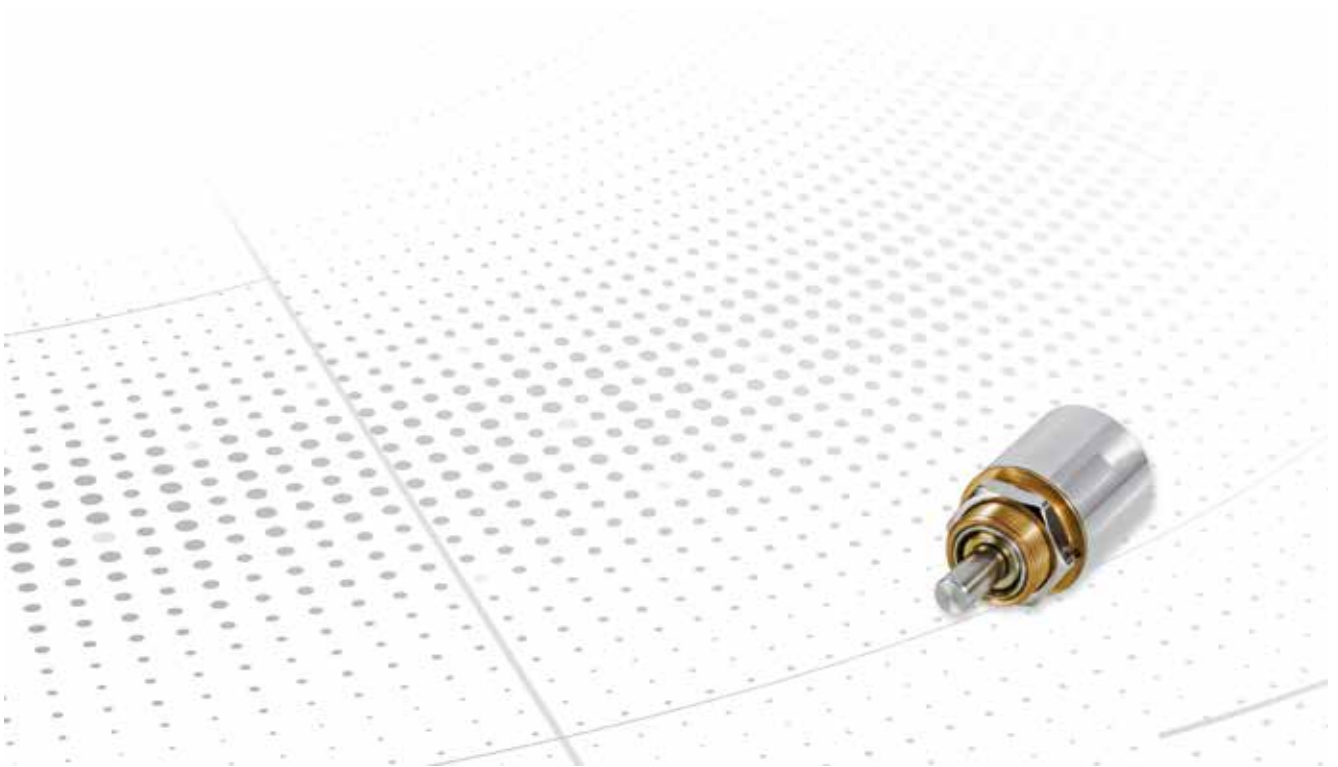
EX atmospheres are divided into six zones. The table on the right describes how the zones are classified, according to hazardous environments for gases, vapors and mists on the one hand and dust on the other.

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.



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

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.

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Shaft Types.....	58

Magnet detection (M)

Product	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	SSI ASI	Analog
Weblink	www.tr-electronic.com/s/S007235	www.tr-electronic.com/s/S007234
QR-Code		

Suggested Products

Order code	Steps per turn	Turns	Shaft / Flange	Connector position	Cable length	Remark
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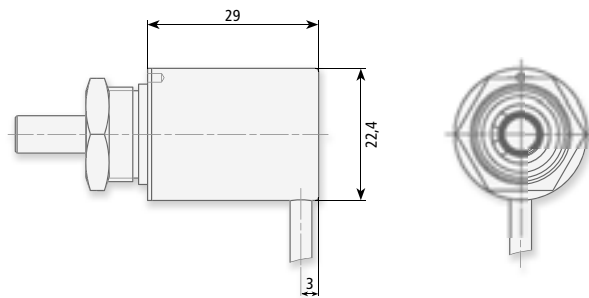
CMV22 - Analogue						
CMV22M-00007	1024	4	6GL/12,7 3/8"-32UNEF	Open end	0,200 m	Analogue voltage
CMV22M-00008	4096	256	1/4"X12 M16X1	Open end	0,500 m	Analogue voltage
CMV22M-00013	4096	10	6,35GL/12 with groove M16X1	1X8P.M12-connector	0,360 m	Analogue voltage
CMV22M-00022	1024	50	6GL/12,7 3/8"-32UNEF	Open end	5,000 m	Analogue voltage
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
CMV22M-00025	4096	256	1/4"X12 M16X1	Open end	0,500 m	Analogue current
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-00017	4096	256	1/4"X12 M16X1	1X8P.M12-connector	0,300 m	
CMV22M-00037	4096	256	6GL/12,7 M16X1	Open end	10,000 m	
CMV22M-00041	4096	256	1/4"X12 M16X1	MOLEX-WIRE 6P	2,500 m	
CMV22S-00003	4096	1	1/4"X12 M16X1	Open end	0,300 m	

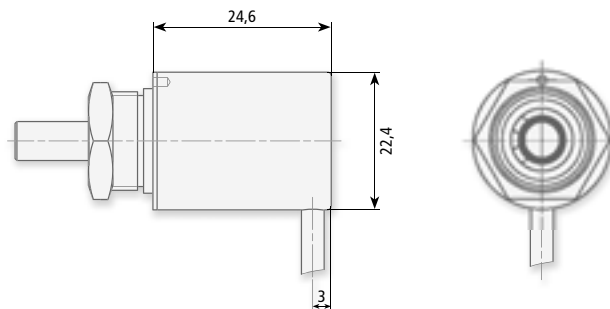
For further product information simply enter the order number in the search field at www.tr-electronic.de.

Dimensional Drawings

CMV22 Analogue

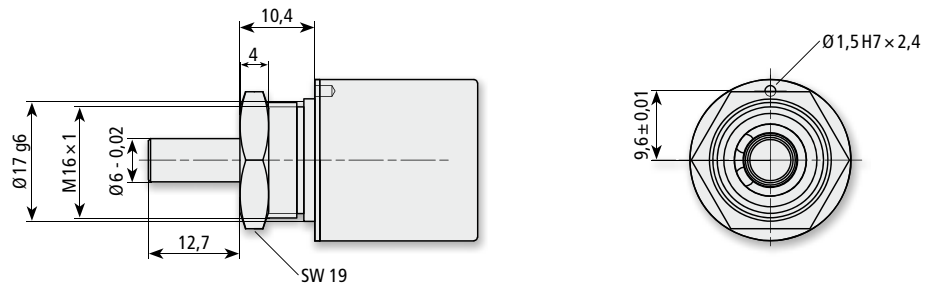


CMV22 SSI, ASI

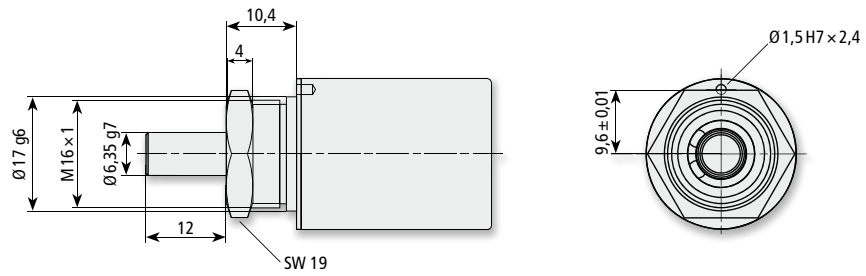


Shaft Types

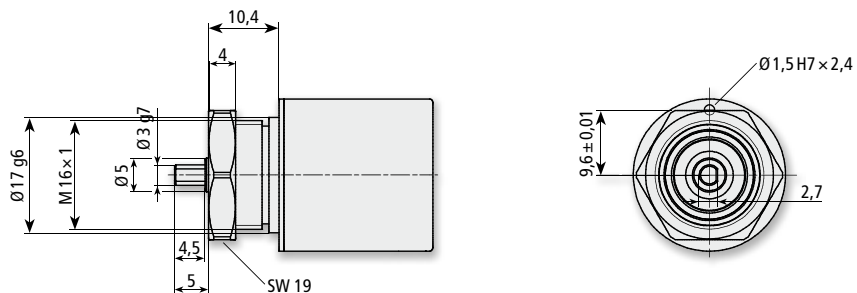
Shaft 6mm



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



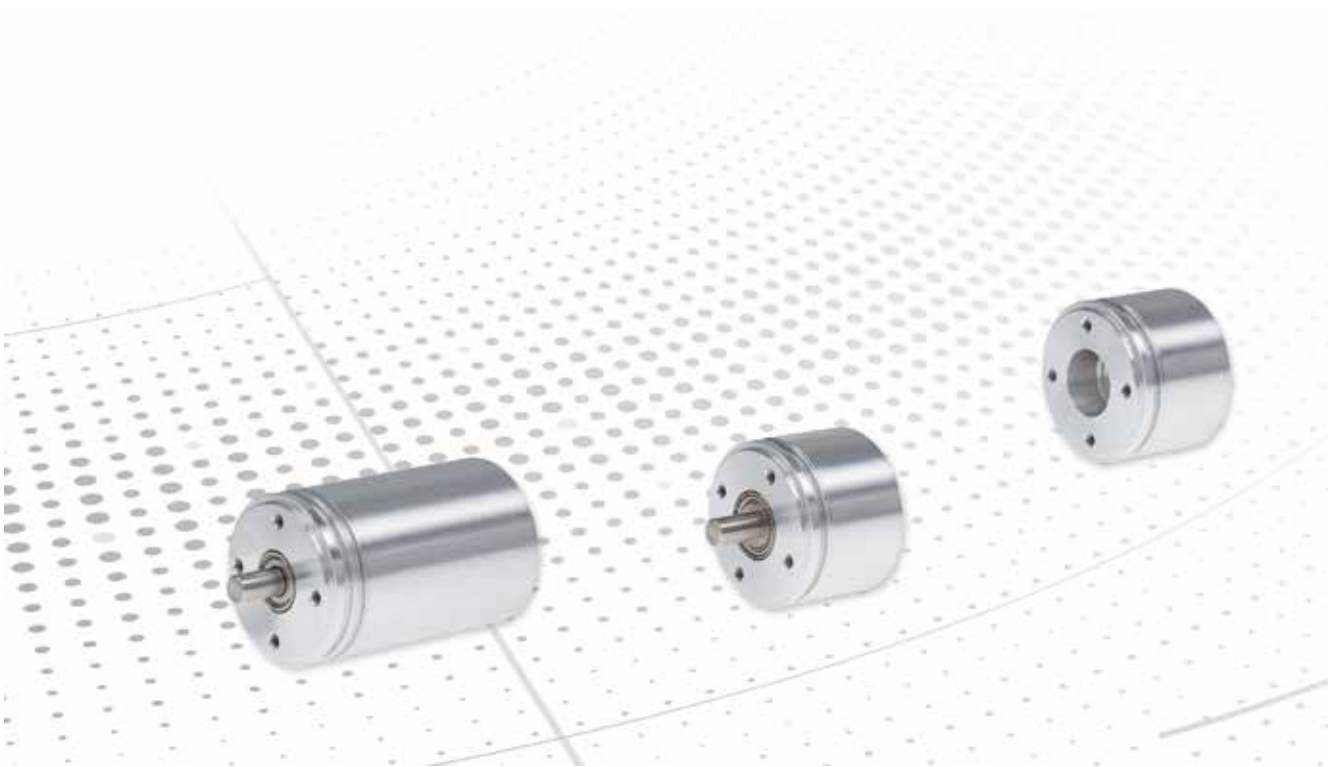
**Shaft 3mm
With flat**



Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at www.tr-electronic.com or on request.



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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Suggested Products.....	64	Samples	68
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Flanges	66		

Magnet detection (M)

Product	CMV36-S	CMV36-M	CMS36-M
			
Detection	Magnet detection (M)	Magnet detection (M)	Magnet detection (M)
Single / Multi	(S) Single	(M) Multi	(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*	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	1	4,096 (Option: 16,777,216)	4,096 (Option: 16,777,216)
Shaft diameters available	6mm	6mm	8mm blind shaft
Connectors	Cable gland axial	Cable gland axial, M12 axial (DRIVE CLiQ)	Cable gland axial, M12 axial (DRIVE CLiQ)
Ambient temperature	-25...+70°C	-25...+70°C	-25...+70°C
Protection class	IP65 (option IP69k)	IP54 (option IP65)	IP54 (option IP65)
Interface	SSI ASI Analog CAN	SSI  ASI CAN	SSI  ASI CAN
Option, additional interfaces (on request)	INC	INC	INC
Weblink	www.tr-electronic.com/s/S007174	www.tr-electronic.com/s/S007175	www.tr-electronic.com/s/S007176
QR-Code			

*Factory set







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

Magnet detection (M)

Product	CMF36-S	CDV36-S	CDV36-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*	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	1	1	4.096	
Shaft diameters available	See drawings section	6mm	6mm	
Connectors	Cable gland axial	2x cable gland axial	2x cable gland axial	
Ambient temperature	-25...+70°C	-25...+70°C	-25...+70°C	
Protection class	IP65 (option IP69k)	IP65 (option IP69k)	IP54 (option IP65)	
Interface	SSI ASI Analog CAN	SSI	SSI	
Option, additional interfaces (on request)	INC	SSI	SSI	
Weblink	www.tr-electronic.com/s/S007177	www.tr-electronic.com/s/S007178	www.tr-electronic.com/s/S007179	
QR-Code				

*Factory set

Magnet detection (M)
 Optical 15 bit (E)
 Optical 18 bit (O)

CDF36-S	CEV36-M	COV36-M
		
Magnet detection (M)	Optical 15 bit (E)	Optical 18 bit (O)
(S) Single	(M) Multi	(M) Multi
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*	1.. .32,768*	1...262,144*
1	65.536	65.536
See drawings section	6mm	6mm
2x cable gland axial	M12 axial	M12 axial
-25...+70°C	-25...+70°C	-25...+70°C
IP65 (option IP69k)	IP54 (option IP65)	IP54 (option IP65)
SSI	SSI	SSI
SSI		
www.tr-electronic.com/s/S007180	www.tr-electronic.com/s/S007293	www.tr-electronic.com/s/S007294
		

*Factory set

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Suggested Products

Order code	Steps per turn	Turns	Shaft / Flange	Connector position	Cable length	Remark
CMV36-SSI (M) Magnet detection, solid shaft, SSI						
CMV36S-00005	4096	1	6GL/10,8 ZB33	Cable gland	1,000 m	
CMV36M-00011	4096	4096	6GL/10,8	Cable gland	1,000 m	
CMV36-A (M) Magnet detection, solid shaft, analogue U+I						
CMV36S-00008	4096	1	6GL/10,8 ZB33	Cable gland	1,000 m	
CMV36-DQ (M) Magnet detection, solid shaft, DRIVECLiQ						
CMV36M-00010	4096	4096	6GL/10,8	1x M12 8pin		
CMF36-SSI (M) Magnet detection, bearing free, SSI						
CMF36S-00002	4096	1	See chapter drawings	Cable gland	1,000 m	
CDV36-SSI (D) Double detection, solid shaft, double SSI						
CDV36S-00002	4096	1	6GL/10,8 ZB33	2x cable gland	1,000 m	
CDV36M-00002	4096	4096	6GL/10,8 ZB33	2x cable gland	1,000 m	
CDF36-SSI (D) Double detection, bearing free, double SSI						
CDF36S-00002	4096	1	See chapter drawings	2x cable gland	1,000 m	

Further product information

1. Enter order code into ...



2. Searchfield (top right) on www.tr-electronic.com



3. Choose desired information

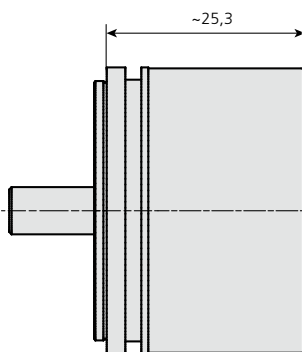


We will help you to select the most suitable products from the complete TR range. Please contact us (info@tr-electronic.de).

Dimensional Drawings

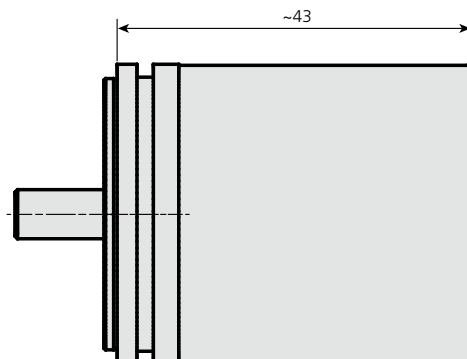
Singleturn

Length of housing



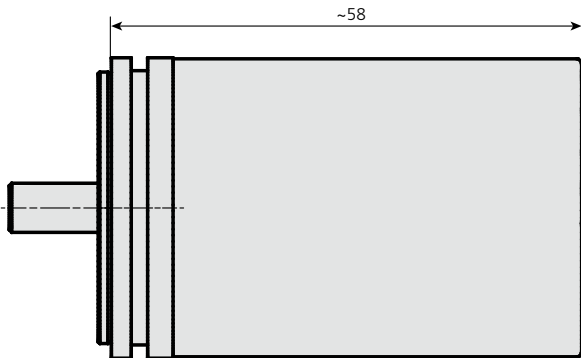
Multiturn

Length of housing



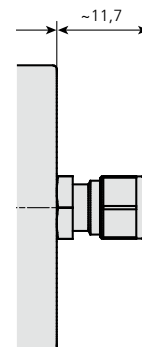
Multiturn DRIVE CLiQ

Length of housing



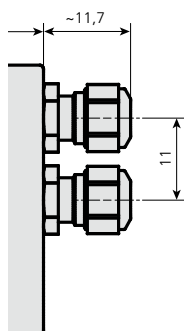
SSI, CANopen, analogue

1 cable gland



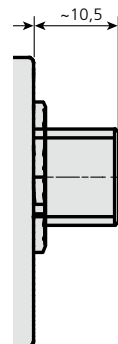
2xSSI, 2x analogue

2 cable glands



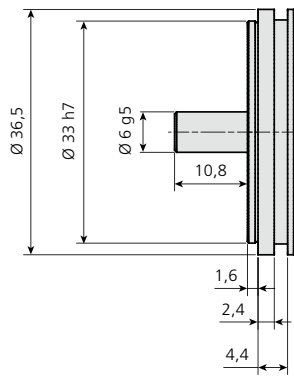
DRIVE CLiQ, all CE_36, CO_36

1 x M12

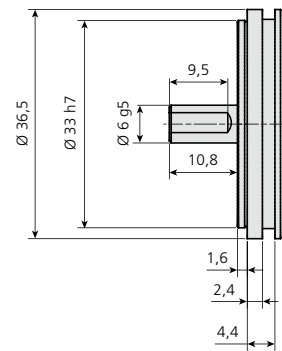


Flanges

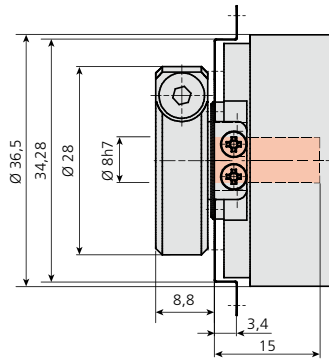
Solid shaft
6GL10,8 (round shaft)



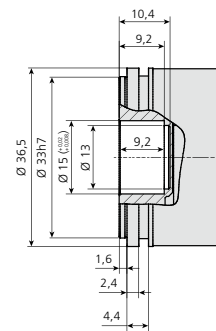
Solid shaft
6FL10,8 (shaft with flat)



Blind shaft
8h7

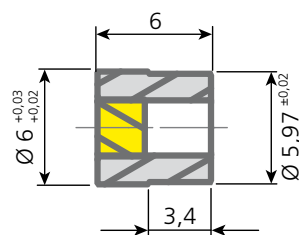
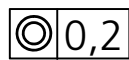
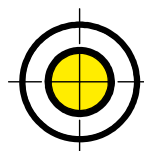
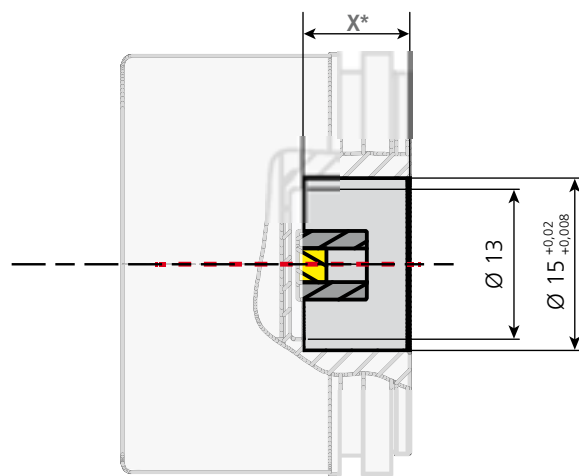


Bearing free

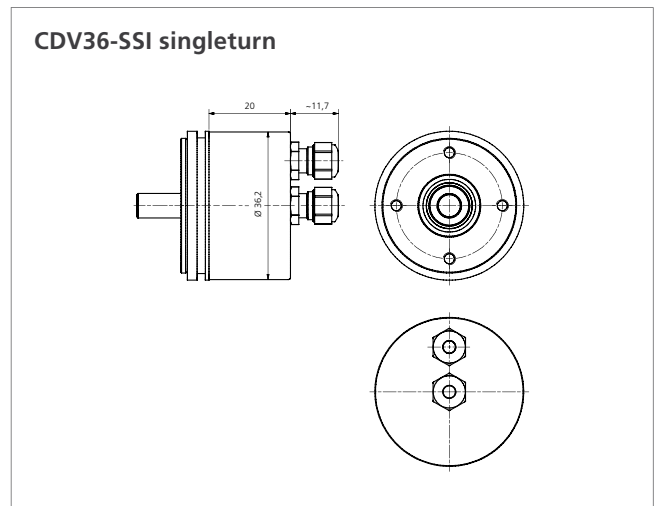
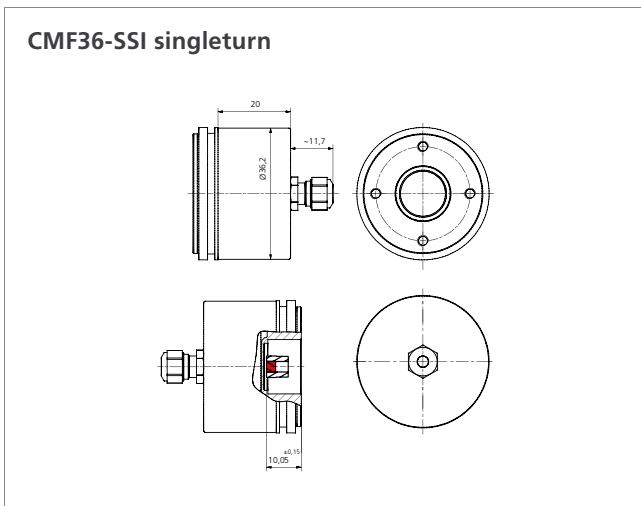
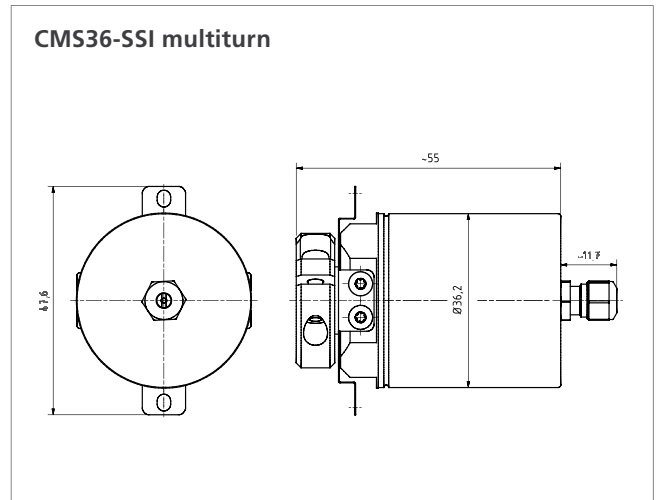
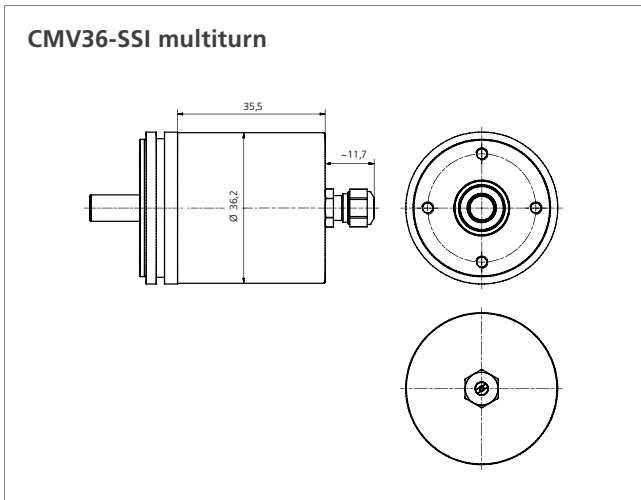
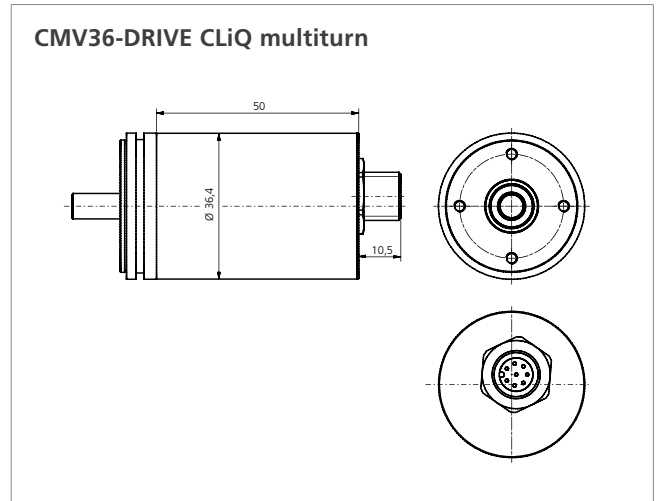
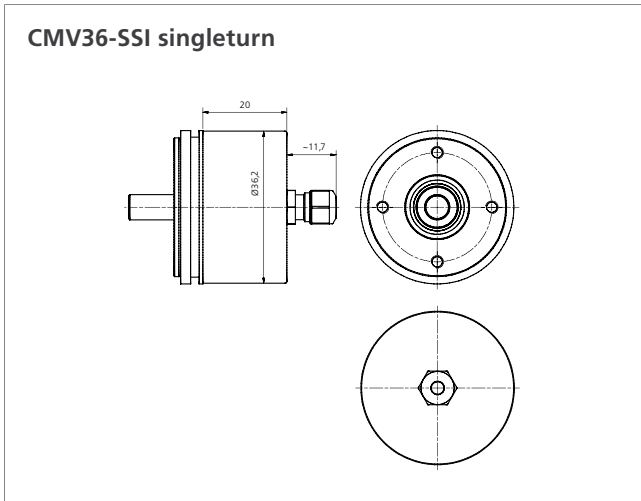


Assembly Examples

-- F36 singleturn

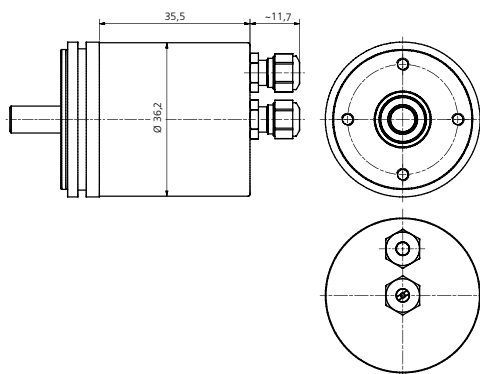


Samples

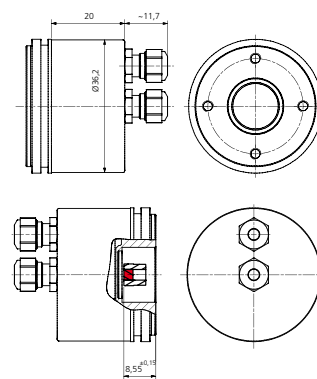


Samples

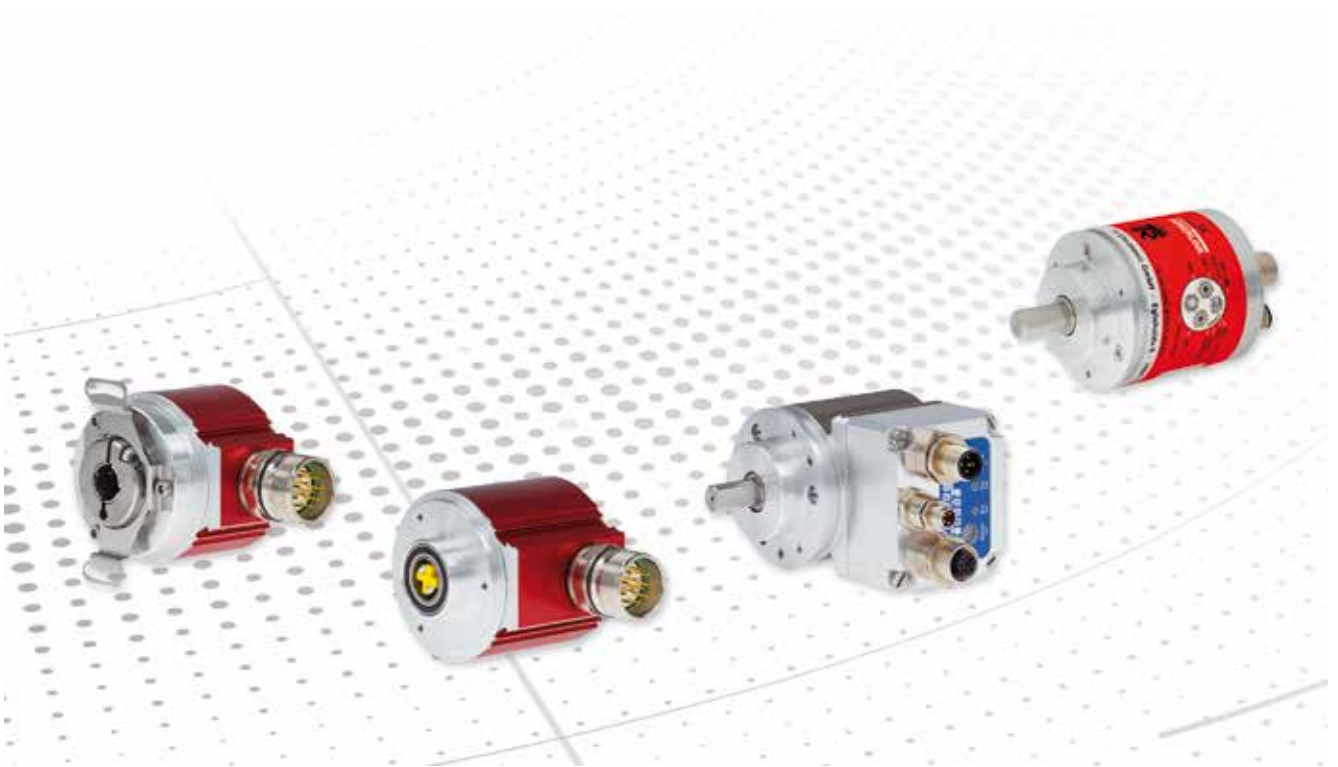
CDV36-SSI multiturn



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 on request

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Shaft Types.....	81		
Dimensional Drawings.....	83		



















Magnet detection (M)

Products	CMV58	CMH58	CMS58
			
Detection	Magnet detection (M)	Magnet detection (M)	Magnet detection (M)
Single / Multi	(M) Multi (S) single	(M) Multi (S) single	(M) Multi (S) single
Supply	11...27 VDC (12...30 VDC)*	11...27 VDC (12...30 VDC)*	11...27 VDC (12...30 VDC)*
Full resolution	≤ 24 bit *	≤ 24 bit *	≤ 24 bit *
Steps per turn	≤ 4096 *	≤ 4096 *	≤ 4096 *
Number of turns	≤ 4096 *	≤ 4096 *	≤ 4096 *
Precision	$\pm 1,0^\circ / \pm 0,5^\circ$ *	$\pm 1,0^\circ / \pm 0,5^\circ$ *	$\pm 1,0^\circ / \pm 0,5^\circ$ *
Shaft diameters available	6...12mm	8, 10, 12mm	8, 10, 12mm
Connectors	Connector axial or radial *	Connector radial	Connector axial or radial *
Ambient temperature	-20...+70 °C	-20...+70 °C	-20...+70 °C
Protection class	IP65	IP54	IP65
ATEX-zone			
Interface	SSI  Analog 	SSI	SSI  Analog 
Option, additional interfaces (on request)			
Weblink	www.tr-electronic.com/s/S006736	www.tr-electronic.com/s/S006741	www.tr-electronic.com/s/S006742
QR-Code			

* depending on the interface

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Magnet detection (M) Optical 15 bit (E)

Products	CMK58	CEV58	CEH58	
				
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 (12...30 VDC)*	11...27 VDC	11...27 VDC	
Full resolution	<= 24 bit *	<= 33 bit *	<= 33 bit *	
Steps per turn	<= 4096 *	<= 32768 *	<= 8192 *	
Number of turns	<= 4096 *	<= 256000 *	<= 32768 *	
Precision	± 1,0 ° / ± 0,5 °*	± 1 digit	± 1 digit	
Shaft diameters available		6...12mm	8, 10, 12mm	
Connectors	Connector 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; option: -40...+85 °C	
Protection class	IP65	IP65	IP54	
ATEX-zone				
Interface	SSI Analog	SSI  ASI  Parallel      CANopen  	SSI  Parallel    CANopen 	
Option, additional interfaces (on request)		INC	INC	
Weblink	www.tr-electronic.com/s/S006747	www.tr-electronic.com/s/S006773	www.tr-electronic.com/s/S006740	
QR-Code				

* depending on the interface

Optical 15 bit (E)

Optical 18 bit (O)

CES58	CEK58	COV58	COH58
			
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
8, 10, 12mm		6...12mm	8, 10, 12mm
Cable gland or connector, radial or axial, Fieldbus hood radial *	Cable gland or connector, radial or axial, Fieldbus hood radial *	Connector radial	Connector radial
-20...+70 °C; option: -40...+85 °C	-20...+70 °C; option: -40...+85 °C	-20...+70 °C	-20...+70 °C
IP65	IP65	IP65	IP54
          	         	       	      
INC	INC	INC	INC
www.tr-electronic.com/s/S006743	www.tr-electronic.com/s/S006746	www.tr-electronic.com/s/S006738	www.tr-electronic.com/s/S006739
			

* depending on the interface

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Optical 18 bit (O) Double detection (D)

Products	COS58	COK58	CDV58	
				
Detection	Optical 18 bit (O)	Optical 18 bit (O)	Double detection (D)	
Single / Multi	(M) Multi (S) single	(M) Multi (S) single	(M) Multi	
Supply	11...27 VDC	11...27 VDC	11...27 VDC double	
Full resolution	<= 36 bit *	<= 36 bit *		
Steps per turn	<= 262144 *	<= 262144 *	<= 262144 *	
Number of turns	<= 262144 *	<= 262144 *	<= 256000 *	
Precision	± 1 digit	± 1 digit	± 1 digit	
Shaft diameters available	8, 10, 12mm		6...12mm	
Connectors	Connector radial	Connector radial	Connector radial	
Ambient temperature	-20...+70 °C	-20...+70 °C	-20...+70 °C	
Protection class	IP65	IP65	IP65	
ATEX-zone				
Interface	      	     	        	
Option, additional interfaces (on request)	INC	INC	INC	
Weblink	www.tr-electronic.com/s/S006744	www.tr-electronic.com/s/S006745	www.tr-electronic.com/s/S006894	
QR-Code				

* depending on the interface

Double detection (D) ATEX zone 2/22

CDS58	AMV58	AEV58	AES58
			
Double detection (D)	Magnet detection (M)	Optical 15 bit (E)	Optical 15 bit (E)
(M) Multi	(M) Multi (S) single	(M) Multi (S) single	(M) Multi (S) single
11...27 VDC double	11...27 VDC (12...30 VDC)*	11...27 VDC	11...27 VDC
	<= 24 bit *	<= 33 bit *	<= 33 bit *
<= 262144 *	<= 4096 *	<= 32768 *	<= 32768 *
<= 256000 *	<= 4096 *	<= 256000 *	<= 256000 *
± 1 digit	± 1,0 ° / ± 0,5 °*	± 1 digit	± 1 digit
8, 10, 12mm	6...12mm	6...12mm	8, 10, 12mm
Connector radial	Connector axial or radial *	Cable gland or connector, radial or axial, Fieldbus hood radial *	Connector axial or radial *
-20...+70 °C	-20...+70 °C	-20...+70 °C	-20...+70 °C
IP65	IP65	IP65	IP65
	2/22	2/22	2/22
SSI  Parallel    CANopen  	Analog	SSI Analog	SSI Analog
INC			
www.tr-electronic.com/s/S006895	www.tr-electronic.com/s/S008452	www.tr-electronic.com/s/S007163	www.tr-electronic.com/s/S007164
			

* 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
CMV58-SSI (M) Magnet detection, solid shaft, SSI						
CMV58M-00002	4096	4096	10FL/19,5 ZB36 3xM3+3xM4	Radial	M23, 12 pin	Preset V/R
CMV58-A (M) Magnet detection, solid shaft, analogue						
CMV58M-00044	4096	256	6GL/10 ZB50	Radial	M23, 12 pin	4...20 mA
CMV58M-00055	4096	256	10FL/19,5 ZB36 3xM3+3xM4	Radial	M23, 12 pin	0...10V
CMV58S-00011	4096	1	10FL/19,5 ZB36 3xM3+3xM4	Radial	M23, 12 pin	0...10 V
CMV58S-00013	4096	1	10FL/19,5 ZB36 3xM3+3xM4	Radial	M23, 12 pin	4...20 mA
CMV58-PB (M) Magnet detection, solid shaft, profibus						
CMV58M-00003	4096	4096	10FL/19,5 ZB36 3xM3+3xM4	Axial	2x 5 pin M12	
CMV58M-00005	4096	4096	10FL/19,5 ZB36 3xM3+3xM4	Axial	2x 5 pin M12	
CMV58S-00001	4096	1	10FL/19,5 ZB36	Axial	2x 5 pin M12 1x 4 pin M8	
CMV58-CO (M) Magnet detection, solid shaft, CANopen						
CMV58M-00017	2048	4096	10FL/19,5 ZB36	Axial	2x 5pin M12	Us via bus
CMV58S-00005	1024	1	6GL/10 ZB50	Axial	2x 5 pin M12	
CMH58-SSI (M) Magnet detection, hollow shaft, SSI						
CMH58M-00005	4096	4096	12H7 hollow through shaft	Radial	M23, 12 pin	Preset V/R
CMH58S-00002	4096	1	12H7 hollow through shaft	Radial	M23, 12 pin	Preset V/R
CMS58-SSI (M) Magnet detection, blind shaft, SSI						
CMS58M-00004	4096	4096	12H7 blind shaft	Radial	M23, 12 pin	Preset V/R
CMS58S-00005	3600	1	12H7 blind shaft	Radial	M23, 12 pin	Preset V/R
CMS58-A (M) Magnet detection, blind shaft, analogue						
CMS58M-00024	4096	16	12H7 blind shaft	Radial	M23, 12 pin	4...20 mA
CMS58S-00009	4096	1	12H7 blind shaft	Radial	M23, 12 pin	0...10V
CMS58-PB (M) Magnet detection, blind shaft, profibus						
CMS58M-00005	4096	4096	12H7 blind shaft	Axial	2x 5 pin M12 1x 4 pin M8	
CMS58S-00004	4096	1	12H7 blind shaft	Axial	2x 5 pin M12 1x 4 pin M8	

For further product information simply enter the order number in the search field at www.tr-electronic.de.

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

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

CM558-CO (M) Magnet detection, blind shaft, CANopen

CM558M-00015	2048	4096	12H7 blind shaft	Axial	2x 5 pin M12	
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CEV58-SSI (E) Optical 15 bit, solid shaft, SSI

CEV58M-00051	8192	4096	10FL/19,5 ZB36, 15 mm thick	Radial	M23, 12 pin	
CEV58M-00180	4096	4096	12NUT/25 ZB50	Cable Gland radial	SUBD 25P	
CEV58S-00002	8192	1	10FL/19,5 ZB36	Radial	M23, 12 pin	

CEV58-PB (E) Optical 15 bit, solid shaft, profibus

CEV58M-00167	8192	4096	10FL/19,5 ZB36	Radial	2XM16X1,5/1XM12X1,5	Fieldbus hood
CEV58M-00299	8192	4096	10FL/19,5 ZB36	Radial	2x 5 pin M12 1x 4 pin M8	
CEV58S-00022	8192	1	10FL/19,5 ZB36	Radial	2XM16X1,5/1XM12X1,5	Fieldbus hood

CEV58-CO (E) Optical 15 bit, solid shaft, CANopen

CEV58M-00433	8192	4096	10FL/19,5 ZB36	Radial	2x 5 pin M12 1x 4 pin M8	
CEV58S-00053	8192	1	10FL/19,5 ZB36	Radial	2XM16X1,5	Fieldbus hood
CEV58S-00123	8192	1	10FL/19,5 ZB36 3xM3+3xM4	Radial	2x 5 pin M12	

CEV58-DN (E) Optical 15 bit, solid shaft, DeviceNet

CEV58M-00206	8192	4096	10FL/19,5 ZB36	Radial	2XM16X1,5	Fieldbus hood
CEV58S-00121	4096	1	6GL/10 ZB36 3xM3+3xM4	Radial	2XM16X1,5	Fieldbus hood

CEV58-PN (E) Optical 15 bit, solid shaft, Profinet

CEV58M-00379	8192	4096	10FL/19,5 ZB36 3xM3+3xM4	Radial	3x 4 pin M12	
CEV58M-00441	8192	4096	10FL/19,5 ZB36	Axial	3x 4 pin M12	
CEV58M-00442	8192	4096	10FL/19,5 ZB36/D65	Axial	3x 4 pin M12	
CEV58M-00478	8192	4096	12FL/25 ZB50/D65	Axial	3x 4 pin M12	Flange 65mm
CEV58M-00557	8192	4096	10FL/19,5 ZB36	Axial	1X4P.M12-connector	With reset button
CEV58S-00118	8192	1	10FL/19,5 ZB36	Radial	3x 4 pin M12	

For further product information simply enter the order number in the search field at www.tr-electronic.de.

Suggested Products

Order code	Steps per turn	Turns	Shaft / Flange	Connector position	Connector type	Remark
CEV58-ETC (E) Optical 15 bit, solid shaft, EtherCAT						
CEV58M-00245	8192	4096	10FL/19,5 ZB36 3xM3+3xM4	Radial	3x 4 pin M12	
CEV58M-00466	8192	4096	10FL/19,5 ZB36	Axial	3x 4 pin M12	
CEV58S-00109	8192	1	10FL/19,5 ZB36 3xM3+3xM4	Radial	2x 4 pin M12 1x 4 pin M8	
CEV58-EIP (E) Optical 15 bit, solid shaft, Ethernet/IP						
CEV58M-00456	8192	4096	10FL/19,5 ZB36	Axial	3x 4 pin M12	
CEV58-DQ (E) Optical 15 bit, solid shaft, DRIVECLiQ						
CEV58M-00534	4096	4096	12NUT/25 ZB50	Axial	1X8PM12-connector	Shaft with groove
CEH58-SSI (E) Optical 15 bit, hollow shaft, SSI						
CEH58M-00107	8192	4096	12H7 hollow through shaft	Radial	M23, 12 pin	
CEH58S-00034	8192	1	12H7 hollow through shaft	Radial	M23, 12 pin	
CEH58-PB (E) Optical 15 bit, hollow shaft, Profibus						
CEH58S-00052	8192	1	12H7 hollow through shaft	Radial	2x 4 pin M12 1x 4 pin M8	
CEH58-DN (E) Optical 15 bit, hollow shaft, DeviceNet						
CEH58S-00016	8192	1	12H7 hollow through shaft	Radial	2XM16X1,5	Fieldbus hood
CEH58-PN (E) Optical 15 bit, hollow shaft, Profinet						
CEH58M-00173	8192	4096	12H7 hollow through shaft	Radial	3x 4 pin M12	
CEH58S-00043	8192	1	12H7 hollow through shaft	Radial	3x 4 pin M12	
CES58-SSI (E) Optical 15 bit, blind shaft, SSI						
CES58M-00015	8192	4096	12H7 blind shaft	Radial	M23, 12 pin	
CES58S-00032	8192	1	10H7 blind shaft	Radial	M23, 12 pin	

For further product information simply enter the order number in the search field at www.tr-electronic.de.

Order code	Steps per turn	Turns	Shaft / Flange	Connector position	Connector type	Remark
CE558-PB (E) Optical 15 bit, blind shaft, Profibus						
CE558S-00013	8192	1	12H7 blind shaft	Radial	2XM16X1,5/1XM12X1,5	Fieldbus hood
CE558-CO (E) Optical 15 bit, blind shaft, CANopen						
CE558M-00001	4096	4096	12H7 blind shaft	Radial	1X8P.M12-connector	
CE558-DN (E) Optical 15 bit, blind shaft, DeviceNet						
CE558M-00039	8192	4096	12H7 blind shaft	Radial	2XM16X1,5	Fieldbus hood
CE558-PN (E) Optical 15 bit, blind shaft, Profinet						
CE558M-00157	8192	4096	12H7 blind shaft	Axial	1X4P.M12-connector	
CE558-ETC (E) Optical 15 bit, blind shaft, EtherCAT						
CE558S-00025	8192	1	10H7 blind shaft	Radial	2x 4 pin M12 1x 4 pin M8	
CE558S-00031	8192	1	12H7 blind shaft	Radial	2x 4 pin M12 1x 4 pin M8	
COV58-SSI (O) Optical 18 bit, solid shaft, SSI						
COV58M-00011	262144	256000	10FL/19,5 ZB36	Radial	M23, 12 pin	
COV58S-00014	524288	1	10FL/19,5 ZB36	Radial	M23, 12 pin	
COV58-PB (O) Optical 18 bit, solid shaft, Profibus						
COV58M-00014	65536	4096	10FL/19,5 ZB36	Radial	2XM16X1,5/1XM12X1,5	Fieldbus hood
COV58S-00027	262144	1	10FL/19,5 ZB36	Radial	2XM16X1,5/1XM12X1,5	Fieldbus hood
COV58-CO (O) Optical 18 bit, solid shaft, CANopen						
COV58M-00024	262144	4096	10FL/19,5 ZB36	Radial	2x 5 pin M12 1x 4 pin M8	
COV58S-00031	262144	1	10FL/19,5 ZB36	Radial	2x 5 pin M12 1x 4 pin M8	
COV58-PN (O) Optical 18 bit, solid shaft, Profinet						
COV58M-00017	131072	4096	10FL/19,5 ZB36	Radial	3x 4 pin M12	

For further product information simply enter the order number in the search field at www.tr-electronic.de.

Suggested Products

Order code	Steps per turn	Turns	Shaft / Flange	Connector position	Connector type	Remark
COV58-ETC (O) Optical 18 bit, solid shaft, EtherCAT						
COV58M-00018	262144	4096	10FL/19,5 ZB36	Radial	3x 4 pin M12	
COV58S-00024	262144	1	10FL/19,5 ZB36	Radial	3x 4 pin M12	
COH58-SSI (O) Optical 18 bit, hollow shaft, SSI						
COH58M-00008	131072	4096	12H7 hollow through shaft	Radial	M23, 17 pin	+ SIN/COS
COH58S-00005	131072	1	12H7 hollow through shaft	Radial	M23, 12 pin	
COH58-PB (O) Optical 18 bit, hollow shaft, Profibus						
COH58M-00012	131072	4096	12H7 hollow through shaft	Radial	2XM16X1,5/1XM12X1,5	Fieldbus hood
COH58S-00010	262144	1	10H7 hollow through shaft	Radial	2XM16X1,5/1XM12X1,5	Fieldbus hood
COS58-PB (O) Optical 18 bit, blind shaft, Profibus						
COS58M-00004	131072	4096	10H7 blind shaft	Radial	2XM16X1,5/1XM12X1,5	Fieldbus hood
COS58S-00004	65536	1	12H7 blind shaft	Radial	2XM16X1,5/1XM12X1,5	Fieldbus hood
ATEX AEV58-SSI (E) Optical 15 bit, solid shaft, SSI						
AEV58M-00001	8192	4096	10FL/19,5 ZB36	Radial	M23, 12 pin	ATEX zone 2 / 22
ATEX AES58-SSI (E) Optical 15 bit, blind shaft, SSI						
AES58M-00001	8192	4096	10H7 blind shaft	Radial	M23, 12 pin	ATEX zone 2 / 22

Further product information

1. Enter order code into ...



2. Searchfield (top right) on www.tr-electronic.com



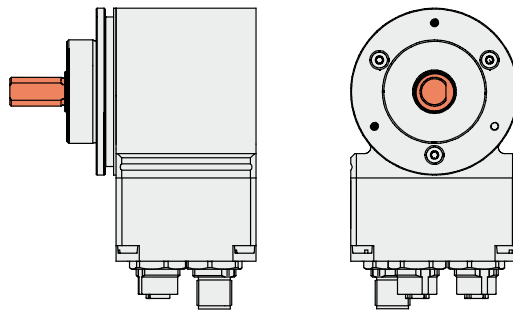
3. Choose desired information



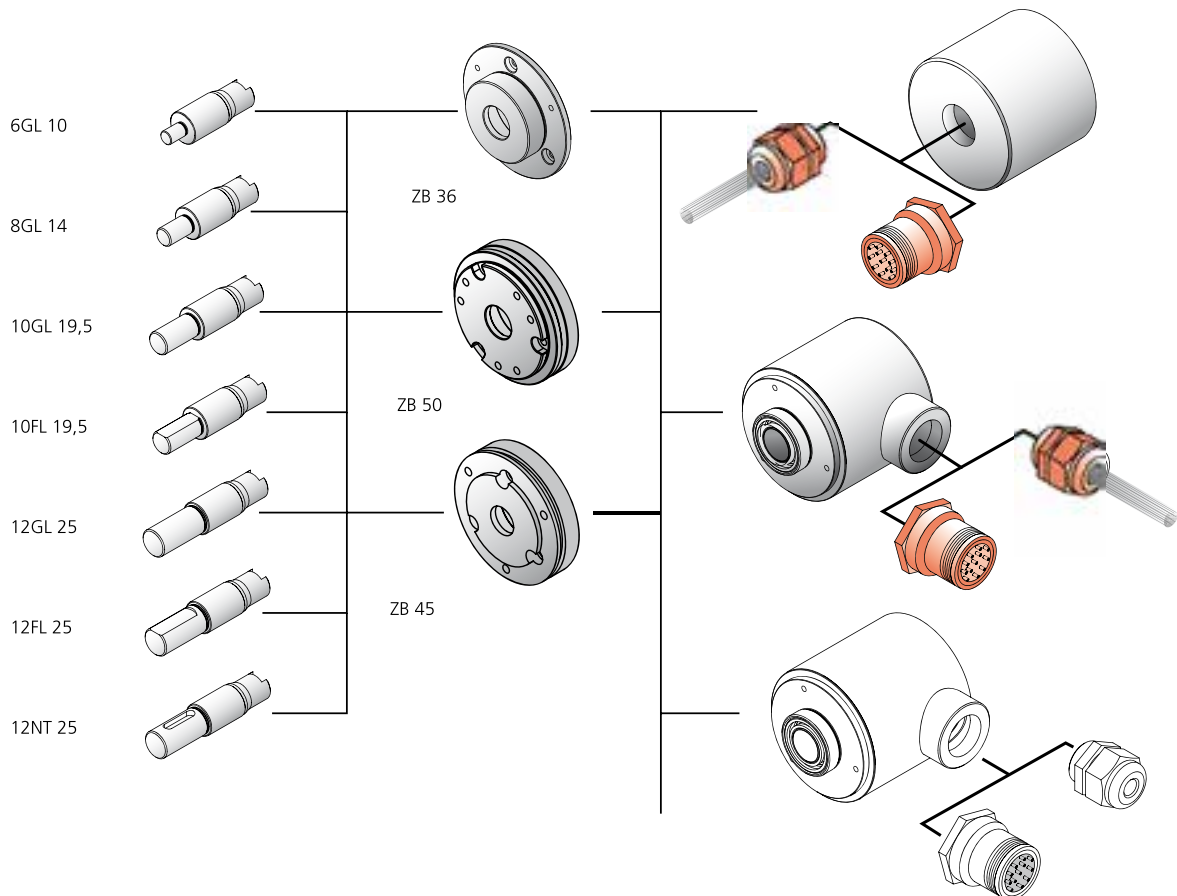
We will help you to select the most suitable products from the complete TR range. Please contact us (info@tr-electronic.de).

Shaft Types

Solid shaft



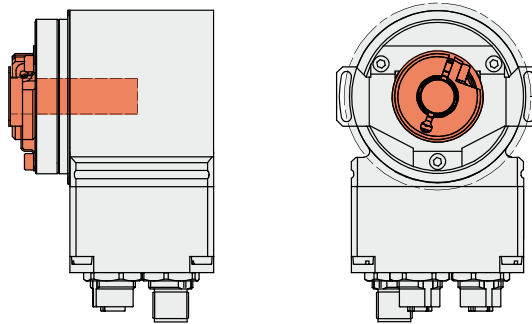
Standard shafts and flanges



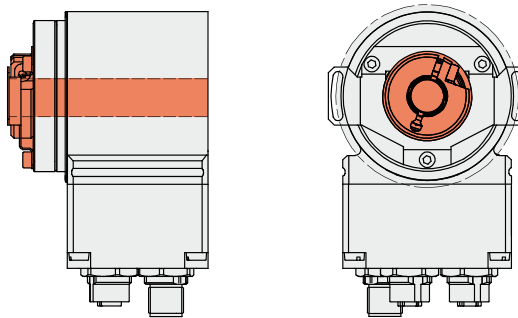
Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at www.tr-electronic.com or on request.

Shaft Types

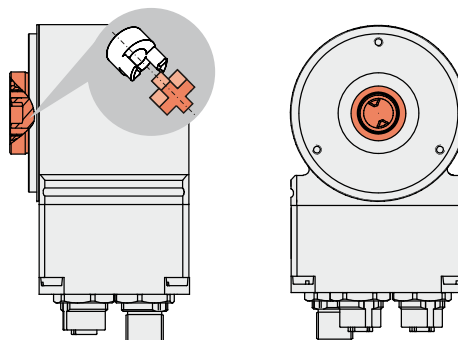
Blind shaft



Hollow shaft



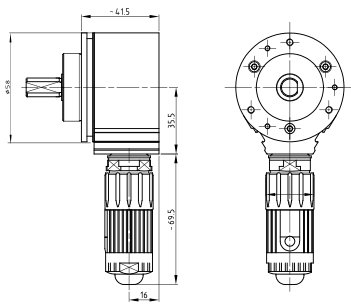
Integrated coupling



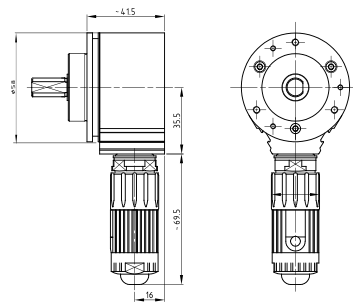
Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at www.tr-electronic.com or on request.

Dimensional Drawings

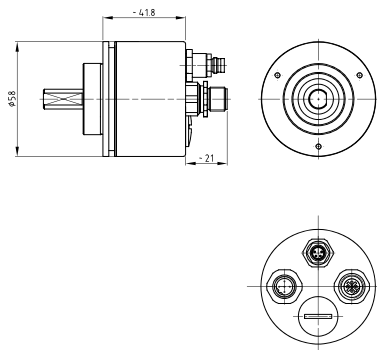
CMV58-SSI



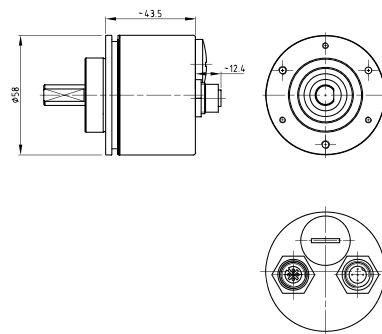
CMV58-analog



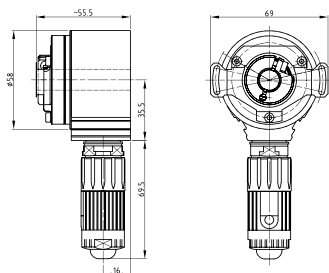
CMV58-Profibus



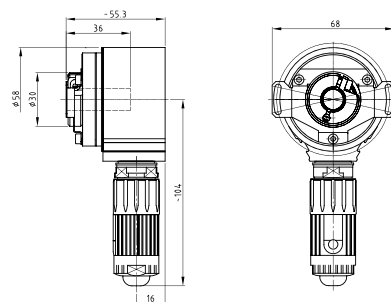
CMV58-CANopen



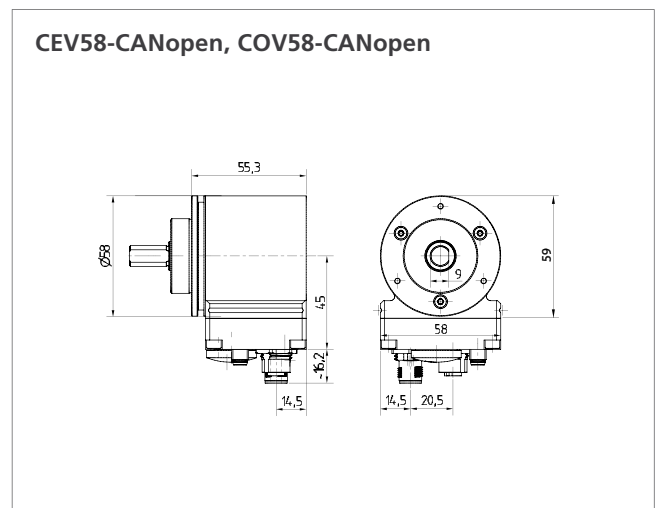
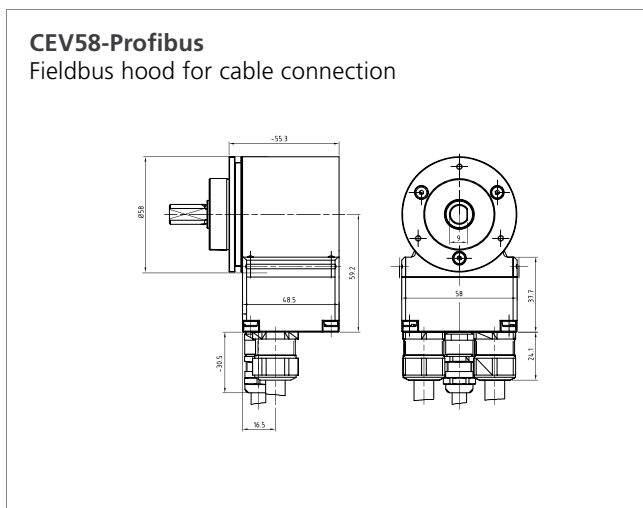
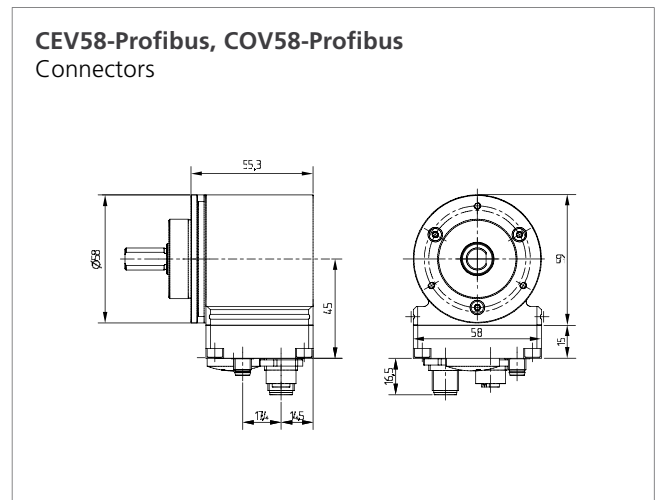
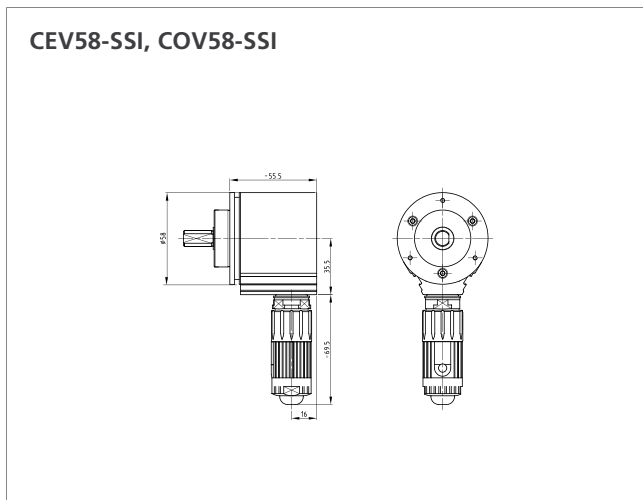
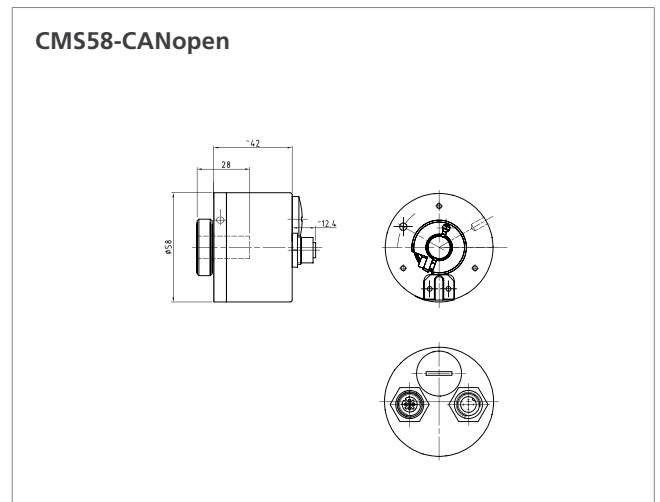
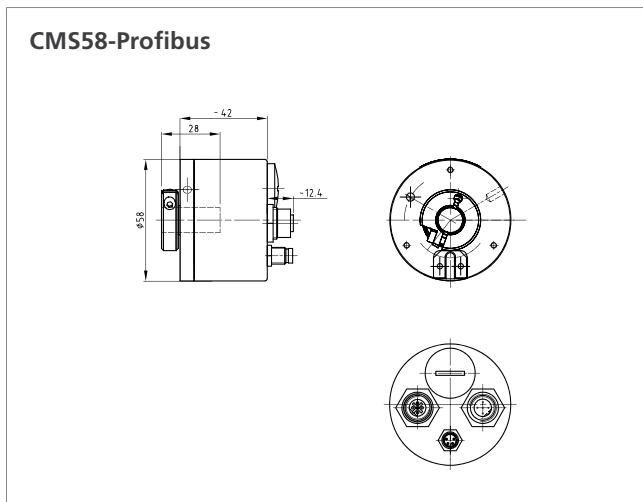
CMH58-SSI



CMS58-SSI, analogue

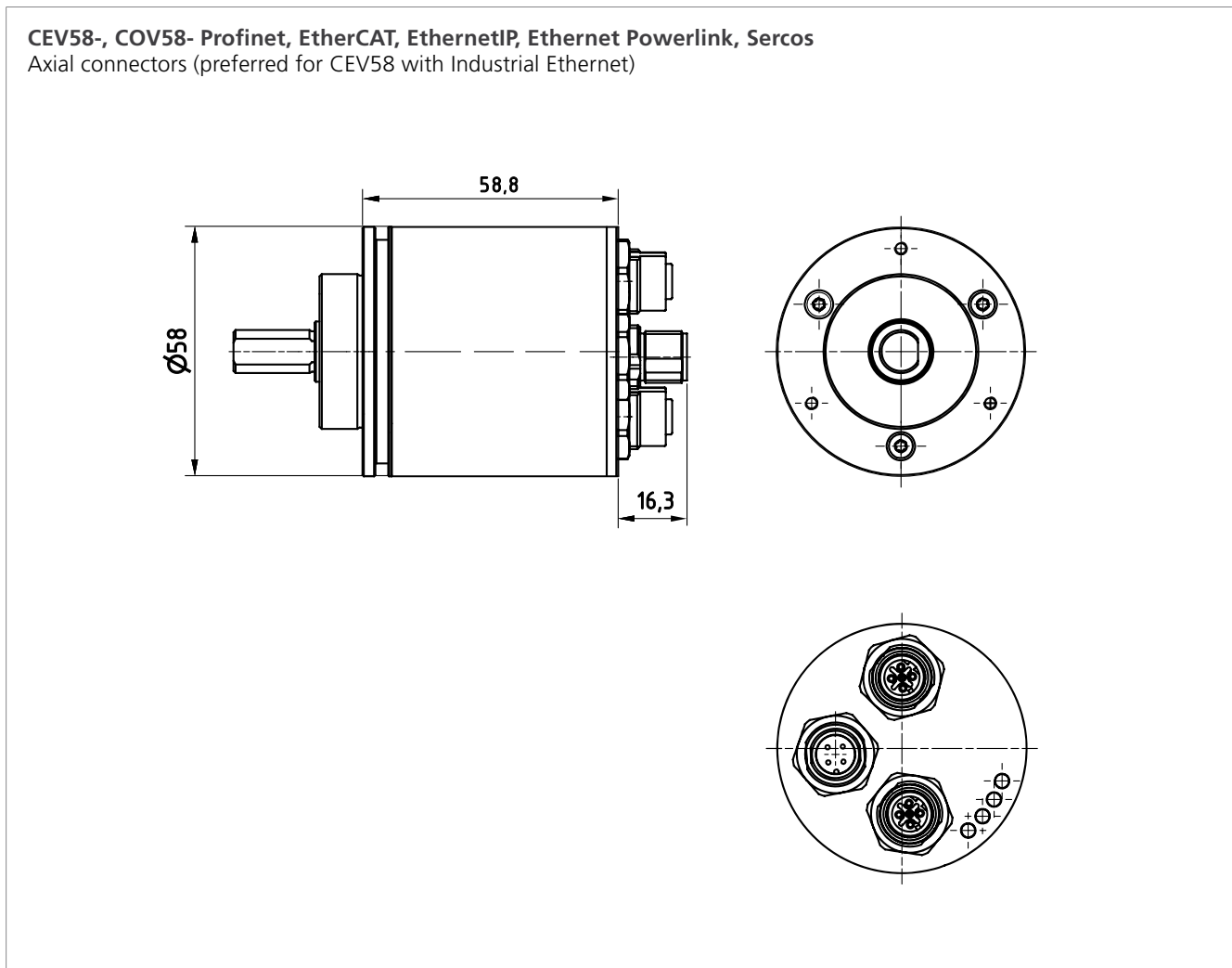
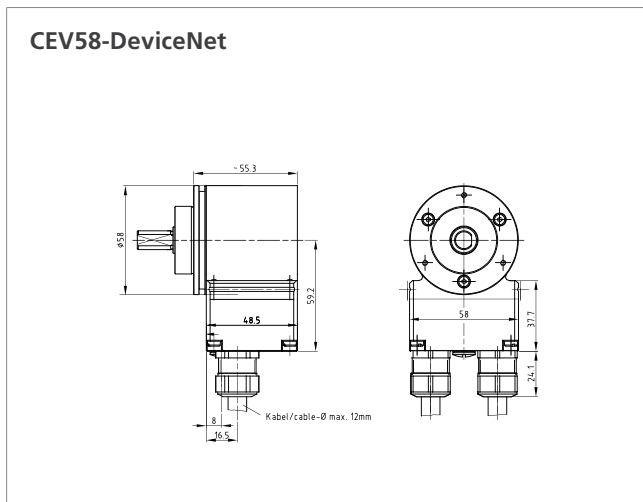


Dimensional Drawings



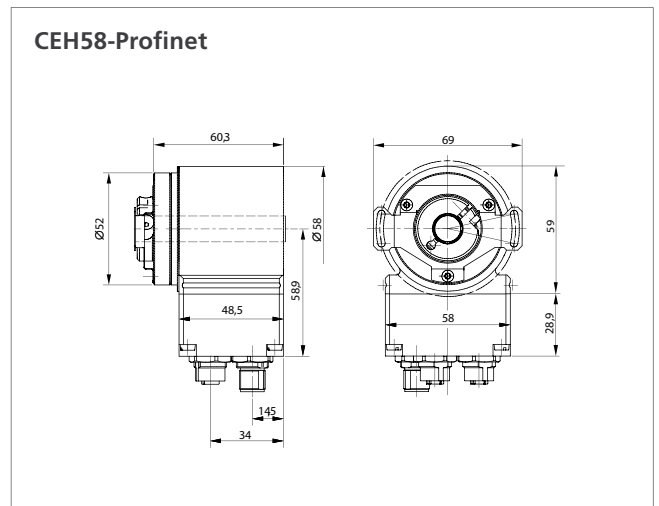
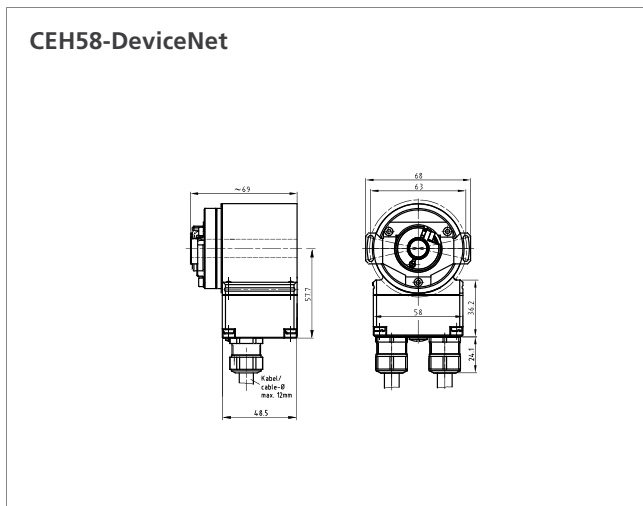
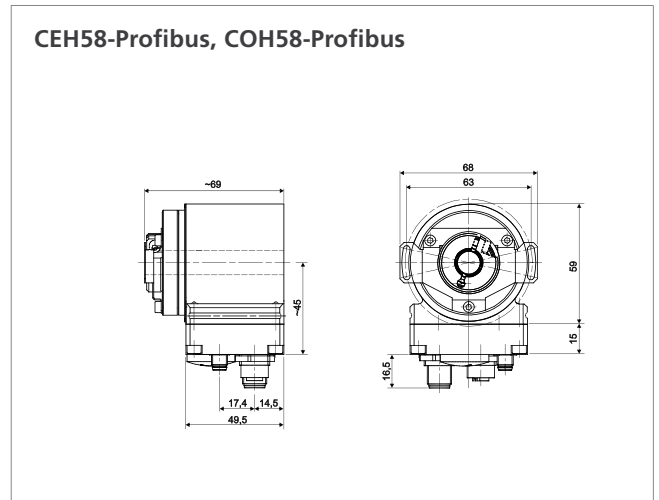
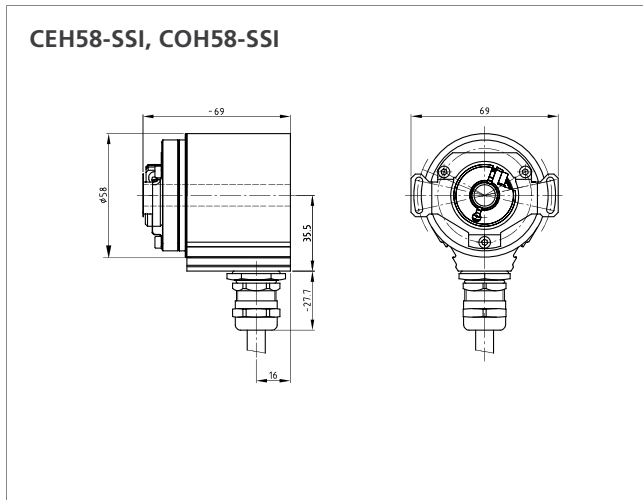
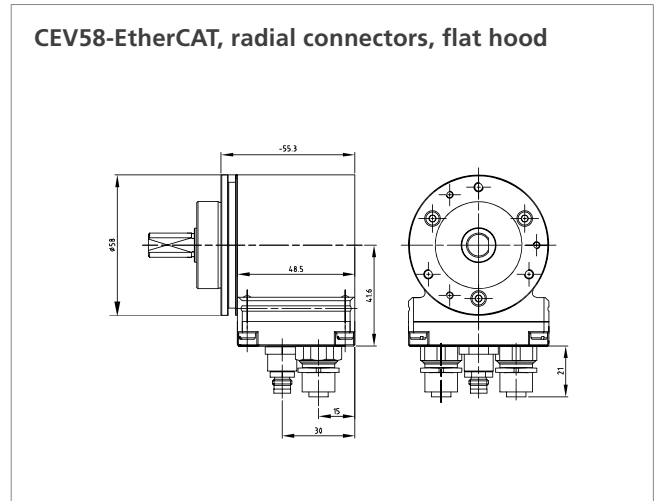
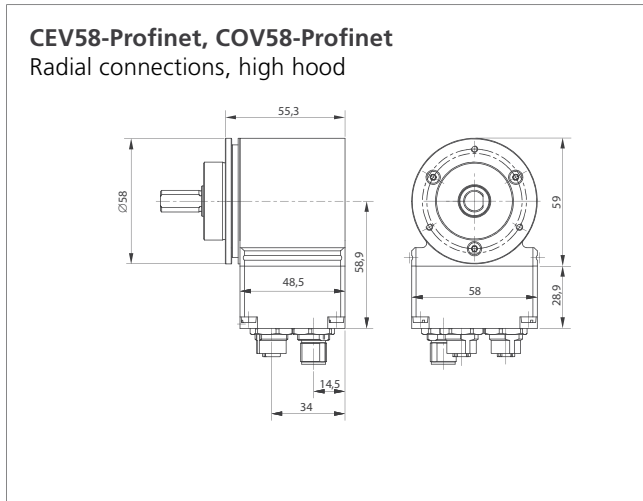
Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at www.tr-electronic.com or on request.

Dimensional Drawings



Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at www.tr-electronic.com or on request.

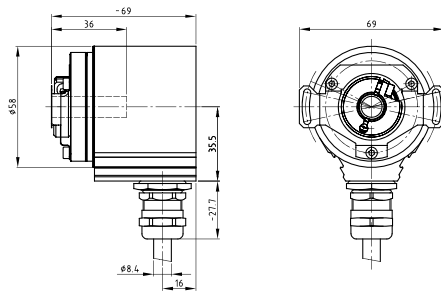
Dimensional Drawings



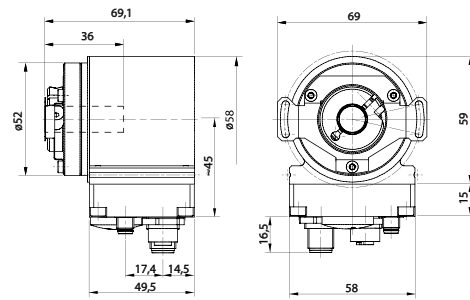
Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at www.tr-electronic.com or on request.

Dimensional Drawings

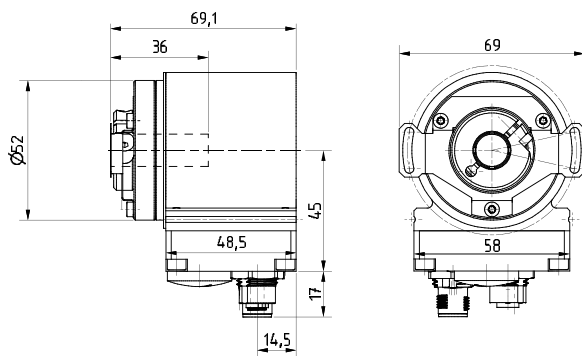
CES58-SSI



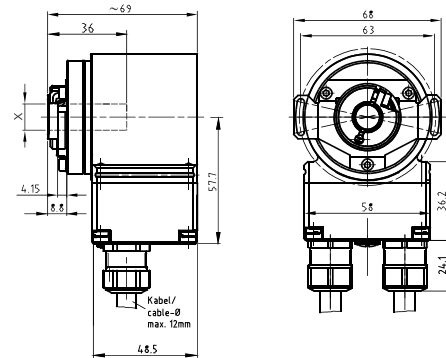
CES58-Profibus, COS58-Profibus



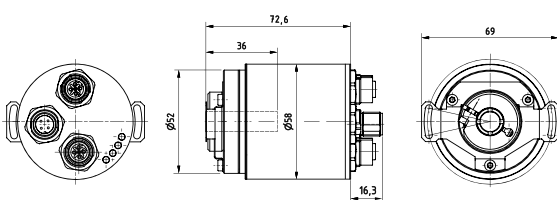
CES58-CANopen



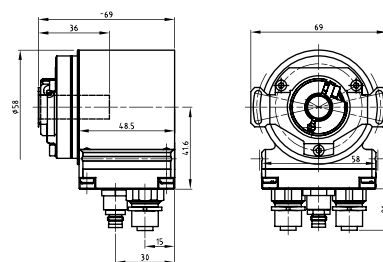
CES58-DeviceNet



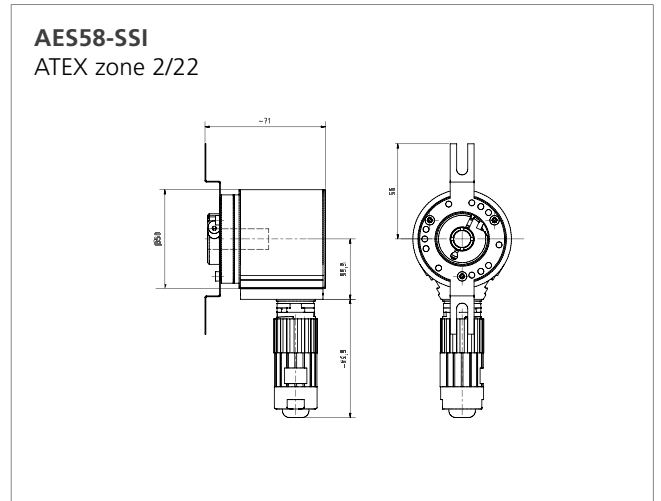
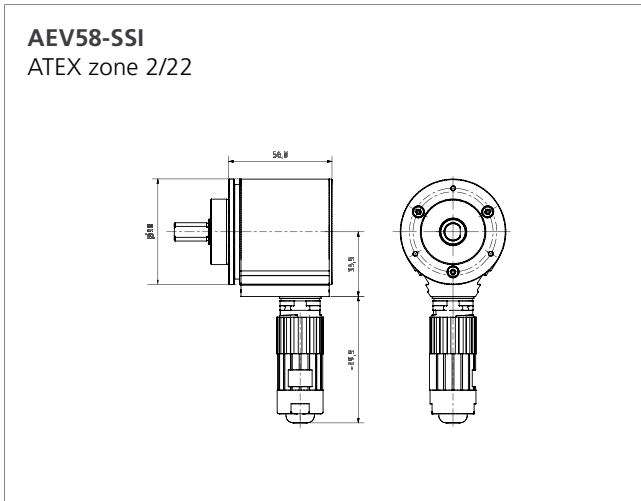
CES58-Profinet



CES58-EtherCAT

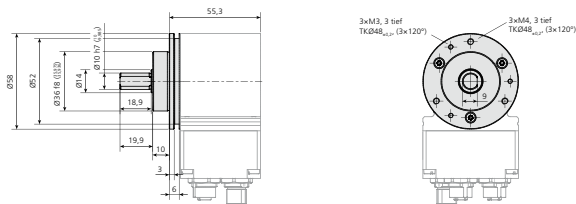


Dimensional Drawings

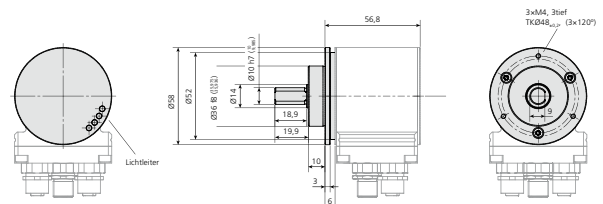


Flanges

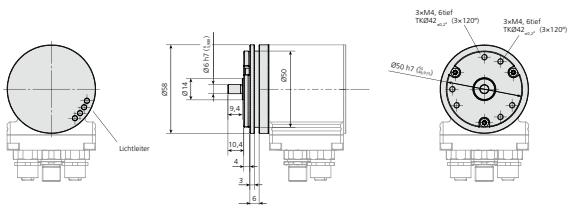
Standard flange ZB 36 M3/M4
Other drill patterns available



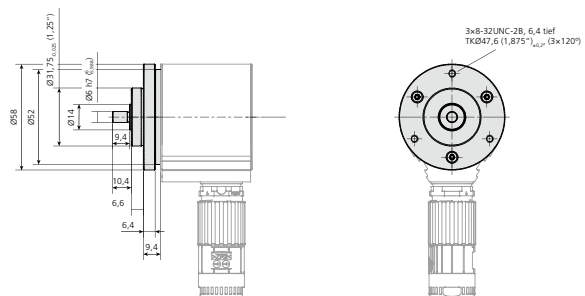
Standard flange ZB 36 M4



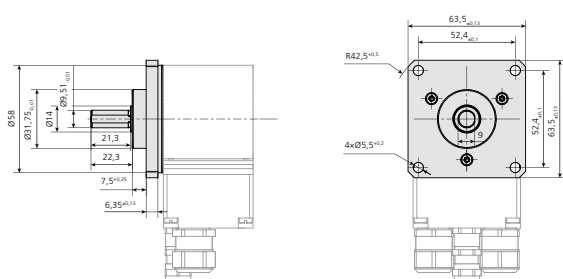
Standard flange ZB 50
Other drill patterns available



Flange ZB 31,75 (1,25")



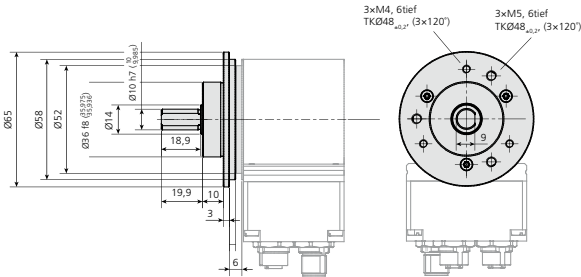
Square flange ZB 31,75 (1,25")



Flanges

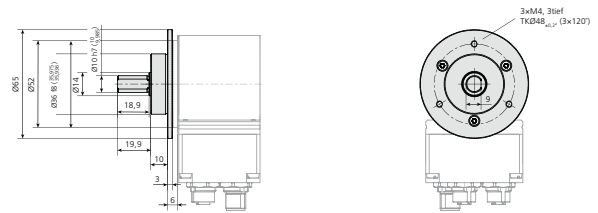
Flange option D65 ZB36 M3/M4

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



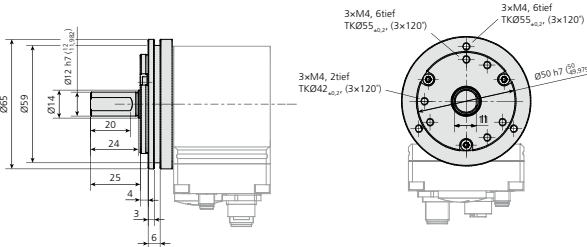
Flange option D65 ZB36 M4

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



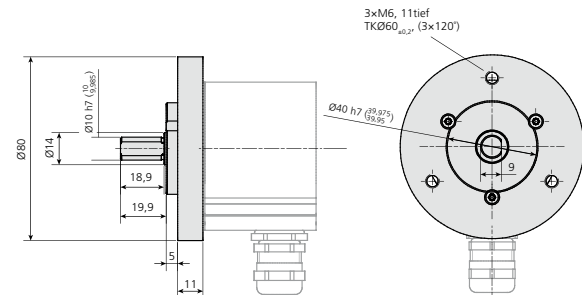
Flange option D65 ZB50

Fits encoder mounting places 65mm, ZB 50mm



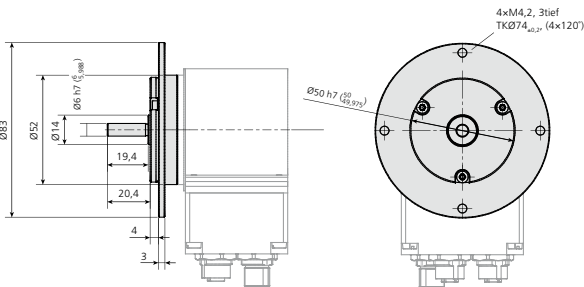
Flange option D80 ZB40

Fits encoder mounting places 80 mm, ZB 40mm



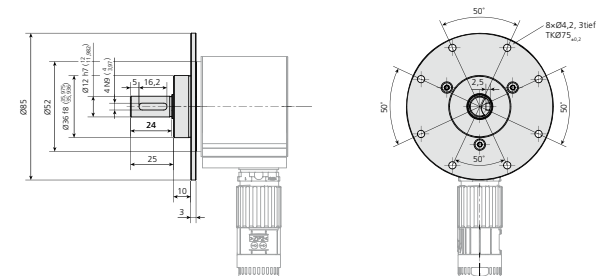
Flange option D83 ZB36

Fits encoder mounting places 83mm, ZB 50mm



Flange option D85 ZB36

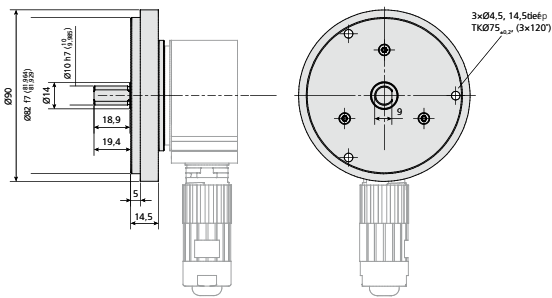
Fits encoder mounting places 85mm, ZB 36mm



Flanges

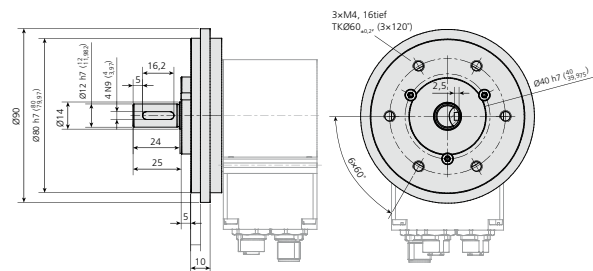
Flange option D90 ZB82

Fits encoder mounting places 90mm, ZB 82mm



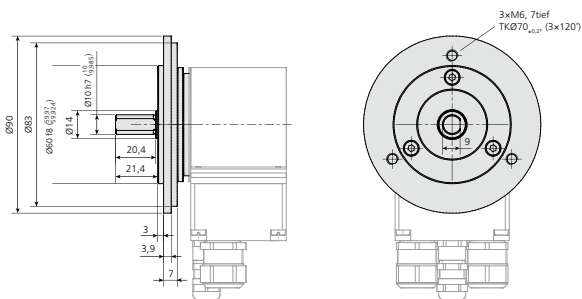
Flange option D90 ZB80,40

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



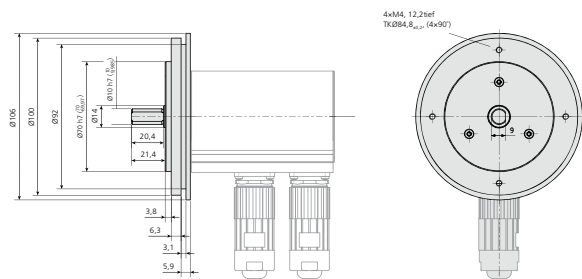
Flange option D90 ZB 60

Fits encoder mounting places 90mm, ZB 60mm



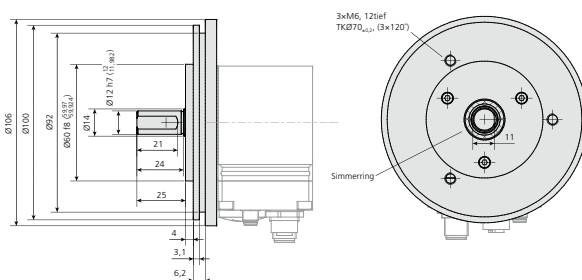
Flange option D106 ZB70

Fits encoder mounting places 106mm, ZB 70mm



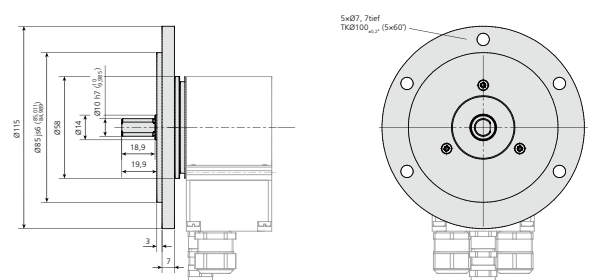
Flange option D106 ZB60

Fits encoder mounting places 106mm, ZB 60mm



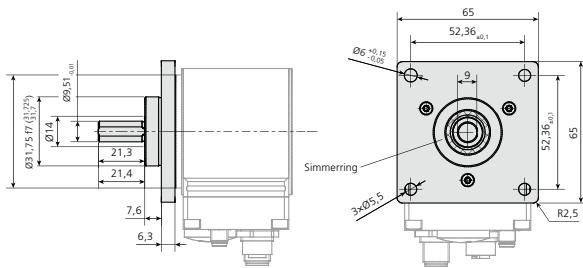
Flange option D115 ZB85

Fits encoder mounting places 115mm, ZB 85mm

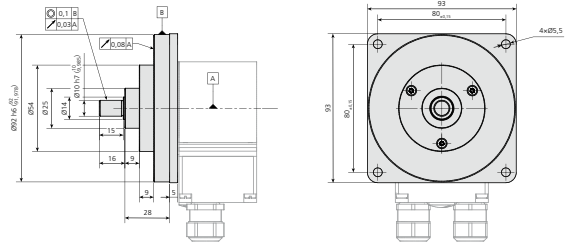


Flanges

Flange option Q65
Square flange 65mm



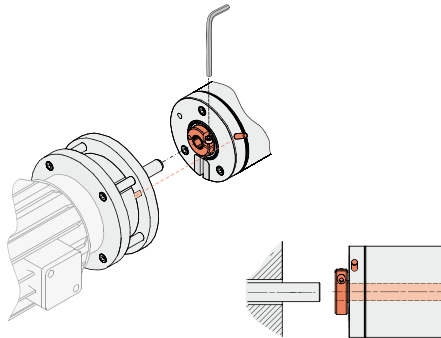
Flange option Q93
Square flange 93mm



Assembly Examples

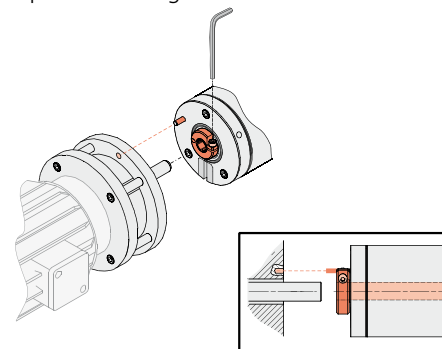
Blind- and hollow-shaft - encoder fixation

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



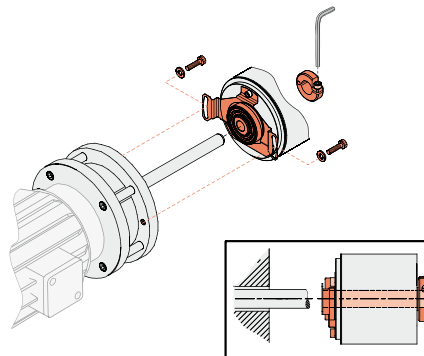
Blind- and hollow-shaft - encoder fixation

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



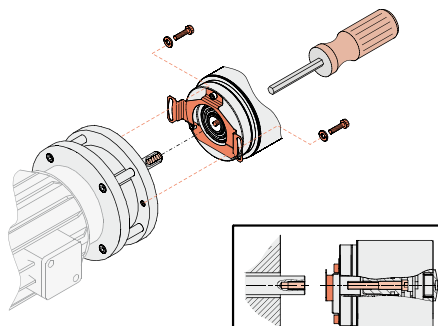
Blind- and hollow-shaft - encoder fixation

Sheet-metal torque support, here with clamping ring.



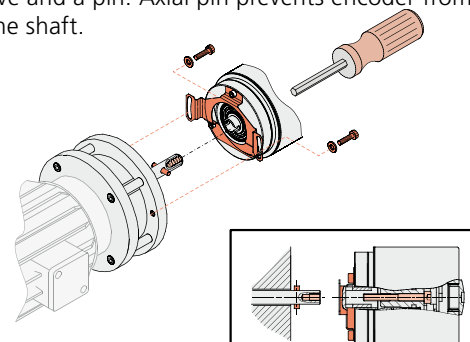
Blind- and hollow-shaft - encoder fixation

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



Blind- and hollow-shaft - shaft fixation

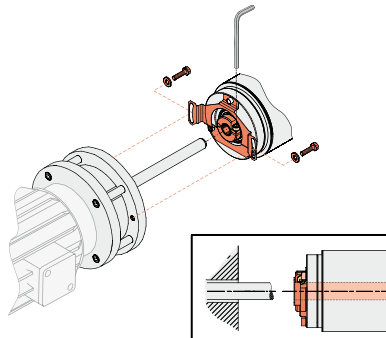
Transmission of torque is done by form closure by a V-groove and a pin. Axial pin prevents encoder from falling off the shaft.



Assembly Examples

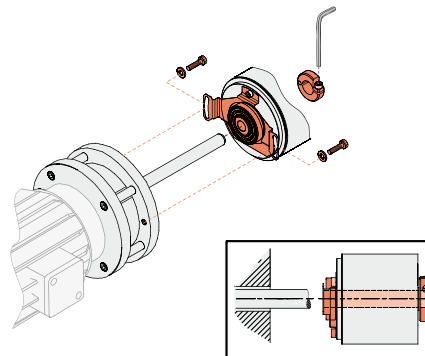
Blind- and hollowShaft - shaft fixation

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



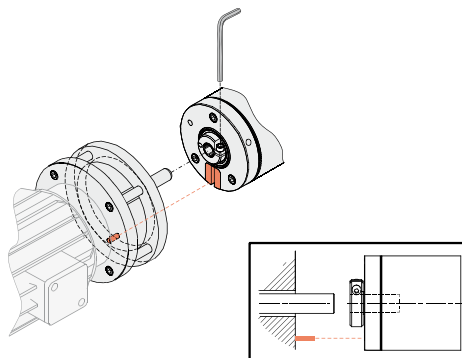
Blind- and hollow-shaft - shaft fixation

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



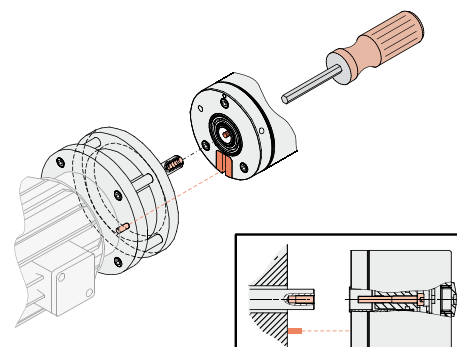
Blind shaft

Pin/groove axial, clamping ring



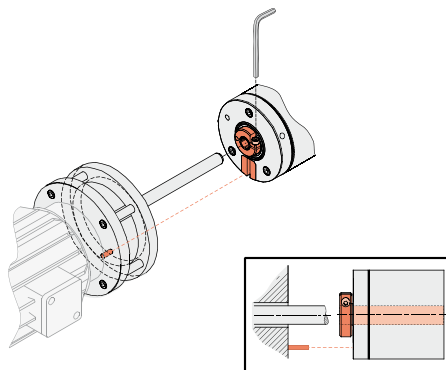
Blind shaft

Axial screw

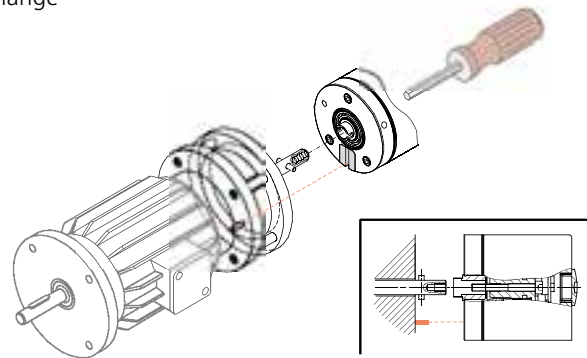


Assembly Examples

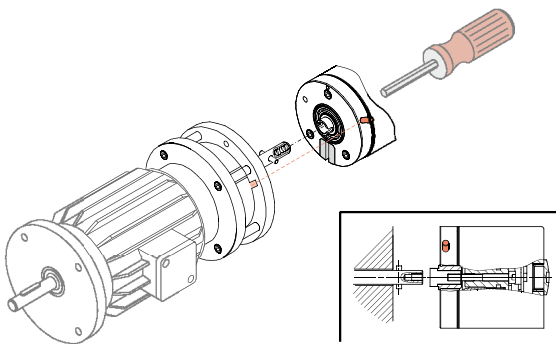
Hollow shaft - clamping ring flange side
Pin/groove, clamping ring flange side



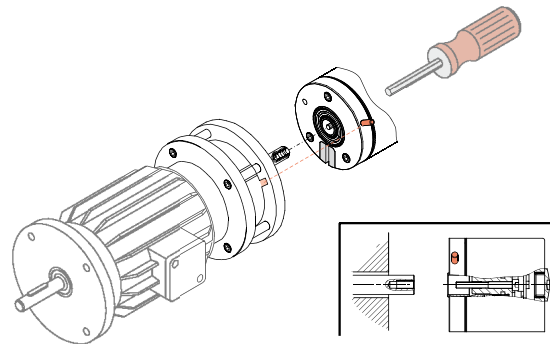
Blind shaft
V-groove, axial screw and pin in customer-provides flange



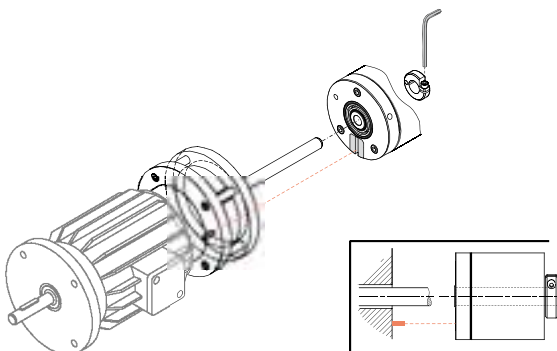
Blind shaft
V-groove, axial screw and pin in encoder flange



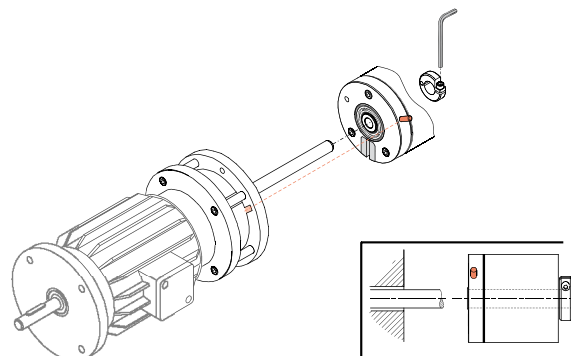
Blind shaft
Axial screw and radial pin in encoder flange



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

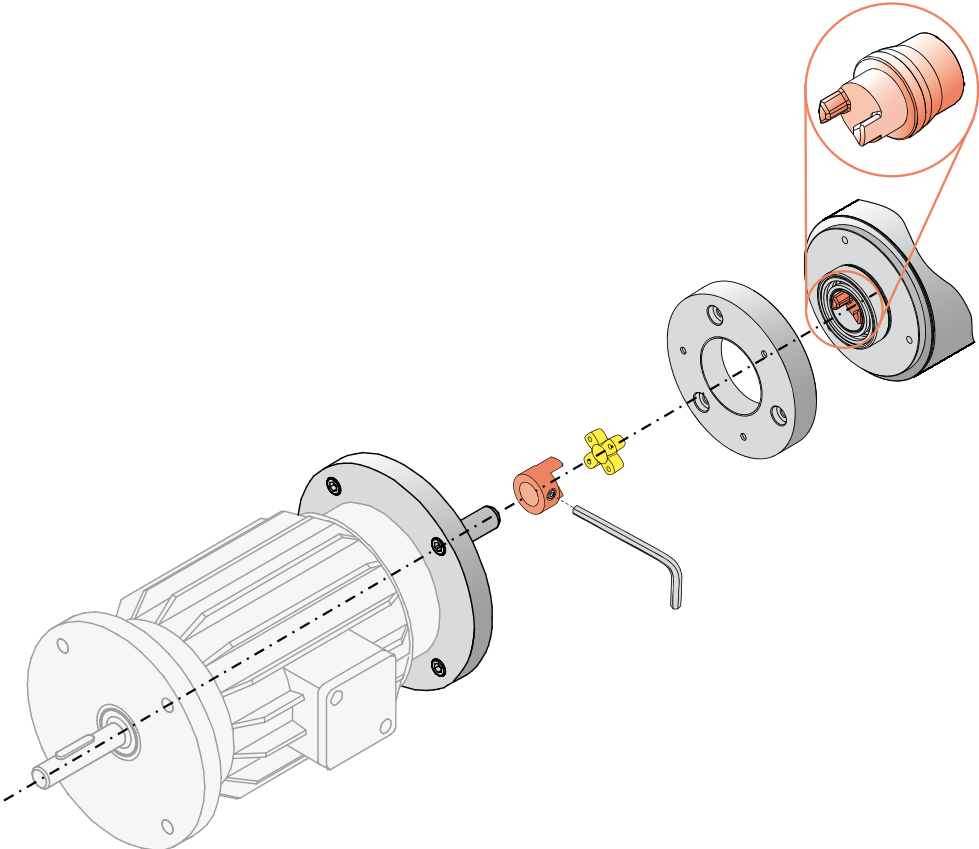


Hollow shaft - clamping ring hood side
Assembly hollow shaft, pin radial in encoder flange.



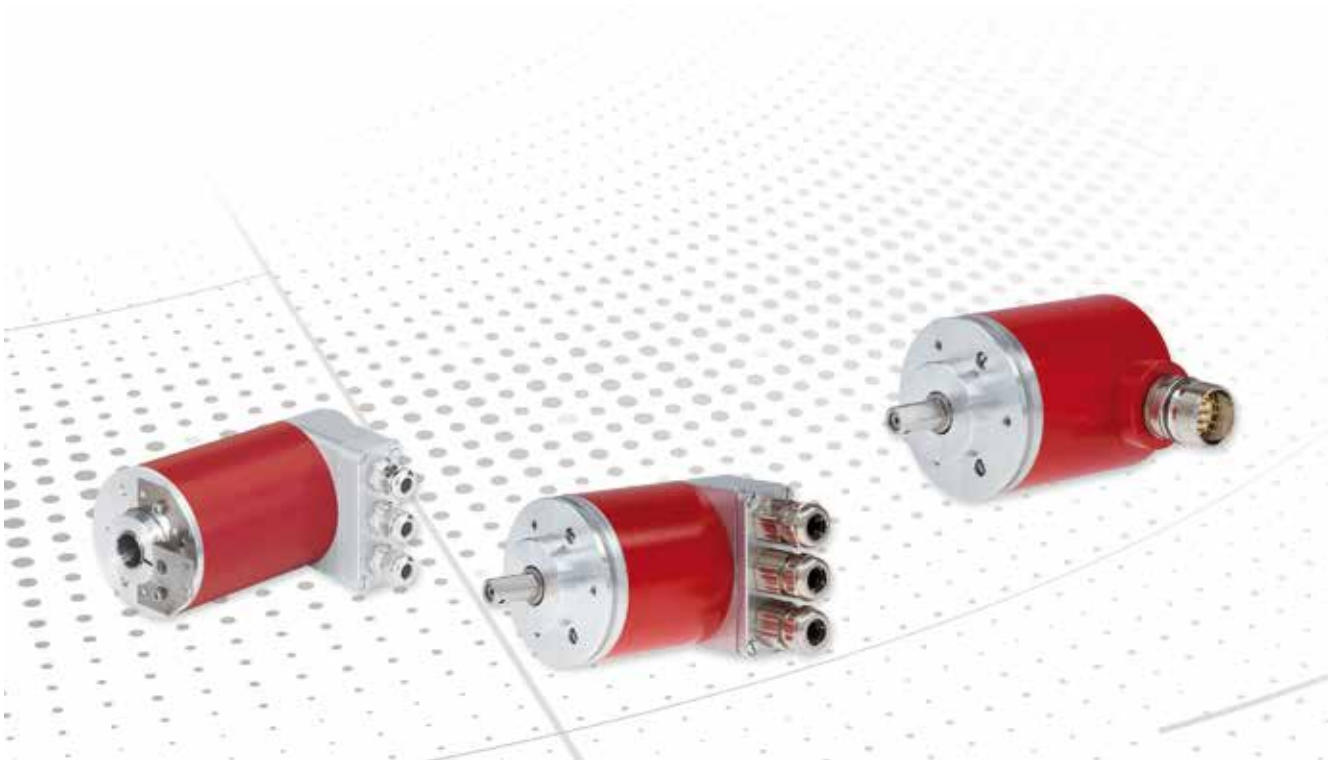
Assembly Examples

Integrated coupling
Assembly with integrated coupling





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 65mm
- _ many flange/shaft combinations
- _ ample wiring room for fieldbuses - 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

Contents

Products.....	99
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Magnet detection (M)






Optical 15 bit (E)

Products	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	SSI 	SSI Nocken Analog  ASI CANopen Parallel 	SSI  Analog  Parallel
Option, additional interfaces (on request)		SSI Nocken Analog INC Parallel SIN / COS	SSI Nocken Analog INC Parallel SIN / COS
Weblink	www.tr-electronic.com/s/S007147	www.tr-electronic.com/s/S007148	www.tr-electronic.com/s/S007149
QR-Code			

* depending on the interface

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

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

Products	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	SSI  ASI	SSI Analog
Option, additional interfaces (on request)	SSI ASI	
Weblink	www.tr-electronic.com/s/S007150	www.tr-electronic.com/s/S007151
QR-Code		

* depending on the interface

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

Suggested Products

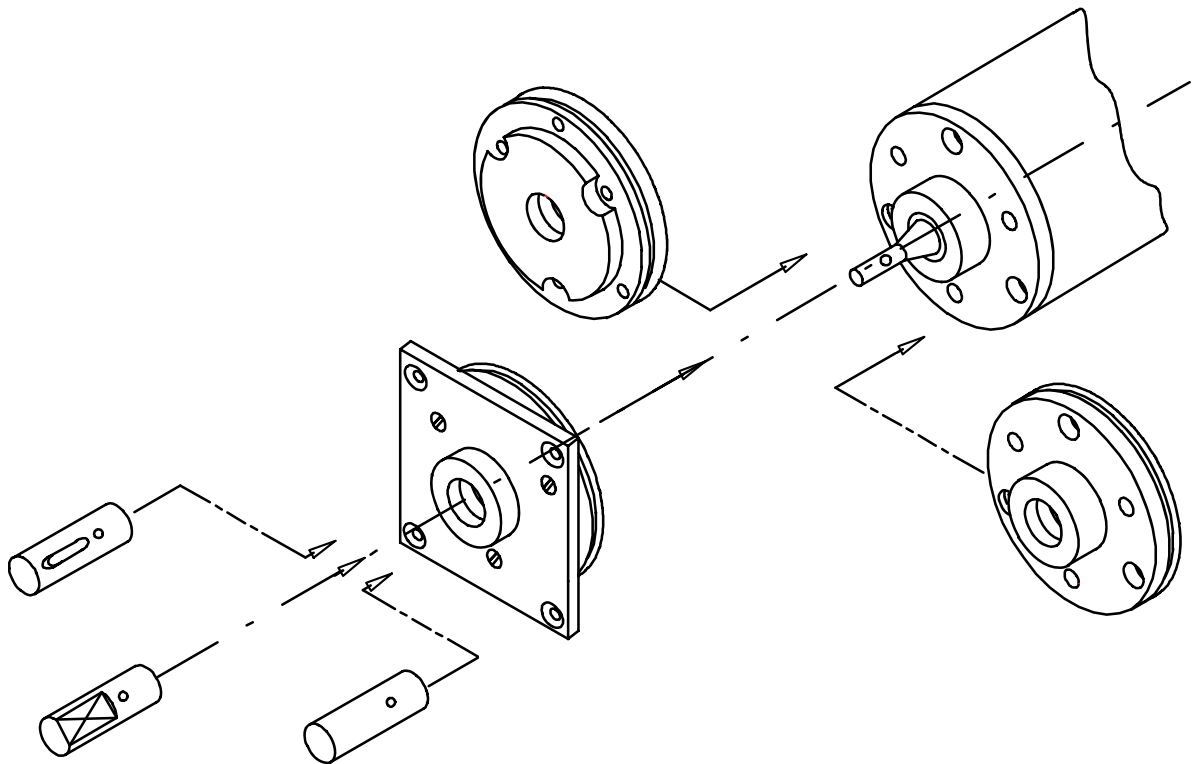
Order code	Steps per turn	Turns	Shaft / Flange	Connector position	Connector type	Remark
CEV65 PARALLEL PUSH PULL						
CEV65M-10498	4096	4096	10FL/19,5 - ZB36	Cable gland radial		
CEV65 SSI						
CEV65M-00444	4096	4096	10FL/19,5 - ZB36	Connector radial	M23, 12 pin	
CEV65 PROFIBUS DP						
CEV65M-01460	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	
CEV65 CAN/DEVICE NET						
CEV65M-10076	4096	4096	10FL/19,5 - ZB36	Fieldbus hood	Cable glands	
CEV65M-10089	8192	4096	10FL/19,5 - ZB36	Fieldbus hood	Cable glands	
CEV65 PROFINET IO						
CEV65M-10323	4096	4096	10FL/19,5 - ZB36	Fieldbus hood	Connectors M12	
CEV65 ETHERNET IP						
CEV65M-10261	8192	4096	10FL/19,5 - ZB36	Fieldbus hood	Connectors M12	
CEV65 POWERLINK V2.0						
CEV65M-10231	8192	4096	10FL/19,5 - ZB36	Fieldbus hood	Connectors M12	
CES65 ETHERNET IP						
CES65M-10060	8192	4096	12H7 Blind Shaft	Fieldbus hood	Connectors M12	
AEV65 SSI+ANALOG						
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.de.

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

Dimensional Drawings

Modular flange / shaft assembly



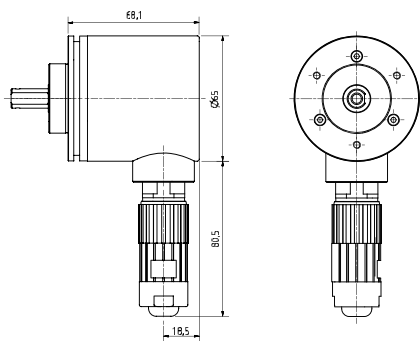
Fieldbus hood

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

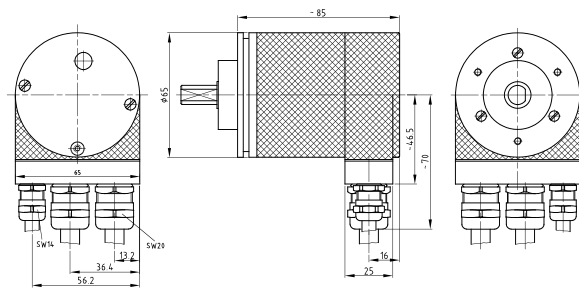


Dimensional Drawings

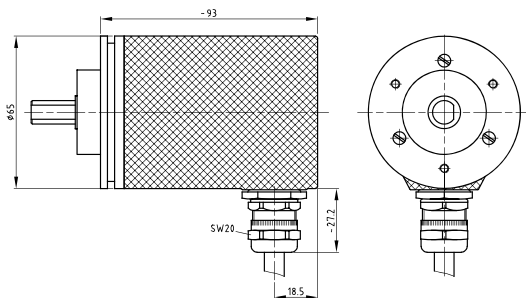
CMV65-SSI



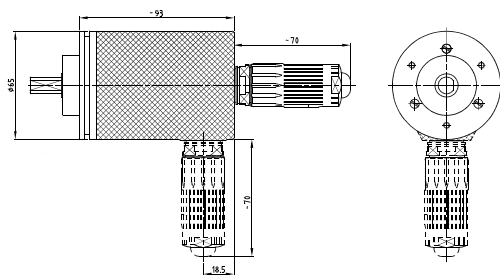
CMV65-Profibus



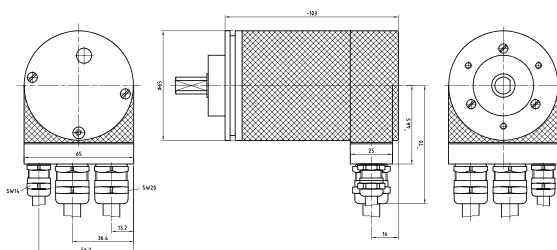
CEV65-PAR, NSW



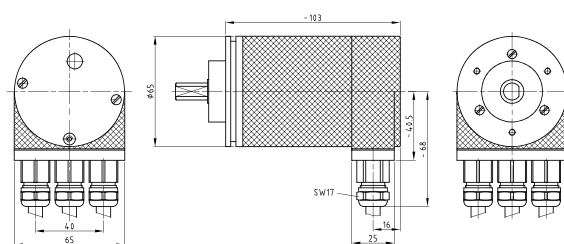
CEV65-SSI, Analog, ASI; COV65-SSI, Analog



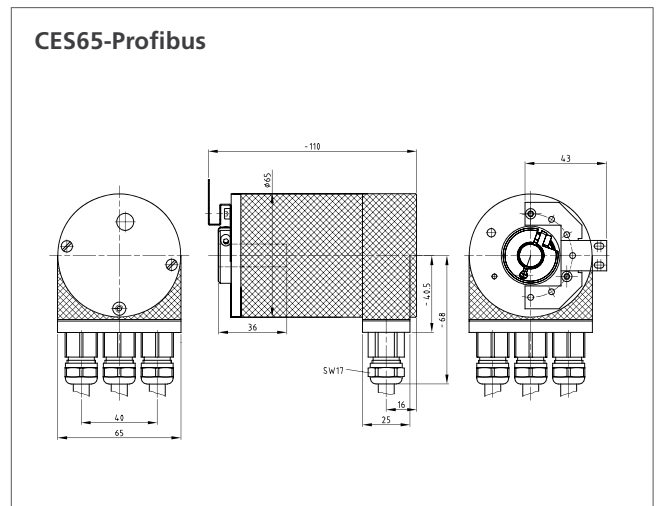
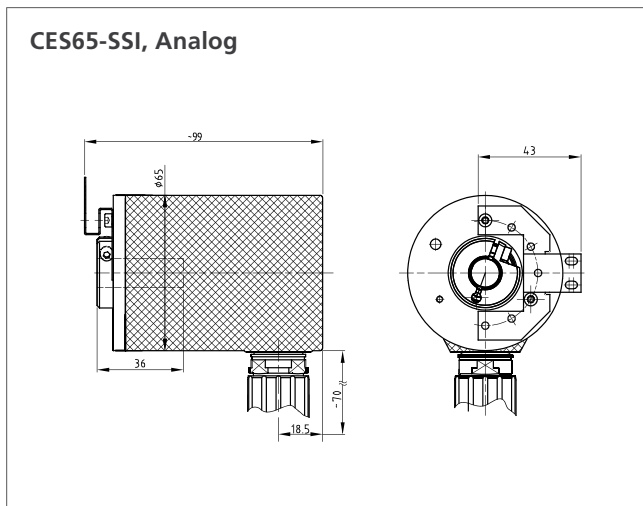
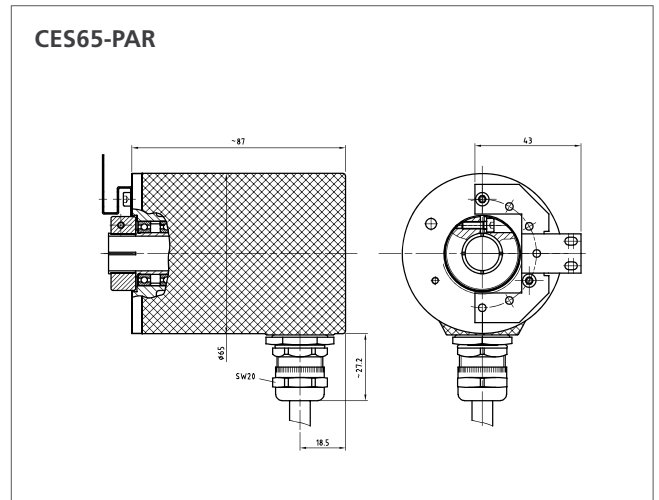
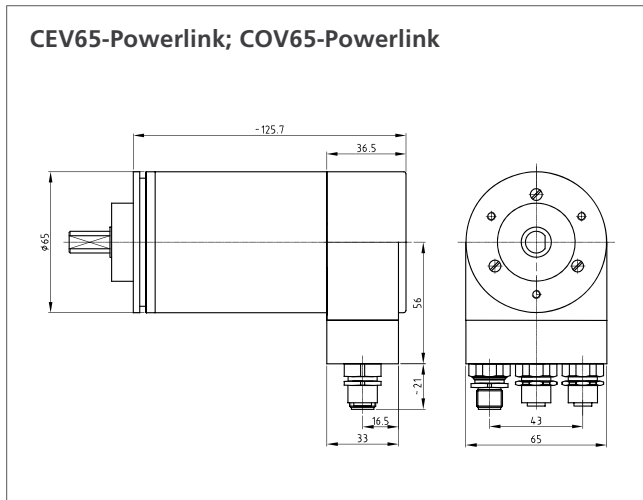
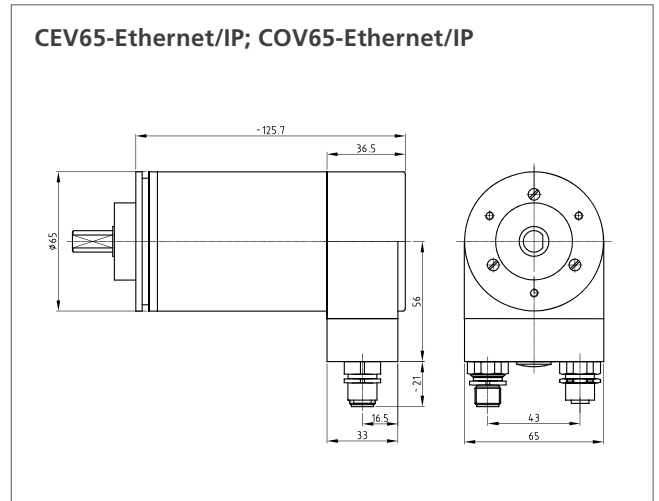
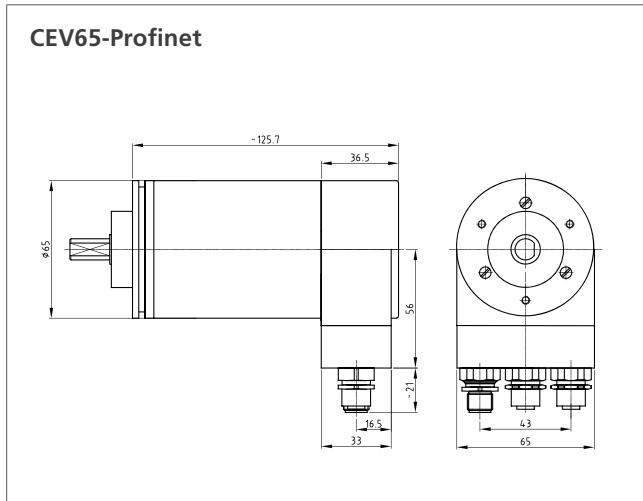
CEV65-Profibus



CEV65-CANopen, DeviceNet

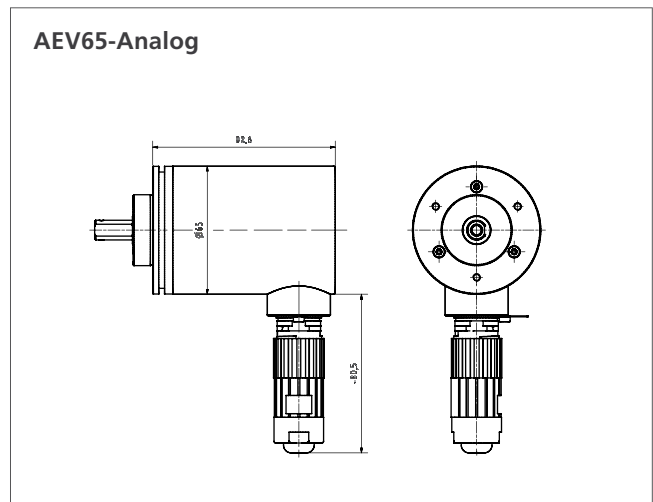
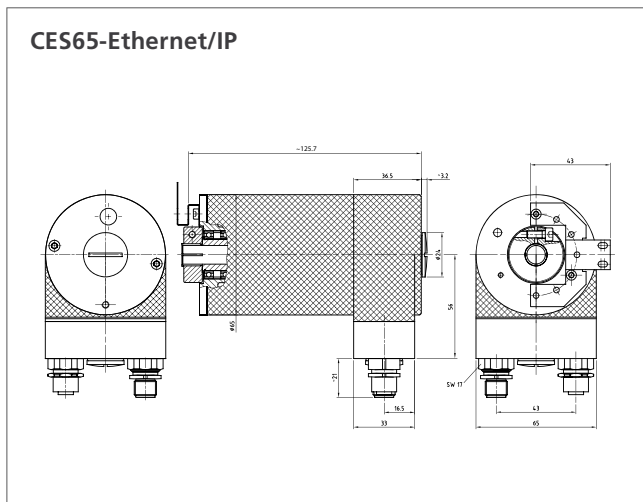


Dimensional Drawings



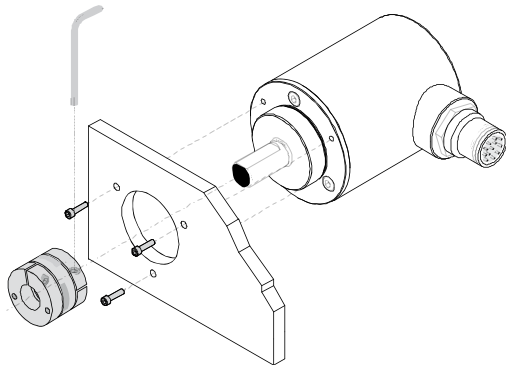
Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at www.tr-electronic.com or on request.

Dimensional Drawings

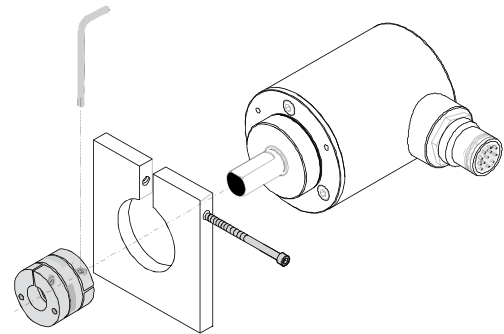


Assembly Examples

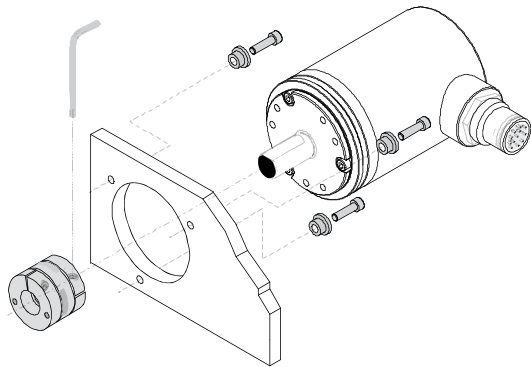
Solid shaft - screws in axial threads



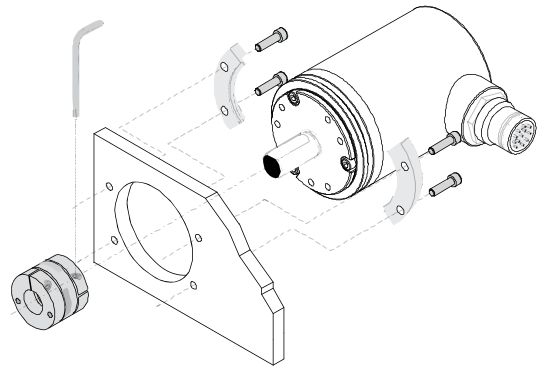
Solid shaft - clamping flange



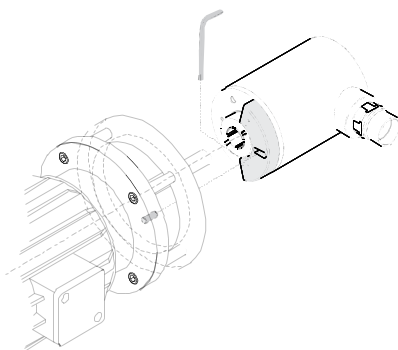
Solid shaft - servo clamps



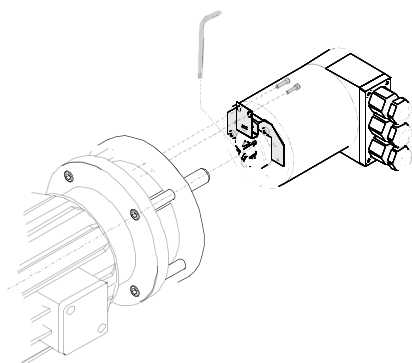
Solid shaft - clamping brackets



Blind shaft - groove / pin

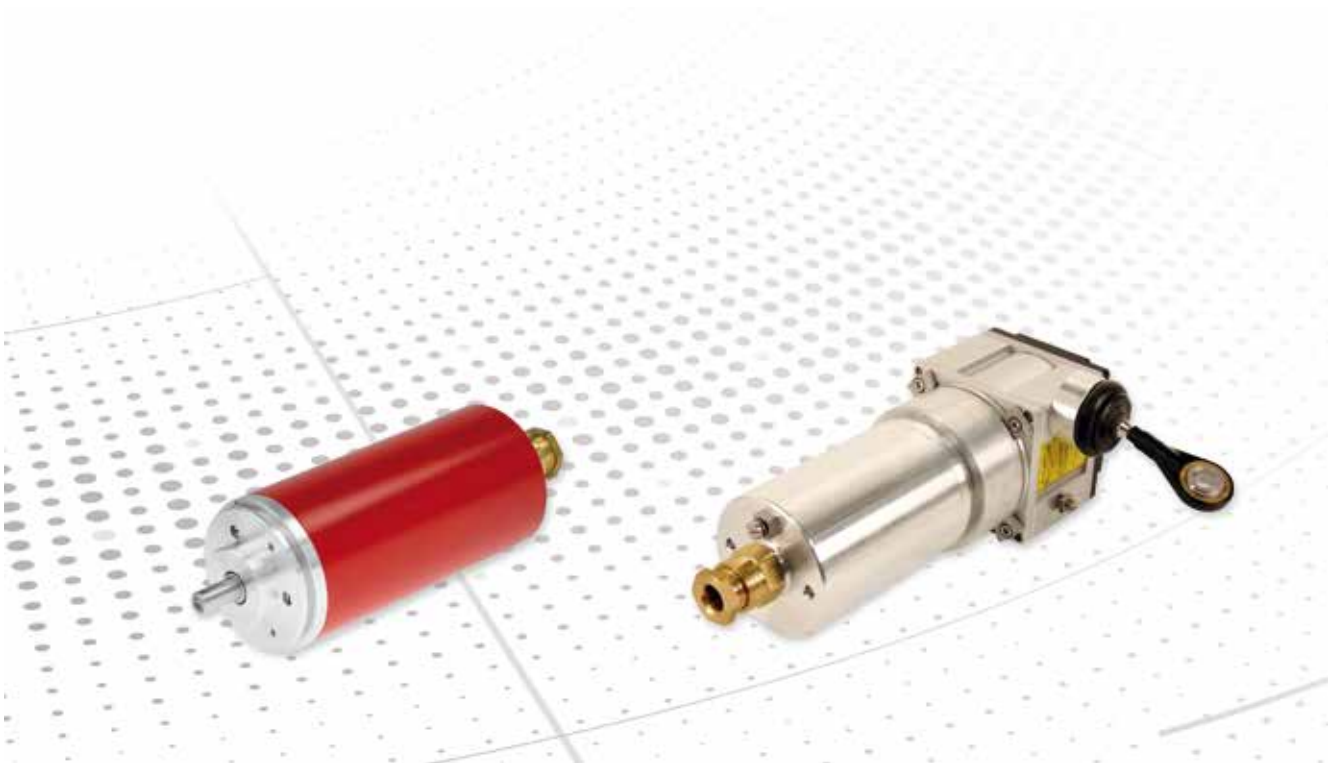


Blind shaft - torque support spring





Rotary Encoder - Family A_V70 - Housing 70 mm



Protective housing for ATEX zone 1/21 for rotary encoder families C__58 and I__58




A special challenge for rotary encoders is presented by potentially explosive atmospheres, for example in transfer systems in painting lines, filling/bagging plants, in flour mills, at fuel pumps in filling stations or in geothermal energy. As an accredited manufacturer of explosion-proof housings we offer ATEX-compliant absolute rotary encoders with housings made of aluminium or stainless steel for hygienically sensitive applications. The housings comprise a flameproof enclosure and can be used even in the highest temperature

class T6 in Zones 1 (gases) and 21 (dusts). Thanks to the enormous selection of interfaces, you will find the right rotary encoder for every requirement. The devices fulfil ATEX Specifications II 2G Ex db IIC T6 resp. II 2D Ex tb IIIC T80°C IP65.

Contents

Products.....	109
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Housing option for rotary encoders

Products	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	<p>SSI INC</p> <p>Analog SIN / COS</p> <p>ASI </p>
Option, additional interfaces (on request)	Analog INC
Weblink	www.tr-electronic.com/s/5008508
QR-Code	

Suggested Products

Order code	Steps per turn	Turns	Shaft / Flange	Connector position	Remark
AEV70M SSI					
AEV70M-00100	4096	4096	10FL/19,5 - ZB36	Cable gland axial, 20 m cable (ATEX cert.)	
AEV70M Profibus					
AEV70M-00101	4096	4096	12NT/19,5 - ZB36	Cable gland axial, 10 m cable (ATEX cert.)	Address 10 factory set

Further product information

1. Enter order code into ...



2. Searchfield (top right) on www.tr-electronic.com



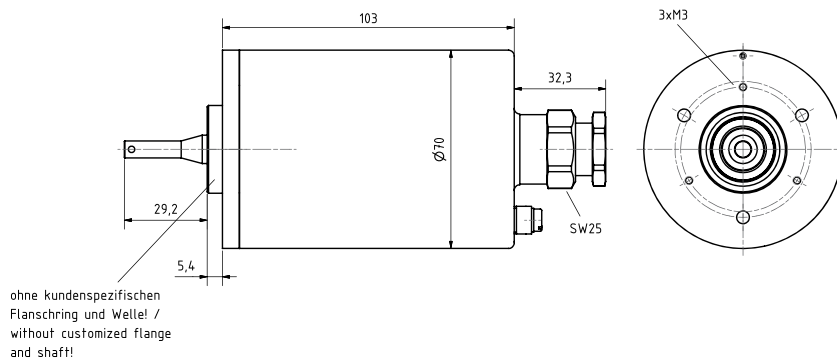
3. Choose desired information



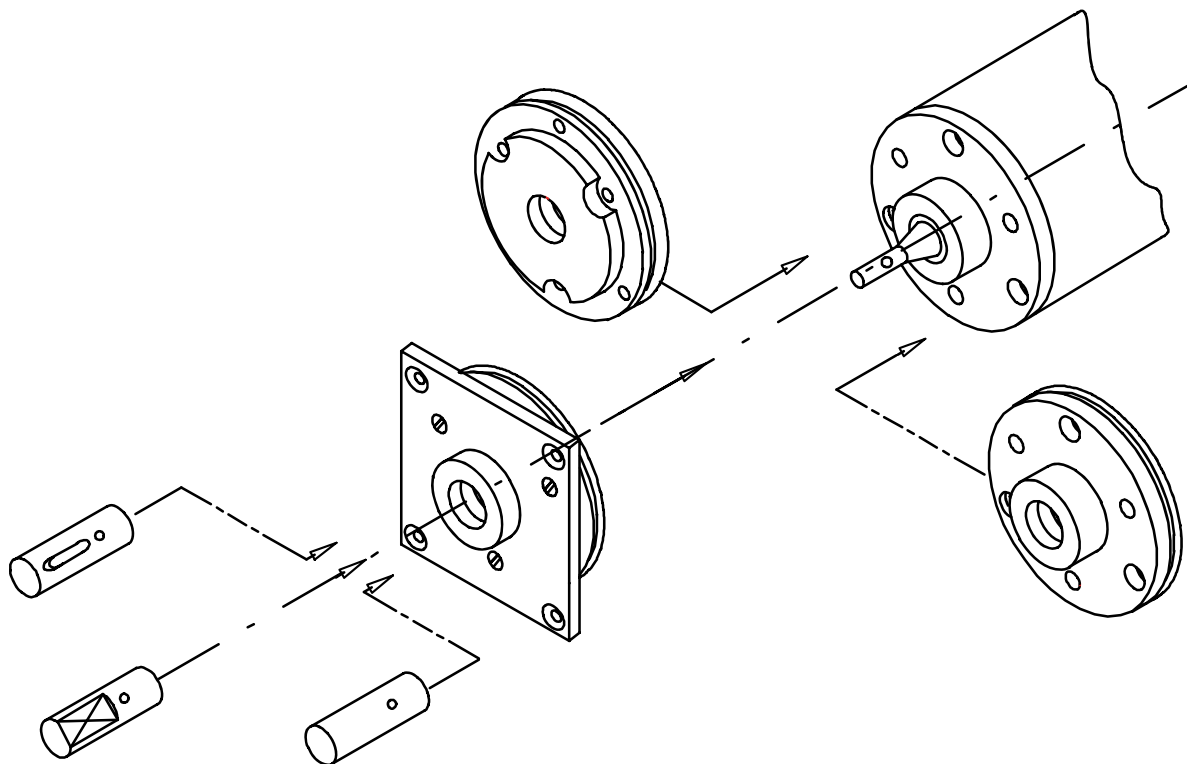
We will help you to select the most suitable products from the complete TR range. Please contact us (info@tr-electronic.de).

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



Absolute Rotary Encoder - Family CD_75 - Housing 75 mm



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 sizes from 75 mm (hollow shaft or solid shaft). Standard interfaces such as Double SSI, PROFIsafe via PROFIBUS, PROFIsafe via PROFINET or Open-Safety via Powerlink 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.

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Optical detection (E)

Magnetic detection (M)

Products	CDV75M	CDV75MM	CDH75M
			
Detection	Optical detection (E)	Magnetic detection (M)	Optical detection (E)
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	32768	32768	32768
Properties	Fast optical main detection	Dewfall proof	Fast optical main detection
Shaft diameters available	10mm with keyway	10mm with keyway	20mm with keyway
Connectors	Connectors radial, cable glands radial (SSI)	Connectors radial, cable glands radial (SSI)	Connectors radial, cable glands radial (SSI)
Ambient temperature	-20...+70 °C	-20...+70 °C	-20...+70 °C
Protection class	IP 54	IP 65	IP 54
ATEX-zone			
Interface	   	   	   
Option, additional interfaces (on request)	INC	INC	INC
Weblink	www.tr-electronic.com/s/S007271	www.tr-electronic.com/s/S007271	www.tr-electronic.com/s/S007272
QR-Code			

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

Optical detection (E)

Products	ADV75M	ADH75M	ADV88M
			
Detection	Optical detection (E)	Optical detection (E)	Optical detection (E)
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	32768	32768	32768
Properties	Fast optical main detection	Fast optical main detection	Fast optical main detection
Shaft diameters available	10mm with keyway	20mm with keyway	10mm with keyway
Connectors	Connectors radial, cable glands radial (SSI)	Connectors radial, cable glands radial (SSI)	Cable gland axial
Ambient temperature	-20...+60 °C	-20...+60 °C	-20...+60 °C
Protection class	IP 54	IP 54	IP 65
ATEX-zone	Zone 2/22	Zone 2/22	Zone 1/21
Interface	   	   	 
Option, additional interfaces (on request)	INC	INC	INC
Weblink	www.tr-electronic.com/s/S007273	www.tr-electronic.com/s/S007274	
QR-Code			

Suggested Products

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

CDV75M-SSI (D) Double detection, solid shaft, SSI

CDV75M-00001	8192	4096	10Keyway/19,5 ZB50	2 x cable gland		TTL Incr -20...70°C
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CDV75M-PB (D) Double detection, solid shaft, Profibus

CDV75M-00008	8192	32768	10Keyway/19,5 ZB50/D75 9XM4	Connector radial	5 x M12	SIN/COS -20°...70°C
--------------	------	-------	--------------------------------	---------------------	---------	------------------------

CDV75M-PN (D) Double detection, solid shaft, Profinet

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-EPL (D) Double detection, solid shaft, Powerlink

CDV75M-00021	8192	32768	10Keyway/19,5 ZB36	Connector radial	4 x M12	
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CDH75M-SSI (D) Double detection, hollow shaft, SSI

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		

CDH75M-PB (D) Double detection, hollow shaft, Profibus

CDH75M-00008	8192	32768	20H7/Keyway slot for pin D4	Connector radial	5 x M12	TTL Incr -20°...70°C
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CDH75M-PN (D) Double detection, hollow shaft, Profinet

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

For further product information simply enter the order number in the search field at www.tr-electronic.de.

Suggested Products

Order code	Steps per turn	Turns	Shaft / Flange	Connector position	Connector type	Remark
CDH75M-EPL (D) Double detection, hollow shaft, Powerlink						
CDH75M-00026	8192	32768	20H7/Keyway slot for pin D4	Connector radial	4 x M12	
ADV75M-PB (D) Double detection, solid shaft, Profibus						
ADV75M-00001	8192	32768	10Keyway/19,5 ZB50/D75 9XM4	Connector radial	5 x M12	II 3G Ex nAc IIC T6X II 3D Ex tc IIIC T65°C IP64 X
ADV75M-PN (D) Double detection, solid shaft, Profinet						
ADV75M-00002	8192	32768	10Keyway/19,5 ZB50/D75 9XM4	Connector radial	4 x M12	II 3G Ex nAc IIC T6X II 3D Ex tc IIIC T65°C IP64 X
ADH75M-PB (D) Double detection, hollow shaft, Profibus						
ADH75M-00001	8192	32768	20H7/Keyway slot for pin D4	Connector radial	5 x M12	II 3G Ex nAc IIC T6X II 3D Ex tc IIIC T65°C IP64 X
ADH75M-PN (D) Double detection, hollow shaft, Profinet						
ADH75M-00002	8192	32768	20H7/Keyway slot for pin D4	Connector radial	4 x M12	II 3G Ex nAc IIC T6X II 3D Ex tc IIIC T65°C IP64 X

Further product information

1. Enter order code into ...



2. Searchfield (top right) on www.tr-electronic.com

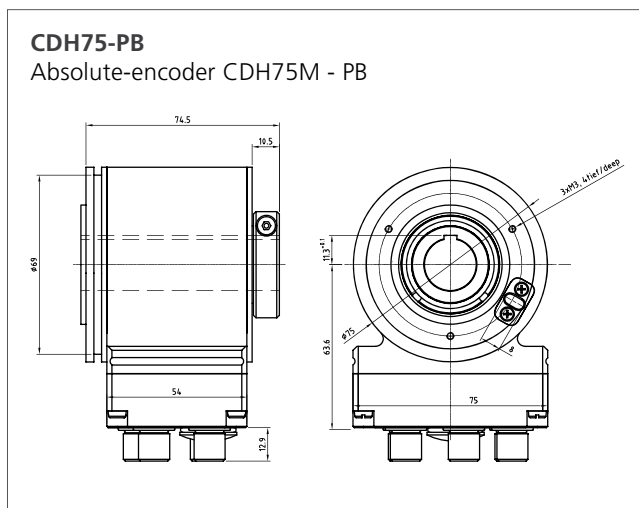
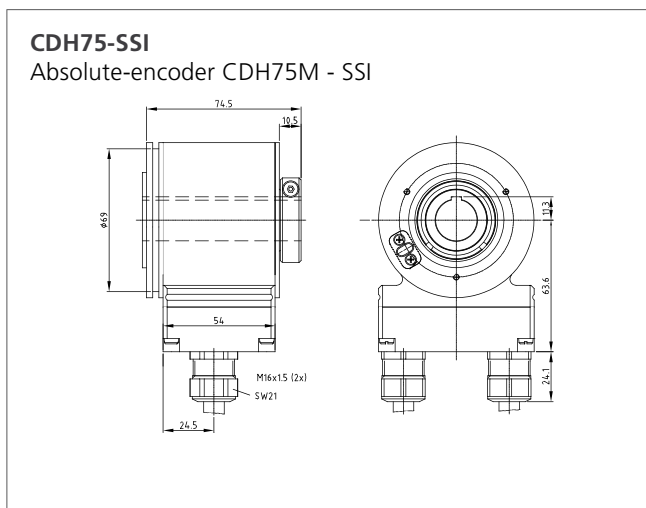
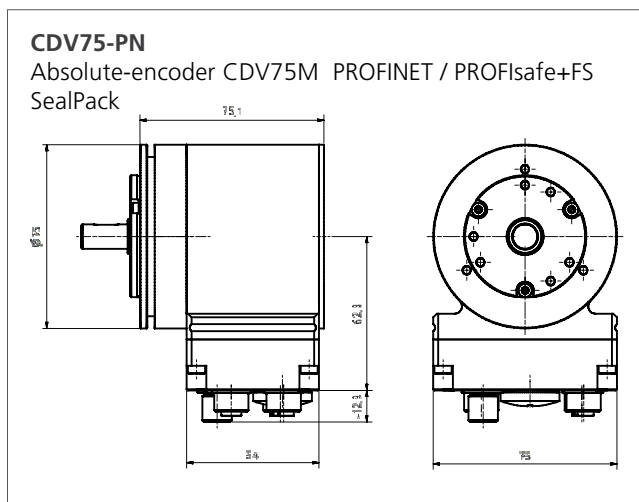
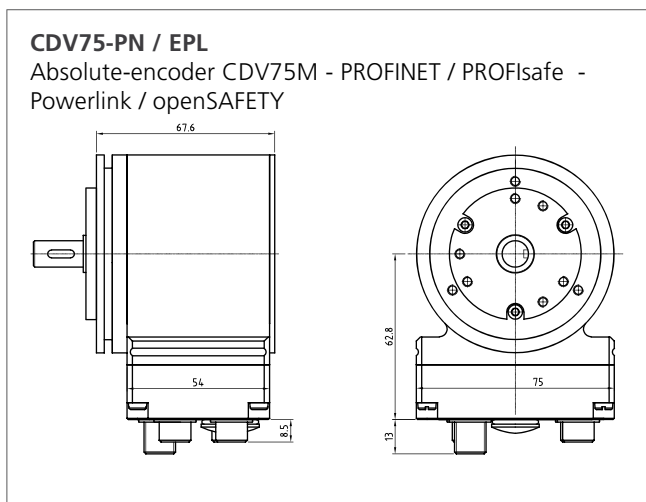
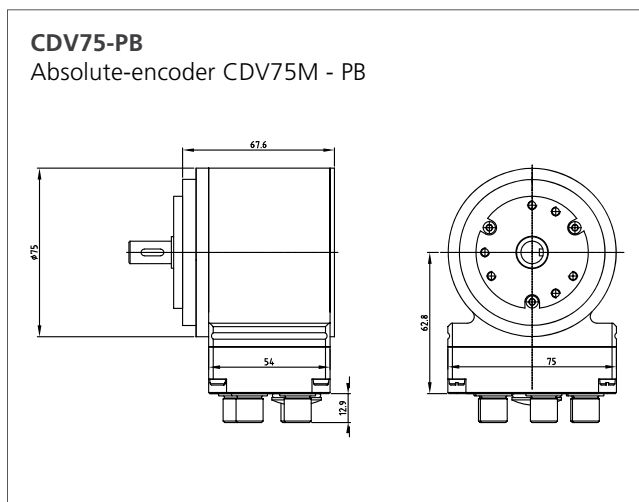
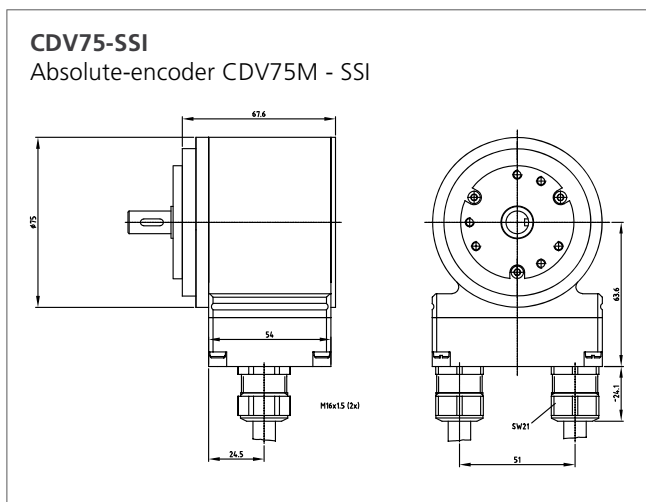


3. Choose desired information



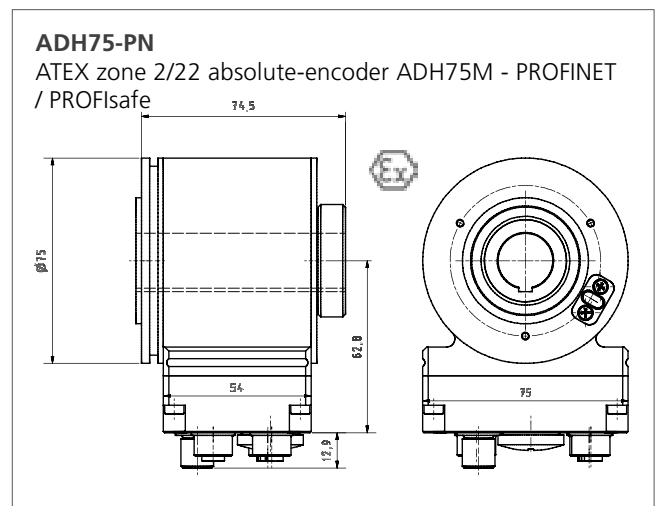
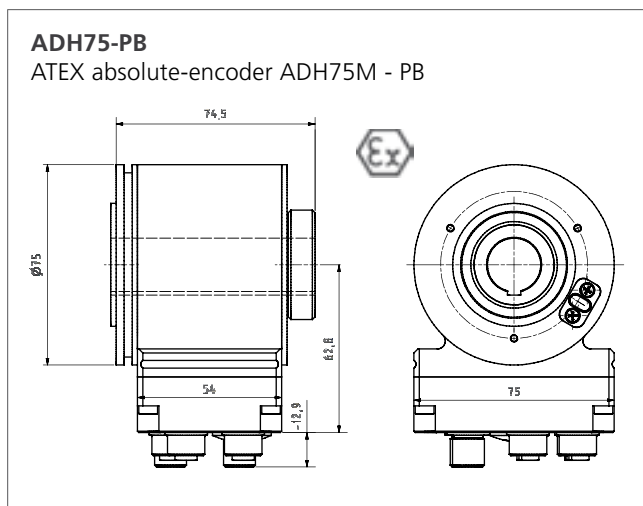
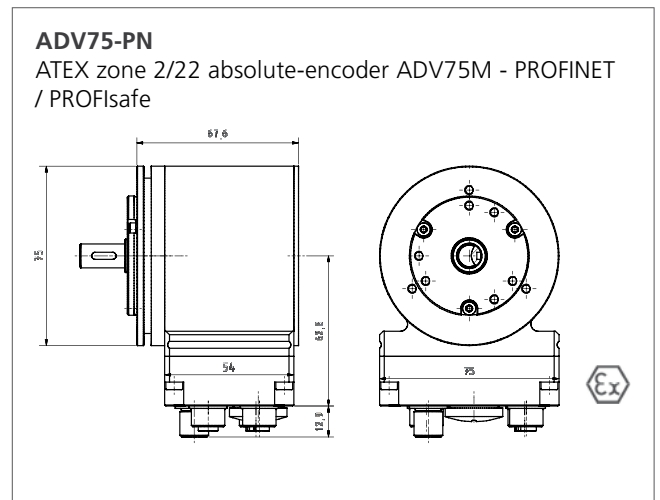
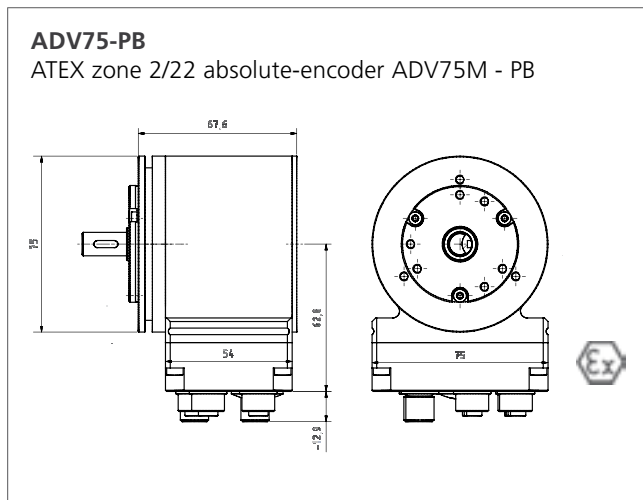
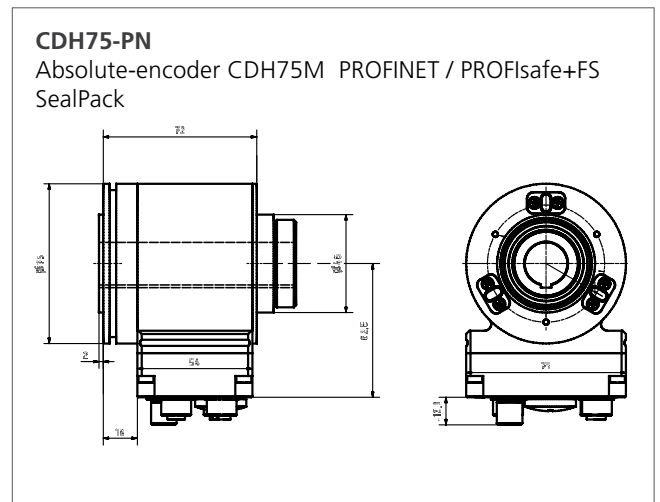
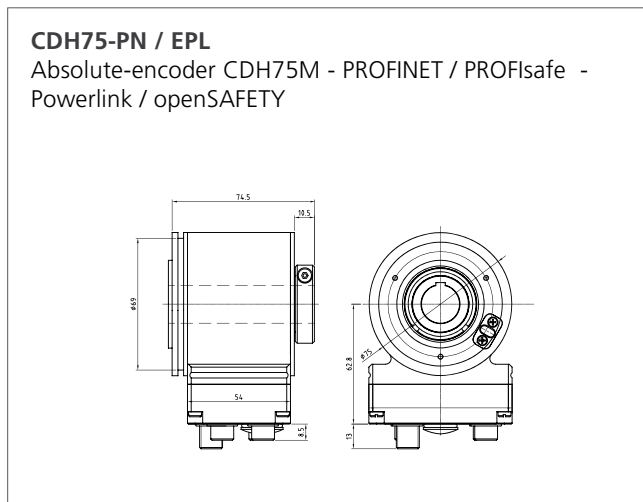
We will help you to select the most suitable products from the complete TR range. Please contact us (info@tr-electronic.de).

Dimensional Drawings



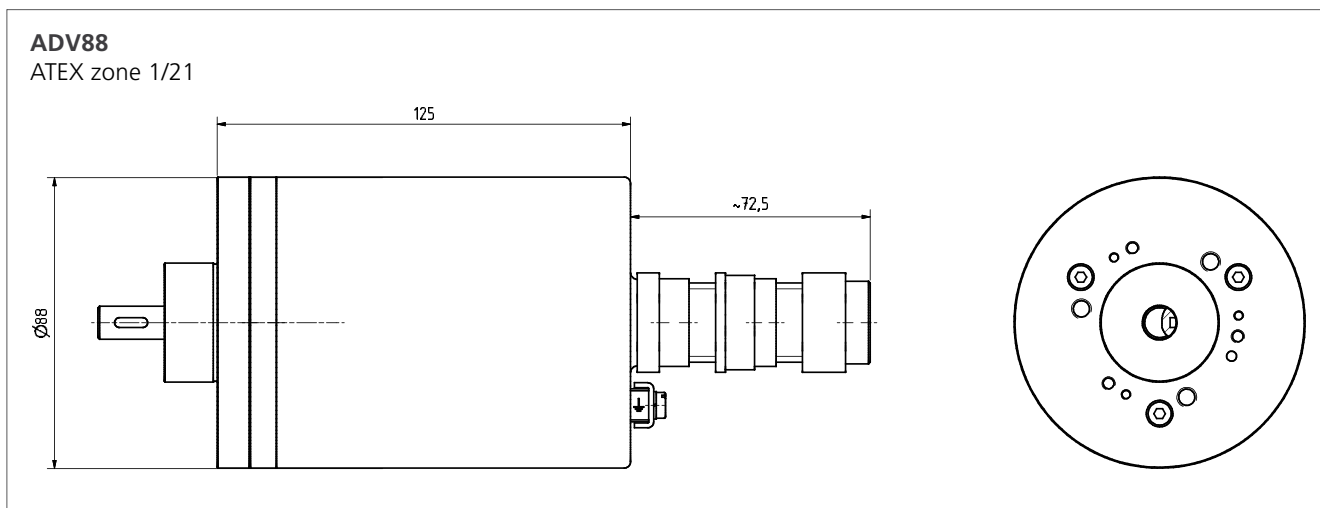
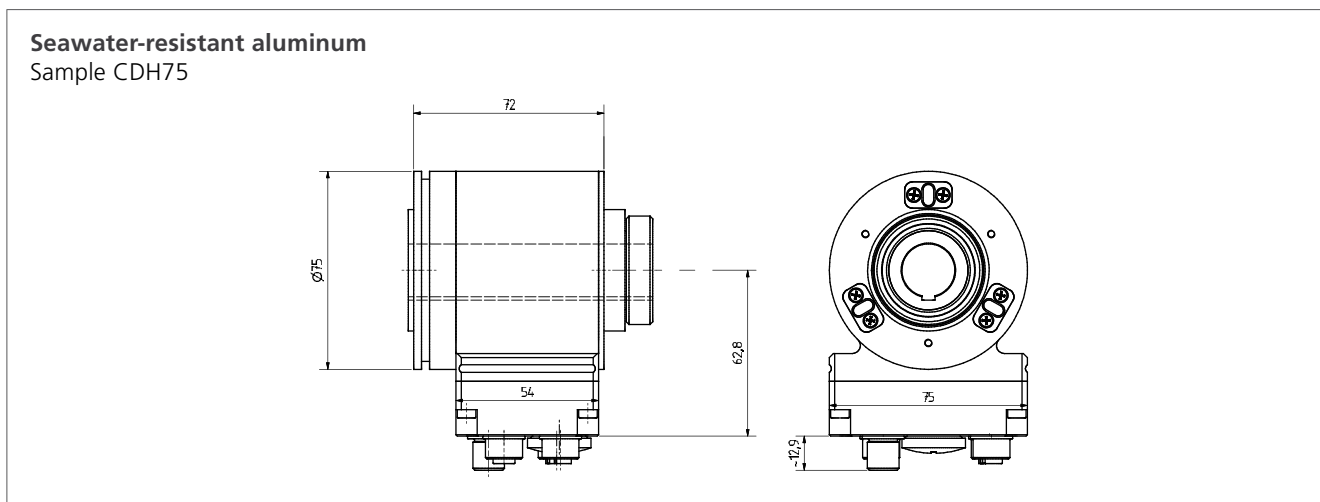
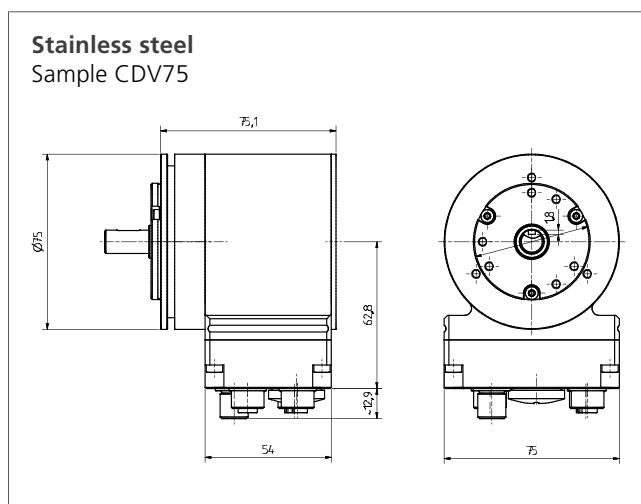
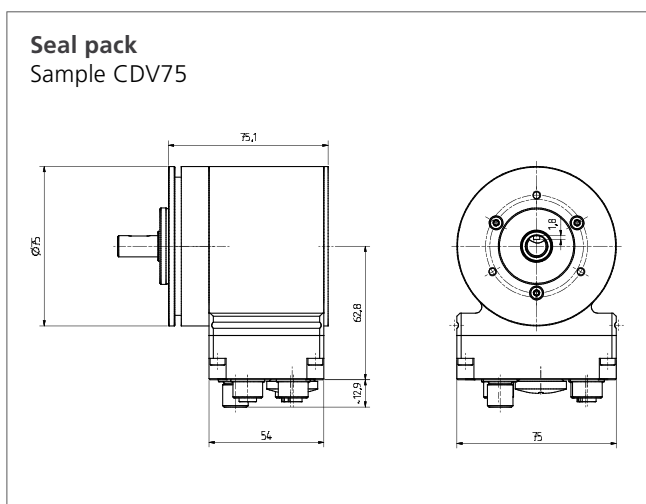
Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at www.tr-electronic.com or on request.

Dimensional Drawings



Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at www.tr-electronic.com or on request.

Dimensional Drawings



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.

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Optical 15 bit (E)

Optical 18 bit (O)

Products	CEH80 	COH80 
Detection	Optical 15 bit (E)	Optical 18 bit (O)
Single / Multi	(M) Multi (S) Single	(M) Multi (S) Single
Supply	24 VDC (11...27)	24 VDC (11...27)
Steps per turn	32768	262144
Number of turns	256000	262144
Shaft diameters available	10, 14, 16, 20, 24, 25, 27	10, 14, 16, 20, 24, 25, 27
Connectors	Connector radial (option: cable*)	Connector radial (option: cable*)
Ambient temperature	0...+60 °C (option -20...+70 °C)	0...+60 °C (option -20...+70 °C)
Protection class	IP54	IP54
Interface	   	   
Option, additional interfaces (on request)	INC	INC
Weblink	www.tr-electronic.com/s/S008496	www.tr-electronic.com/s/S008497
QR-Code		

* depending on the interface

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

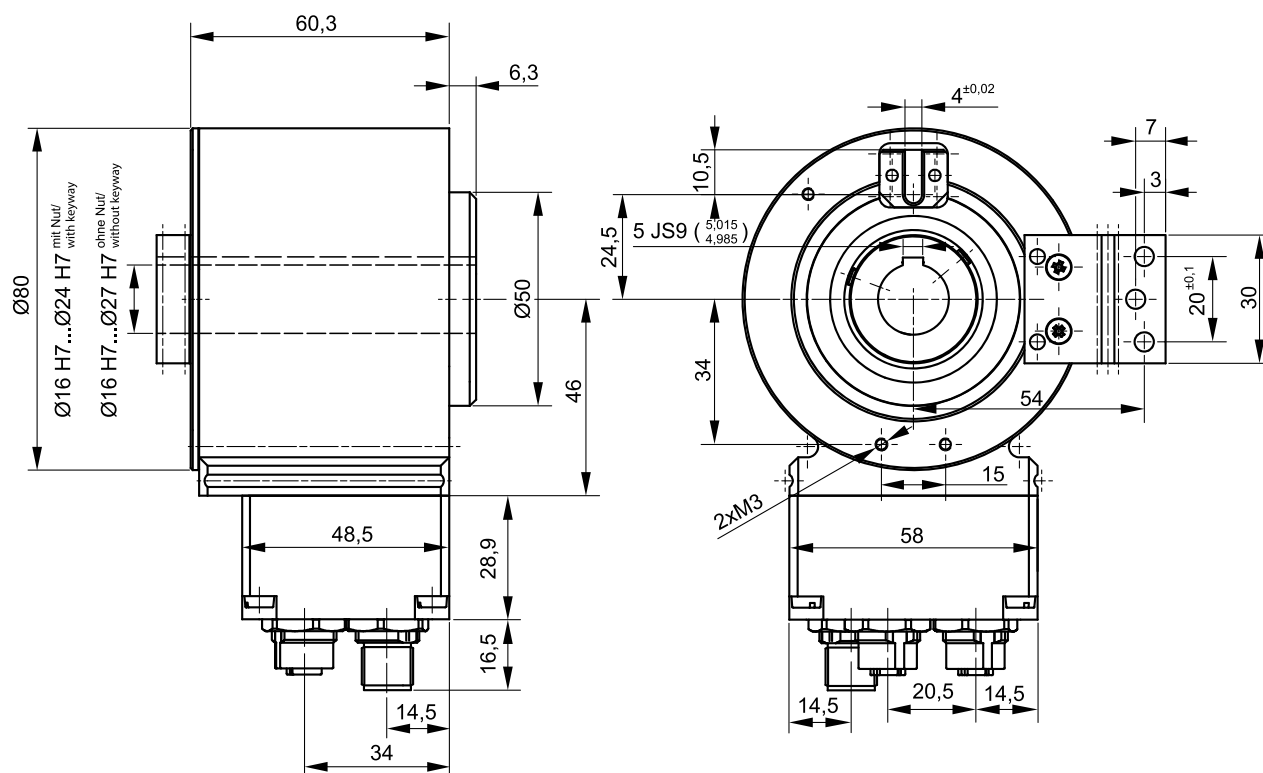
Suggested Products

Order code	Steps per turn	Turns	Shaft	Connector position
CEH80 - SSI				
CEH80M-00001	8192	4096	25H7	M23, 12 pin
CEH80M-00022	4096	4096	20H7	M23, 12 pin
CEH80S-00007	8192	1	25H7	M23, 12 pin
CEH80 - PROFIBUS				
CEH80M-00012	8192	4096	20H7	2x 5 pin M12 1x 4 pin M8
CEH80S-00015	8192	1	20H7	2x 5 pin M12 1x 4 pin M8
CEH80 - PROFINET				
CEH80M-00039	8192	4096	20H7	3x 4 pin M12
CEH80 - EtherCAT				
CEH80M-00034	8192	4096	25H7	3x 4 pin M12
COH80 - SSI				
COH80S-00004	262144	1	16H7	M23, 12 pin
COH80 - PROFIBUS				
COH80M-00003	262144	4096	10H7	2x 5 pin M12 1x 4 pin M8
COH80S-00002	262144	1	25H7	2x 5 pin M12 1x 4 pin M8
COH80 - PROFINET				
COH80S-00003	262144	1	20H7	3x 4 pin M12
COH80 - EtherCAT				
COH80M-00001	262144	4096	10H7	3x 4 pin M12
COH80S-00001	262144	1	10H7	3x 4 pin M12

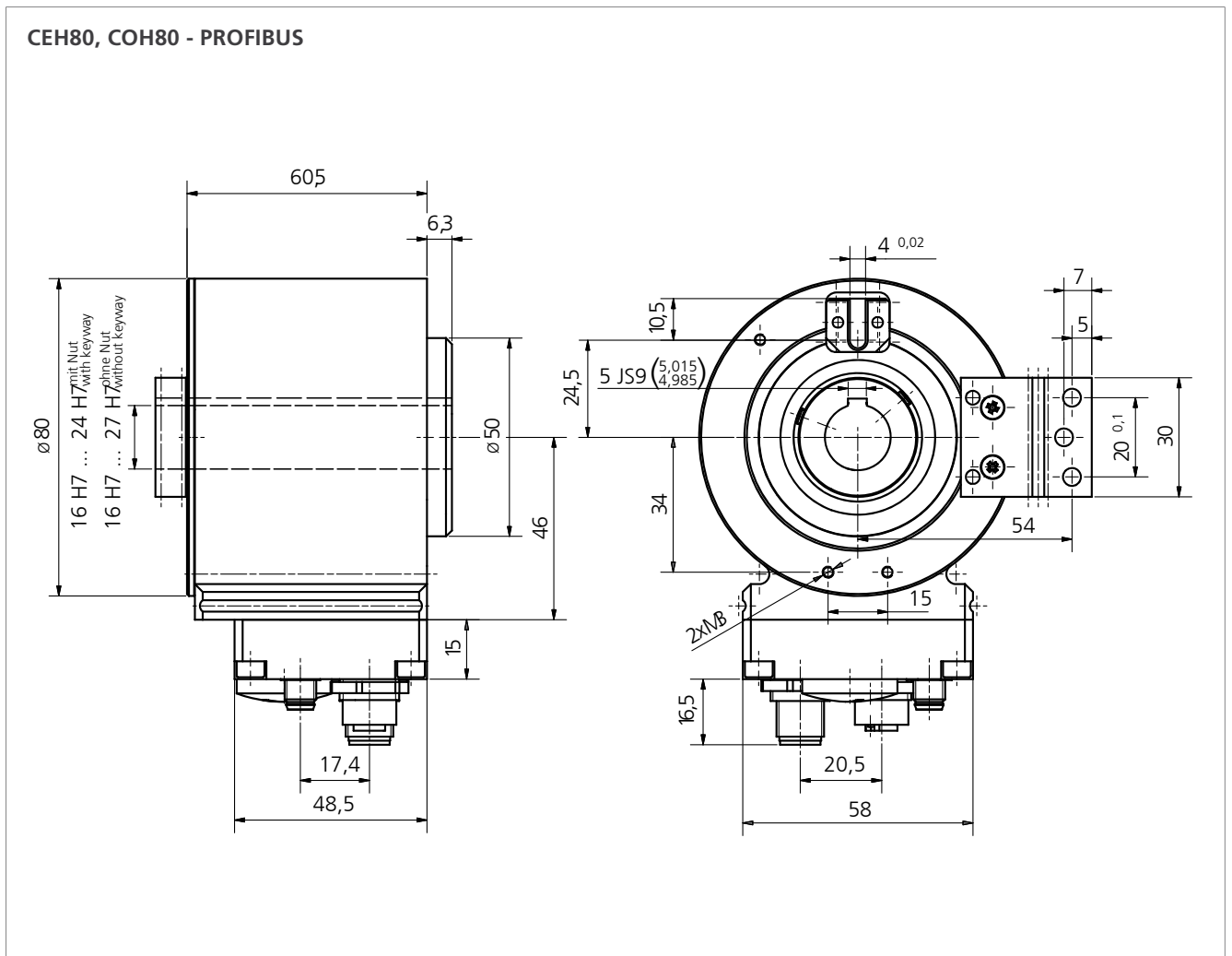
For further product information simply enter the order number in the search field at www.tr-electronic.de.

Dimensional Drawings

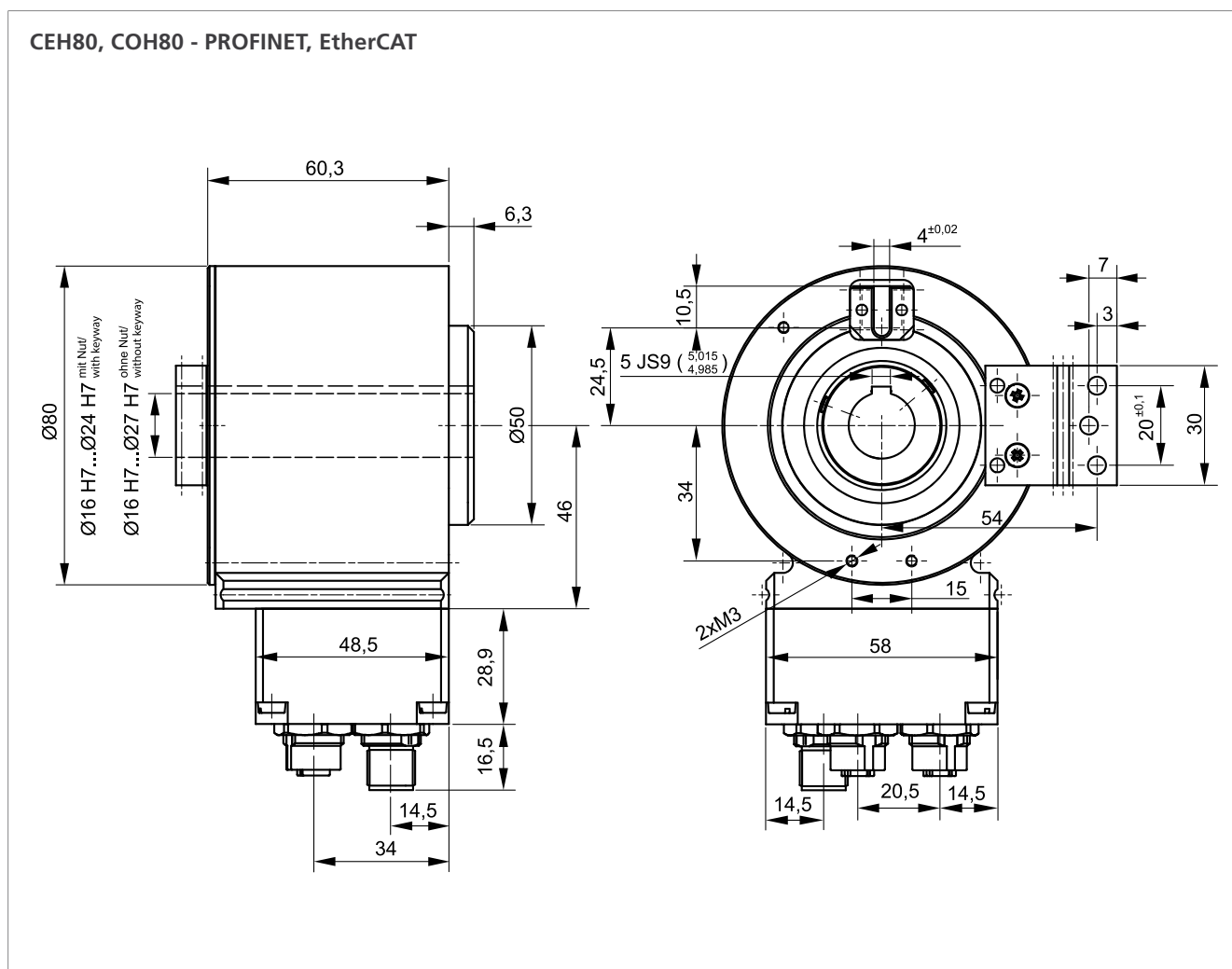
CEH80, COH80 - PROFINET, EtherCAT



Dimensional Drawings



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).

Contents




Products.....	127
Dimensional Drawings.....	129

Optical 15 bit (E) Double detection (D)

Products	QEH80	QEH81	QDH80
			
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	SSI  INC	SSI  INC	SSI  INC
Option, additional interfaces (on request)	INC	INC	INC
Weblink	www.tr-electronic.com/s/S008515	www.tr-electronic.com/s/S008518	www.tr-electronic.com/s/S008516
QR-Code			

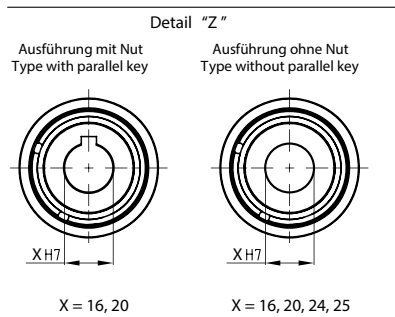
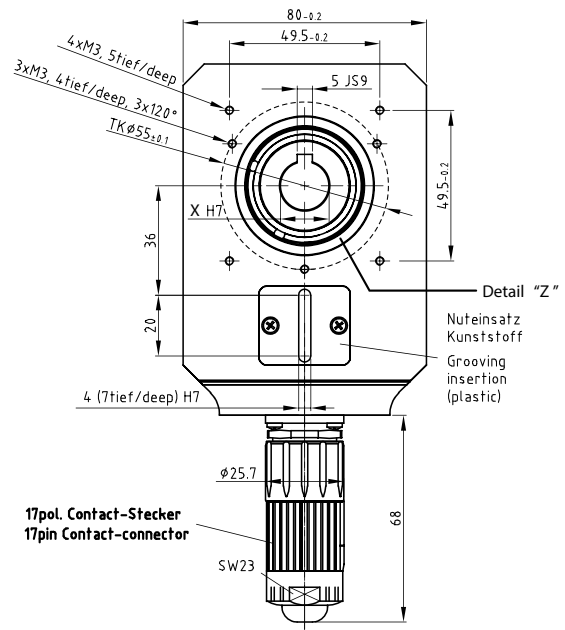
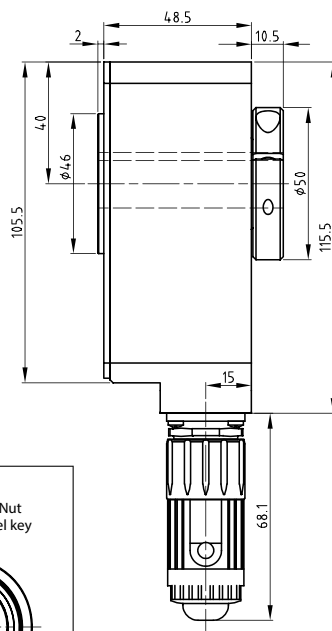
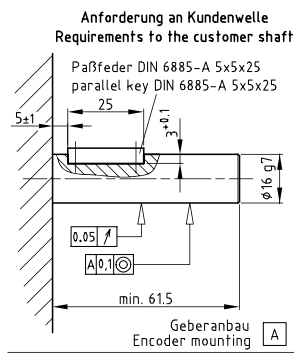
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Double detection (D)

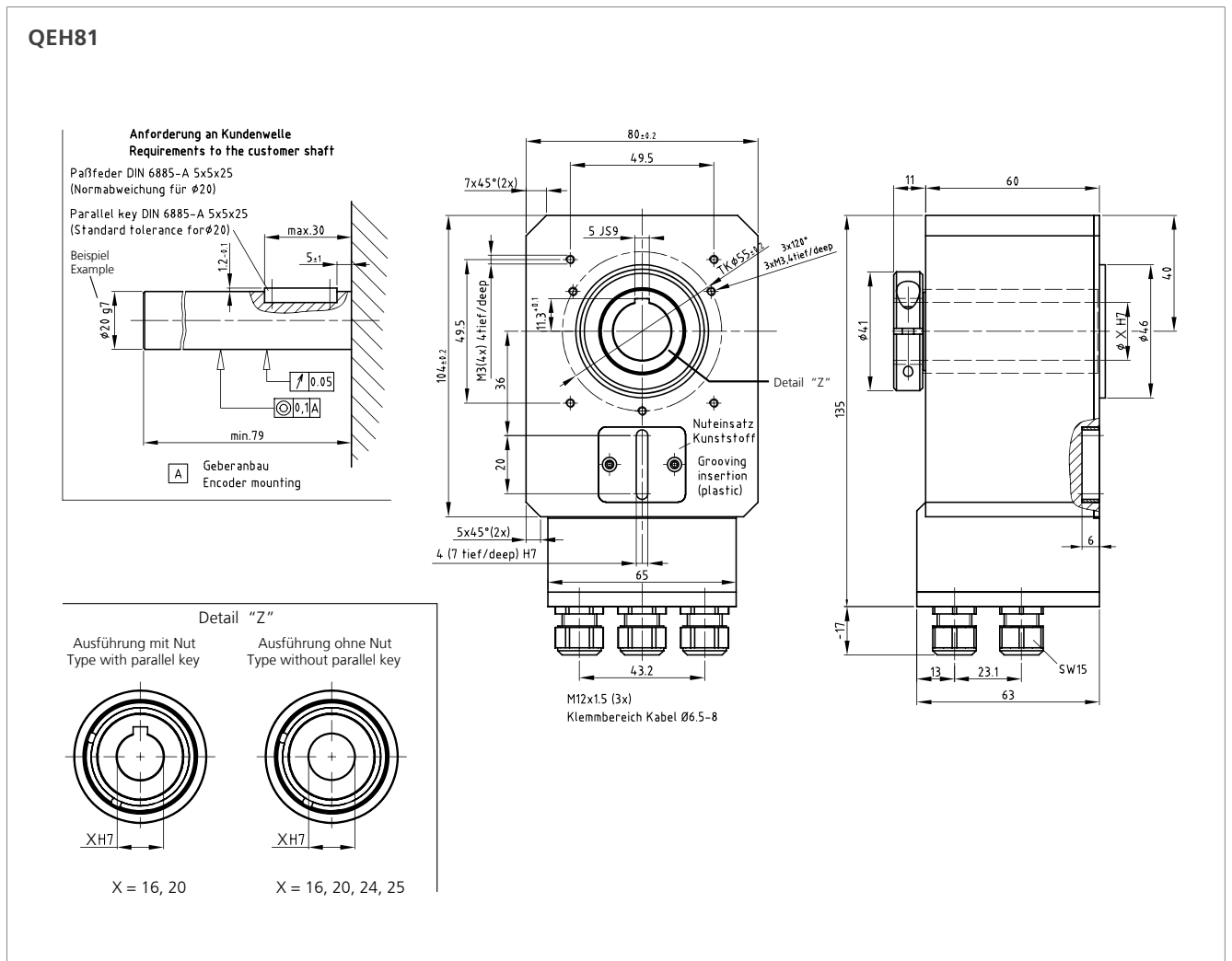
Products	QDH81 
Detection	Double detection (D)
Single / Multi	(M) Multi (S) Single (2nd detection: Single)
Supply	24 VDC (11..27)
Steps per turn	<= 8192
Number of turns	<= 256000
Shaft diameters available	16, 20, 22, 24, 25
Connectors	Connector radial, connection hood with cable glands
Ambient temperature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

Dimensional Drawings

QEH80, QDH80

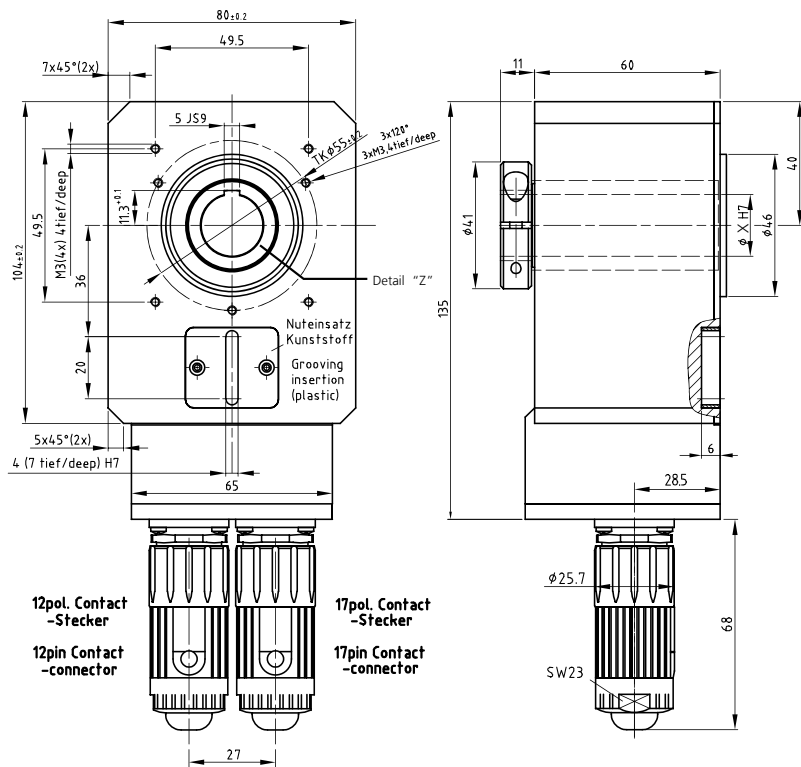
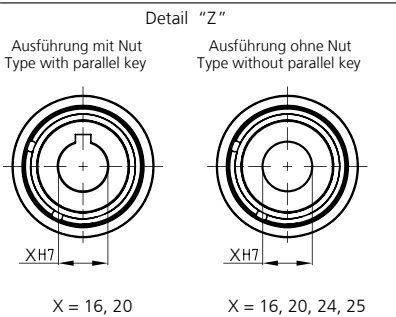
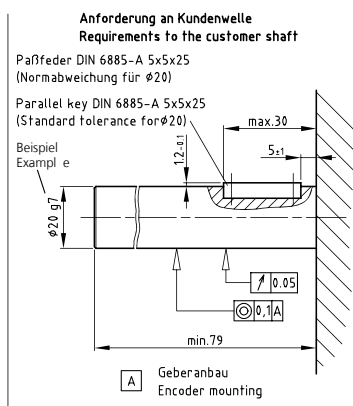


Dimensional Drawings

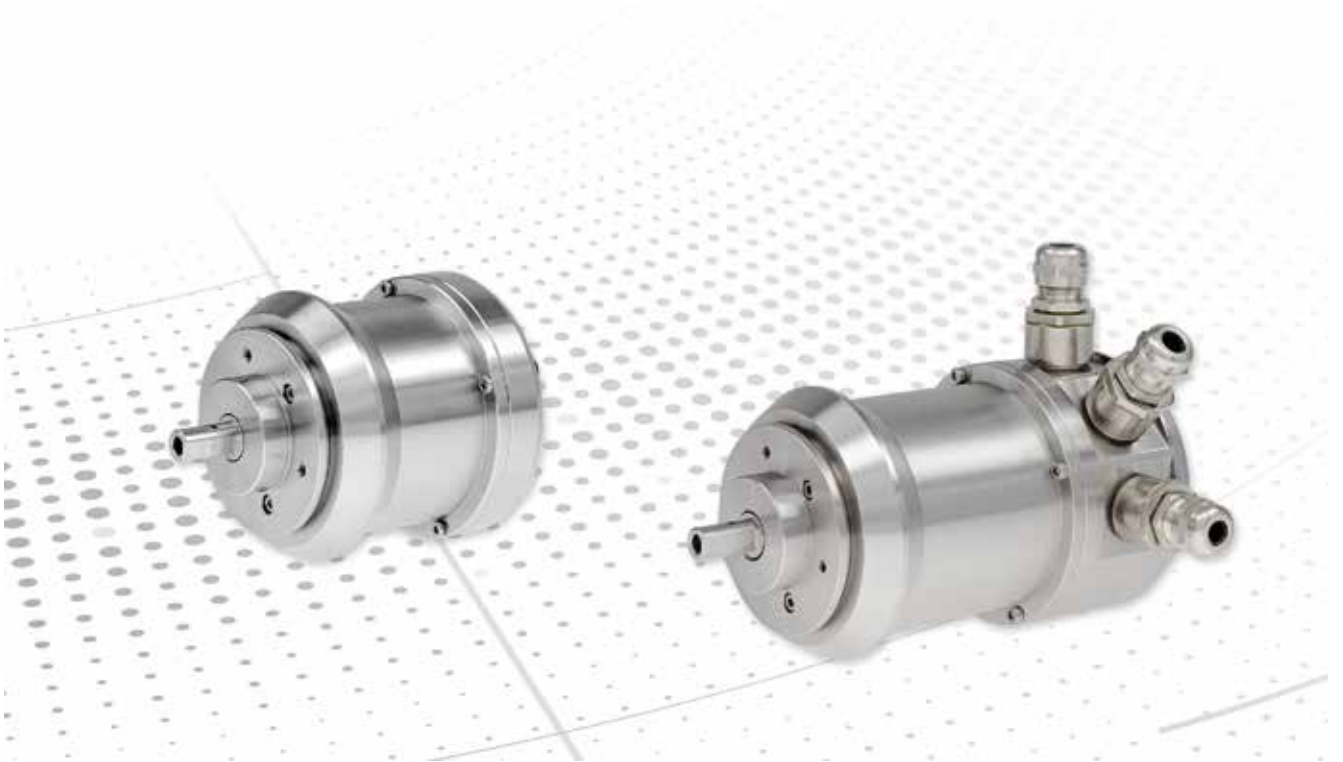


Dimensional Drawings

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.

Contents

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Stainless steel

Produkt	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	SSI Parallel Analog	  CANopen	  EtherCAT  
Option, additional interfaces (on request)	Analog INC Parallel	SSI Parallel Analog INC	
Weblink	www.tr-electronic.com/s/S007190	www.tr-electronic.com/s/S007190	www.tr-electronic.com/s/S007190
QR-Code			

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
CEV84 - Ethernet/IP						
CEV84M-10046	8192	4096	10FL19,5 ZB36	Axial	3 x M12	
CEV84 - PROFINET						
CEV84M-10049	8192	4096	10FL19,5 ZB36	Axial	3 x M12	
CEV84 - EtherCAT						
CEV84M-10050	8192	4096	10FL19,5 ZB36	Axial	3 x M12	
CEV84 - Sercos						
CEV84M-10051	8192	4096	10FL19,5 ZB36	Axial	3 x M12	
CEV84 - Powerlink						
CEV84M-10052	8192	4096	10FL19,5 ZB36	Axial	3 x M12	

Further product information

1. Enter order code into ...

Bestellnummer	Umdrehung	Weller
CMV58-A		
_CMV58S-00011	1,000	01067

2. Searchfield (top right) on www.tr-electronic.com



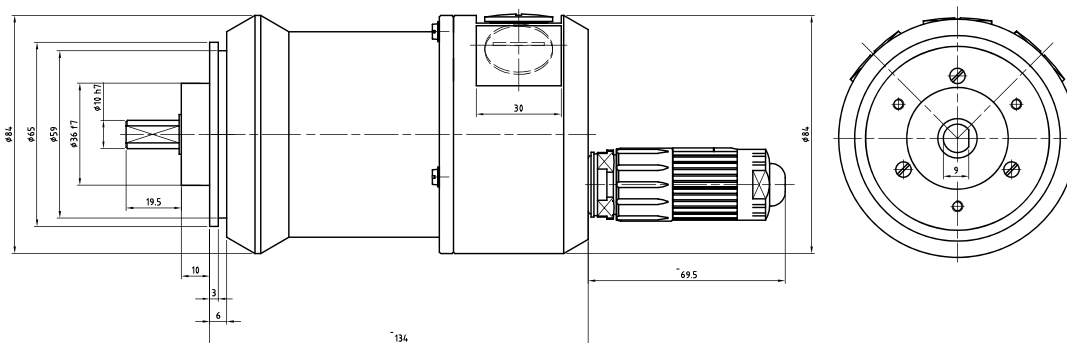
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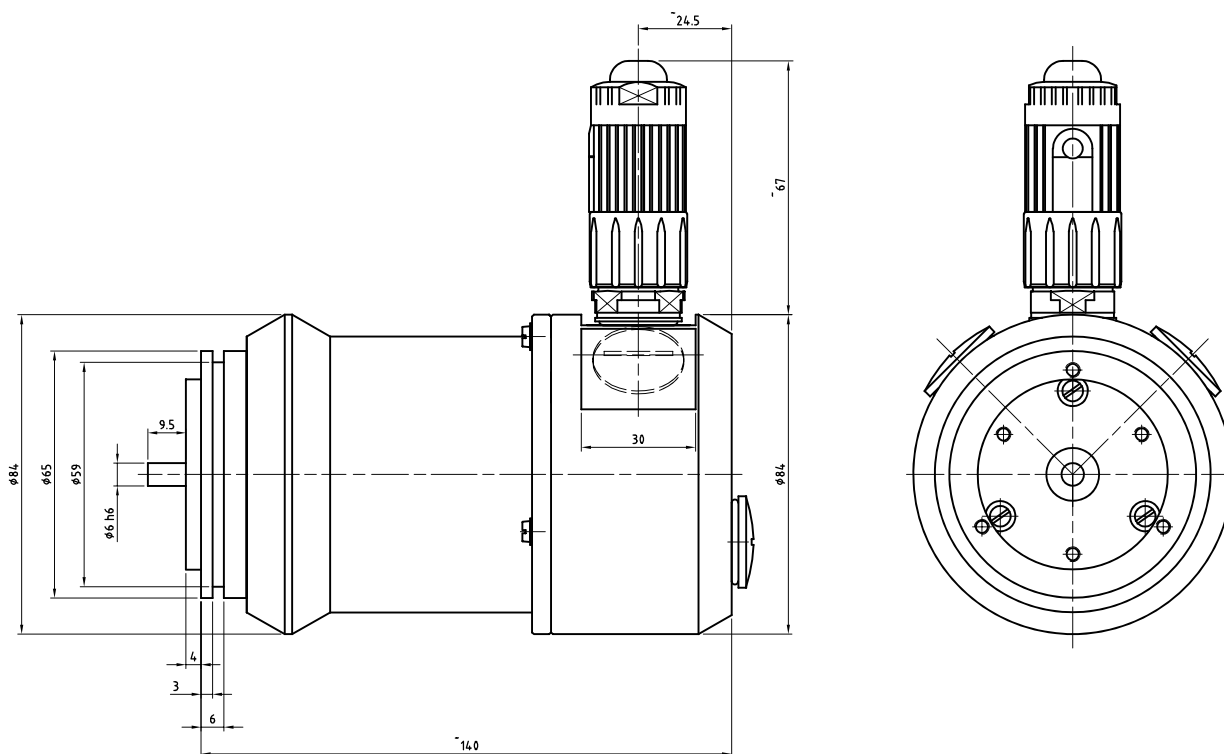
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Dimensional Drawings

CEV84
SSI, Analog, PAR - axial



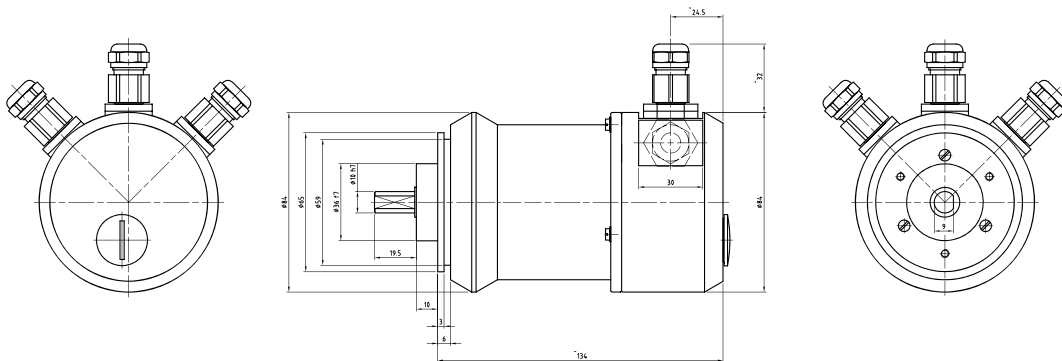
CEV84
SSI, Analog, PAR - radial



Dimensional Drawings

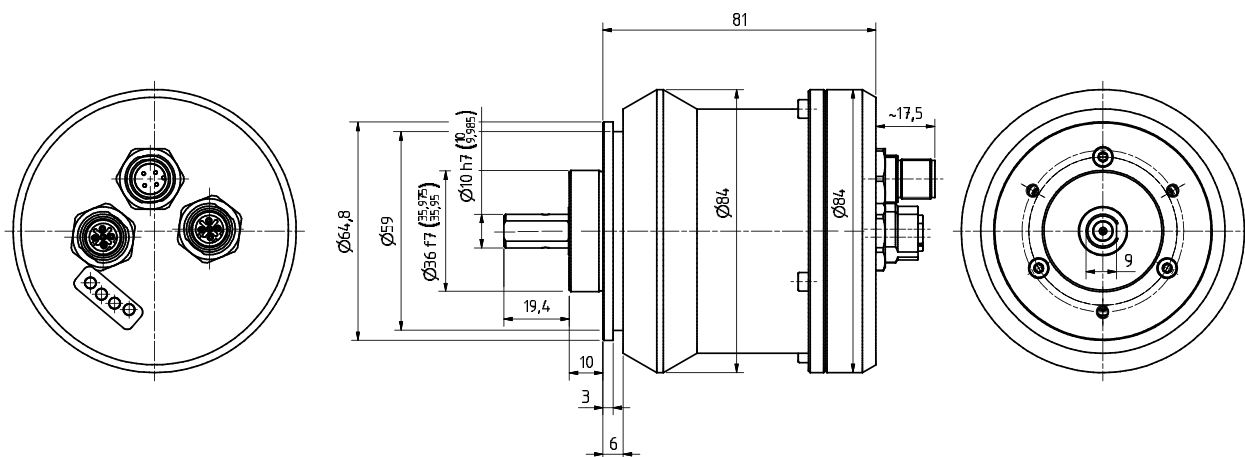
CEV84 Fieldbus

CANopen, CAN DeviceNet, Profibus



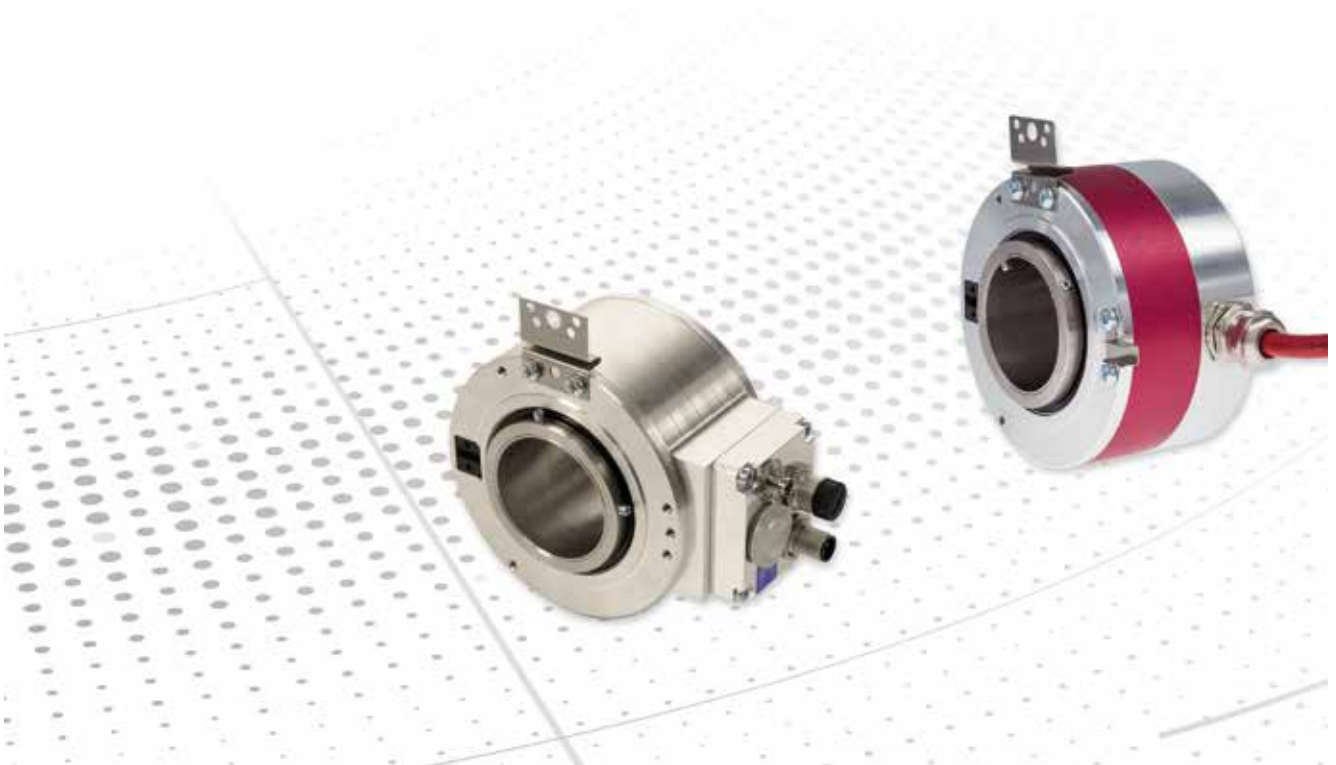
CEV84 Industrial Ethernet

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





Rotary Encoders - Family C_H110 - 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-Elec-





tronic. 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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Optical 15 bit (E)

Optical 18 bit (O)

Products	CEH110 	COH110 
Detection	Optical 15 bit (E)	Optical 18 bit (O)
Single / Multi	(M) Multi (S) Single	(M) Multi (S) Single
Supply	24 VDC (11...27)	24 VDC (11...27)
Steps per turn	32768	262144
Number of turns	256000	262144*
Shaft diameters available	15, 28, 30, 35, 38, 40, 45, 50	15, 28, 30, 35, 38, 40, 45, 50
Connectors	Cable gland, connector radial*	Cable gland, connector radial*
Ambient temperature	0...+60 °C (option -20...+70 °C)	0...+60 °C (option -20...+70 °C)
Protection class	IP54	IP54
Interface	<p>SSI EtherCAT</p> <p>PROFINET BUS</p>	<p>SSI EtherCAT</p> <p>PROFINET BUS</p>
Option, additional interfaces (on request)	INC	INC
Weblink	www.tr-electronic.com/s/S008519	www.tr-electronic.com/s/S008520
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	Connector position
CEH110 - SSI				
CEH110M-00001	4096	4096	30H7 Groove	Cable gland, 0,3 m cable, M23 12 pin
CEH110M-00009	8192	4096	50H7	Cable gland, 3 cable, open end
CEH110S-00002	8192	1	30H7 Groove	Cable gland, 0,3 m cable, M23 12 pin
COH110 - EtherCAT				
COH110M-00001	262144	4096	50H7	3 x M12 4 pin, 1 x M12 8 pin
COH110S-00001	262144	1	50H7	3 x M12 4 pin, 1 x M12 8 pin

Further product information

1. Enter order code into ...



2. Searchfield (top right) on www.tr-electronic.com



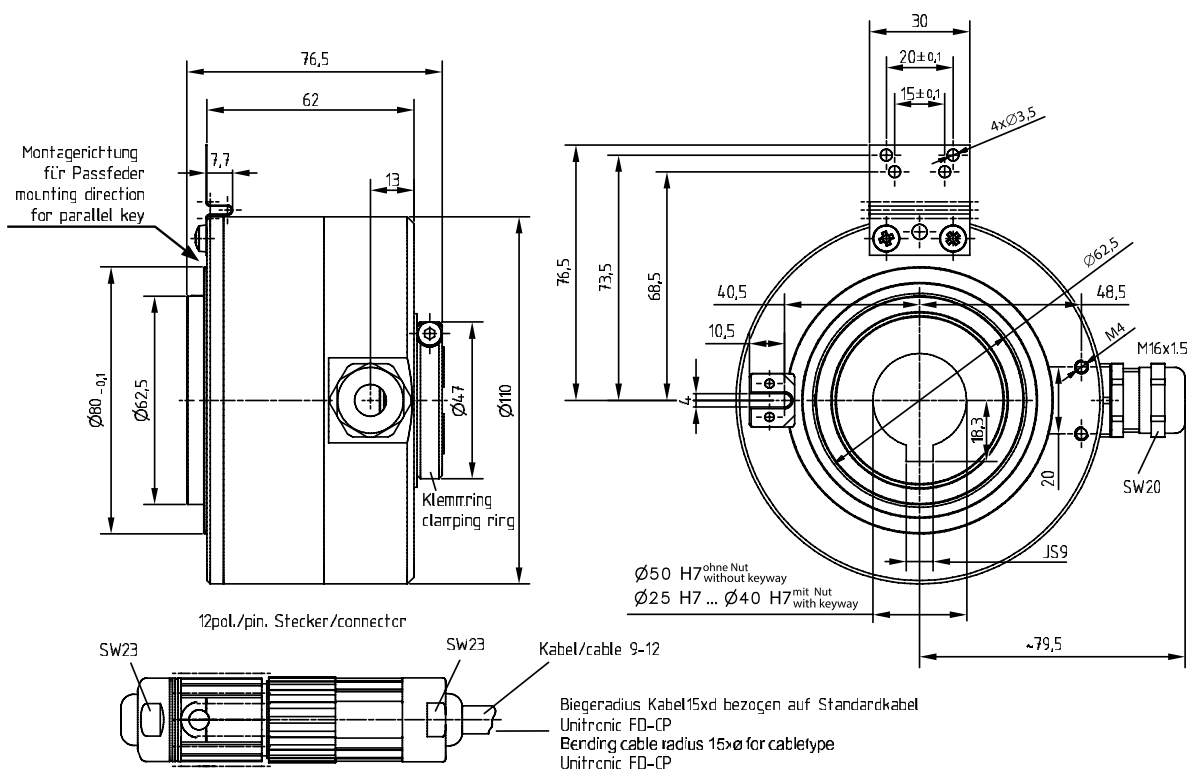
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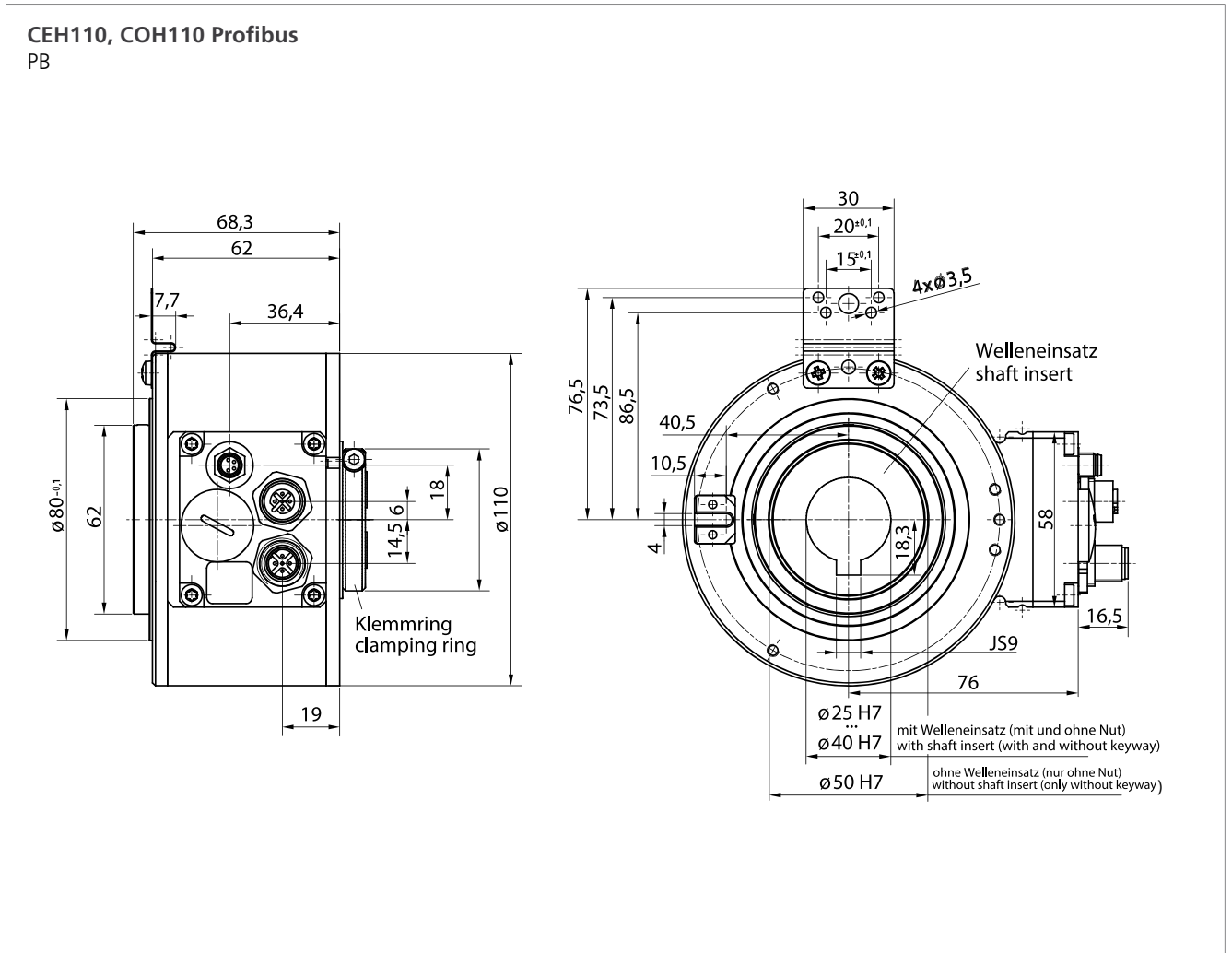
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Dimensional Drawings

CEH110, COH110 SSI
SSI

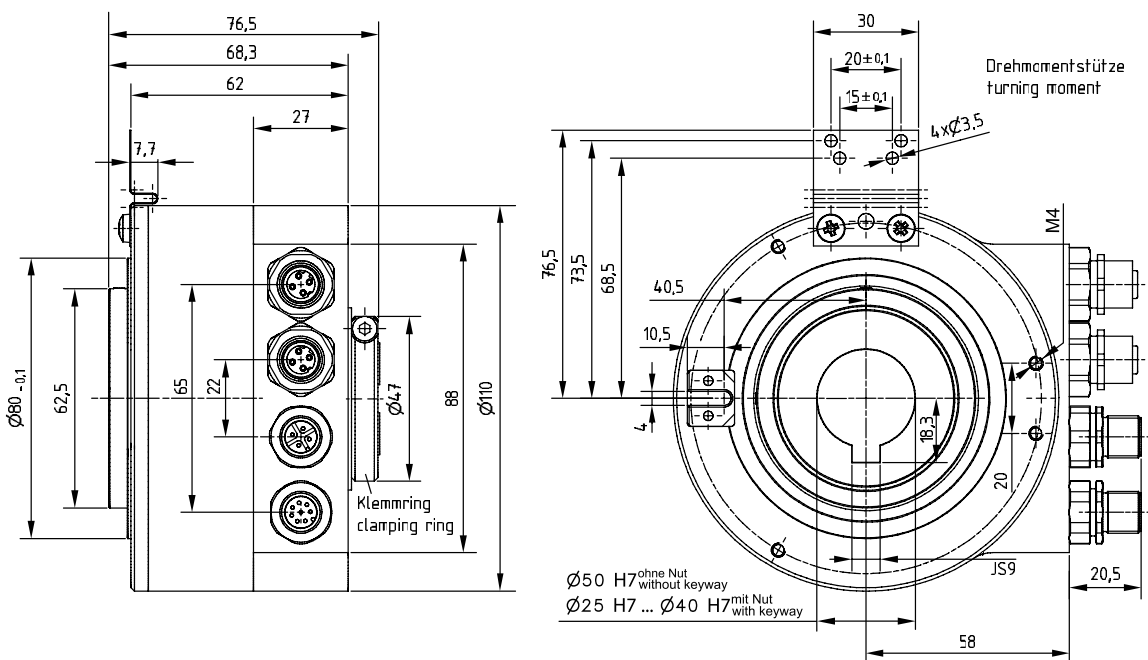


Dimensional Drawings

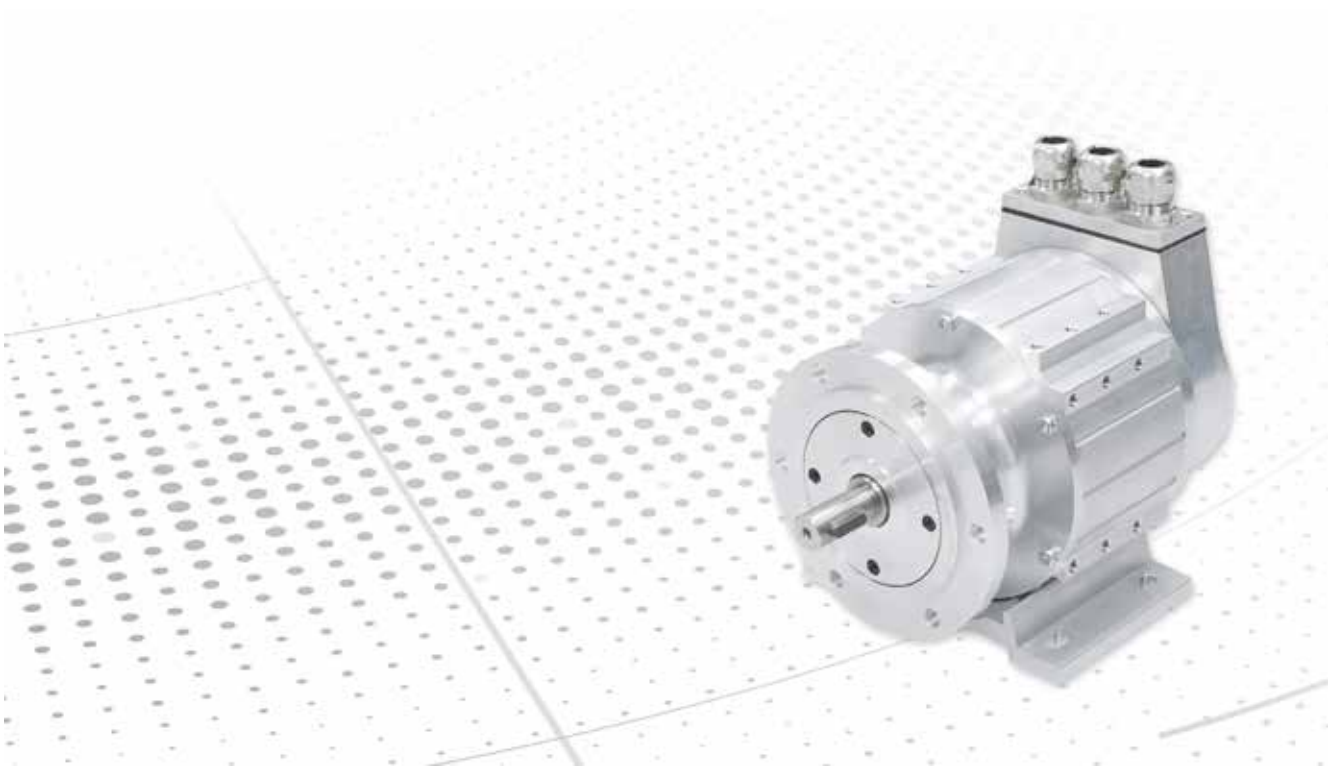


Dimensional Drawings

**CEH110, COH110 EtherCAT
ETC**



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, 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 family C_V115 from TR-Electronic offer thick-walled housings 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 and I__58 series are used.




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Housing option for rotary encoders

Encoder with protective housing

Double encoder with protective housing

Products	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	SSI  Analog  Parallel  Nocken    CANopen		SSI 
Option, additional interfaces (on request)	Analog INC Nocken	SSI	SSI INC
Weblink	www.tr-electronic.com/s/5008523	www.tr-electronic.com/s/5008524	www.tr-electronic.com/s/5008525
QR-Code			

Suggested Products

Order code	Steps per turn	Turns	Shaft / Flange	Connector position	Remark
CEV115 SSI					
CEV115M-01368	4096	4096	14 Keyway /33	Cable gland, 10 m cable	
CEV115M-10021	4096	4096	20 Keyway /40	M23 12 radial	Address 10 factory set
CEV115 Profibus					
CEV115M-10010	8192	4096	14 Keyway /33	Fieldbus hood with 3 x PG 11 cable glands	
CEV115 Profibus + SSI					
CEV115M-10024	4096	4096	20 Keyway /40	Fieldbus hod with 3 x M16 cable glands	
CEV115 Ethernet / IP					
CEV115M-10054	8192	4096	14 Keyway /33	3 x M12, 1 x M23 radial	
CEV115M-10055	8192	4096	14 Keyway /33	3 x M12 radial	
AEV115 Profibus					
AEV115M-00001	4096	4096	20 Keyway /40	Fieldbus hood with 3 x M16 cable glands	
ADV115 Double encoder Profibus + SSI, SSI + INC					
ADV115M-00001	8192 / 8192	4096 / 4096	20 Keyway /40	Fieldbus hood with 4 x M16 cable glands	

Further product information

1. Enter order code into ...



2. Searchfield (top right) on www.tr-electronic.com



3. Choose desired information

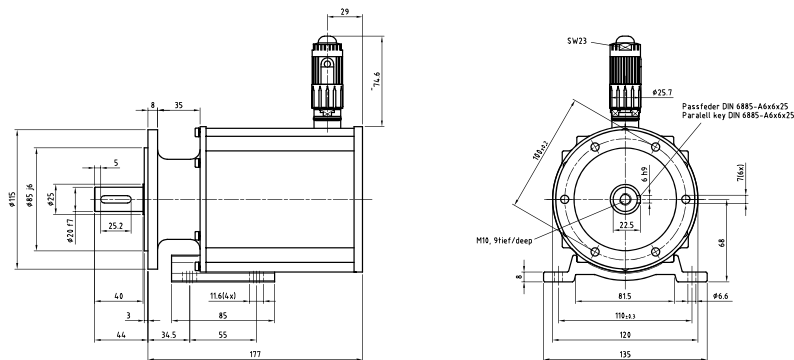


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Dimensional Drawings

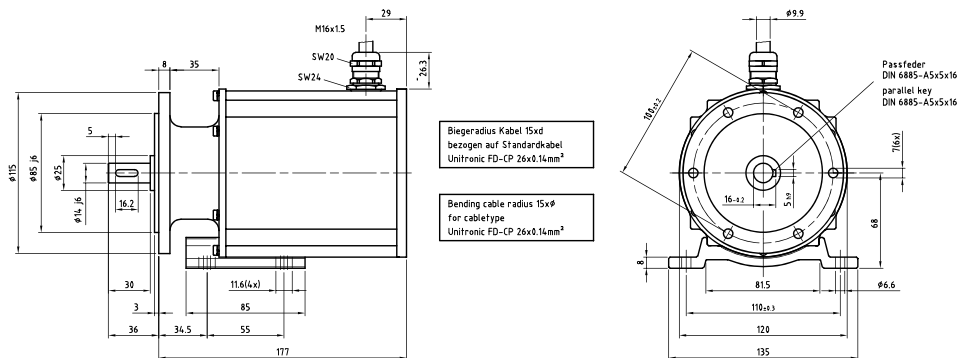
CEV115

1 x M23 12 pin radial (e.g. SSI)



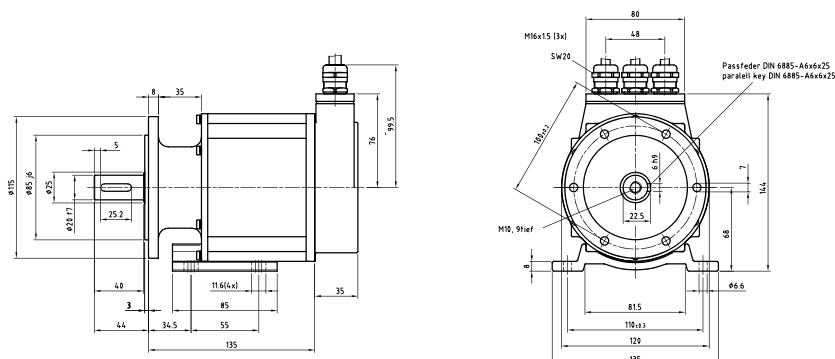
CEV115

1 x Cable gland radial (e.g. SSI)

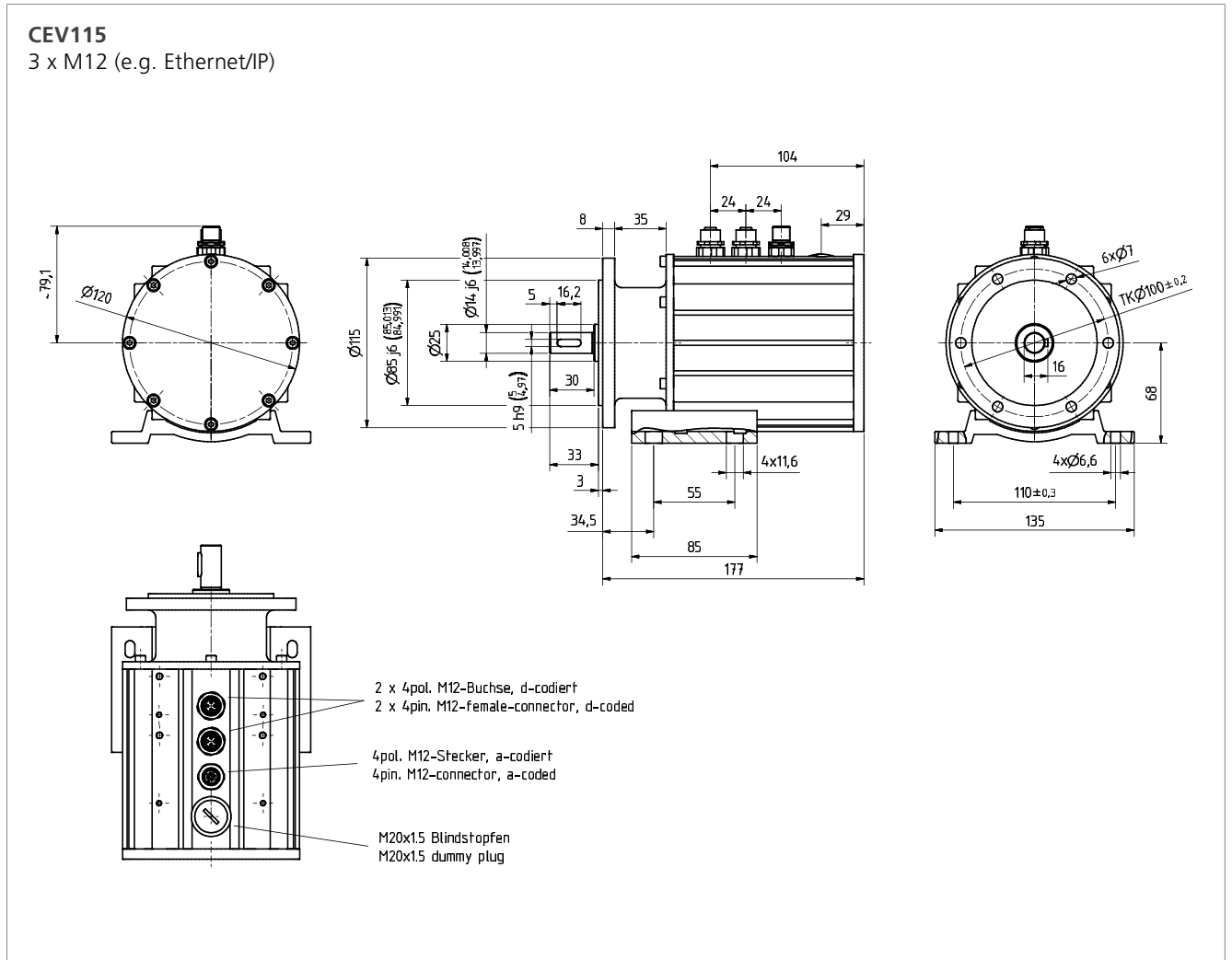


CEV115

Fieldbus hood with 3 x cable gland, for e.g. field busses



Dimensional Drawings

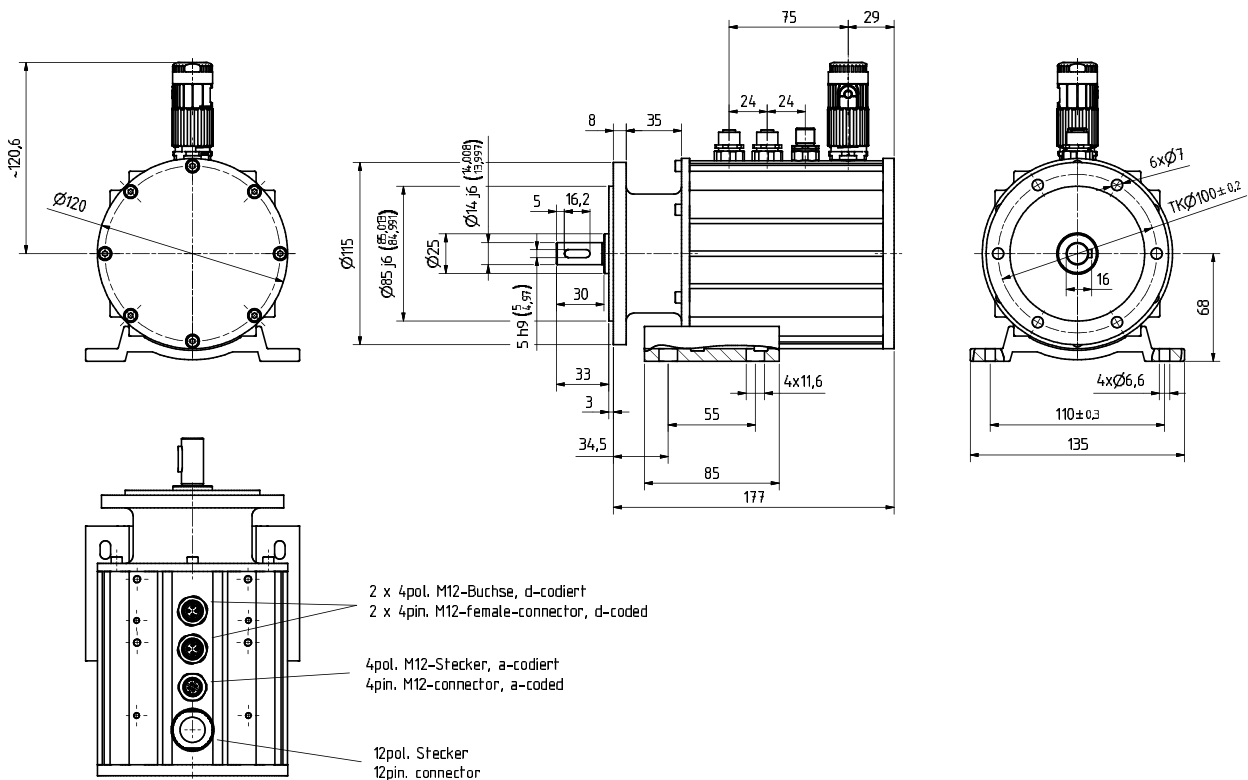


Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at www.tr-electronic.com or on request.

Dimensional Drawings

CEV115

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

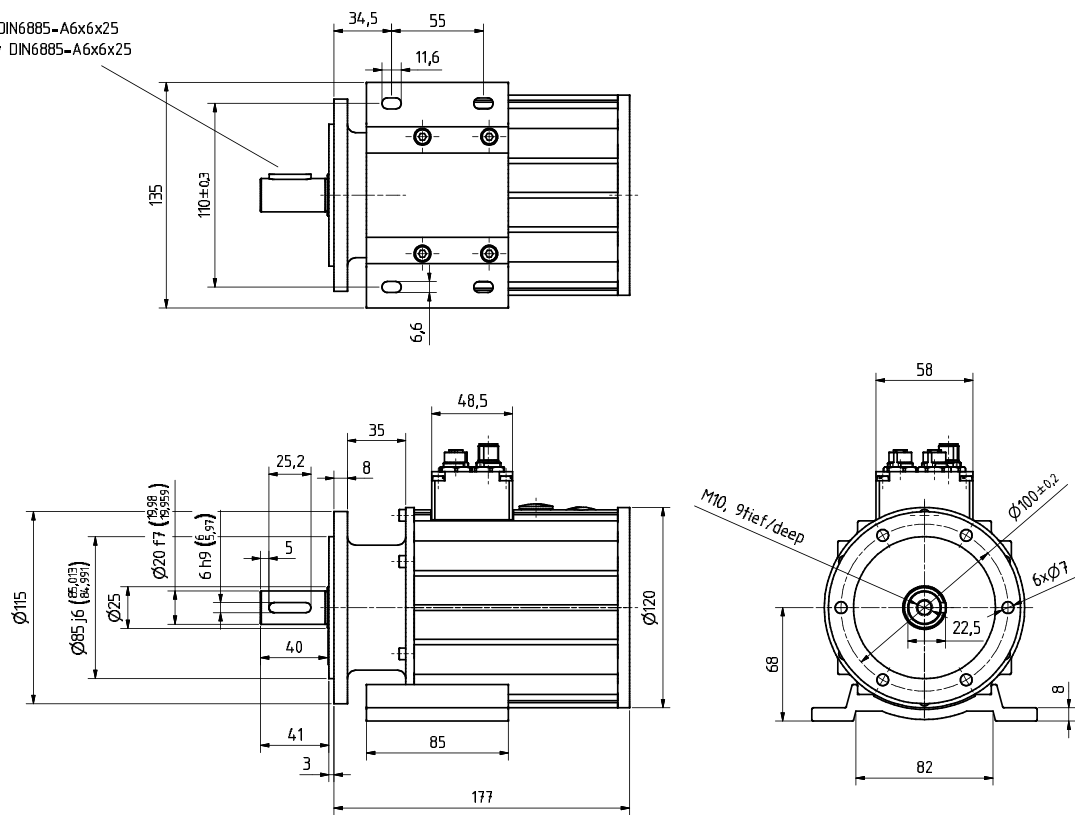


Dimensional Drawings

CEV115

Connector hood radial for PROFINET, EtherCAT

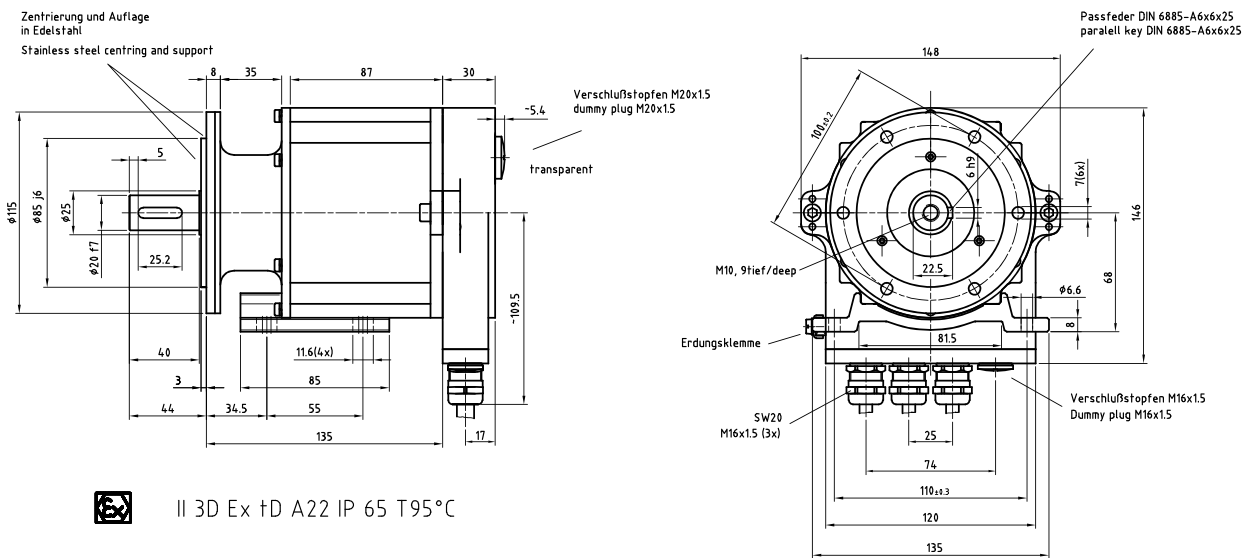
Passfeder DIN6885-A6x6x25
parallel key DIN6885-A6x6x25



Dimensional Drawings

AEV115

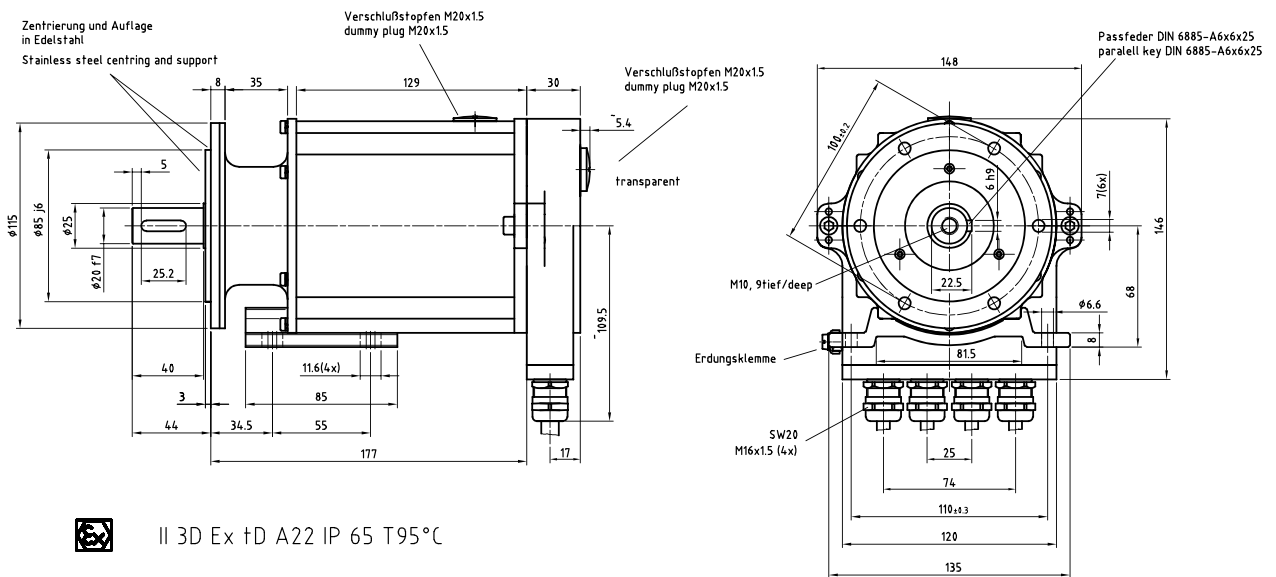
Connection hood, same orientation as mounting foot



Dimensional Drawings

ADV115

Connection hood, same orientation as mounting foot





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 sizes from 75 mm (hollow shaft or solid shaft). Standard interfaces such as Double SSI, PROFIsafe via PROFIBUS, PROFIsafe via PROFINET or Open-Safety via Powerlink guarantee optimal safety and pre-



















cision. 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.

Contents

Products.....	155
Suggested Products.....	157
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Optical detection (E)

Magnetic detection (M)

Products	CDV75M	CDV75MM	CDH75M
			
Detection	Optical detection (E)	Magnetic detection (M)	Optical detection (E)
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	32768	32768	32768
Properties	Fast optical main detection	Dewfall proof	Fast optical main detection
Shaft diameters available	10mm with keyway	10mm with keyway	20mm with keyway
Connectors	Connectors radial, cable glands radial (SSI)	Connectors radial, cable glands radial (SSI)	Connectors radial, cable glands radial (SSI)
Ambient temperature	-20...+70 °C	-20...+70 °C	-20...+70 °C
Protection class	IP 54	IP 65	IP 54
ATEX-zone			
Interface	   	   	   
Option, additional interfaces (on request)	INC	INC	INC
Weblink	www.tr-electronic.com/s/S007271	www.tr-electronic.com/s/S007271	www.tr-electronic.com/s/S007272
QR-Code			

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

Optical detection (E)

Products	ADV75M	ADH75M	ADV88M
			
Detection	Optical detection (E)	Optical detection (E)	Optical detection (E)
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	32768	32768	32768
Properties	Fast optical main detection	Fast optical main detection	Fast optical main detection
Shaft diameters available	10mm with keyway	20mm with keyway	10mm with keyway
Connectors	Connectors radial, cable glands radial (SSI)	Connectors radial, cable glands radial (SSI)	Cable gland axial
Ambient temperature	-20...+70 °C	-20...+70 °C	-20...+60 °C
Protection class	IP 54	IP 54	IP 65
ATEX-zone	Zone 2/22	Zone 2/22	Zone 1/21
Interface	   	   	 
Option, additional interfaces (on request)	INC	INC	INC
Weblink	www.tr-electronic.com/s/S007273	www.tr-electronic.com/s/S007274	
QR-Code			

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
CDV75M-SSI (D) Double detection, solid shaft, SSI						
CDV75M-00001	8192	4096	10Keyway/19,5 ZB50	2 x Cable gland	2 x Cable gland	TTL Incr -20...70°C
CDV75M-PB (D) Double detection, solid shaft, Profibus						
CDV75M-00008	8192	32768	10Keyway/19,5 ZB50/D75 9XM4	Connector radial	Connector radial	SIN/COS -20°...70°C
CDV75M-PN (D) Double detection, solid shaft, Profinet						
CDV75M-00012	8192	32768	10Keyway/19,5 ZB50/D75 9XM4	Connector radial	Connector radial	TTL Incr -20°...70°C
CDV75M-00014	8192	32768	10Keyway/19,5 ZB50/D75 9XM4	Connector radial	Connector radial	
CDV75M-00018	8192	32768	10Keyway/19,5 ZB36	Connector radial	Connector radial	TTL Incr -20°...70°C IP65
CDV75M-00026	8192	32768	10Keyway/19,5 ZB50/D75 9XM4	Connector radial	Connector radial	seawater-resistant
CDV75M-00020	8192	32768	10Keyway/19,5 ZB36	Connector radial	Connector radial	Stainless steel
CDV75M-EPL (D) Double detection, solid shaft, Powerlink						
CDV75M-00021	8192	32768	10Keyway/19,5 ZB36	Connector radial	Connector radial	
CDH75M-SSI (D) Double detection, hollow shaft, SSI						
CDH75M-00001	8192	4096	20H7/Keyway slot for pin D4	2 x Cable gland	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	2 x Cable gland	
CDH75M-PB (D) Double detection, hollow shaft, Profibus						
CDH75M-00008	8192	32768	20H7/Keyway slot for pin D4	Connector radial	Connector radial	TTL Incr -20°...70°C
CDH75M-PN (D) Double detection, hollow shaft, Profinet						
CDH75M-00013	8192	32768	20H7/Keyway slot for pin D4	Connector radial	Connector radial	TTL Incr -20°...70°C
CDH75M-00019	8192	32768	20H7/Keyway slot for pin D4	Connector radial	Connector radial	seawater-resistant
CDH75M-EPL (D) Double detection, hollow shaft, Powerlink						
CDH75M-00026	8192	32768	20H7/Keyway slot for pin D4	Connector radial	Connector radial	

For further product information simply enter the order number in the search field at www.tr-electronic.de.

Suggested Products

Order code	Steps per turn	Turns	Shaft / Flange	Connector position	Connector type	Remark
ATEX ADV75M-PB (D) Double detection, solid shaft, Profibus						
ADV75M-00001	8192	32768	10Keyway/19,5 ZB50/D75 9XM4	Connector radial	Connector radial	II 3G Ex nAc IIC T6X - II 3D Ex tc IIIC T65°C IP64 X
ATEX ADV75M-PN (D) Double detection, solid shaft, Profinet						
ADV75M-00002	8192	32768	10Keyway/19,5 ZB50/D75 9XM4	Connector radial	Connector radial	II 3G Ex nAc IIC T6X - II 3D Ex tc IIIC T65°C IP64 X
ATEX ADH75M-PB (D) Double detection, hollow shaft, Profibus						
ADH75M-00001	8192	32768	20H7/Keyway slot for pin D4	Connector radial	Connector radial	II 3G Ex nAc IIC T6X - II 3D Ex tc IIIC T65°C IP64 X
ATEX ADH75M-PN (D) Double detection, hollow shaft, Profinet						
ADH75M-00002	8192	32768	20H7/Keyway slot for pin D4	Connector radial	Connector radial	II 3G Ex nAc IIC T6X - II 3D Ex tc IIIC T65°C IP64 X

Further product information

1. Enter order code into ...



2. Searchfield (top right) on www.tr-electronic.com



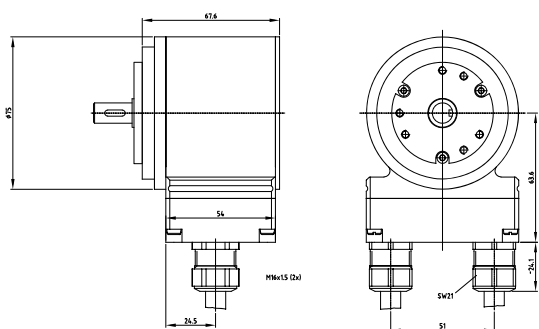
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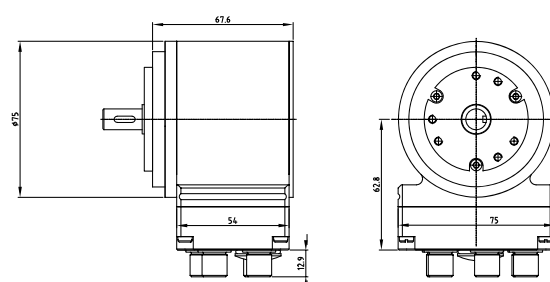
We will help you to select the most suitable products from the complete TR range. Please contact us (info@tr-electronic.de).

Dimensional Drawings

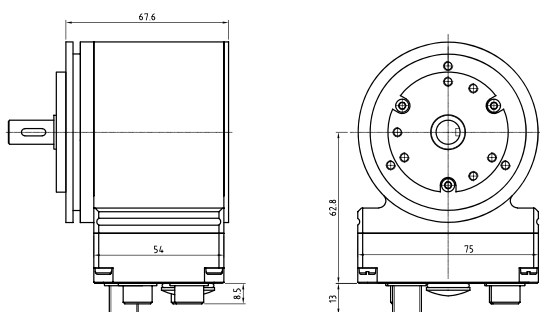
CDV75-SSI
Absolute encoder CDV75M - SSI



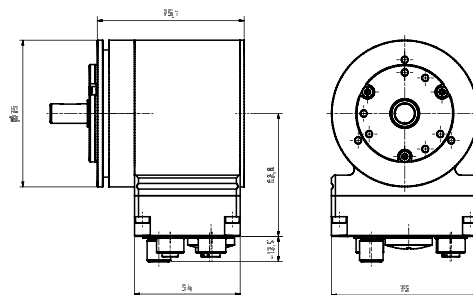
CDV75-PB
Absolute encoder CDV75M - PB



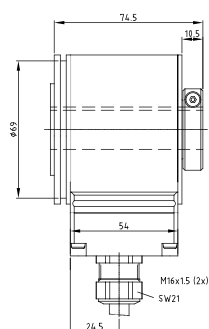
CDV75-PN / EPL
Absolute encoder CDV75M - PROFINET / PROFIsafe , -
Powerlink / openSAFETY



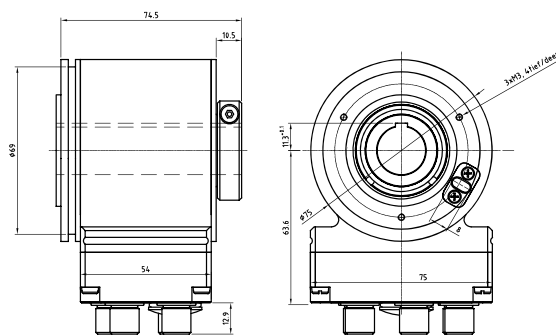
CDV75-PN
Absolute encoder CDV75M PROFINET / PROFIsafe+FS
SealPack



CDH75-SSI
Absolute encoder CDH75M - SSI



CDH75-PB
Absolute encoder CDH75M - PB

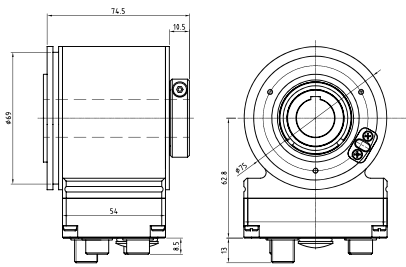


Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at www.tr-electronic.com or on request.

Dimensional Drawings

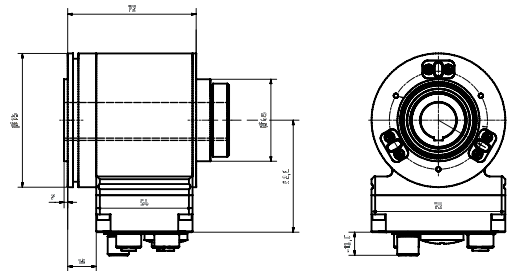
CDH75-PN / EPL

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



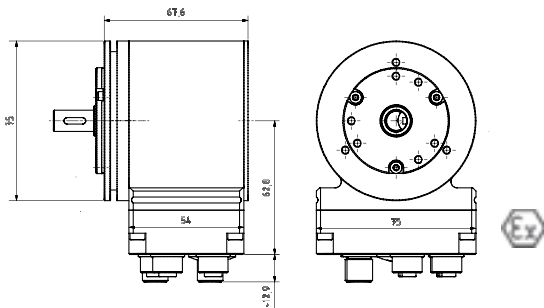
CDH75-PN

Absolute encoder CDH75M PROFINET / PROFIsafe+FS SealPack



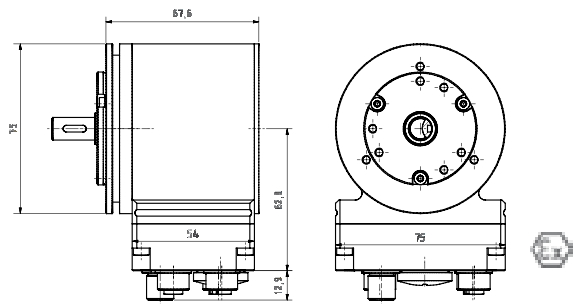
ADV75-PB

ATEX zone 2/22 absolute encoder ADV75M - PB



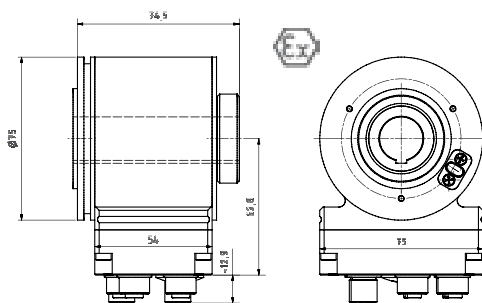
ADV75-PN

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



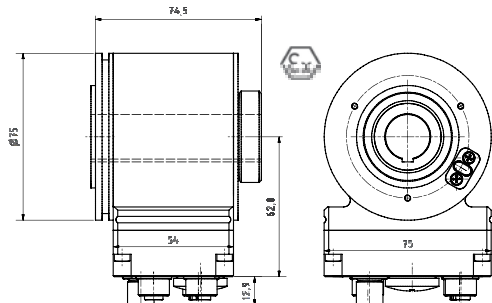
ADH75-PB

ATEX absolute encoder ADH75M - PB



ADH75-PN

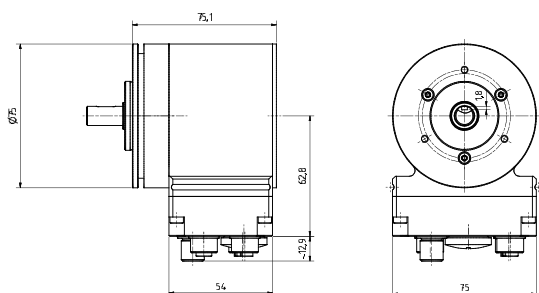
ATEX zone 2/22 absolute-encoder ADH75M - PROFINET / PROFIsafe



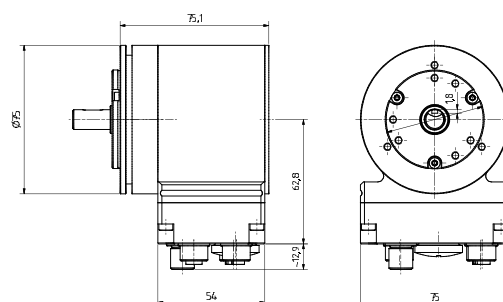
Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at www.tr-electronic.com or on request.

Dimensional Drawings

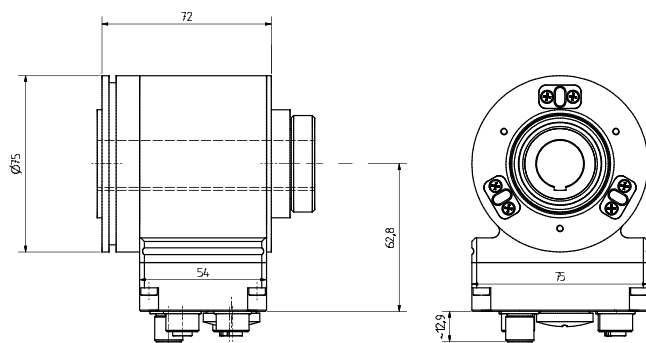
Seal Pack
Sample CDV75



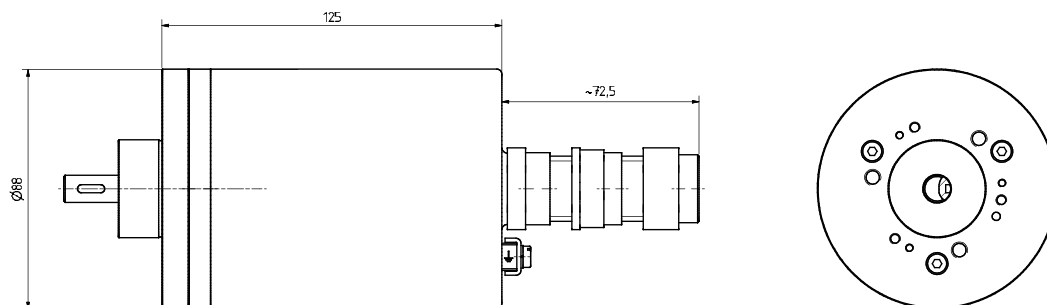
Stainless Steel
Sample CDV75



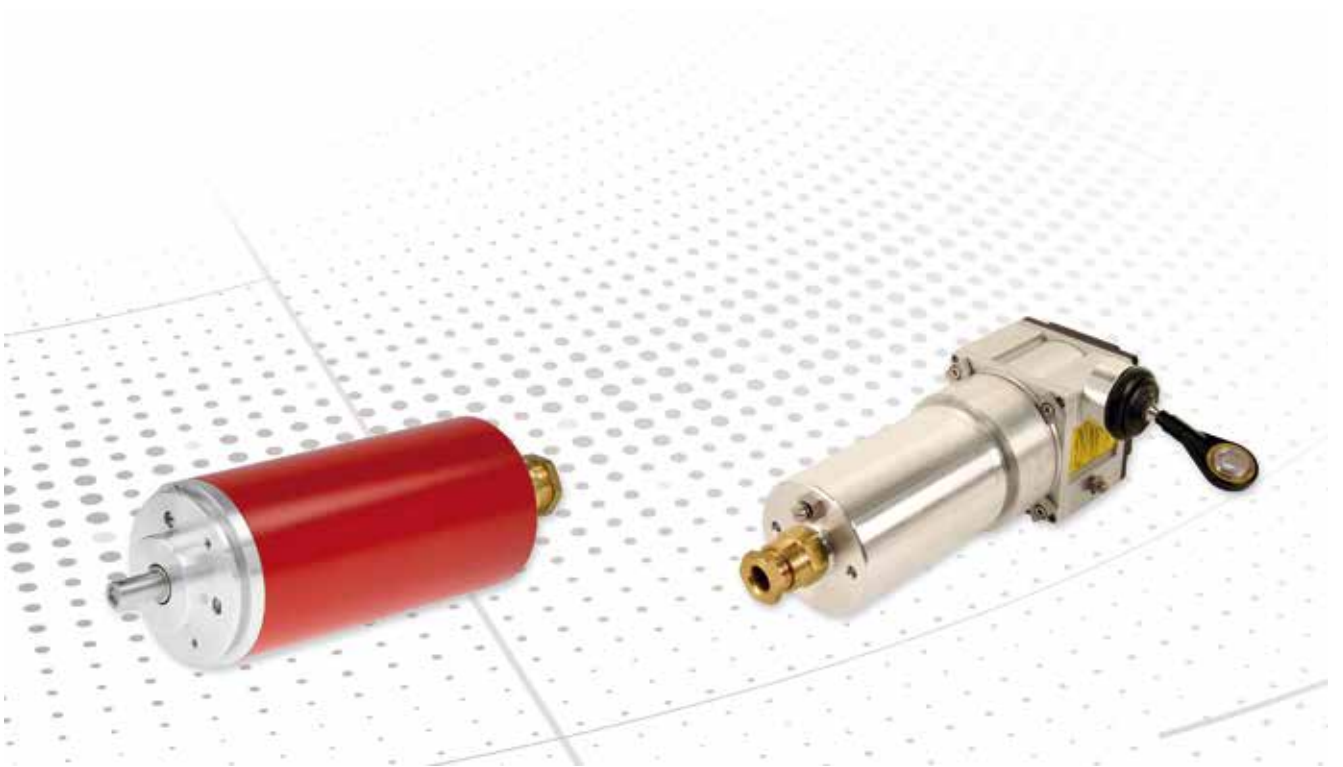
Seawater-resistant Aluminum
Sample CDH75



ADV88
ATEX zone 1/21



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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Suggested Products.....	164
Dimensional Drawings.....	165

Housing option for rotary encoders

Absolute rotary encoder SIL3/Plc

Products	AEV70	AOV70	ADV88M
			
Type	Housing option for rotary encoders	Housing option for rotary encoders	Absolute rotary encoder SIL3/Plc
Single / Multi	(M) Multi (S) Single	(M) Multi (S) Single	(M) Multi
Supply	11...27 VDC	11...27 VDC	11...27 VDC
Full resolution	<= 33 bit *	<= 36 bit *	28 bit
Steps per turn	<= 32768 *	<= 262144 *	8192
Number of turns	<= 256000 *	<= 262144 *	32768
Shaft diameters available	6...12mm	6...12mm	10mm with groove
Connectors	Cable gland with ATEX-specified cable	Cable gland with ATEX-specified cable	Cable gland axial
Ambient temperature	-20...+60 °C	-20...+60 °C	-20...+60 °C
Protection class	IP65 (option IP67)	IP65 (option IP67)	IP65
ATEX-zone	1/21	1/21	1/21
Interface	SSI INC Analog SIN / COS ASI PROFINET BUS	SSI INC Analog SIN / COS ASI PROFINET BUS	SSI ETHERCAT POWERLINK
Option, additional interfaces (on request)	Analog INC	Analog INC	INC
Weblink	www.tr-electronic.com/s/S008508	www.tr-electronic.com/s/S008508	
QR-Code			

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	Remark
AEV70M SSI					
AEV70M-00100	4096	4096	10FL/19,5 - ZB36	Cable gland axial, 20 m cable (ATEX cert.)	
AEV70M Profibus					
AEV70M-00101	4096	4096	12NT/19,5 - ZB36	Cable gland axial, 10 m cable (ATEX cert.)	Address 10 factory set

Further product information

1. Enter order code into ...



2. Searchfield (top right) on www.tr-electronic.com



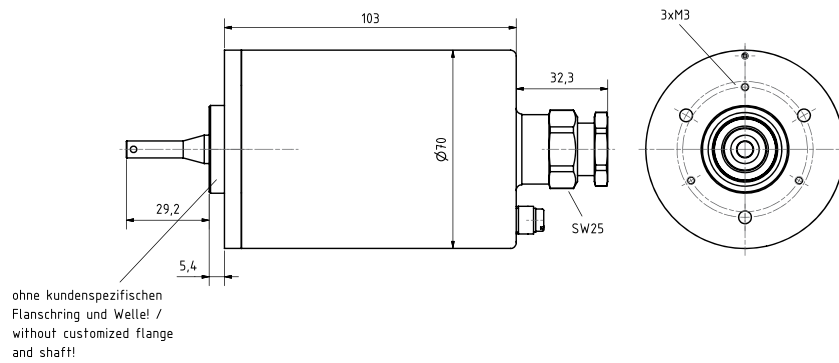
3. Choose desired information



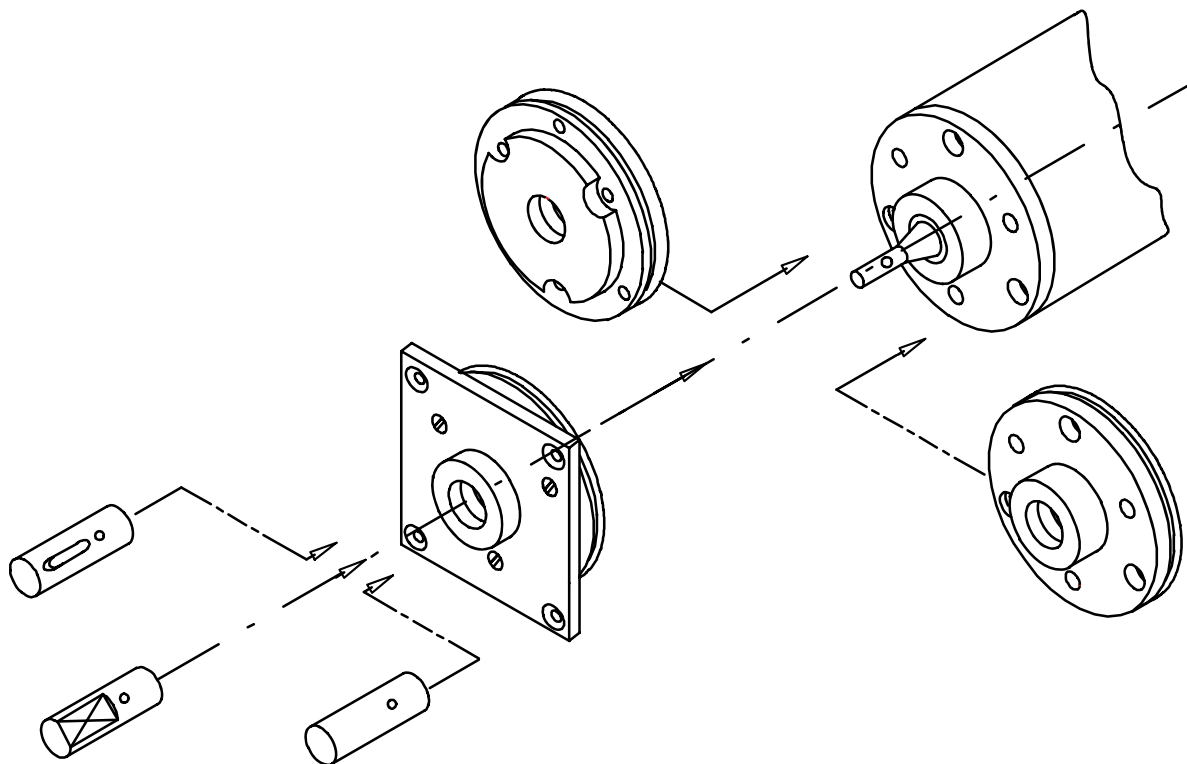
We will help you to select the most suitable products from the complete TR range. Please contact us (info@tr-electronic.de).

Dimensional Drawings

A_V70 Basic device without flange / shaft
 Flange / shaft can be chosen from the C__65 family



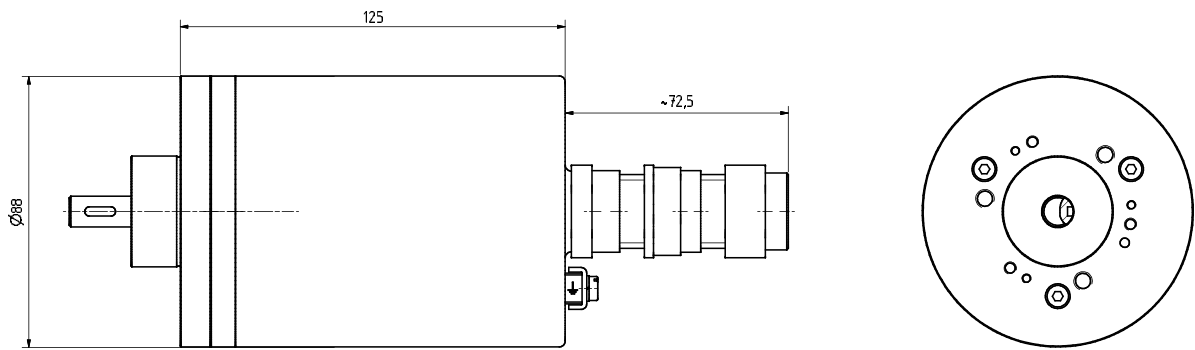
A_V70 Modular flange / shaft assembly



Dimensional Drawings

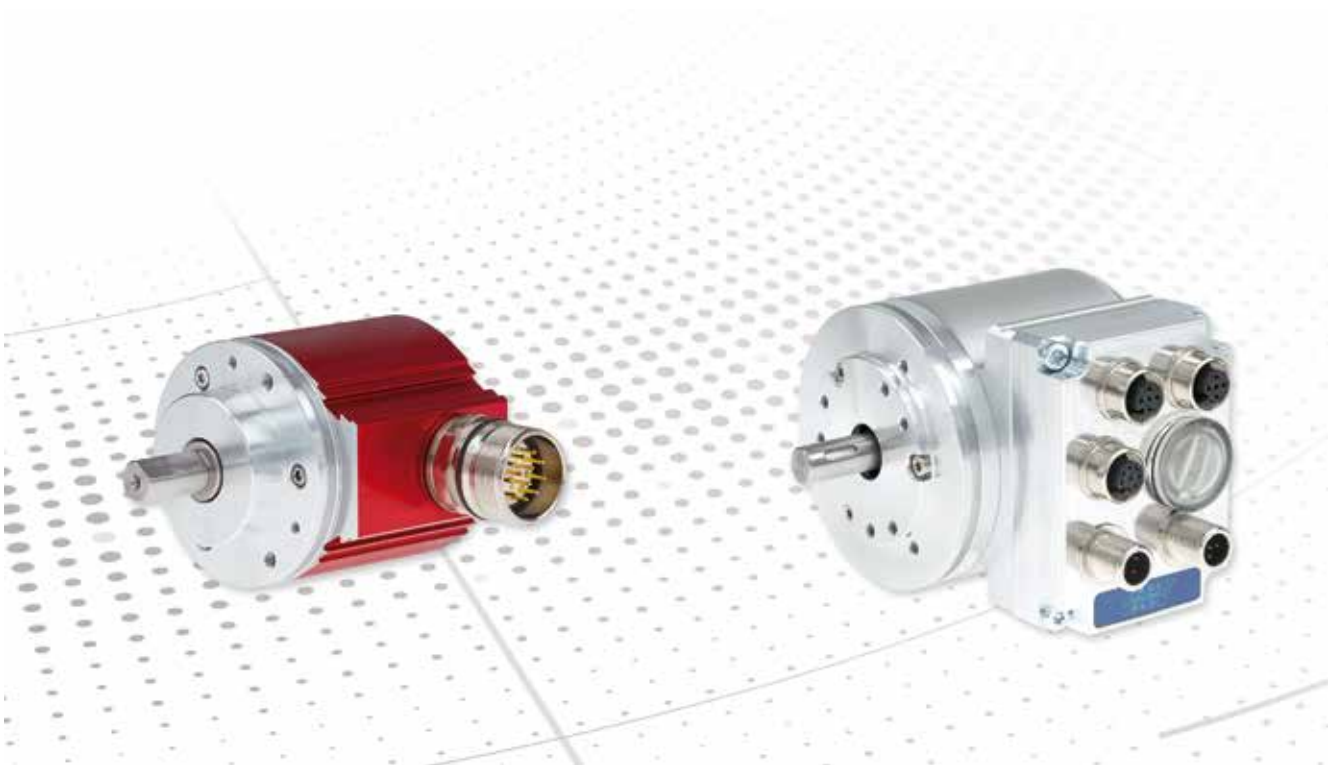
ADV88

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.

Contents

Products.....	169
Suggested Products.....	172
Dimensional Drawings.....	173

A__58

Products	AMV58	AEV58	AES58
			
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 (12...30 VDC)*	11...27 VDC	11...27 VDC
Full resolution	<= 24 bit *	<= 33 bit *	<= 33 bit *
Steps per turn	<= 4096 *	<= 32768 *	<= 32768 *
Number of turns	<= 4096 *	<= 256000 *	<= 256000 *
Special			
Shaft diameters available	6...12 mm	6...12 mm	8, 10, 12 mm
Connectors	Connector axial or radial *	Cable gland or connector, radial or axial, fieldbus hood radial *	Connector axial or radial *
Ambient temperature	-20...+70 °C	-20...+70 °C	-20...+70 °C
Protection class	IP65	IP65	IP65
ATEX-zone	2/22	2/22	2/22
Interface	Analog	SSI Analog	SSI Analog
Option, additional interfaces (on request)			
Weblink	www.tr-electronic.com/s/S008452	www.tr-electronic.com/s/S007163	www.tr-electronic.com/s/S007164
QR-Code			

* depending on the interface







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

A__65
AD_75

Products	AEV65	ADV75M	ADH75M	
				
Detection	Optical 15 bit (E)	Optical detection (E)	Optical detection (E)	
Single / Multi	(M) Multi (S) Single	(M) Multi	(M) Multi	
Supply	11...27 VDC (A: 18...27VDC)	11...27 VDC	11...27 VDC	
Full resolution	<= 33 bit	28 bit	28 bit	
Steps per turn	32768	8192	8192	
Number of turns	25600	32768	32768	
Special		SIL3 / Ple	SIL3 / Ple	
Shaft diameters available	6...12 mm	10mm with keyway	20 mm with keyway	
Connectors	Connectors axial or radial *	Connectors radial, cable glands radial (SSI)	Connectors radial, cable glands radial (SSI)	
Ambient temperature	-20...+60 °C	-20...+70 °C	-20...+70 °C	
Protection class	IP64	IP54	IP54	
ATEX-zone	2/22	Zone 2/22	Zone 2/22	
Interface	SSI Analog	SSI   	SSI   	
Option, additional interfaces (on request)		INC	INC	
Weblink	www.tr-electronic.com/s/S007151	www.tr-electronic.com/s/S007273	www.tr-electronic.com/s/S007274	
QR-Code				

* depending on the interface

A_V115

<p>AEV115</p> 	<p>ADV115</p> 
Optical 15 bit (E)	Double detection (D)D
(M) Multi (S) Single	(M) Multi (S) Single
11...27 VDC	11...27 VDC
25 bit	25 bit
8192	8192
256000	256000
12, 14, 20	12, 14, 20
Cable gland	Cable gland
0...+40 °C	0...+40 °C
IP65	IP65
22	22
	<p>SSI</p> 
<p>SSI</p>	<p>SSI INC</p>
<p>www.tr-electronic.com/s/S008524</p>	<p>www.tr-electronic.com/s/S008525</p>
	

* depending on the interface

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

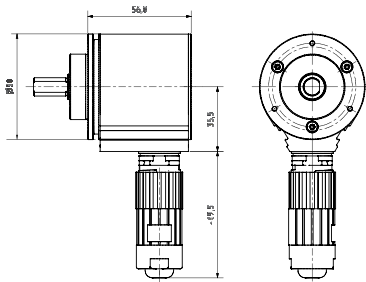
Suggested Products

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

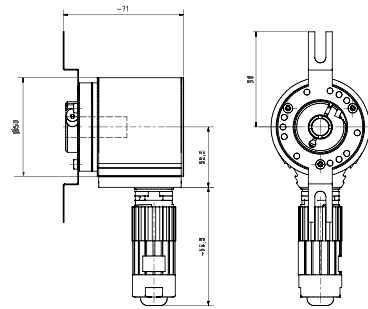
For further product information simply enter the order number in the search field at www.tr-electronic.de.

Dimensional Drawings

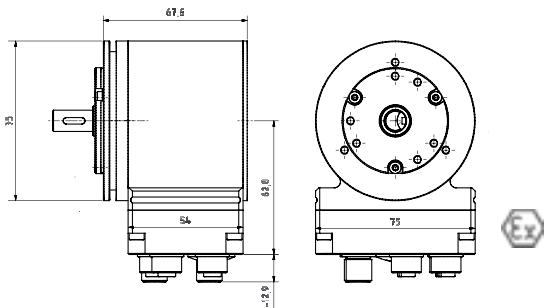
AEV58-SSI
ATEX zone 2/22



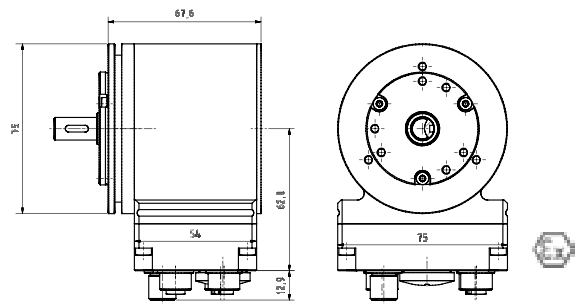
AES58-SSI
ATEX zone 2/22



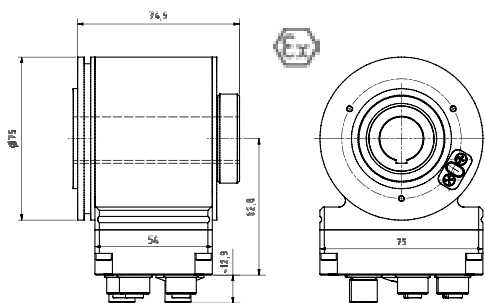
ADV75-PB
ATEX zone 2/22 absolute encoder ADV75M - PB



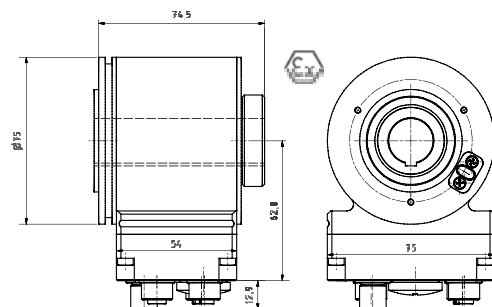
ADV75-PN
ATEX zone 2/22 absolute encoder ADV75M - PROFINET / PROFIsafe



ADH75-PB
ATEX absolute encoder ADH75M - PB



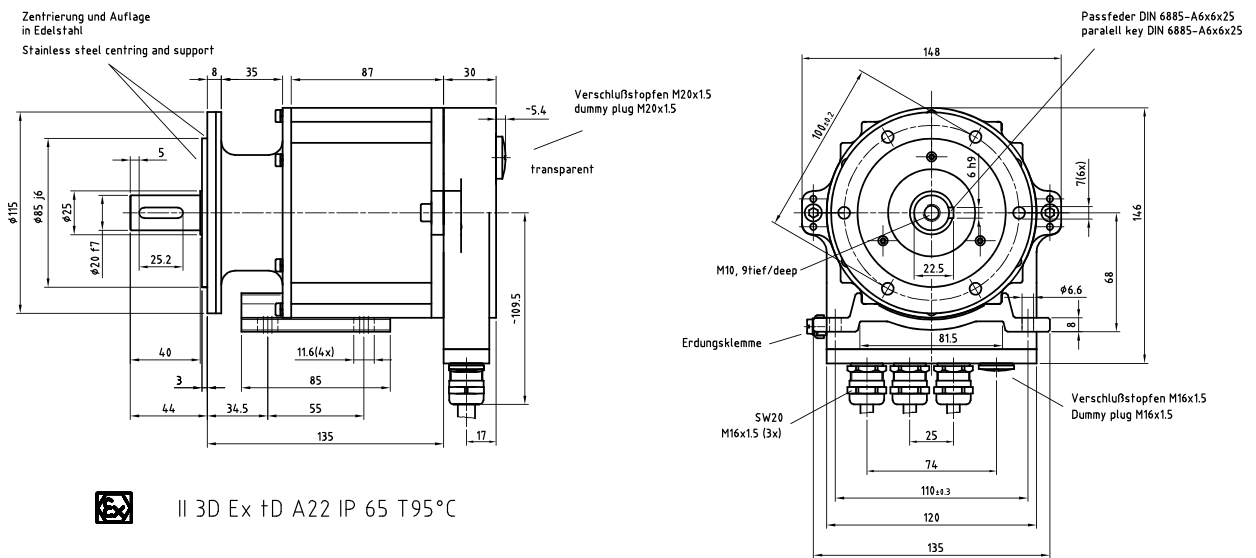
ADH75-PN
ATEX zone 2/22 absolute encoder ADH75M - PROFINET / PROFIsafe



Dimensional Drawings

AEV115

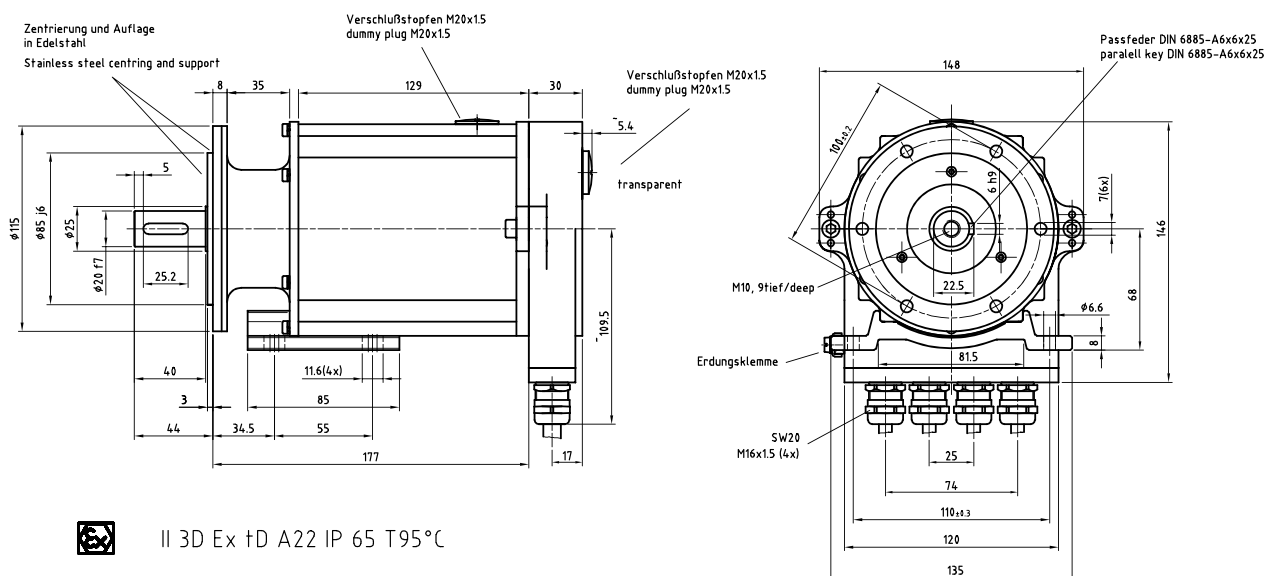
Connection hood same orientation as mounting foot



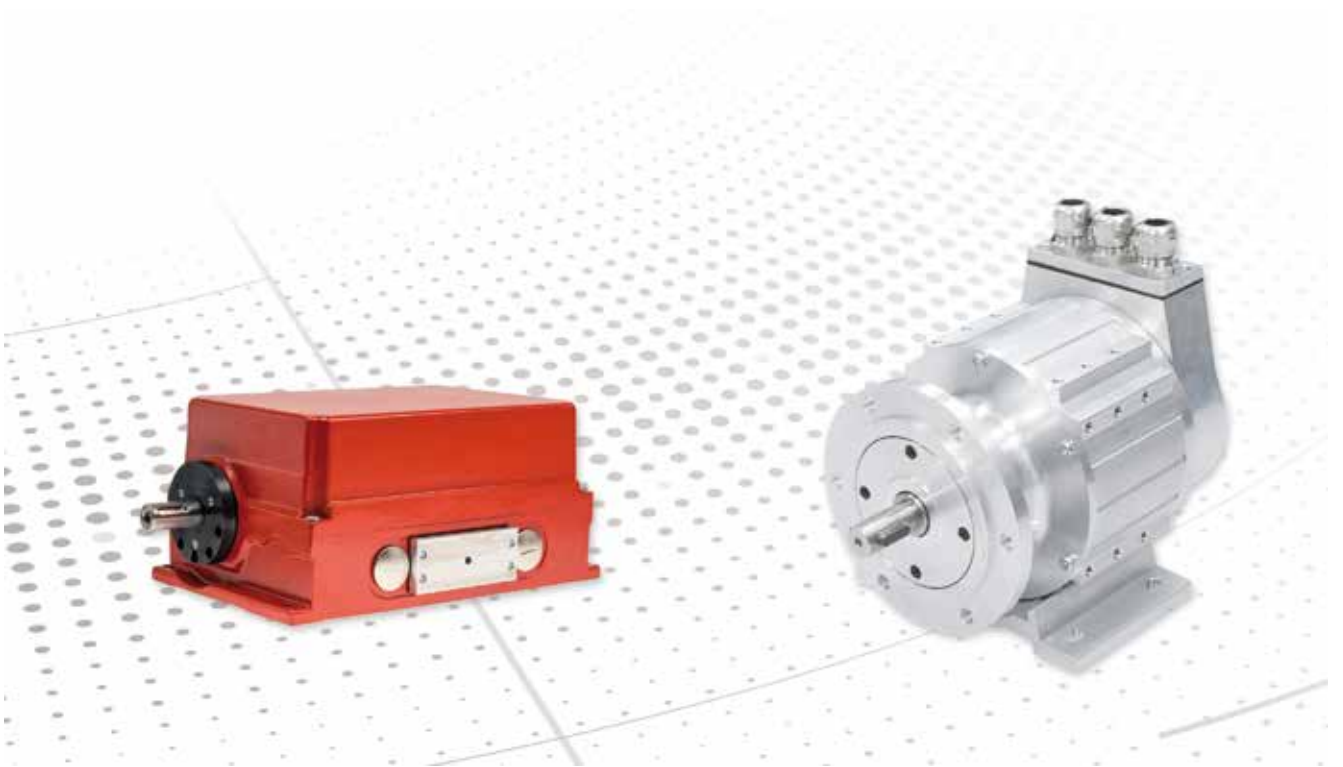
Dimensional Drawings

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.

Contents

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Stainless steel

Products	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	<p>SSI Parallel</p> <p>Analog</p>	  	    
Option, additional interfaces (on request)	<p>Analog INC</p> <p>Parallel</p>	<p>SSI Parallel</p> <p>Analog INC</p>	
Weblink	www.tr-electronic.com/s/S007190	www.tr-electronic.com/s/S007190	www.tr-electronic.com/s/S007190
QR-Code			






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

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

Housing option for rotary encoders









Encoder with protective housing

Double encoder with protective housing

Products	C_V115 	AEV115 	ADV115 	
Type	Housing option for rotary encoders	Encoder with protective housing	Doubleencoder with protective housing	
Technical data encoder	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	SSI  Analog  Parallel  Nocken    CANopen		SSI 	
Option, additional interfaces (on request)	Analog INC Nocken	SSI	SSI INC	
Weblink	www.tr-electronic.com/s/S008523	www.tr-electronic.com/s/S008524	www.tr-electronic.com/s/S008525	
QR-Code				

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

Housing option for rotary encoders

	<p>DAG Housing</p> 
	<p>Protective housing</p>
	<p>C__58, C__65, CD_75, I__58</p>
	<p>20 with keyway</p>
	<p>Cable gland, different industrial connection solutions</p>
	<p>-20...+70 °C (option -40...+85 °C*)</p>
	<p>IP65</p>
	<p> SSI  Analog  Parallel  Nocken    CANopen </p>
	<p> Analog INC Nocken </p>
	<p>http://www.tr-electronic.com/products/heavy-duty.html</p>
	

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

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

Suggested Products

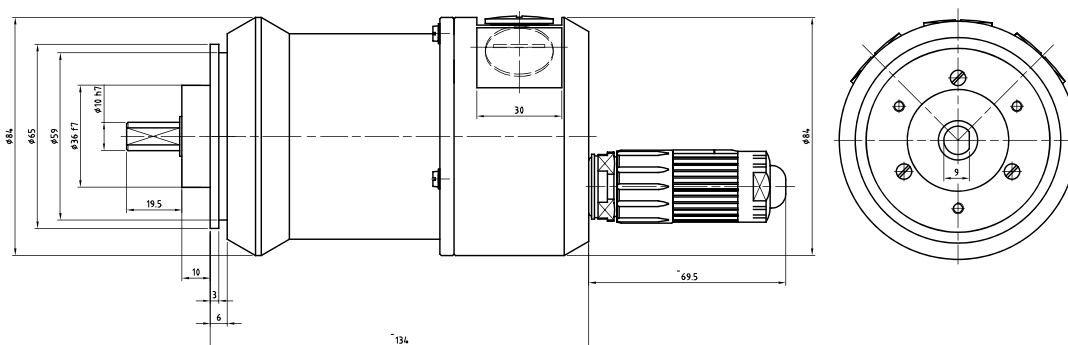
Order code	Steps per turn	Turns	Shaft / Flange	Connector position	Remark
CEV84 - Ethernet/IP					
CEV84M-10046	8192	4096	10FL19,5 ZB36	axial, 3 x M12	
CEV84 - PROFINET					
CEV84M-10049	8192	4096	10FL19,5 ZB36	axial, 3 x M12	
CEV84 - EtherCAT					
CEV84M-10050	8192	4096	10FL19,5 ZB36	axial, 3 x M12	
CEV84 - Sercos					
CEV84M-10051	8192	4096	10FL19,5 ZB36	axial, 3 x M12	
CEV84 - Powerlink					
CEV84M-10052	8192	4096	10FL19,5 ZB36	axial, 3 x M12	
CEV115 SSI					
CEV115M-01368	4096	4096	14 Keyway /33	Cable gland, 10 m cable	
CEV115M-10021	4096	4096	20 Keyway /40	M23 12 radial	Address 10 factory set
CEV115 Profibus					
CEV115M-10010	8192	4096	14 Keyway /33	Fieldbus hood with 3 x PG 11 cable glands	
CEV115 Profibus + SSI					
CEV115M-10024	4096	4096	20 Keyway /40	Fieldbus hood with 3 x M16 cable glands	
CEV115 Ethernet/IP					
CEV115M-10054	8192	4096	14 Keyway /33	3 x M12, 1 x M23 radial	
CEV115M-10055	8192	4096	14 Keyway /33	3 x M12 radial	
AEV115 Profibus					
AEV115M-00001	4096	4096	20 Keyway /40	Fieldbus hood with 3 x M16 cable glands	
ADV115 Double encoder Profibus+SSI, SSI+INC					
ADV115M-00001	8192 / 8192	4096 / 4096	20 Keyway /40	Fieldbus hood with 4 x M16 cable glands	

For further product information simply enter the order number in the search field at www.tr-electronic.de.

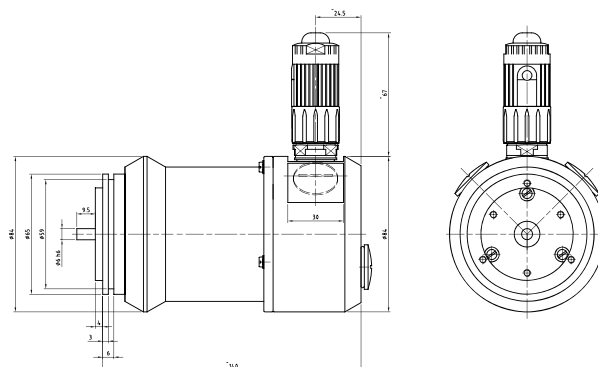
We will help you to select the most suitable products from the complete TR range. Please contact us (info@tr-electronic.de).

Dimensional Drawings

CEV84
SSI, Analog, PAR - axial



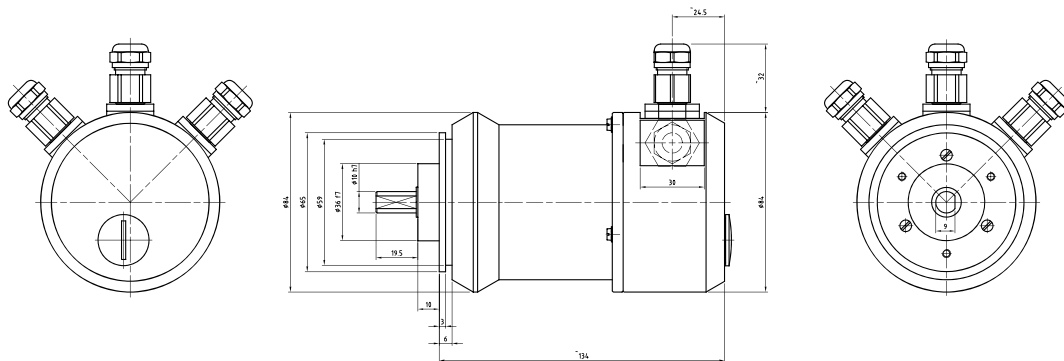
CEV84
SSI, Analog, PAR - radial



Dimensional Drawings

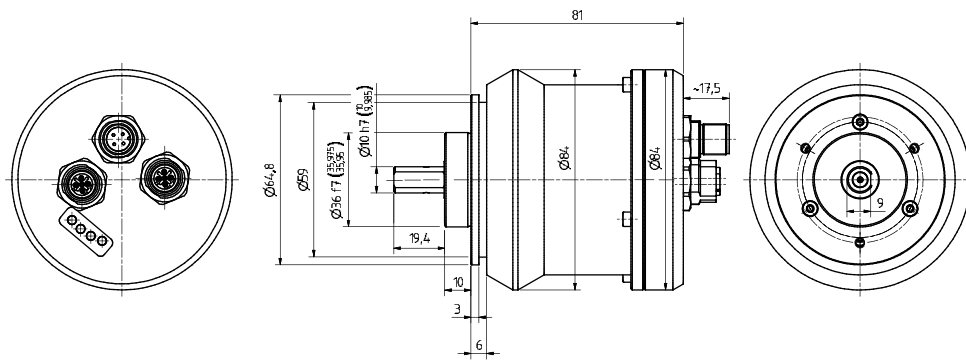
CEV84 Fieldbus

CANopen, CAN DeviceNet, Profibus



CEV84 Industrial Ethernet

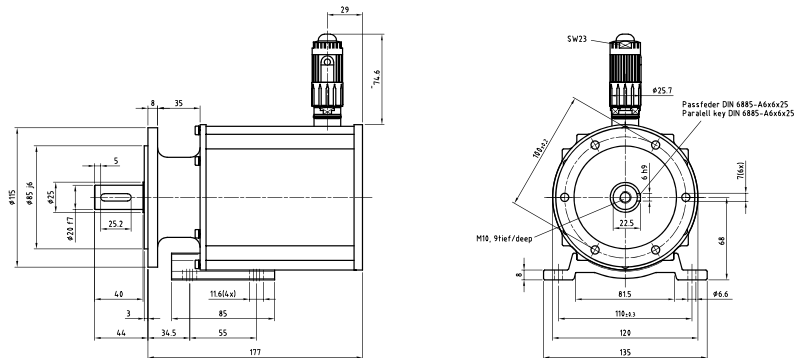
EtherNet/IP, Sercos, EtherCAT, PROFINET IO, POWERLINK



Dimensional Drawings

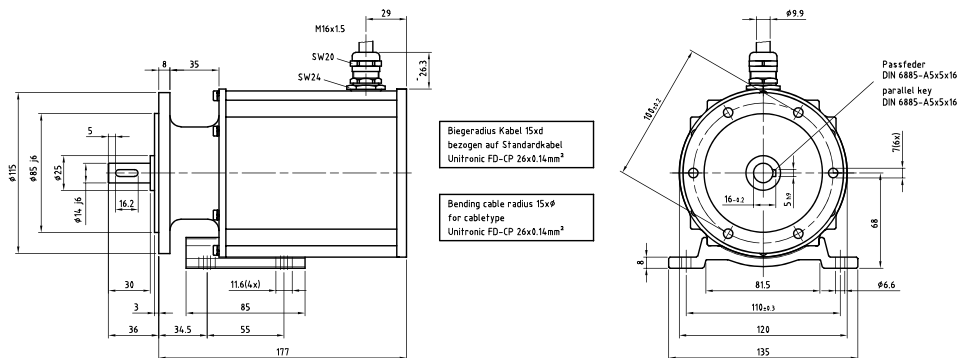
CEV115

1 x M23 12 pin radial (e.g. SSI)



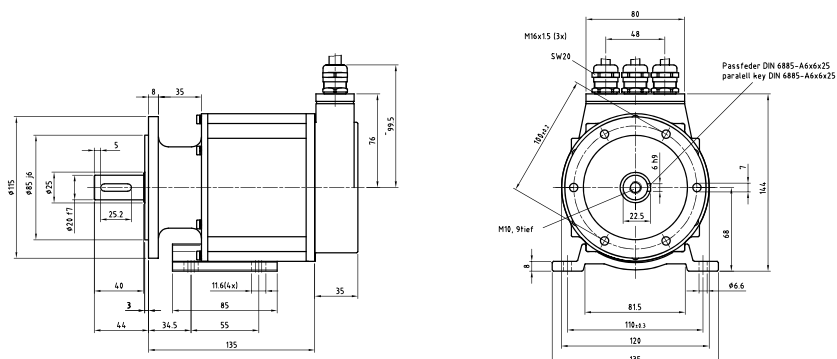
CEV115

1 x Cable gland radial (e.g. SSI)

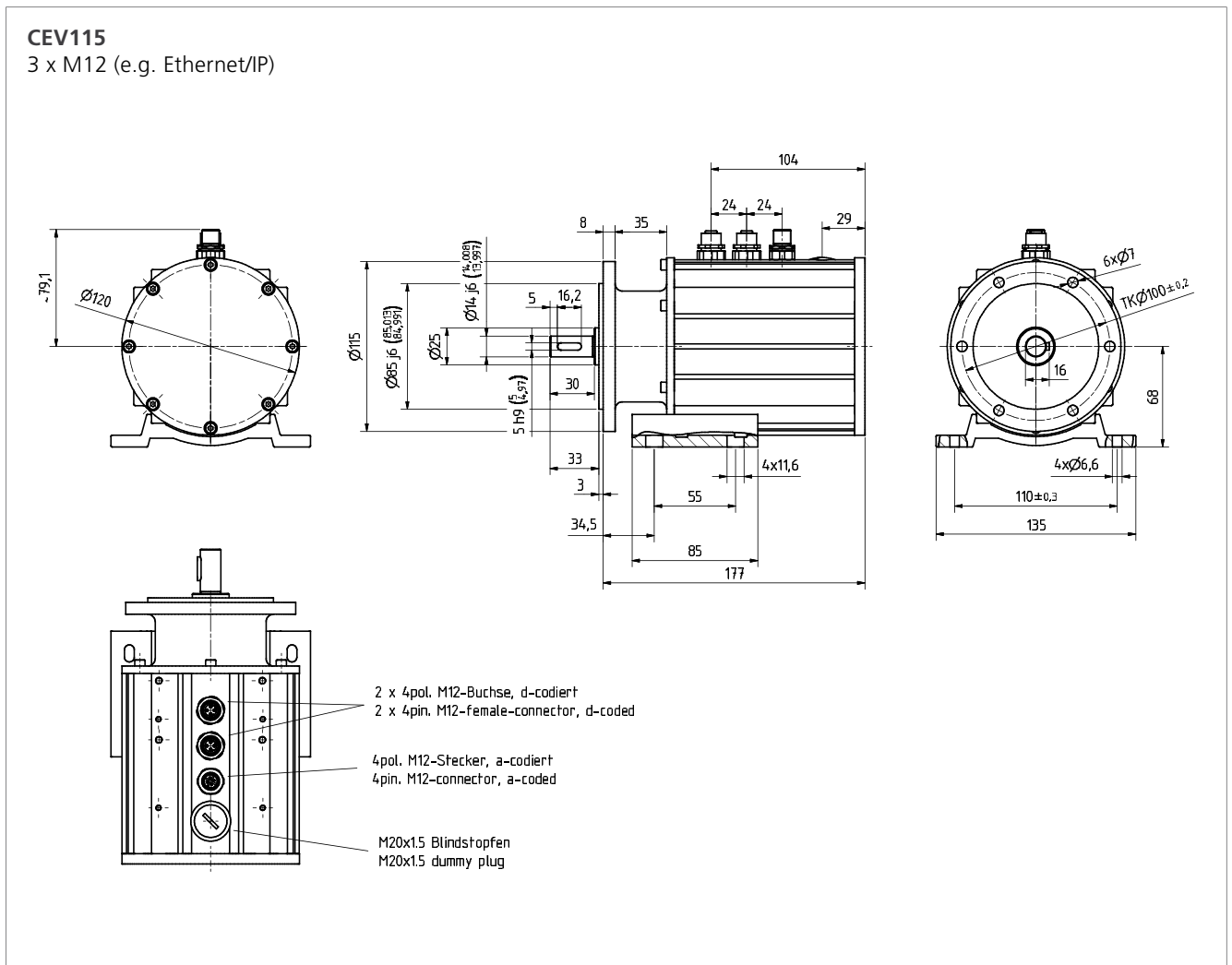


CEV115

Fieldbus hood with 3 x cable gland, for e.g. field busses



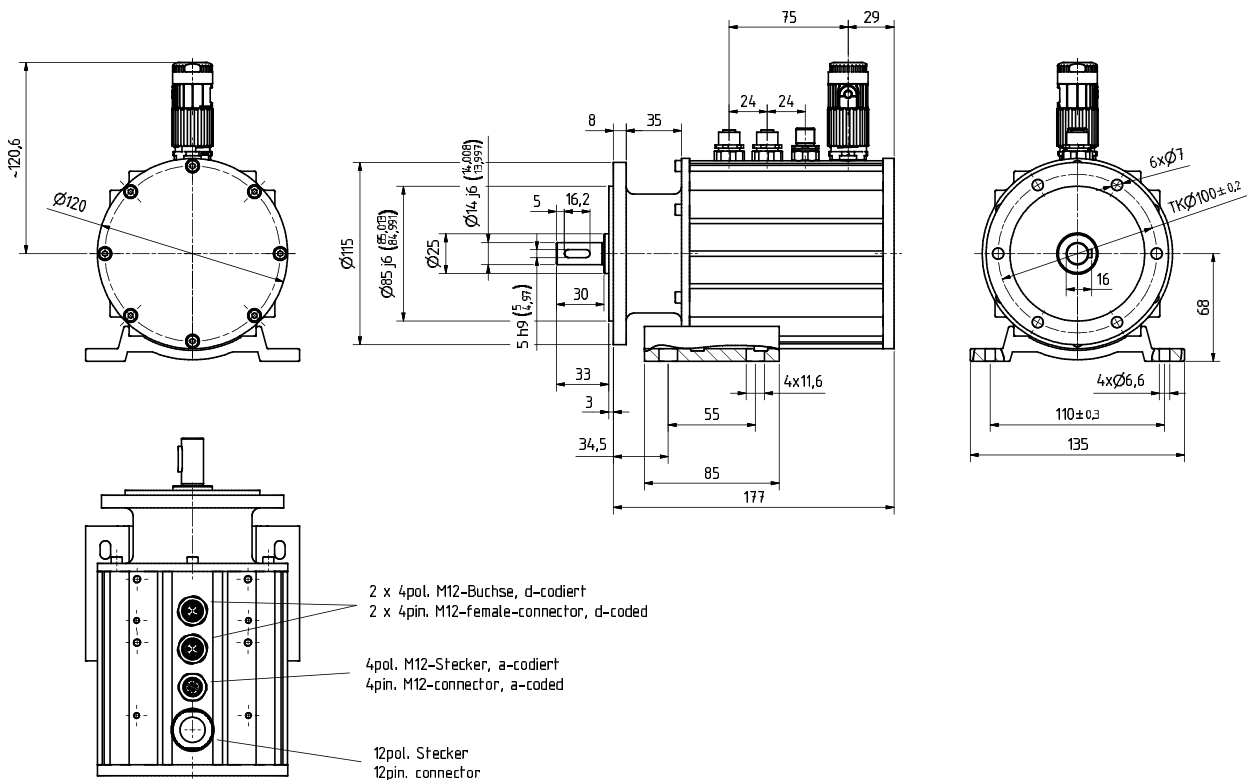
Dimensional Drawings



Dimensional Drawings

CEV115

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

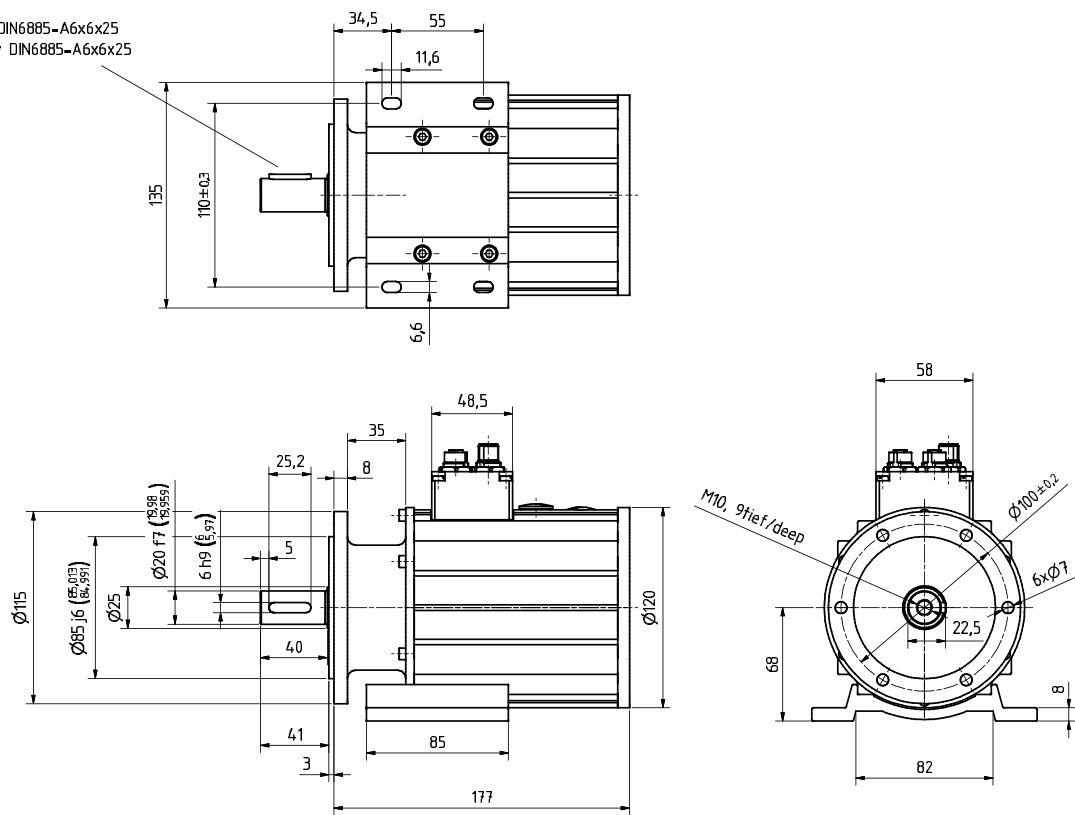


Dimensional Drawings

CEV115

Connector hood radial for PROFINET, EtherCAT

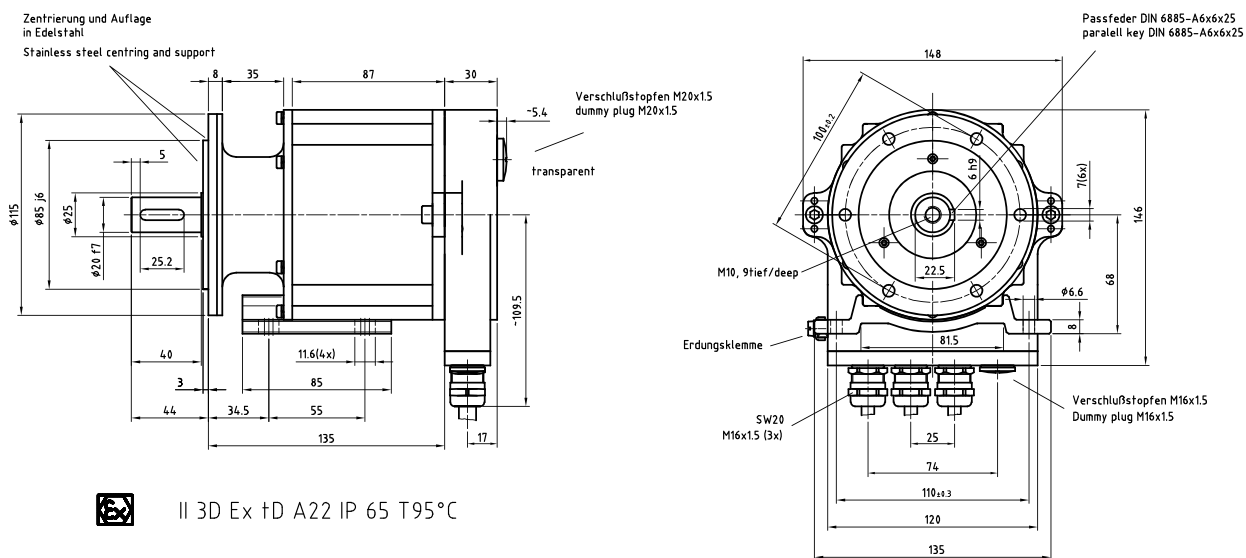
Passfeder DIN6885-A6x6x25
parallel key DIN6885-A6x6x25



Dimensional Drawings

AEV115

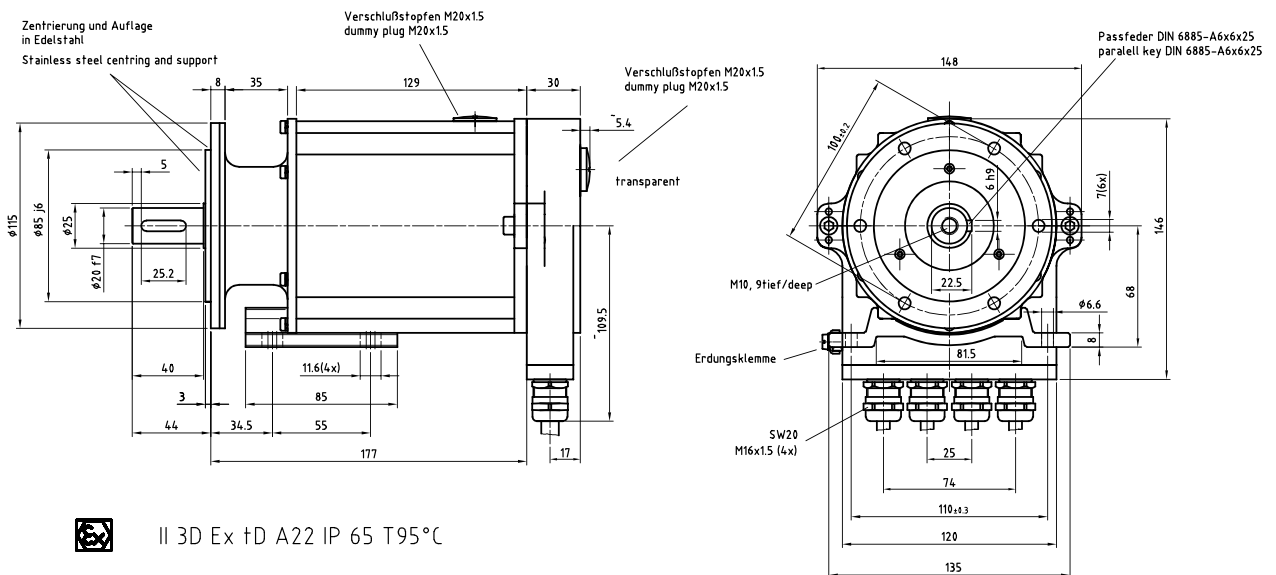
Connection hood same orientation as mounting foot



Dimensional Drawings

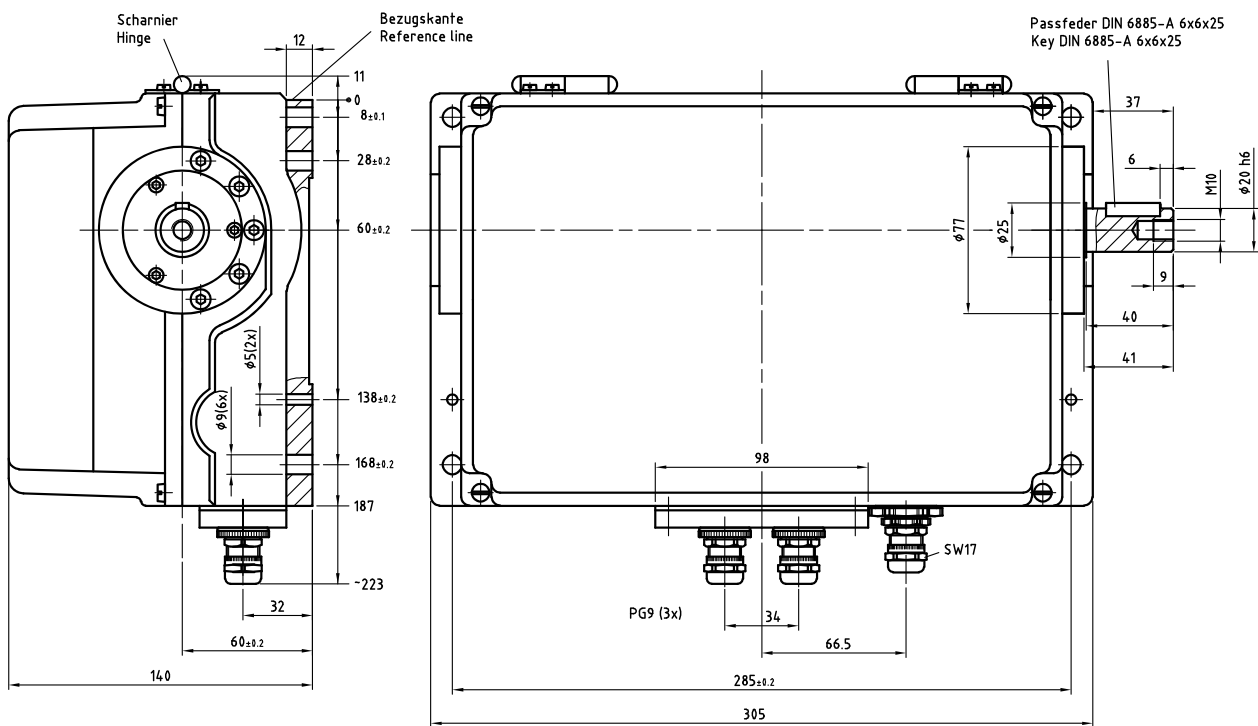
ADV115

Connection hood same orientation as mounting foot

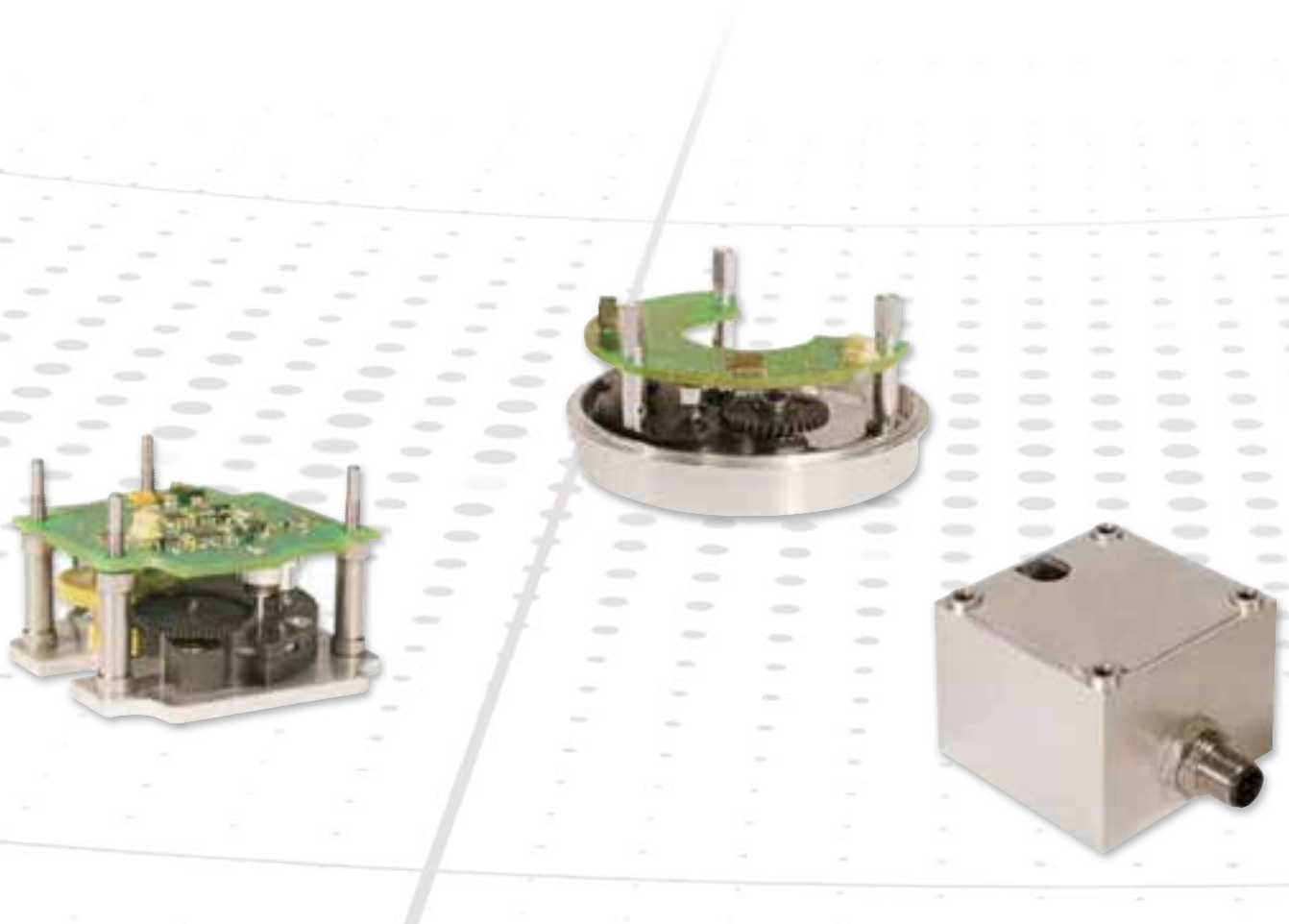


Dimensional Drawings

DAG-Housing
Sample configuration



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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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.

Incremental Rotary Encoders



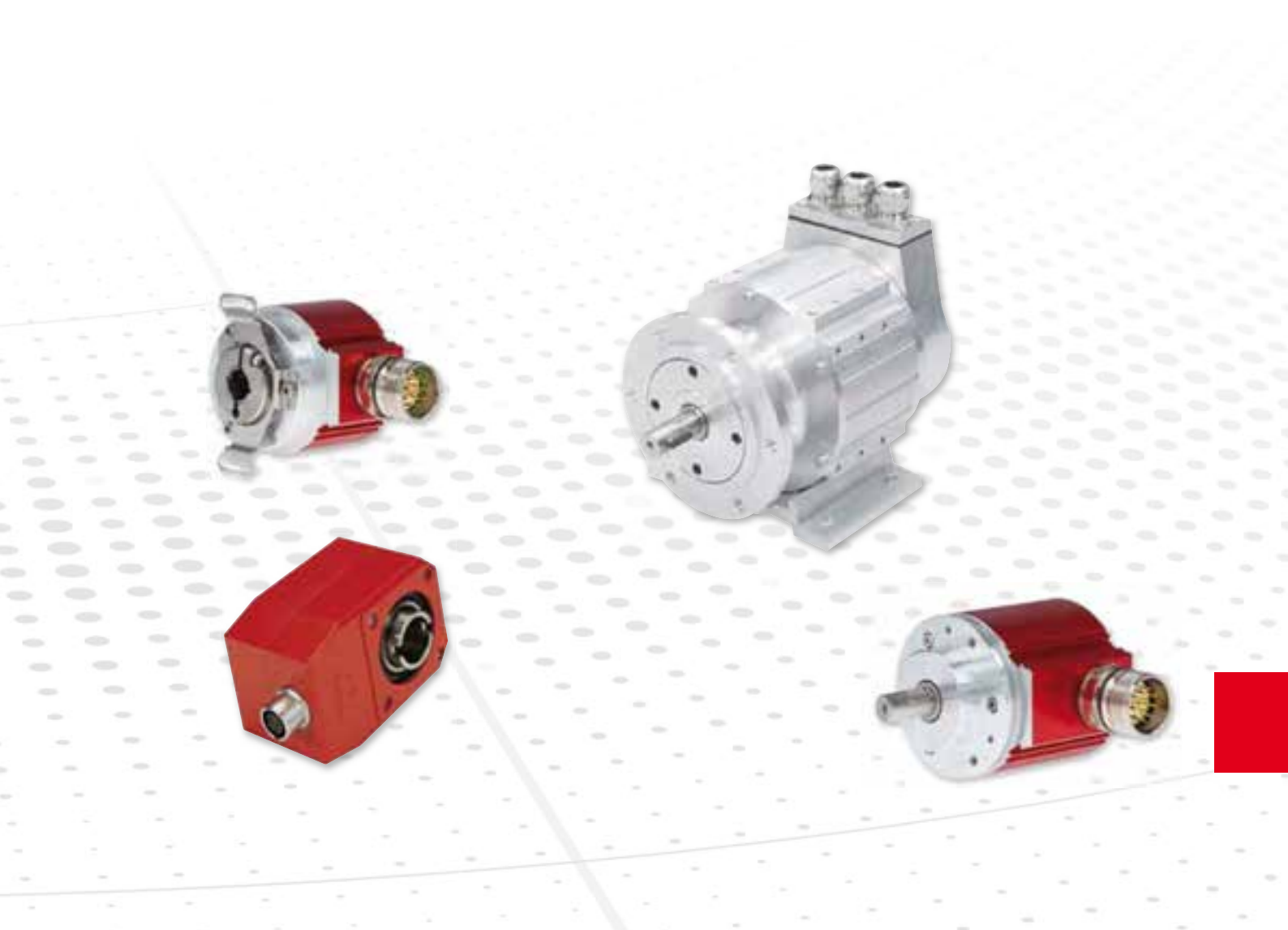
Programmable, extremely resilient and more

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 58mm 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.

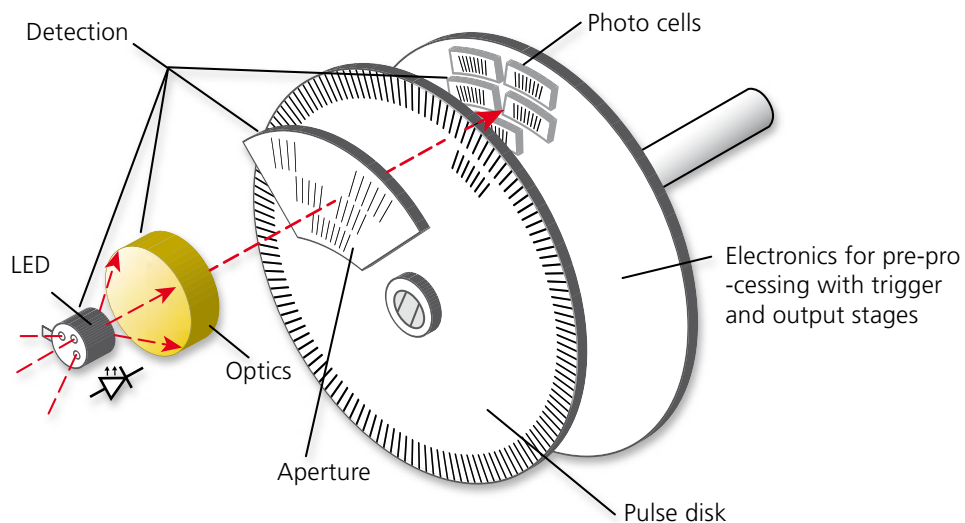
You will also find a multitude of housing options, e.g. ATEX-compliant housings and housings for use in aggressive media or for heavy mechanical stress (heavy-duty).



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Pulse Encoder mode of operation

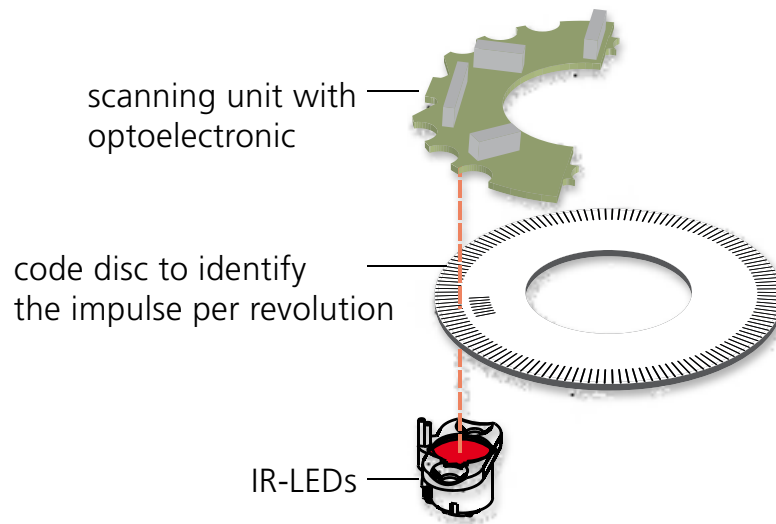


Consistent mechanical concept

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.

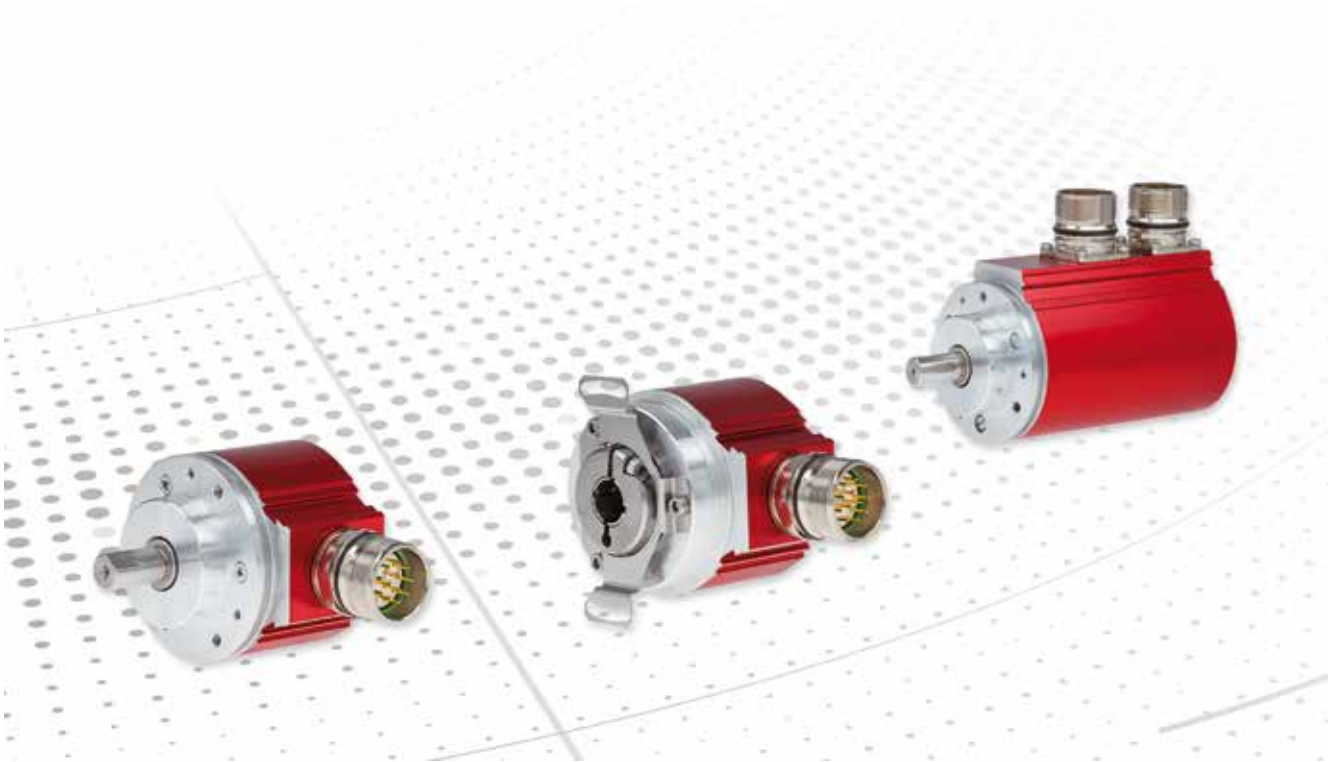
The new generation I__58:2 offers wide range input of 4.5 ... 32 V DC and number of graduation marks up to 62,450 increments per revolution as well as a hollow shaft diameter up to 15 mm or ½".

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 disk 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.

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 70,000. Additionally, it provides hollow and blind shaft diameters up to 15 mm resp. 1/2".

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Up to 10,000 pulses





Product	IEV58:2	IES58:2	IEH58:2
			
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	-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	www.tr-electronic.com/s/S008480	www.tr-electronic.com/s/S008481	www.tr-electronic.com/s/S008482
QR-Code			

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

Up to 10,000 pulses

Product	IOV58:2 	IOS58:2 	IOH58:2 	
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	>= 2...<= 70000	>= 2...<= 70000	>= 2...<= 70000	
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	-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	www.tr-electronic.com/s/S008483	www.tr-electronic.com/s/S008484	www.tr-electronic.com/s/S008485	
QR-Code				







Double detection

<p>IDV58</p> 	<p>IDS58</p> 
<p>Double detection (D)</p>	<p>Double detection (D)</p>
<p>24 VDC (11 .. 28), 5V DC (+-5%)</p>	<p>24 VDC (11 .. 28), 5V DC (+-5%)</p>
<p>>= 2...<= 1024, 2048, 4096, 8192</p>	<p>>= 2...<= 1024, 2048, 4096, 8192</p>
<p>6, 8, 10, 12, 3/8"</p>	<p>8, 10, 11, 12</p>
<p>Connector or cable</p>	<p>Connector or cable</p>
<p>0...+60 °C</p>	<p>0...+60 °C</p>
<p>IP65</p>	<p>IP65</p>
<p></p>	<p></p>
<p>Square</p>	<p>Square</p>
<p>www.tr-electronic.com/s/S008486</p>	<p>www.tr-electronic.com/s/S008487</p>
	

ATEX, up to 10,000 pulses

Product	AEV58I:2	AE558I: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	www.tr-electronic.com/s/S008488	www.tr-electronic.com/s/S008489	www.tr-electronic.com/s/S008490	
QR-Code				

ATEX, up to 70,000 pulses

<p>AOV58I:2</p> 	<p>AOS58I:2</p> 	<p>AOH58I:2</p> 
Optical (O)	Optical (O)	Optical (O)
24 VDC (4,5 .. 32)	24 VDC (4,5 .. 32)	24 VDC (4,5 .. 32)
$\geq 2 \dots \leq 70000$	$\geq 2 \dots \leq 70000$	$\geq 2 \dots \leq 70000$
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"
Connector or cable	Connector or cable	Connector or cable
-30...+75 °C	-30...+75 °C	-30...+75 °C
IP67 / shaft IP65	IP67 / shaft IP65	IP67 / shaft IP65
2/22	2/22	2/22
Square	Square	Square
www.tr-electronic.com/s/S008492	www.tr-electronic.com/s/S008493	www.tr-electronic.com/s/S008491
		

Suggested Products

Order code	Steps per turn - delivered	Maximum steps per turn	Channels	Shaft / Flange	Connector position	Supply	Signal level
IEV58:2 - solid shaft							
IEV58:2-00001	10000	10000	A,\A, B,\B, 0,\0	10FL/19,5, ZB36 3xM3+3xM4	M23 12 pin, radial	4,5V..32V	=Ub
IEV58:2-00003	10000	10000	A,\A, B,\B, 0,\0	6GL/10, ZB50	M23 12 pin, radial	4,5V..32V	=Ub
IEH58:2 - hollow shaft							
IEH58:2-00001	10000	10000	A,\A, B,\B, 0,\0	15H7	M23 12 pin, radial	4,5V..32V	=Ub
IEH58:2-00003	10000	10000	A,\A, B,\B, 0,\0	12H7	M23 12 pin, radial	4,5V..32V	=Ub
IEH58:2-00004	10000	10000	A,\A, B,\B, 0,\0	10H7	M23 12 pin, radial	4,5V..32V	=Ub
IEH58:2-00005	10000	10000	A,\A, B,\B, 0,\0	3/8" H7	M23 12 pin, radial	4,5V..32V	=Ub
IEH58:2-00006	10000	10000	A,\A, B,\B, 0,\0	1/2" H7	M23 12 pin, radial	4,5V..32V	=Ub
AEV58I:2 - ATEX solid shaft Zone 2/22							
AEV58I:2-00001	600	10000	A,\A, B,\B, 0,\0	10FL/19,5, ZB36	Cable gland, radial, 5 m, open end	4,5V-32V	=Ub

Further product information

1. Enter order code into ...



2. Searchfield (top right) on www.tr-electronic.com



3. Choose desired information

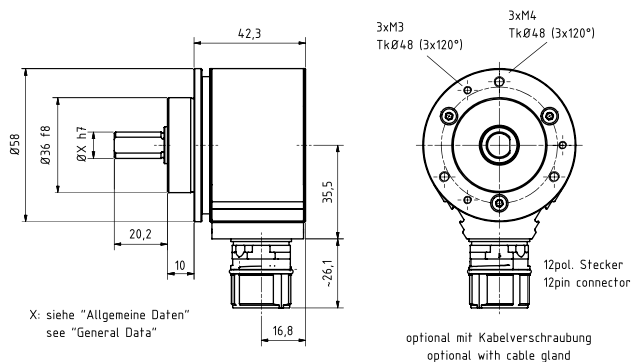


We will help you to select the most suitable products from the complete TR range. Please contact us (info@tr-electronic.de).

Dimensional Drawings

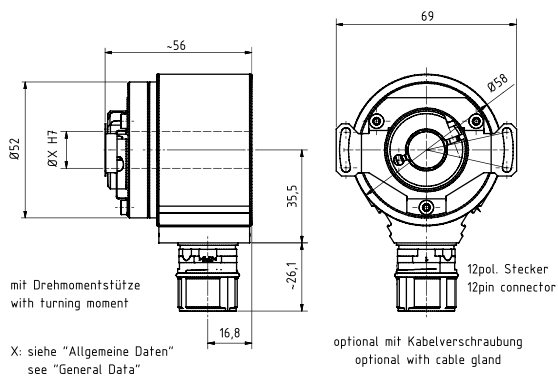
Solid shaft

IEV58:2; IOV58:2; AEV58I:2; AOV58I:2



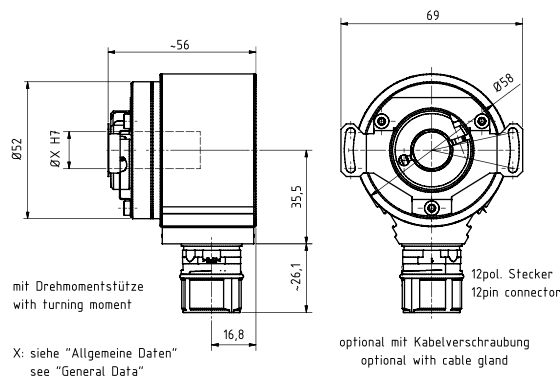
Hollow shaft

IEH58:2; IOH58:2; AEH58I:2; AOH58I:2

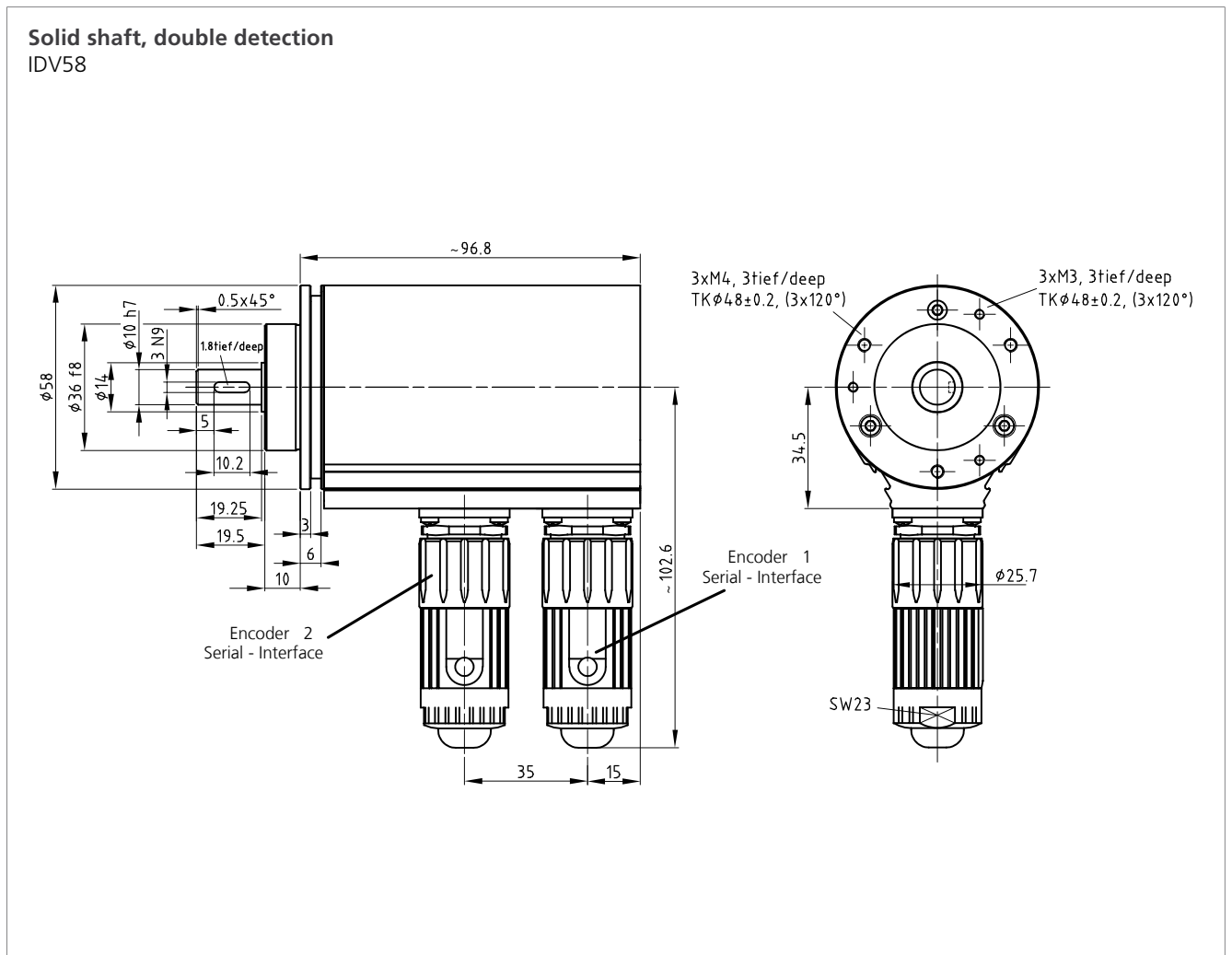


Blind shaft

IES58:2; IOS58:2; AES58I:2; AOS58I:2

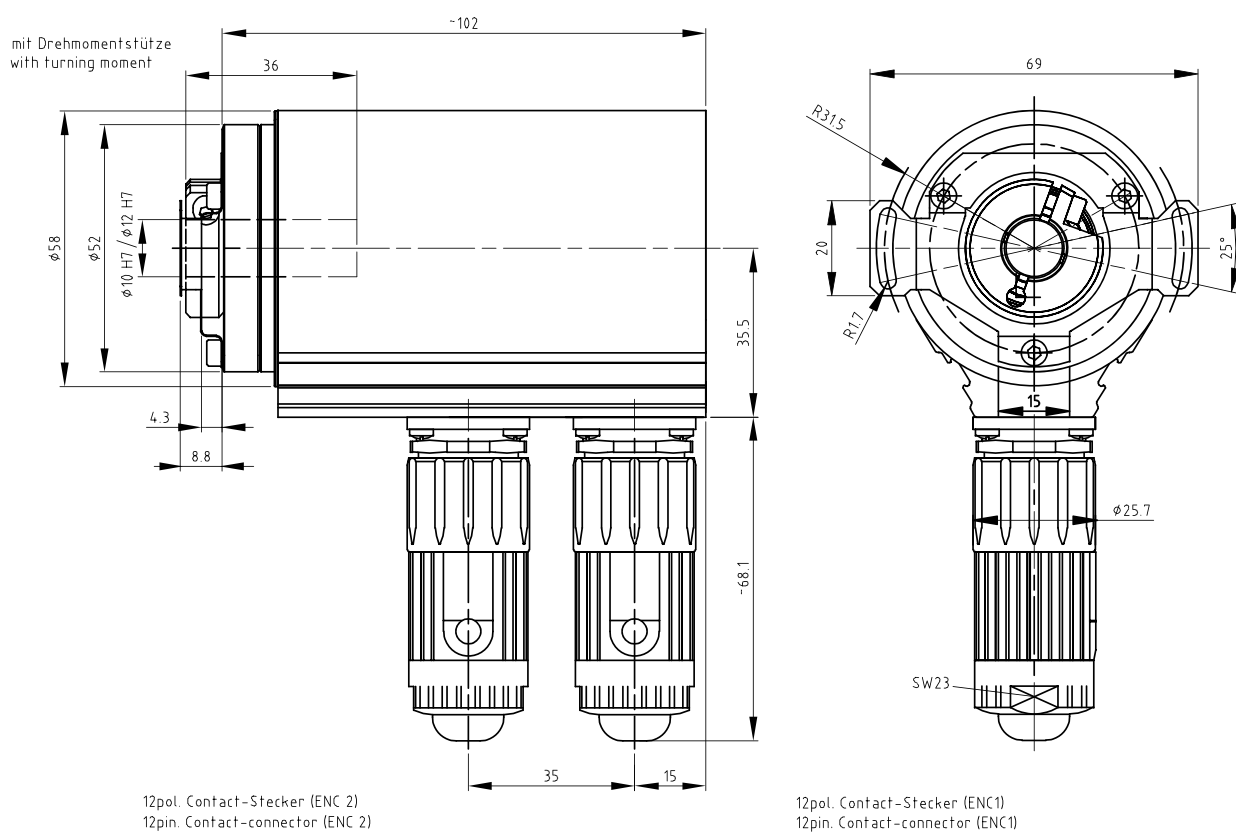


Dimensional Drawings

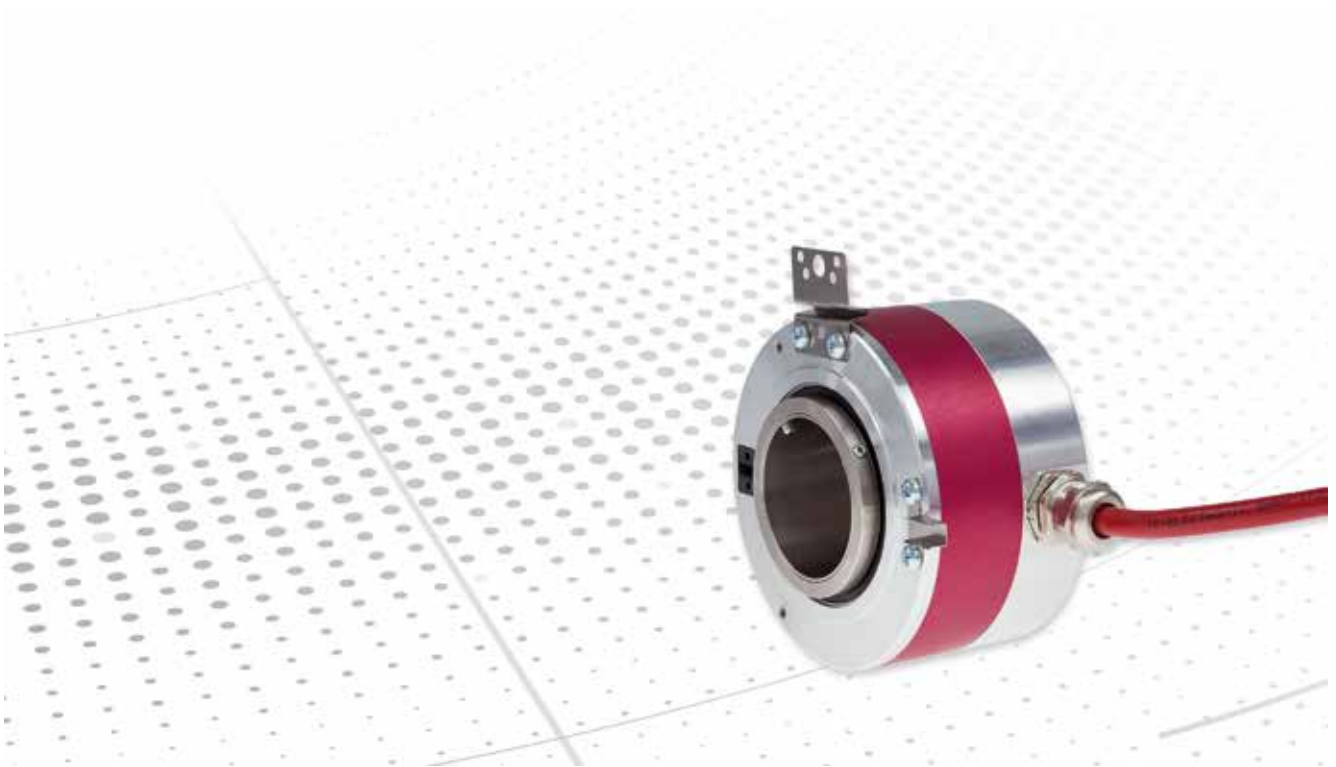


Dimensional Drawings

Blind shaft, double detection IDS58



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.

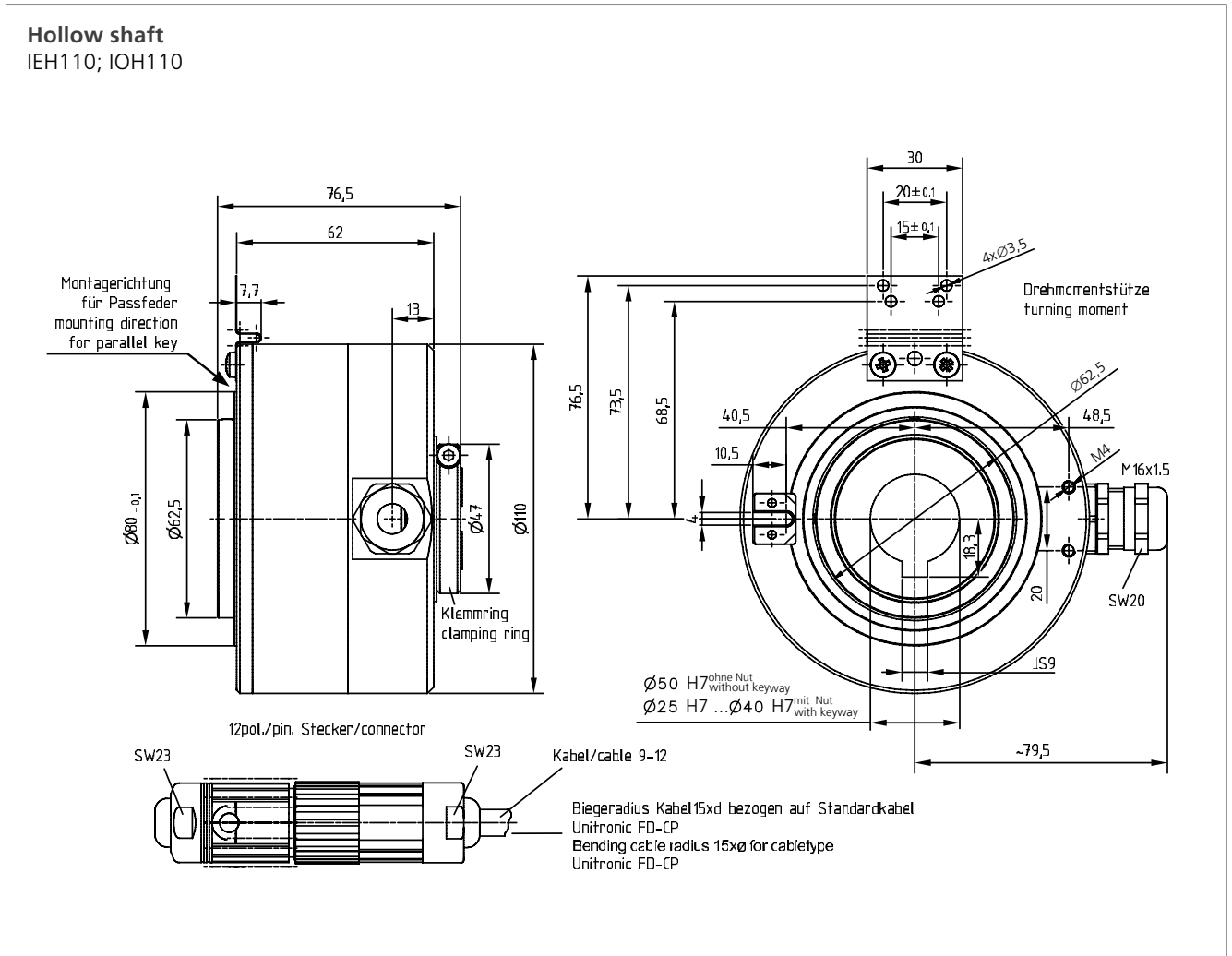
Contents

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

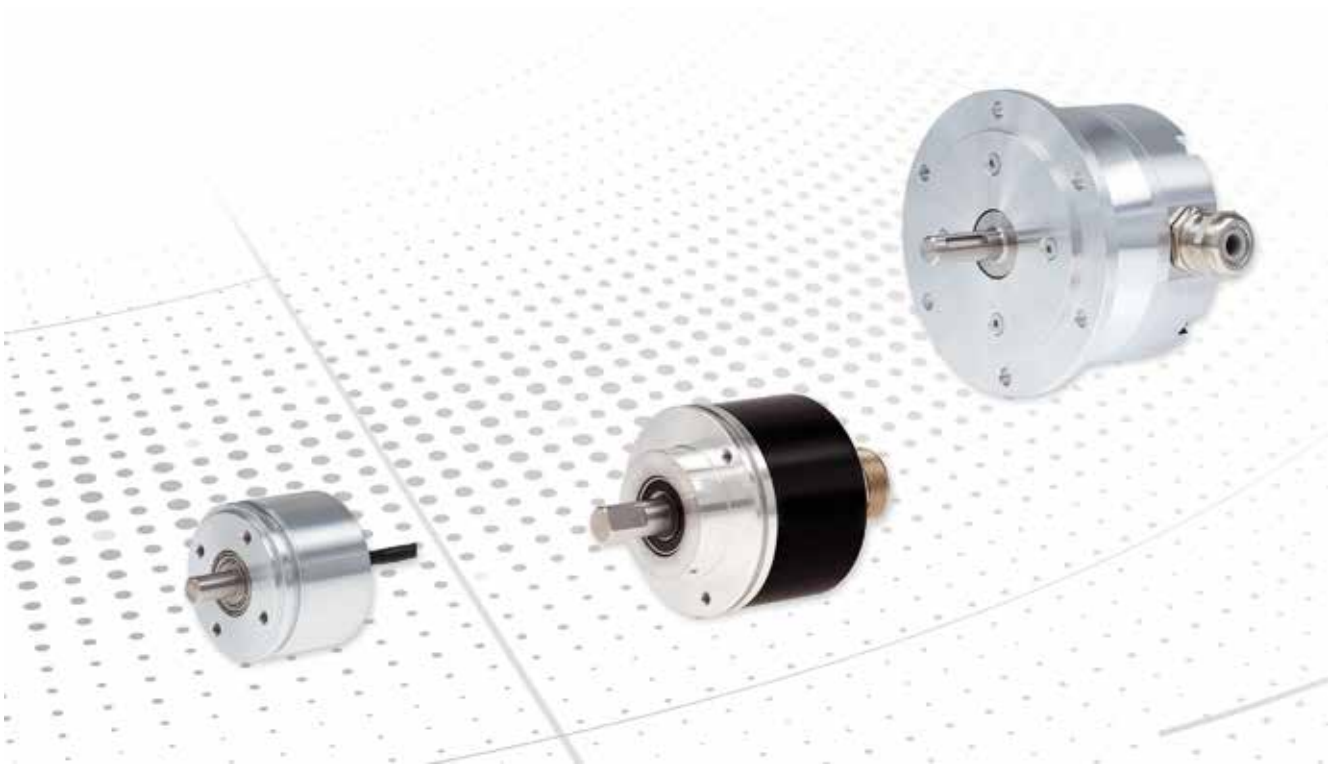
Product	IEH110	IOH110
		
Detection	Optical (E)	Optical (O)
Supply	24 VDC (11...27)	24 VDC (11...27)
Steps per turn	2 ... 8192	2 ... 36 000
Shaft diameters available	15, 28, 30, 35, 38, 40, 45, 50	15, 28, 30, 35, 38, 40, 45, 50
Connectors	Connector or cable	Connector or cable
Ambient temperature	0...+60°C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

Dimensional Drawings





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 - 120 mm. Of course they are also available with different mechanical connections such as solid shaft, continuous hollow shaft, blind shaft or integrated coupling.

Contents

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Solid shaft

Product	IE24	IE35	IMV36
			
Detection	Optical (E)	Optical (E)	Magnet detection (M)
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	1...2.500	1...3.600	8, 10, 16, 20, 25, 32, 40, 50, 64, 80, 100, 125, 128, 200, 250, 256, 400, 500, 512, 1024, 2048*
Shaft diameters available	3...6	4...6	See drawing
Connectors	Cable	Cable	Cable
Ambient temperature	0...+80 °C	0...+80 °C	-40...+70 °C
Protection class	IP64	IP65	IP65
Interface	Square	Square	Square
Weblink	www.tr-electronic.com/s/S008419	www.tr-electronic.com/s/S008423	www.tr-electronic.com/s/S008422
QR-Code			

*Others on request

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

Solid shaft

Product	IE40 	IE58 	IMV58 	
Detection	Optical (E)	Optical (E)	Magnet detection (M)	
Supply	11...27 VDC (5 VDC ± 5 %)	11...27 VDC (5 VDC ± 5 %)	11...27 VDC (5 VDC ± 5 %)	
Steps per turn	1...3.600	1...10.000	1, 2, 4, 8, 10, 16, 20, 25, 32, 40, 50, 64, 80, 100, 125, 128, 200, 250, 256, 400, 500, 512, 1024, 2048*	
Shaft diameters available	6	6, 10, inch based	6, 10	
Connectors	Connector or cable	Connector or cable	Connector or cable	
Ambient temperature	0...+80 °C	0...+70 °C (-20...+70 °C)	-10...+70°C	
Protection class	IP64	IP65	IP64	
Interface	Square	Square / Sine-Cosine	Square / Sine-Cosine	
Weblink	www.tr-electronic.com/s/S008424	www.tr-electronic.com/s/S008425	www.tr-electronic.com/s/S008426	
QR-Code				

*Others on request

Solid shaft Blind shaft

			
Optical (O)	Optical (E)	Optical (E)	Optical (E)
11...27 VDC (5 VDC ± 5 %)	11...30 VDC	11...27 VDC (5 VDC ± 5 %)	11...27 VDC (5 VDC ± 5 %)
9000, 10000, 18000	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*
10	6...24 (with groove 10...24)	3...6H7	8H7, 10H7, 12H7
Cable	Cable gland	Cable	Connector or cable
0...+80 °C	-20...+80°C	0...+80 °C	-20...+85 °C
IP64	IP67	IP64	IP67
Square	Square	Square	Square
www.tr-electronic.com/s/S008431	www.tr-electronic.com/s/S008432	www.tr-electronic.com/s/S008420	www.tr-electronic.com/s/S008428
			

*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 (M)	Optical (E)	
Supply	11...30 VDC	11...27 VDC (5 VDC ± 5 %)	11...27 VDC (5 VDC ± 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	<= 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	www.tr-electronic.com/s/S008433	www.tr-electronic.com/s/S008421	www.tr-electronic.com/s/S008427	
QR-Code				

*Others on request

Hollow shaft

<p>IH20</p> 	<p>IH76A</p> 	<p>IH76B</p> 	<p>IH76V</p> 
Optical (E)	Optical (E)	Optical (E)	Optical (O)
11...27 VDC (5 VDC ± 5 %)	11...27 VDC (5 VDC ± 5 %)	11...27 VDC (5 VDC ± 5 %)	11...27 VDC (5 VDC ± 5 %)
1, 15, 25, 30, 60, 100, 200, 218, 360, 500, 600, 720, 800, 900, 1000, 1024*	1...10.000	1...10.000	9000, 10000, 18000
20H7	<= 15H7	<= 28H7	<= 28H7
Connector or cable	Connector or cable	Connector or cable	Connector or cable
0...+60 °C (-20...+70 °C)	0...+80 °C	0...+80 °C	0...+80 °C
IP54 (option IP65)	IP64	IP64	IP64
Square	Square / Sine-Cosine	Square / Sine-Cosine	Square
www.tr-electronic.com/s/S008418	www.tr-electronic.com/s/S008429	www.tr-electronic.com/s/S008429	www.tr-electronic.com/s/S008429
			

*Others on request

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

Hollow shaft

Product	IH92V 	IH120 	IH120V 
Detection	Optical (O)	Optical (E)	Optical (O)
Supply	11...27 VDC (5 VDC ± 5 %)	11...27 VDC (5 VDC ± 5 %)	11...27 VDC (5 VDC ± 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	www.tr-electronic.com/s/S008430	www.tr-electronic.com/s/S008434	www.tr-electronic.com/s/S008434
QR-Code			

*Others on request

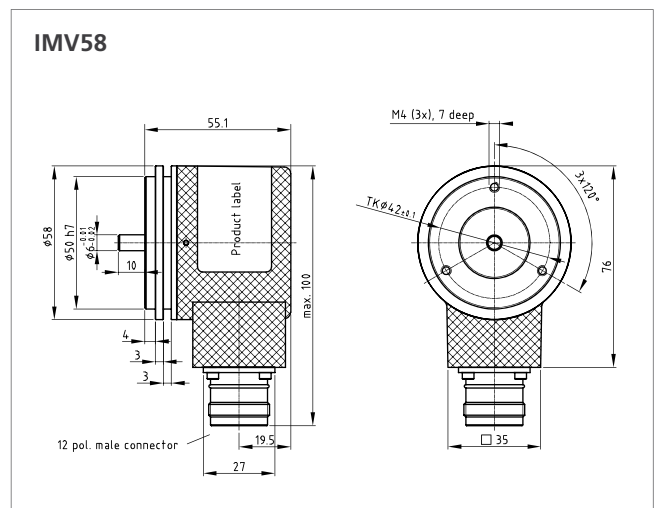
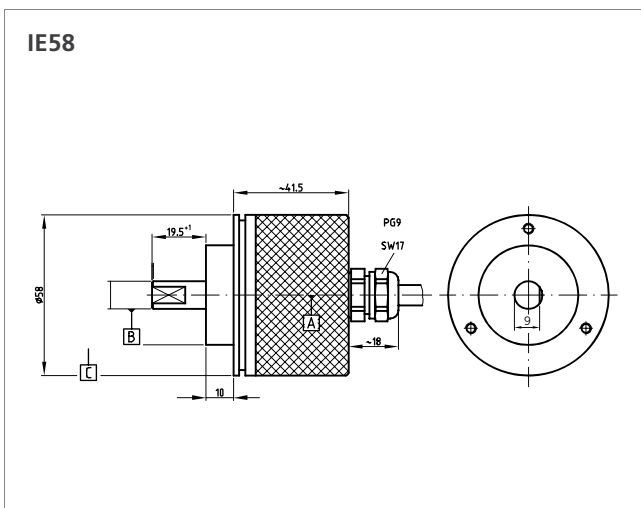
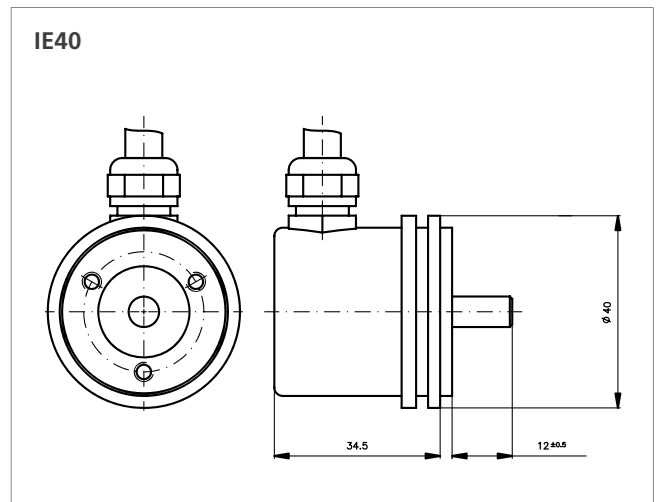
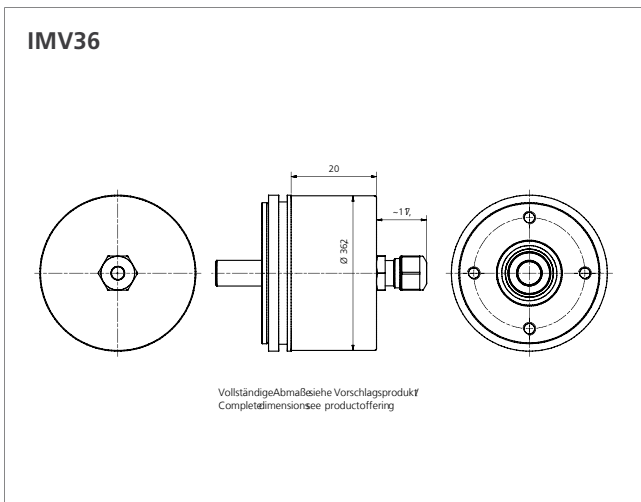
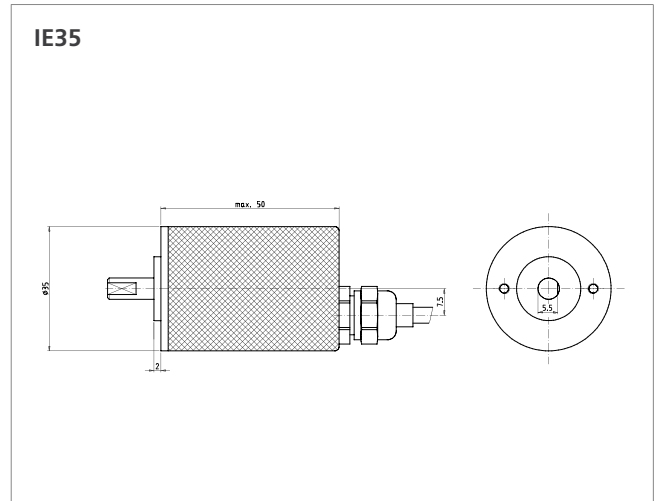
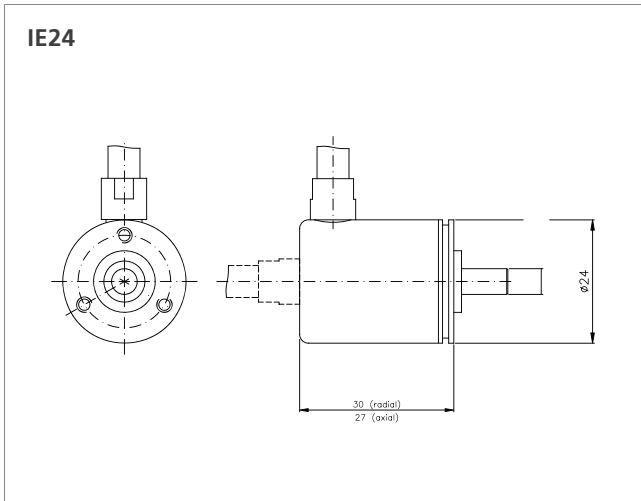
Can't find the right variant? Please contact us (info@tr-electronic.de)

Suggested Products

Order code	Steps per turn	Channels	Shaft / Flange	Connector position	Cable length	Remark
IE58A						
219-00059	1024	A,\A, B,\B, 0,\0	10FL/19,5 ZB36	M23 12P RADIAL		
219-00292	10000	A,\A, B,\B, 0,\0	6GL/10 ZB50	M23 12P AXIAL		
219-00590	10000	A,\A, B,\B, 0,\0	10FL/19,5 ZB36	M23 12P RADIAL		
219-01530	2048	A,\A, B,\B, 0,\0	10FL/19,5 ZB36	M23 12P RADIAL		
IV99						
IV99-00001	2048	A,\A, B,\B, 0,\0	11Glatt/32 ZB85	Cable gland M20x1,5 radial		
IV99-00002	1024	A,\A, B,\B, 0,\0	11Glatt/32 ZB85	Cable gland M20x1,5 radial		
IS24						
215-00002	500	A,\A, B,\B, 0,\0	4H7 blind shaft	open End Cable gland RADIAL	2.000 m	
IMF36						
IMF36-00005	2048	A,\A, B,\B, 0,\0		open End 1X M6 AXIAL	1.000 m	
IMF36-00012	2048	A,\A, B,\B, 0,\0		SUBD 9P 1X M6 AXIAL	1.000 m	
IS99						
IS99-00001	2048	A,\A, B,\B, 0,\0	16G7 blind shaft	Cable gland M20x1,5 radial		
IS99-00003	1024	A,\A, B,\B, 0,\0	16G7 blind shaft	Cable gland M20x1,5 radial		
IS99-00004	1024	A,\A, B,\B, 0,\0	16G7 blind shaft	Cable gland M20x1,5 radial		
IH20						
240-00001	25	A, B	20H7 hollow shaft	LEMO 6P		
240-00005	1024	A,\A, B,\B, 0,\0	20H7 hollow shaft	BINDER 12P		
240-00148	1024	A,\A, B,\B, 0,\0	20H7 hollow shaft	open End cable gland RADIAL	5.000 m	
240-00161	1000	A,\A, B,\B, 0,\0	20H7 hollow shaft	LUMBERG 8P		

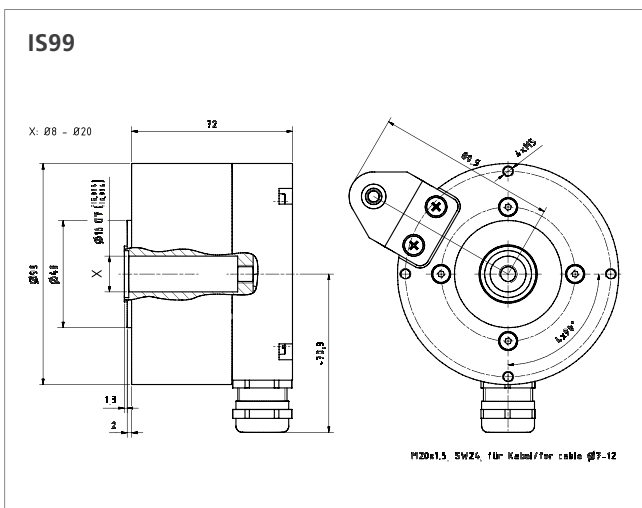
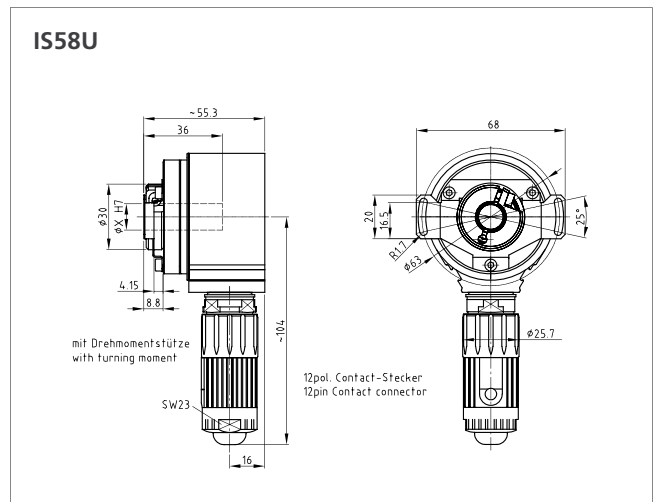
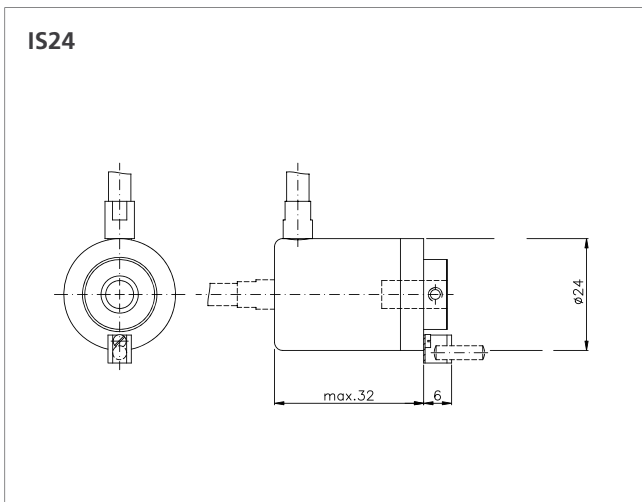
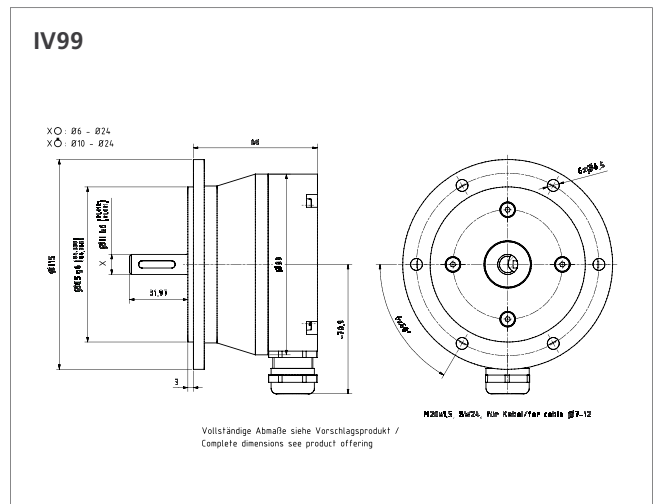
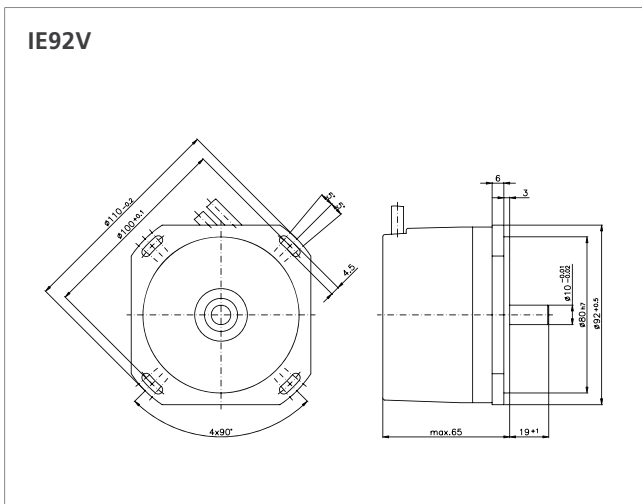
For further product information simply enter the order number in the search field at www.tr-electronic.de.

Dimensional Drawings

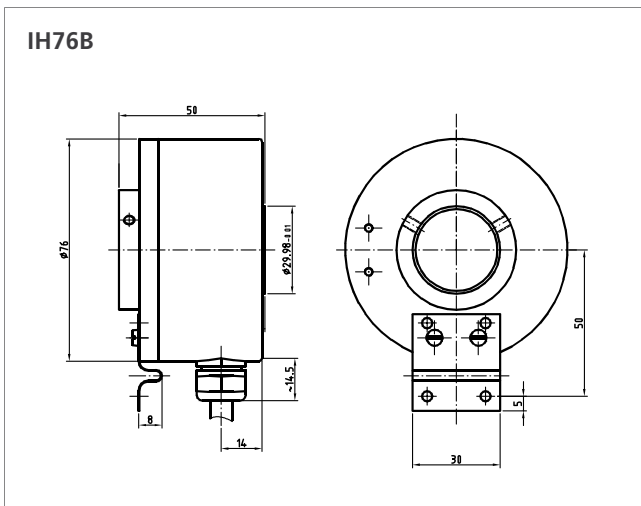
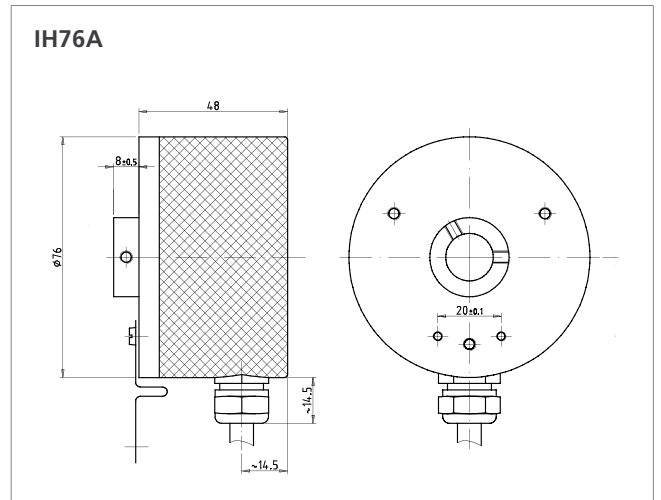
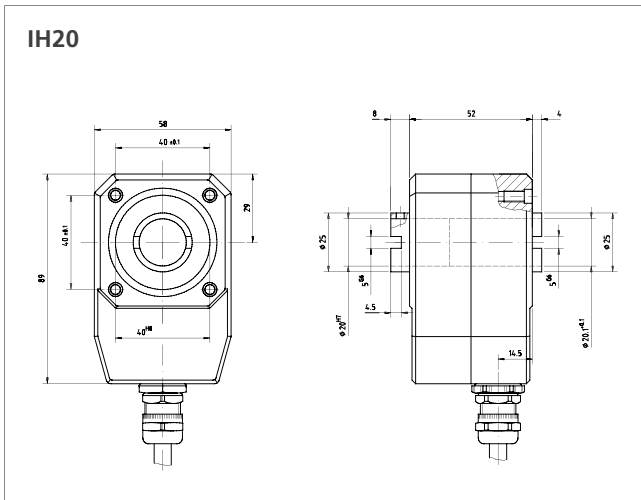
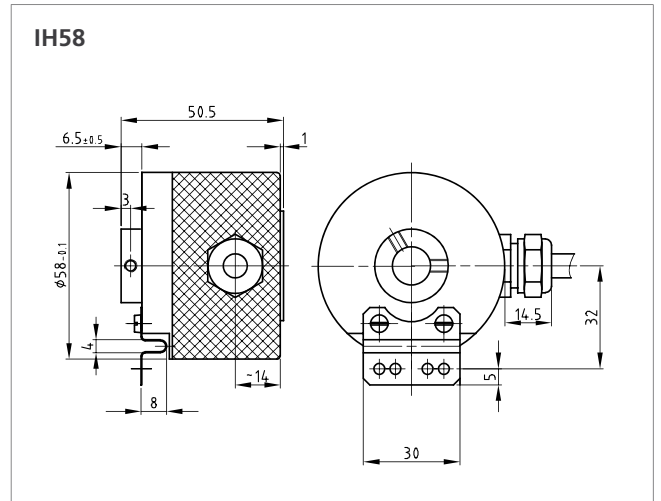
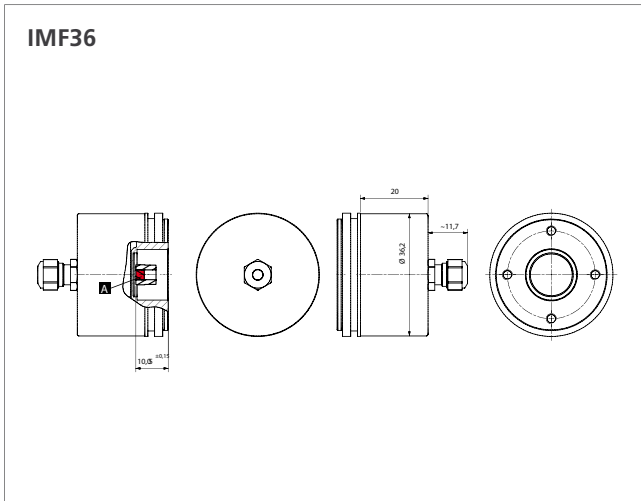


Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at www.tr-electronic.com or on request.

Dimensional Drawings



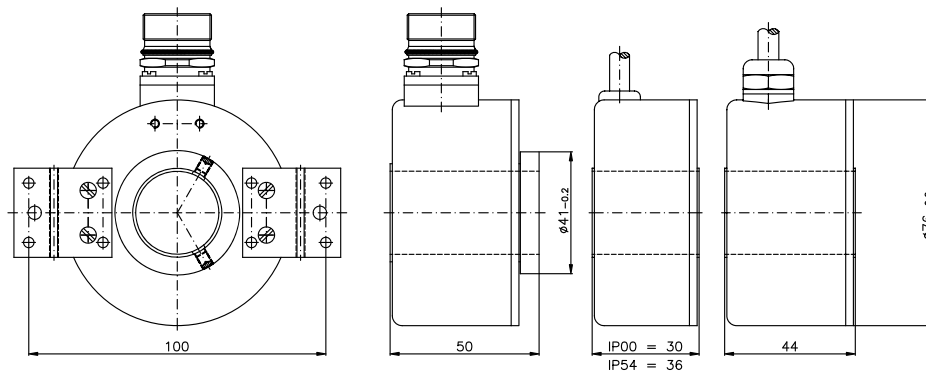
Dimensional Drawings



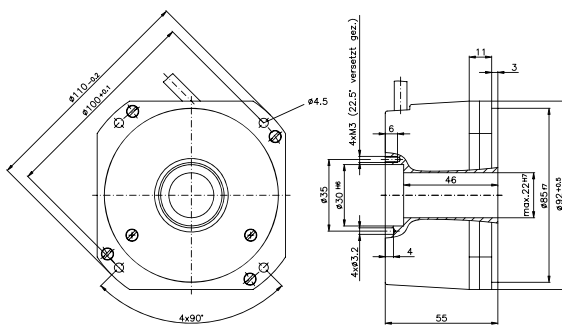
Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at www.tr-electronic.com or on request.

Dimensional Drawings

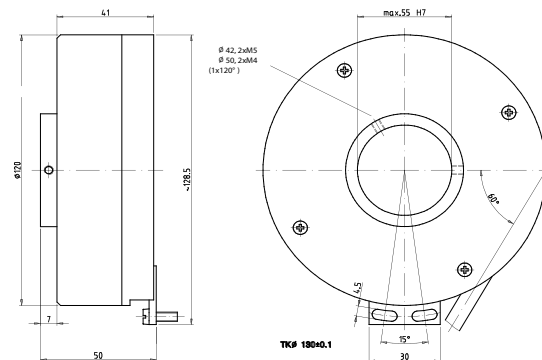
IH76V



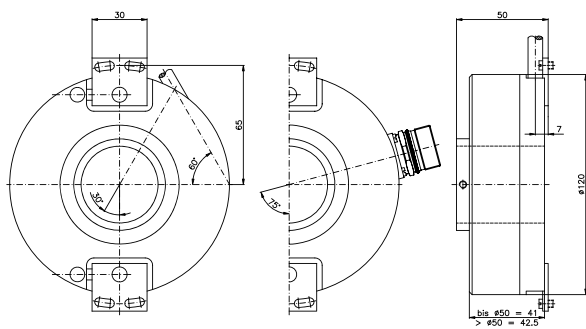
IH92V



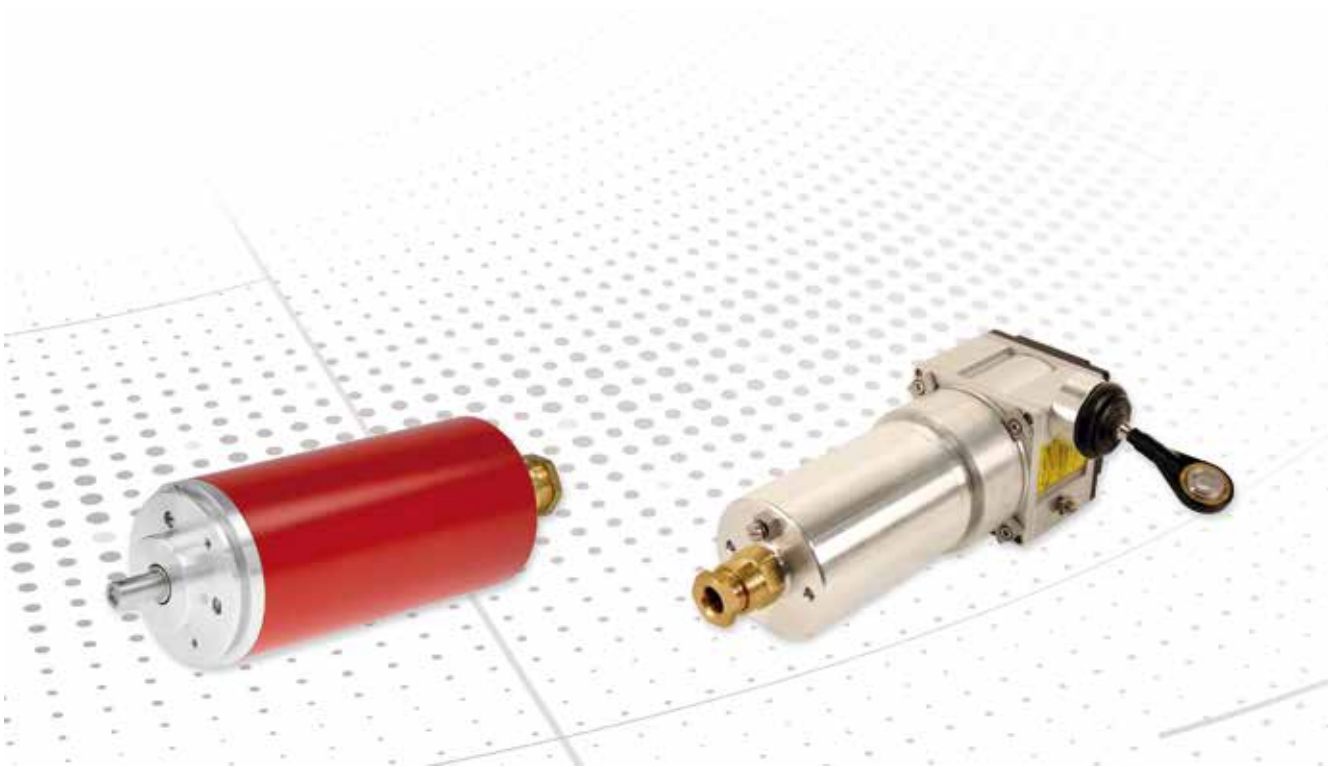
IH120



IH120V



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.

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Dimensional Drawings.....	226

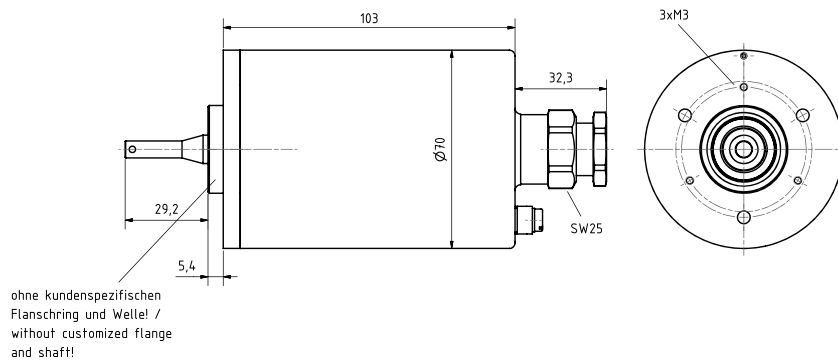
Housing option for rotary encoders

Products	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	INC SIN / COS
Option, additional interfaces (on request)	
Weblink	www.tr-electronic.com/s/S008508
QR-Code	

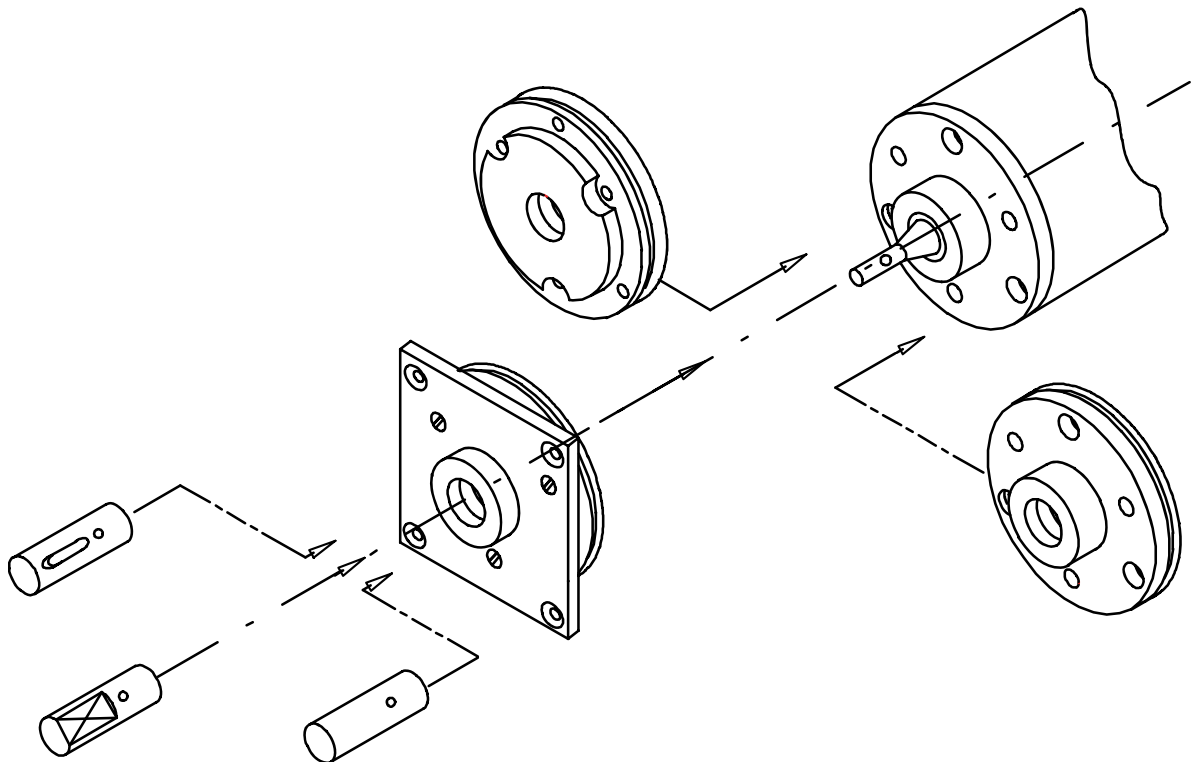
Dimensional Drawings

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

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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	www.tr-electronic.com/s/S008488	www.tr-electronic.com/s/S008489	www.tr-electronic.com/s/S008490
QR-Code			

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

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	$\geq 2 \dots \leq 70000$	$\geq 2 \dots \leq 70000$	$\geq 2 \dots \leq 70000$	
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	www.tr-electronic.com/s/S008492	www.tr-electronic.com/s/S008493	www.tr-electronic.com/s/S008491	
QR-Code				

115 mm

<p>A_V115I</p> 
<p>Housing option for rotary encoders</p>
<p>See rotary encoders I__58</p>
<p>See rotary encoders I__58</p>
<p>12, 14, 20</p>
<p>Cable gland / connector</p>
<p>-20...+60 °C</p>
<p>IP65 (option IP67)</p>
<p>Option 22</p>
<p>See data encoder integrated</p>
<p>www.tr-electronic.com/s/S008523</p>


Suggested Products

Order code	Steps per turn - delivered	Maximum steps per turn	Channels	Shaft / Flange	Connector position	Supply	Signal level
AEV58I:2 - ATEX solid shaft zone 2/22							
AEV58I:2-00001	600	10000	A,VA, B,B, 0,0	10FL/19,5, ZB36	Cable gland, radial, 5 m, open end	4,5V-32V	=Ub

Further product information

1. Enter order code into ...



2. Searchfield (top right) on www.tr-electronic.com



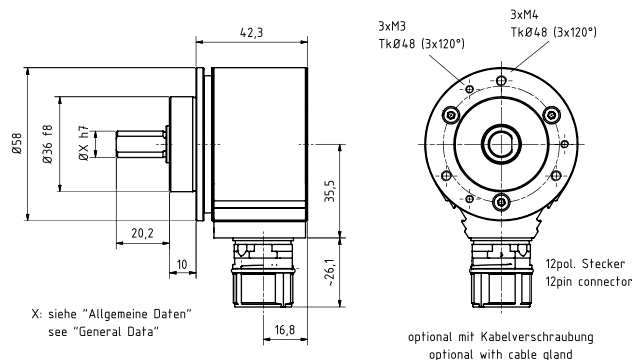
3. Choose desired information



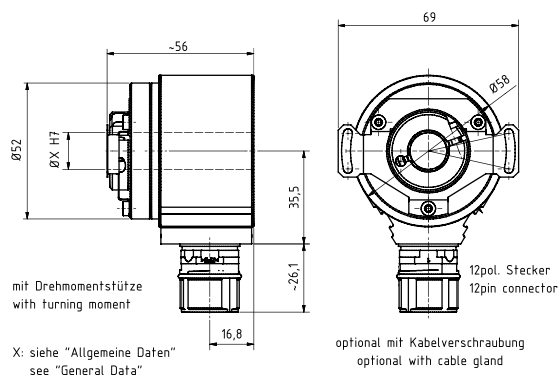
We will help you to select the most suitable products from the complete TR range. Please contact us (info@tr-electronic.de).

Dimensional Drawings

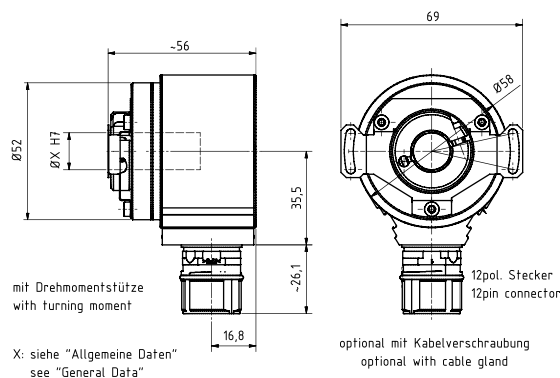
AEV58I:2; AOV58I:2



AEH58I:2; AOH58I:2

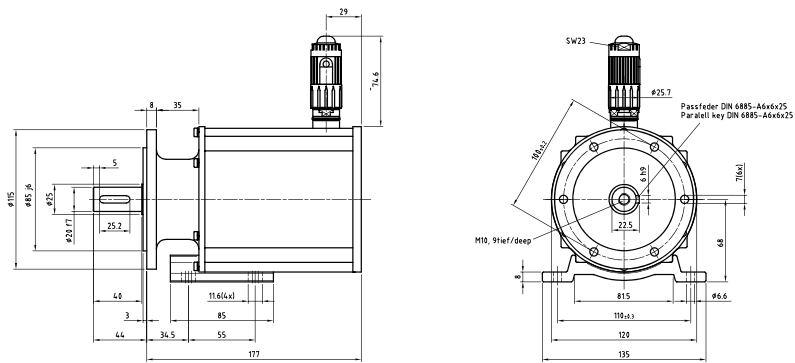


AES58I:2; AOS58I:2

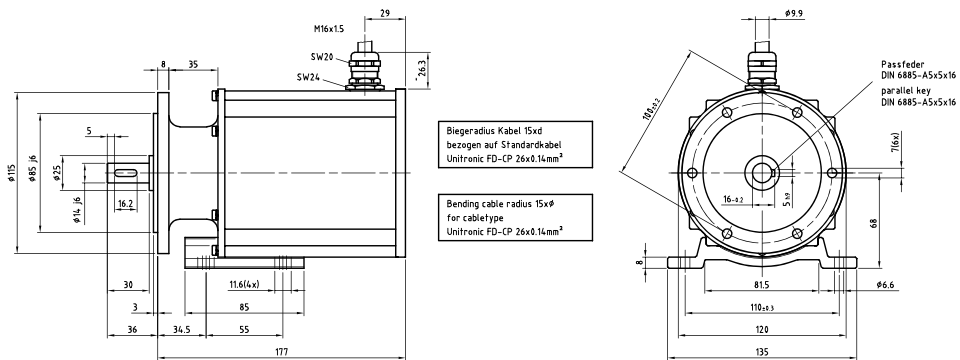


Dimensional Drawings

A_V115I
1 x M23 12 pin radial



A_V115I
1 x Cable gland radial





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).

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	www.tr-electronic.com/s/S008432	www.tr-electronic.com/s/S008433
QR-Code		

*Others on request

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

Suggested Products

Order code	Steps per turn	Channels	Shaft / Flange	Connector position	Cable length	Remark
IV99						
IV99-00001	2048	A,\A, B,\B, 0,\0	11Glatt/32 ZB85	Cable gland M20x1,5 radial		
IV99-00002	1024	A,\A, B,\B, 0,\0	11Glatt/32 ZB85	Cable gland M20x1,5 radial		
IS99						
IS99-00001	2048	A,\A, B,\B, 0,\0	16G7 blind shaft	Cable gland M20x1,5 radial		
IS99-00003	1024	A,\A, B,\B, 0,\0	16G7 blind shaft	Cable gland M20x1,5 radial		
IS99-00004	1024	A,\A, B,\B, 0,\0	16G7 blind shaft	Cable gland M20x1,5 radial		

Further product information

1. Enter order code into ...



2. Searchfield (top right) on www.tr-electronic.com



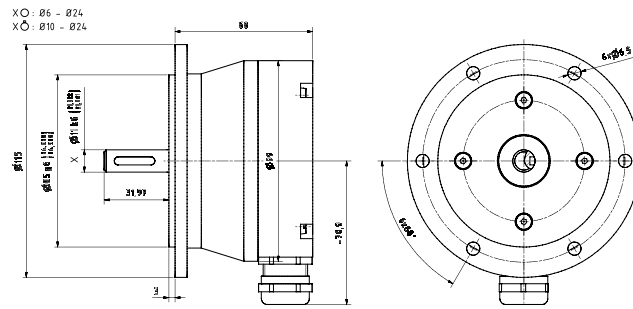
3. Choose desired information



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

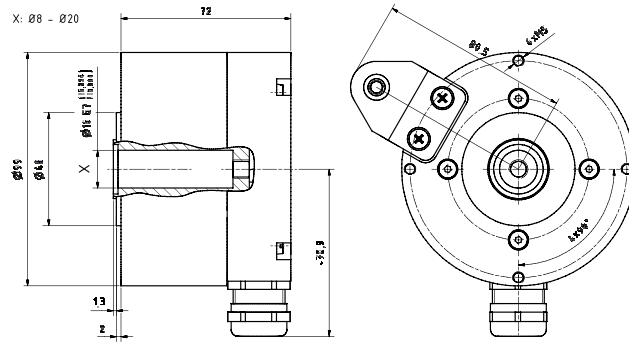
Dimensional Drawings

IV99



Vollständige Abmaße siehe Vorschlagsprodukt /
Complete dimensions see product offering

IS99



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

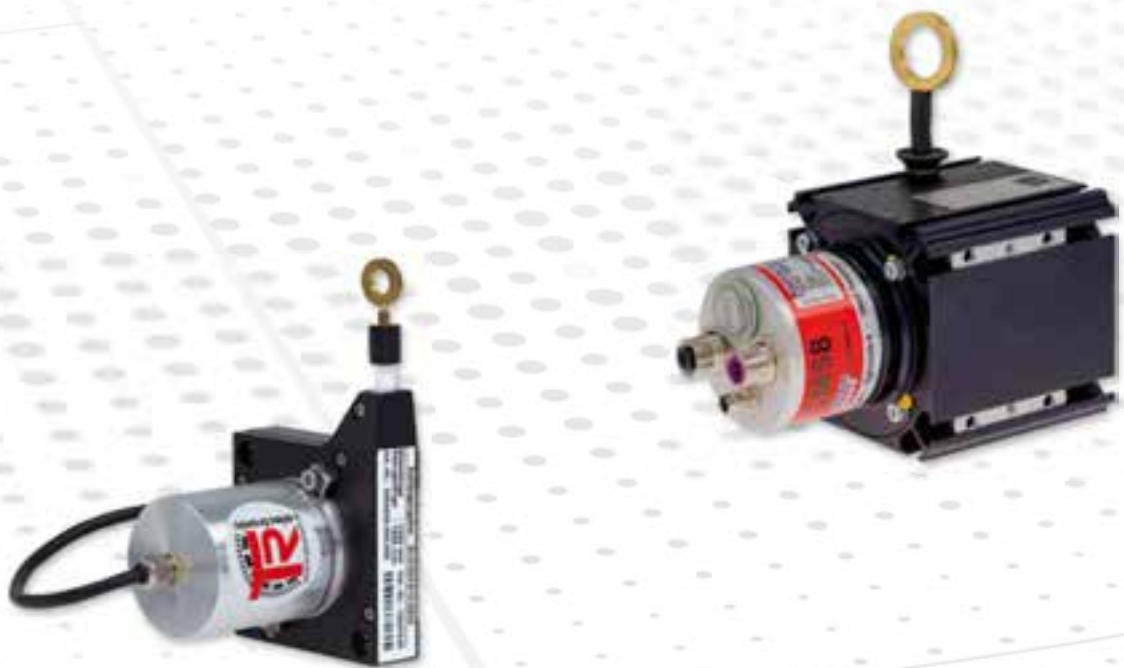
Wire-actuated Encoders



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.



Contents

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Standard	243
Basic	243
Industrial	245

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

The SL30 is 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.

Contents

Products.....	243
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Dimensional Drawings.....	249

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	Analog	SSI  Analog CANopen INC	SSI  Analog CANopen INC
Option, additional interfaces (on request)			
Weblink	www.tr-electronic.com/s/S006900	www.tr-electronic.com/s/S006899	www.tr-electronic.com/s/S006900
QR-Code			

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

Application: standard

Product	SL00 size 130 mm	WDS size 60 mm	WDS size 96 mm	
				
Application	Standard	Standard	Standard	
Available measurement lengths (m)	5	1,6	2; 3	
Suits encoder series	58	58	58	
Diameter of measurement wire	0,55 mm	0,45 mm	0,80 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.)	260,2 mm/turn (typ.)	
Options available		Single or double deflection pulleys	Single or double deflection pulleys	
Protection class	IP50	IP65	IP65	
ATEX zone				
Interface	<p>SSI </p> <p>Analog </p> <p>INC</p>	<p>SSI </p> <p>Analog </p> <p>INC</p>	<p>SSI </p> <p>Analog </p> <p>Parallel </p> <p></p> <p>INC </p> <p> </p>	
Option, additional interfaces (on request)			SSI Analog	
Weblink	www.tr-electronic.com/s/S006901	www.tr-electronic.com/s/S006902	www.tr-electronic.com/s/S006903	
QR-Code				







Application: standard

Application: industrial

WDS size 115 mm	WDS size 200 mm	SL30 size 80 mm	SL30 size 130 mm
Standard	Standard	Industrial	Industrial
5; 7; 10; 15	30	2; 3	10; 15
58 65 75	58 65 75	58 65 75 81 84	58 65 75 81 84
1,00 mm	0,80 mm	1,35 mm	0,81 mm
Stainless steel, covered with polyamide	Stainless steel, covered with polyamide	Stainless steel, 1.4401	Stainless steel, 1.4401
Aluminium anodized	Aluminium anodized	Aluminium anodized	Aluminium anodized
			Plastic
315,23 mm/turn (typ.)	500,21 mm/turn (typ.)	200 mm/turn (typ.)	333,21 mm/turn (typ.)
Single or double deflection pulleys	Single or double deflection pulleys	-30...+80 °C, wire brush, different deflection pulleys, below, fixed ball joint	-30...+80 °C, wire brush, different deflection pulleys, below, fixed ball joint
IP65	IP65	IP65	IP65
<p>SSI CANopen</p> <p>Analog </p> <p>Parallel </p> <p>Nocken </p> <p> </p> <p>INC </p> <p> </p>	<p>SSI CANopen</p> <p>Analog </p> <p>Parallel </p> <p>Nocken </p> <p> </p> <p>INC </p> <p> </p>	<p>SSI CANopen</p> <p>Analog </p> <p>Parallel </p> <p>Nocken </p> <p> </p> <p>INC </p> <p> </p>	<p>SSI CANopen</p> <p>Analog </p> <p>Parallel </p> <p>Nocken </p> <p> </p> <p>INC </p> <p> </p>
SSI Analog	SSI Analog	SSI Analog	SSI Analog
www.tr-electronic.com/s/S006904	www.tr-electronic.com/s/S006905	www.tr-electronic.com/s/S006906	www.tr-electronic.com/s/S006907

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

Application: industrial

Product	SL30 size 190 mm	SL30 ATEX size 80 mm	SL30 ATEX size 130 mm
			
Application	Industrial	Industrial ATEX	Industrial ATEX
Available measurement lengths (m)	40; 50	2; 3	10; 25
Suits encoder series	58 65 75 81 84	58 65 70 75 115	58 65 70 75 115
Diameter of measurement wire	1,35 mm	1,35 mm	0,81 mm
Measurement wire made from	Stainless steel, 1.4401	Stainless steel, 1.4401	Stainless steel, 1.4401
Housing of drum	Aluminium anodized	Aluminium anodized	Aluminium anodized
Housing of spring	Plastic	Plastic	Plastic
Ratio	491,5 mm/turn (typ.)	200 mm/turn (typ.)	333,21 mm/turn (typ.)
Options available	-30...+80 °C, wire brush, different deflection pulleys, bellow, fixed ball joint	-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		2	2
Interface	<p>SSI CANopen</p> <p>Analog DeviceNet</p> <p>Parallel PROFINET</p> <p>Nocken EtherCAT</p> <p>DRIVE-CLIQ EtherNet/IP</p> <p>INC ETHERNET POWERLINK</p> <p>PROFINET SERCOS the automation bus</p>	<p>SSI PROFINET</p> <p>Analog CANopen</p> <p>Parallel DeviceNet</p> <p>INC PROFINET</p>	<p>SSI PROFINET</p> <p>Analog CANopen</p> <p>Parallel DeviceNet</p> <p>INC PROFINET</p>
Option, additional interfaces (on request)	SSI Analog		
Weblink	www.tr-electronic.com/s/S006908	www.tr-electronic.com/s/S006909	www.tr-electronic.com/s/S006910
QR-Code			

Suggested Products

Order code	Name	Measurement range	Interface	Remark
Basic WPS size 88mm				
CMW58M-00048	CMW58M*4096/256 V000 ANALOG*ME5M „KIT“	5,00 m	ANALOG CURRENT	
Standard SL00 size 55mm				
CMW36M-00001	CMW36M*4096/4096 SSI SL55 1,25M	1,25 m	SSI	
Standard SL00 size 80mm				
CMW58M-00055	CMW58M*4096/4096 SSI SL80 3M	3,00 m	SSI	
Standard SL00 size 130mm				
CMW58M-00056	CMW58M*4096/4096 SSI SL130 5M	5,00 m	SSI	
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	
Standard WDS size 115mm				
CMW58M-00002	CMW58M*4096/4096 PBS-DP SLG/ME5M	5,00 m	PROFIBUS DP	
CMW58M-00017	CMW58M*4096/4096 V000 SSI SLG/ME5M	5,00 m	SSI	
CMW58M-00041	CMW58M*2048/4096 V000 CAN/OPEN ME 0-5M	5,00 m	CAN/OPEN	
CMW58M-00068	CMW58M*4096/4096 SSI ME5M+ULR	5,00 m	SSI	With single pulley
CMW58M-00076	CMW58M*4096/4096 PB SLG/ME5M DUR00	5,00 m	PROFIBUS DP	With double pulley
CMW58M-00077	CMW58M*4096/4096 PB SLG/ME5M DUR90	5,00 m	PROFIBUS DP	With double pulley, 90°
Industrial SL30 size 80mm				
CEW58M-00020	CEW58M*4096/4096 V000 PROFIBUS *SL3002	2,00 m	PROFIBUS DP	
CEW58M-00132	CEW58M*8192/4096 V000 SSI SL3002	2,00 m	SSI	
CEW58M-00215	CEW58M*4096/4096 EIP SL3002	2,00 m	ETHERNET IP	
CEW58M-00219	CEW58M*8192/4096 V000 PROFINET *SL3002	2,00 m	PROFINET IO	
CEW58M-00221	CEW58M*8192/4096 V000 ETHERCAT *SL3002	2,00 m	EtherCAT	
CEW58M-00127	CEW58M*8192/4096 V000 PROFIBUS *SL3003	3,00 m	PROFIBUS DP	
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-00232	CEW58M*8192/4096 PROFINET *SL3003	3,00 m	PROFINET IO	
CEW58M-00241	CEW58M*8192/4096 EIP SL3003	3,00 m	ETHERNET IP	

For further product information simply enter the order number in the search field at www.tr-electronic.de.

Suggested Products

Order code	Name	Measurement range	Interface	Remark
Industrial SL30 size 130mm				
CEW58M-00019	CEW58M*8192/4096 V000 SSI SL3005	5,00 m	SSI	
CEW58M-00134	CEW58M*8192/4096 V000 PROFIBUS *SL3005	5,00 m	PROFIBUS DP	
CEW58M-00156	CEW58M*8192/4096 V000 ETHERCAT *SL3005	5,00 m	EtherCAT	
CEW58M-00225	CEW58M*8192/8192 V000 PROFINET *SL3005	5,00 m	PROFINET IO	
CEW58M-00242	CEW58M*8192/4096 EIP SL3005	5,00 m	ETHERNET IP	
CEW58M-00029	CEW58M*8192/4096 V000 PROFIBUS *SL3010	10,00 m	PROFIBUS DP	
CEW58M-00141	CEW58M*8192/4096 V000 ETHERCAT *SL3010	10,00 m	EtherCAT	
CEW58M-00229	CEW58M*8192/4096 V000 SSI SL3010	10,00 m	SSI	
CEW58M-00239	CEW58M*8192/4096 EPN *SL3010	10,00 m	PROFINET IO	
CEW58M-00008	CEW58M*8192/4096 V000 PROFIBUS *SL3015	15,00 m	PROFIBUS DP	
CEW58M-00065	CEW58M*8192/4096 V000 SSI SL3015	15,00 m	SSI	
CEW58M-00228	CEW58M*8192/4096 EPN SL3015	15,00 m	PROFINET IO	
CEW58M-00256	CEW58M*8192/4096 EIP SL3015	15,00 m	ETHERNET IP	
CEW58M-00022	CEW58M*4096/4096 V000 PROFIBUS *SL3020	20,00 m	PROFIBUS DP	
CEW58M-00148	CEW58M*8192/4096 V000 SSI SL3020	20,00 m	SSI	
CEW58M-00092	CEW58M*8192/4096 V000 PROFIBUS *SL3025	25,00 m	PROFIBUS DP	
CEW58M-00231	CEW58M*8192/4096 V000 SSI SL3025	25,00 m	SSI	
CEW58M-00068	CEW58M*4096/4096 V000 SSI SL3030	30,00 m	SSI	
Industrial SL30 size 190mm				
CEW58M-00115	CEW58M*4096/4096 V000 PROFIBUS *SL3050	50,00 m	PROFIBUS DP	

Further product information

1. Enter order code into ...



2. Searchfield (top right) on www.tr-electronic.com



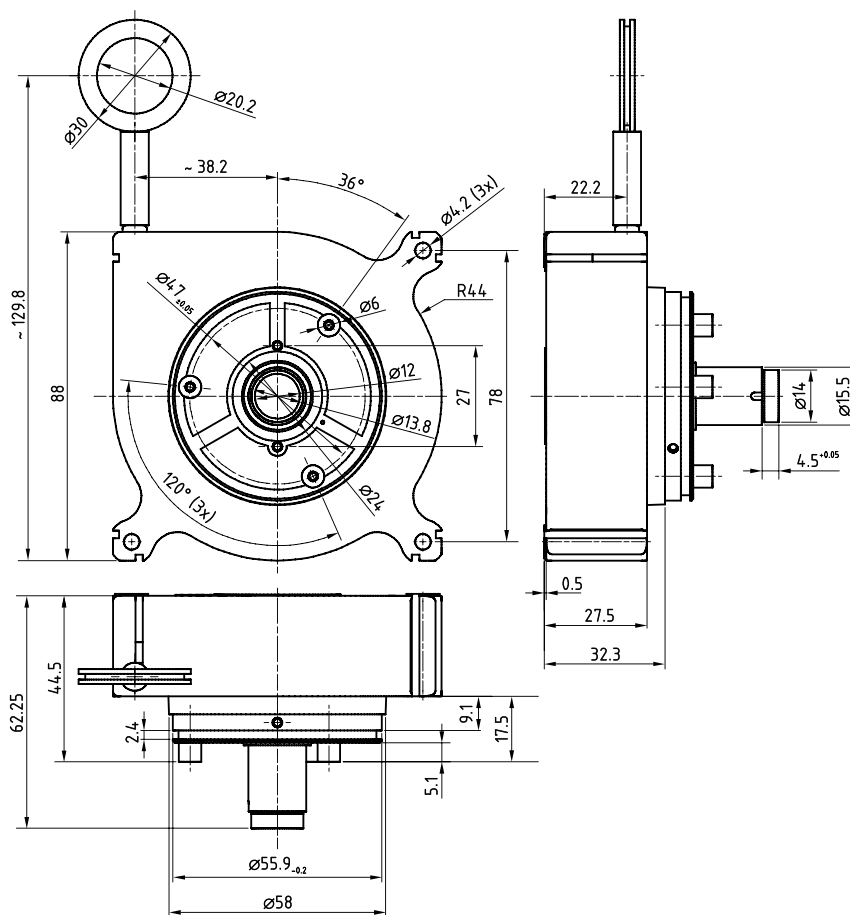
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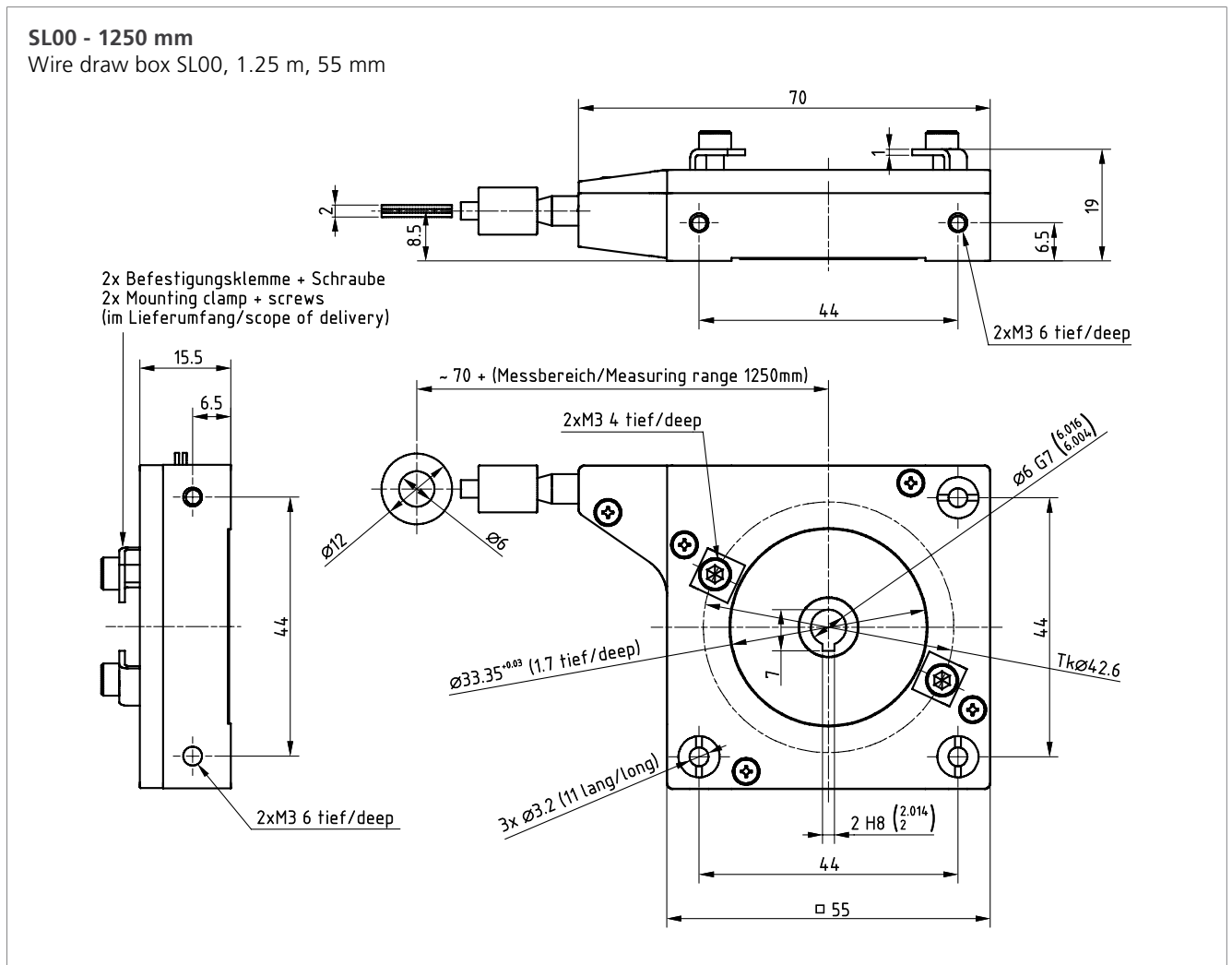
We will help you to select the most suitable products from the complete TR range. Please contact us (info@tr-electronic.de).

Dimensional Drawings

WPS - 5000 mm
Wire draw box WPS-5000-mK88, 5.0 m, 88 mm



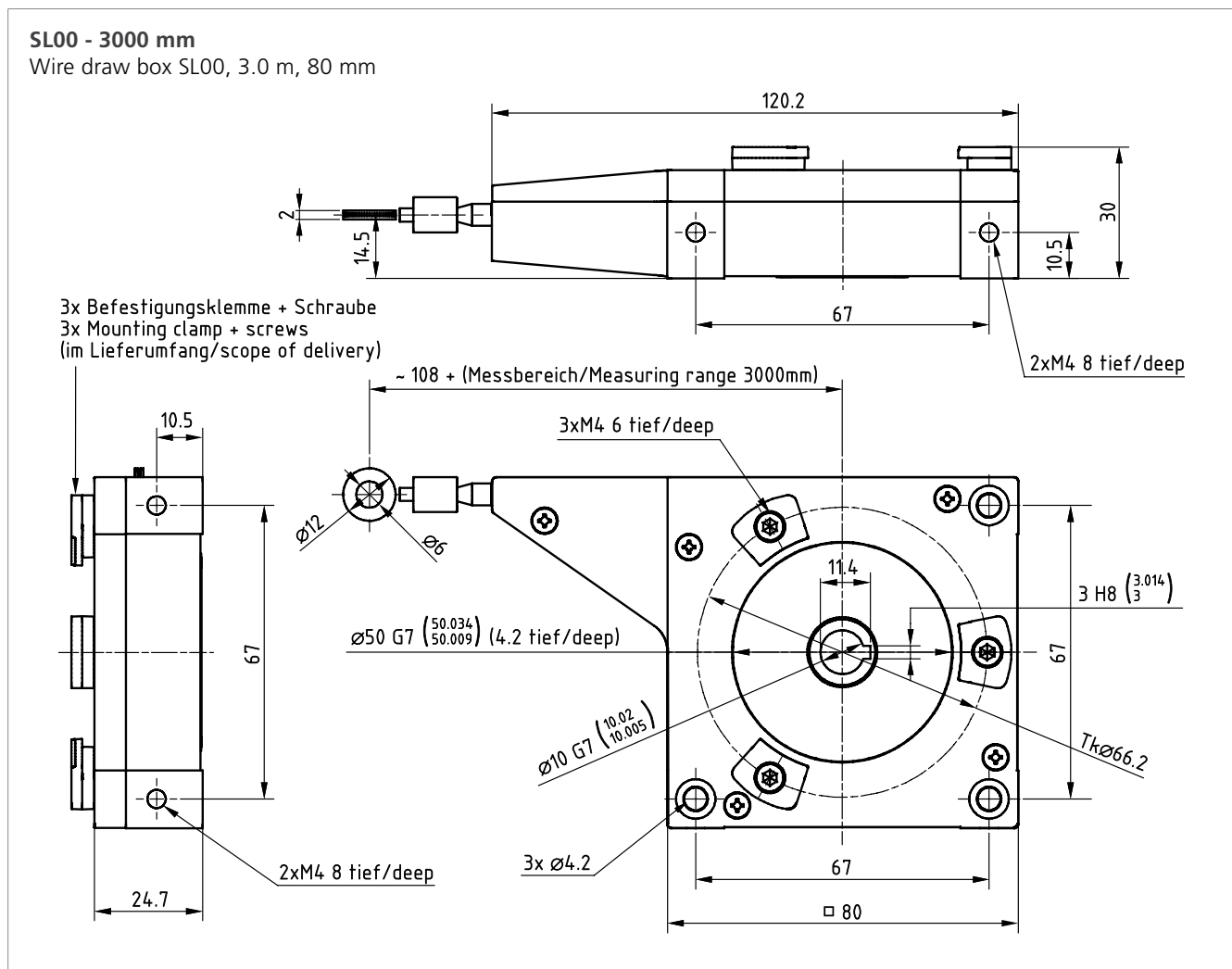
Dimensional Drawings



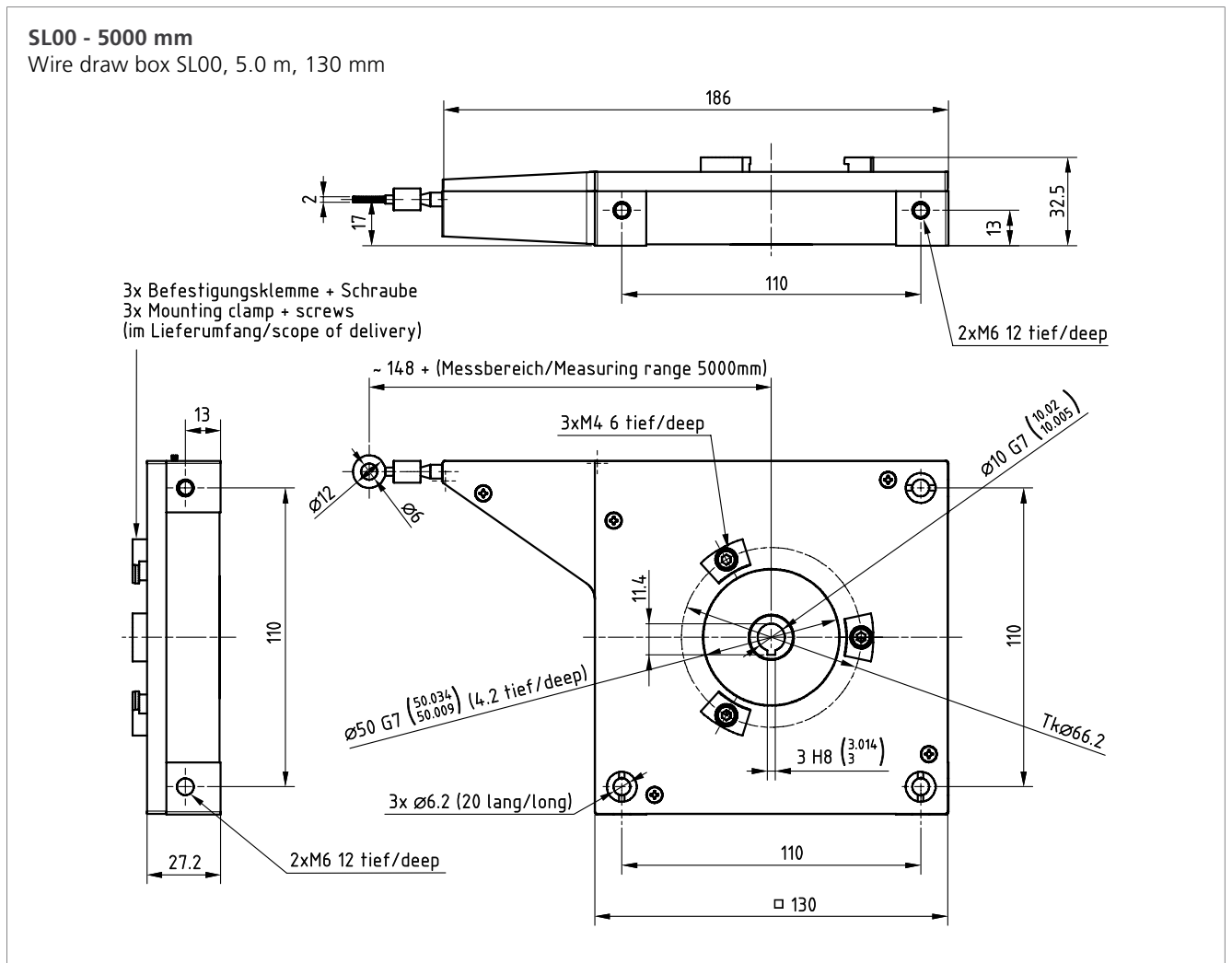
Shown is only wire draw box without encoder

Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at www.tr-electronic.com or on request.

Dimensional Drawings



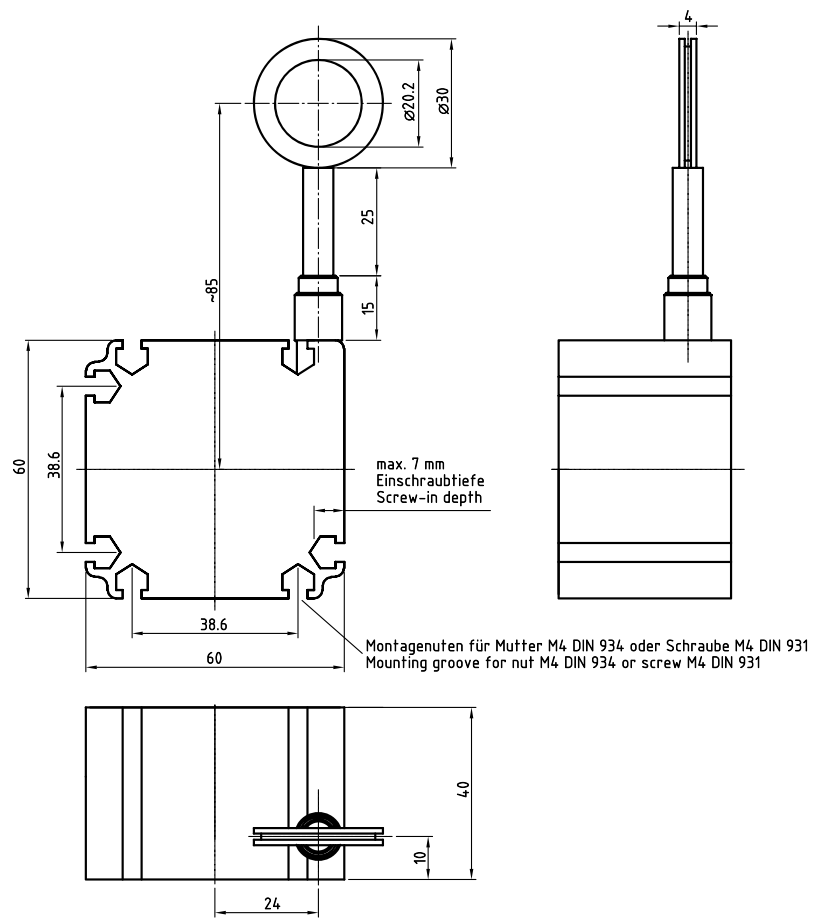
Dimensional Drawings



Dimensional Drawings

WDS - 1600 mm

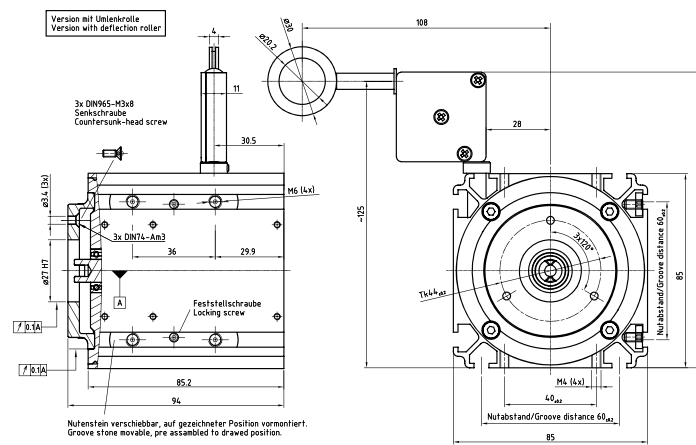
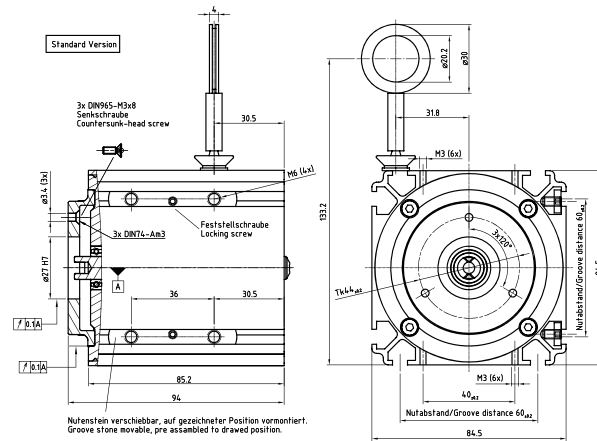
Wire draw box WDS-1600-P60, 1.6 m, 60 mm



Dimensional Drawings

WDS - 2500 mm

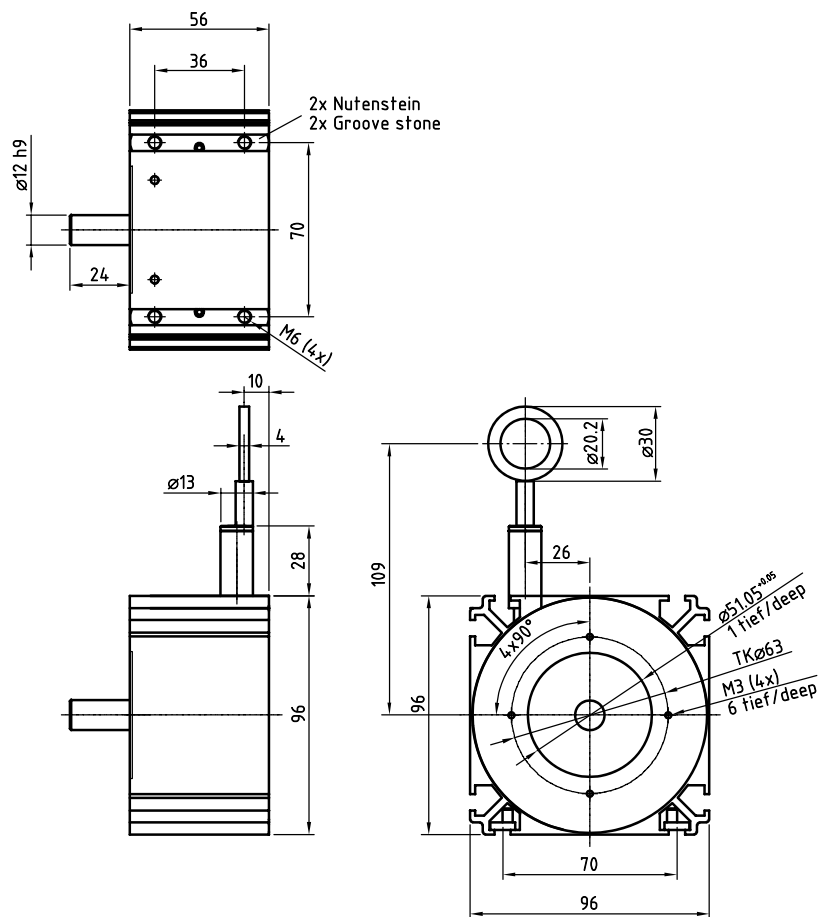
Wire draw box WDS-2500-P85, 2.5 m, 85 mm



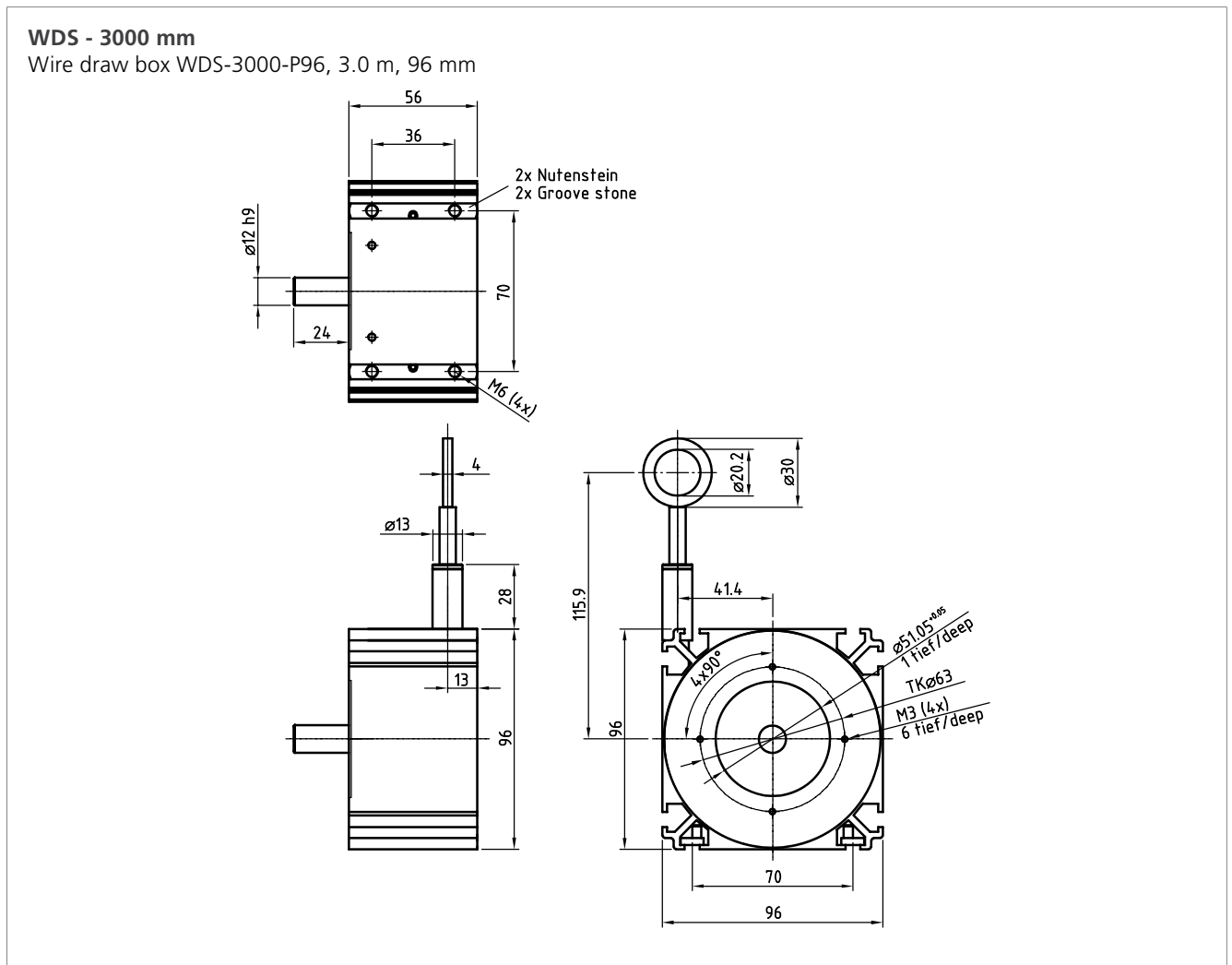
Dimensional Drawings

WDS - 2000 mm

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



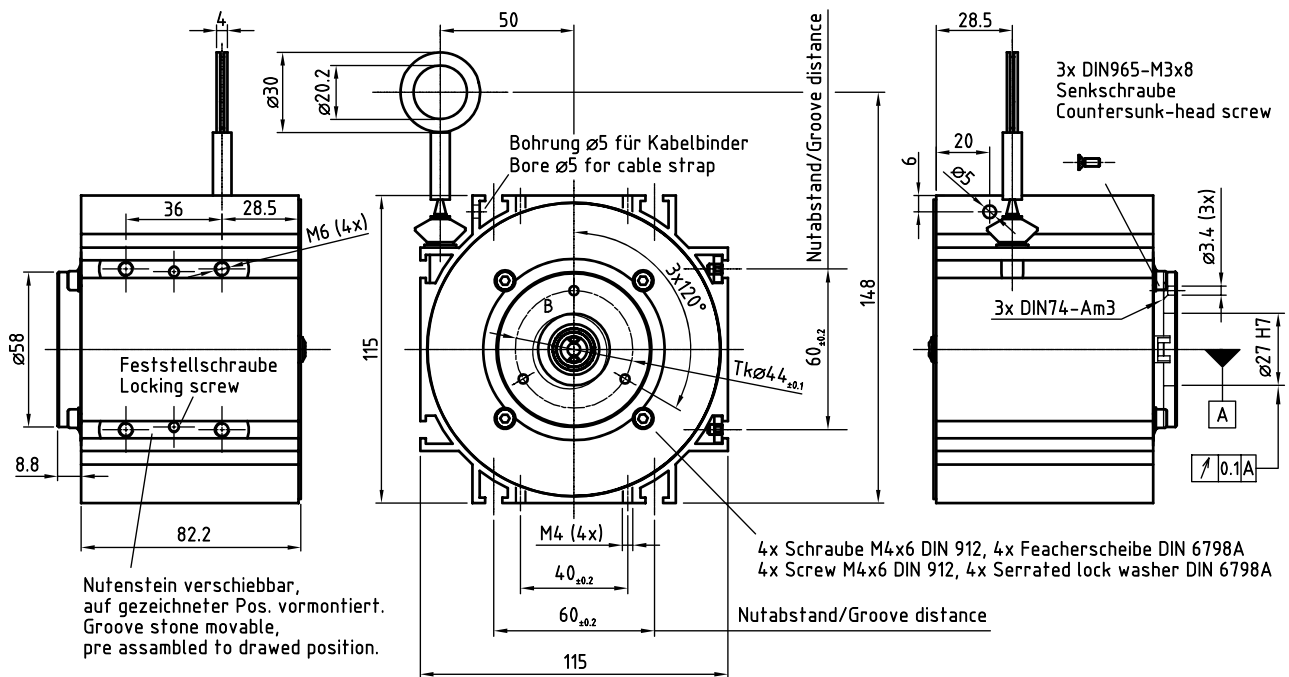
Dimensional Drawings



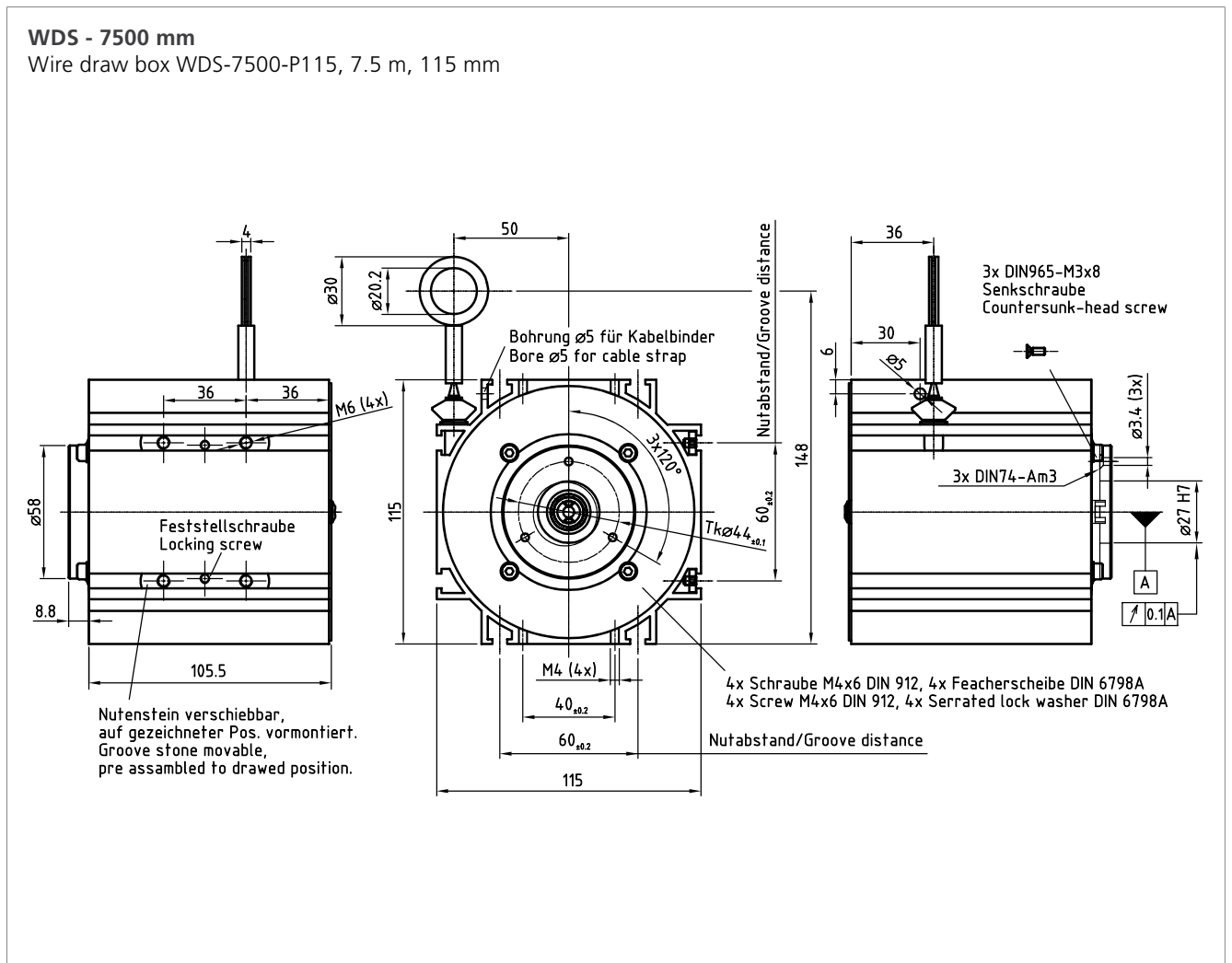
Dimensional Drawings

WDS - 5000 mm

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



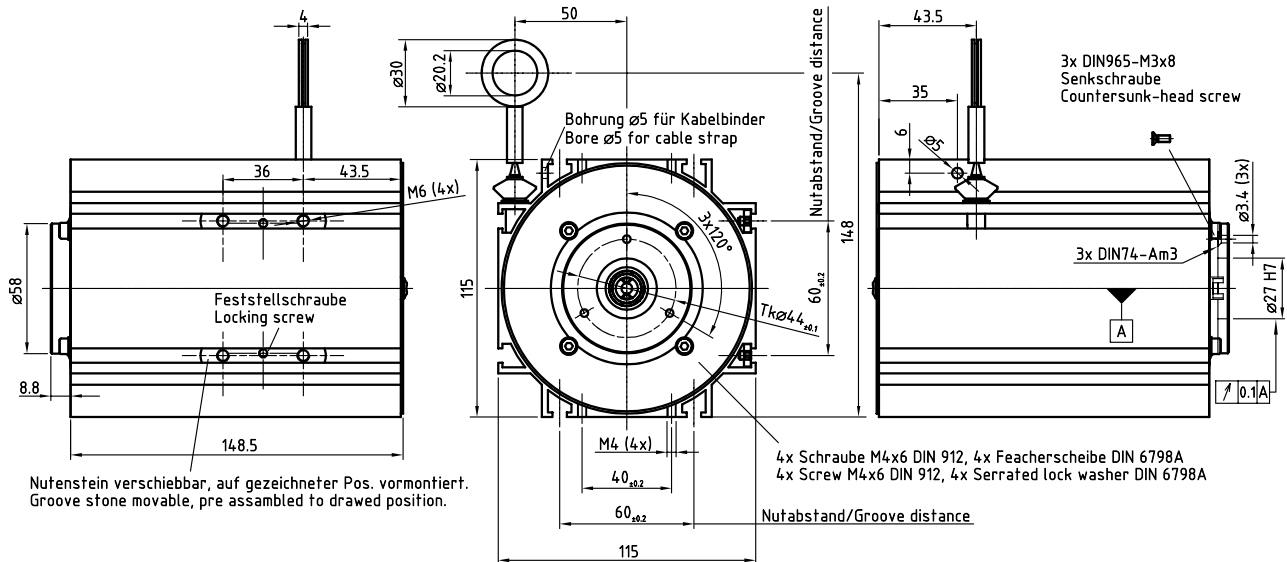
Dimensional Drawings



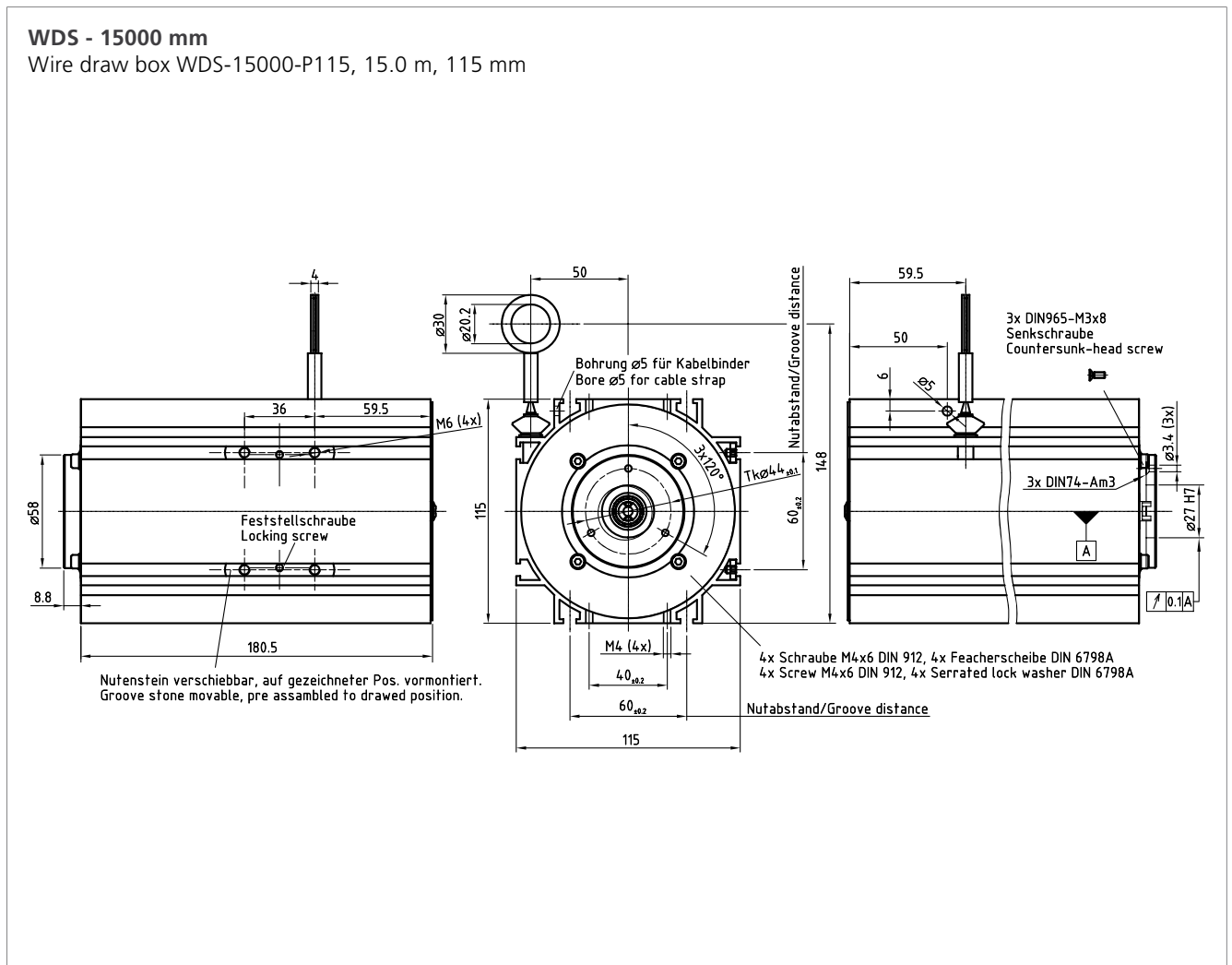
Dimensional Drawings

WDS - 10000 mm

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



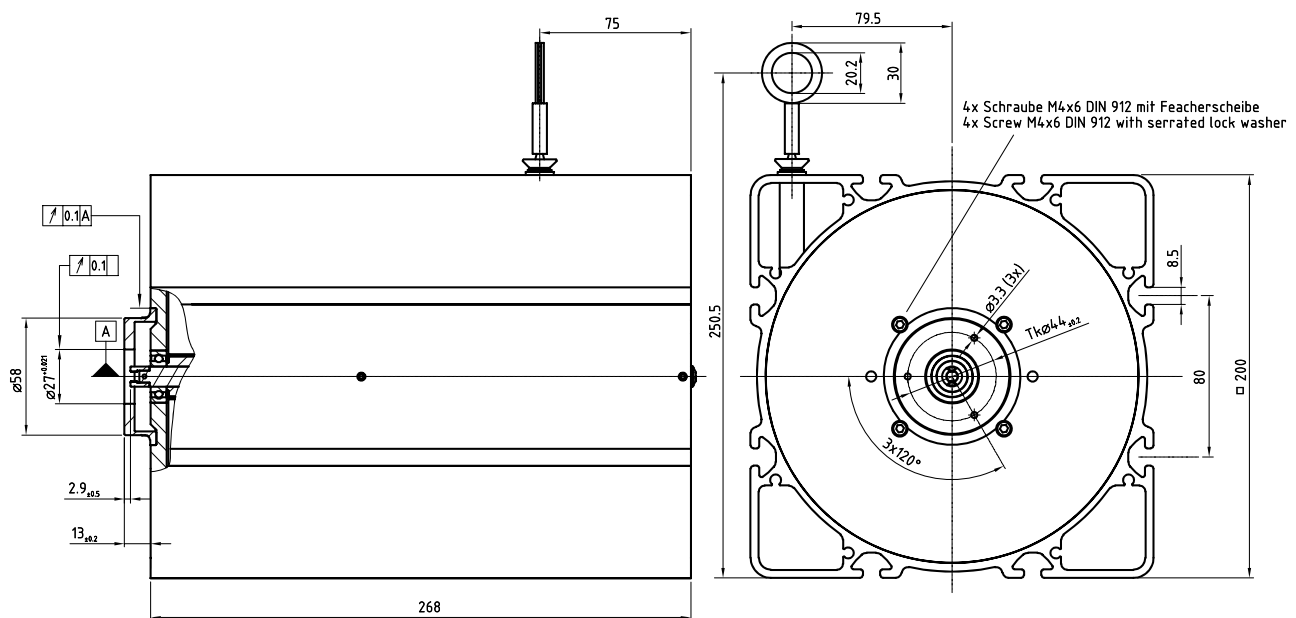
Dimensional Drawings



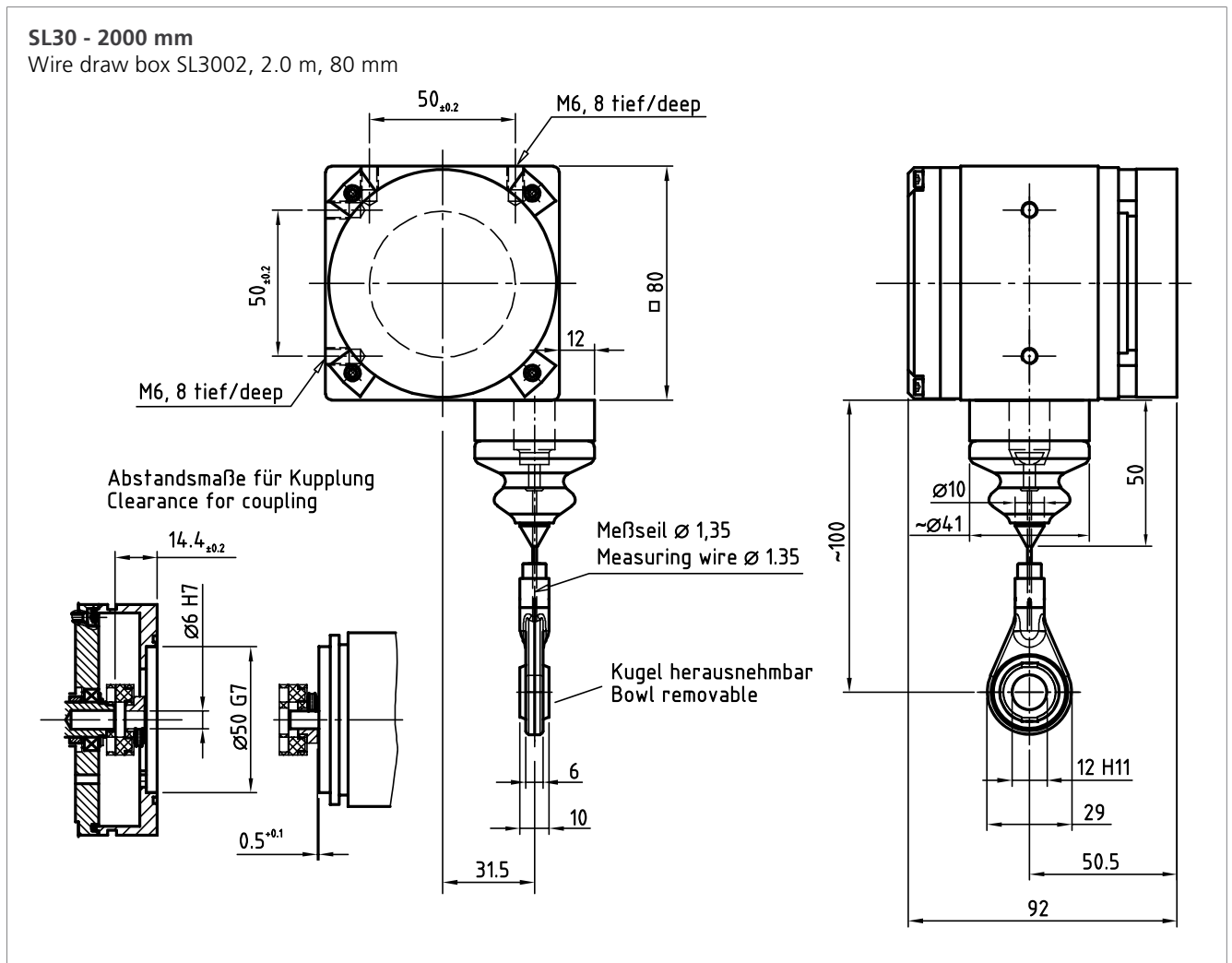
Dimensional Drawings

WDS - 30000 mm

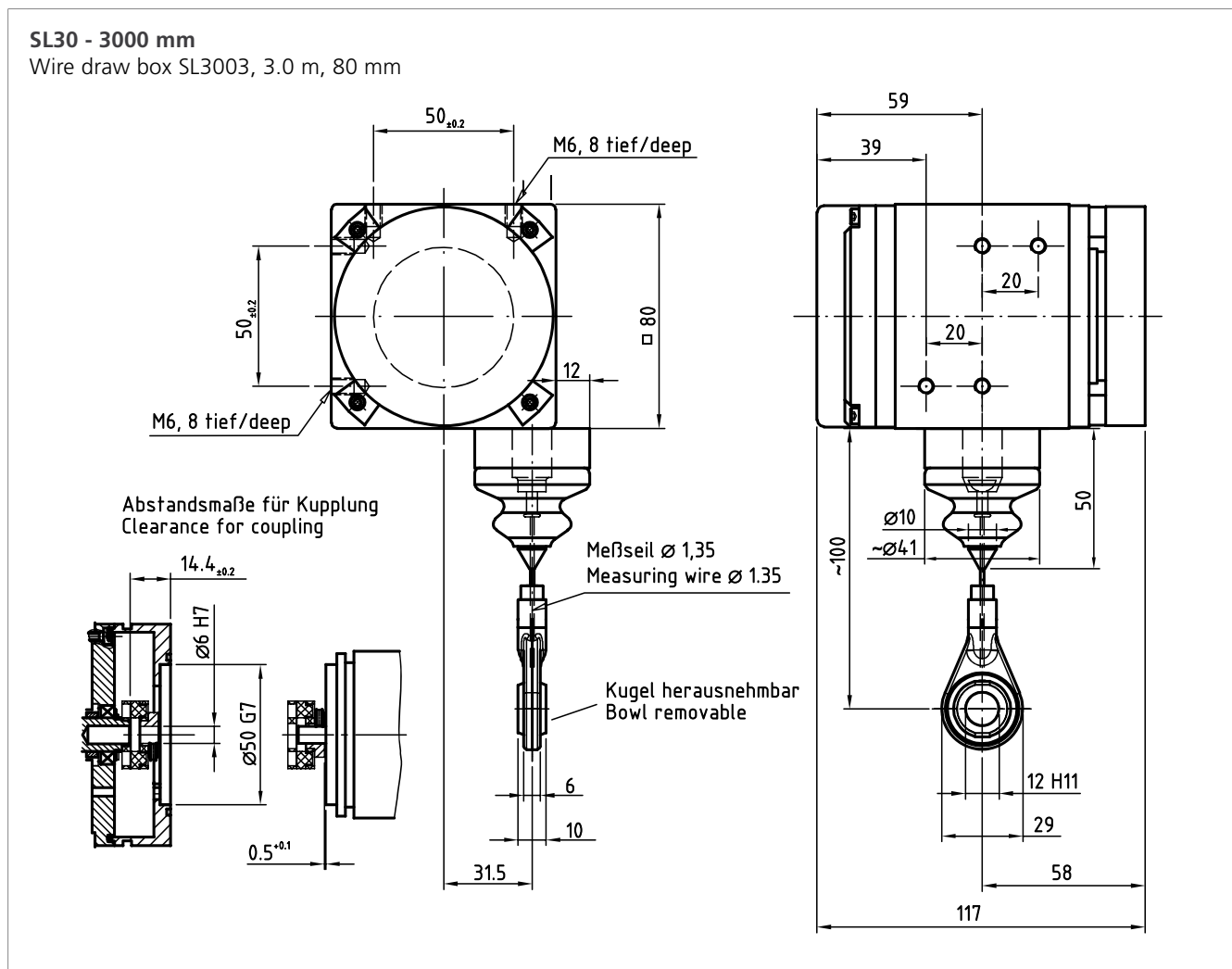
Wire draw box WDS-30000-P200, 30.0 m, 200 mm



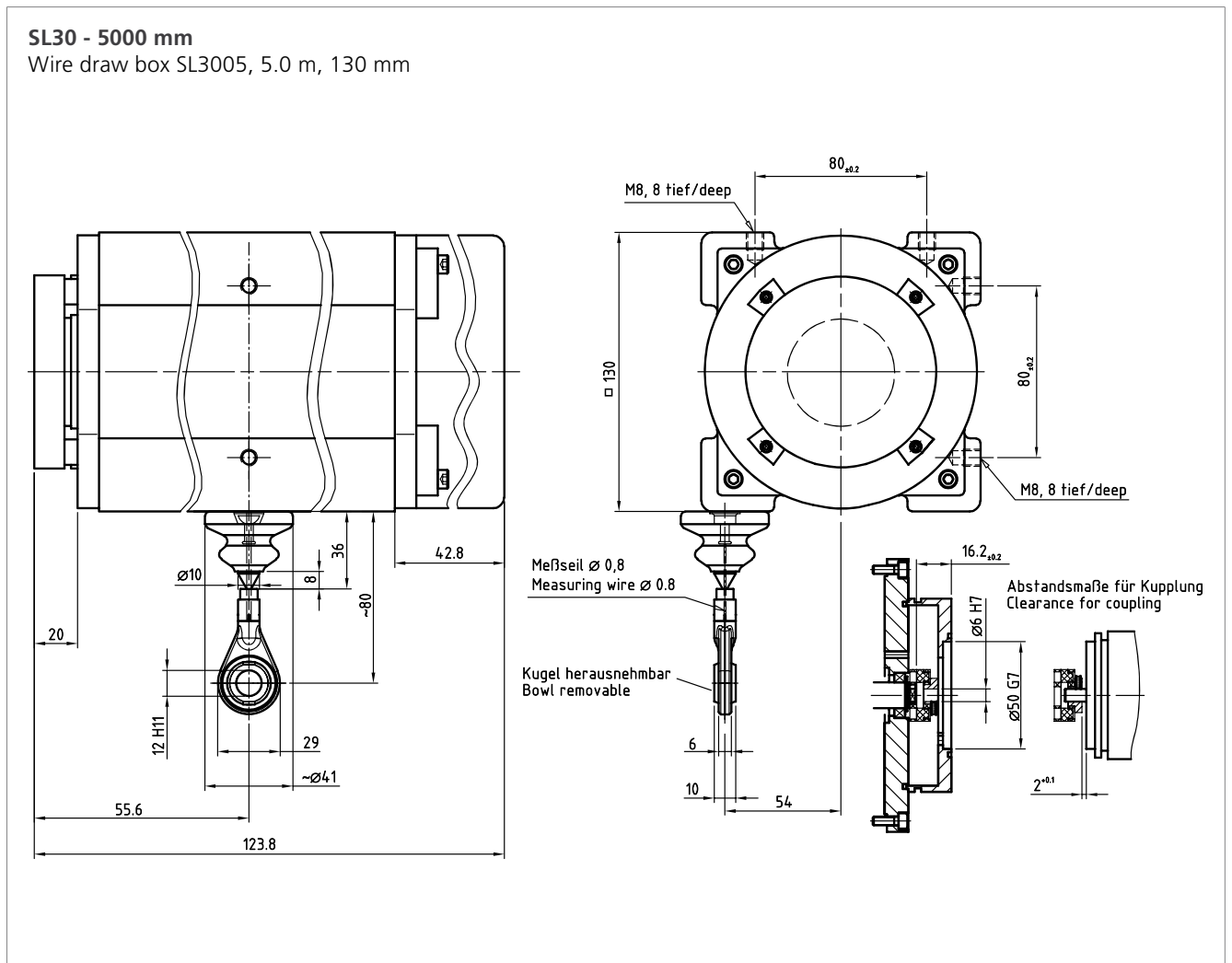
Dimensional Drawings



Dimensional Drawings



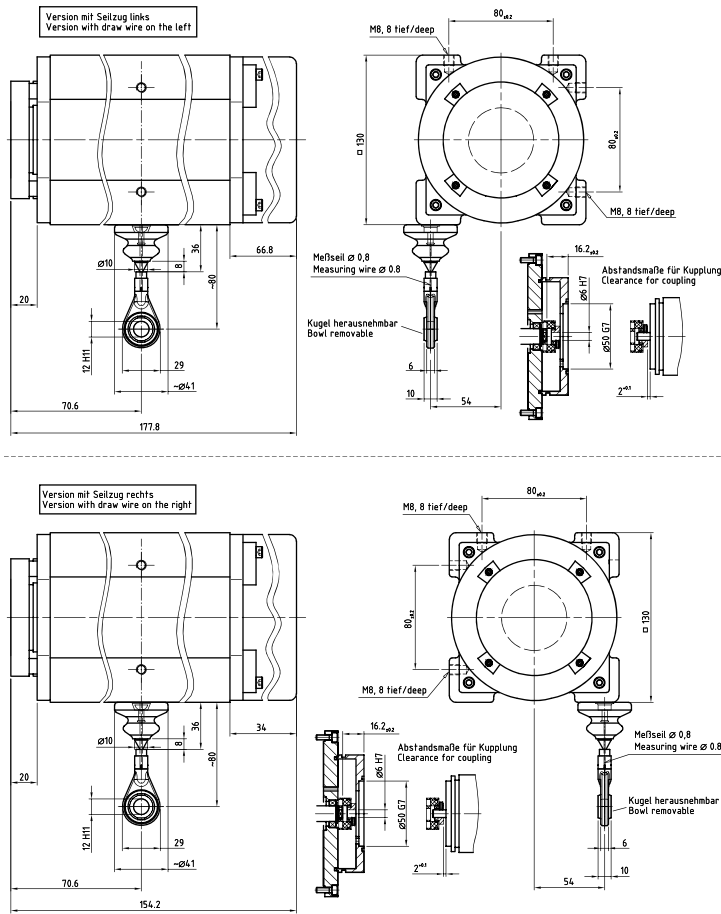
Dimensional Drawings



Dimensional Drawings

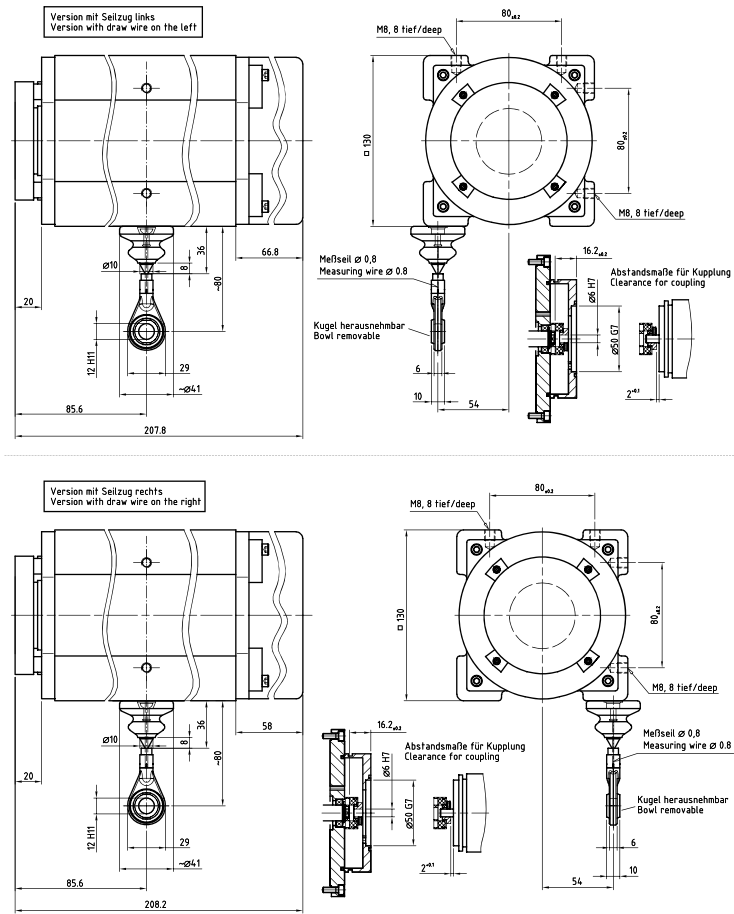
SL30 - 10000 mm

Wire draw box SL3010, 10.0 m, 130 mm



Dimensional Drawings

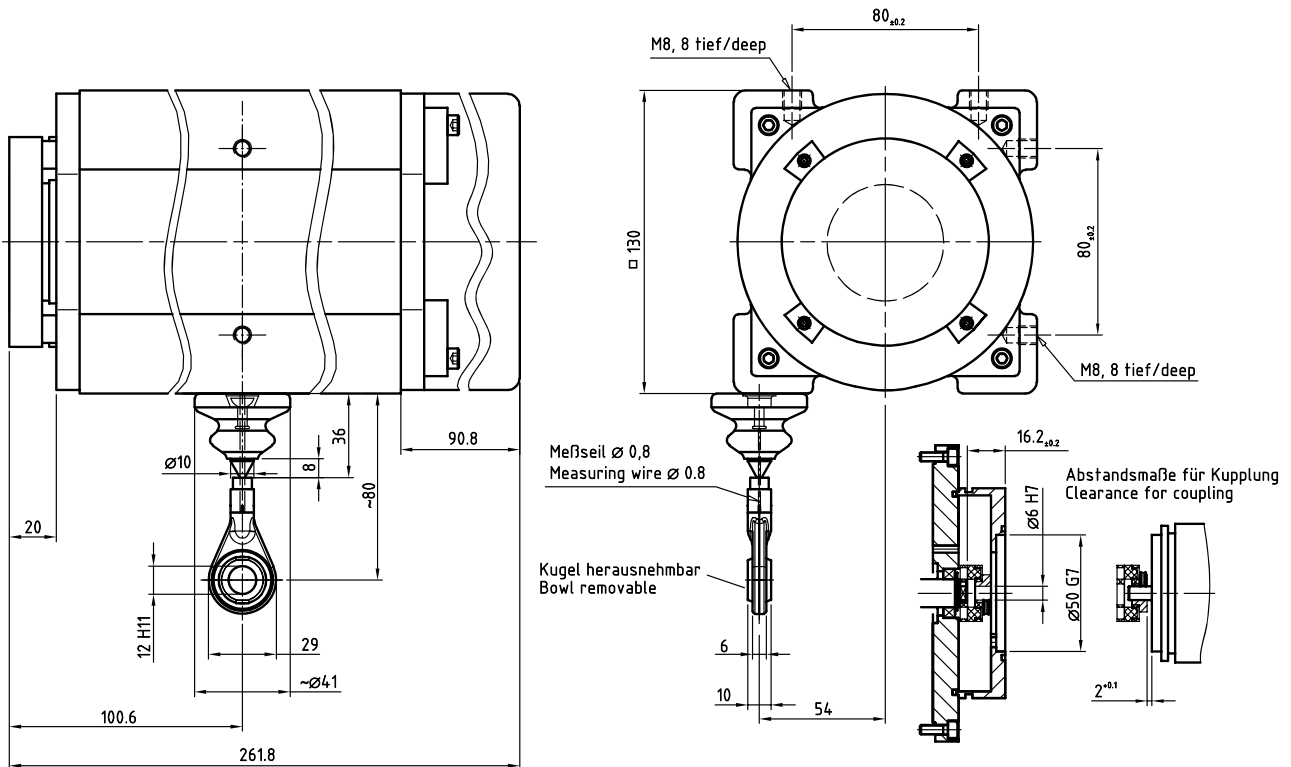
SL30 - 15000 mm
Wire draw box SL3015, 15.0 m, 130 mm



Dimensional Drawings

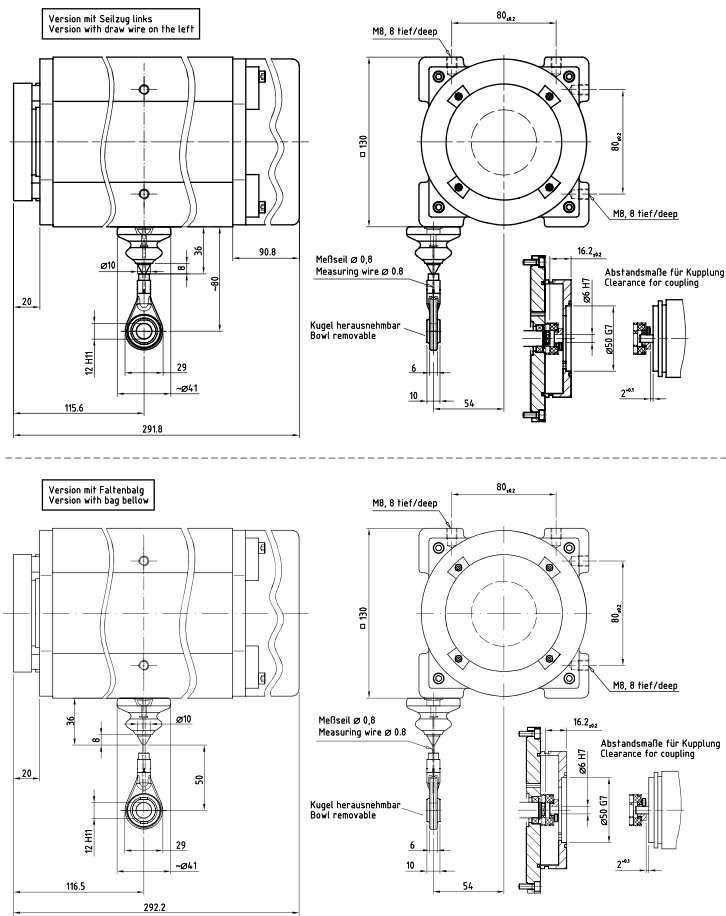
SL30 - 20000 mm

Wire draw box SL3020, 20.0 m, 130 mm



Dimensional Drawings

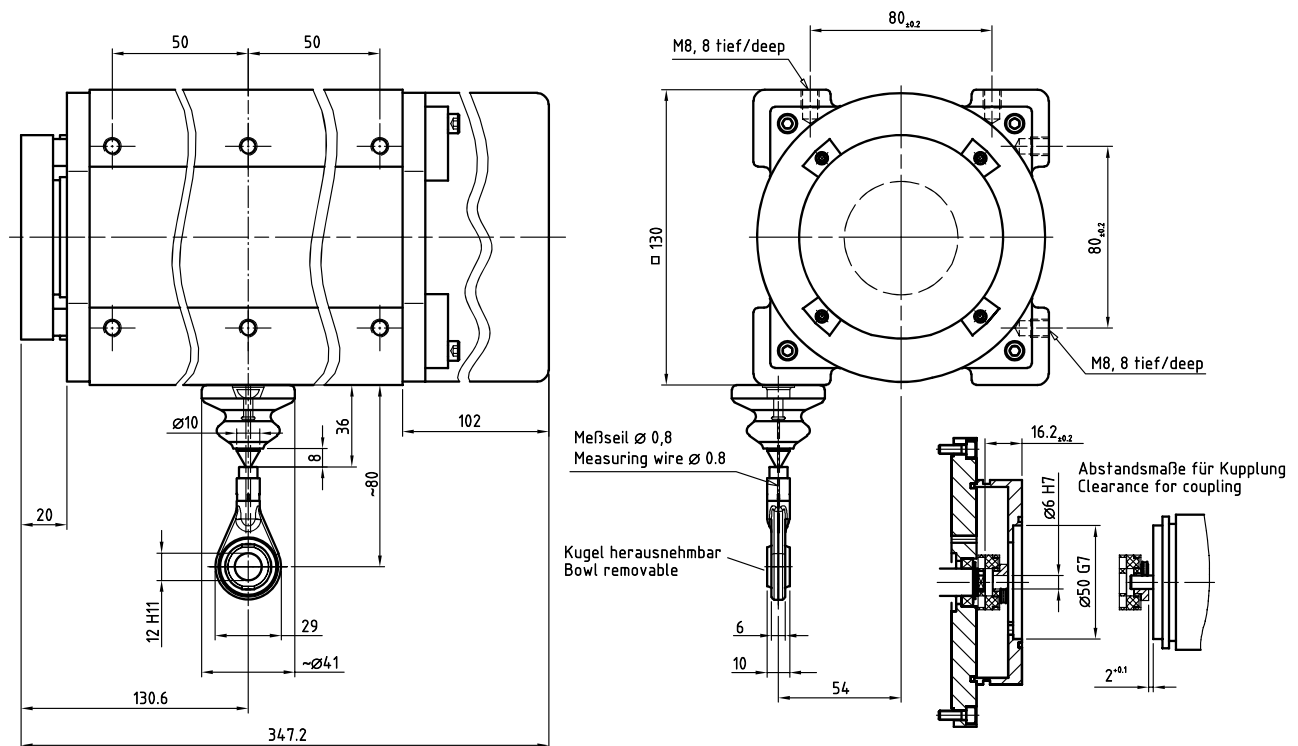
SL30 - 25000 mm
Wire draw box SL3025, 25.0 m, 130 mm



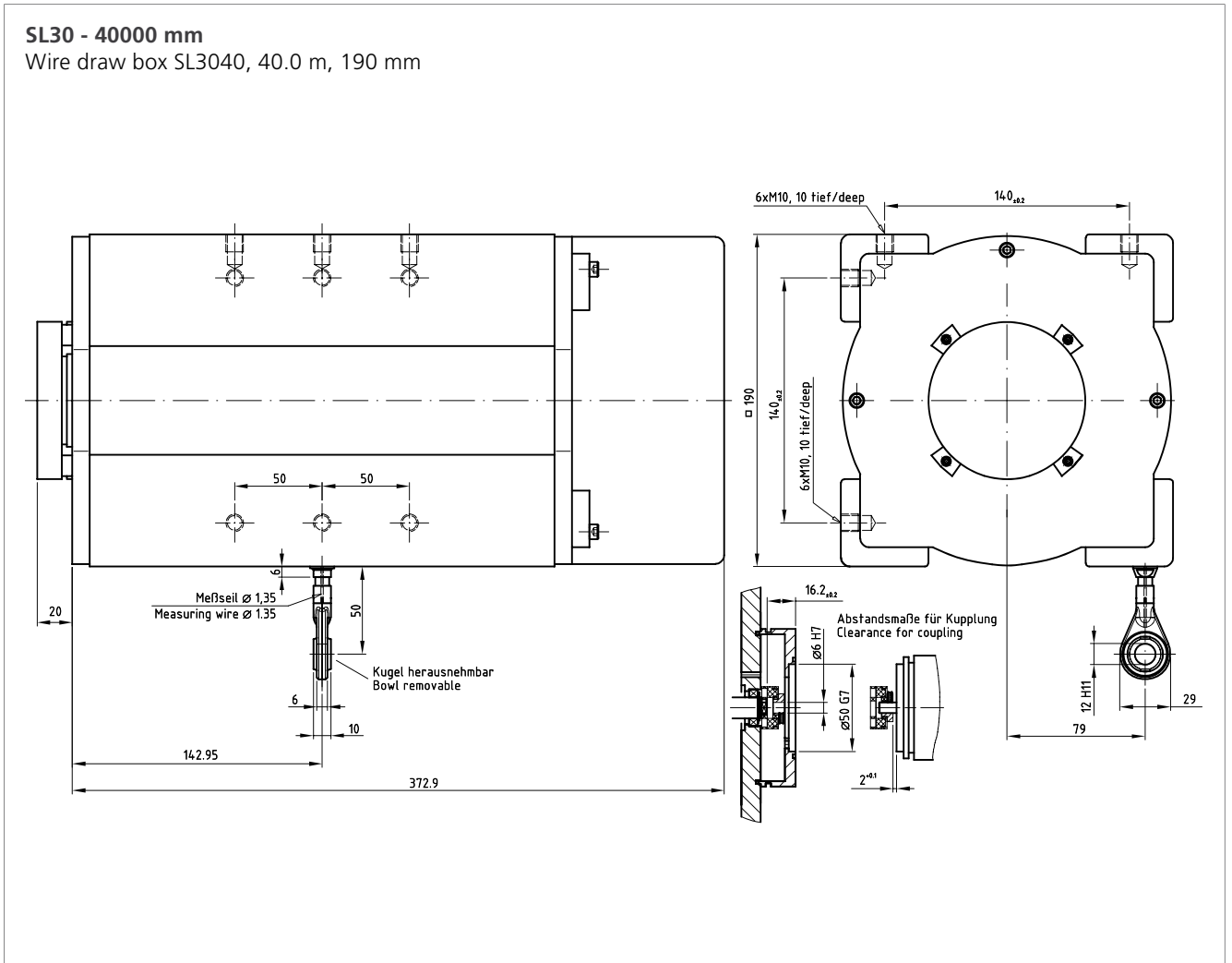
Dimensional Drawings

SL30 - 30000 mm

Wire draw box SL3030, 30.0 m, 130 mm



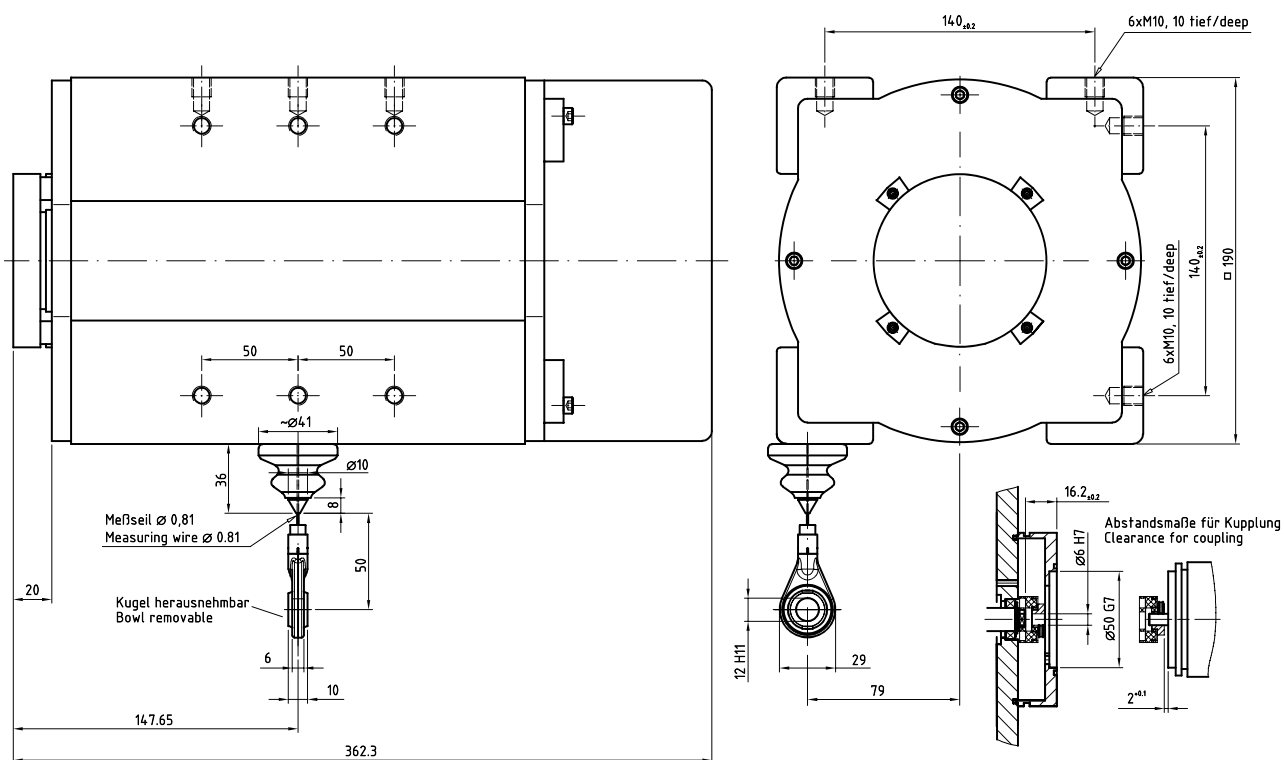
Dimensional Drawings



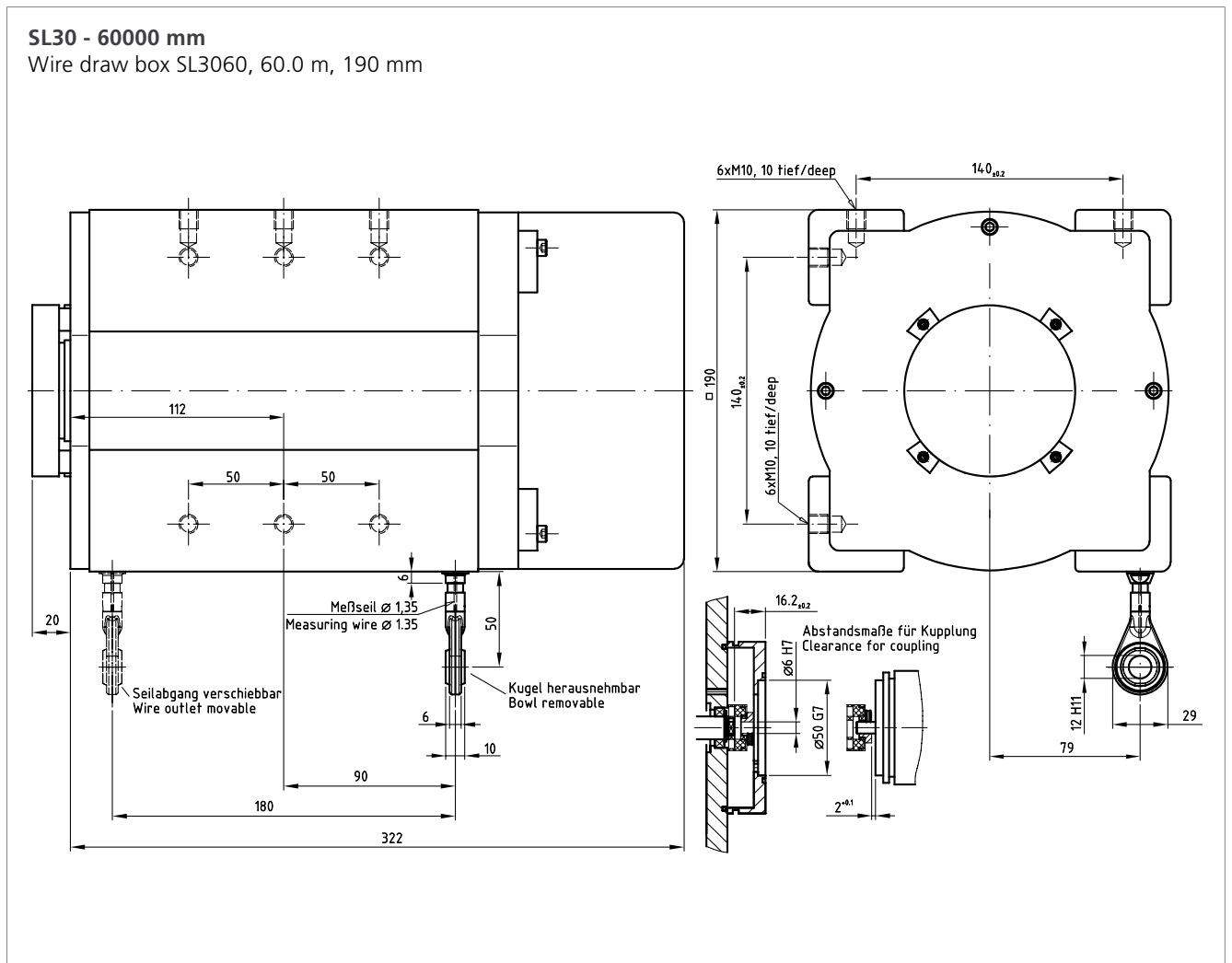
Dimensional Drawings

SL30 - 50000 mm

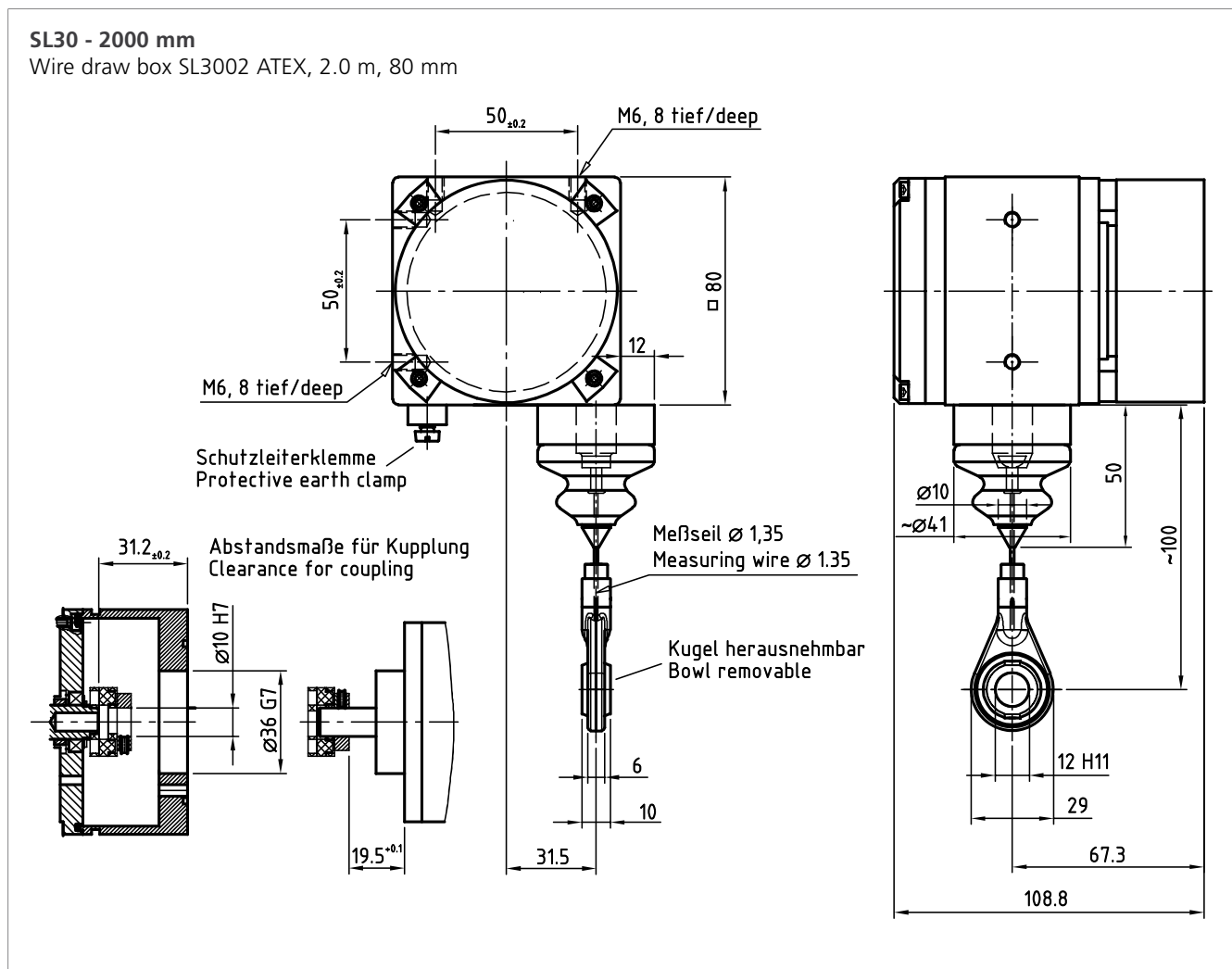
Wire draw box SL3050, 50.0 m, 190 mm



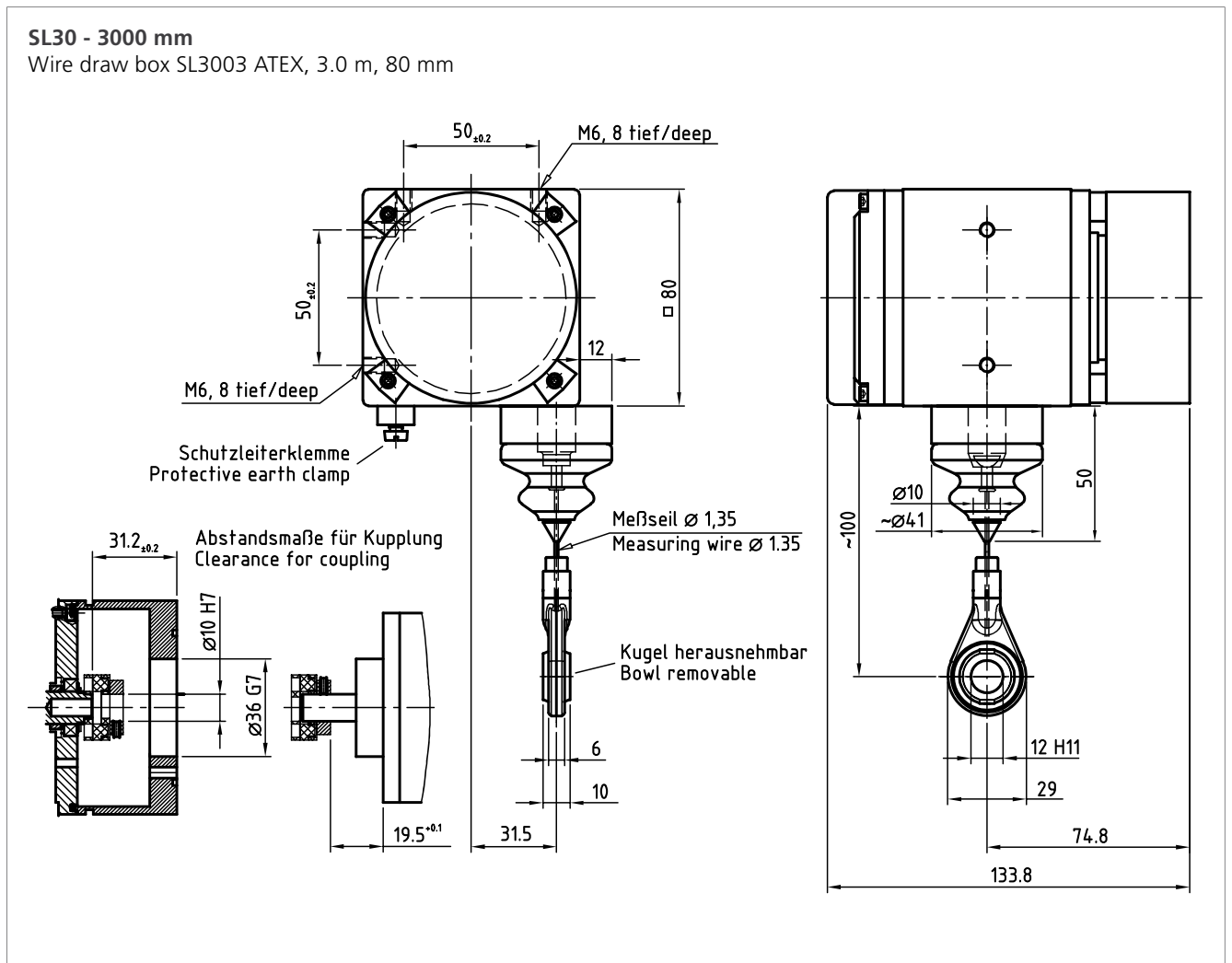
Dimensional Drawings



Dimensional Drawings



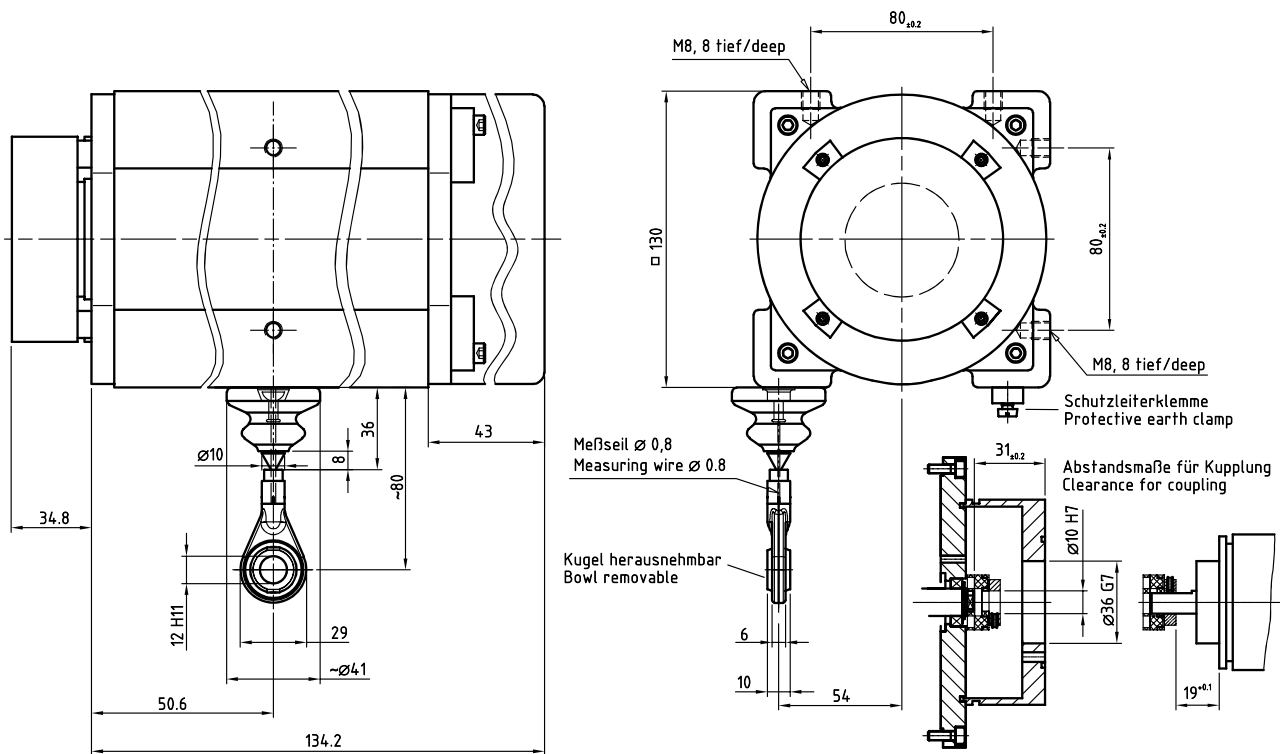
Dimensional Drawings



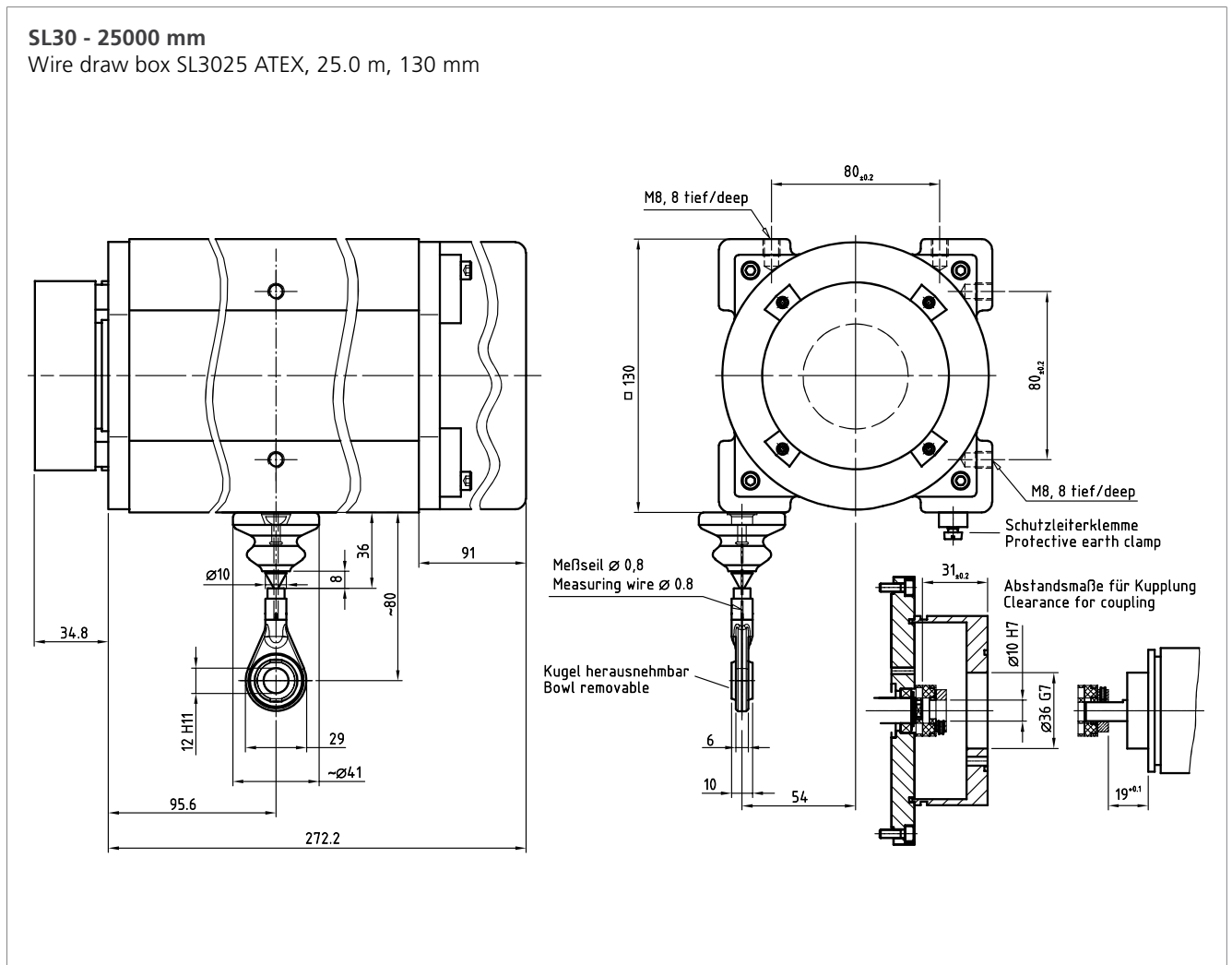
Dimensional Drawings

SL30 - 10000 mm

Wire draw box SL3010 ATEX, 10.0 m, 130 mm

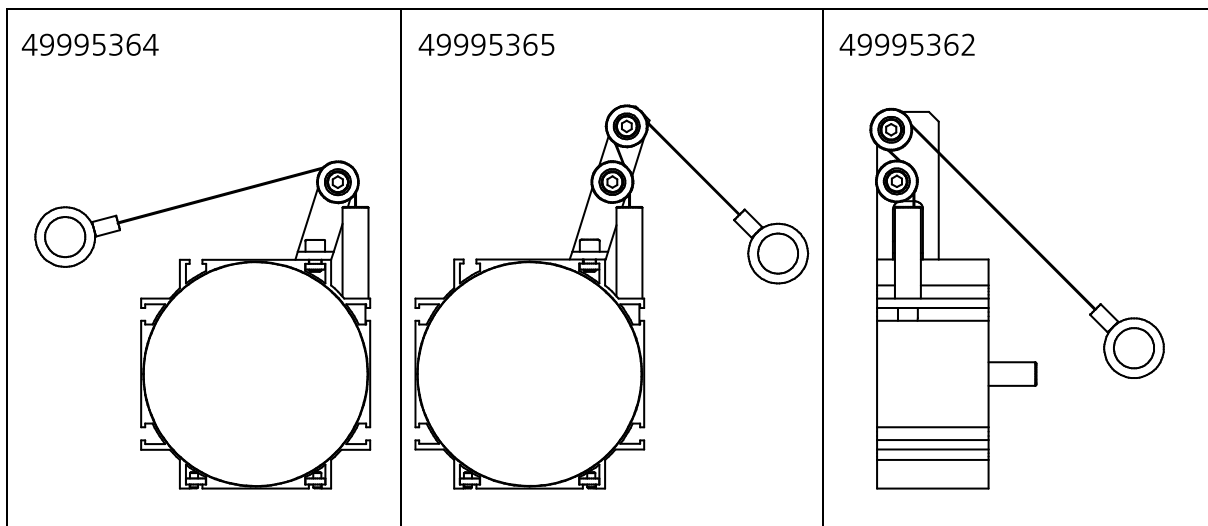


Dimensional Drawings



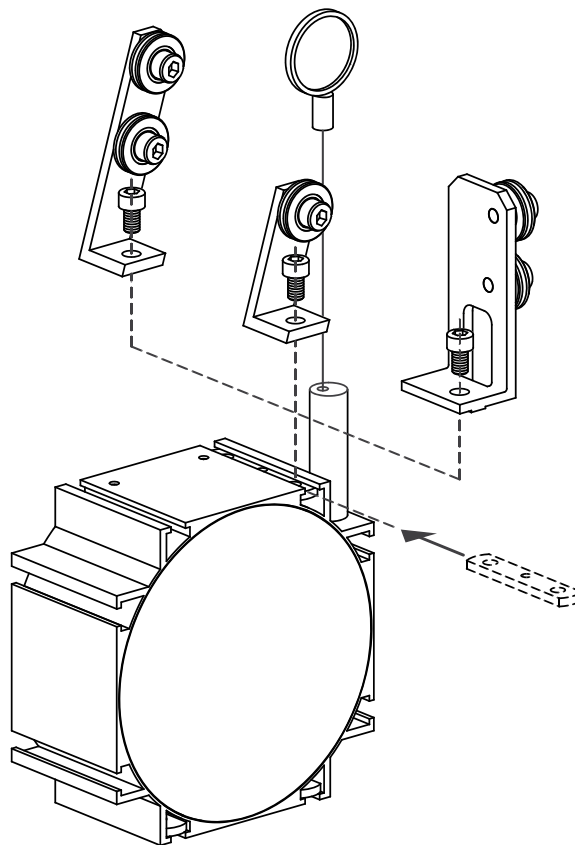
Dimensional Drawings

Guide Pulleys for WDS Types



Dimensional Drawings

**Guide Pulleys for WDS
Assembly**





Linear Encoders

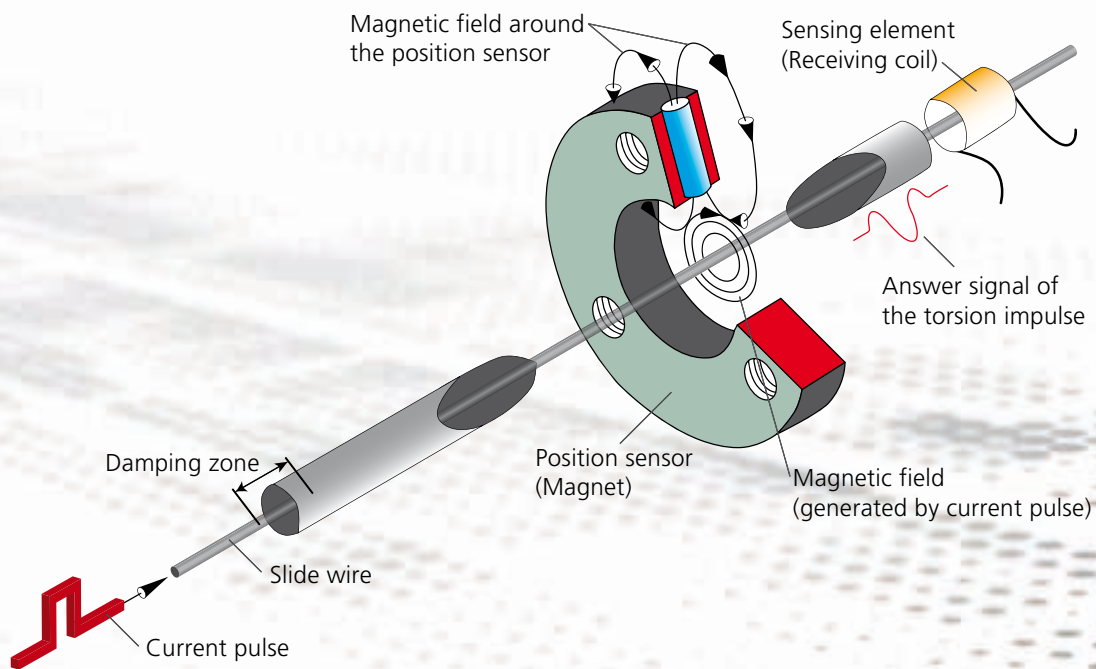




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Magnetostriction



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.

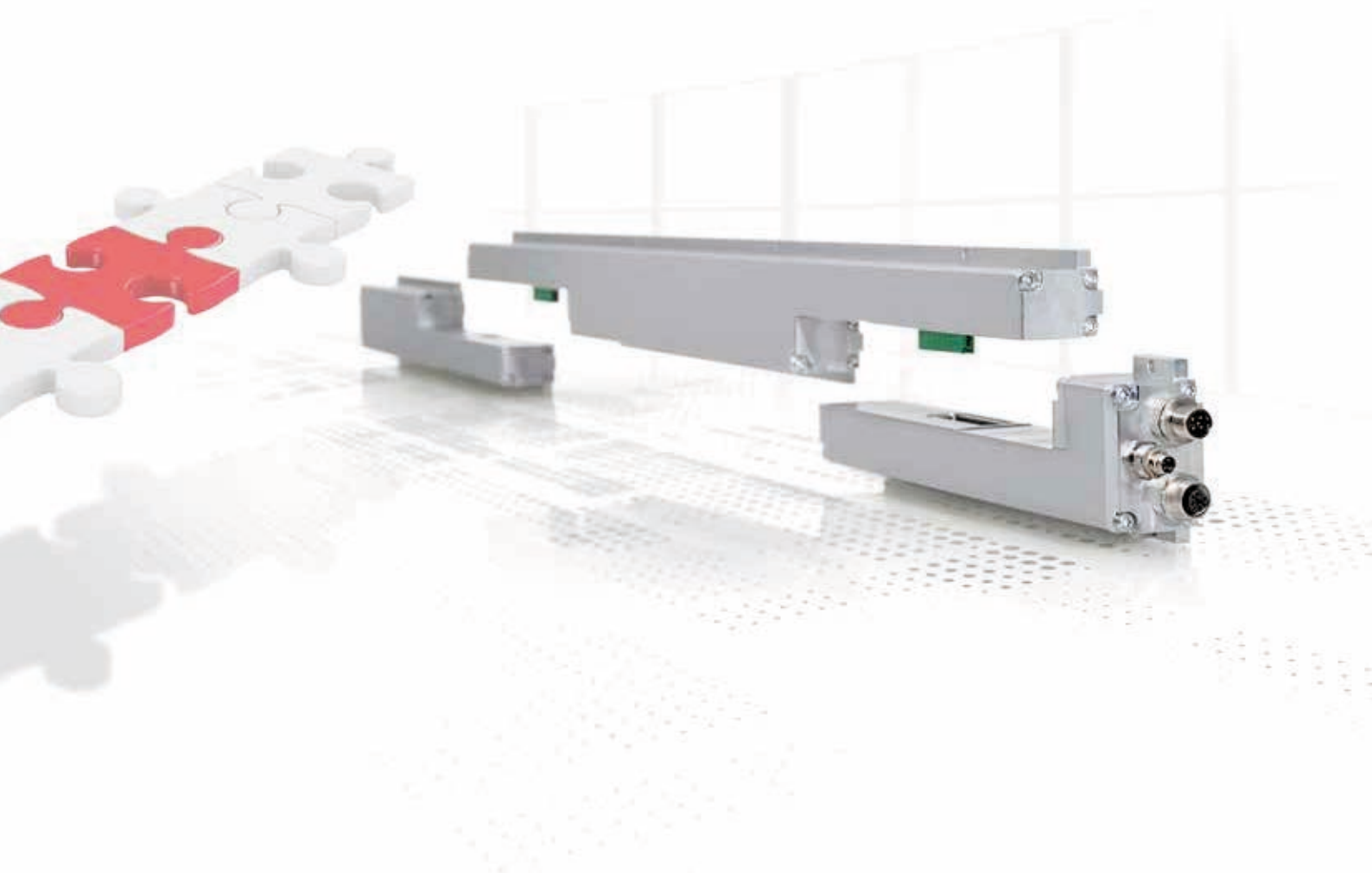
The time difference between the transmission of the torsion pulse and its arrival at the sensing element at the detector head is converted electronically into a distance proportional signal, which is provided either as a digital or analog output signal.



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		Cascadable Linear Encoders	314

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.

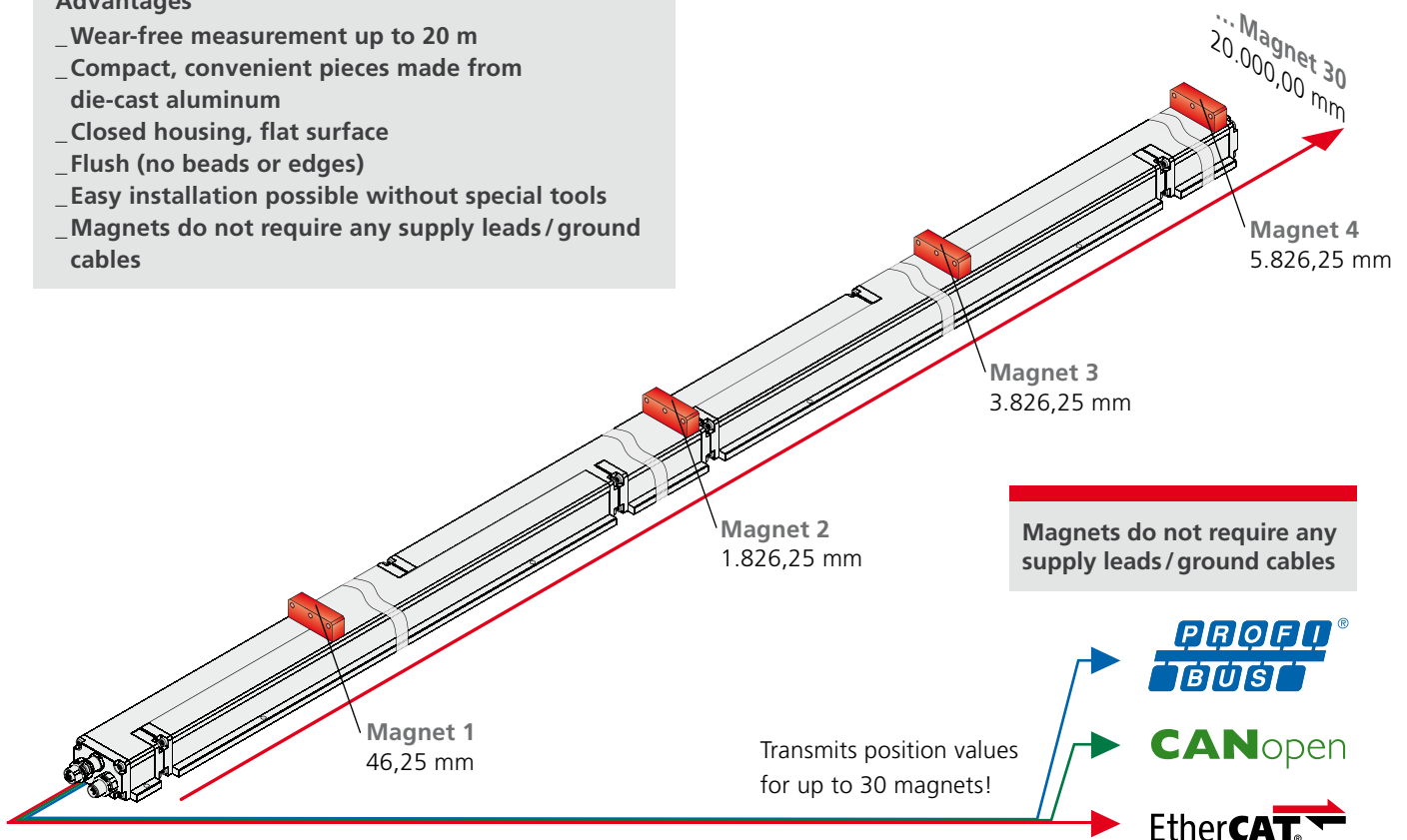
With LMC55 we have closed this gap: up to 30 positions are acquired simultaneously. The moving part is a passive magnet, which does not require power supply. The measuring system is only assembled to the full measuring length in

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

Transmits position values for up to 30 magnets!

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

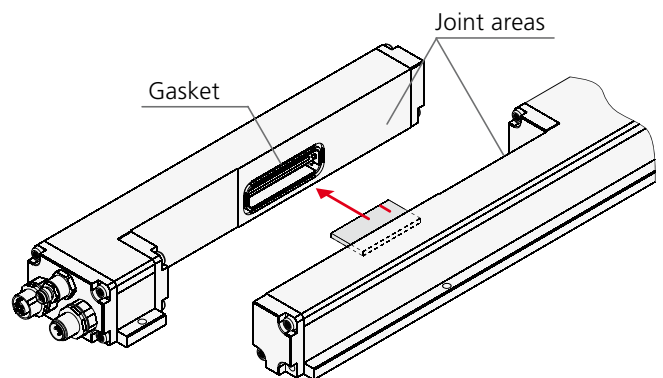
The type 2 end component forms the end element in conjunction with a type 1 slave.

Correct configuration before measurement

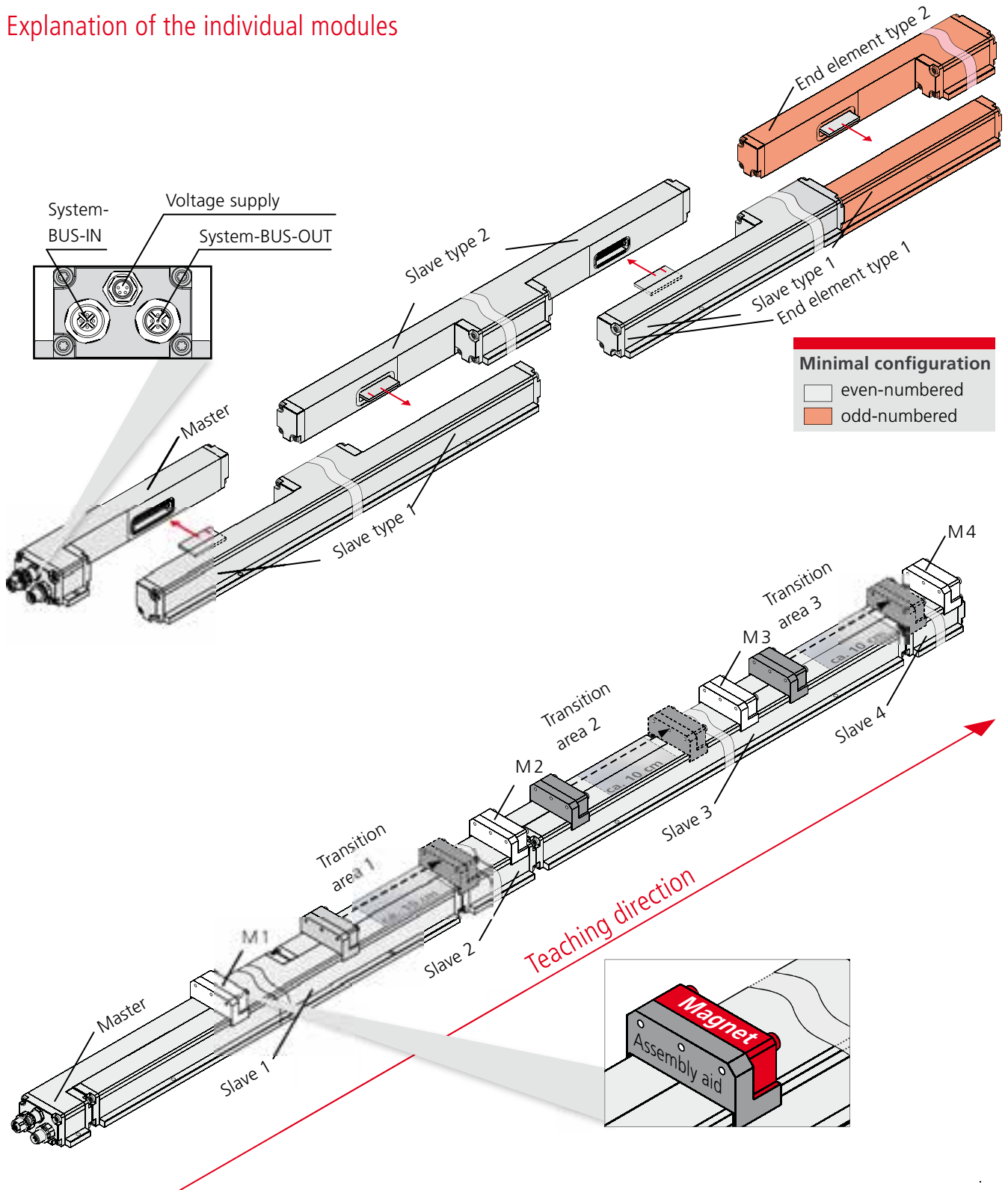
Before the measuring system can be operated, e.g. on PROFIBUS, the mechanically installed individual components, the so-called slaves, must first be detected using the teach-in function.

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.



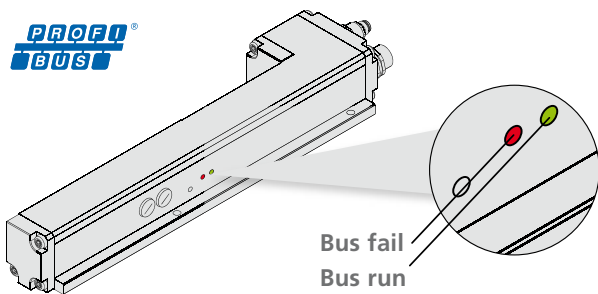
Explanation of the individual modules



Bus status display – LMC55

Example: Profibus

The measuring system has two LEDs. A green LED (Bus run) to display status information and a red LED (Bus fail) to display errors. When the measuring system starts up, both LEDs flash briefly. The display then depends on the operating status of the measuring system.



LED, green	Bus run
● = on	ready for operation
○ = off	supply absent, hardware error
○ = 10 Hz	parameterization or configuration errors

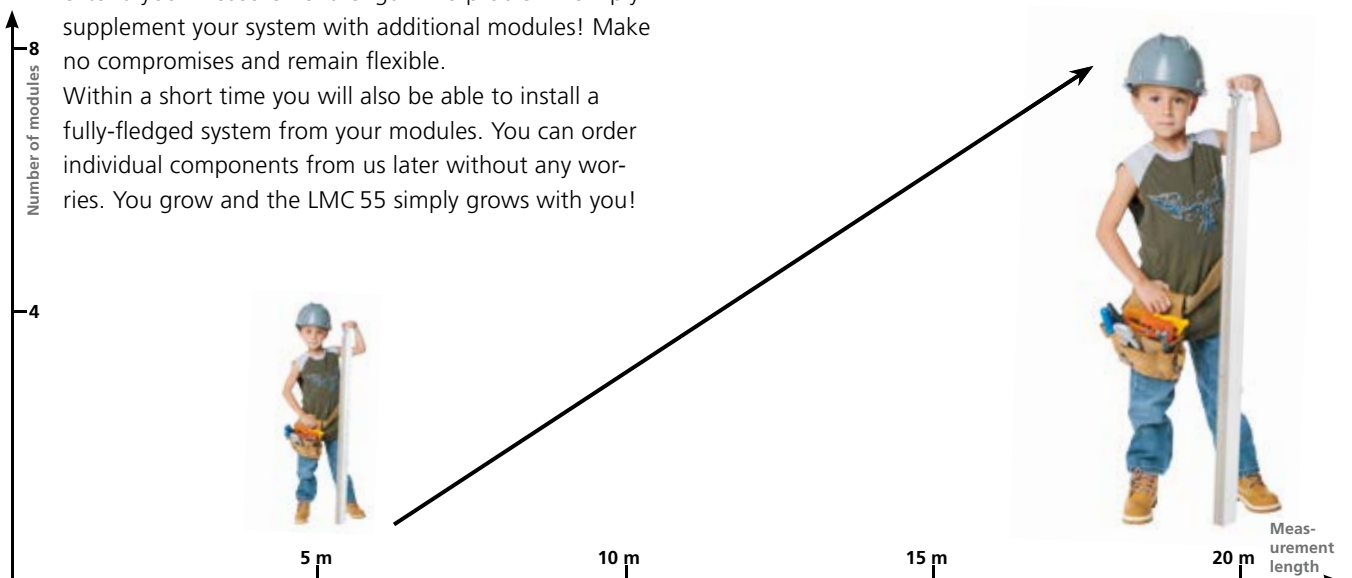
LED, red	Bus fail
○ = off	No error, bus in cycle
● = 1 Hz	Measuring system not addressed by the master, no data exchange
● = 10 Hz	Measuring system is in data exchange and has not detected any magnets.

Can be extended at any time – individual measuring lengths in stock

Simply keep individual components in stock. If a replacement is required, you will have the replacement modules immediately available. You can replace the necessary modules and then carry out the repair unhurriedly - also resulting in minimal downtime. Thanks to its compact design it only requires minimal storage space.

Demands in the industry are increasing, and you need to extend your measurement length? No problem - simply supplement your system with additional modules! Make no compromises and remain flexible. Within a short time you will also be able to install a fully-fledged system from your modules. You can order individual components from us later without any worries. You grow and the LMC 55 simply grows with you!

- _ full interchangeability of the individual components
- _ only needs minimal storage space (handy modules)
- _ measuring system grows as requirements increase
- _ with minimal downtime (in the event of repairs)



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.

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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LA46

LMR48

LMR70

Product	LA46	LMR48	LMR70
			
Mechanic execution	(R) Tube, (H) detachable tube	(R) Tube	(R) Tube
Range	50...4000 mm*, in steps	50...3000 mm*, in steps	50...2000 mm
Size	46	48	70 (triple redundant)
Supply voltage	24 VDC, -20...+10 %*	12...24 VDC, +- 10%	24 VDC, -20...+20 %
Resolution	0,005 mm	0,05 mm	12 bit or 16 bit
Linearity defect	± 0,10 mm ≤ 1500 mm ± 0,15 mm > 1500 mm	± 0,04 % + 1 LSB	± 0,10 mm ≤ 1500 mm ± 0,15 mm > 1500 mm
Reproducibility	0,005 mm		0,04mm
Hysteresis	0,02 mm ≤ 1500 mm 0,1 mm > 1500 mm	0,1 mm	0,02 mm ≤ 1500 mm 0,1 mm > 1500 mm
Temperature coefficient	< 15 ppm/°C > 500 mm *	± 30 ppm/°C	< 15 ppm/°C > 500 mm *
Ambient temperature	-20...+70 °C; 0...+70 °C	-40...+85 °C	-40...+85 °C
Protection class	IP65	IP65, option IP69K	IP65
Options	Multimagnet*, tube tip support	SIL 2, PLd	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	450 bar, static	600 bar, static
Interface	SSI Analog     CANopen   	SSI CANopen Analog	Analog
Weblink	www.tr-electronic.com/s/S006913	www.tr-electronic.com/s/S007102	www.tr-electronic.com/s/S008380
QR-Code			

* depends on interface

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

Suggested Products

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

LA46 SSI					
321-00975	LA_46K*150 SSI	4...20mA 16 bit w/ mating plug	150,00 mm	240,00 mm	0,002 mm
321-00872	LA_46K*500 SSI	4...20mA 16 bit w/ mating plug	500,00 mm	590,00 mm	0,002 mm
321-00801	LA_46K*750 SSI	4...20mA 16 bit w/ mating plug	750,00 mm	840,00 mm	0,005 mm
321-00569	LA_46K*1000 SSI	4...20mA 16 bit w/ mating plug	1.000,00 mm	1.090,00 mm	0,01 mm

LA46 Analog					
321-00593	LA_46K*150 ANA_I +JUSTAGE	4...20mA 16 bit w/ mating plug	150,00 mm	240,00 mm	16 BIT;
321-00616	LA_46K*300 ANA_I +JUSTAGE	4...20mA 16 bit w/ mating plug	300,00 mm	390,00 mm	16 BIT;
321-00599	LA_46K*500 ANA_I +JUSTAGE	4...20mA 16 bit w/ mating plug	500,00 mm	590,00 mm	16 BIT;
321-01002	LA_46K*750 ANA_I +JUSTAGE	4...20mA 16 bit w/ mating plug	750,00 mm	840,00 mm	16 BIT;
321-00597	LA_46K*1000 ANA_I +JUSTAGE	4...20mA 16 bit w/ mating plug	1.000,00 mm	1.090,00 mm	16 BIT;

LA46 Profibus					
321-01271	LA_46K*150 PB	R 0,005mm 2x5pinM12 1x4pinM8	150,00 mm	240,00 mm	0,005 mm
321-01041	LA_46K*300 PB	R 0,005mm 2x5pinM12 1x4pinM8	300,00 mm	390,00 mm	0,005 mm
321-00805	LA_46K*500 PB	R 0,005mm 2x5pinM12 1x4pinM8	500,00 mm	590,00 mm	0,005 mm
321-00806	LA_46K*750 PB	R 0,005mm 2x5pinM12 1x4pinM8	750,00 mm	840,00 mm	0,005 mm
321-00654	LA_46K*1000 PB	R 0,005mm 2x4pinM12 1x4pinM8	1.000,00 mm	1.090,00 mm	0,005 mm

LA46 DeviceNet					
321-00151	LA_46*150 DN	R 0,01 mm fieldbus hood	150,00 mm	240,00 mm	0,01 mm
321-00508	LA_46*500 DN	R 0,005 mm fieldbus hood	500,00 mm	590,00 mm	0,005 mm
321-01285	LA_46*750 DN	R 0,01 mm fieldbus hood	750,00 mm	840,00 mm	0,01 mm
321-00961	LA_46*1000 DN	R 0,01 mm fieldbus hood	1.000,00 mm	1.090,00 mm	0,005 mm

For further product information simply enter the order number in the search field at www.tr-electronic.de.

Ordering code	Name	Remark	Measurement length	Tube length	Resolution
LA46 Profinet					
321-01103	LA_46*150 EPN	R 0,005mm 2x4pinM12 1x4pinM8	150,00 mm	240,00 mm	0,005 mm
321-00884	LA_46*300 EPN	R 0,005mm 2x4pinM12 1x4pinM8	300,00 mm	390,00 mm	0,005 mm
321-00809	LA_46*750 EPN	R 0,005mm 2x4pinM12 1x4pinM8	750,00 mm	840,00 mm	0,005 mm
321-00942	LA_46*1000 EPN	R 0,005mm 2x4pinM12 1x4pinM8	1.000,00 mm	1.090,00 mm	0,005 mm
LA46 Ethernet/IP					
321-00897	LA_46*300 EIP	R 0,005mm 2x4pinM12 1x4pinM8	300,00 mm	390,00 mm	0,005 mm
321-01564	LA_46/42*150 EIP	Flange M18 x 1,5 with groove (LA46/42)	150,00 mm	232,00 mm	0,005 mm
321-01565	LA_46/42*150 EIP	Flange M18 x 1,5 with groove (LA46/42)	350,00 mm	432,00 mm	0,005 mm
321-01566	LA_46/42*150 EIP	Flange M18 x 1,5 with groove (LA46/42)	750,00 mm	832,00 mm	0,005 mm
LMR70 Analogue					
335-00001	LMR_70*180 ANA_I+JUSTAGE		180,00 mm	264,00 mm	16 BIT;

Further product information

1. Enter order code into ...



2. Searchfield (top right) on www.tr-electronic.com



3. Choose desired information

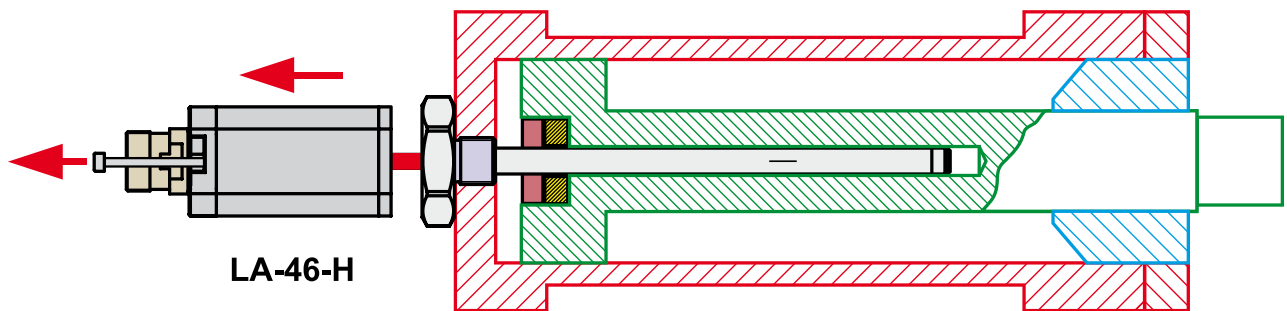


We will help you to select the most suitable products from the complete TR range. Please contact us (info@tr-electronic.de).

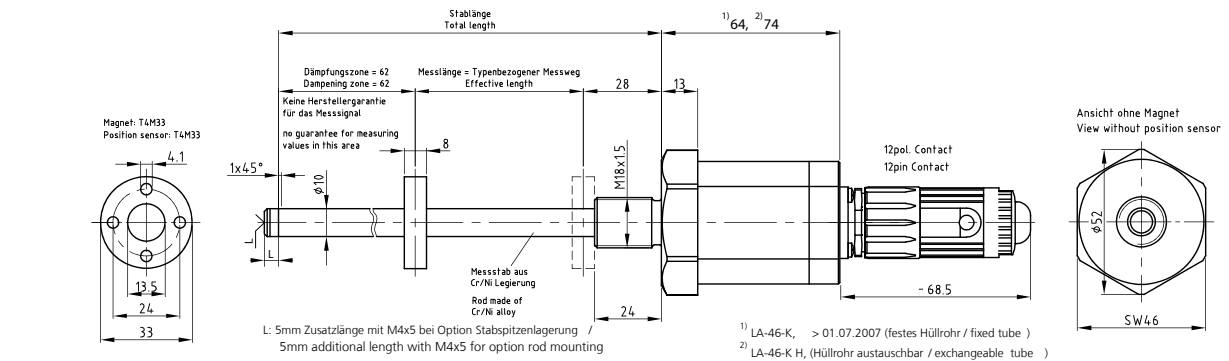
Dimensional Drawings

Detachable tube (H) (option for LA46)

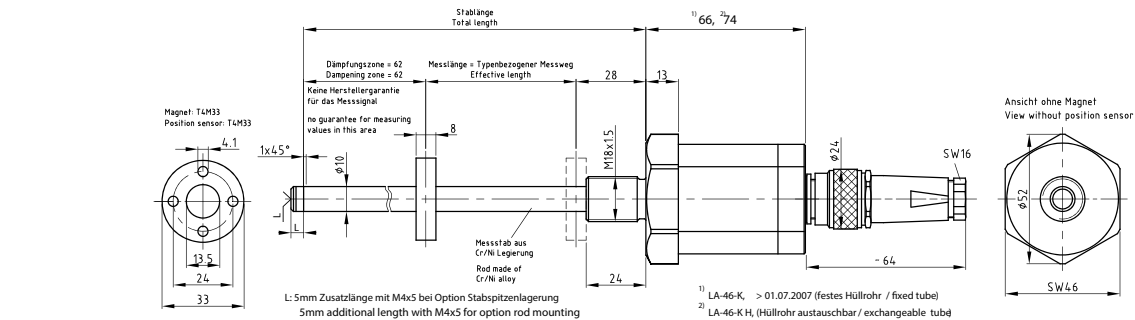
Tube resides in cylinder, oil stays pressurized. Change in length, see following drawings



LA46 SSI

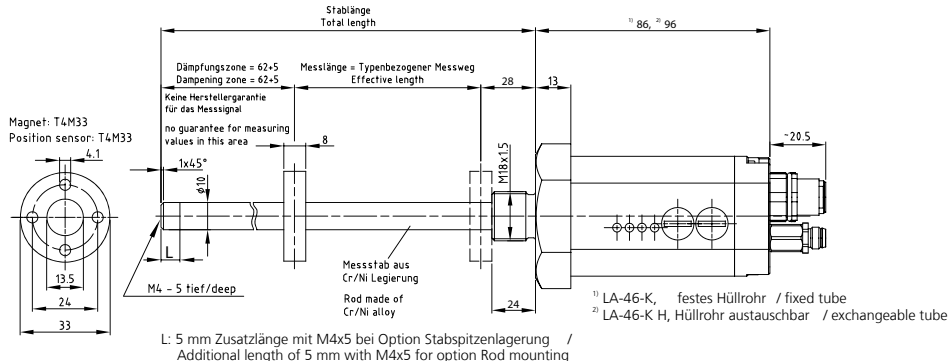


LA 46 Analog



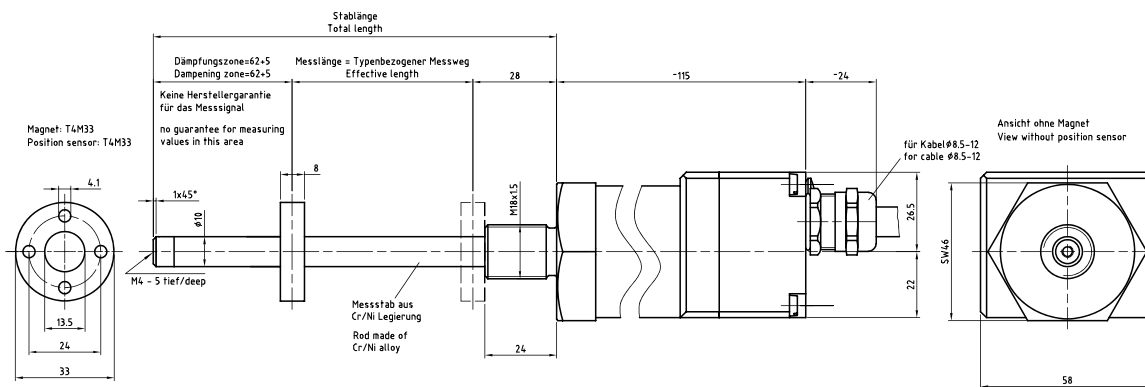
Dimensional Drawings

LA46 Profibus, CANopen



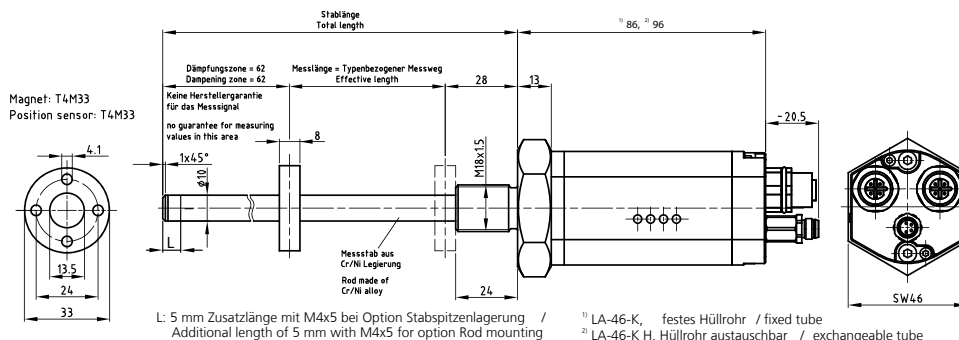
LA46 CAN DeviceNet

DN

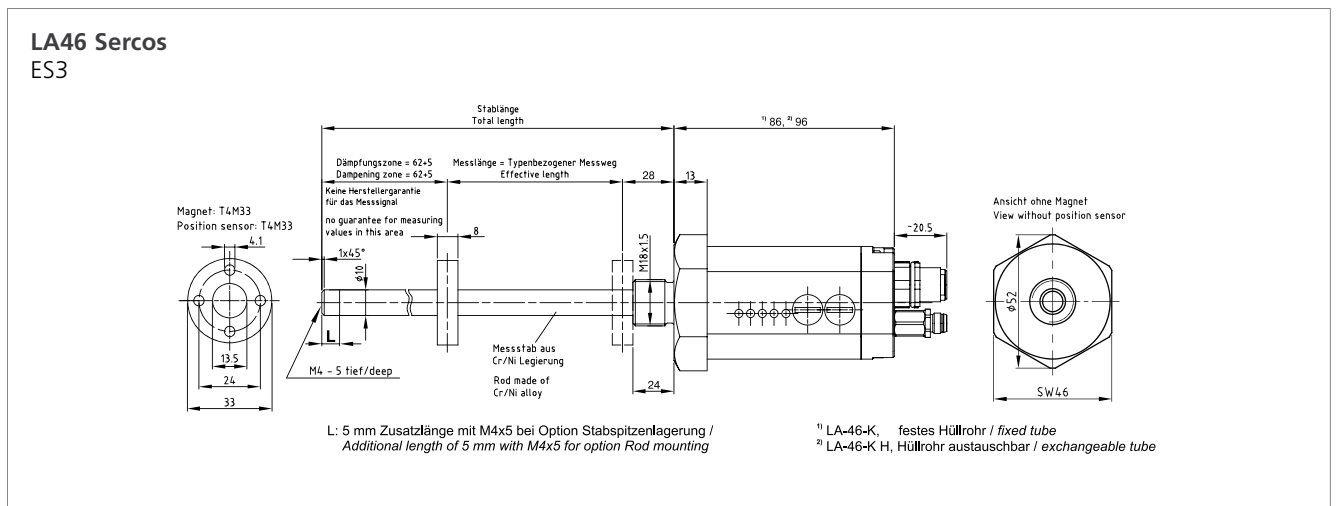
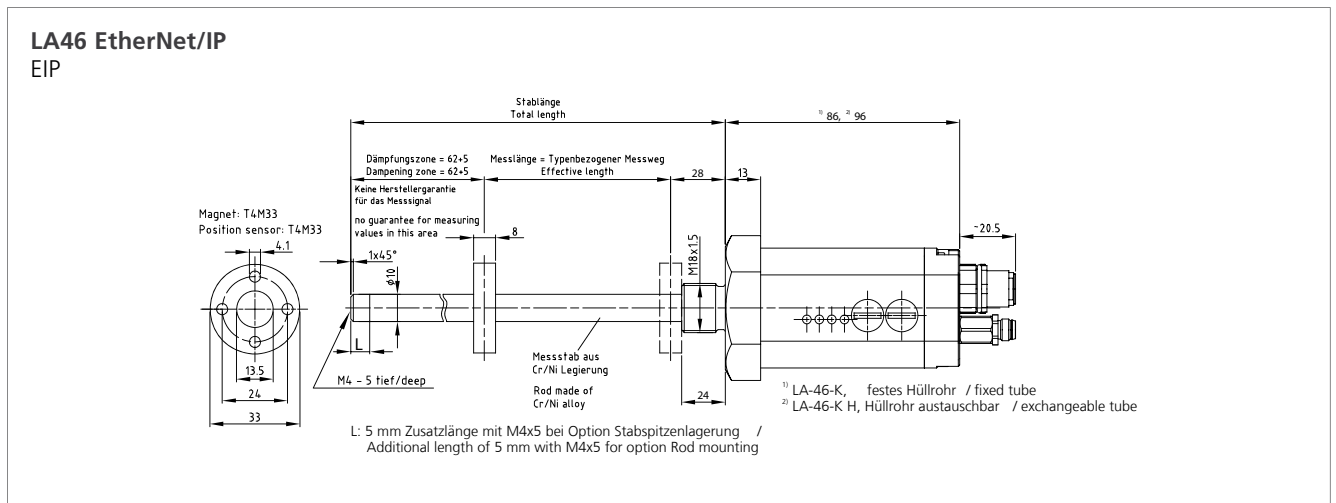
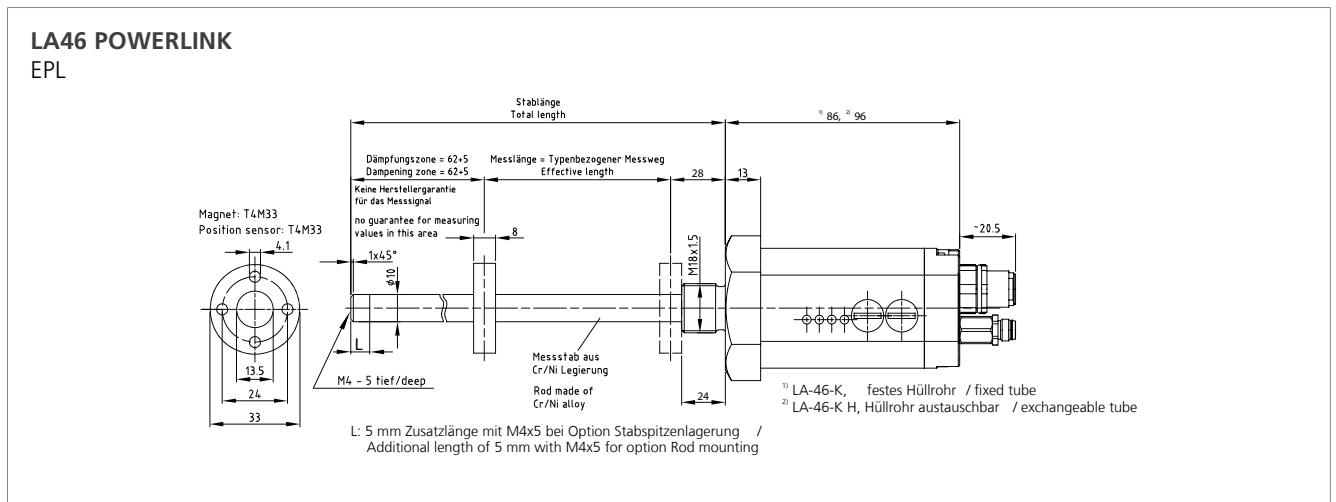


LA46 EtherCAT, PROFINET IO

ETC, EPN

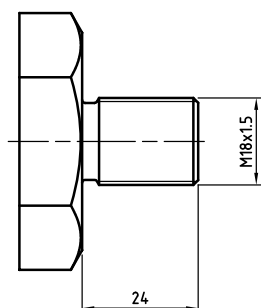


Dimensional Drawings

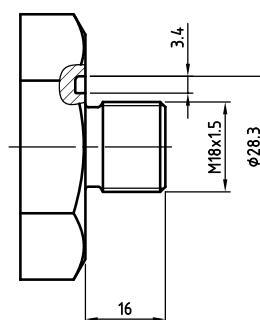


Dimensional Drawings

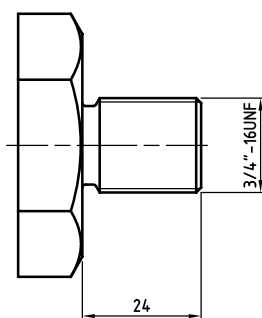
LA46 flange type M18 x 1,5
O-Ring gasket in thread undercut



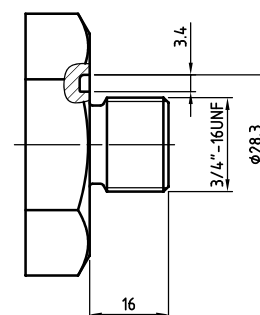
LA46 flange type M18 x 1,5 with groove (LA46/42)
O-Ring gasket in addl. groove



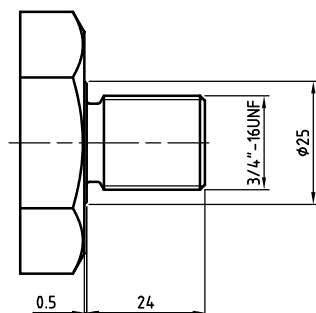
LA46 flange type 3/4" - 16UNF
O-Ring gasket in thread undercut



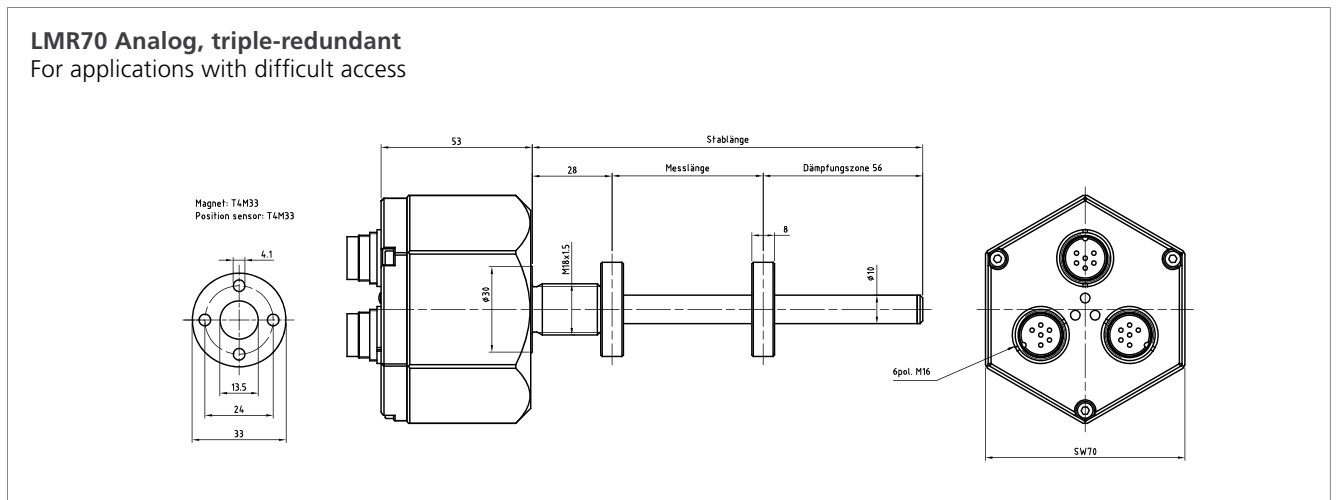
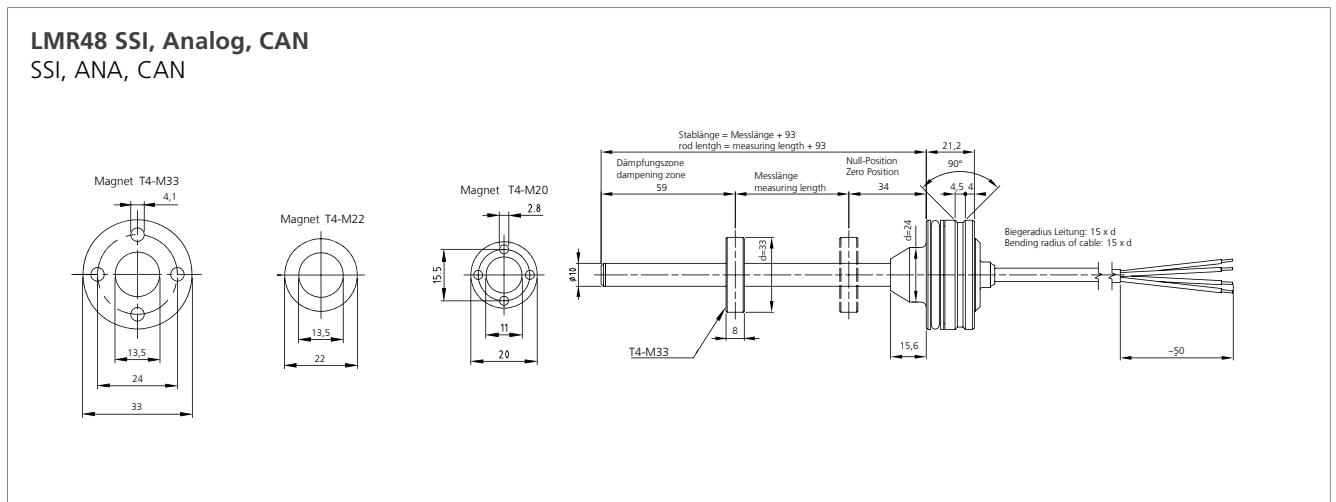
LA46 flange type 3/4" - 16UNF with groove (LA46/42)
O-Ring gasket in addl. groove



LA46 flange type 3/4" - 16UNF with chamfer
Chamfer on flange



Dimensional Drawings





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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LP46

LMP30

LMP48

Product	LA46	LMP30	LMP48
			
Mechanic execution	(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	0,005 mm	0,01mm *	0,05 mm
Linearity defect	± 0,10 mm ≤ 1500 mm ± 0,15 mm > 1500 mm	± 0,15 mm ≤ 1500 mm ± 0,20 mm > 1500 mm	< 0,01 % FS, ≥ 60 µm ± 0,1 % FS *
Reproducibility	0,005 mm	0,005 mm *	< 0,005 % FS ≥ 50 µm ± 0,1 % FS *
Hystheresis	0,02 mm ≤ 1500 mm 0,1 mm > 1500 mm	0,02 mm ≤ 1500 mm 0,1 mm > 1500 mm	± 0,1 % FS *
Temperature coefficient	< 15 ppm/°C > 500 mm *	< 8 µm/°C ≤ 500 mm < 15 ppm/°C > 500 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*	SIL 2, PLd*
Orientation	Any desired	Any desired	Any desired
Material	Aluminum extruded profile	Aluminum extruded profile	Aluminum extruded profile
Maximum pressure			
Interface	<p>SSI </p> <p>Analog </p> <p> </p> <p>CANopen </p> <p> SERCOS the automation bus</p>	<p>SSI </p> <p>Analog </p> <p>ISI </p> <p> </p> <p>CANopen</p>	<p>SSI CANopen</p> <p>Analog</p>
Weblink	www.tr-electronic.com/s/S008394	www.tr-electronic.com/s/S008395	www.tr-electronic.com/s/S008396
QR-Code			

* depends on interface

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

Suggested Products

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

Linear encoder profile housing SSI LP46 SSI

320-00185	LP_46K*150 SSI	M23, 12 pin including mating plug	150,00 mm	239,00 mm	0,002 mm
320-00352	LP_46K*300 SSI	M23, 12 pin including mating plug	300,00 mm	389,00 mm	0,002 mm
320-00226	LP_46K*500 SSI	M23, 12 pin including mating plug	500,00 mm	589,00 mm	0,002 mm
320-00631	LP_46K*750 SSI	M23, 12 pin including mating plug	750,00 mm	839,00 mm	0,002 mm
320-00327	LP_46K*1000 SSI	M23, 12 pin including mating plug	1.000,00 mm	1.089,00 mm	0,002 mm

Linear encoder profile housing Analogue LP46 A

320-00257	LP_46K*150 ANA_I+JUSTAGE	Current, 8 pin including mating plug	150,00 mm	239,00 mm	16 BIT
320-00258	LP_46K*300 ANA_I+JUSTAGE	Current, 8 pin including mating plug	300,00 mm	389,00 mm	16 BIT
320-00321	LP_46K*500 ANA_I+JUSTAGE	Current, 8 pin including mating plug	500,00 mm	589,00 mm	16 BIT
320-00232	LP_46K*750 ANA_I+JUSTAGE	Current, 8 pin including mating plug	750,00 mm	839,00 mm	16 BIT
320-00370	LP_46K*1000 ANA_I+JUSTAGE	Current, 8 pin including mating plug	1.000,00 mm	1.089,00 mm	16 BIT

Linear encoder profile housing Profibus LP46 PB

320-00282	LP_46K*150 PB	2x M12, 1 x M8	150,00 mm	239,00 mm	0,005 mm
320-00360	LP_46K*300 PB	2x M12, 1 x M8	300,00 mm	389,00 mm	0,005 mm
320-00438	LP_46K*500 PB	2x M12, 1 x M8	500,00 mm	589,00 mm	0,005 mm
320-00259	LP_46K*750 PB	2x M12, 1 x M8	750,00 mm	839,00 mm	0,005 mm
320-00260	LP_46K*1000 PB	2x M12, 1 x M8	1.000,00 mm	1.089,00 mm	0,005 mm

Linear encoder profile housing DeviceNet LP46 DN

320-00132	LP_46*150 DN	Fieldbus hood, 2x cable gland M16x1,5	150,00 mm	239,00 mm	0,01 mm
320-00187	LP_46*300 DN	Fieldbus hood, 2x cable gland M16x1,5	300,00 mm	389,00 mm	0,01 mm
320-00188	LP_46*500 DN	Fieldbus hood, 2x cable gland M16x1,5	500,00 mm	589,00 mm	0,01 mm
320-00632	LP_46*750 DN	Fieldbus hood, 2x cable gland M16x1,5	750,00 mm	839,00 mm	0,01 mm
320-00633	LP_46*1000 DN	Fieldbus hood, 2x cable gland M16x1,5	1.000,00 mm	1.089,00 mm	0,01 mm

For further product information simply enter the order number in the search field at www.tr-electronic.de.

Ordering code	Name	Remark	Measurement length	Tube length	Resolution
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Linear encoder profile housing Profinet LP46 PN

320-00289	LP_46*150 EPN	2x M12, 1 x M8	150,00 mm	239,00 mm	0,005 mm
320-00498	LP_46*300 EPN	2x M12, 1 x M8	300,00 mm	389,00 mm	0,005 mm
320-00419	LP_46*500 EPN	2x M12, 1 x M8	500,00 mm	589,00 mm	0,005 mm
320-00342	LP_46*750 EPN	2x M12, 1 x M8	750,00 mm	839,00 mm	0,005 mm
320-00600	LP_46*1000 EPN	2x M12, 1 x M8	1.000,00 mm	1.089,00 mm	0,005 mm

Linear encoder profile housing Powerlink LP46 EPL

320-00194	LP_46*150 EPL_2	2x M12, 1 x M8	150,00 mm	239,00 mm	0,005 mm
320-00198	LP_46*300 EPL_2	2x M12, 1 x M8	300,00 mm	389,00 mm	0,005 mm

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

For further product information simply enter the order number in the search field at www.tr-electronic.de.

Suggested Products

Ordering code	Name	Remark	Measurement length	Tube length	Resolution
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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 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 LMP48 SSI

333-00003	LMP_48*750 SSI	1x M12, 12 pin	750,00 mm	839,00 mm	0,01 mm
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Linear encoder profile housing Analogue LMP48 A

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
333-00009	LMP_48*1250 ANALOG	1x M12, 4 pin	1.250,00 mm	1.339,00 mm	12 BIT

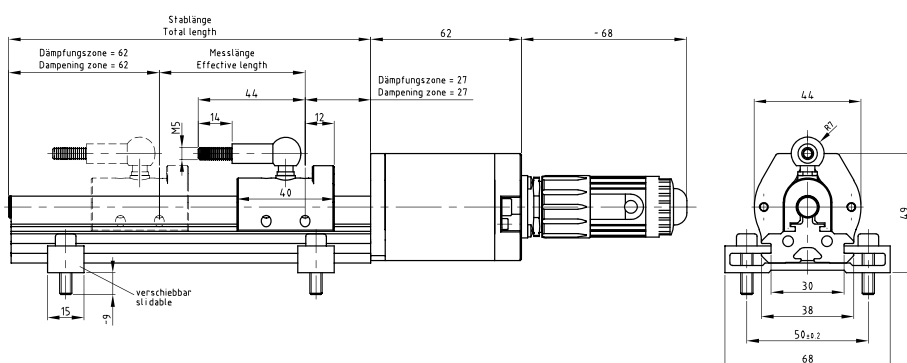
Linear encoder profile housing CAN LMP48 CAN

333-00001	LMP_48*750 CAN OPEN	1x M12, 5 pin	750,00 mm	839,00 mm	0,05 mm
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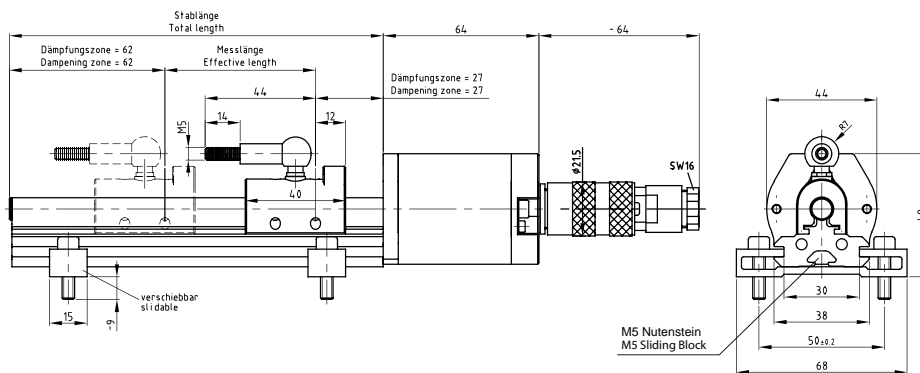
For further product information simply enter the order number in the search field at www.tr-electronic.de.

Dimensional Drawings

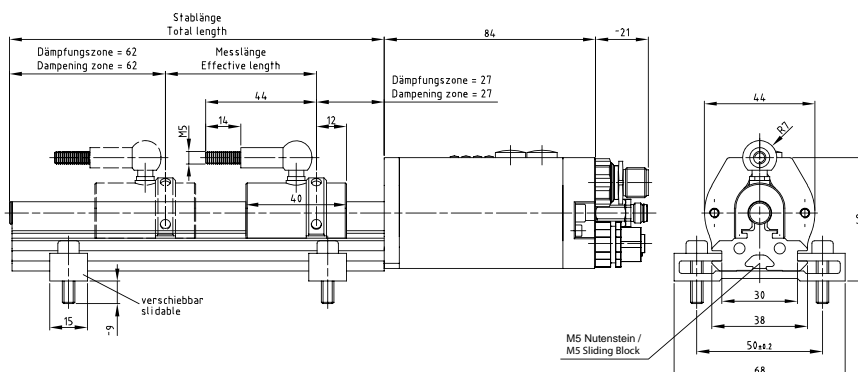
LP46 SSI SSI



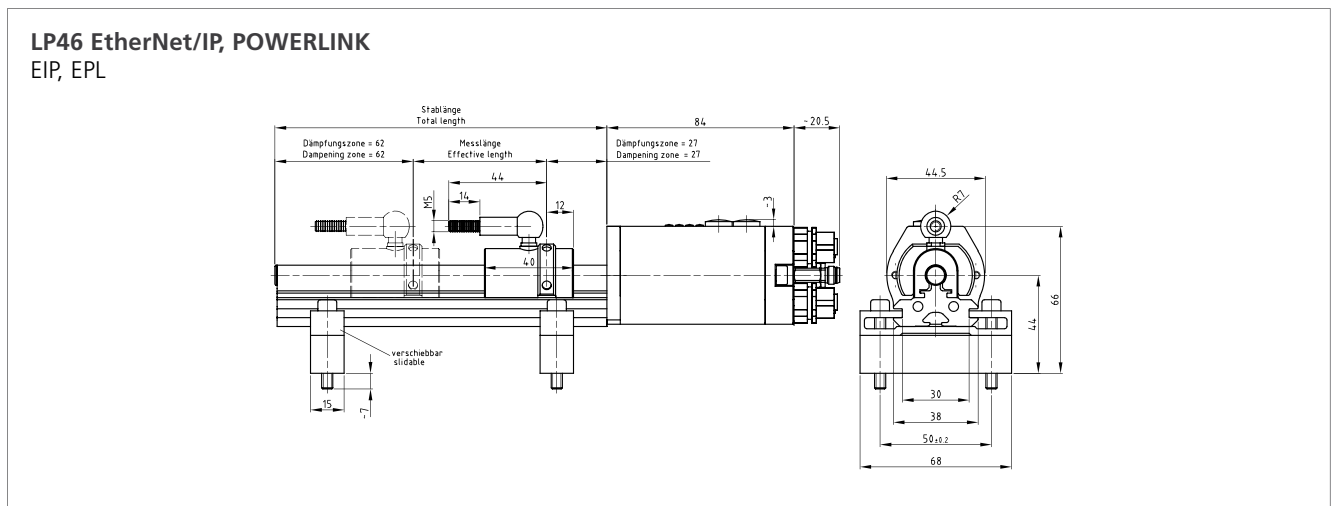
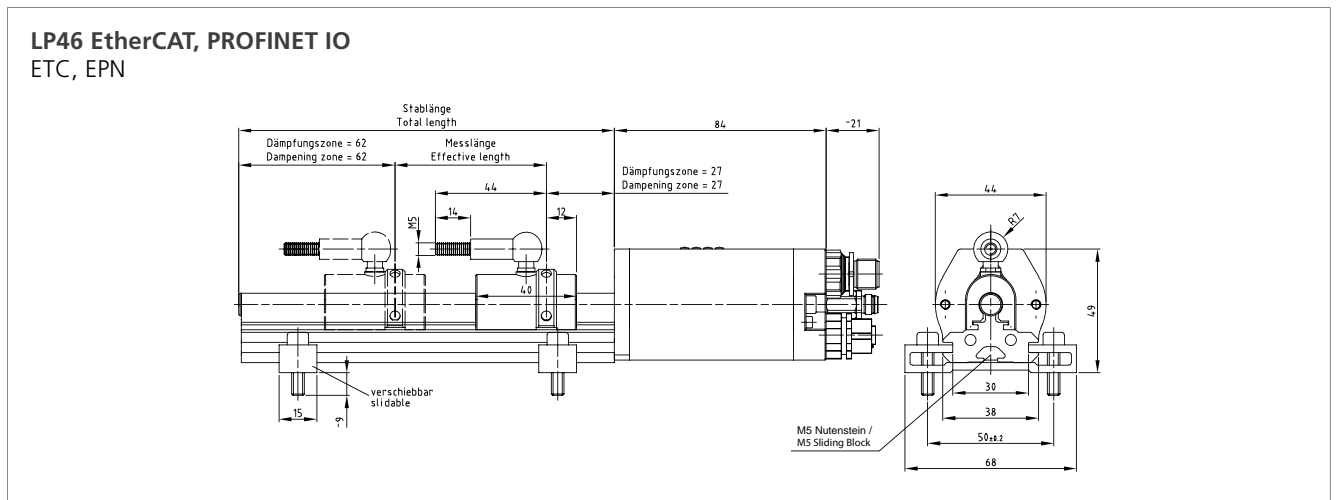
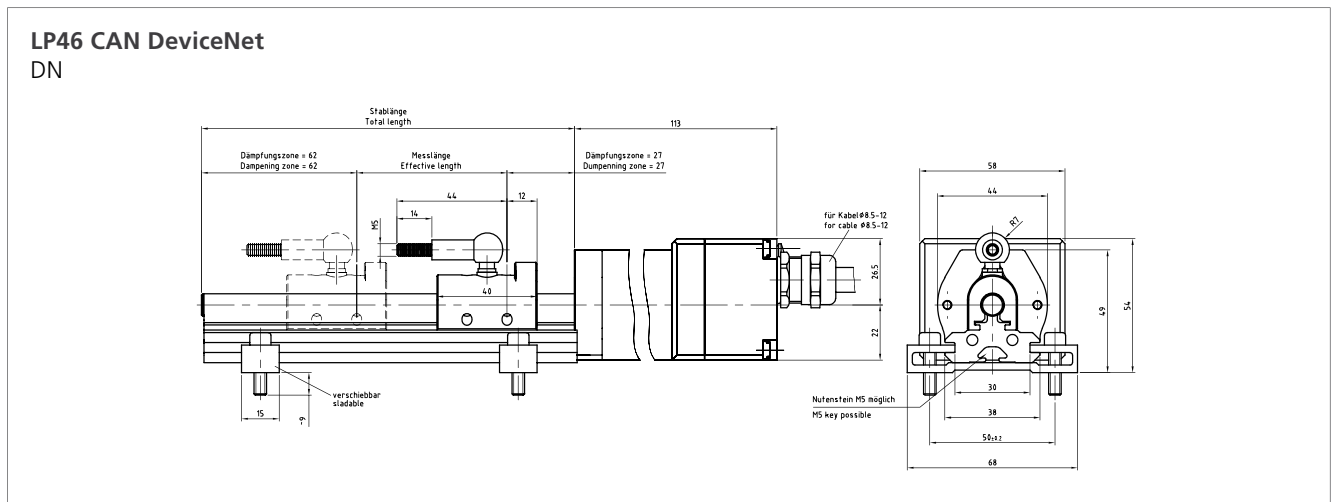
LP46 Analog ANA



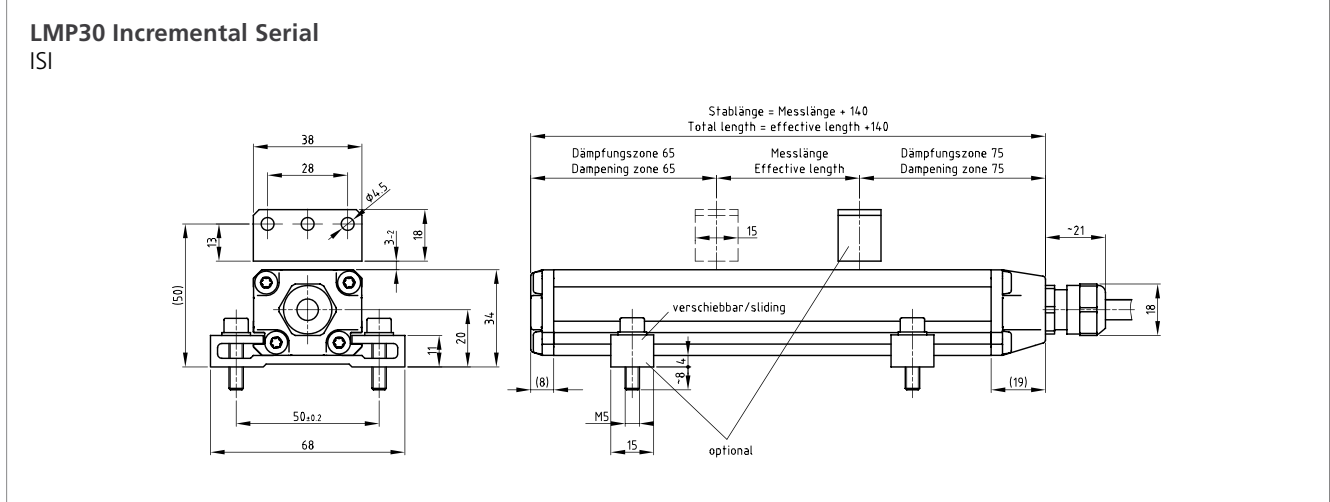
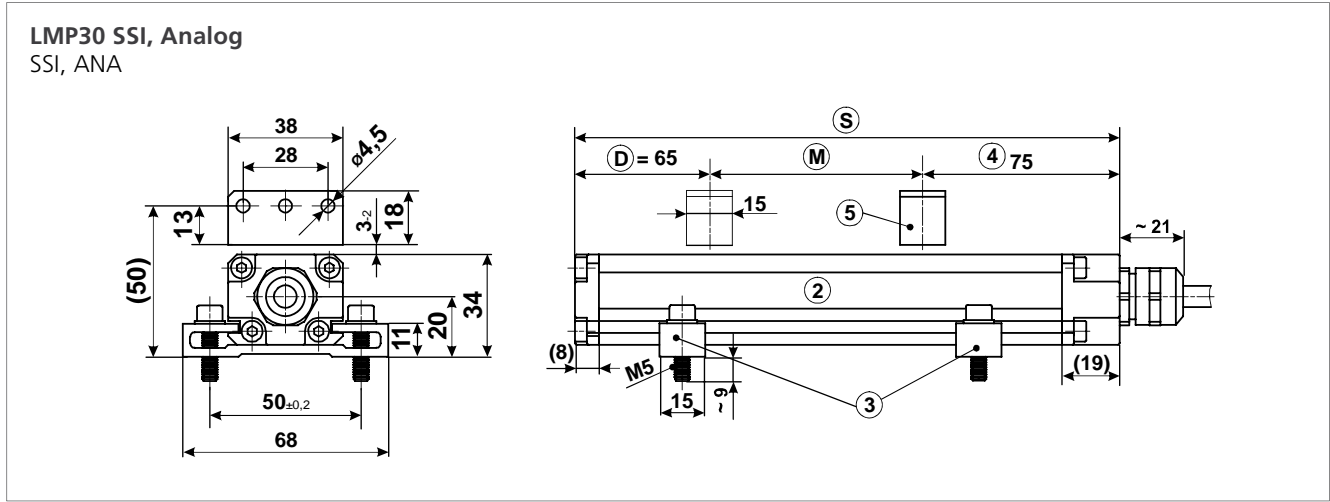
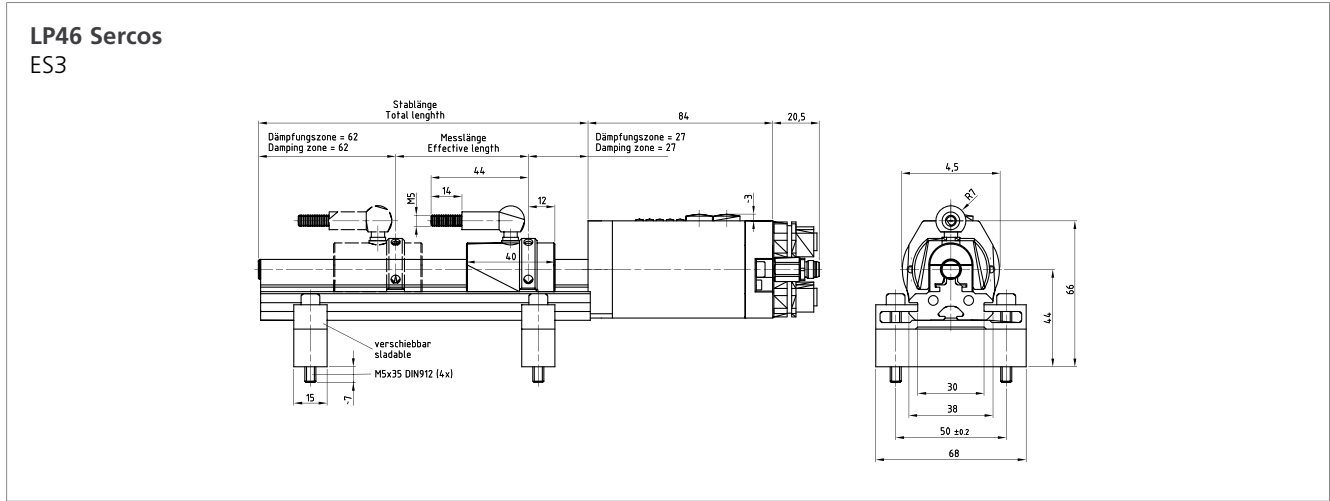
LP46 Profibus, CANopen PB, CO



Dimensional Drawings



Dimensional Drawings

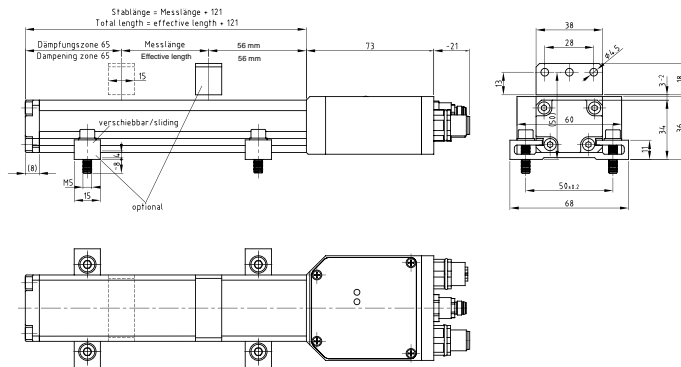


Magnets etc see chapter - Accessories - Linear Encoders

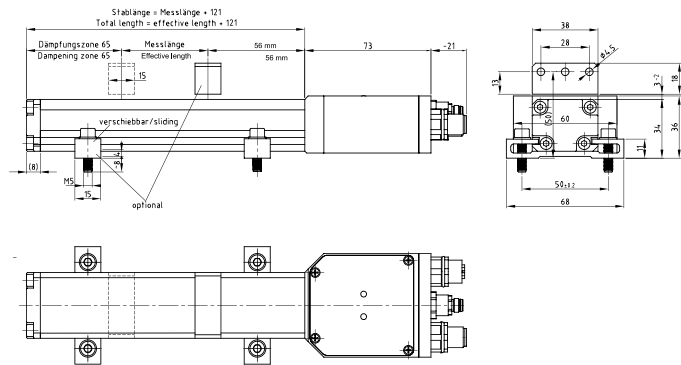
Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at www.tr-electronic.com or on request.

Dimensional Drawings

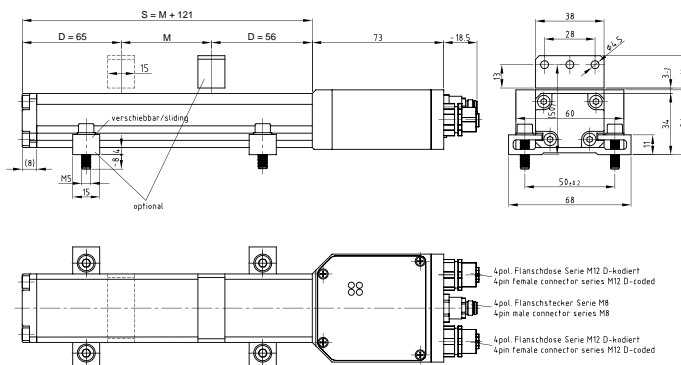
LMP30 Profibus PB



LMP30 CANopen CO

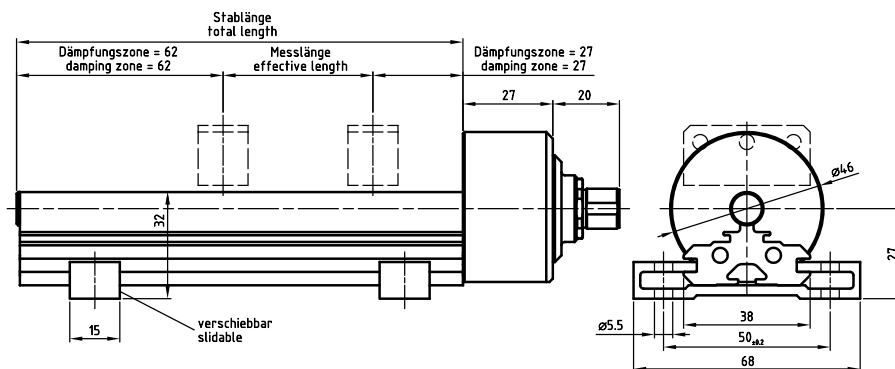


LMP30 Profinet, Ethernet/IP, EtherCAT, Powerlink EPN, EIP, ETC, EPL

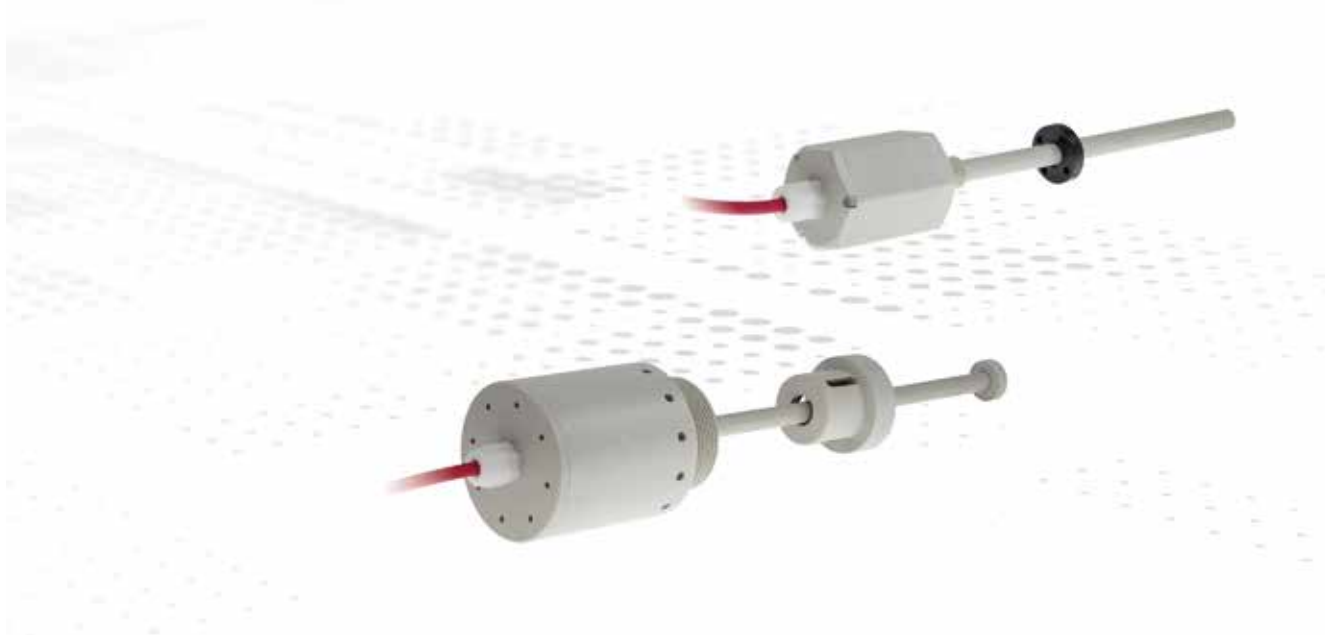


Dimensional Drawings

LMP48 Analog, Analog Functional Safety, SSI, CAN AN, AN+FS, SSI, CAN



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

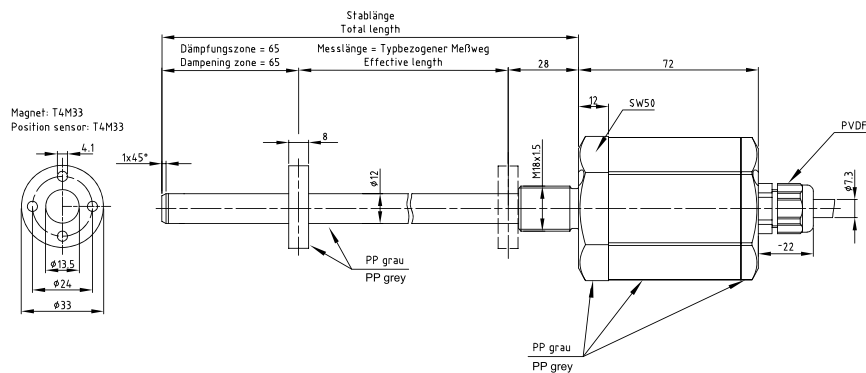
Product	LA50	LA80
		
Mechanic execution	(R) Tube (plastic)	(R) Tube (plastic)
Range	100 ... 10000 mm (in steps)	100 ... 10000 mm (in steps)
Size	50	80
Supply voltage	24 VDC, -20...+10 %	24 VDC, -20...+10 %
Resolution	0,001 mm	0,01 mm
Linearity defect	± 0,10 mm	< 0,05 %
Reproducibility	0,005 mm	0,01 mm
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	SSI	SSI
Weblink	www.tr-electronic.com/s/S008501	www.tr-electronic.com/s/S008502
QR-Code		

*depends on Measurement Length and Interface

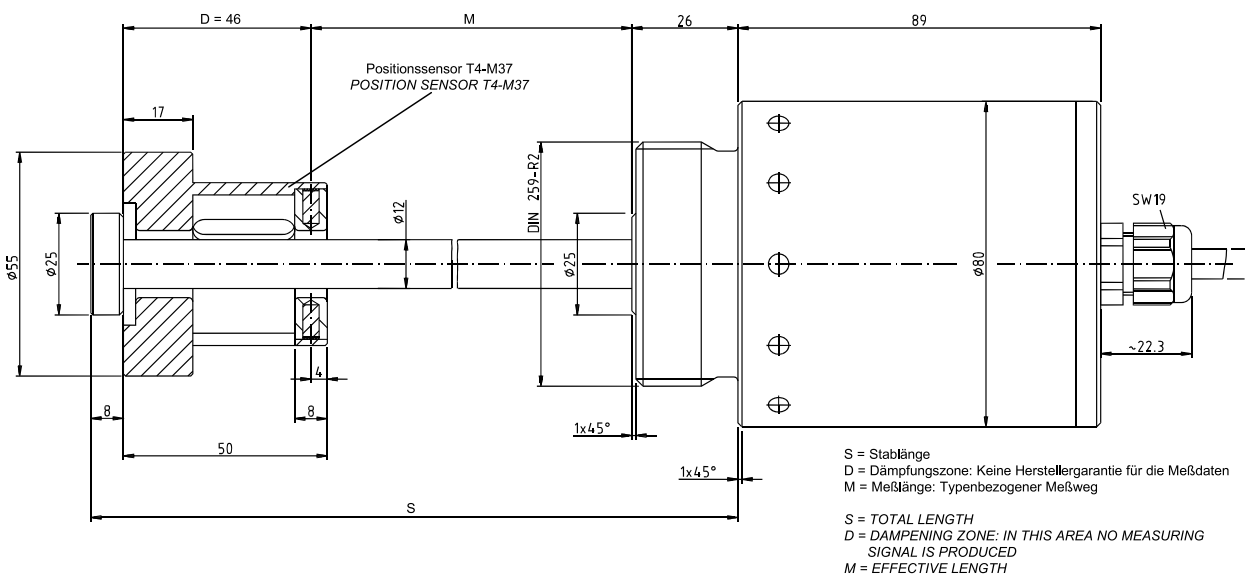
Can't find the right variant? Please contact us (info@tr-electronic.de)

Dimensional Drawings

LA50 SSI, Analog
SSI, ANA



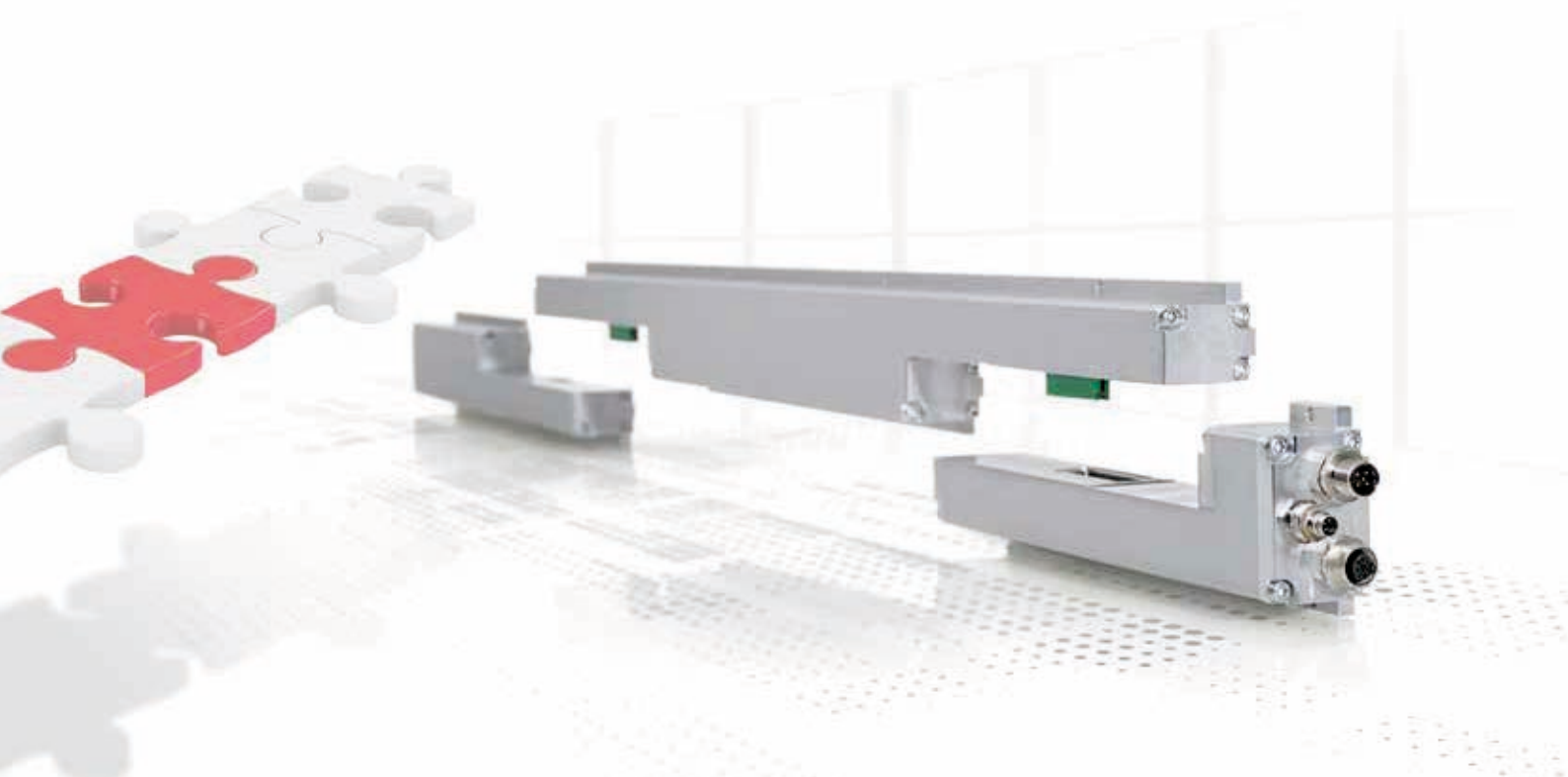
LA80 SSI, Analog
SSI, ANA



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.






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
- _ Interfaces: PROFIBUS, CANopen, EtherCAT
- _ 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/Module
Reproducibility	0,05 mm
Hysteresis	0,1 mm
Material - Measuring body	Aluminium extruded profile
Cycle time, internal	≤ 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	www.tr-electronic.com/s/S008458
QR-Code	

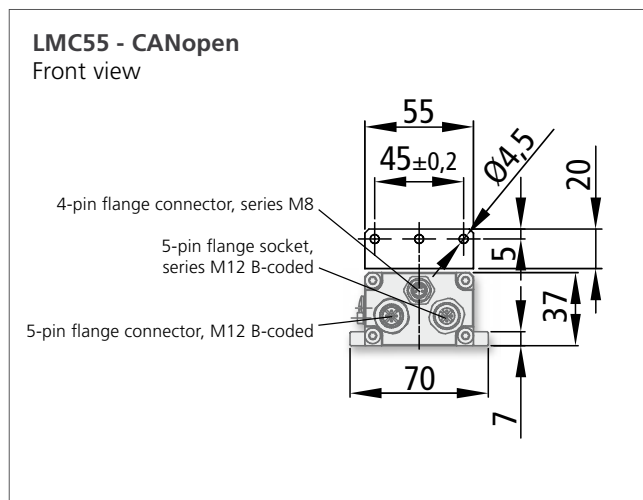
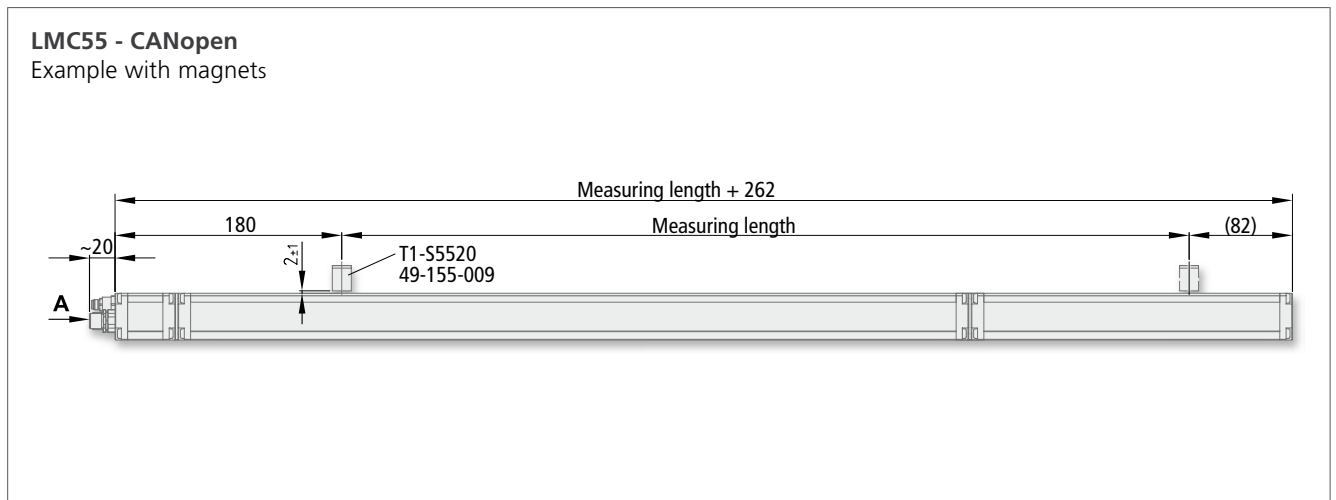
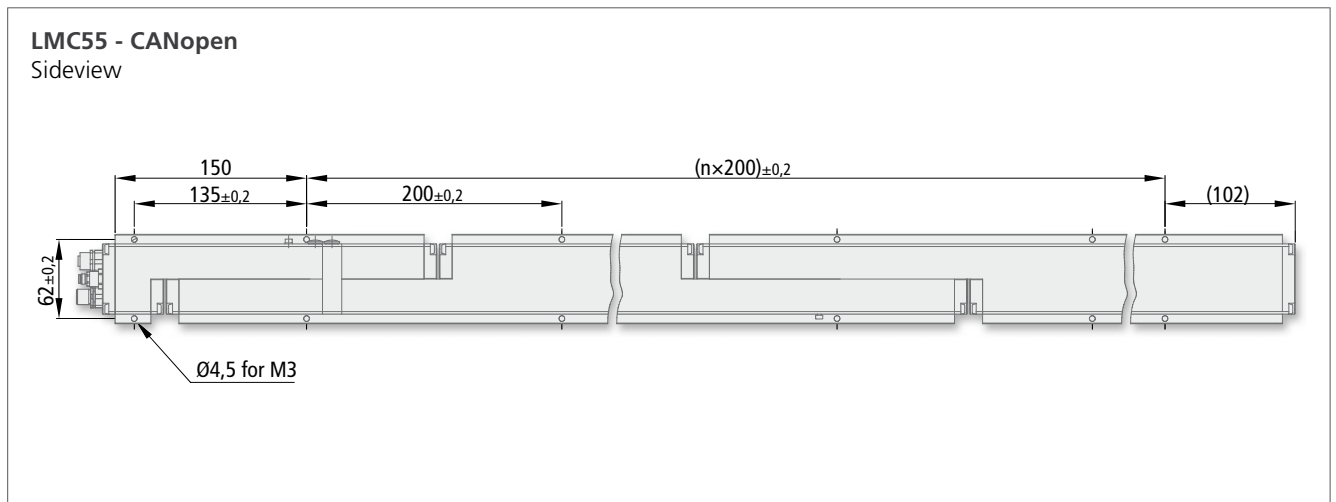
Suggested Products

Interfaces	Article description	Order code
LMC55		
PROFIBUS	Master	326M-00001
LMC55		
CANopen	Master	326M-00002
LMC55		
EtherCAT	Master	326M-00003
Range	Article description	Order code
LMC55		
2,000 mm	Slave type 1	326S-00002
LMC55		
2,000 mm	Slave type 2	326S-00001
Range	Article description	Order code
LMC55		
250 mm	End element type 1	326E-00009
LMC55		
500 mm	End element type 1	326E-00005
LMC55		
750 mm	End element type 1	326E-00011
LMC55		
850 mm	End element type 1	326E-00017
LMC55		
1,000 mm	End element type 1	326E-00004
LMC55		
,250 mm	End element type 1	326E-00013
LMC55		
1,500 mm	End element type 1	326E-00001
LMC55		
1,750 mm	End element type 1	326E-00015
LMC55		
2,000 mm	End element type 1	326E-00007

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

Range	Article description	Order code
LMC55		
250 mm	End element type 2	326E-00010
LMC55		
500 mm	End element type 2	326E-00006
LMC55		
750 mm	End element type 2	326E-00012
LMC55		
850 mm	End element type 2	326E-00018
LMC55		
1,000 mm	End element type 2	326E-00003
LMC55		
1,250 mm	End element type 2	326E-00014
LMC55		
1,500 mm	End element type 2	326E-00002
LMC55		
1,750 mm	End element type 2	326E-00016
LMC55		
2,000 mm	End element type 2	326E-00008
Magnets	Article description	Order code
Distance from measuring system		
max. 3 mm	Magnet T1-S5520 (black)	49155009
Distance from measuring system		
max. 8 mm	Magnet T2-S5520 (red)	49155010
Bus terminator	Interfaces	Order code
B-coded		
220 Ω	PROFIBUS	40803-40005
A-coded		
120 Ω	CANopen	62000-1366

Dimensional Drawings





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.

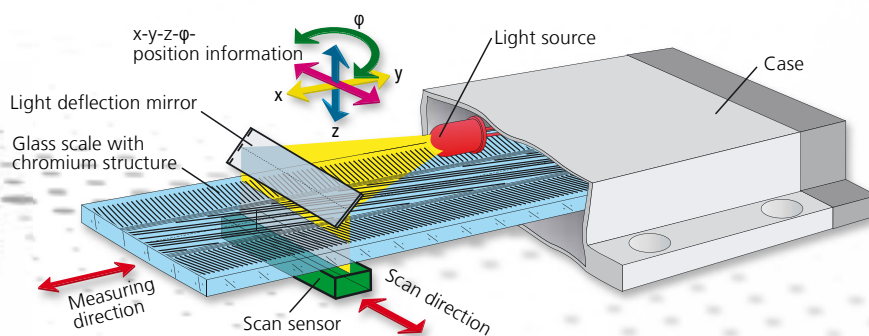
Evaluating the measurement signals, the coded measurement position is determined by the sensor signal and thanks to the additional measurement information, guidance and adjustment errors are completely corrected.

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.

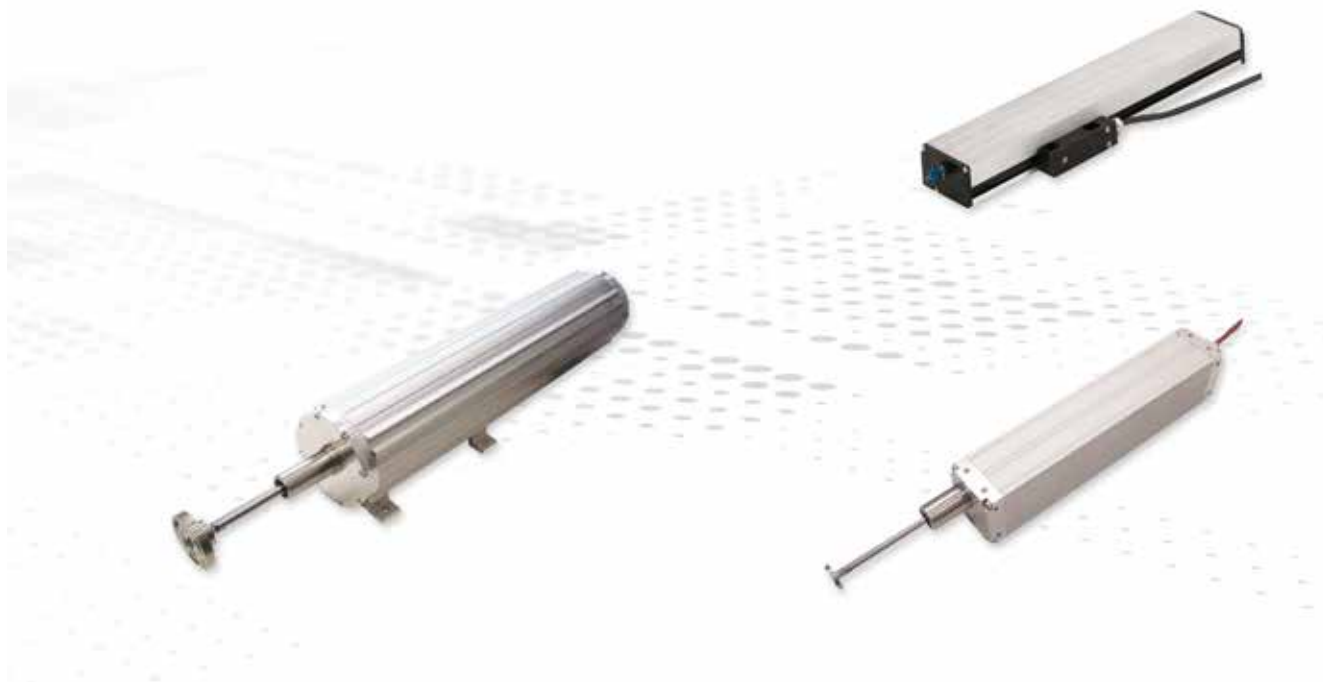
Our measurement systems of the LT series are available in following versions:

- _ 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 voltage	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
Working 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 of slider/probe	10 m/s	10 m/s	10 m/s
Orientation	Any desired	Any desired	Any desired
Interface	SSI	SSI	SSI
Option, additional interfaces (on request)	INC	INC	INC
Weblink	www.tr-electronic.de/f/TR-VLT-TI-GB-0200	www.tr-electronic.de/f/TR-VLT-TI-GB-0300	www.tr-electronic.de/f/TR-VLT-TI-GB-0400
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
LT-S Slider measurement system					
3200-00025	LT140-S SSI		140 mm	3 m cable, connector M23 12 pin	0,1µm
3200-00108	LT240-S SSI		240 mm	3 m cable, connector M23 12 pin	0,1µm
3200-00002	LT340-S SSI		340 mm	3 m cable, connector M23 12 pin	0,1µm
3200-00004	LT440-S SSI		440 mm	3 m cable, connector M23 12 pin	0,1µm
3200-00021	LT540-S SSI		540 mm	3 m cable, connector M23 12 pin	0,1µm
3200-00135	LT640-S SSI		640 mm	3 m cable, connector M23 12 pin	0,1µm
3200-00005	LT740-S SSI		740 mm	3 m cable, connector M23 12 pin	0,1µm
3200-00007	LT840-S SSI		840 mm	3 m cable, connector M23 12 pin	0,1µm
3200-00142	LT940S-SSI		940 mm	3 m cable, connector M23 12 pin	0,1µm
3200-00001	LT1040-S SSI		1040 mm	3 m cable, connector M23 12 pin	0,1µm
3200-00014	LT1140-S SSI		1140 mm	3 m cable, connector M23 12 pin	0,1µm
3200-00149	LT1240-S SSI		1240 mm	3 m cable, connector M23 12 pin	0,1µm
3200-00152	LT1340S-SSI		1340 mm	3 m cable, connector M23 12 pin	0,1µm
3200-00153	LT1440S-SSI		1440 mm	3 m cable, connector M23 12 pin	0,1µm
3200-00154	LT1540S-SSI		1540 mm	3 m cable, connector M23 12 pin	0,1µm

For further product information simply enter the order number in the search field at www.tr-electronic.de.

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

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

LT-S Slider measurement system

3200-00155	LT1640S-SSI		1640 mm	3 m cable, connector M23 12 pin	0,1µm
3200-00156	LT1840-S SSI		1840 mm	3 m cable, connector M23 12 pin	0,1µm
3200-00157	LT2040-S SSI		2040 mm	3 m cable, connector M23 12 pin	0,1µm
3200-00160	LT2240-S SSI		2240 mm	3 m cable, connector M23 12 pin	0,1µm
3200-00161	LT2440-S SSI		2440 mm	3 m cable, connector M23 12 pin	0,1µm
3200-00162	LT2640-S SSI		2640 mm	3 m cable, connector M23 12 pin	0,1µm
3200-00163	LT2840-S SSI		2840 mm	3 m cable, connector M23 12 pin	0,1µm
3200-00022	LT3040-S SSI		3040 mm	3 m cable, connector M23 12 pin	0,1µm

LT-PI Touch rod probe

3300-00003	LT100-PI SSI	With spring loaded probe	100 mm	3 m cable	0,1µm
3300-00015	LT200-PI SSI		200 mm	3 m cable	0,1µm

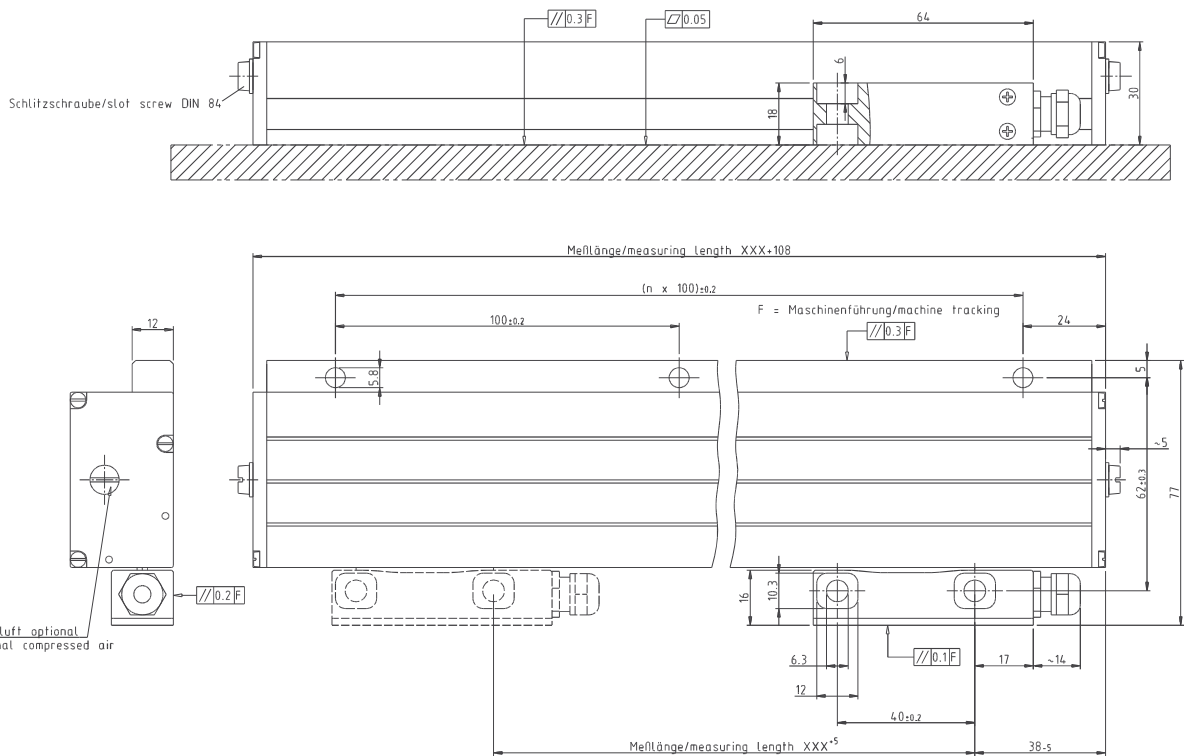
LT-RV Heavy-duty measurement system

3400-00004	LT400-PI SSI		400 mm	3 m cable	0,1µm
3400-00007	LT520-PI SSI		520 mm	3 m cable	0,1µm

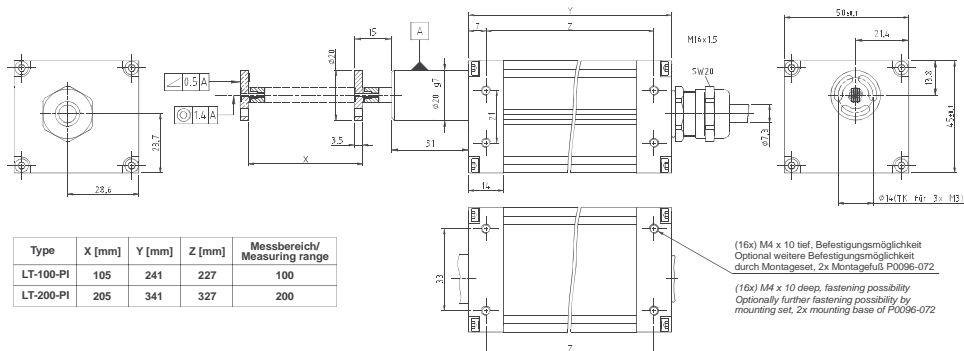
For further product information simply enter the order number in the search field at www.tr-electronic.de.

Dimensional Drawings

LT-S Slider

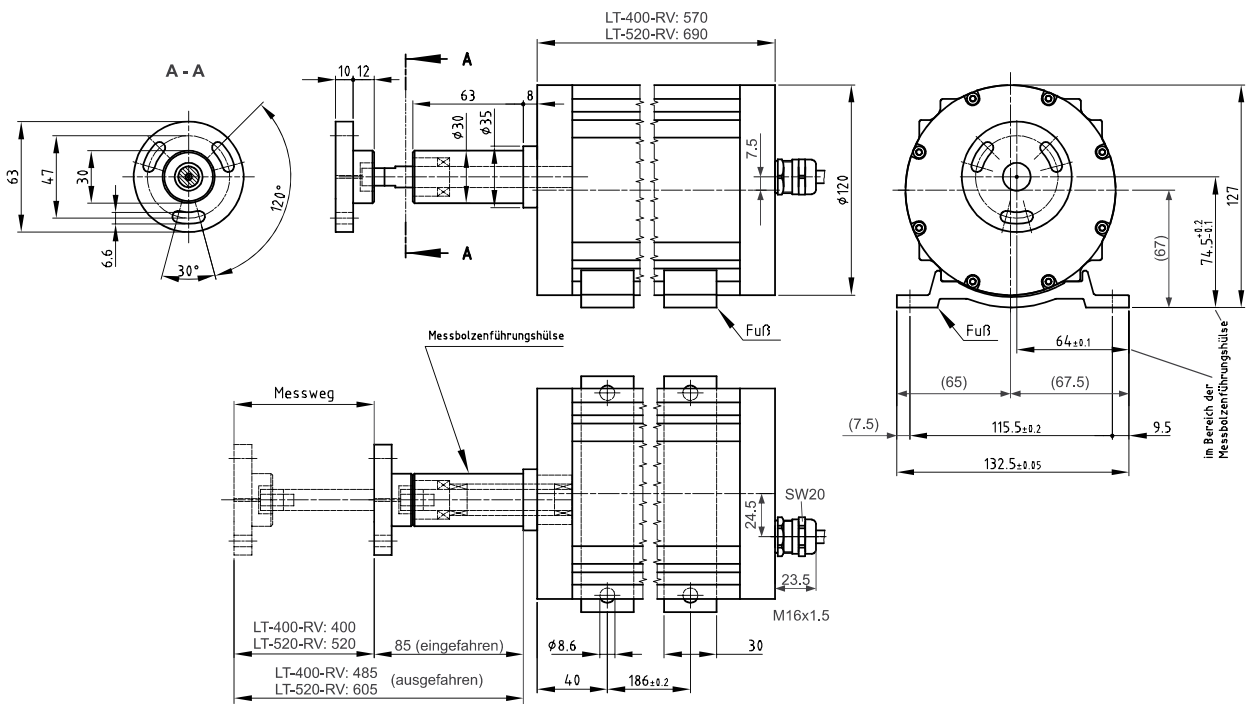


LT-PI Touch probe

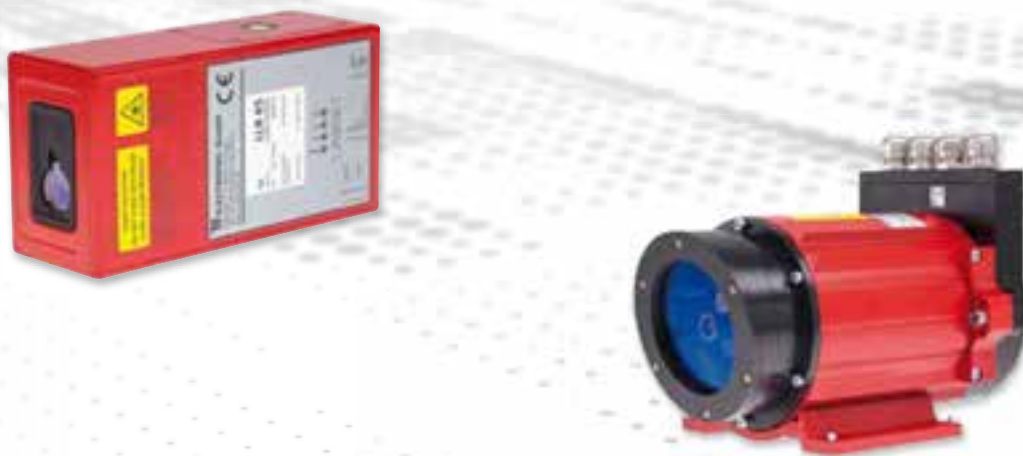


Dimensional Drawings

LT-RV
Heavy-duty touch probe



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 ± 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
Other distances on request
- _ Flexible programming
- _ Other interfaces on request
- _ Option with Integrated heating
- _ Customized adaptations upon request

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Position detection 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 λ	670 nm	670 nm
Radiant power	$P_{\max} \leq 1$ mW	$P_{\max} \leq 1$ 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	$\leq 50 \text{m/s}^2$, sine 50 ... 2,000 Hz	$\leq 50 \text{m/s}^2$, sine 50 ... 2.000 Hz
Shock	$\leq 300 \text{m/s}^2$, Half sine 11 ms Hz	$\leq 300 \text{m/s}^2$, Half sine 11 ms Hz
Interface (others on request)	      	      
Weblink	www.tr-electronic.com/s/S007232	www.tr-electronic.com/s/S007232
QR-Code		

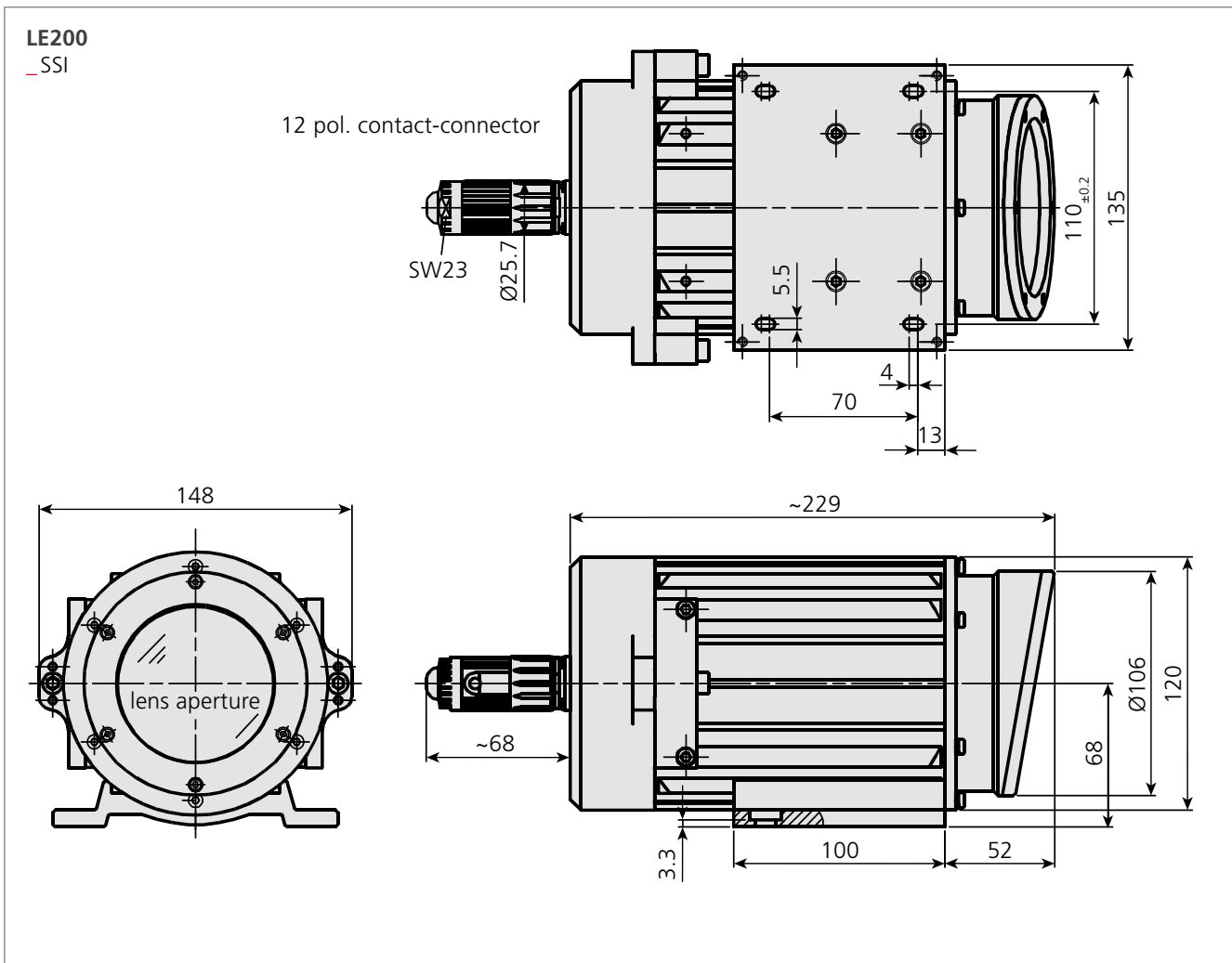
Can't find the right variant? Please contact us (info@tr-electronic.de)

Suggested Products

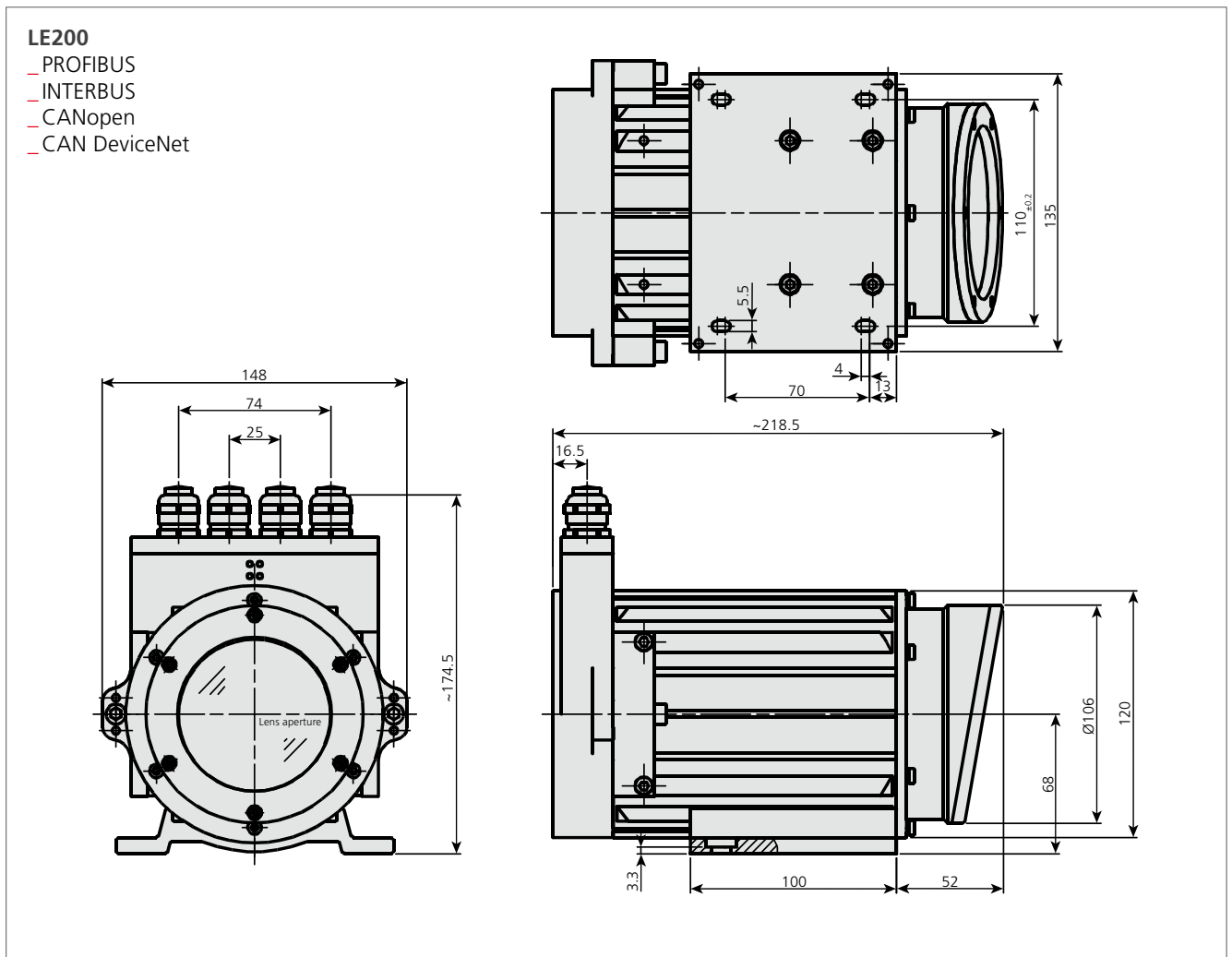
Range	Interface	Order code
LE200 - 50 m		
	PROFIBUS + SSI (with reflector 200 x 200 mm)	2200-04102
	CAN OPEN (with reflector 200 x 200 mm)	2200-04302
	DEVICE NET (with reflector 200 x 200 mm)	2200-04402
	ETHERNET IP (with reflector 200 x 200 mm)	2200-04702
	PROFINET (with reflector 200 x 200 mm)	2200-04802
LE200 - 125 m		
	SSI (with reflector 200 x 200 mm)	2200-00002
	PROFIBUS + SSI (with reflector 200 x 200 mm)	2200-00102
	INTERBUS S (with reflector 200 x 200 mm)	2200-00202
	CAN OPEN (with reflector 200 x 200 mm)	2200-00302
	DEVICE NET (with reflector 200 x 200 mm)	2200-00402
	ETHERNET IP (with reflector 200 x 200 mm)	2200-00702
	PROFINET (with reflector 200 x 200 mm)	2200-00802
LE200 - 170 m		
	SSI (with reflector panel 554 x 480 mm)	2200-01002
	PROFIBUS + SSI (with reflector panel 554 x 480 mm)	2200-01102
	CAN OPEN (with reflector panel 554 x 480 mm)	2200-01302
	ETHERNET IP (with reflector panel 554 x 480 mm)	2200-01702
	PROFINET IO (with reflector panel 554 x 480 mm)	2200-01802
LE200 - 195 m		
	SSI (with reflector panel 554 x 480 mm)	2200-02002
	PROFIBUS + SSI (with reflector panel 554 x 480 mm)	2200-02102
	CAN OPEN (with reflector panel 554 x 480 mm)	2200-02302
	DEVICE NET (with reflector panel 554 x 480 mm)	2200-02402
	ETHERNET IP (with reflector panel 554 x 480 mm)	2200-02702
	PROFINET (with reflector panel 554 x 480 mm)	2200-02802

For further product information simply enter the order number in the search field at www.tr-electronic.de.

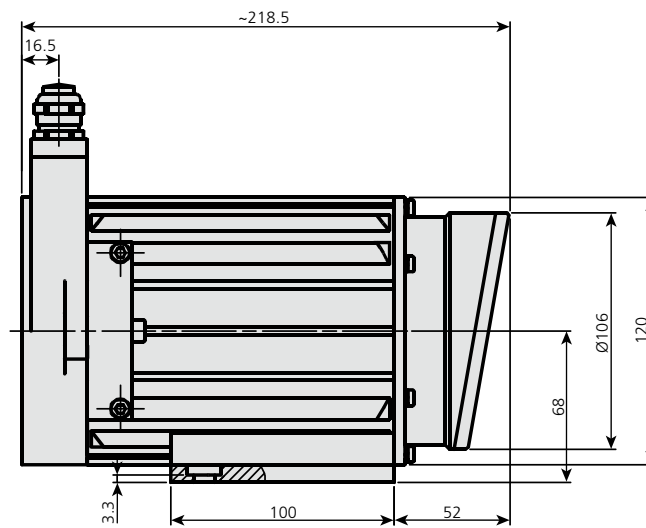
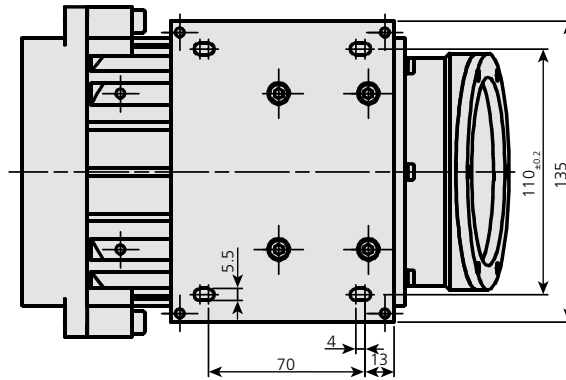
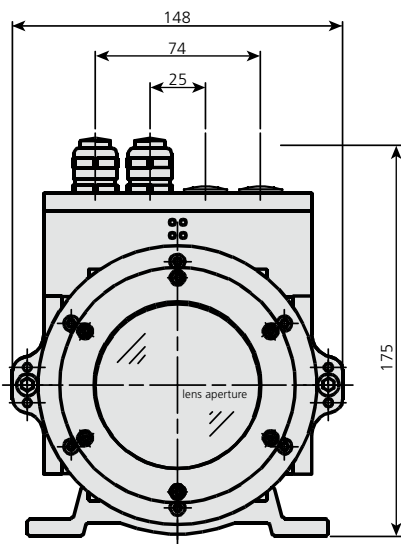
Dimensional Drawings



Dimensional Drawings



LE200
_EIP



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 of quasi static targets up to 65 m

Product	LLB65 (H) - A	LLB65 - PB
		
Supply voltage	9 ... 30 VDC	13 ... 30 VDC
_ Integrated heating	24 ... 30 VDC	–
Current consumption, no load	≤ 0,6 A	≤ 0,6 A
_ Integrated heating	≤ 2,5 A	–
Measuring range	typically 0,05 m ... 65 m	typically 0,05 m ... 65 m
Linearity deviation (12 m, standard)	0,1 mm	0,1 mm
Reproducibility	±1,5 mm ... ±3 mm bei 2 σ	±1,5 mm ... ±3 mm bei 2 σ
Time for a measurement	typically 0,3 ... 4 s	typically 0,3 ... 4 s
Light source	Laser diode, Red light	Laser diode, Red light
Wave length λ	620 ... 690 nm	620 ... 690 nm
Radiant power	0,95 mW	0,95 mW
Laser protection class	2	2
Beam divergence	0,16 × 0,6 mrad	0,16 × 0,6 mrad
Mass	690 g, 720 g (with heating)	950 g
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/s ² , sine 50 ... 2,000 Hz	≤50m/s ² , sine 50 ... 2,000 Hz
Shock	≤300m/s ² , Half sine 11 ms Hz	≤300m/s ² , Half sine 11 ms Hz
Interface (others on request)	Analog	
Weblink	www.tr-electronic.com/f/LLB65-A-1-GB-1	www.tr-electronic.com/f/LLB65-PB-1-GB-1
QR-Code		

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

Position detection of quasi static targets up to 500 m

Product	LLB500 (H)-A	LLB500-PB
		
Supply voltage	9 ... 30 VDC	13 ... 30 VDC
_ Integrated heating	24 ... 30 VDC	–
Current consumption no load	≤ 0,6 A	≤ 0,6 A
_ Integrated heating	≤ 2,5 A	–
Measuring range	typically 0,05 m ... 500 m	typically 0,05 m ... 500 m
Linearity deviation (12 m, standard)	0,1 mm	0,1 mm
Reproducibility	±1,5 mm ... ±3 mm bei 2 σ	±1 mm ... ±3 mm bei 2 σ
Time for a measurement	typically 0,3 ... 4 s	typically 0,04 ... 4 s
Light source	Laser diode, Red light	Laser diode, Red light
Wave length λ	620 ... 690 nm	620 ... 690 nm
Radiant power	0,95 mW	0,95 mW
Laser protection class	2	2
Beam divergence	0,16 × 0,6 mrad	0,16 × 0,6 mrad
Mass	690 g, 720 g (with heating)	950 g
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	≤50 m/s ² , sine 50... 2.000 Hz	≤50m/s ² , sine 50... 2.000 Hz
Shock	≤300 m/s ² , Half sine 11 ms Hz	≤300m/s ² , Half sine 11 ms Hz
Interface (others on request)	Analog SSI	
Weblink	www.tr-electronic.com/f/LLB500-A-1-GB-1	www.tr-electronic.com/f/LLB500-PB-1-GB-1
QR-Code		

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

Suggested Products

Range	Interface	Order code
LLB65 - 65 m		
	PROFIBUS ($\pm 1,5$ mm)	LLB65-00100
	PROFIBUS (± 3 mm)	LLB65-00101
	Analog ($\pm 1,5$ mm)	LLB65-00600
	Analog (± 3 mm)	LLB65-00601
	Analog ($\pm 1,5$ mm) with heating	LLB65-00610
	Analog (± 3 mm) with heating	LLB65-00611
LLB500 - 500 m (500 m with reflector, not included)		
	PROFIBUS (± 1 mm)	LLB500-00100
	PROFIBUS (± 3 mm)	LLB500-00101
	SSI + Analog ($\pm 1,0$ mm)	LLB500-00600
	SSI + Analog (± 3 mm)	LLB500-00601
Reflector for LLB 500, Range 65... 500 m		
	210 x 297mm, aluminium, red	49500040

Further product information

1. Enter order code into ...



2. Searchfield (top right) on www.tr-electronic.com

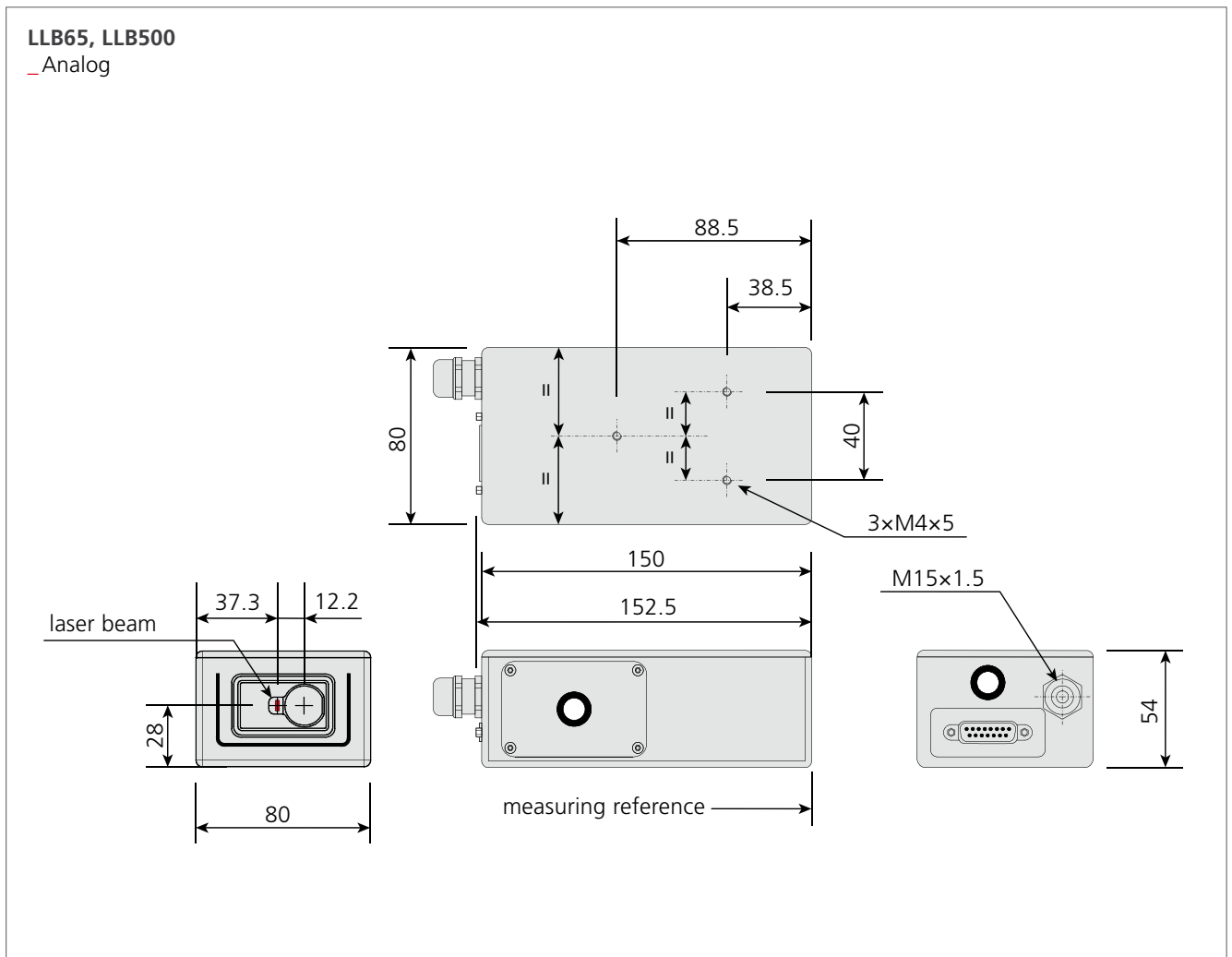


3. Choose desired information

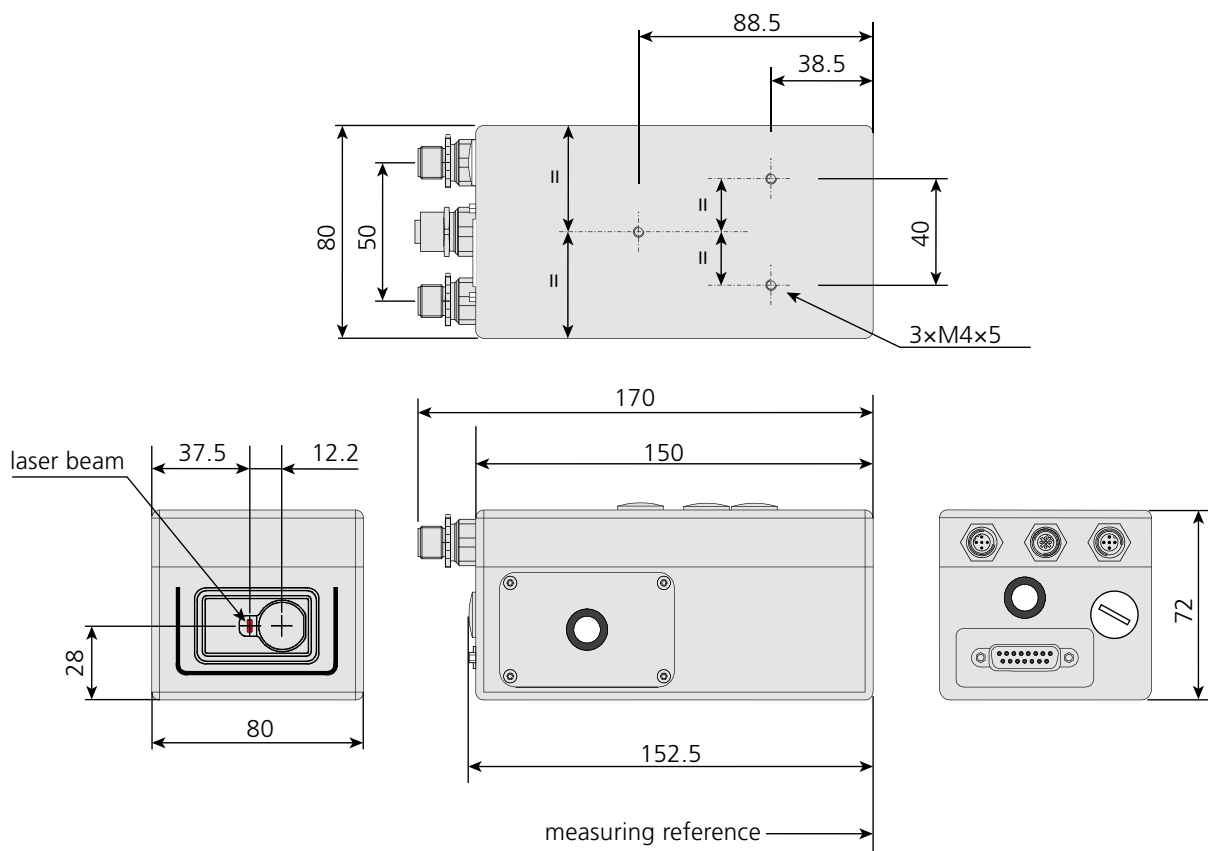


We will help you to select the most suitable products from the complete TR range. Please contact us (info@tr-electronic.de).

Dimensional Drawings



LLB65, LLB500
 _ PROFIBUS



Barcode Positioning System – BE90



Non-contact measurement up to 10 km






Barcode positioning systems of type BE-90 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-90 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 & PROFIBUS
- _ Easy installation and activation
- _ Movements (curved systems)
- _ Non contact position measurement
- _ Position detection up to 10,000 m
- _ Parameterizable via the PROFIBUS DP

Contents

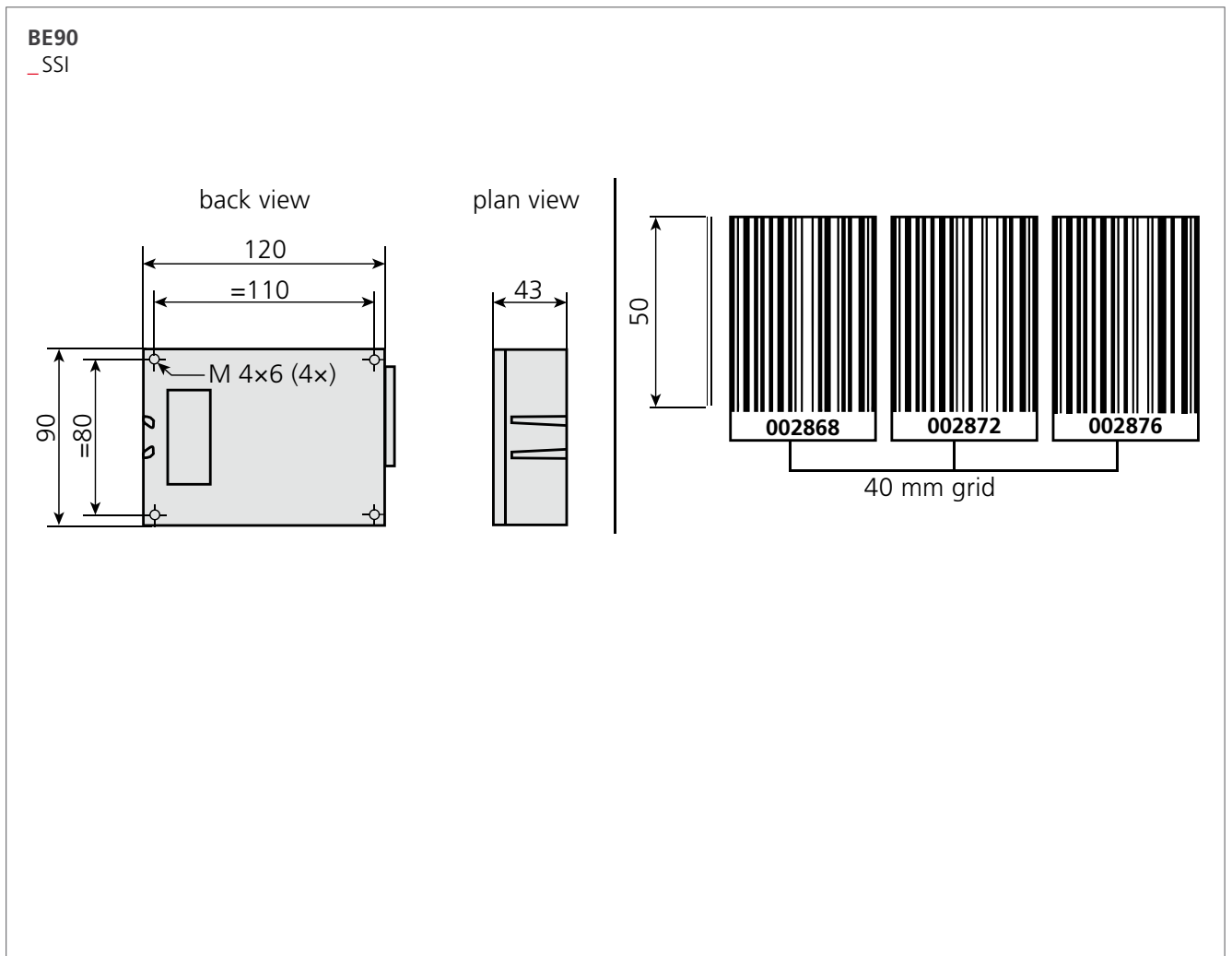
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Barcode Positioning System

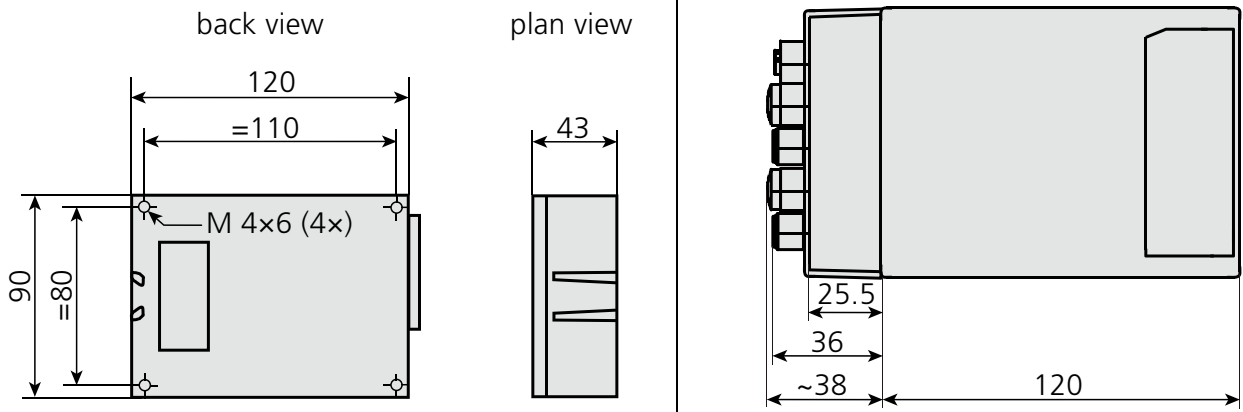
Product	BE90 - SSI	BE90 - PB
		
Supply voltage	10 ... 30 VDC	10 ... 30 VDC
Power consumption	3,2 W	5 W
Light source	Laser diode 650 nm	Laser diode 650 nm
Scanning rate	1.000 values/sec.	1.000 values/sec.
Reproducible accuracy	±1 (2) mm	±1 (2) mm
Integration time	16 (8) ms	16 (8) ms
Measurement value output	500 values/sec.	500 values/sec.
Scanning depth	90 ... 170 mm	90 ... 170 mm
Service Interface	RS232 with fixed data format, 9,600 baud, 8 data bits, etc.	RS232 with fixed data format, 9,600 baud, 8 data bits, etc.
Ports	1 switching output, 1 switching input	1 switching output, 1 switching input
Housing	die-cast aluminium	die-cast aluminium
Weight	400 g	400 g
Working temperature	0 ... 40 °C	0 ... 40 °C
Working temperature (+ heating)	-30 ... +40 °C	-30 ... 40 °C
Air humidity	max. 90% rel. humidity	max. 90% rel. humidity
Vibration	IEC 62.2.6 / 62.2.27 / 801	IEC 62.2.6 / 62.2.27 / 801
Protection class	IP65	IP65
Range	10,000 m	10,000 m
Interface (others on request)	SSI	
Weblink	www.tr-electronic.com/f/TR-VBE-TI-GB-0010	www.tr-electronic.com/f/LLB500-PB-1-GB-1
QR-Code		

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

Dimensional Drawings

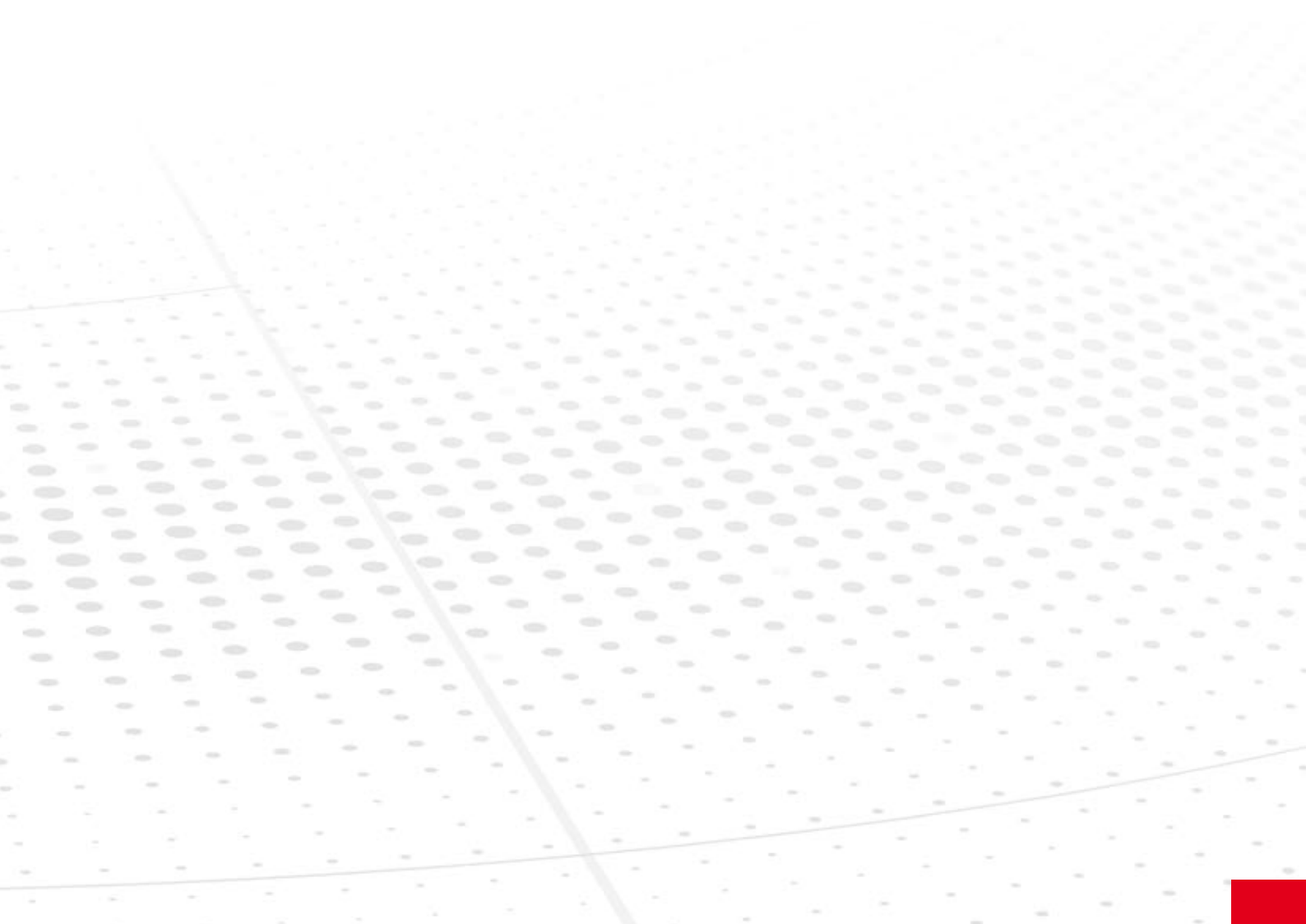


BE90
_ PROFIBUS

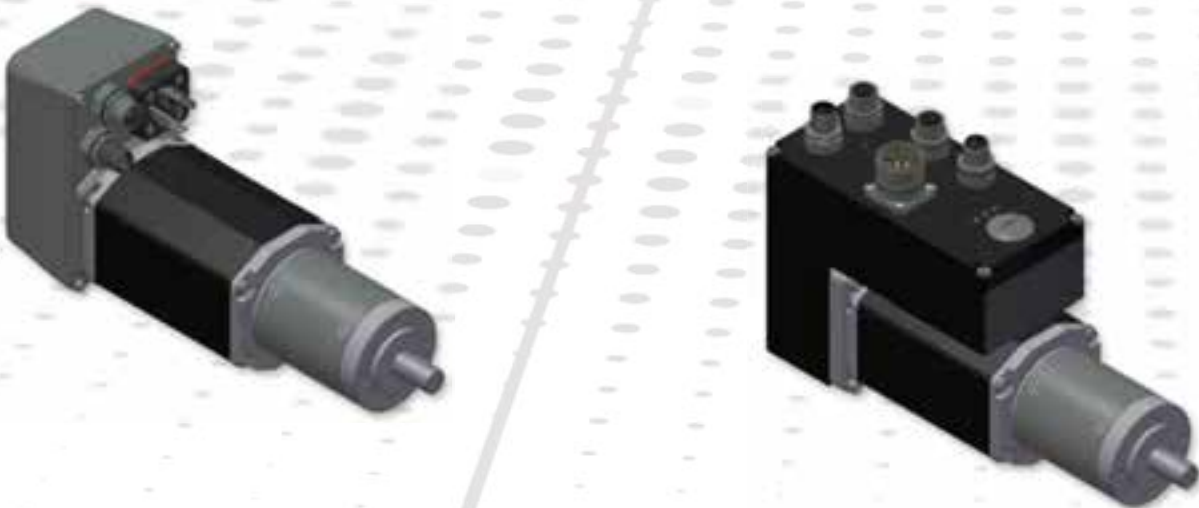


Motion





Motion – Intelligent Compact Drives



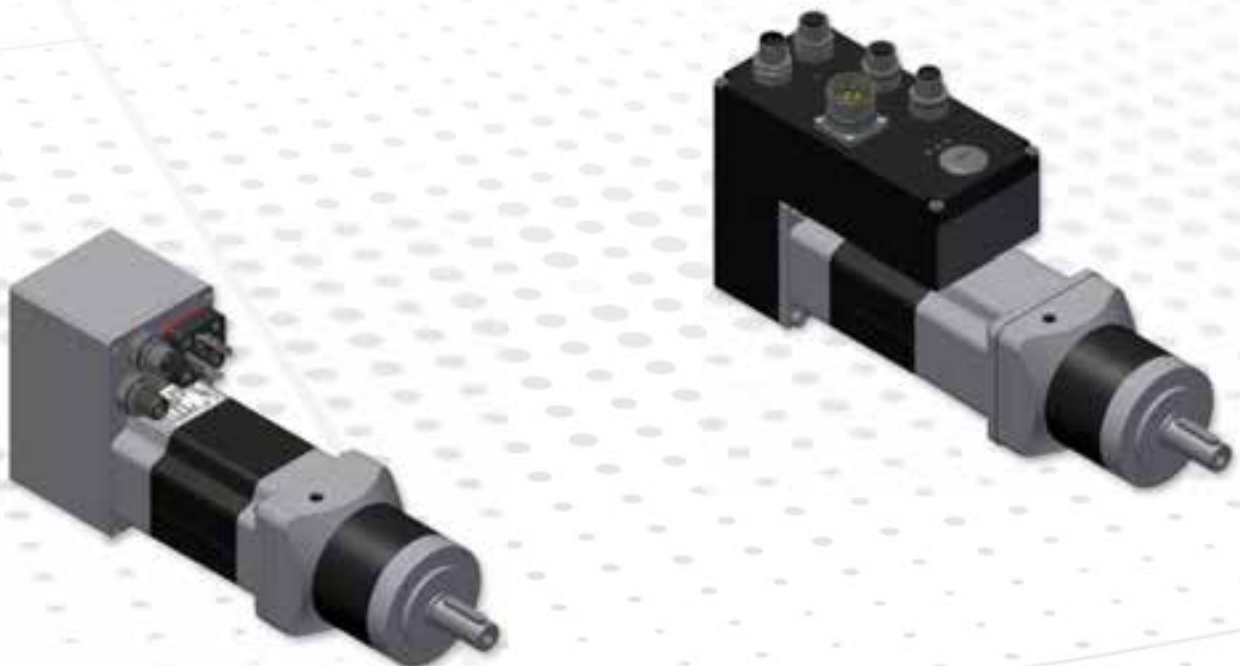
Intelligent compact drives integrate absolute rotary encoder, motor and control technology

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	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
1,000 min ⁻¹ per s	Dynamics
20 ms	Real time
1–2°	Accuracy
without	Inputs and outputs
1,000 h	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⁻¹ per s

2 ms

20 arcmin

programmable

30,000 h



from ... up to ...

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TR-Electronic – Helps You to Face the Challenges of the market

TR-Electronic – TR-Electronic helps you face the challenge of knowing and reacting to the demands of the market, which 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 challenge 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 and retrofitting. Our encoTRive integrates and tunes all important 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 are required. Both aspects of innovation – automation and integration – enable progressive machine concepts.

In addition to the already automated main processes, the auxiliary functions have to be electromotively 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 range from simple tasks for the actuating drives up to complex, highly accurate tasks for positioning drives.

Decentralized Drive Technology – encoTRive

encoTRive is the brand name for our complete drive technology product line. It is derived from the two components, **absolute Encoder and DRive**, modified and combined 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 wide range of gear types. Further options include radial or axial shaft, solid or hollow shaft, a moderate backlash or backlash-free gear. This is accomplished by using gear 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 that 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 breaks new ground with its standard decentralized concept, a new level of automation technology that applies to 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
- _ implementation of a 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 ± 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 gear 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, internal controller and holding brake. In addition, there are 4 M12 connectors for bus IN/OUT and digital I/O. A sixth connector enables 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 are simpler in their design and feature more limited functionality than the MD series. The electronics housing is smaller as well. As a result, there is less power output during continuous operation. During intermittent operation or short-term operation, the same output and the same torque are available, but they are limited to shorter activation and cycle times.



Electronics and drives of the MA series

The electronics are especially configured for short-term 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-sized series.

Gear types range from economy planetary gears to low-backlash servo gears. Driving torques of up to 180 Nm are available 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. Instead, 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 gears is set to one of the four possible directions.



Collection of drive series with possible component combinations

	Electronics			
	MA	MP	MD	
Technology: DC (brushed) PROFIBUS CANopen	MAxxx 			
EC (electronically commutated) PROFIBUS PROFINET CANopen		MP xxx 	MD xxx 	
EC (electronically commutated) PROFIBUS PROFINET CANopen		MP 200 	MD 300 	

	Motors	Gears	Options
	 055  100  130	<p>Simple gears</p> <p>Standard</p>  PLG 52  SG 80 H  SG 80 WL1 <p>Reinforced</p>  PLG 63  SGF 120 H  SGF 120 WL1	
	 060  100  140  180	<p>Precision gears</p> <p>Standard</p>  PLE 60  WPLE 60 <p>Reinforced</p>  PLE 80  WPLE 80	 HFUC  Integrated holding brake
	 200/300 without brake  200/300 with brake		

Process drive MD 300

The MD 300 series features comprehensive electronic functions and high-quality gears. Various gear series are available in several 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 series is particularly suited to special machine building where machine configurations are constantly changing, from quantities of 1 piece to medium-size series.



Optimal

- _ 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 ⁻¹	2,175 (1,550)	4,350 (3,100)
Nominal current S1 (S3)	A	8.0	7.6
Inertia torque	g cm ²	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) (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	

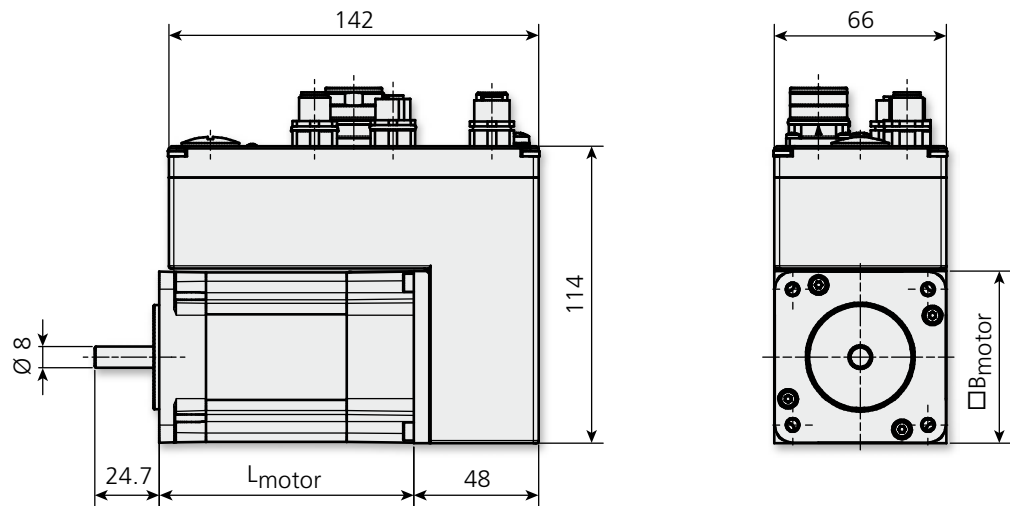
Definitions

- S1**
Continuous operation
- S3**
Intermittent operation
25 %, 10 min
Duty cycle 2.5 min
Cycle time 10 min
Max. torque 1.10 Nm

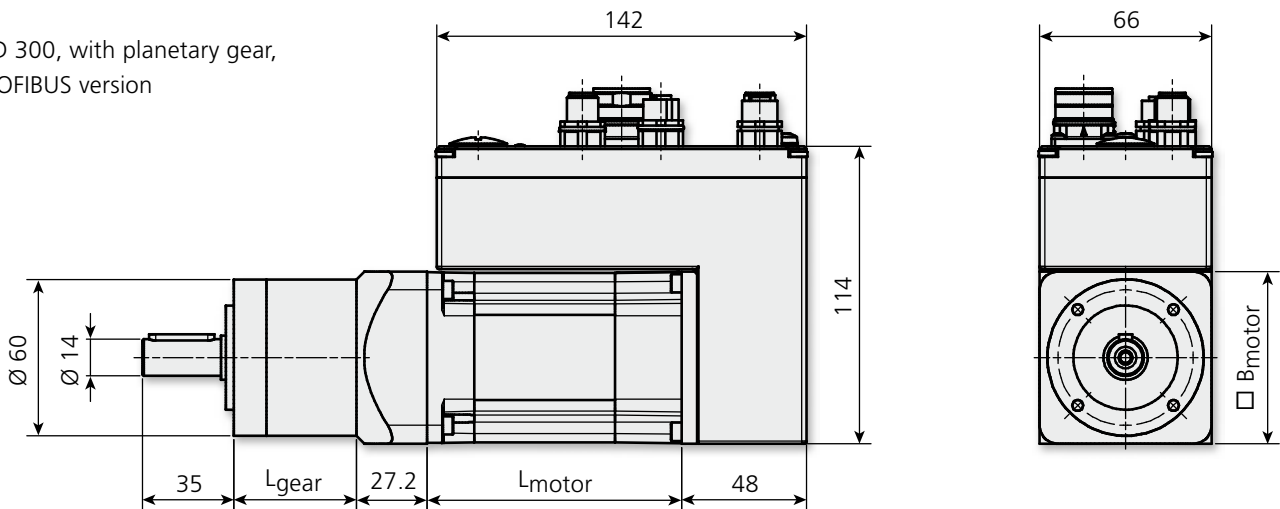
True absolute encoder
Fail-safe position information through electromechanical principle of measurement

Drawings

MD 300, without gear,
PROFIBUS version



MD 300, with planetary gear,
PROFIBUS version



Motor design

Brake	L_{motor}	B_{motor}
no	97.6 mm	□ 66 mm
yes	132 mm	□ 67 mm

PLE 60 gear design

Gear stages	L_{gear}
1	47 mm
2	59.5 mm
3	72 mm




Process drive MD xxx (-060, -100, -140, -180)

The MD xxx series is characterized by comprehensive electronic functions and simple gears. The gears available are planetary and worm gears in several 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. This series is particularly suited to mass production with defined drive configurations.



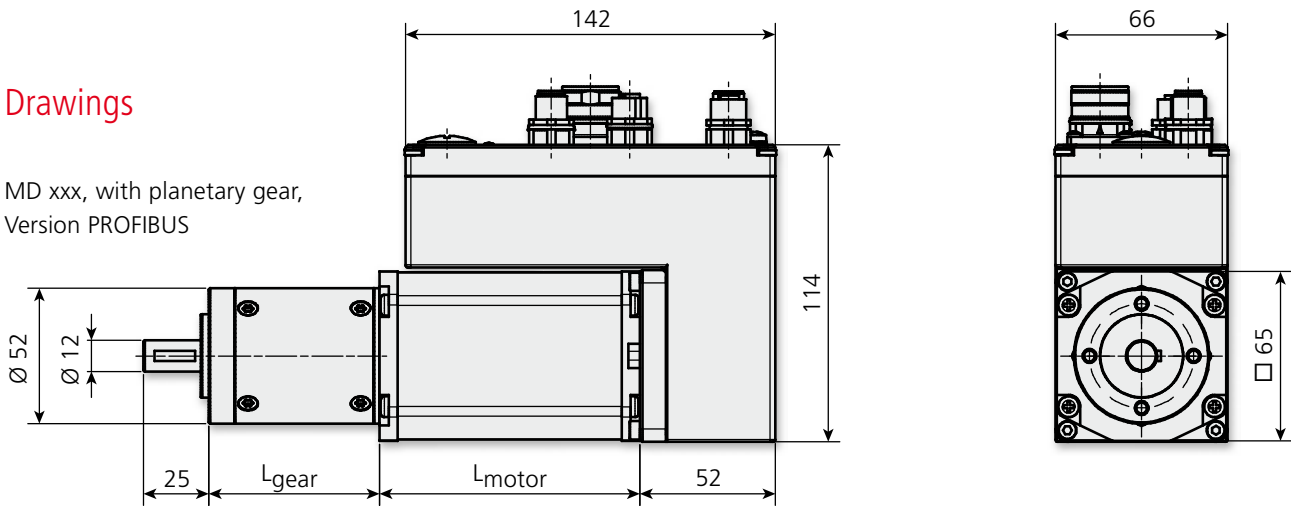
Optimal

- _ for easy positioning
 - _ for cyclic and pulsed positioning
 - _ for simultaneous use of decentralized I/Os
- _ in handling systems
 - _ in assembly devices
 - _ in special machines

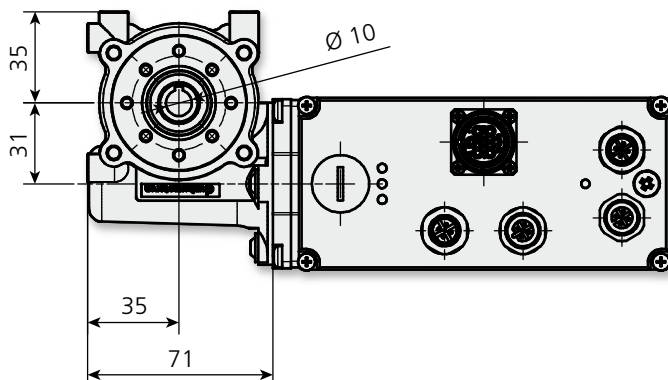
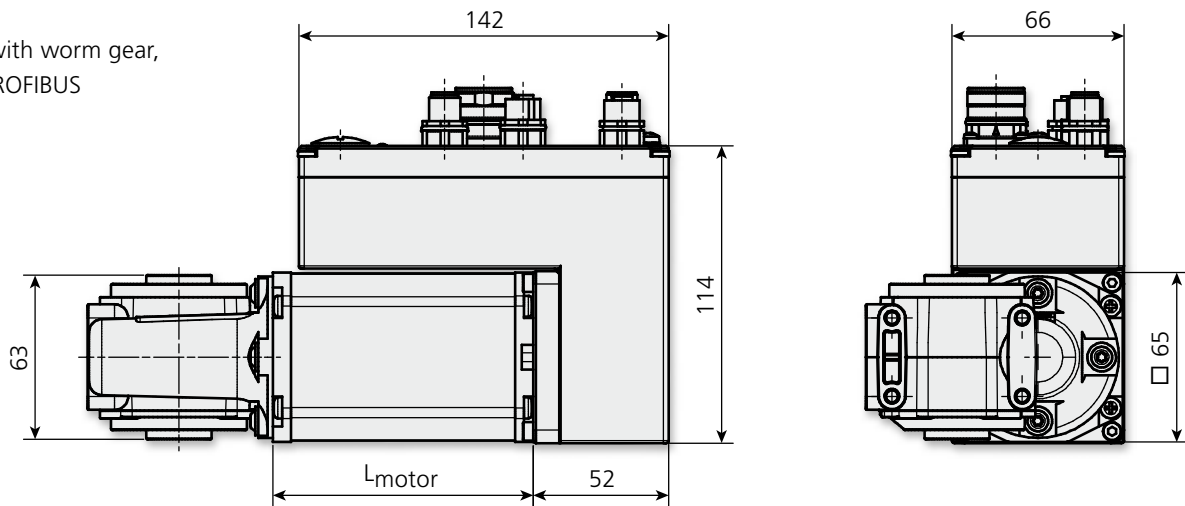
Technical data		MD 060	MD 100	MD 140	MD 180
Nominal voltage	VDC	24	24	42	24
Nominal torque S1	Nm	0.17	0.26	0.40	0.49
Nominal power S1	W	55	84	120	166
Nominal speed S1	min ⁻¹	3,080	3,090	2,860	3,240
Nominal current S1	A	4.0	5.6	4.5	9.0
Inertia torque	gcm ²	72	128	172	129
Electric motor		EC, electronically commutated motor with neodymium magnet IP 50			
_ Technology					
_ Protection class					
Encoder		Absolute encoder, multi turn 0.35° / 1,024 steps per revolution 65,536 revolutions ±0.7° / ±2 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		 (V0/V1)  (IO)  (402)			
		RS-232, logic I/O module, limit switch			
Options		Hand-held operator panel			
Brake chopper		Power 50 W, pulse energy 35 Ws			

Drawings

MD xxx, with planetary gear,
Version PROFIBUS



MD xxx, with worm gear,
Version PROFIBUS



Motor design

Type series	L _{motor}
MD 060	75 mm
MD 100	100 mm
MD 140	125 mm
MD 180	118 mm

PLG 52 gear design

Gear stages	L _{gear}
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 or on request.

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 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 series is particularly suited to special machine building where machine configurations are constantly changing, from quantities of 1 piece to medium-size series.



Optimal

- _ 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 ⁻¹	2,175 (1,550)	4,350 (3,100)
Nominal current S1 (S3)	A	5.2	4.8
Inertia torque	g cm ²	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		4,096 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		(V0/V1) (IO) (402)	
Options		Holding brake, hand-held operator panel	

Definitions

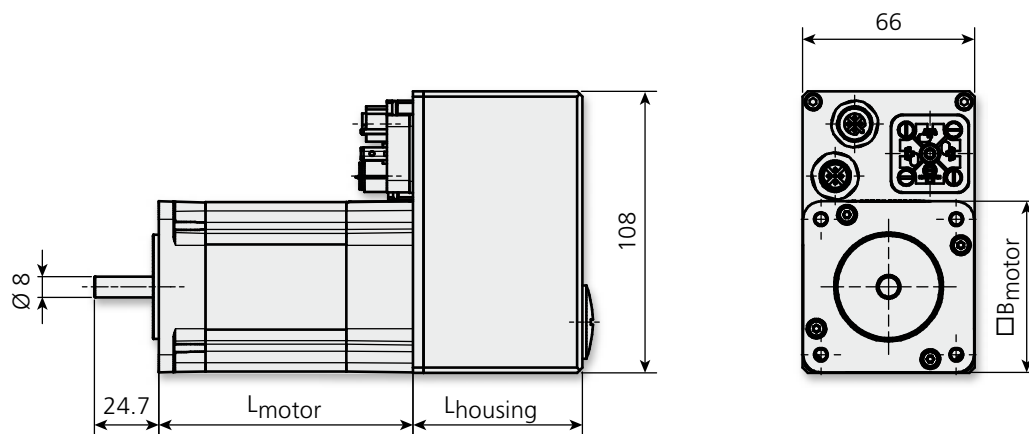
S1
Continuous operation

S3
Intermittent operation
25 %, 4 min
Duty cycle 1 min
Cycle time 4 min
Max. torque 1.10 Nm

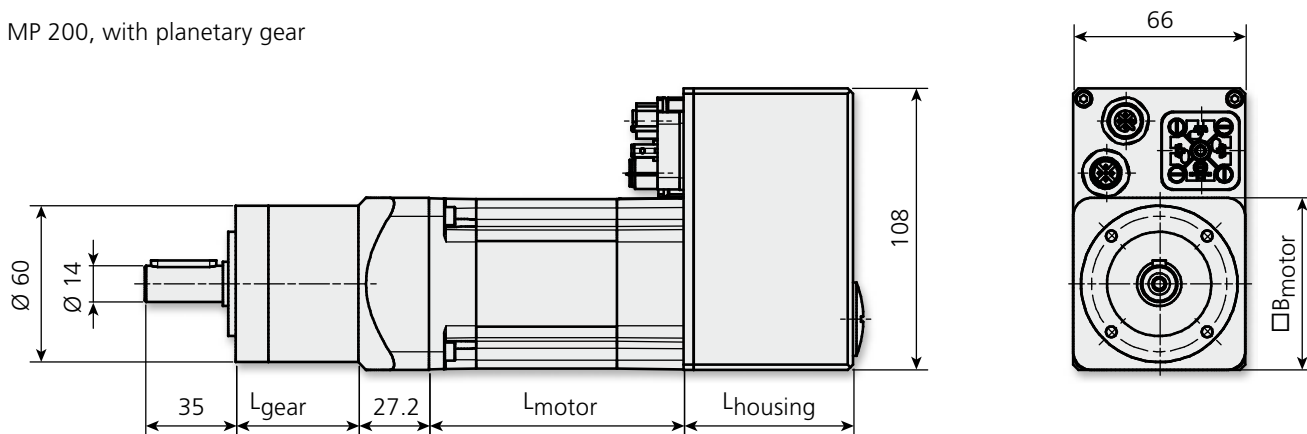
True absolute encoder
Fail-safe position information through electromechanical principle of measurement

Drawings

MP 200, without gear



MP 200, with planetary gear



Housing length

Bus	L _{housing}
CANopen	50 mm
PROFIBUS	65 mm
PROFINET	47 mm

Motor design

Type series	L _{motor}	B _{motor}
no	97.6 mm	□ 66 mm
yes	132 mm	□ 67 mm

PLE 60 gear design

Gear stages	L _{gear}
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 or on request.

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 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 series is particularly suited to mass production with defined drive configurations.



Optimal

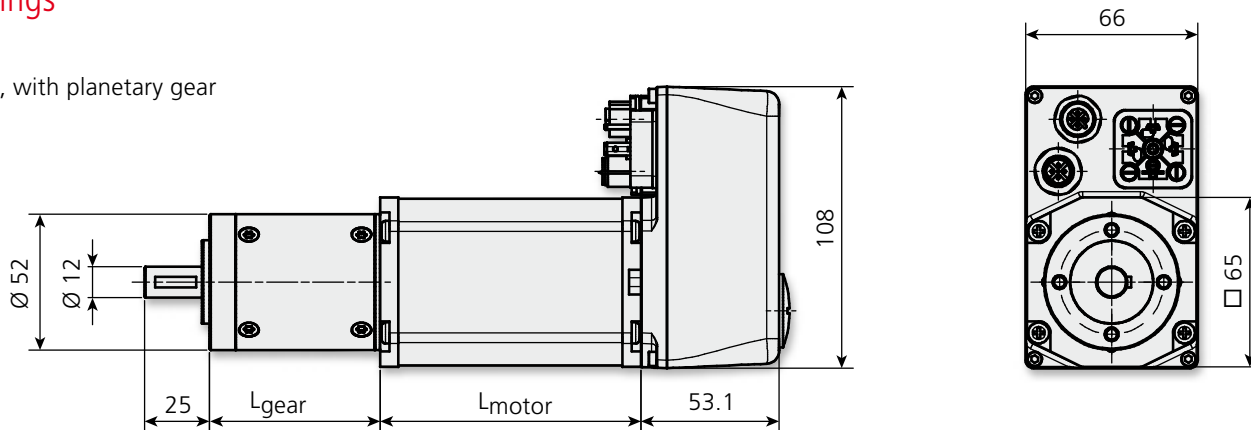
- _ for easy positioning
- _ for broad format setting
- _ for high precision constant speed

- _ in handling systems
- _ in assembly devices
- _ in special machines

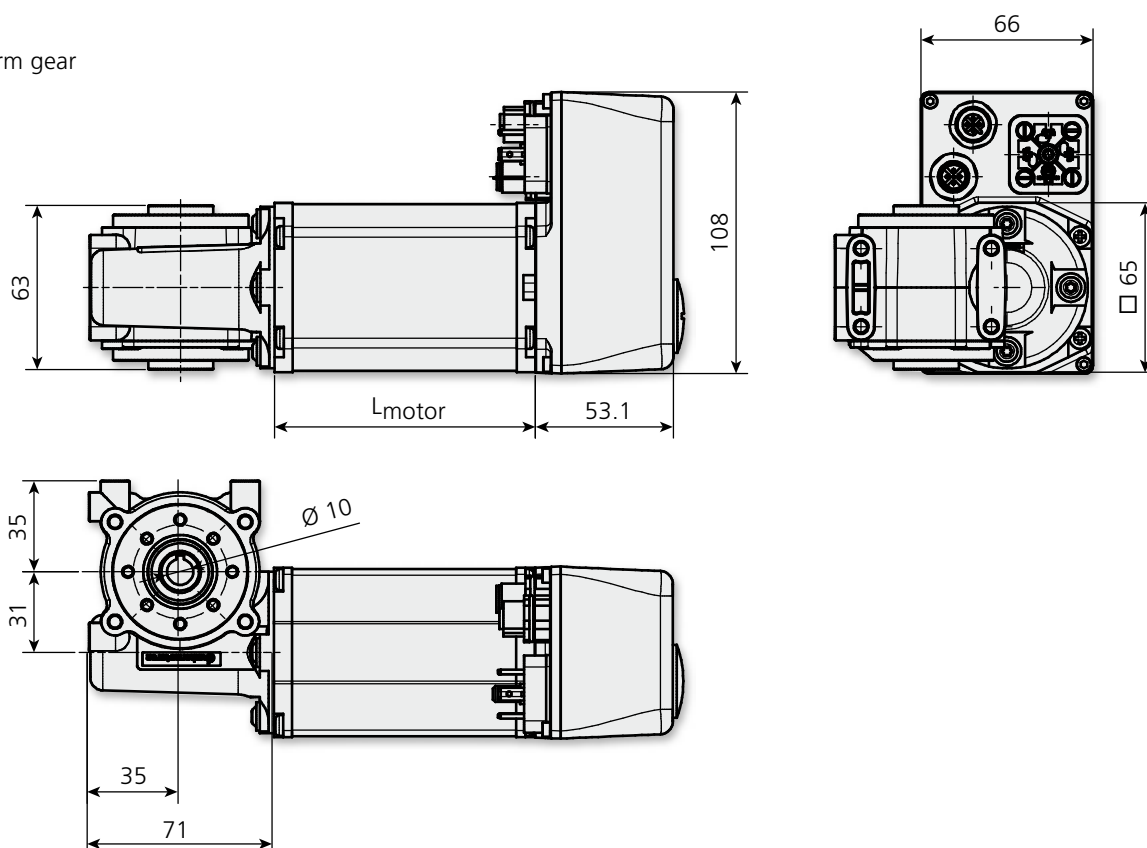
Technical data		MP 060	MP 100	MP 140	MP 180
Nominal voltage	VDC	24	24	42	24
Nominal torque S1	Nm	0.17	0.26	0.40	0.49
Nominal power S1	W	55	84	120	166
Nominal speed S1	min ⁻¹	3,080	3,090	2,860	3,240
Nominal current S1	A	4.0	5.6	4.5	9.5
Inertia torque	gcm ²	72	128	172	129
Electric motor _ Technology _ Protection class		EC, electronically commutated motor with neodymium magnet IP 50			
Encoder _ Technology _ Positioning resolution _ Positioning range _ Positioning accuracy		Absolute encoder, multi turn 0.088° / 4,096 steps per revolution 4,096 revolutions ±0.7° / ±8 steps			
Gear _ 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 _{motor}
MP 060	75 mm
MP 100	100 mm
MP 140	125 mm
MP 180	118 mm

PLG 52 gear design

Gear stages	L _{gear}
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 or on request.

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 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 to mass production with defined drive configurations.



Optimal

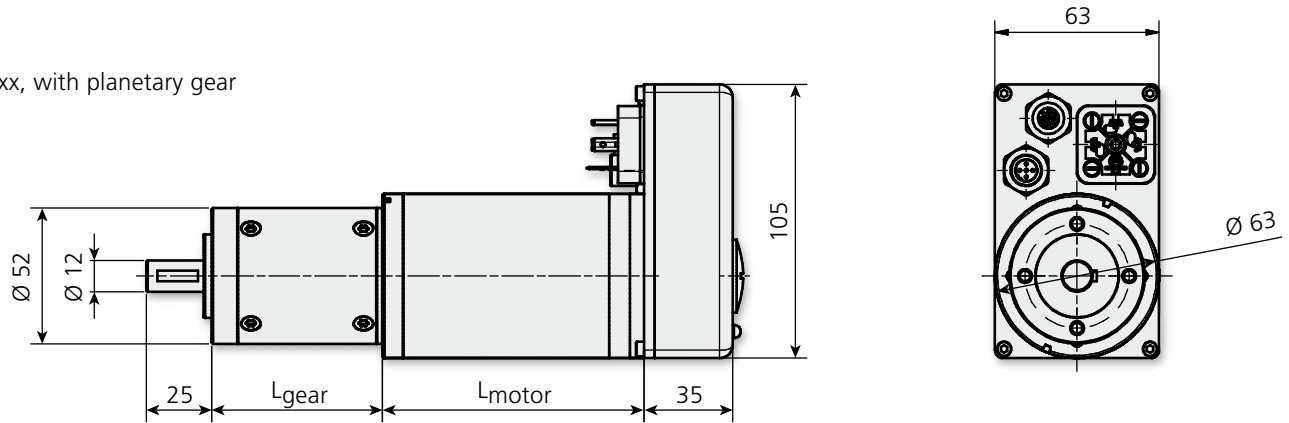
- _ for setting stops
- _ for positioning guide rails
- _ for aligning spray nozzles

- _ in woodworking machines
- _ in packaging machines
- _ in coating machines

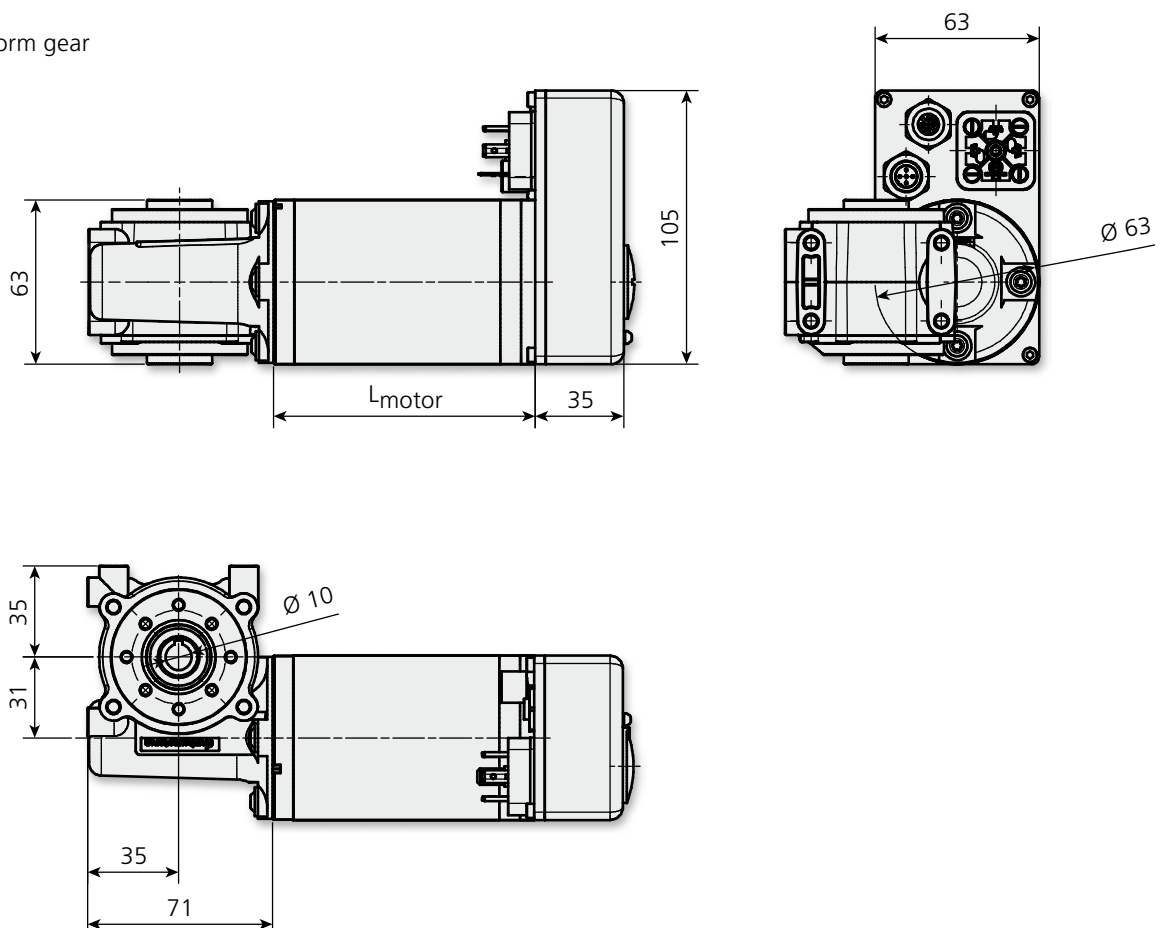
Technical data		MA 055	MA 100	MA 130
Nominal voltage	VDC	24	24	24
Nominal torque S1	Nm	0.14	0.27	0.32
Nominal power S1	W	44	86	107
Nominal speed S1	min ⁻¹	3,000	3,050	3,200
Nominal current S1	A	2.7	4.9	5.8
Inertia torque	gcm ²	400	750	750
Electric motor		DC, brushed motor IP 50		
_ Technology				
_ Protection 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		 (V0/V1)  (402)		
Options		Special voltages for large production series		

Drawings

MA xxx, with planetary gear



MA xxx, with worm gear



Motor design

Type series	L _{motor}
MA 055	95 mm
MA 100	125 mm
MA 130	125 mm

PLG 52 gear design

Gear stages	L _{gear}
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 or on request.

Servo drive MA 025

The MA 025 series is optimally suited to occasional adjustment tasks and to automation of adjustment tasks that had been previously performed manually. In general, the series is suitable for auxiliary functions without special requirements to be met by dynamics, runtime or service life.



The drive reaches its position in regard to means of a fail-safe absolute encoder at the gear output and is capable of handling short-term high overloads. The series features two defined types, each with a driving torque of 2 and 4 Nm.



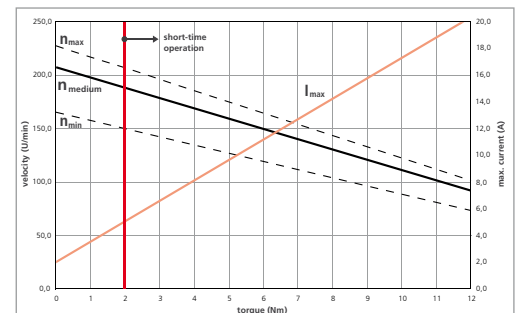
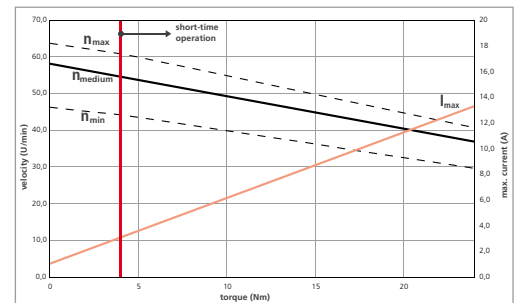
Optimal

- _ for setting stops
- _ for positioning guide rails
- _ for controlling valves, flaps and sliders

- _ in folding machines
- _ in thermoforming machines
- _ in component mixing systems

Technical data		2 Nm	4 Nm
Nominal voltage	VDC	24	24
Nominal torque S2 (10 min)	Nm	2.0	4.0
Nominal power S2 (10 min)	W	39	27
Nominal speed S2 (10 min)	min ⁻¹	187	54
Nominal current S2 (10 min)	A	5.5	4.0
Inertia torque	g cm ²	780	
Electric motor		DC, brushed motor	
_ Technology		IP 42	
_ Protection class			
Encoder		Absolute encoder, multi turn	
_ Technology		0.35°/4,096 steps per revolution	
_ Positioning resolution		256 revolutions (gear shaft)	
_ Positioning range		±8 steps	
_ Positioning accuracy			
Gear		Worm gear	
_ Type		17.5 at 2 Nm, 65 at 4 Nm	
_ Reductions			
Interfaces		 (V0/V1)  (402)	

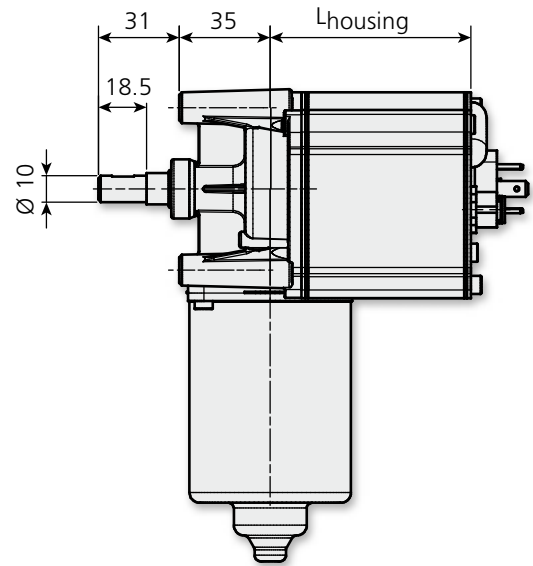
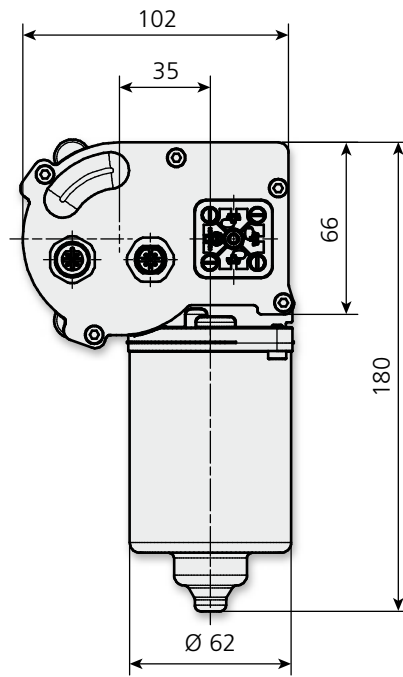
Characteristic curves



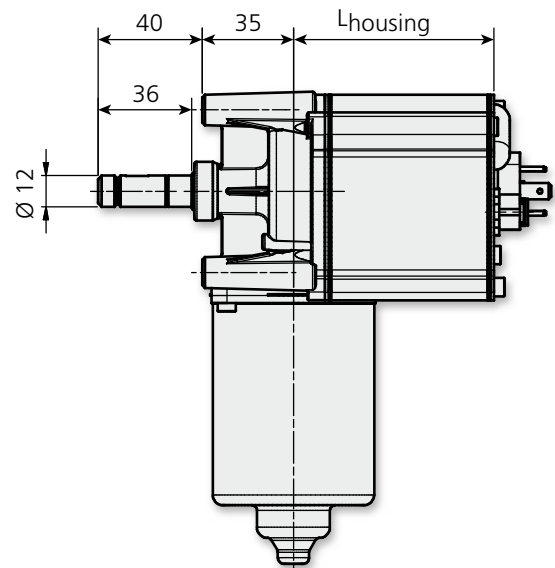
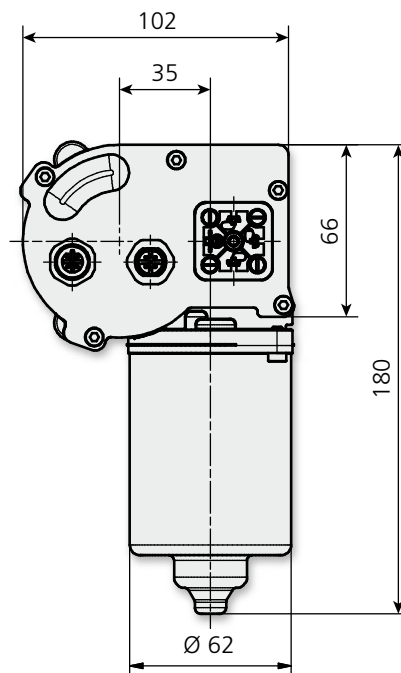
There is a minor difference between the speeds in the two directions of rotation of the output shaft. In the characteristic curve fields, this is illustrated by dotted boundary lines indicating the tolerance width. The values for the allowed shaft forces are standard values and should not be exceeded.

Drawings

MA 025, 2 Nm



MA 025, 4 Nm



Housing length

Bus	L _{housing}
CANopen	57 mm
PROFIBUS	77 mm

Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at www.tr-electronic.com or on request.

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Precision gears for MD 300, MP 200

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 which it is appropriate 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 acceptable shaft forces 600/500 N, (axial/radial)



up to 44/70 Nm

- _ high short-term overload factor 60 %
- _ selectable mounting position
- _ full service life lubrication

Angular Planetary Gear WPLE 60

Permanent operation/periodic duty up to 44/70 Nm

The WPLE 60 is the 90° angle version of 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 located on the 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 acceptable shaft forces 600/500 N, (axial/radial)



up to 44/70 Nm

- _ high short-term overload factor 60 %
- _ selectable mounting position
- _ full service life lubrication

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

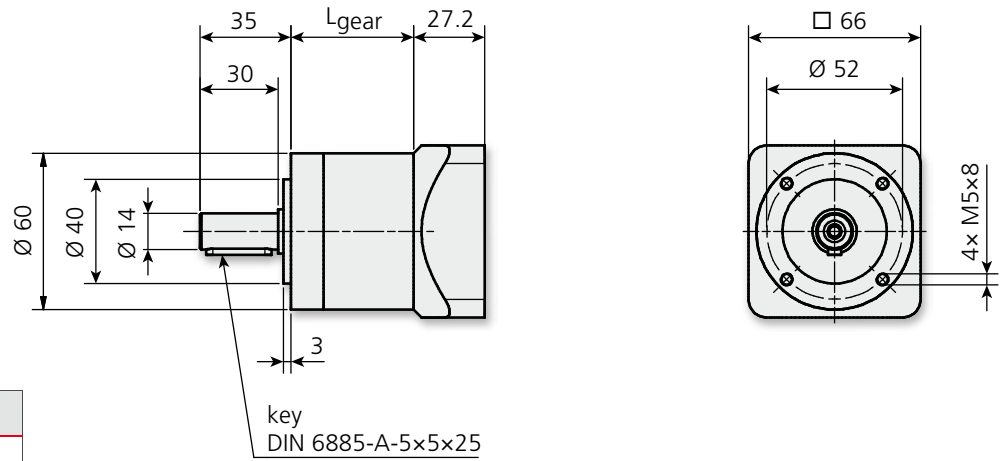
- _ 4 different reductions $i = (30 \dots 100)$
- _ high load-dependent efficiency
- _ high acceptable radial force 1,500 N



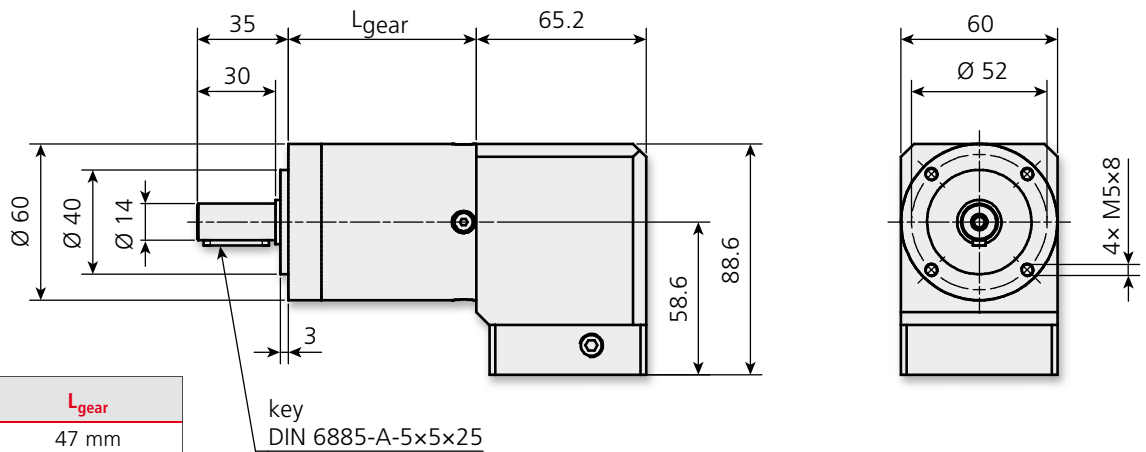
Backlash-free

- _ short-term overload 100 %
- _ selectable installation position
- _ full service life lubrication

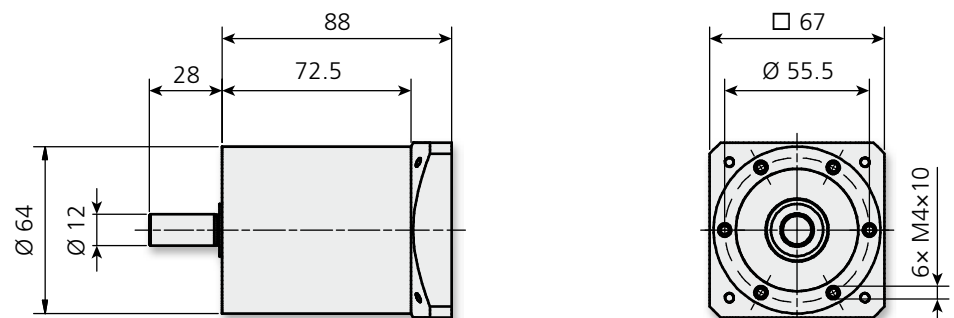
Drawings



Gear stages	L_{gear}
1	47 mm
2	59.5 mm
3	72 mm



Gear stages	L_{gear}
1	47 mm
2	59.5 mm
3	72 mm



Reinforced precision gears for MD 300, MP 200

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 are not negligible. The gear is suitable for all applications where it is appropriate to have a backlash of approximately 11 arcmin.

Features

- _ low backlash (7-9-11 arcmin), (1-2-3)-stage
- _ high level of efficiency (96-94-90 %), (1-2-3)-stage
- _ high acceptable shaft forces 1,200/950 N, (axial-radial)



130/208 Nm

- _ high short-term overload factor 60%
- _ selectable mounting position
- _ full service life lubrication

Angular Planetary Gear WPLE 80

Permanent operation/periodic duty up to 130/208 Nm

The WPLE 80 is the 90° angle version of the PLE 80. The motor and gear are connected with a detachable coupling and clamping hub. Friction losses are not negligible. A bevel gear 1:1 is located on the front of the PLE 80.

Features

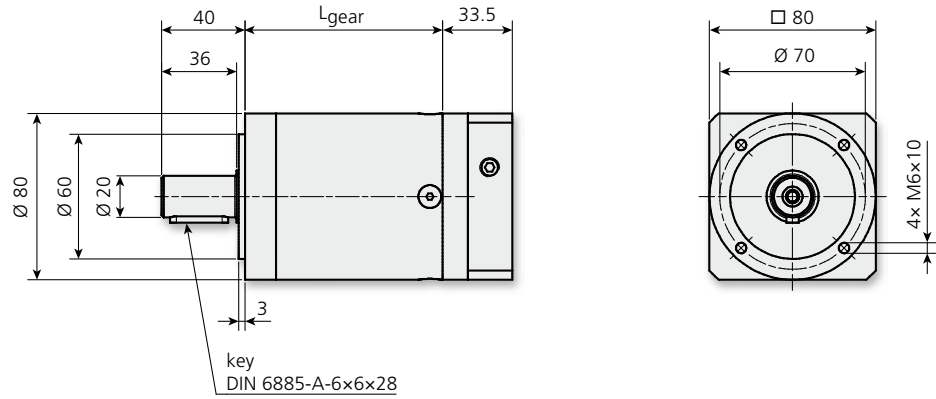
- _ low backlash (13-15-17 arcmin), (1-2-3)-stage
- _ high level of efficiency (94-92-88 %), (1-2-3)-stage
- _ high acceptable shaft forces 1.200/950 N, (axial-radial)



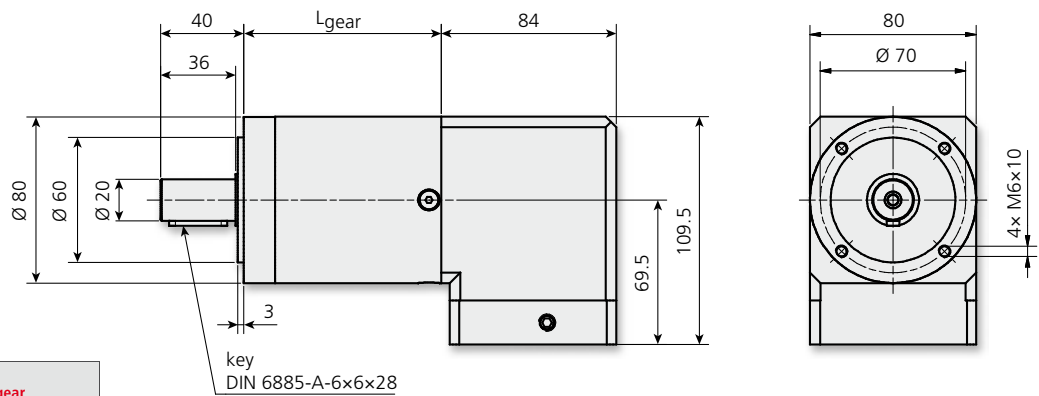
bis 130/208 Nm

- _ high short-term overload factor 60%
- _ selectable mounting position
- _ full service life lubrication

Drawings



Gear stages	L_{gear}
1	60.5 mm
2	77.5 mm
3	95 mm



Gear stages	L_{gear}
1	60.5 mm
2	77.5 mm
3	95 mm

Simple gears for MD xxx, 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 are negligible.

Features

- _ backlash (1-1-1,5)°, (1-2-3) -stage
- _ level of efficiency (90-81-73) %, (1-2-3) -stage
- _ acceptable shaft forces 300/350 N, (axial/radial)
- _ output shaft with double ball bearing
- _ selectable mounting position
- _ full service life 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 are not negligible.

Features

- _ backlash 1°
- _ level of efficiency (70...25) % at $1,500 \text{ min}^{-1}$
- _ acceptable shaft forces 300/350 N, (axial/radial)
- _ output shaft offset by 31 mm
- _ selectable orientation
- _ full service life 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 suitable for applications with highly confined installation spaces and low circumferential backlash requirements. Friction losses are not negligible.

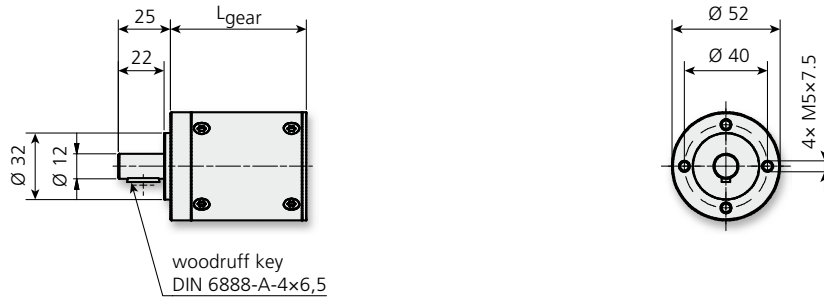
Features

- _ backlash 1°
- _ level of efficiency (70...25) % at $1,500 \text{ min}^{-1}$
- _ admissible shaft forces 300/350 N, (axial/radial)
- _ output shaft offset by 31 mm
- _ selectable orientation
- _ full service life lubrication

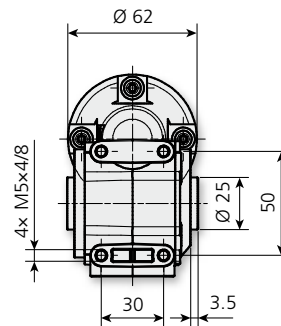
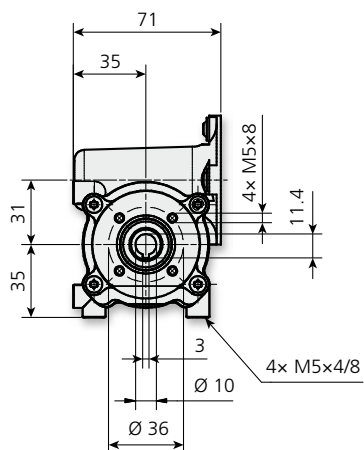
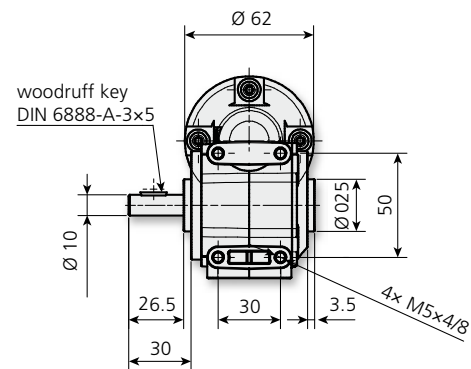
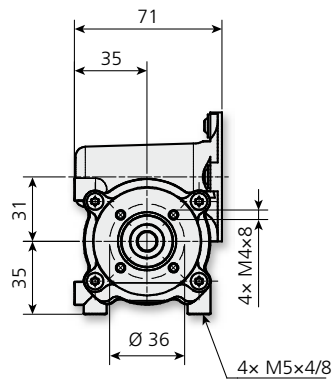


up to 10 Nm

Drawings



Gear stages	L _{Gear box}
1	50 mm
2	65.5 mm
3	80.5 mm



Reinforced simple gears for MD xxx, 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 are negligible.

Features

- _ circumferential backlash (1-1-1.5)°, (1-2-3) stages
- _ efficiency (90-81-73) %, (1-2-3) stages
- _ acceptable shaft forces 800/800 N, (axial/radial)

- _ output shaft with double ball bearing
- _ selectable installation position
- _ full service life 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 to applications with confined installation spaces and low circumferential backlash requirements. Friction losses are not negligible.

Features

- _ circumferential backlash 1°
- _ efficiency (70 ... 25) % at 1.500 min⁻¹
- _ acceptable shaft forces 300/500 N, (axial/radial)

- _ output shaft offset by 31 mm
- _ selectable orientation
- _ full service life 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 suitable for applications with highly confined installation spaces and low circumferential backlash requirements. Friction losses are not negligible.

Features

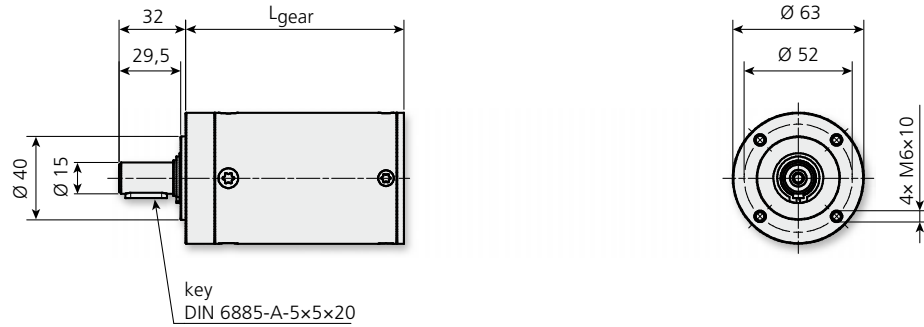
- _ circumferential backlash 1°
- _ efficiency (70 ... 25) % at 1,500 min⁻¹
- _ acceptable shaft forces 300/500 N, (axial/radial)

- _ output shaft offset by 31 mm
- _ selectable orientation
- _ lifetime lubrication

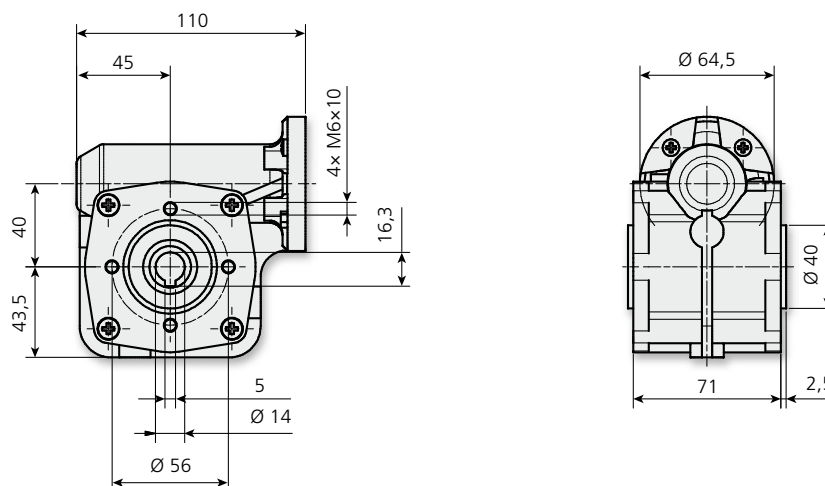
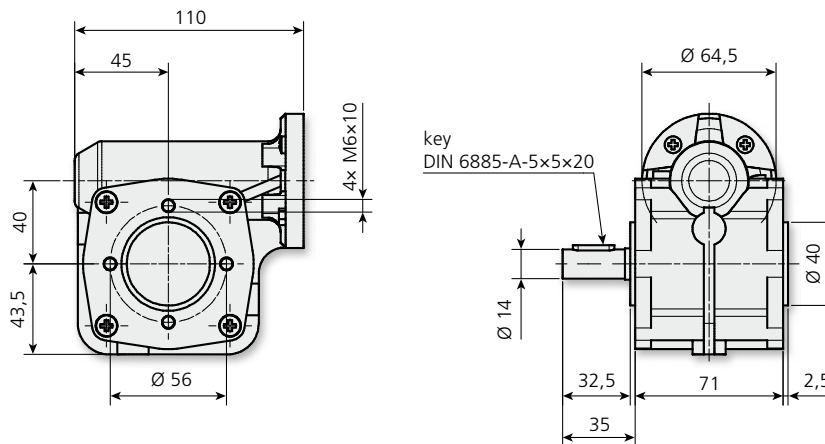


up to 30 Nm

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 are automatically adjusted based on a bus analysis. In 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 a logical I/O module in the PROFIBUS network.

Features

- _ positioning and speed control
- _ cyclic and acyclic communication according to PROFIBUS DP VO/V1
- _ freely 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 project planning 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 various 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 non-real-time parameters)	
Process data configuration	freely configured or standard protocols	
Max. participants	max. 96	>1000
Terminating resistance	MD: internal, MP/MA: external	not necessary

Function blocks for PROFIBUS and PROFINET

The available demo function blocks allow for the implementation of 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

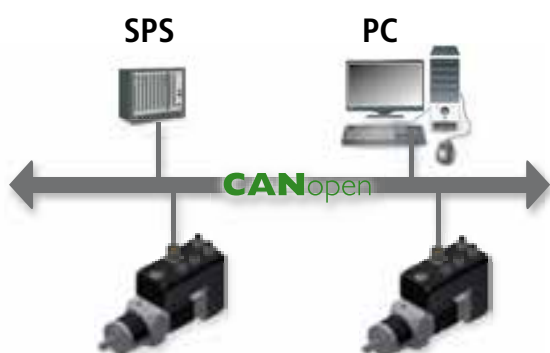
The drive version with CANopen is based on the device profile CiA DSP 402 – drives and motion control. The device profile permits a free configuration of process telegrams through PDO mapping of application objects. Available are 4 RxPDO and 4 TxPDO.

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); 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
- _ freely configurable process data telegram according to the communication profile CiA DS 301
- _ each transmission direction with up to 6 PDOs



Communication specifications

Technical data	CANopen
Communication profile	CiA DS 301-DP
Device profile	CiA DSP 402
Address range	0 ... 127
Address adjustment	hardware, DIP-switch
Bit rates	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)

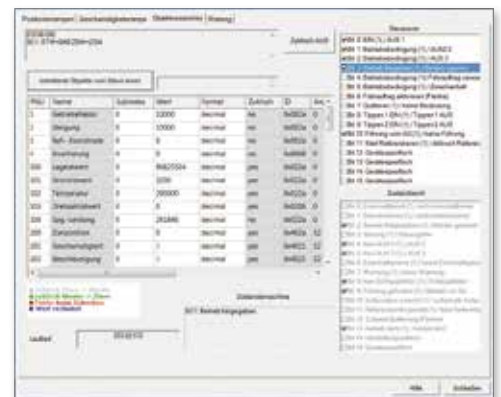
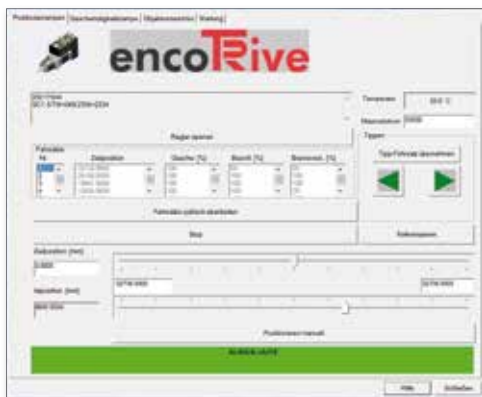
EDT is the parameterization and diagnosis tool for all drives of the encoTRive product family. It is accessed via predefined interfaces. In the case of PROFIBUS, these interfaces are the Hilscher Master Class 1/2, Siemens CP5xxx and other interface cards. In addition, a PC can be connected to the MD 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 allow for the simple execution of processing operations. At the same time, current 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

The PC-USB to CANopen converter enables connection to CANopen networks via a 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 with USB 2.0
- _ connection to CAN-Bus over D-Sub, 9-pole according to CiA® 102
- _ voltage supply through USB
- _ CAN specification 2.0A (11-Bit-ID) and 2.0B (29-Bit-ID)
- _ time-stamp resolution approx. 42 μ s

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 for the execution of simple drive functions without a bus connection, for example, on initial activation or during service work. It is designed as a portable component and features a 5 m long connecting cable.

When it is fitted without a 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 to the hand-held operator panel or 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

- _ step-by-step-movement
- _ indicator for software limit min., max. and reference
- _ setting a reference point
- _ fault acknowledgement



Demo kit and function block for S7 (PROFIBUS, PROFINET)

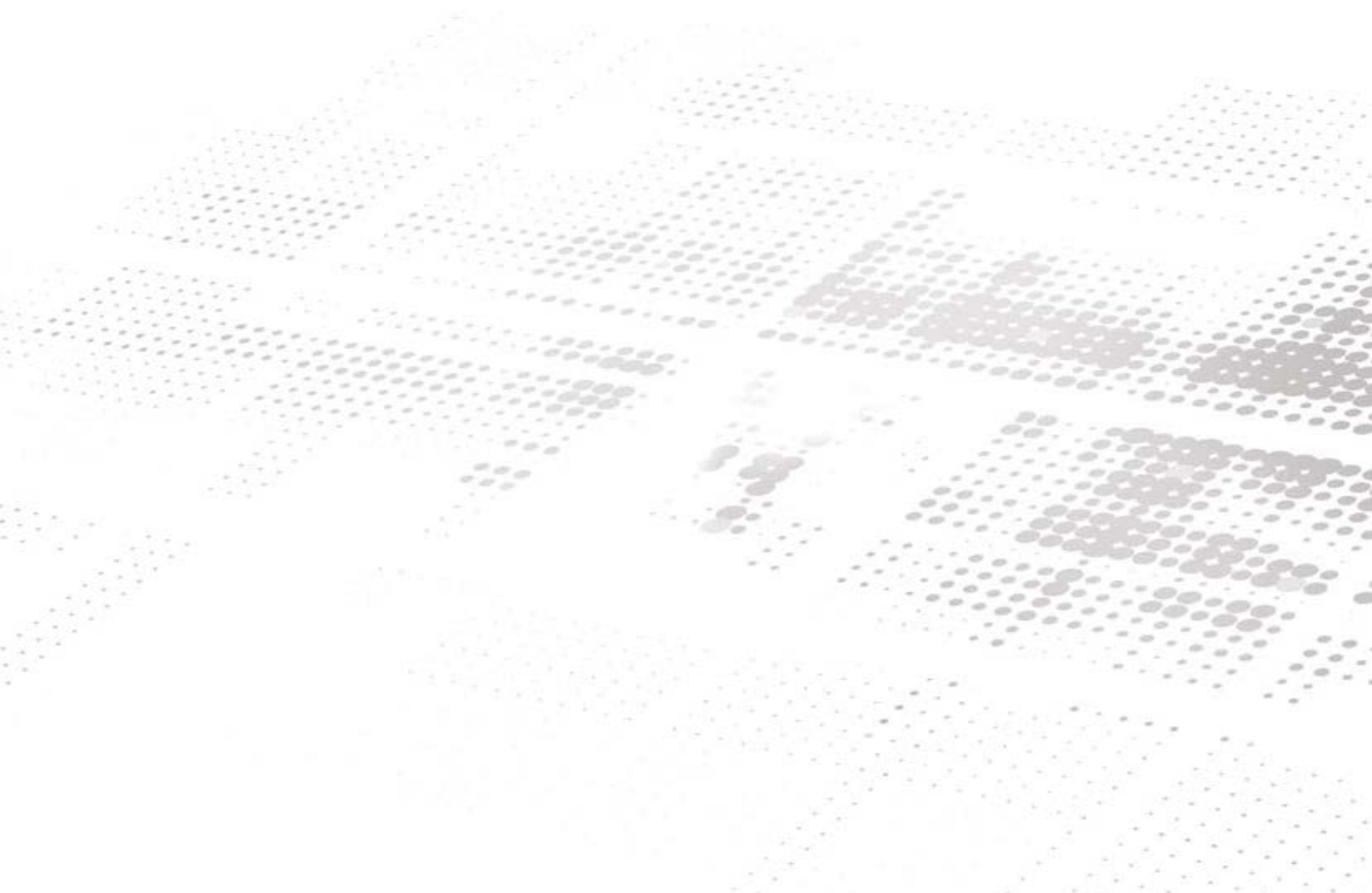
The demo kits contain all components required for fast implementation. For this purpose, the power supply unit and the drive are already pre-wired. Activation only requires that the bus lines be established by means of configurable plug connectors.

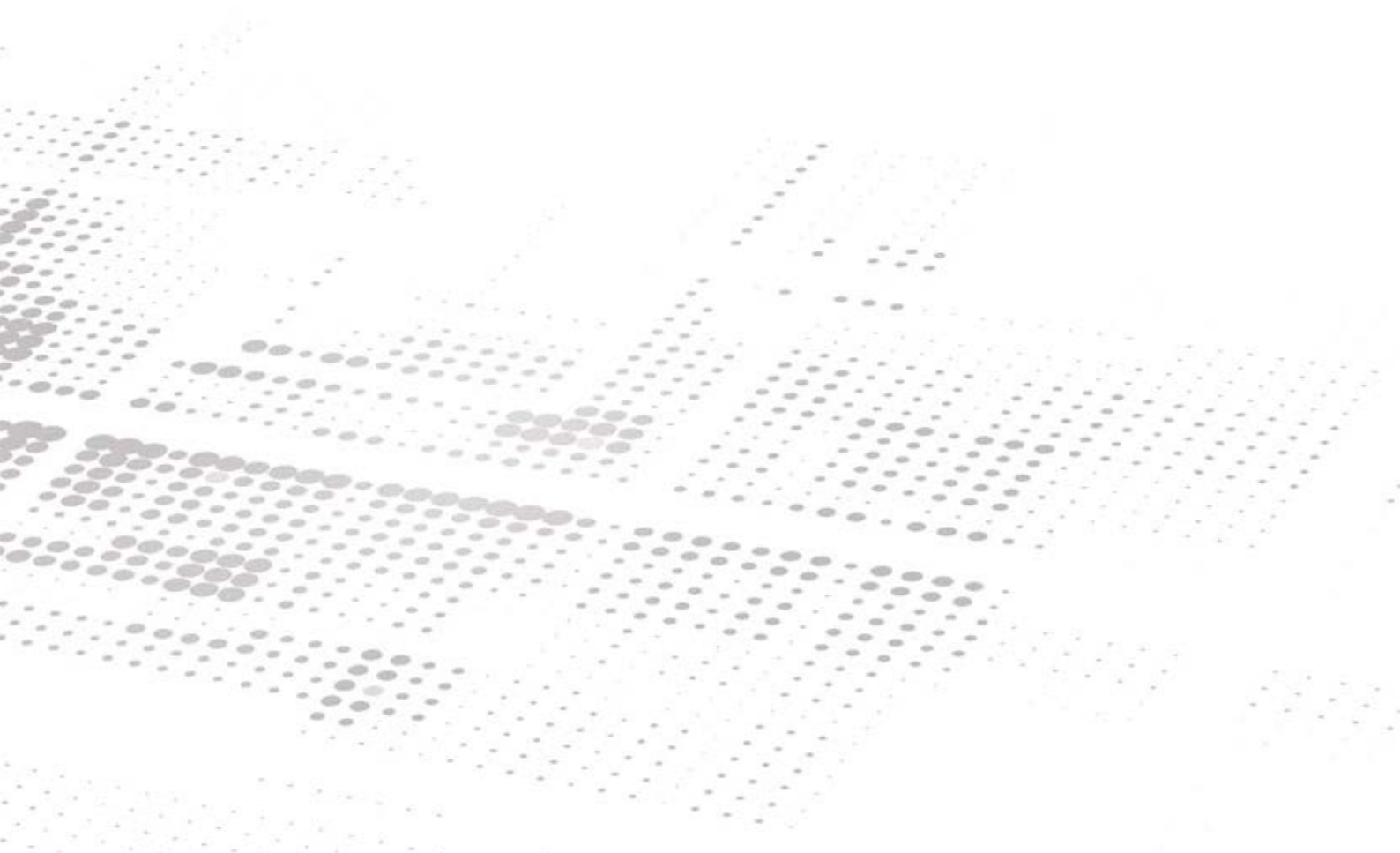


EncoTRive demo kit contents

- _ 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

Accessories

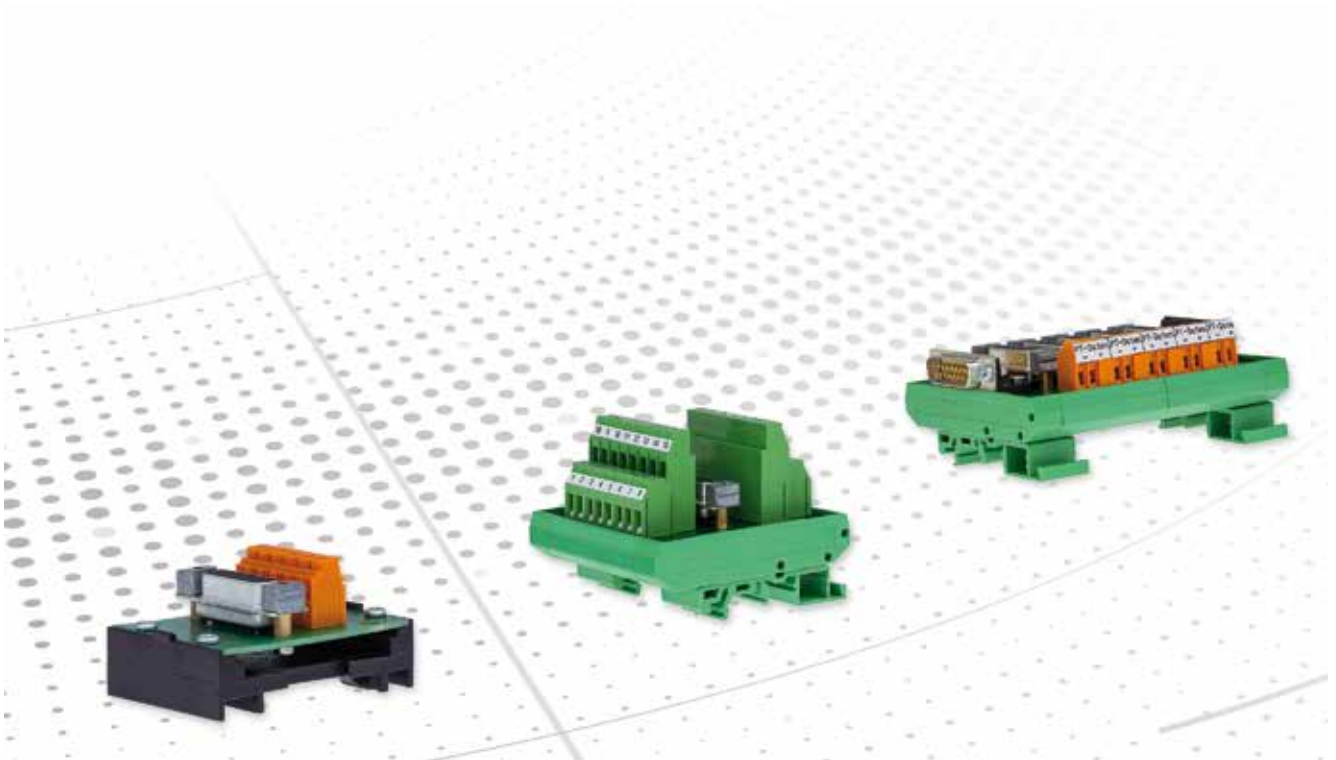




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Programming Tools



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 	
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
Supply		
Operating system		
Technology		
Transferred signals		
Interface		SSI ISI
Weblink	www.tr-electronic.com/service/downloads/file-download.html	www.tr-electronic.com/service/downloads/software.html
QR-Code		

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


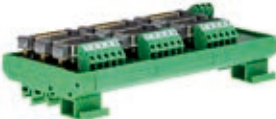


Adapter

Product	PC-Adapter V5 	PC-Adapter V4 	PC-Adapter 	
Group	Adapter	Adapter	Adapter	
Description	Connects PC with programming interface of sensors made by TR-Electronic. Galvanically isolated	Connects PC with programming interface of sensors made by TR-Electronic. Galvanically isolated	Connects PC with programming interface of sensors made by TR-Electronic. Galvanically isolated	
Supply				
Operating system	WIN 95 se ... WIN 8	WIN XP	WIN XP	
Technology	USB (HID)	USB (Virtual COM-Port)	RS 232	
Transferred signals				
Interface				
Weblink	www.tr-electronic.com/f/TR-V-TI-GB-0092	www.tr-electronic.com/f/TR-V-TI-GB-0091	www.tr-electronic.com/f/TR-V-TI-GB-0090	
QR-Code				

Switch cabinet module

<p>PT 6</p> 	<p>PT 6 N</p> 	<p>PT 100</p> 	<p>PT 15/2</p> 
<p>Switch cabinet module</p>	<p>Switch cabinet module</p>	<p>Switch cabinet module</p>	<p>Switch cabinet module</p>
<p>Connects programming adapter with programming lines and supply</p>	<p>Connects programming adapter with programming lines and supply - defined voltage levels on PT+/PT- when no programming tool is connected</p>	<p>Similar to PT 6 N, but for up to 5 sensor systems</p>	<p>Connects programming adapter with programming lines and supply. Other sensor lines are bypassed</p>
<p>PT +, PT-, UB, GND</p>	<p>PT +, PT-, UB, GND</p>	<p>5 x PT +, PT-, UB, GND</p>	<p>PT +, PT-, UB, GND and signal lines (clamping block)</p>
<p>www.tr-electronic.com/f/TR-V-TI-GB-0020</p>	<p>www.tr-electronic.com/f/TR-V-TI-GB-0030</p>	<p>www.tr-electronic.com/f/TR-V-TI-GB-0040</p>	<p>www.tr-electronic.com/f/TR-V-TI-GB-0060</p>
			

Switch cabinet module

Product	SSI/ISI simple 	SSI/ISI triple 
Group	Switch cabinet module	Switch cabinet module
Description	To daisy chain into sensor lines using SubD 15 connectors	Similar to SSI/ISI simple, but for up to 3 encoder lines
Supply		
Operating system		
Technology		
Transferred signals	PT +, PT-, UB, GND and signals for SSI/ISI (SubD 15)	3 x PT +, PT-, UB, GND and signals for SSI/ISI (SubD 15)
Interface		
Weblink	www.tr-electronic.com/f/TR-V-TI-GB-0070	www.tr-electronic.com/f/TR-V-TI-D-0050
QR-Code		

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Suggested Products

Order code	Description	Items delivered	For TR-Software
PC-Adapter			
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
Switch cabinet module			
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	
Software			
490-01001	Programming tools, EDS-/GSD-/XML-files for products made by TR-Electronic	DVD	

Further product information

1. Enter order code into ...



2. Searchfield (top right) on www.tr-electronic.com

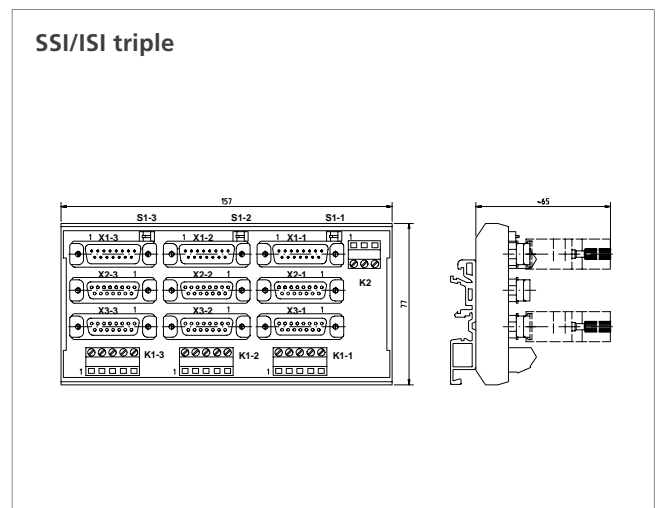
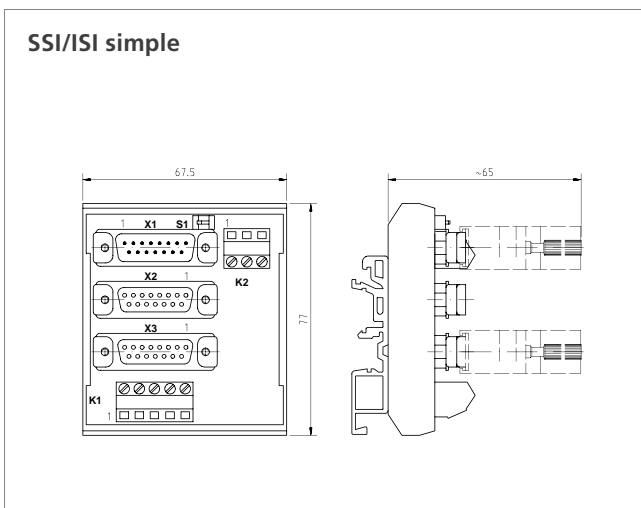
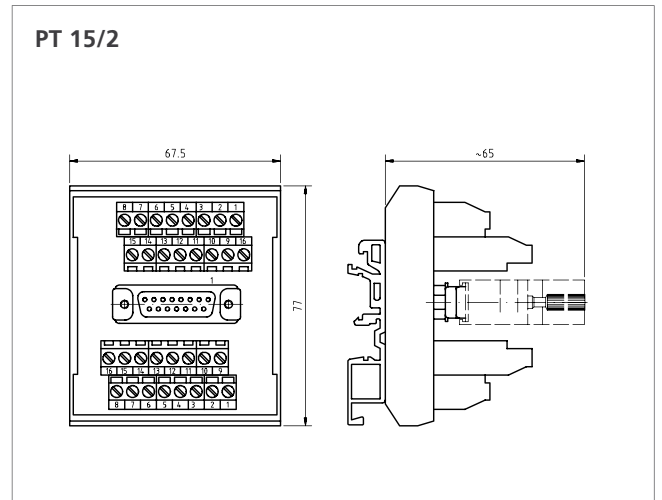
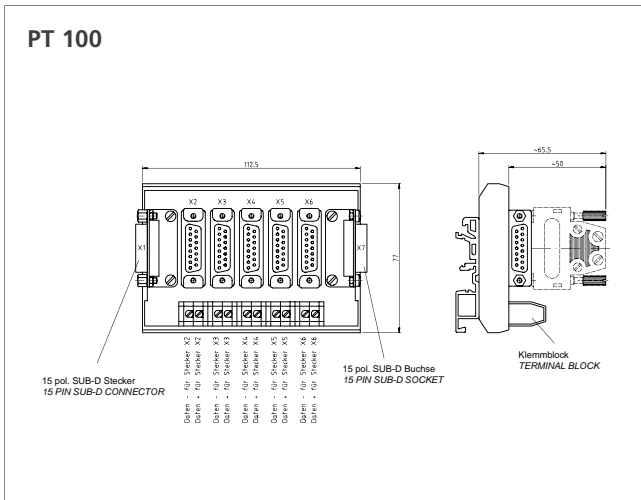
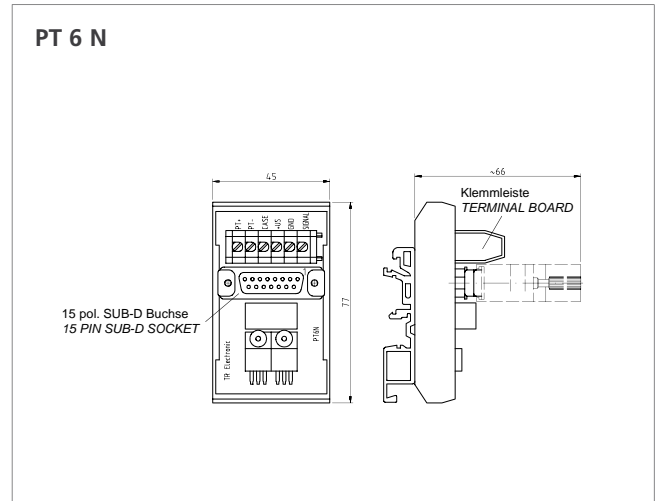
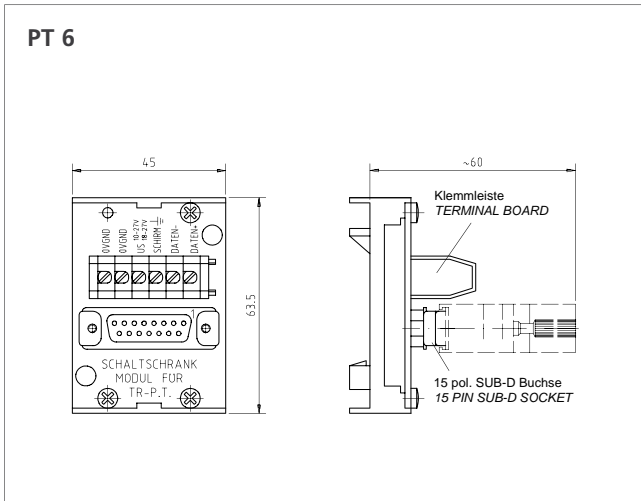


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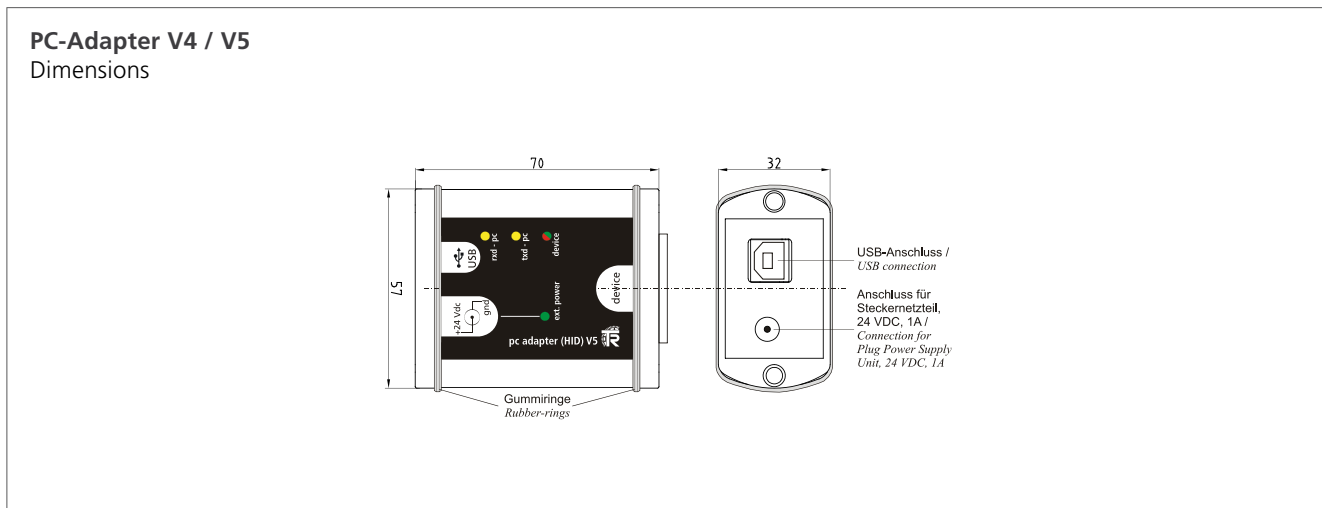
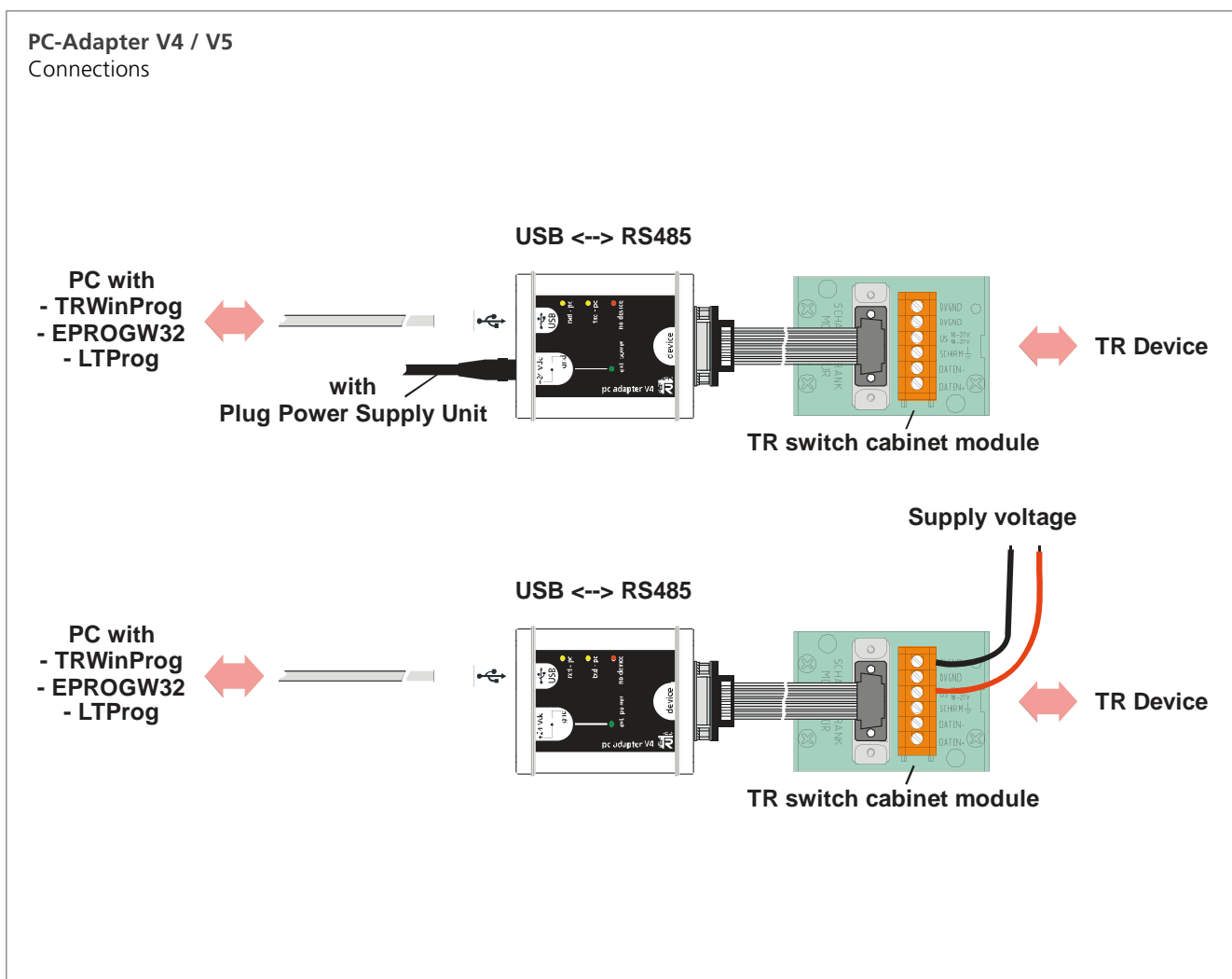
We will help you to select the most suitable products from the complete TR range. Please contact us (info@tr-electronic.de).

Dimensional Drawings



Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at www.tr-electronic.com or on request.

Dimensional Drawings



Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at www.tr-electronic.com or on request.

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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Converter

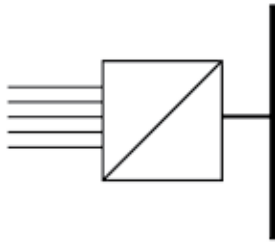
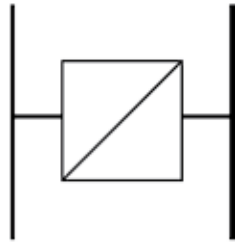






Product	PU 10 	PU 20 	PU 30 
Group	Converter	Converter	Converter
Description	SSI -> Parallel	Parallel -> SSI	2 x SSI -> Parallel
suitable software			
Technology	Master (produces SSI Clock) or listening mode (uses external SSI Clock)	Chechsum as option	2 x PU 10, Output channels galvanically isolated
Transferred signals	32 bit	28 bit	32 bit
Interface	SSI Parallel	SSI Parallel	SSI Parallel
Weblink	http://www.tr-electronic.de/f/TR-VAK-TI-GB-0060	http://www.tr-electronic.de/f/TR-VAK-TI-GB-0070	
QR-Code			

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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	<p style="text-align: center;">INC</p>	<p style="text-align: center;">INC</p>	<p style="text-align: center;">INC</p>	
Weblink	http://www.tr-electronic.de/f/TR-VAK-TI-GB-0080	http://www.tr-electronic.de/f/TR-VAK-TI-GB-0090	http://www.tr-electronic.de/f/TR-VAK-TI-GB-0091	
QR-Code				

Converter

<p>fieldbus interface</p> 	<p>fieldbus bridge</p> 	<p>TA-MINI-UNI</p> 	<p>FOD 10</p> 
<p>Converter</p>	<p>Converter</p>	<p>Display</p>	<p>Display</p>
<p>Transmits encoder signals from direct interfaces into fieldbusses</p>	<p>Transmits signals from one fieldbus into another</p>	<p>Programmable display for SSI or TR-specific programming interfaces</p>	<p>Display for fiber optic IIO</p>
		<p>TRWINprog</p>	
<p>Fieldbus slave with sensor input</p>	<p>Data input via one fieldbus slave and output via another fieldbus slave</p>		<p>Decimal point is transmitted via FO telegram, alternatively with soldering bridge.</p>
		<p>8 digit - depending on encoder/ display configuration</p>	<p>6 digit + decimal point</p>
		<p>SSI</p>	<p>LWL</p>
		<p>http://www.tr-electronic.de/f/TR-V-TI-GB-0301</p>	<p>http://www.tr-electronic.de/f/TR-V-TI-GB-0320</p>
			

Display

Product	ADP010 	ADP001 
Group	Display	Display
Description	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		
Technology	With addl. Analogue output	With addl. Analogue output
Transferred signals		
Interface	SSI Analog	SSI Analog
Weblink	http://www.tr-electronic.de/f/TR-V-TI-GB-0341	http://www.tr-electronic.de/f/TR-V-TI-GB-0340
QR-Code		

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

Suggested Products

Order code	Description	Signals
Converter for absolute signals		
491-00002	PU 10 - SSI -> Parallel	SSI / Parallel
492-00001	PU 20 - Parallel -> SSI	Parallel / SSI
491-00100	PU 30 - 2x SSI -> Parallel	SSI / Parallel
Converter for incremental signals		
490-00007	IT 10 - 1 x INC -> 2 x INC with divider	Incremental
490-00006	IV 20 - 1 x INC -> 6 x INC	Incremental
493-00100	IV 30 - 1 x INC -> 6 x INC, galvanically isolated, input level RS 422	Incremental
493-00101	IV 30 - 1 x INC -> 6 x INC, galvanically isolated, input level HTL	Incremental
Display		
485-80020	TA - MINI - UNI	SSI Master, SSI listen, PT+ / PT - (TRWinProg, LLBProg, LTProg...)
485-00230	ADP 010 - front panel installation	SSI Master, SSI listen / Analogue
485-00220	ADP 001 - DIN Rail	SSI Master, SSI listen / Analogue

Further product information

1. Enter order code into ...



2. Searchfield (top right) on www.tr-electronic.com

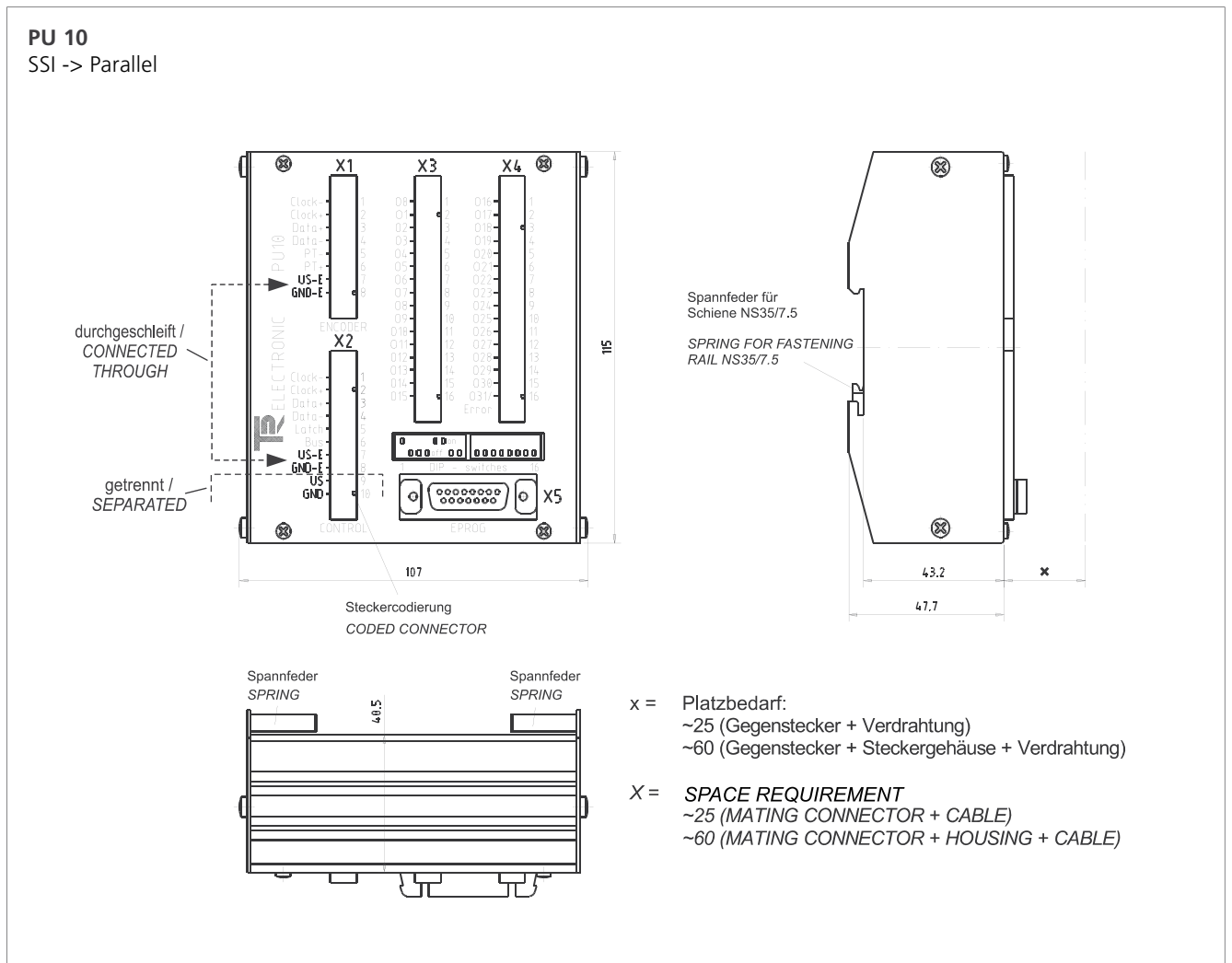


3. Choose desired information



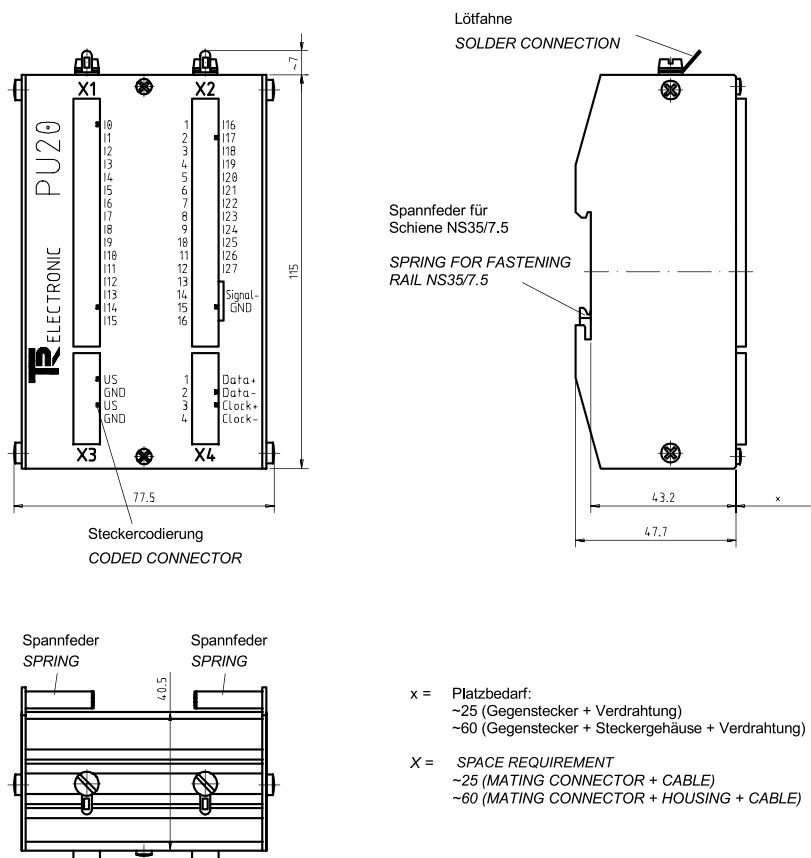
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Dimensional Drawings

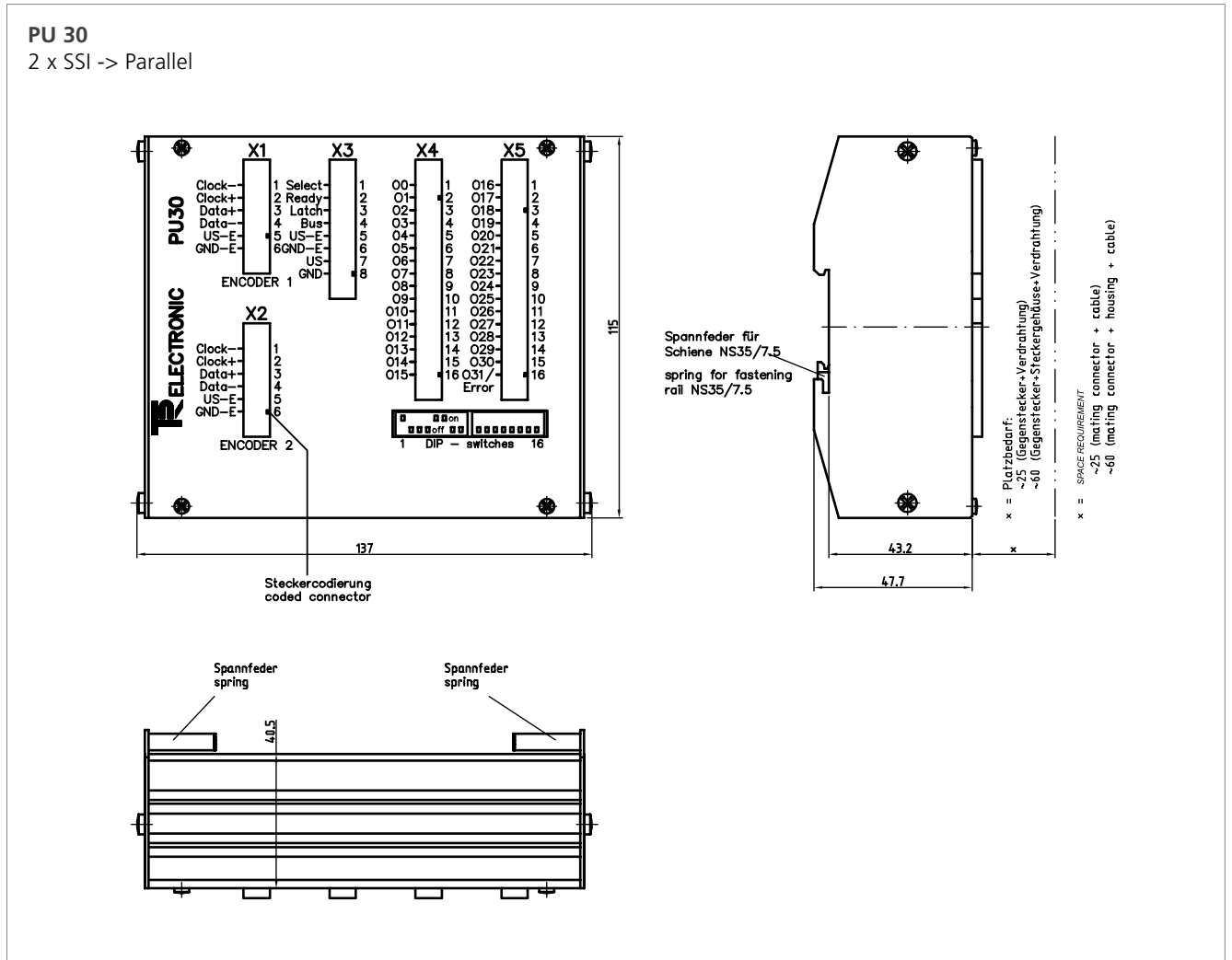


Dimensional Drawings

PU 20
Parallel -> SSI



Dimensional Drawings

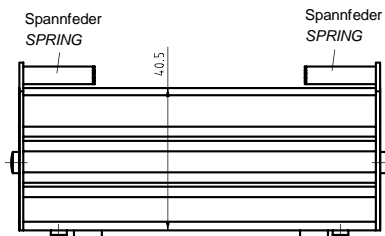
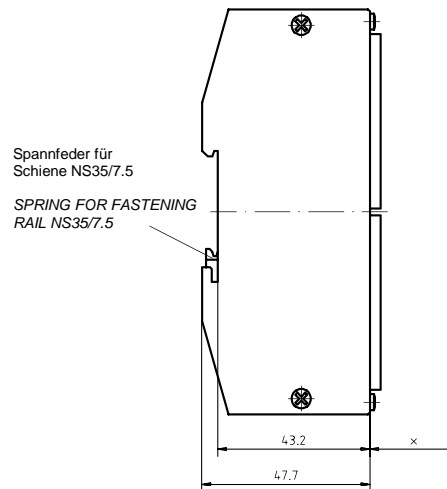
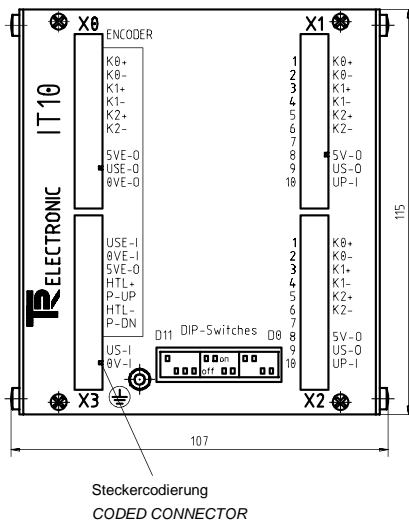


Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at www.tr-electronic.com or on request.

Dimensional Drawings

IT 10

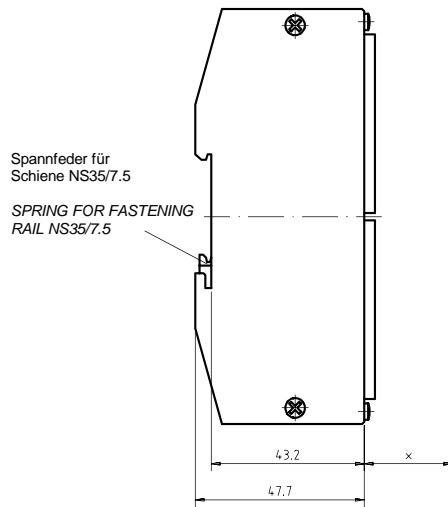
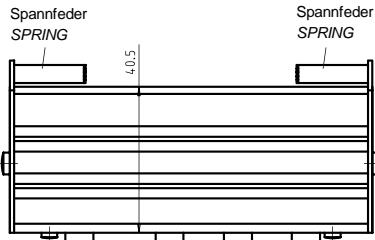
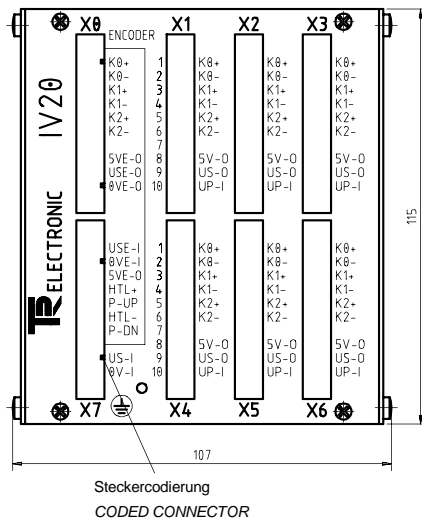
Incremental -> 2 x Incremental divided up to 1:4096



- x = Platzbedarf:
 -25 (Gegenstecker + Verdrahtung)
 -60 (Gegenstecker + Steckergehäuse + Verdrahtung)
- X = SPACE REQUIREMENT
 -25 (MATING CONNECTOR + CABLE)
 -60 (MATING CONNECTOR + HOUSING + CABLE)

Dimensional Drawings

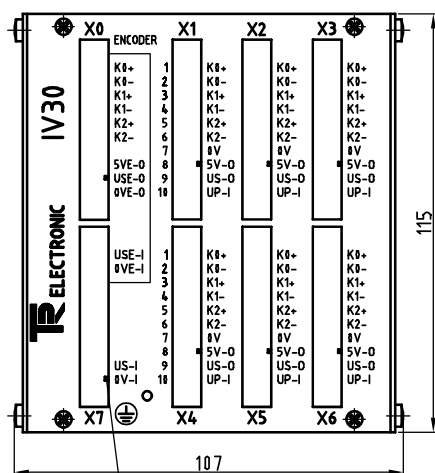
IV 20
Incremental -> 6 x Incremental



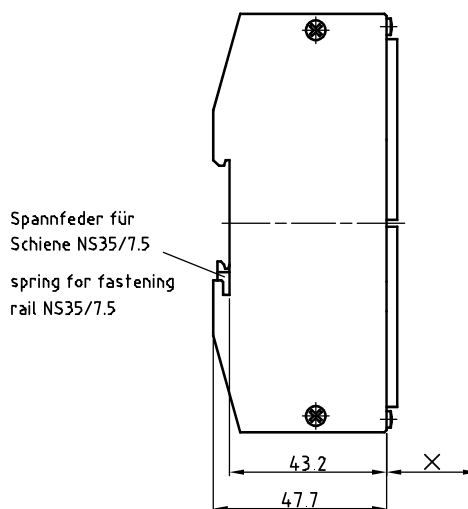
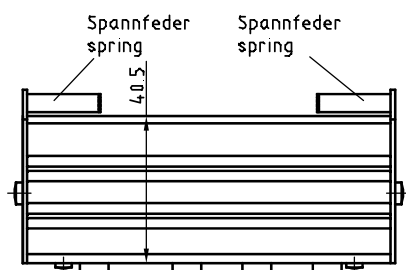
- x = Platzbedarf:
~25 (Gegenstecker + Verdrahtung)
~60 (Gegenstecker + Steckergehäuse + Verdrahtung)
- X = SPACE REQUIREMENT
~25 (MATING CONNECTOR + CABLE)
~60 (MATING CONNECTOR + HOUSING + CABLE)

Dimensional Drawings

IV 30
Incremental -> 6 x Incremental



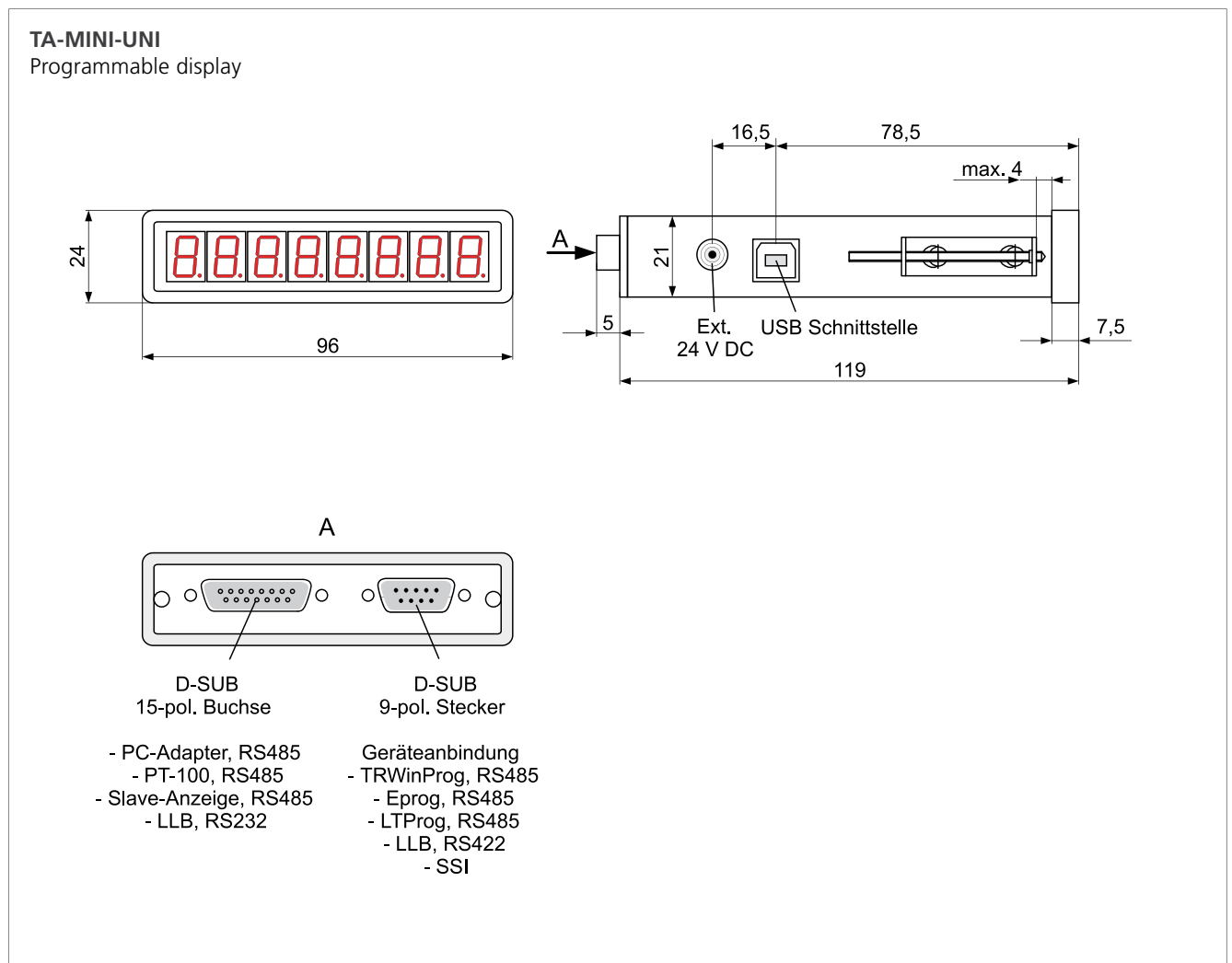
Steckercodierung
coded connector



x = Platzbedarf:
~25 (Gegenstecker+Verdrahtung)
~60 (Gegenstecker+Steckergehäuse+Verdrahtung)

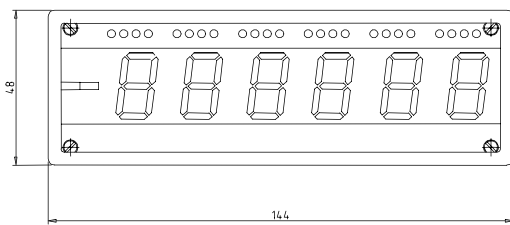
x = SPACE REQUIREMENT
~25 (mating connector + cable)
~60 (mating connector + housing + cable)

Dimensional Drawings

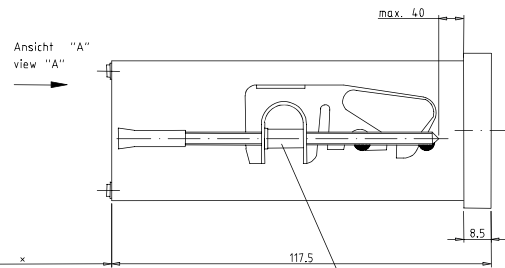


Dimensional Drawings

FOD 10 Display for FiberOptic I/O



-60 (mating connector+housing+cable)
 -25 (mating connector + cable)
 x = needed height:
 -60 (Gegenseiter-Steckerabschluss-Verdrahtung)
 -25 (Gegenseiter-Verdrahtung)
 x = Platzbedarf:



Befestigungsspannen zur Montage abnehmbar
 clamps for assembly removable

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

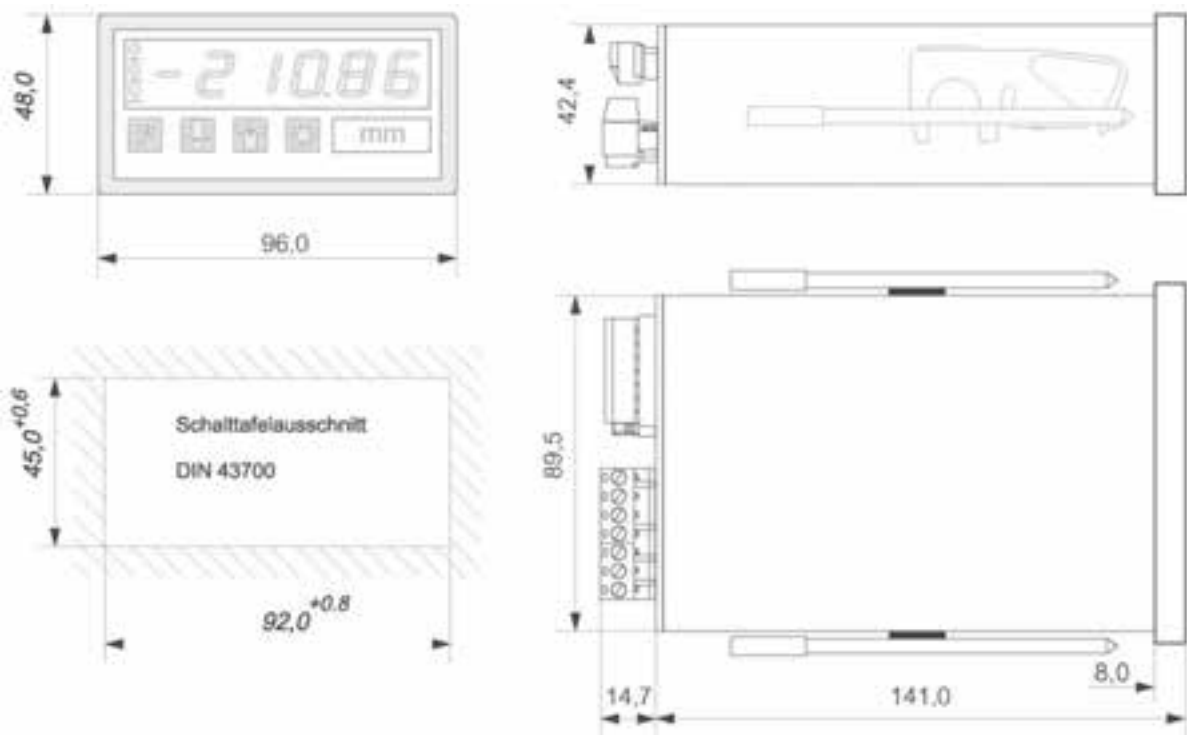
Ansicht "A"
 view "A"



Dimensional Drawings

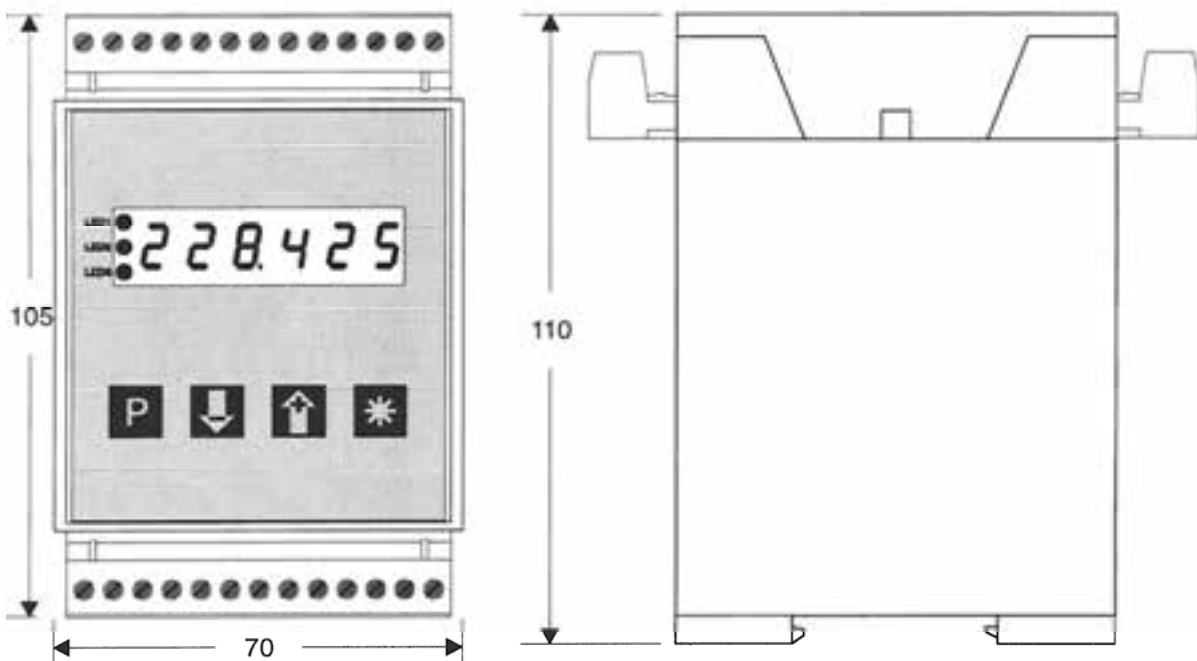
ADP010

Programmable Display for SSI for front panel installation

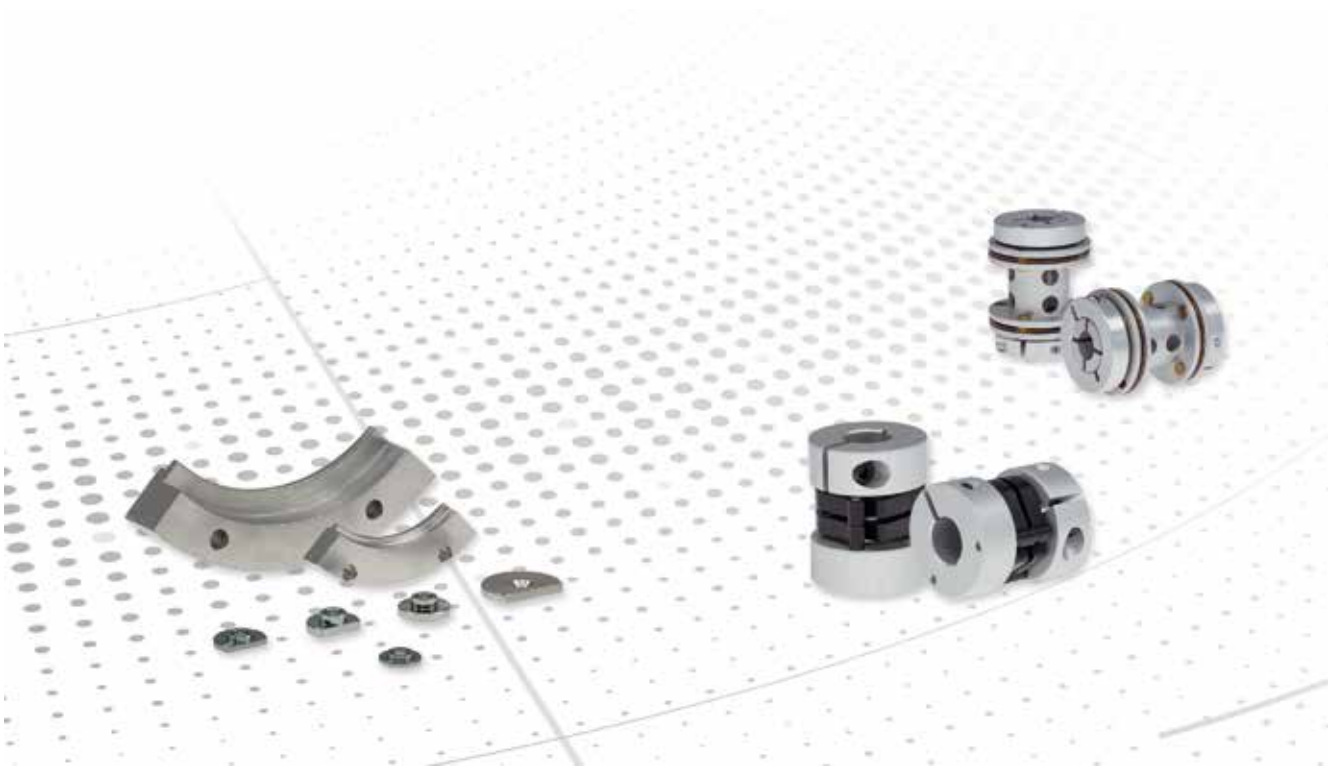


Dimensional Drawings

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

Products.....	411
Suggested Products.....	416
Dimensional Drawings.....	420







Couplings

Product	Coupling CPS 	Coupling SED 	Coupling EKN 
Group	Couplings	Couplings	Couplings
Description	The most widely used coupling for rotary encoders. Ideal in the case of parallel misalignment between drive and encoder shaft.	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.
Shaft diameters	4...28 mm in steps	6, 8, 10, 12 mm	6, 8, 10, 12 mm
Ordering	Accessory	Accessory	Accessory
Weblink	www.tr-electronic.de/f/TR-V-TI-GB-0410	www.tr-electronic.de/f/TR-V-TI-GB-0410	www.tr-electronic.de/f/TR-V-TI-GB-0420
QR-Code			








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

Couplings






Bearing modules

Product	Coupling GEL 	Bearing-Module 58 	Bearing-Module 65 	
Group	Couplings	Bearing modules	Bearing modules	
Description	The GEL coupling bridges large distances between drive and encoder shaft.	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.	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.	
Shaft diameters	10, 12, 14 mm	10, 12 mm	See shaft range type 65	
Ordering	Accessory	As option with an encoder -> pre-assembled or for retrofitting	As option with an encoder -> pre-assembled or for retrofitting	
Weblink	www.tr-electronic.de/f/TR-V-TI-GB-0430	www.tr-electronic.de/f/TR-V-TI-GB-0439	www.tr-electronic.de/f/TR-V-TI-GB-0440	
QR-Code				



Bearing modules

<p>Bearing-Module 100</p> 	<p>Absorber flange 58</p> 	<p>Absorber flange 65</p> 	<p>Absorber module 65</p>
<p>Bearing modules</p>	<p>Bearing modules</p>	<p>Bearing modules</p>	<p>Bearing modules</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>	<p>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.</p>	<p>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.</p>	<p>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.</p>
<p>See shaft range type 65</p>	<p>6 mm</p>	<p>6 mm</p>	<p>6, 8, 10, 12 mm</p>
<p>As option with an encoder -> pre-assembled or for retrofitting</p>	<p>As option with an encoder -> pre-assembled</p>	<p>As option with an encoder -> pre-assembled</p>	<p>As option with an encoder -> pre-assembled</p>
<p>www.tr-electronic.de/f/TR-V-TI-D-0441</p>	<p>www.tr-electronic.com/f/TR-V-TI-GB-0463</p>	<p>www.tr-electronic.com/f/TR-V-TI-GB-0462</p>	<p>www.tr-electronic.de/f/TR-V-TI-GB-0460</p>
			

Bearing modules Installation

Product	Absorber module 100	Mounting Brackets	Clamps	
				
Group	Bearing modules	Installation	Installation	
Description	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.	
Shaft diameters	6, 8, 10, 12 mm			
Ordering	As option with an encoder -> pre-assembled	Accessory	Accessory	
Weblink	www.tr-electronic.de/f/TR-V-TI-GB-0461	www.tr-electronic.de/f/TR-V-TI-GB-0400	www.tr-electronic.de/f/TR-V-TI-GB-0400	
QR-Code				

Installation

	<p>Deflection pulleys for wire actuated encoders</p> 
	<p>Installation</p>
	<p>Deflection pulleys guide the measurement wire safely and precisely even with changing pull-off angles. Fits our wire-actuated encoders type WDS</p>
	<p>As option with an encoder -> pre-assembled or for retrofitting</p>
	<p>www.tr-electronic.de/f/TR-ECE-TI-DGB-0254</p>
	

Suggested Products

Order code	Type	Parameter	Dimensions
Coupling CPS			
34000090	CPS 8/1	For shaft diameter from/to	6mm / 5mm
34000053	CPS 8/1	For shaft diameter from/to	6mm / 6mm
34000054	CPS 8/1	For shaft diameter from/to	6mm / 10mm
34000104	CPS 8/1	For shaft diameter from/to	10mm / 8mm
34000087	CPS 9/1	For shaft diameter from/to	5mm / 10mm
34000100	CPS 9/1	For shaft diameter from/to	6mm / 6mm
34000038	CPS 9/1	For shaft diameter from/to	6mm / 10mm
34000035	CPS 9/1	For shaft diameter from/to	8mm / 10mm
34000025	CPS 9/1	For shaft diameter from/to	10mm / 10mm
34000075	CPS 10/1	For shaft diameter from/to	10mm / 10mm
34000055	CPS 10/2	For shaft diameter from/to	6mm / 6mm
34000072	CPS 10/2	For shaft diameter from/to	6mm / 10mm
34000048	CPS 10/2	For shaft diameter from/to	8mm / 10mm
34000044	CPS 10/2	For shaft diameter from/to	10mm / 10mm
34000026	CPS 10/2	For shaft diameter from/to	10mm / 12mm
34000027	CPS 10/2	For shaft diameter from/to	12mm / 12mm
34000034	CPS 10/2	For shaft diameter from/to	12mm / 12mm (keyway)
34000068	CPS 14/2	For shaft diameter from/to	10mm / 10mm
34000031	CPS 15/1	For shaft diameter from/to	6mm / 10mm
34000050	CPS 15/1	For shaft diameter from/to	10mm / 10mm
34000061	CPS 15/1	For shaft diameter from/to	10mm / 12mm
34000021	CPS 15/1	For shaft diameter from/to	10mm / 20mm
34000062	CPS 15/1	For shaft diameter from/to	12mm / 12mm
34000029	CPS 15/1	For shaft diameter from/to	12mm / 20mm
34000059	CPS 15/2	For shaft diameter from/to	4mm / 6mm
34000091	CPS 15/2	For shaft diameter from/to	6mm / 6mm
34000060	CPS 15/2	For shaft diameter from/to	6mm / 8mm
34000058	CPS 15/2	For shaft diameter from/to	6mm / 10mm
34000084	CPS 15/2	For shaft diameter from/to	8mm / 10mm
34000022	CPS 15/2	For shaft diameter from/to	10mm / 10mm
34000081	CPS 15/2	For shaft diameter from/to	10mm / 11mm
34000064	CPS 15/2	For shaft diameter from/to	10mm / 12mm
34000063	CPS 15/2	For shaft diameter from/to	10mm / 12mm (keyway)
34000057	CPS 15/2	For shaft diameter from/to	10mm / 14mm
34000069	CPS 15/2	For shaft diameter from/to	10mm / 15mm (keyway)
34000078	CPS 15/2	For shaft diameter from/to	10mm / 16mm

For further product information simply enter the order number in the search field at www.tr-electronic.de.

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

Order code	Type	Parameter	Dimensions
Coupling CPS			
34000039	CPS 15/2	For shaft diameter from/to	10mm / 20mm
34000088	CPS 15/2	For shaft diameter from/to	10mm / 20mm (keyway)
34000045	CPS 15/2	For shaft diameter from/to	12mm / 6mm
34000047	CPS 15/2	For shaft diameter from/to	12mm / 12mm
34000086	CPS 15/2	For shaft diameter from/to	12mm / 12mm (keyway)
34000096	CPS 15/2	For shaft diameter from/to	12mm / 14mm
34000070	CPS 15/2	For shaft diameter from/to	14mm / 14mm (keyway)
34000102	CPS 15/2	For shaft diameter from/to	15mm / 6mm
34000043	CPS 22/2	For shaft diameter from/to	10mm / 20mm
34000099	CPS 23/1	For shaft diameter from/to	12mm / 28mm
34000076	CPS 23/2	For shaft diameter from/to	10mm / 15mm
34000079	CPS 23/2	For shaft diameter from/to	10mm / 25mm (keyway)
34000032	CPS 23/2	For shaft diameter from/to	20mm / 20mm
34000080	CPS 30/1	For shaft diameter from/to	12mm / 14mm

Coupling SED			
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

For further product information simply enter the order number in the search field at www.tr-electronic.de.

Suggested Products

Order code	Type	Parameter	Dimensions
Coupling EKN			
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
Coupling GEL			
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
Bearing-Module 58			
85900077	Bearing-Modul 58	Shaft diameter	10mm
85900078	Bearing-Modul 58	Shaft diameter	10mm
Bearing-Module 65			
85900035	Bearing-Modul 65		Shaft adapter / flange ring not included.
Bearing-Module 100			
85900033	Bearing-Modul 100		Shaft adapter / flange ring not included.
Mounting brackets			
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

For further product information simply enter the order number in the search field at www.tr-electronic.de.

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

Order code	Type	Parameter	Dimensions
------------	------	-----------	------------

Clamps			
49115002	Clamp type A (round with shoulder)		11mm / 7mm / 4,2mm
49115004	Clamp type A (round with shoulder)		14mm / 7mm / 4,2mm
49115003	Clamp type B (with flat, without shoulder)		22mm / 6,6mm / 3,4mm
49115001	Clamp type B (with flat, with shoulder)		14mm / 7mm / 4,2mm / 5mm
49115005	Clamp type B (with flat, with shoulder)		14mm / 7mm / 4,2mm / 3,2mm

Deflection pulleys for wire-actuated encoders			
49995364	Pulley, simple	Suits ME-WDS	
49995365	Pulley, double	Suits ME-WDS	
49995362	Pulley, double 90°	Suits ME-WDS	

Further product information

1. Enter order code into ...



2. Searchfield (top right) on www.tr-electronic.com

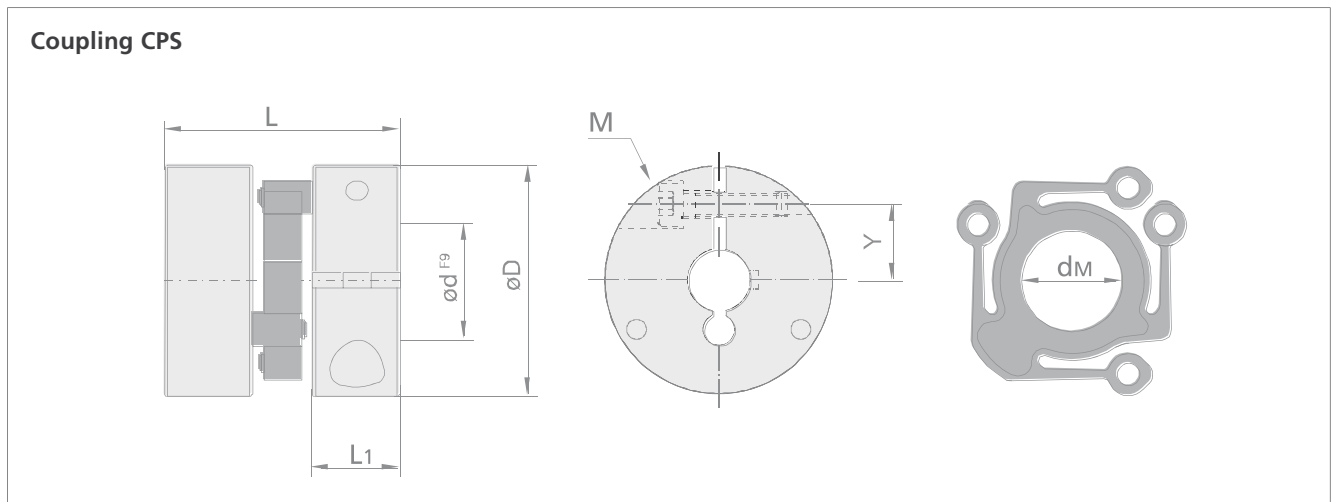


3. Choose desired information



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

Dimensional Drawings



Coupling CPS
Dimensions

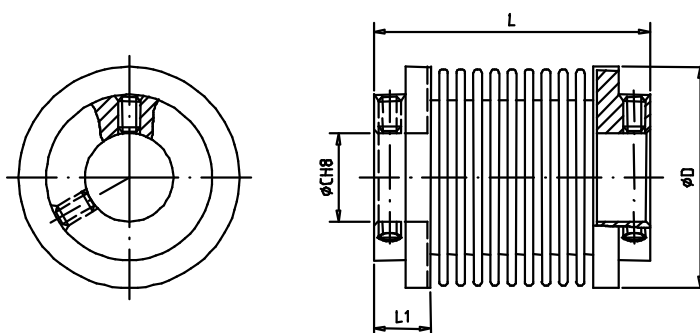
C P S	Leistungsdaten						Abmessungen in mm										Gewicht m (g)	Massen- trächtigkeit J (g cm ²)
	Drehmoment M (Nm)		max. Leistung (kw)	max. Versatz			Geometrie					Klemmschraube						
	max.	Dauer		Richtwert	radial Vr (mm)	axial Va (mm)	Winkel Vw (°)	Außen Ø D ¹⁾	Nenn- länge L	Bohrungs- Ø d max.	Scheiben- breite L _s	Element bohrung Ø d _w ¹⁾	Größe	Länge	Abstands- maß Y	Anzugs- moment 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	
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								1	57	240
30	22	15	0.75	2	0.5	1	75	50.5	40	18	28.5	M 8	30	25	24	500	3800	
30/1	22	15	0.75		1	1.5		57								500	3800	
30/2	44	30	1.5		1	1		73								500	3800	

¹⁾ bei durchgehender Welle $d \leq d_w - 2 \times$ Radialversatz beachten.

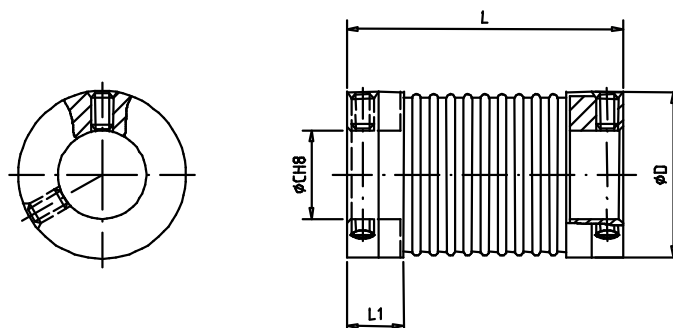
Dimensional Drawings

Coupling SED

Typ SED 10090 A



Typ SED 1450 A

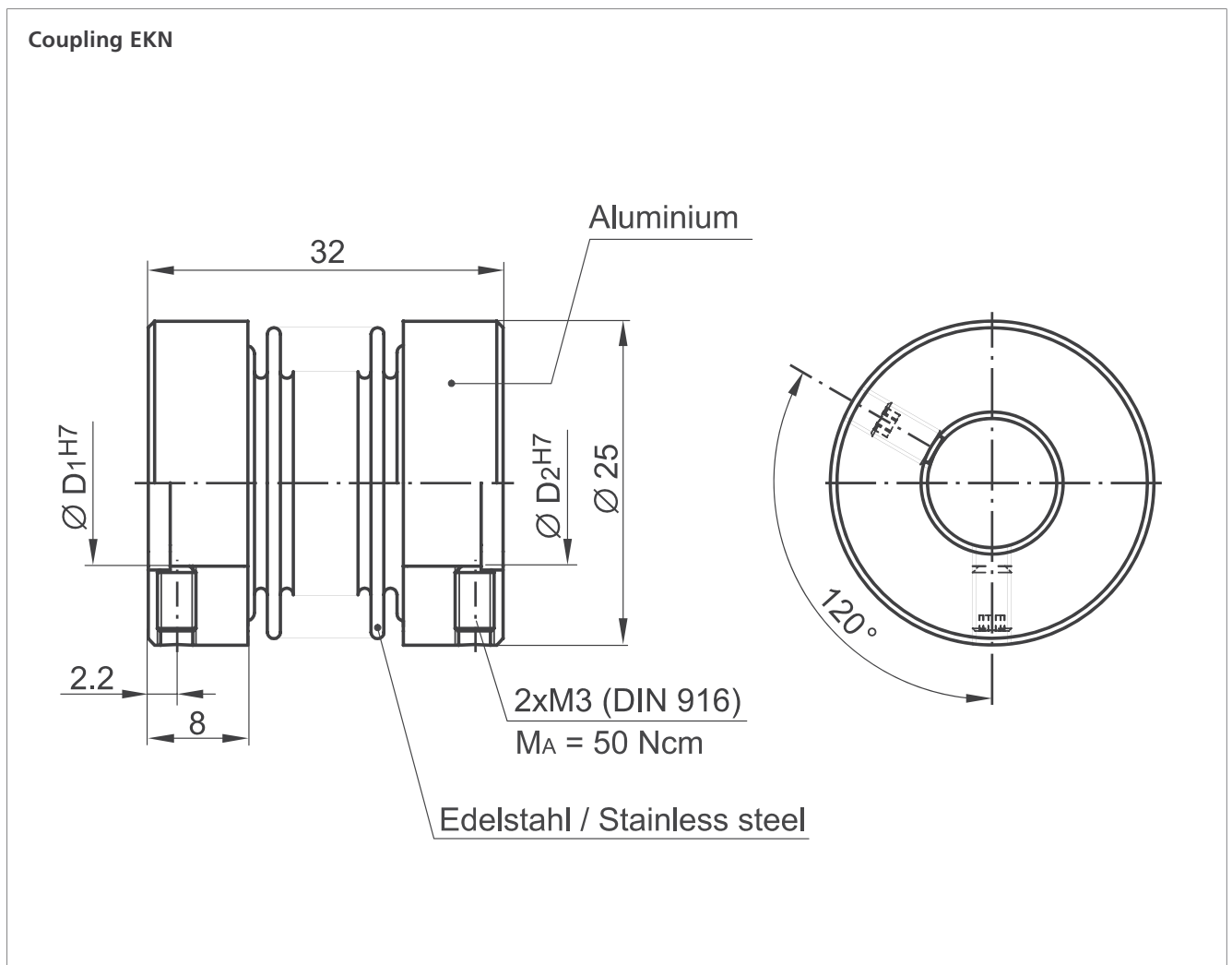


Coupling SED Dimensions

Typ	Bohrungs Ø	Artikel-NR.
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

Typ	Bohrungs Ø	Artikel-NR.
SED 1450 A	6/10	34-000-065
SED 1450 A	10/10	34-000-018

Dimensional Drawings



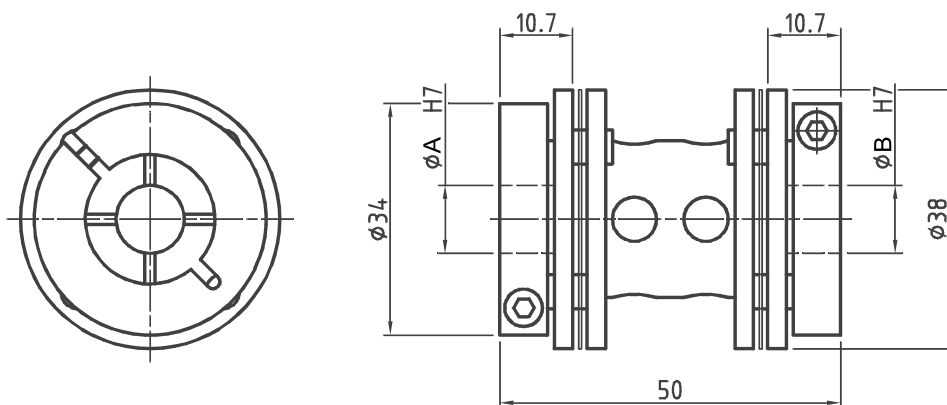
Coupling EKN
Dimensions

Typ	$\text{Ø } D_1 H7$	$\text{Ø } D_2 H7$	#
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

Dimensional Drawings

Coupling GEL

Typ
GEL-500-S



Coupling GEL
Dimensions

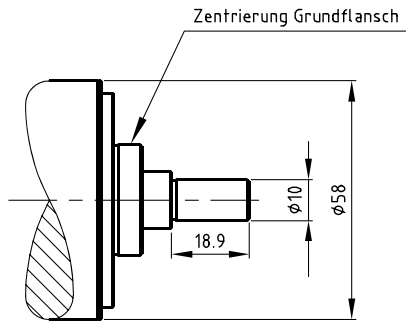
Typ	ØA H7	ØB H7	Artikel – NR
GEL-500-S	10	14	34-000-181
	10	10	34-000-182
	10	12	34-000-183
	12	12	34-000-184
	12	14	34-000-185
	14	14	34-000-186

Dimensional Drawings

Bearing-Module 58

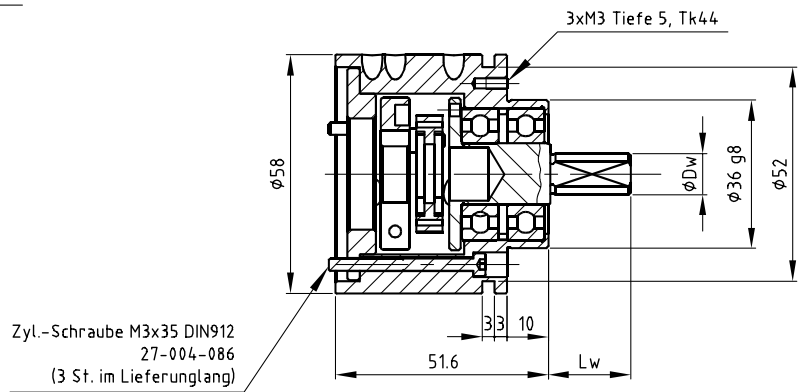
Encoderanbau

(nicht im Lieferumfang)



CE-58 ohne Flansching

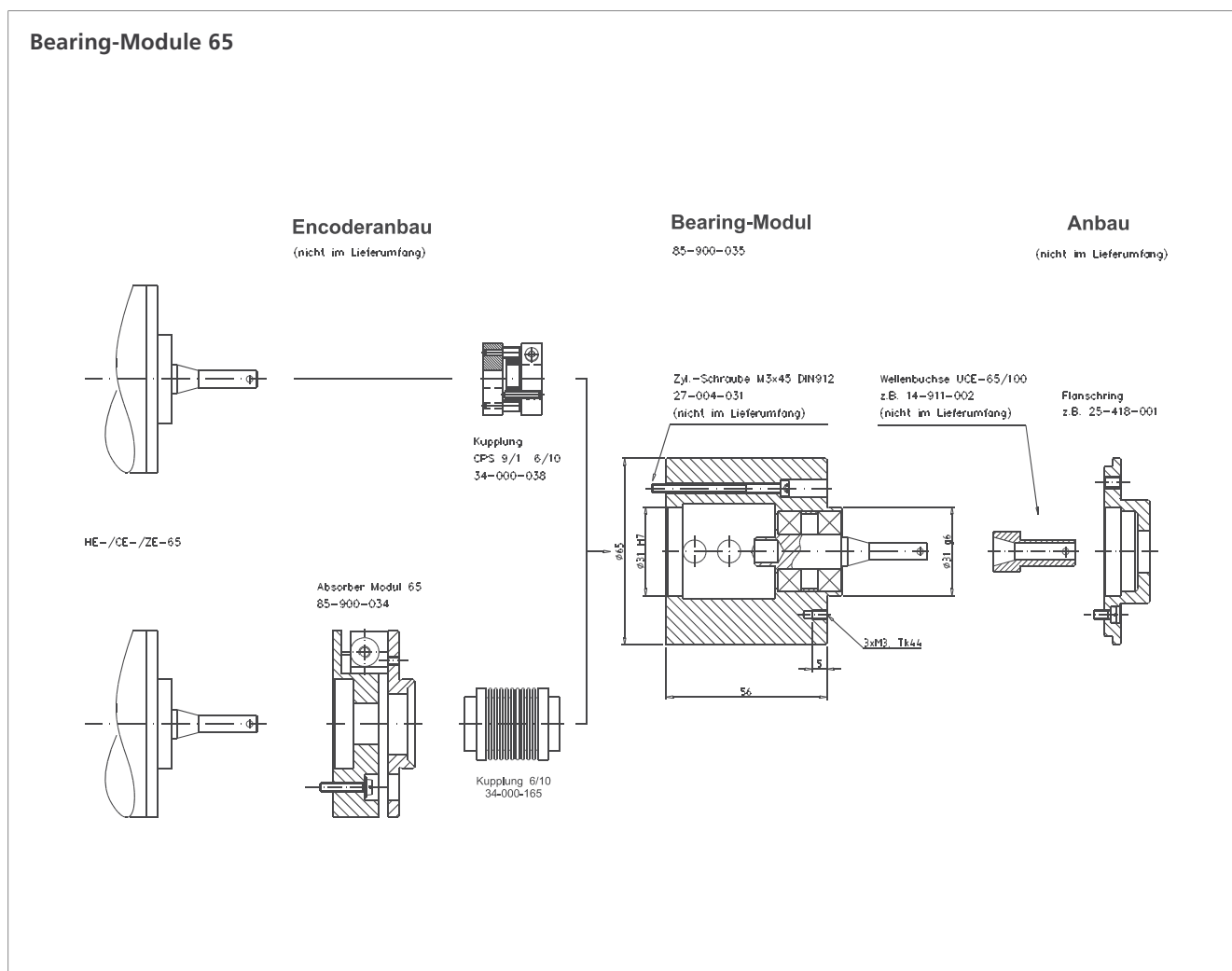
Bearing-Modul



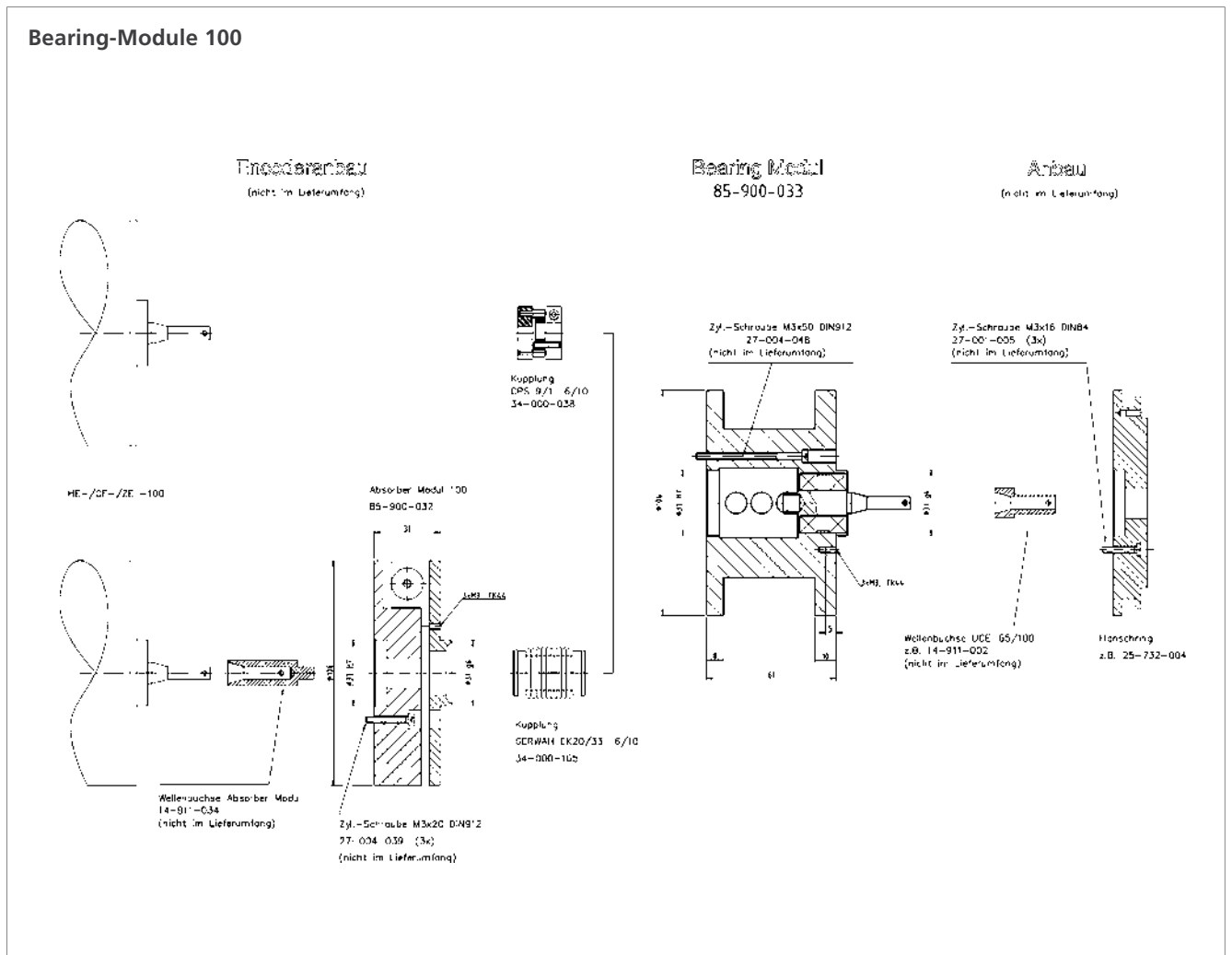
Zyl.-Schraube M3x35 DIN912
27-004-086
(3 St. im Lieferumgang)

Art-Nr.	Dw	Lw	Bemerkung
85-900-077	10	Lw=20	mit Abflachung 1mm
85-900-078	12	Lw=25	ohne Abflachung

Dimensional Drawings



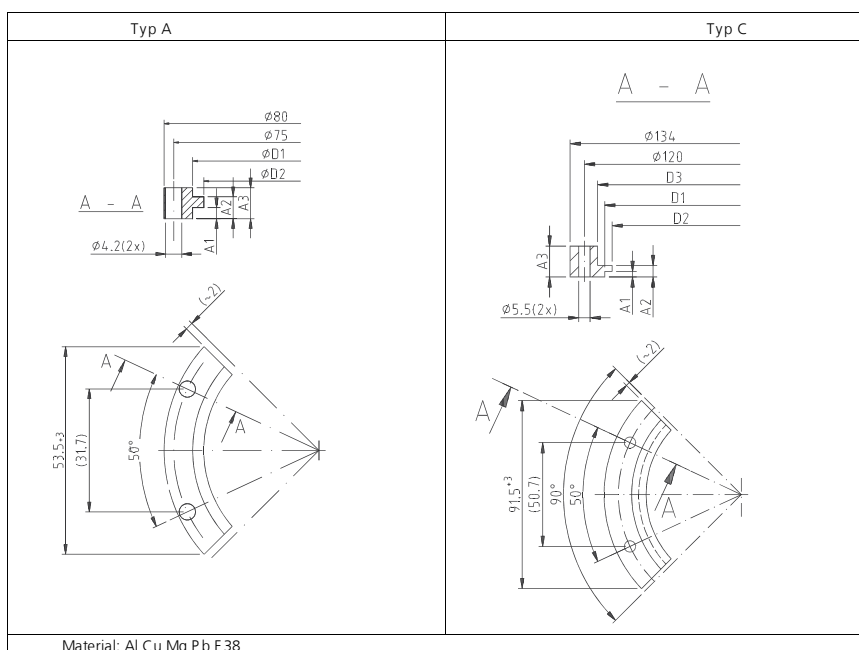
Dimensional Drawings



Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at www.tr-electronic.com or on request.

Dimensional Drawings

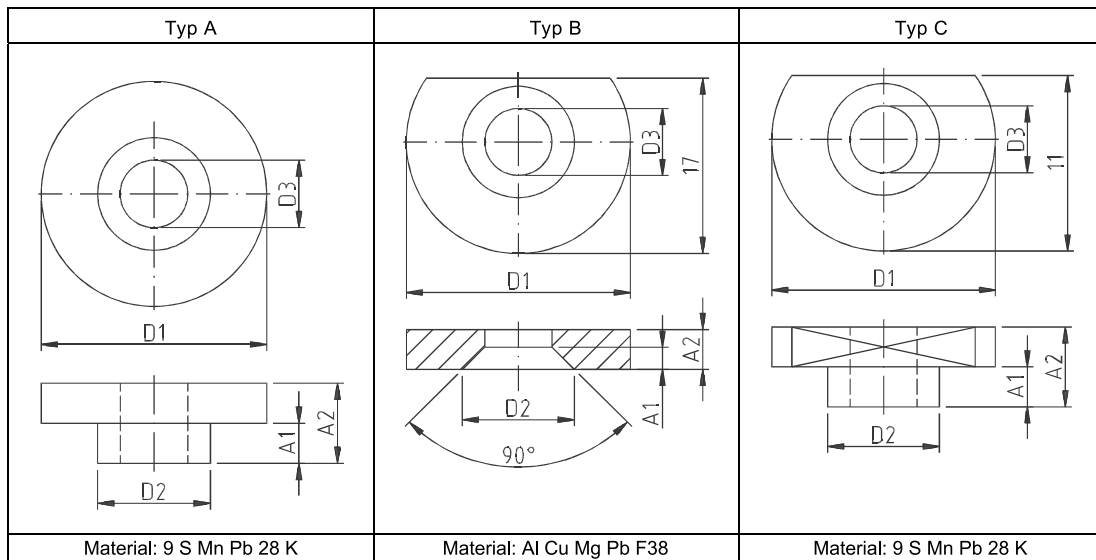
Mounting brackets



Typ	$\phi D1$	$\phi D2$	$\phi D3$	A1	A2	A3	#
A	$65,2 \pm 0,1$	$61,5 \pm 0,1$	----	$1,9 -0,1$	$3,7 -0,1$	6	49 110 002
A	$65,2 \pm 0,1$	$59,5 \pm 0,1$	----	$2,9 -0,1$	$5,7 -0,1$	8	49 110 005
A	$58,2 \pm 0,1$	$54,5 \pm 0,1$	----	$1,9 -0,1$	$3,8 -0,1$	6,7	49 110 008
C	$100,2 \pm 0,1$	$93,2 \pm 0,1$	$107,1 \pm 0,1$	$2,7 -0,1$	$5,6 -0,1$	15	49 110 003

Dimensional Drawings

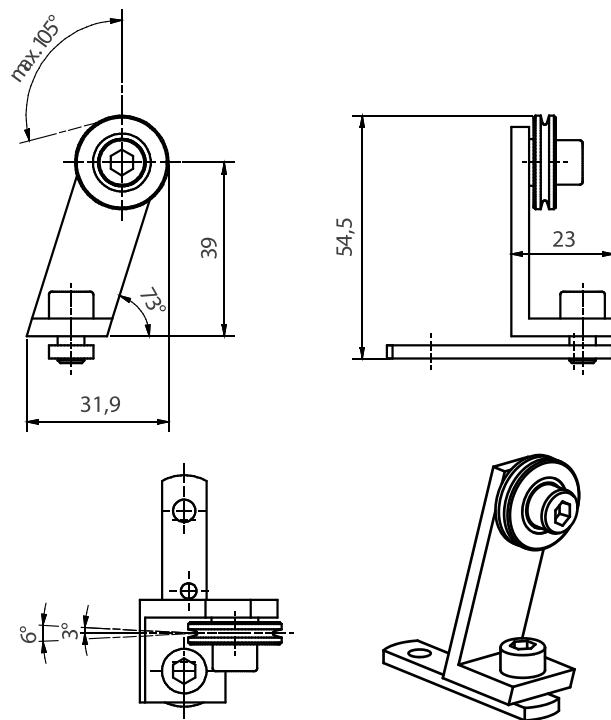
Clamps



Typ	Ø D1	Ø D2	Ø D3	A1	A2	Artikel-NR.
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

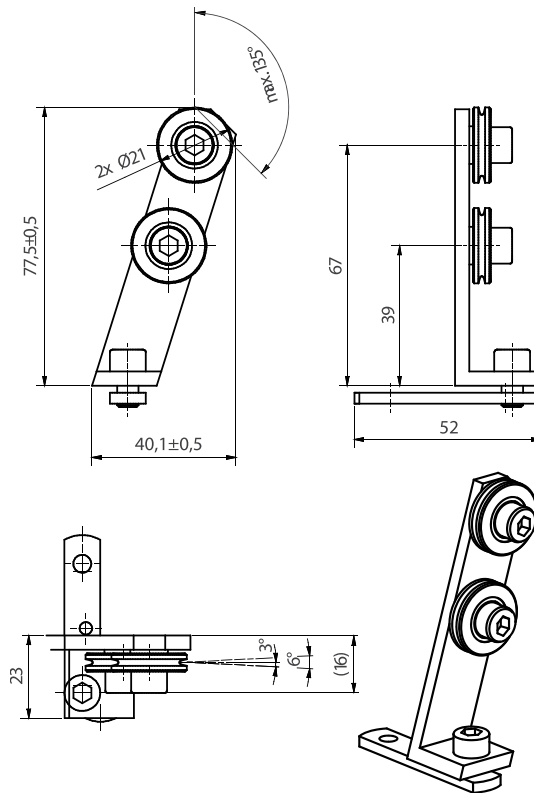
Dimensional Drawings

Pulley, simple
49995364



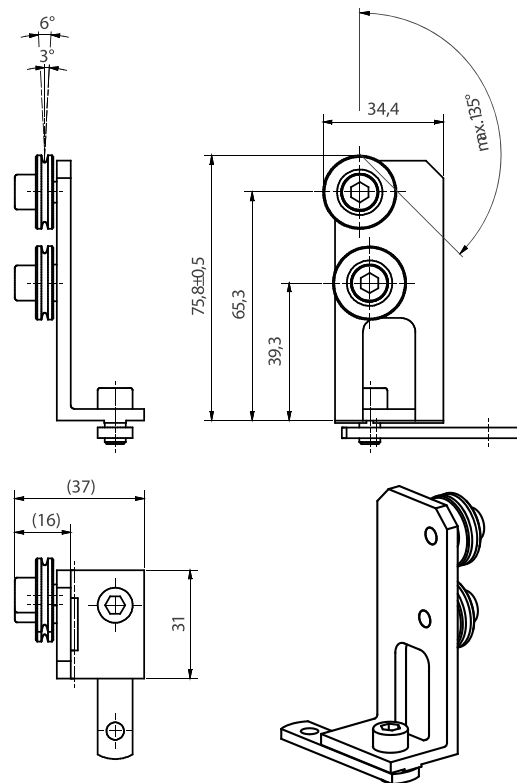
Dimensional Drawings

Pulley, double
49995365

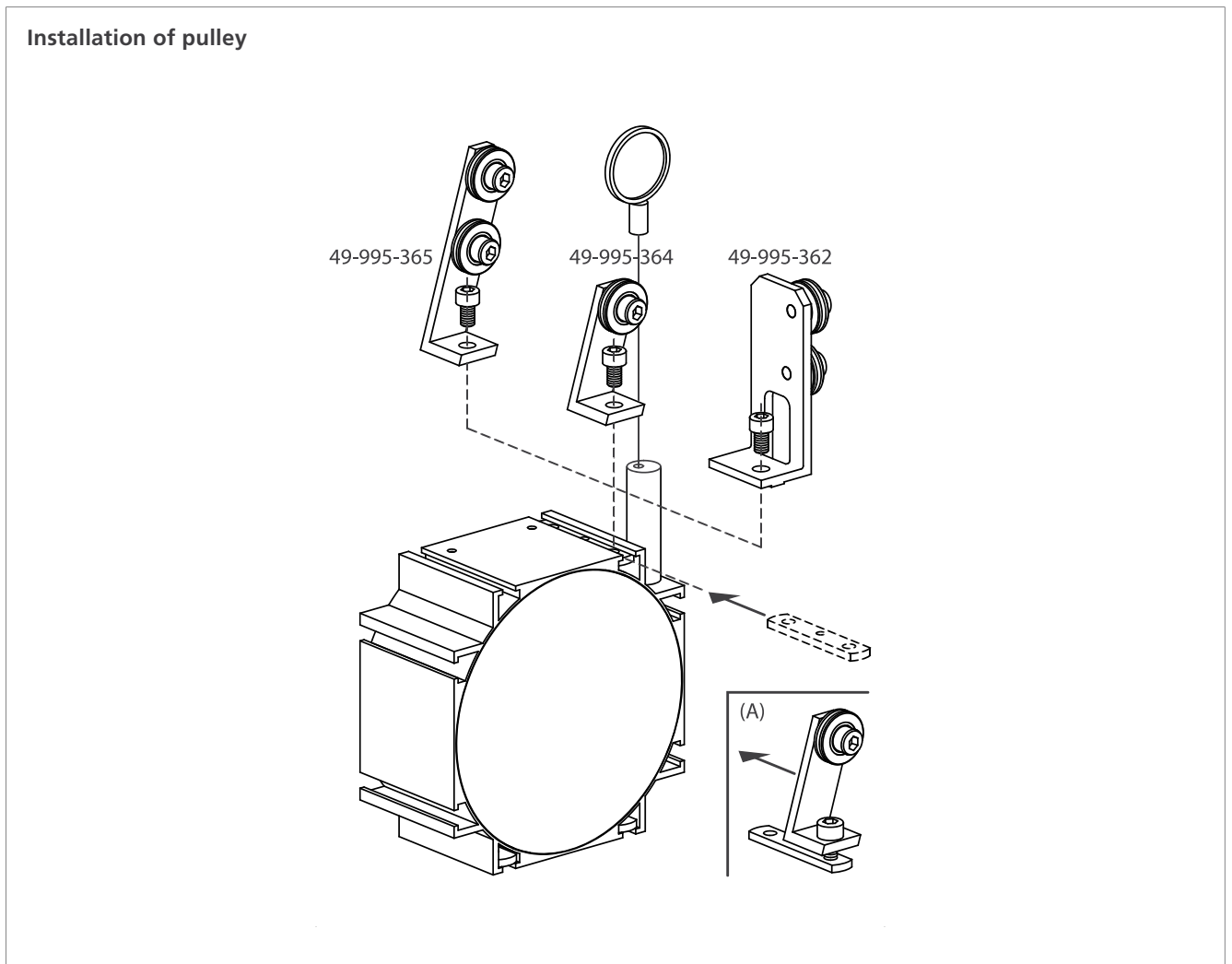


Dimensional Drawings

Pulley, double 90°
49995362



Dimensional Drawings





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 moves 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.

Contents

Products.....	435
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Magnets

Product	Magnet ring LA/LMR 	Open magnet ring LA/LMR 	Magnet with cut 
Group	Magnets for linear encoder	Magnets for linear encoder	Magnets for linear encoder
Description	Closed magnet rings for linear encoders for integration into hydraulic cylinders	Open magnet ring for LA/LMR	For LA, LMR, LP, LMP (except LMP30)
Dimensions	See drawings chapter	See drawings chapter	See drawings chapter
Ordering	Accessory or delivery option included with encoder	Accessory or delivery option included with encoder	Accessory or delivery option included with encoder
Weblink	www.tr-electronic.de/f/TR-V-TI-GB-0500	www.tr-electronic.de/f/TR-V-TI-GB-0500	www.tr-electronic.de/f/TR-V-TI-GB-0500
QR-Code			

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

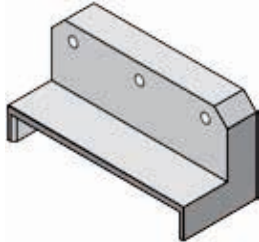
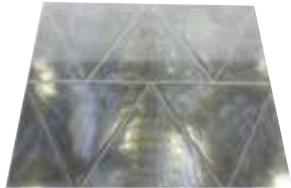


Magnets

Product	Magnet slider 	Block magnets 	Float 	
Group	Magnets for linear encoder	Magnets for linear encoder	Magnets for linear encoder	
Description	For LA46, LMP46	For LMP30, LMC 55, fits as well LA46, LMP48	For LA, LMR	
Dimensions	See drawings chapter	See drawings chapter	See drawings chapter	
Ordering	Accessory or delivery option included with encoder	Accessory or delivery option included with encoder	Accessory or delivery option included with encoder	
Weblink	www.tr-electronic.de/f/TR-V-TI-GB-0500	www.tr-electronic.de/f/TR-V-TI-GB-0500	www.tr-electronic.de/f/TR-V-TI-GB-0500	
QR-Code				



Installation

<p>Double clamping bracket</p> 	<p>Double clamping bracket, stainless steel</p> 	<p>Distance mounting bracket</p> 	<p>Connector LMC</p> 
<p>Mounting accessories for linear encoders</p>	<p>Mounting accessories for linear encoders</p>	<p>Mounting accessories for linear encoders</p>	<p>Mounting accessories for linear encoders</p>
<p>For LP, LMP</p>	<p>For LP, LMP</p>	<p>For LP46, LMP48 - raises the measurement level to fit different existing surroundings</p>	<p>For LMC 55</p>
<p>See drawings chapter</p>	<p>See drawings chapter</p>	<p>See drawings chapter</p>	
<p>Accessory or delivery option included with encoder</p>	<p>Accessory or delivery option included with encoder</p>	<p>Accessory or delivery option included with encoder</p>	<p>Spare</p>
<p>www.tr-electronic.de/f/TR-V-TI-GB-0500</p>	<p>www.tr-electronic.de/f/TR-V-TI-GB-0500</p>	<p>www.tr-electronic.de/f/TR-V-TI-GB-0500</p>	
			

Installation Reflectors

Product	Assembly aid 	Reflector sheet	Reflector board 	
Group	Mounting accessories for linear encoders	Laser range finders	Laser range finders	
Description	For LMC 55	For LE 200 with range up to 120 m	For LE 200 with range of 175 m and above	
Dimensions	Fits magnet T1-5520	200 x 200 mm - 749 x 914 mm	554 x 480 mm - 1108 x 960 mm	
Ordering	Accessory	Accessory / spare (1 sheet 200 x 200 is included with delivery)	Accessory / spare (1 board 554 x 480 is included with delivery)	
Weblink		www.tr-electronic.de/f/TR-ELE_BA_DGB-0018	www.tr-electronic.de/f/TR-ELE_BA_DGB-0018	
QR-Code				

Reflectors

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
http://www.tr-electronic.de/f/TR-ELE-BA-DGB-0021	www.tr-electronic.de/f/TR-V-TI-GB-0550
	

Suggested Products

Order code	Typ	Material	Dimensions
Magnet ring			
49155004	T4M20	Aluminum	D=20mm
49155005	T4M22	Aluminum	D=22mm
49155016	T4M33	Plastic	D=33mm
Magnet ring, open			
49155006	T3U46	PPE 30% glass fiber	D=63,5mm
49155003	T4U3820	PPE 30% glass fiber	20,2 x 38 mm
Block magnet			
49155009	T1-S5520 (for LMC55) - distance max 3 mm	Plastic	20 x 55 mm
49155010	T2-S5520 (for LMC55) - distance max 8 mm	Aluminum (red)	20 x 55 mm
49155015	T1-S3818 (for LMP30)	Plastic	18 x 38 mm
Magnet slider			
85917013	with ball joint arm		See chapter drawings
Float			
49915080	K4-M51	1.4571	D=51mm
Clamping bracket			
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
Spacer			
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.de.

Order code	Typ	Material	Dimensions
Reflector sheet			
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
Reflector board			
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
Target panel			
49500040	For LLB500, range 65...500m	Aluminum	210 x 297 mm
Deviation mirror			
49500033	For LE	Aluminum, Glass	80 x 145 x 76,5 mm

Further product information

1. Enter order code into ...



2. Searchfield (top right) on www.tr-electronic.com



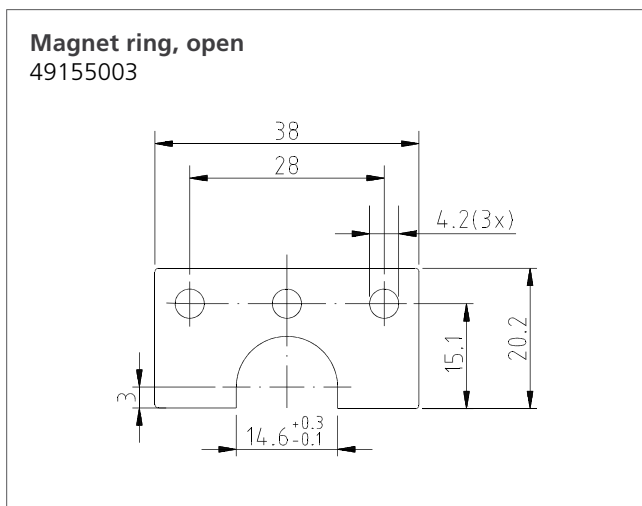
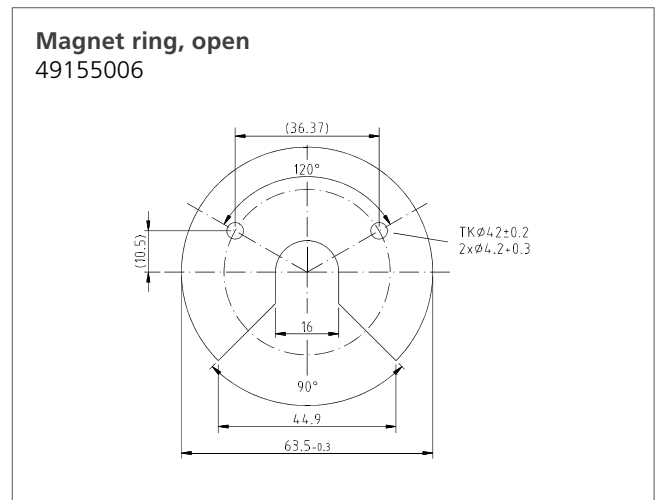
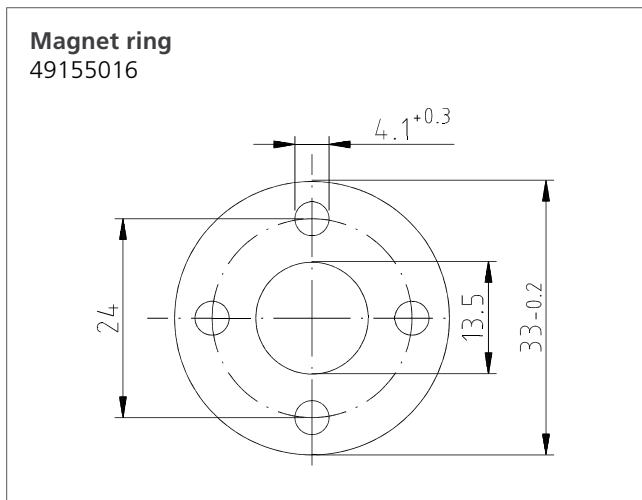
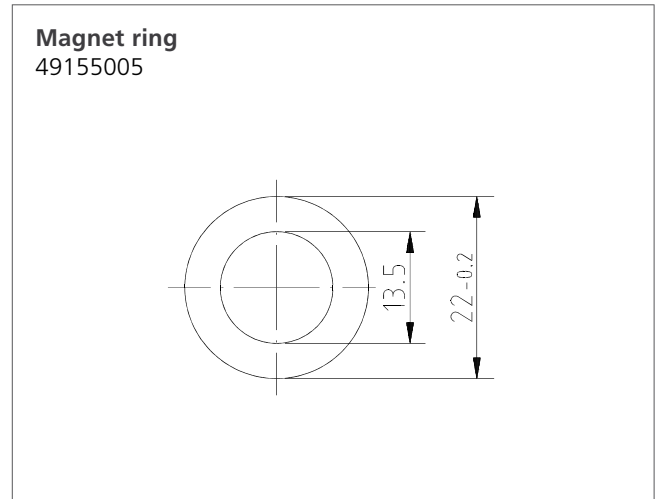
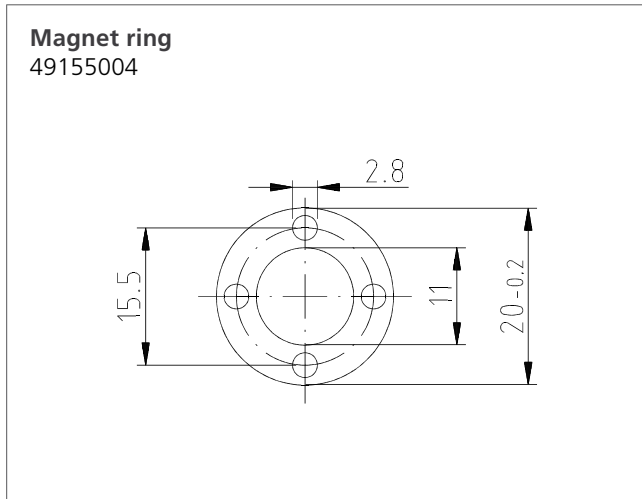
3. Choose desired information



*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).

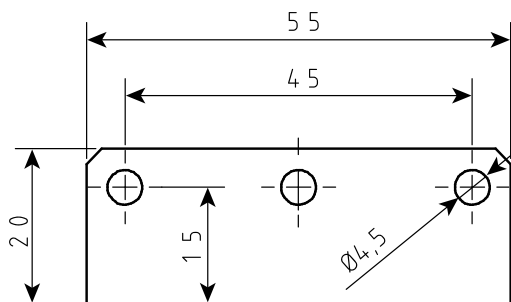
Dimensional Drawings



Dimensional Drawings

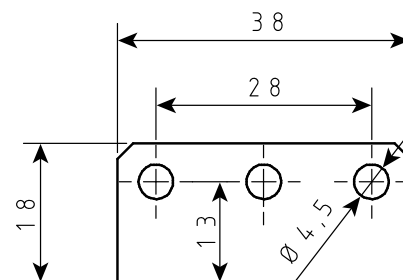
Block magnet

49155009 (black, distance max 3mm) 49155010 (red, distance max 8mm)



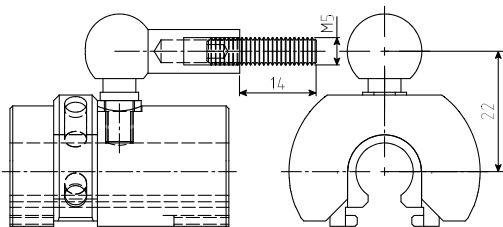
Block magnet

49155015



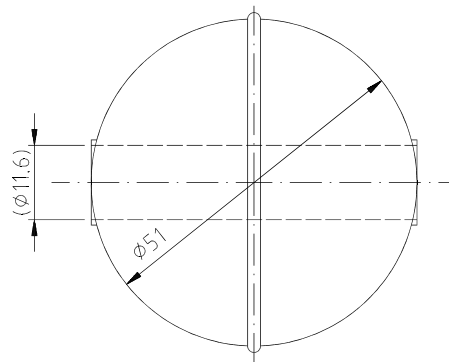
Magnet slider

85917013



Float

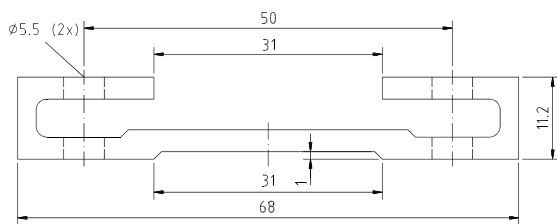
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Dimensional Drawings

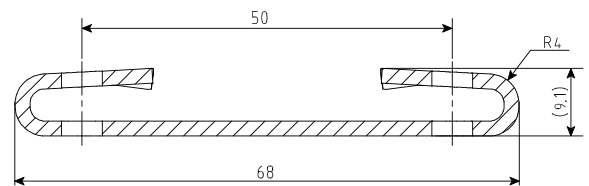
Clamping bracket

49917001, as kit incl. screws: 85917002



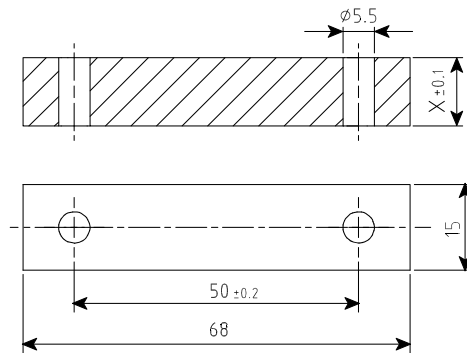
Clamping bracket

49917057



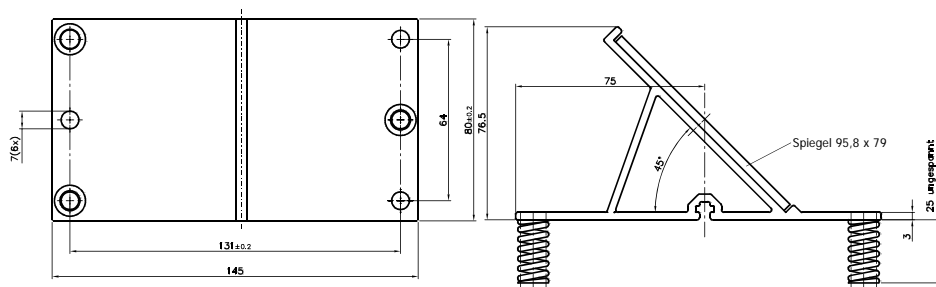
Spacer

49917081 (X=5mm), ...82 (X=10mm), ... 83 (X=12mm)



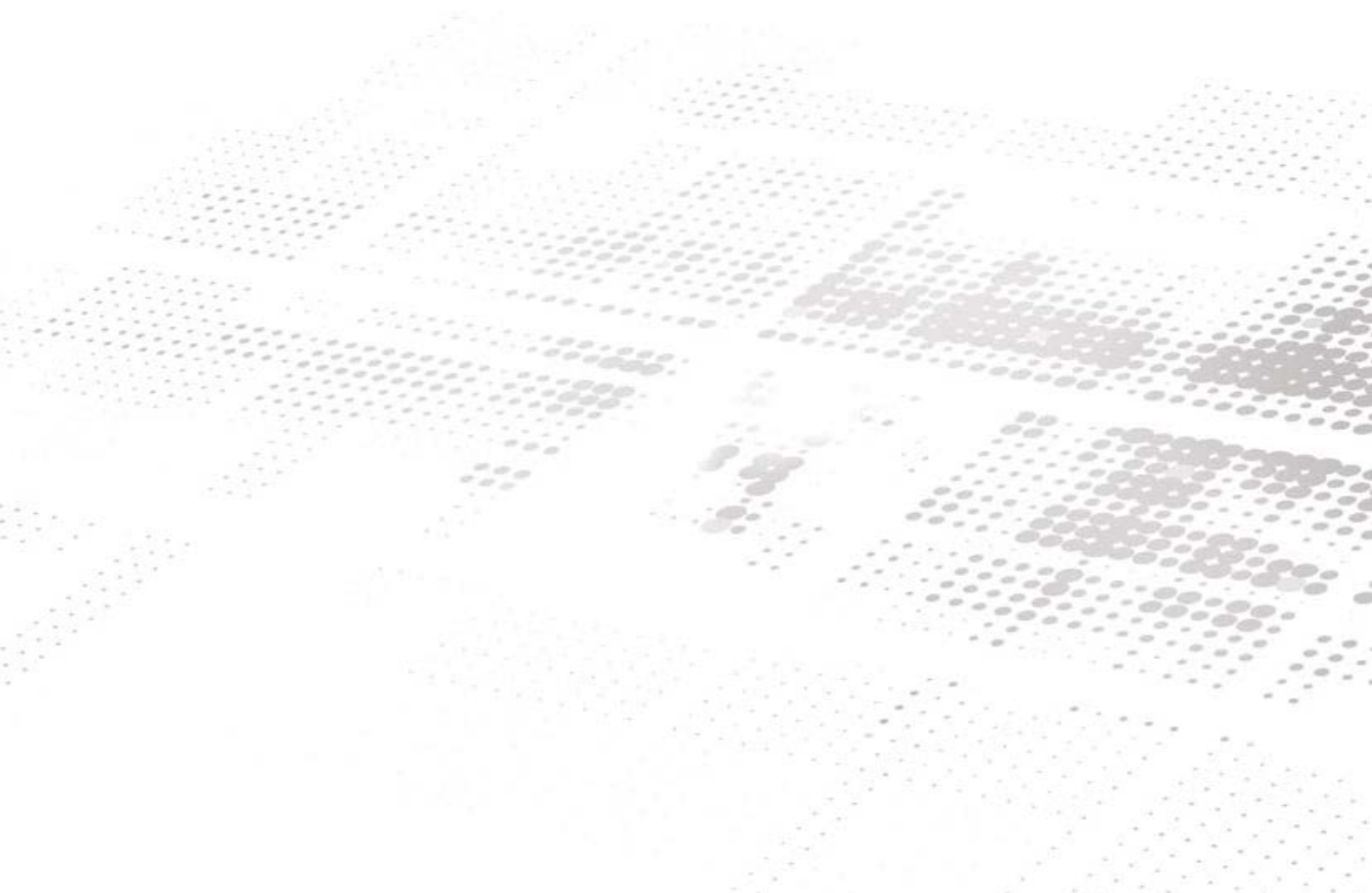
Deviation mirror for LE

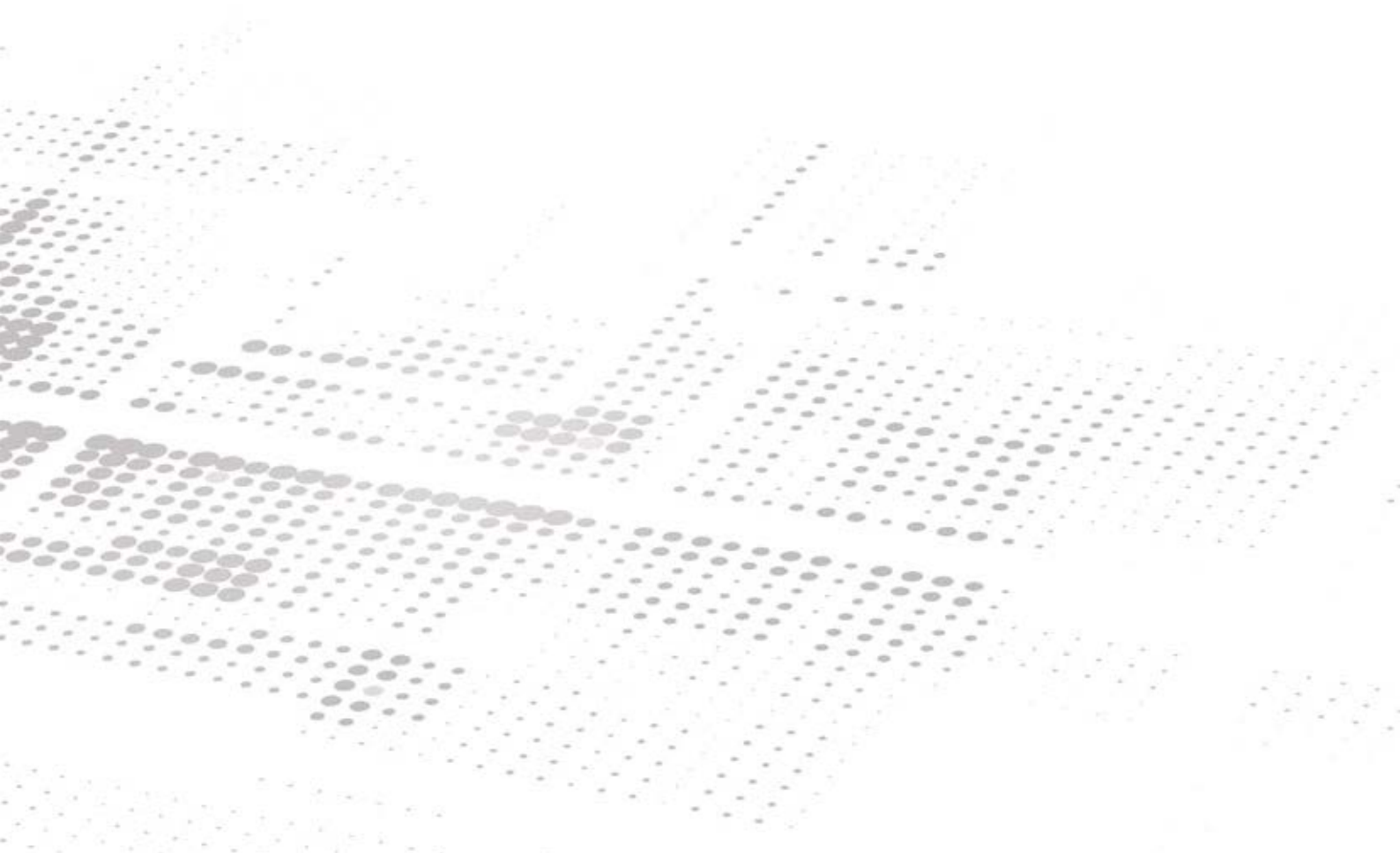
49500033





TRsystems





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notion.ABC



The new platform for automation

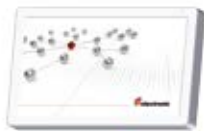

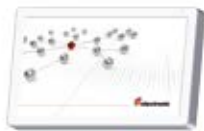



Three basic designs are integrated into a wide variety of configurations. "notion.A" are completely enclosed units. They are mounted by means of a supporting arm and enable system visualization and operation under the most difficult ambient conditions. The modern 16:9 aspect ratio displays its advantages to the full in upright portrait orientation: visualization at the top, with status displays, trend diagrams and softkeys at the bottom. But even in landscape orientation, the larger display helps to make the multi-touch navigation

highly ergonomic. As a switch cabinet computer, "notion.B" offers the necessary processing power. For traditional installation in 19-inch control panels, switch cabinets or consoles, "notion.C" combines the IP65 tight front unit of "notion.A" with the processing power of "notion.B". "notion.ABC" is the innovative foundation for both future-oriented and traditional operating system and automation applications.

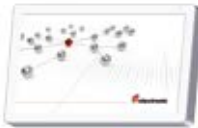
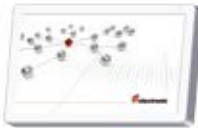
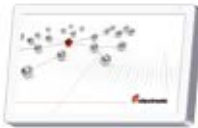



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notion.A (tablet)

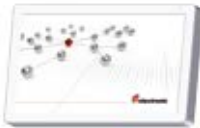
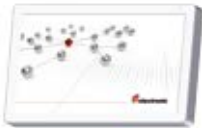
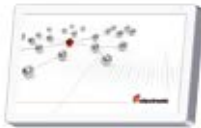
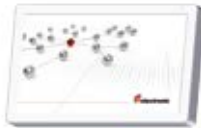




Product	notion.A (tablet) 	notion.A (tablet) 	notion.A (tablet) 
Screen diagonal	256.0 mm (10.1")	439.4 mm (17.3")	469.9 mm (18.5")
Screen resolution	1280*800	1920*1080	1366*768
Screen format	16:9 Wide XGA	16:9 Full HD	16:9 Wide XGA
Touch screen	Glass touch (multitouch)	Glass touch (multitouch)	Glass touch (multitouch)
Operating voltage	24 VDC; +/- 20%	24 VDC; +/- 20%	24 VDC; +/- 20%
Operating temperature	0...50 °C	0...50 °C	0...50 °C
Type of protection front / backside (IP)	IP65 / IP65	IP65 / IP65	IP65 / IP65
Case mounting	VESA 75 / 100	VESA 75 / 100	VESA 75 / 100
CPU	ARM Cortex	ARM Cortex	ARM Cortex
Drive	SD (Secure Digital Memory Card)	SD (Secure Digital Memory Card)	SD (Secure Digital Memory Card)
Operating system	Android	Android	Android
interface	LAN USB 2.0	LAN USB 2.0	LAN USB 2.0
Weblink	www.tr-electronic.de/f/TRS-DOC-000817	www.tr-electronic.de/f/TRS-DOC-000817	www.tr-electronic.de/f/TRS-DOC-000817
QR-Code			

notion.A (tablet)
notion.A (computer)


Product	notion.A (tablet) 	notion.A (computer) 	notion.A (computer) 	
Screen diagonal	609.6 mm (24.0")	256.0 mm (10.1")	439.4 mm (17.3")	
Screen resolution	1920*1080	1280*800	1920*1080	
Screen format	16:9 Full HD	16:9 Wide XGA	16:9 Full HD	
Touch screen	Glass touch (multitouch)	Glass touch (multitouch)	Glass touch (multitouch)	
Operating voltage	24 VDC; +/- 20%	24 VDC; +/- 20%	24 VDC; +/- 20%	
Operating temperature	0...50 °C	0...50 °C	0...50 °C	
Type of protection front / backside (IP)	IP65 / IP65	IP65 / IP54	IP65 / IP54	
Case mounting	VESA 75 / 100	VESA 75 / 100	VESA 75 / 100	
CPU	ARM Cortex	Intel® Atom™ Quad-Core;	Intel® Atom™ Quad-Core; AMD Quad Core; Intel® Core™ i5; Intel® Core™ i7	
Drive	SD (Secure Digital Memory Card)	CFast (CompactFlash ATA Serial Transfer); CF (Compact Flash); SD (Secure Digital Memory Card); SSD (Solid-State-Drive); HDD (Hard-Disk-Drive);	CFast (CompactFlash ATA Serial Transfer); CF (Compact Flash); SD (Secure Digital Memory Card); SSD (Solid-State-Drive); HDD (Hard-Disk-Drive);	
Operating system	Android	Windows® Embedded Standard 7; Windows® 7 Professional; Windows® Embedded 8 Standard; Windows® 8 Professional	Windows® Embedded Standard 7; Windows® 7 Professional; Windows® Embedded 8 Standard; Windows® 8 Professional	
interface	LAN USB 2.0	LAN RS232 WLAN Bluetooth USB 2.0 Realtime-LAN USB 3.0	LAN RS232 WLAN Bluetooth USB 2.0 Realtime-LAN USB 3.0	
Weblink	www.tr-electronic.de/f/TRS-DOC-000817	www.tr-electronic.de/f/TRS-DOC-000817	www.tr-electronic.de/f/TRS-DOC-000817	
QR-Code				

notion.A (computer)

notion.A (terminal)


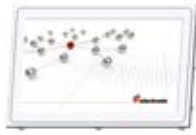





notion.A (computer)	notion.A (computer)	notion.A (terminal)	notion.A (terminal)
			
469.9 mm (18.5")	609.6 mm (24.0")	256.0 mm (10.1")	439.4 mm (17.3")
1366*768	1920*1080	1280*800	1920*1080
16:9 Wide XGA	16:9 Full HD	16:9 Wide XGA	16:9 Full HD
Glass touch (multitouch)	Glass touch (multitouch)	Glass touch (multitouch)	Glass touch (multitouch)
24 VDC; +/- 20%	24 VDC; +/- 20%	24 VDC; +/- 20%	24 VDC; +/- 20%
0...50 °C	0...50 °C	0...50 °C	0...50 °C
IP65 / IP54	IP65 / IP54	IP65 / IP65	IP65 / IP65
VESA 75 / 100	VESA 75 / 100	VESA 75 / 100	VESA 75 / 100
Intel® Atom™ Quad-Core; AMD Quad Core; Intel® Core™ i5; Intel® Core™ i7	Intel® Atom™ Quad-Core; AMD Quad Core; Intel® Core™ i5; Intel® Core™ i7		
CFast (CompactFlash ATA Serial Transfer); CF (Compact Flash); SD (Secure Digital Memory Card); SSD (Solid-State-Drive); HDD (Hard-Disk-Drive);	CFast (CompactFlash ATA Serial Transfer); CF (Compact Flash); SD (Secure Digital Memory Card); SSD (Solid-State-Drive); HDD (Hard-Disk-Drive);		
Windows® Embedded Standard 7; Windows® 7 Professional; Windows® Embedded 8 Standard; Windows® 8 Professional	Windows® Embedded Standard 7; Windows® 7 Professional; Windows® Embedded 8 Standard; Windows® 8 Professional		
LAN RS232	LAN RS232	VGA DVI	VGA DVI
WLAN Bluetooth	WLAN Bluetooth		
USB 2.0 Realtime -LAN	USB 2.0 Realtime -LAN		
USB 3.0	USB 3.0		
www.tr-electronic.de/f/TRS-DOC-000817	www.tr-electronic.de/f/TRS-DOC-000817	www.tr-electronic.de/f/TRS-DOC-000817	www.tr-electronic.de/f/TRS-DOC-000817
			

notion.A (terminal)
notion.B 100

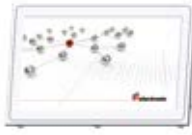
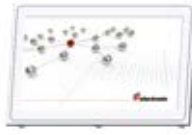
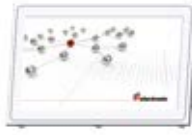



Product	notion.A (terminal) 	notion.A (terminal) 	notion.B 100 	
Screen diagonal	469.9 mm (18.5")	609.6 mm (24.0")		
Screen resolution	1366*768	1920*1080		
Screen format	16:9 Wide XGA	16:9 Full HD		
Touch screen	Glass touch (multitouch)	Glass touch (multitouch)	Keyboard, mouse	
Operating voltage	24 VDC; +/- 20%	24 VDC; +/- 20%	24 VDC; +/- 20%	
Operating temperature	0...50 °C	0...50 °C	0...50 °C	
Type of protection front / backside (IP)	IP65 / IP65	IP65 / IP65	IP20	
Case mounting	VESA 75 / 100	VESA 75 / 100	Mounting bracket	
CPU			AMD Quad Core EX-420 CA SoC	
Drive			CF (Compact Flash); SSD (Solid-State-Drive); HDD (Hard-Disk-Drive);	
Operating system			Windows® Embedded Standard 7; Windows® 7 Professional; Windows® Embedded 8 Standard; Windows® 8 Professional	
interface	VGA DVI	VGA DVI	LAN USB 2.0	
Weblink	www.tr-electronic.de/f/TRS-DOC-000817	www.tr-electronic.de/f/TRS-DOC-000817	www.tr-electronic.de/f/TRS-DOC-000818	
QR-Code				

notion. B 200

notion.A (tablet)


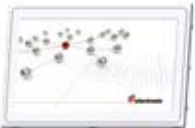






<p>notion. B 200</p> 	<p>notion.A (tablet)</p> 	<p>notion.A (tablet)</p> 	<p>notion.A (tablet)</p> 
	256.5 mm (10.1 „)	439.4 mm (17.3“)	469.9 mm (18.5“)
	1280*800	1920*1080	1366*768
	16:9 Wide XGA	16:9 Full HD	16:9 Wide XGA
Keyboard, mouse	Glass touch (multitouch)	Glass touch (multitouch)	Glass touch (multitouch)
24 VDC; +/- 20%	24 VDC; +/- 20%	24 VDC; +/- 20%	24 VDC; +/- 20%
0...50 °C	0...50 °C	0...50 °C	0...50 °C
IP20	IP65 / IP20	IP65 / IP20	IP65 / IP20
Mounting bracket: DIN rail	Recessed mounting	Recessed mounting	Recessed mounting
Intel® Atom™ Quad-Core; AMD Quad Core; Intel® Core™ i5; Intel® Core™ i7	ARM Cortex	ARM Cortex	ARM Cortex
CFast (CompactFlash ATA Serial Transfer); CF (Compact Flash); SD (Secure Digital Memory Card); SSD (Solid-State-Drive); HDD (Hard-Disk-Drive);	SD (Secure Digital Memory Card);	SD (Secure Digital Memory Card);	SD (Secure Digital Memory Card);
Windows® Embedded Standard 7; Windows® 7 Professional; Windows® Embedded 8 Standard; Windows® 8 Professional	Android	Android	Android
LAN RS232	LAN USB 2.0	LAN USB 2.0	LAN USB 2.0
WLAN Bluetooth			
USB 2.0 Realtime-LAN			
USB 3.0			
www.tr-electronic.de/f/TRS-DOC-000873	www.tr-electronic.de/f/TRS-DOC-000819	www.tr-electronic.de/f/TRS-DOC-000819	www.tr-electronic.de/f/TRS-DOC-000819
			

notion.A (tablet)
notion.A (computer)

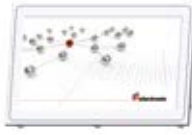
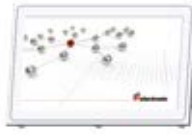


Products	notion.A (tablet) 	notion.A (computer) 	notion.A (computer) 	
Screen diagonal	609.6 mm (24.0")	256.5 mm (10.1 ")	439.4 mm (17.3")	
Screen resolution	1920*1080	1280*800	1920*1080	
Screen format	16:9 Full HD	16:9 Wide XGA	16:9 Full HD	
Touch screen	Glass touch (multitouch)	Glass touch (multitouch)	Glass touch (multitouch)	
Operating voltage	24 VDC; +/- 20%	24 VDC; +/- 20%	24 VDC; +/- 20%	
Operating temperature	0...50 °C	0...50 °C	0...50 °C	
Type of protection front / backside (IP)	IP65 / IP20	IP65 / IP20	IP65 / IP20	
Case mounting	Recessed mounting	Recessed mounting	Recessed mounting	
CPU	ARM Cortex	Intel® Atom™ Quad-Core;	Intel® Atom™ Quad-Core; AMD Quad Core; Intel® Core™ i5; Intel® Core™ i7	
Drive	SD (Secure Digital Memory Card);	CFast (CompactFlash ATA Serial Transfer); CF (Compact Flash); SD (Secure Digital Memory Card); SSD (Solid-State-Drive); HDD (Hard-Disk-Drive);	CFast (CompactFlash ATA Serial Transfer); CF (Compact Flash); SD (Secure Digital Memory Card); SSD (Solid-State-Drive); HDD (Hard-Disk-Drive);	
Operating system	Android	Windows® Embedded Standard 7; Windows® 7 Professional; Windows® Embedded 8 Standard; Windows® 8 Professional	Windows® Embedded Standard 7; Windows® 7 Professional; Windows® Embedded 8 Standard; Windows® 8 Professional	
interface	LAN USB 2.0	LAN RS232 WLAN Bluetooth USB 2.0 Realtime-LAN USB 3.0	LAN RS232 WLAN Bluetooth USB 2.0 Realtime-LAN USB 3.0	
Weblink	www.tr-electronic.de/f/TRS-DOC-000819	www.tr-electronic.de/f/TRS-DOC-000819	www.tr-electronic.de/f/TRS-DOC-000819	
QR-Code				

notion.A (computer)

notion.C (Terminal)

notion.A (computer)	notion.A (computer)	notion.A (terminal)	notion.A (terminal)
			
469.9 mm (18.5")	609.6 mm (24.0")	256.5 mm (10.1 ")	439.4 mm (17.3")
1366*768	1920*1080	1280*800	1920*1080
16:9 Wide XGA	16:9 Full HD	16:9 Wide XGA	16:9 Full HD
Glass touch (multitouch)	Glass touch (multitouch)	Glass touch (multitouch)	Glass touch (multitouch)
24 VDC; +/- 20%	24 VDC; +/- 20%	24 VDC; +/- 20%	24 VDC; +/- 20%
0...50 °C	0...50 °C	0...50 °C	0...50 °C
IP65 / IP20	IP65 / IP20	IP65 / IP20	IP65 / IP20
Recessed mounting	Recessed mounting	Recessed mounting	Recessed mounting
Intel® Atom™ Quad-Core; AMD Quad Core; Intel® Core™ i5; Intel® Core™ i7	Intel® Atom™ Quad-Core; AMD Quad Core; Intel® Core™ i5; Intel® Core™ i7		
CFast (CompactFlash ATA Serial Transfer); CF (Compact Flash); SD (Secure Digital Memory Card); SSD (Solid-State-Drive); HDD (Hard-Disk-Drive);	CFast (CompactFlash ATA Serial Transfer); CF (Compact Flash); SD (Secure Digital Memory Card); SSD (Solid-State-Drive); HDD (Hard-Disk-Drive);		
Windows® Embedded Standard 7; Windows® 7 Professional; Windows® Embedded 8 Standard; Windows® 8 Professional	Windows® Embedded Standard 7; Windows® 7 Professional; Windows® Embedded 8 Standard; Windows® 8 Professional		
LAN RS232	LAN RS232	VGA DVI	VGA DVI
WLAN Bluetooth	WLAN Bluetooth		
USB 2.0 Realtime -LAN	USB 2.0 Realtime -LAN		
USB 3.0	USB 3.0		
www.tr-electronic.de/f/TRS-DOC-000819	www.tr-electronic.de/f/TRS-DOC-000819	www.tr-electronic.de/f/TRS-DOC-000819	www.tr-electronic.de/f/TRS-DOC-000819
			

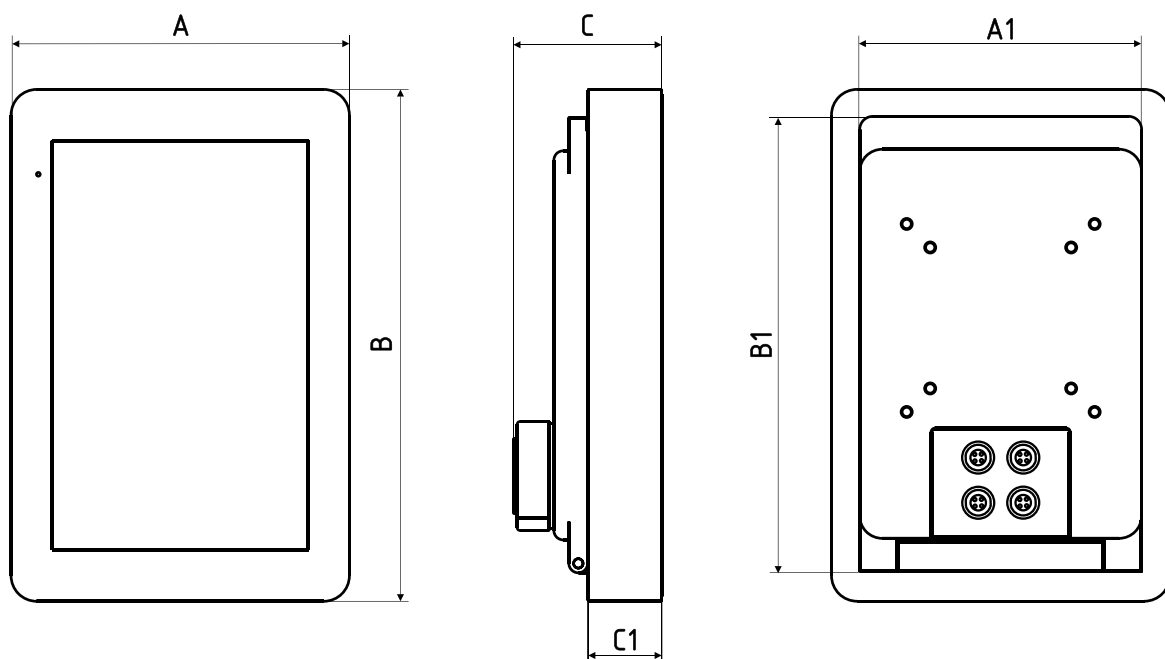
notion.A (terminal)

Product	notion.A (terminal) 	notion.A (terminal) 
Screen diagonal	469.9 mm (18.5")	609.6 mm (24.0")
Screen resolution	1366*768	1920*1080
Screen format	16:9 Wide XGA	16:9 Full HD
Touch screen	Glass touch (multitouch)	Glass touch (multitouch)
Operating voltage	24 VDC; +/- 20%	24 VDC; +/- 20%
Operating temperature	0...50 °C	0...50 °C
Type of protection front / backside (IP)	IP65 / IP20	IP65 / IP20
Case mounting	Recessed mounting	Recessed mounting
CPU		
Drive		
Operating system		
interface	VGA DVI	VGA DVI
Weblink	www.tr-electronic.de/f/TRS-DOC-000819	www.tr-electronic.de/f/TRS-DOC-000819
QR-Code		

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

Dimensional Drawings

notion.A (tablet)
Dimensions see table



notion.A
Dimensions

Displaydiagonale [mm]	A	A1	B	B1	C	C1
10,1 inch	180,0	150,0	272,3	242,0	78,9	39,0
17,3 inch	266,2	150,0	433,3	242,0	83,5	41,0
18,5 inch	289,6	150,0	460,5	242,0	85,5	41,0
24,0 inch	357,5	150,0	594,7	242,0	85,0	42,5

Dimensional Drawings

notion.B
Dimensions

Montagevarianten

X (2,5 : 1)

[mm]	A	A1	A2	A3	B	B1	B2	C	C1	C2
	199,0	143,0	28,3	18,5	70,5	63,5	44,5±0,2	133,0	127,0	6,0

[mm]	B3	A4	ØX
	4,5	14,0	9,0

notion.B
DIN-rail mounted

notion.B
Attached with bracket

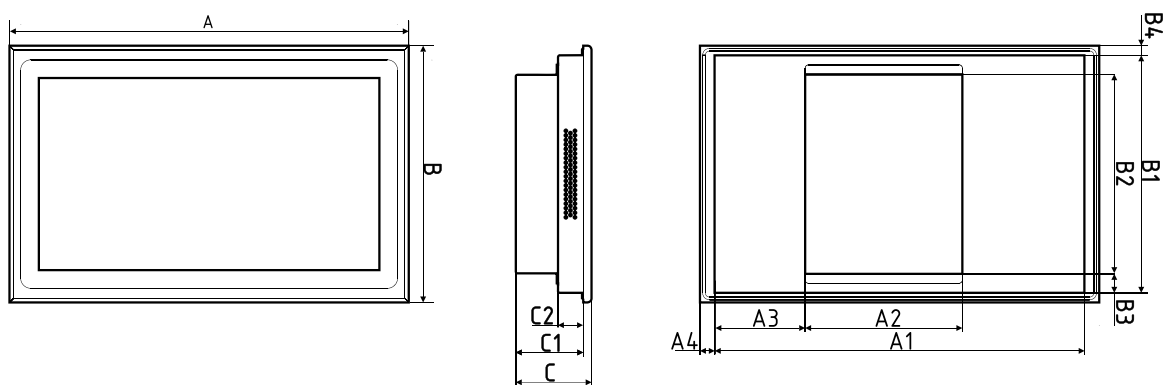
A 1:1

Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at www.tr-electronic.com or on request.

Dimensional Drawings

notion.C

Dimensions see table



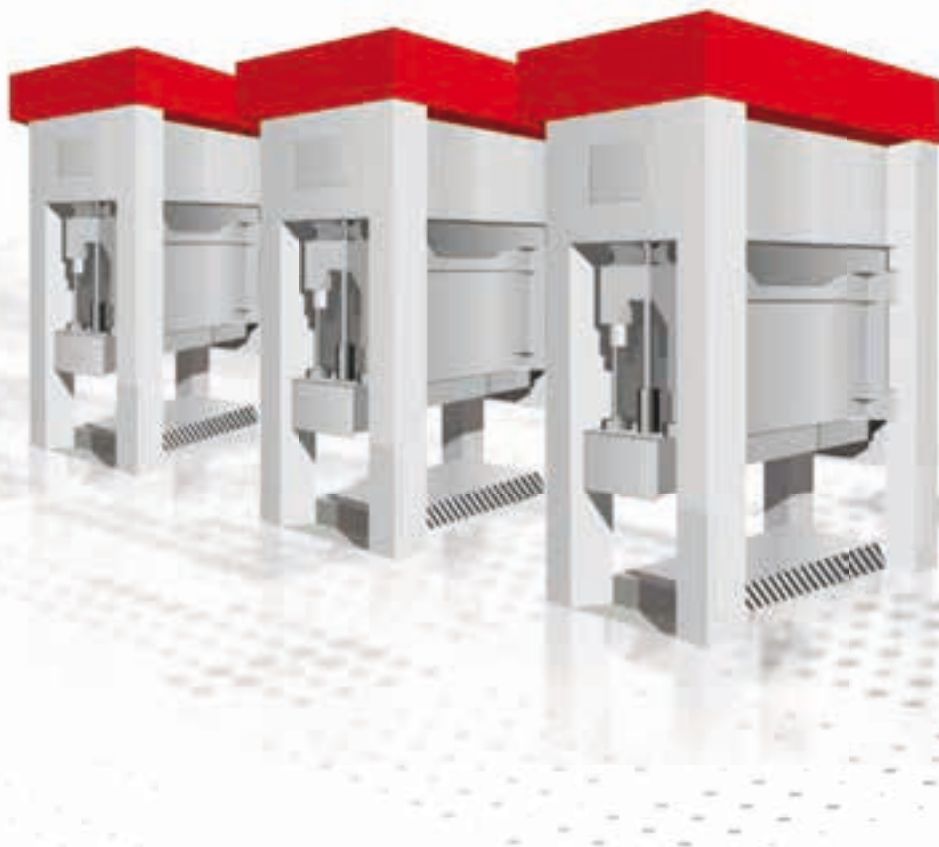
notion.C

Dimensions

[mm]	A	A1	A2	A3	A4	B	B1	B2	B3	B4	C	C1	C2
7,0 inch	201,1	189,1	185,7	1,7	6,0	126,4	114,4	86,0	26,7	6,0	39,7	36,7	11,7
10,1 inch													
17,3 inch													
18,5 inch	482,6	455,0	190,0	109,5	18,8	310,3	287,0	240,0	23,5	11,7	56,5	81,5	46,5
24,0 inch													

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.

Contents

Consulting	462
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Software	464
Benefit of Retrofit.....	465

Consulting

Our service extends to the areas of machine and plant retrofit as well as in the building of new systems:

- _ Consulting
- _ Recording and analysis of the current condition
- _ Process optimisation
- _ Project planning
- _ Processing the specifications
- _ Drawing up the specifications
- _ Planning
- _ State-of-the-art algorithms for control and regulation
- _ Development of safety concepts
- _ Risk and danger analysis
- _ Construction
- _ Assembly
- _ Commissioning on site
- _ Plant-specific documentation
- _ Training of your operating and maintenance staff
- _ Production support
- _ Service, e.g. remote maintenance, after-sales service
- _ CE-marking

Electrical:

- _ Setup of new control cabinets
- _ Conversion of control cabinets
- _ Performance increase by modification of present electrical systems
- _ Exchange of sensors and actors

Hydraulics:

- _ Performance increase by hydraulics load increase
- _ Exchange of components



Hardware

Whether you desire a simple control conversion or a completely new installation of your machine – we offer a wide range of hardware-technical solutions customised to your requirements.

The machine or plant's core is a state-of-the-art server-client architecture. The client assumes the user-specific visualisation tasks of the plant that are implemented via touch-panel PCs. The operating and pre-selection panel (BVT) has a differently sized integrated panel PC with a single touch function. The server PC assumes the hard- or software PLC and calculates the time-critical control algorithms to ensure a stable process.

For the hard- and software PLC, you can choose between

- _ Beckhoff
- _ Siemens
- _ Rockwell Allen-Bradley
- _ Bachmann
- _ TRsystems etc.

With integration of a safety PLC such as

- _ Pilz Pss4000
- _ Siemens S7 Safe

And the bus systems

- _ EtherCAT
- _ ProfiNet
- _ ProfiSave
- _ Safetybus p

We create an advanced and modern system that can be customised individually to your needs.



Software

High-level language programming

We offer the following technology functions:

Control technology

- _ Plunger
 - _ Position/speed control
 - _ Pressure control
 - _ Parallelism controller
- _ Drawing cushion
 - _ Position/speed control
 - _ Pressure control
 - _ Pre-acceleration

Control functions

We offer the following control functions with the PLC/PSS:

Process functions

- _ Programme process
- _ Step chains

Safety functions

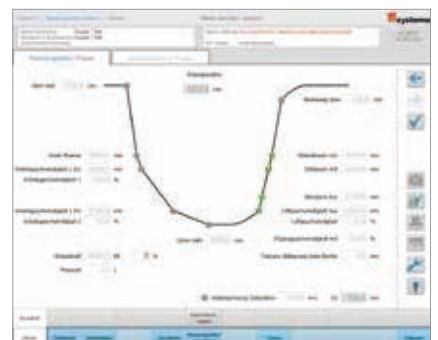
- _ Cyclic monitoring

Visualisation

The visualisation proVi implements the data display and serves for data input. It is the operating system. It is based on the Microsoft.Net framework and is integrated into a server-client architecture.

Visualisation is clearly structured and easy to operate. It has an implemented language-switching function and user management. The operating interface is variable depending on the pre-selected function. There are plant-specific input masks. In addition to the comfortable dynamic signal illustration, there are diverse diagnosis options or messages, PLC processes, statistic process signals, etc. available.

All Windows-based programmes can be integrated into the visualisation, such as Media Player, Adobe Reader etc.



Benefit of Retrofit

Retrofitting serves as a replacement for components that are no longer available. Additionally, process optimisation is possible, i.e. productivity is increased. It also optimises costs as compared to the purchase of a new system, since the present system is only expanded and retrofitted. In some cases, the machine can be used more flexibly after a retrofit. The retrofit of a machine has a higher acceptance since the machines and plants are mostly known already.

Overview of the projects of TR-Electronic

- _ Lane control for feeder automation
- _ Support for Müller-Weingarten control systems
- _ Brake test bench
- _ Casing Jack for offshore plants
- _ Injection moulding machines
- _ Hydraulic presses for tool construction
- _ Hydraulic production presses
- _ IHU plants
- _ Multicurve presses
- _ PCB loaders - unstacking feeders, conveyor belts, washing machines, oilers, centring stations
- _ Press with parallelism control
- _ Press with storage drive
- _ Robot automation/uncoupling and integration into the plant control
- _ Extension drawing presses
- _ Drawing cushion pressure control
- _ Drawing cushion pre-acceleration

Overview of the references of TR-Automation

- _ Airbus Deutschland GmbH, Nordenham-Einswarden
- _ Allgaier AEF S.à.r.l, France
- _ Allgaier Werke GmbH, Uhingen
- _ Audi AG, Neckarsulm
- _ BMW AG, Munich Dingolfing
- _ Erdöl-Erdgas Workover GmbH, Salzwedel
- _ Fangmann Group, Salzwedel
- _ G. Siempelkamp GmbH & Co. KG, Krefeld
- _ Knorr-Bremse AG, Munich
- _ Magna Drive Automotive Industries of America Inc., USA
- _ Magna International Stanztech GmbH, Heilbad Heiligenstadt
- _ Magna Sonora Forming Technology, Mexico
- _ Magnetto Automotive Deutschland GmbH, Treuen
- _ Schuler SMG GmbH & Co. KG, Esslingen
- _ SMF GmbH & Co. KG, Ahlen
- _ Strothmann Machines & Handling GmbH, Schloß Holte Stukenbrock
- _ ThyssenKrupp System Engineering GmbH, Wadern-Lockweiler
- _ Universität Stuttgart, IFU
- _ Volkswagen AG, Wolfsburg

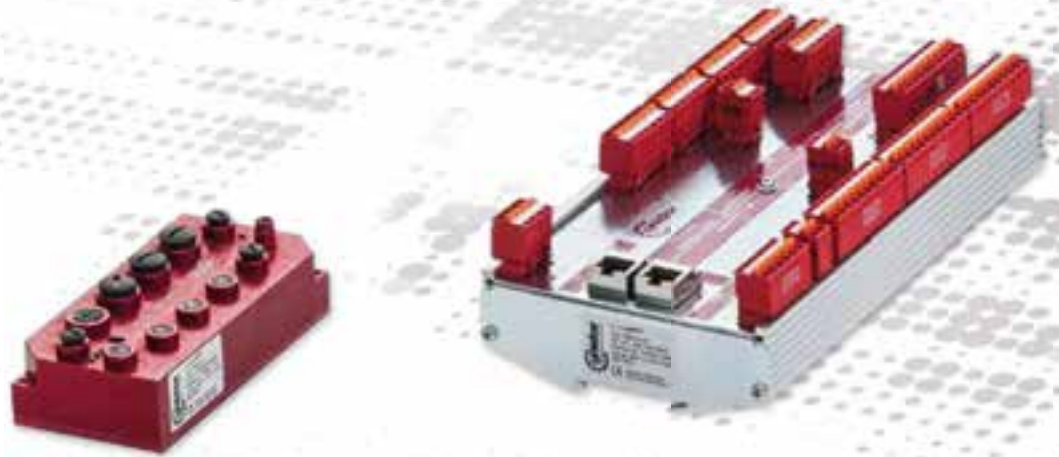


We will gladly advise you

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Phone: +49 (7425) 228 660
Email: herbert.majer@trsistemas.de

TRsystems GmbH Unidor System Division



Unidor, TRsystems GmbH is more than the sum of its products

More than 40 years of Unidor, more than 40 years of technology for the stamping and forming industry. We have not only successfully installed many thousands of systems for the stamping and forming industry worldwide, but we have also decisively shaped the technology. We were pioneers in much of what is state-of-the-art today.

We live up to this claim with energy and passion in accordance with the principle: „Each customer is our only customer“.

We offer you

- _ a direct contact for all queries
- _ sophisticated system tests
- _ professional quality assurance
- _ passionate sales
- _ prompt order processing
- _ practical training in-house and at your premises



Contents

Everything for Stamping and Pressing	468
Sensors	470
smartLINE.....	471
ecoLINE.....	472
powerPRESS.....	473
smartProtection.....	474
Retrofit Instead of New	475

Everything you need for perfect stamping and forming



Certified
ISO 9001



Expertise + quality

Quality and rapid availability are our topmost priority. This applies from the electronic component through to the finished device.

Quality inside: for mechanics and electronics
Quality outside: for support and service

All systems are subjected to a 48-hour endurance test under worst-case conditions. We perform tests to national and international ISO, GS and IEC standards, to name but a few. Our products not only offer maximum cost efficiency and reliability, but also comprehensive and complete service: From consultation through to user support, from hotline through to service, from manuals through to training - you can expect thorough and individual service. We achieve innovation and perspectives for practical and commercially viable products through continuous and intensive dialogs with institutes, external experts and above all with our customers.

Enthusiastic employees, specialists with a great deal of know-how and initiative influence the professionalism of our work

from development through production and quality assurance to service. You need products which make your work easier, which make sense and whose investment will pay off quickly. Products that will ensure your strength and profile in the market, performances from which you can profit and which you can convert into sales.

Only those who react dynamically to customer requirements and deliver what the customer wants will be successful in the long term.

Competent presence and intensive contact with the customer, together with practical products, are an important key to success.

We can only develop successful products if we know exactly what you want. Components and systems by practitioners for practitioners! So look upon our sales representatives not just as enthusiastic salespeople, but rather as passionate service providers with the common goal of convincing you of our products and our company in the long term.



Whenever you need us, we are there for you: dynamic, creative and highly efficient. With the full range of experience of a successful company.

Three product lines in four applications

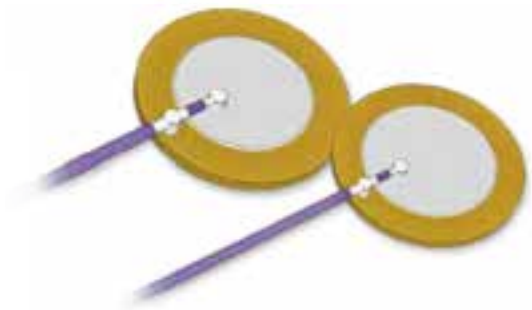
The Unidor concept can most simply be described as follows: Sensors, controls and systems ensure optimal results in machines and production, in tools and in modernization.

We don't claim to be able to do everything, but in stamping and forming we are professionals and reliable partners, your enthusiastic problem solver for production processes and the highest quality.

Unidor sensors, controls and systems for perfect stamping and forming for ...

- _ mechanical engineering
- _ production
- _ tool making
- _ machine modernization

Sensors



These transform physical quantities such as sound, temperature, displacement, vibrations and pressure into electrical signals, which are evaluated and interpreted by measurement and control systems.

The mechanical versions of the sensors are as varied as the physically measured quantities. In order to satisfy all requirements, we offer a comprehensive range of special sensors for tools and machines.

As a complete provider we also offer further accessories such as:

incremental shaft encoders (SSI, absolute, incremental), connection boxes, charge amplifiers (for piezo sensors) and prefabricated cables.

For all encoders and sensors we guarantee safe, long-term operation, even under the extreme conditions of stamping and forming production.

Generally a different number of sensors are mounted on the machine and in the tool. Distribution boxes have proved highly successful for quick and simple electrical installation. They provide a robust interface between sensors and evaluation systems. We supply all boxes ready-configured.

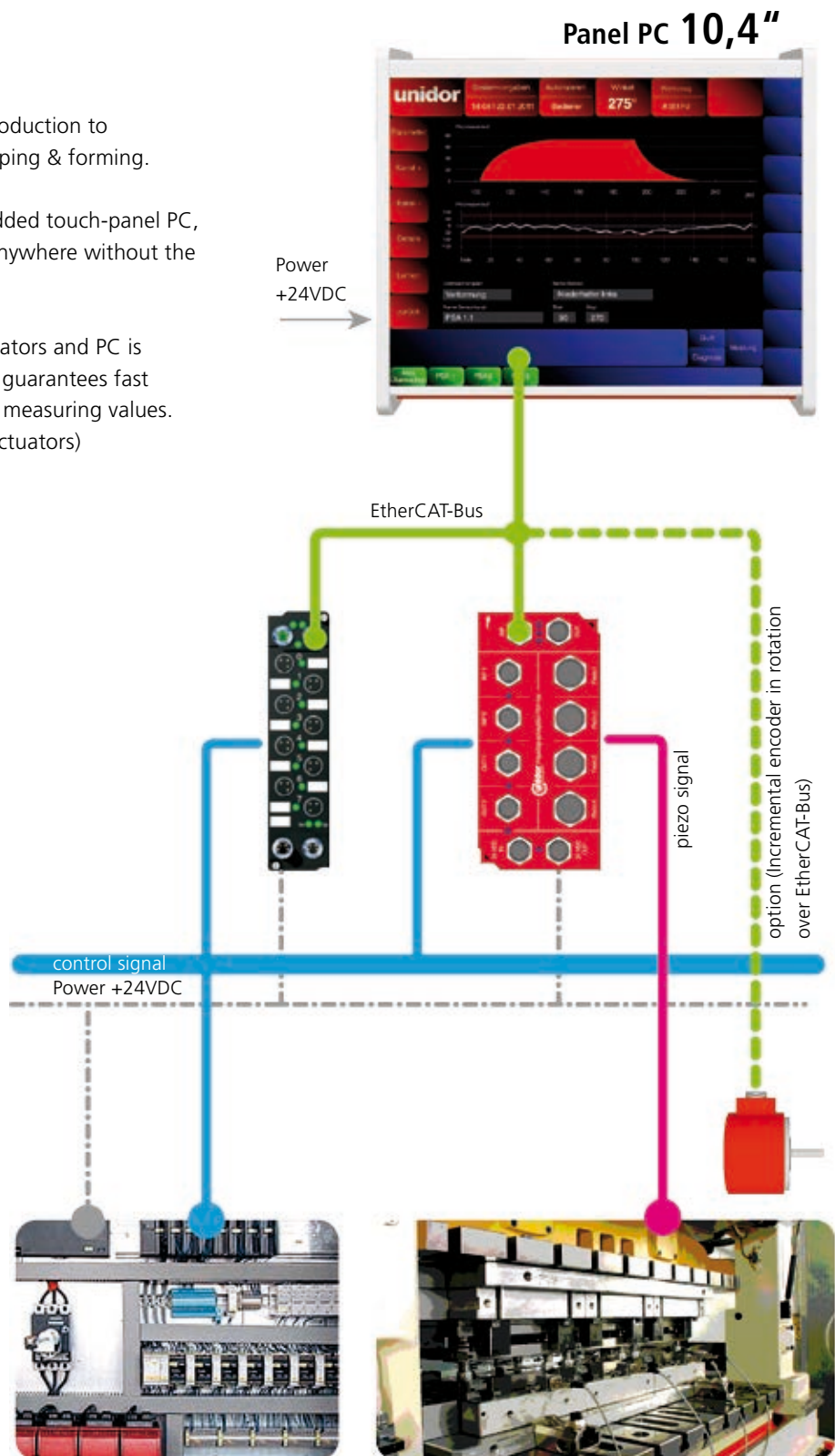
The small compactPRESS: **smartLINE**

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-panel PC, a 10.4" desktop device which will fit anywhere without the need for setup.

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.



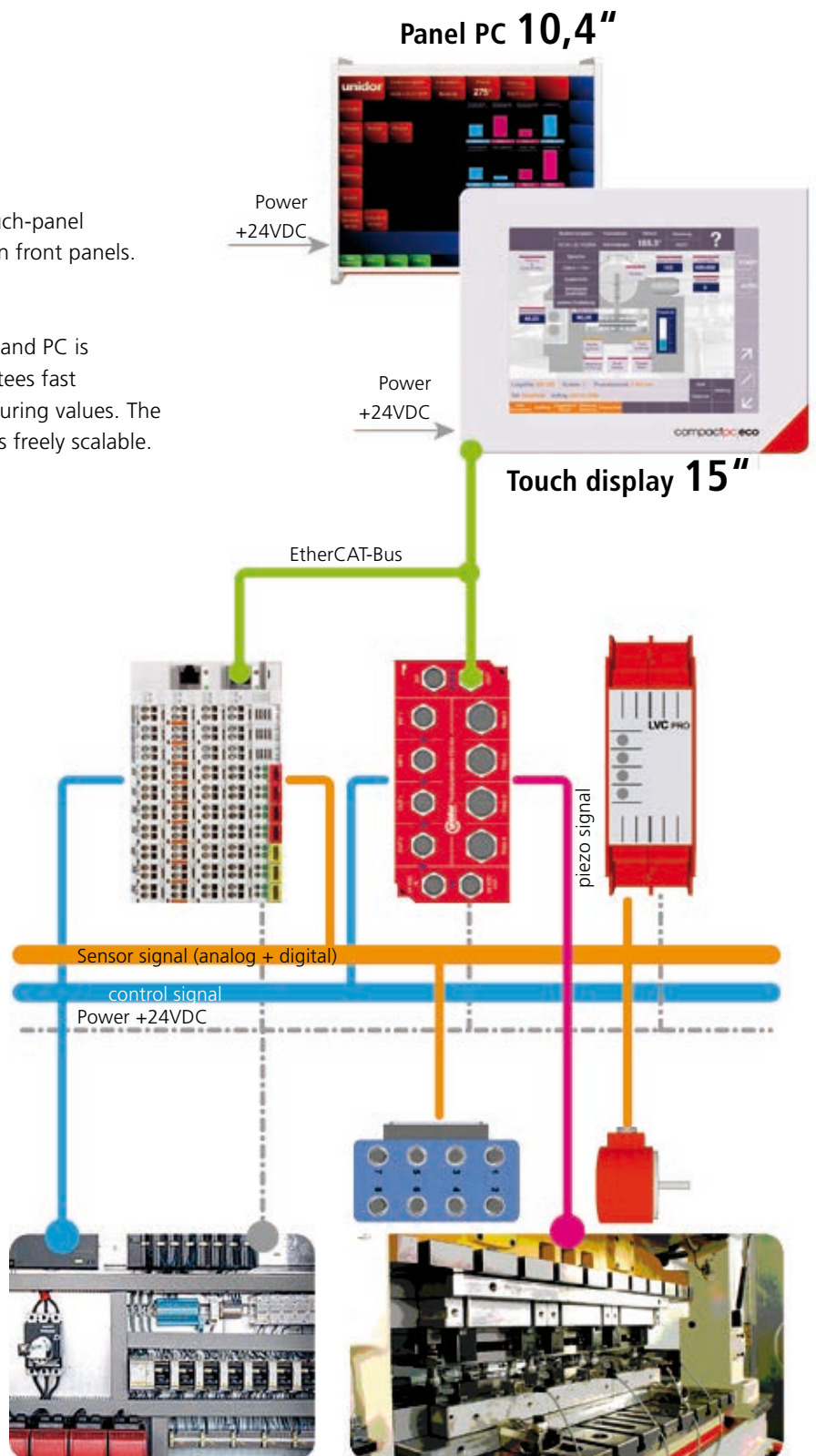
The medium-sized compactPRESS: ecoLINE

The medium-sized ecoLINE

ecoLINE, suitable for universal intelligent process monitoring for stamping & forming.

ecoLINE is based on a robust embedded touch-panel 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.



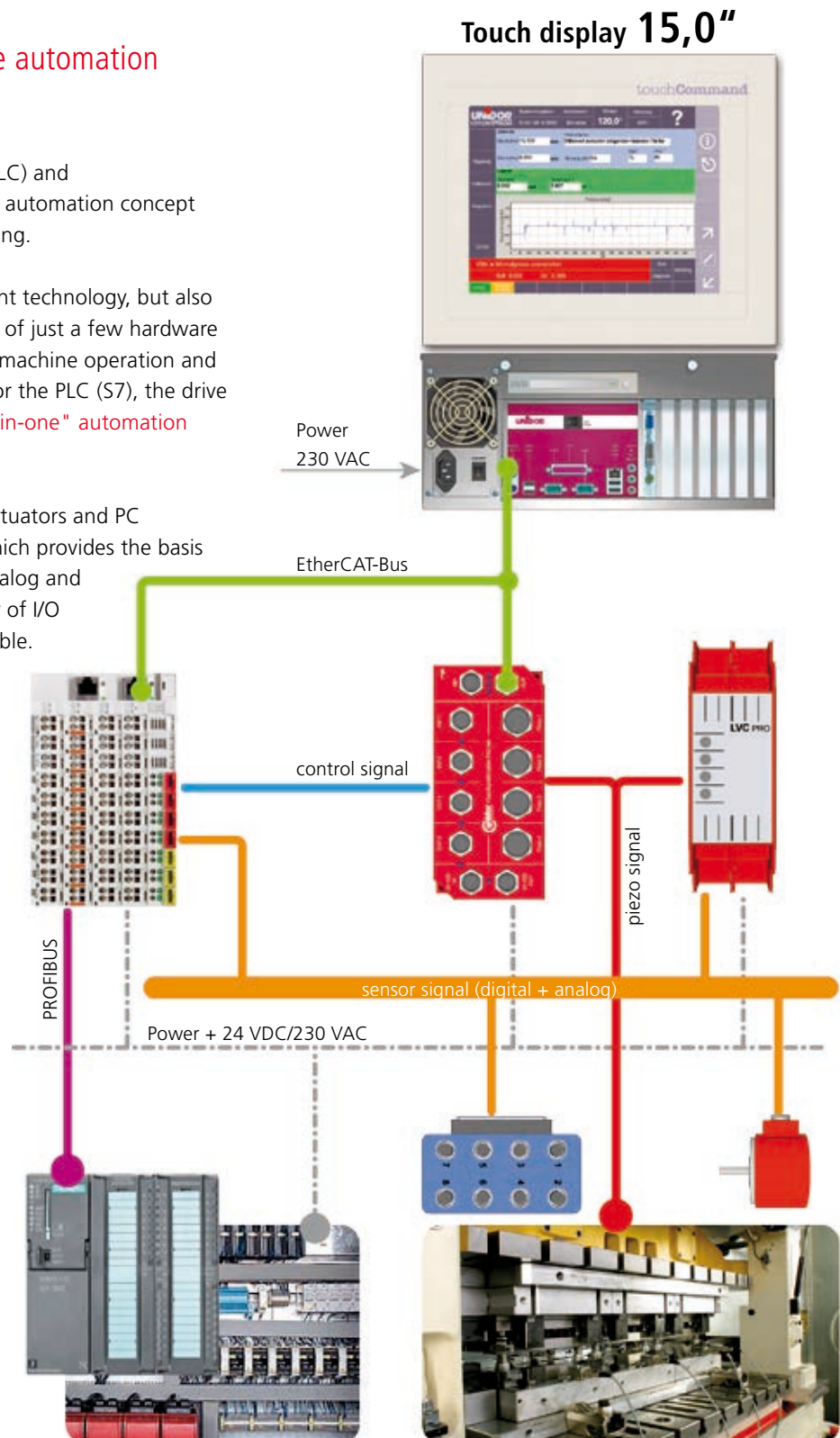
powerPRESS with S7-PLC & starLINE

powerPRESS, the complete automation solution

powerPRESS is operation, control (PLC) and compactPRESS in one: An automated automation concept for all machines for stamping & 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 PC is enabled via EtherCAT (fieldbus), which provides the basis for very fast signal transmission of analog and digital measuring values. The number of I/O terminals (sensors / actuators) is scalable.



smartProtection – low-cost monitoring devices

Connect, switch on and the control and monitoring of tool and machine begins straight away: all very simple.

PKM 2000

Continuous monitoring and display of press force. The force is recorded with piezo sensors on the machine or on the tool. The evaluation system has two channels. In case of overload the system is switched off. Replacement for Imco devices. Direct exchange possible.



smartDIE-PRO 6

Six-channel digital die protection device 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-tolerant data storage management and intelligent power control ensure an extremely safe system.

All at a price which will convince you of our tool monitoring entry-level system.



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 (powerPRESS & compactPRESS) or external PC and PLC systems.

Applications:

For machines and devices that measure dynamic and quasi-static forces, primarily in press manufacture. The necessary piezo sensors are prefabricated in different designs by TRsystems GmbH, and supplied by the Unidor System Division.

**Innovation:
Charge amplifier
with EtherCAT!**



Modernize instead of buying new, always a good alternative

Talk to 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 peripheral equipment, actuators and sensors. Why 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.

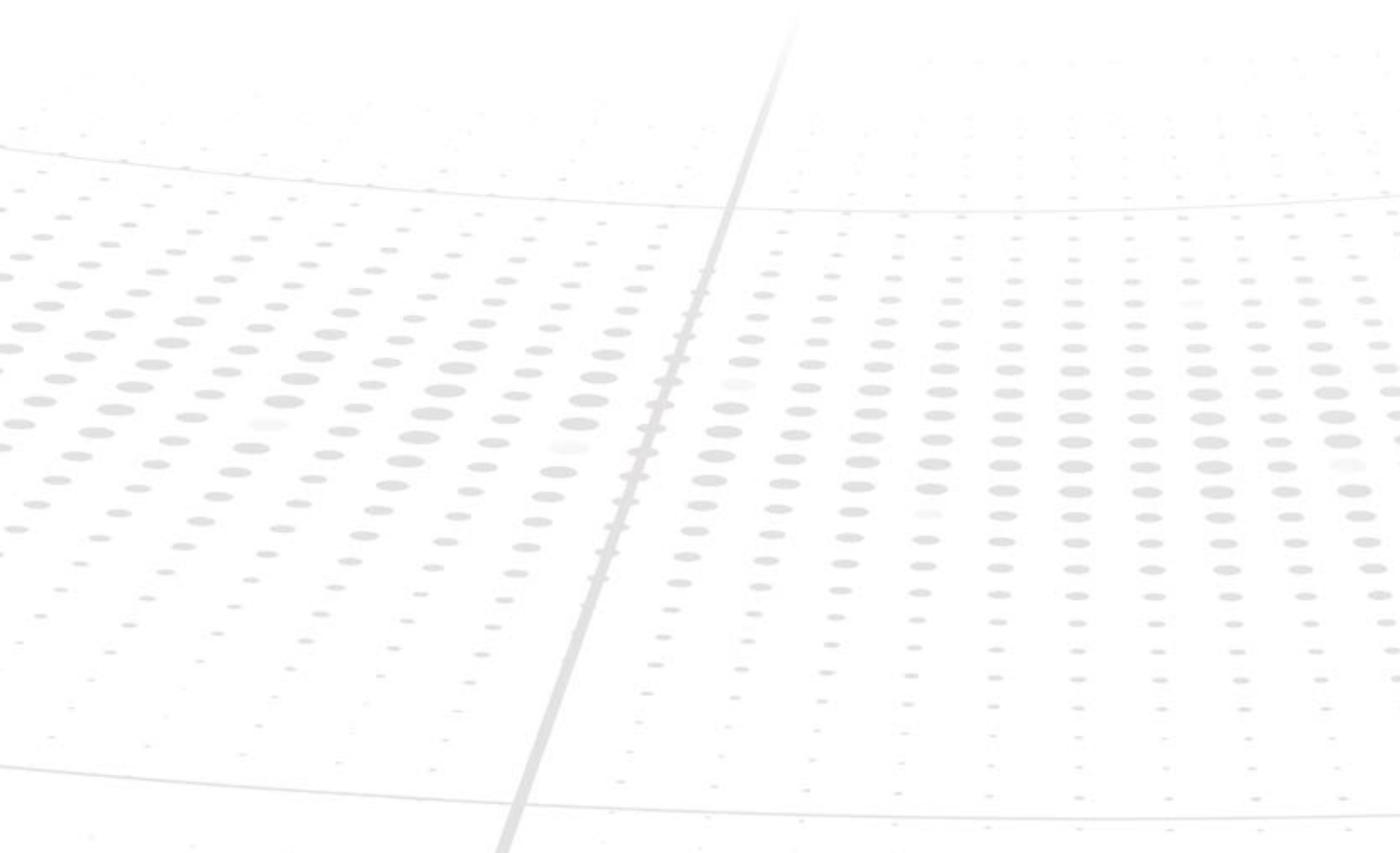
An overhauled punching press will enhance image in relation to customers and ultimate buyers just as much as a new one! The performance and look of a perfectly overhauled punching press is in no way inferior to a new one!

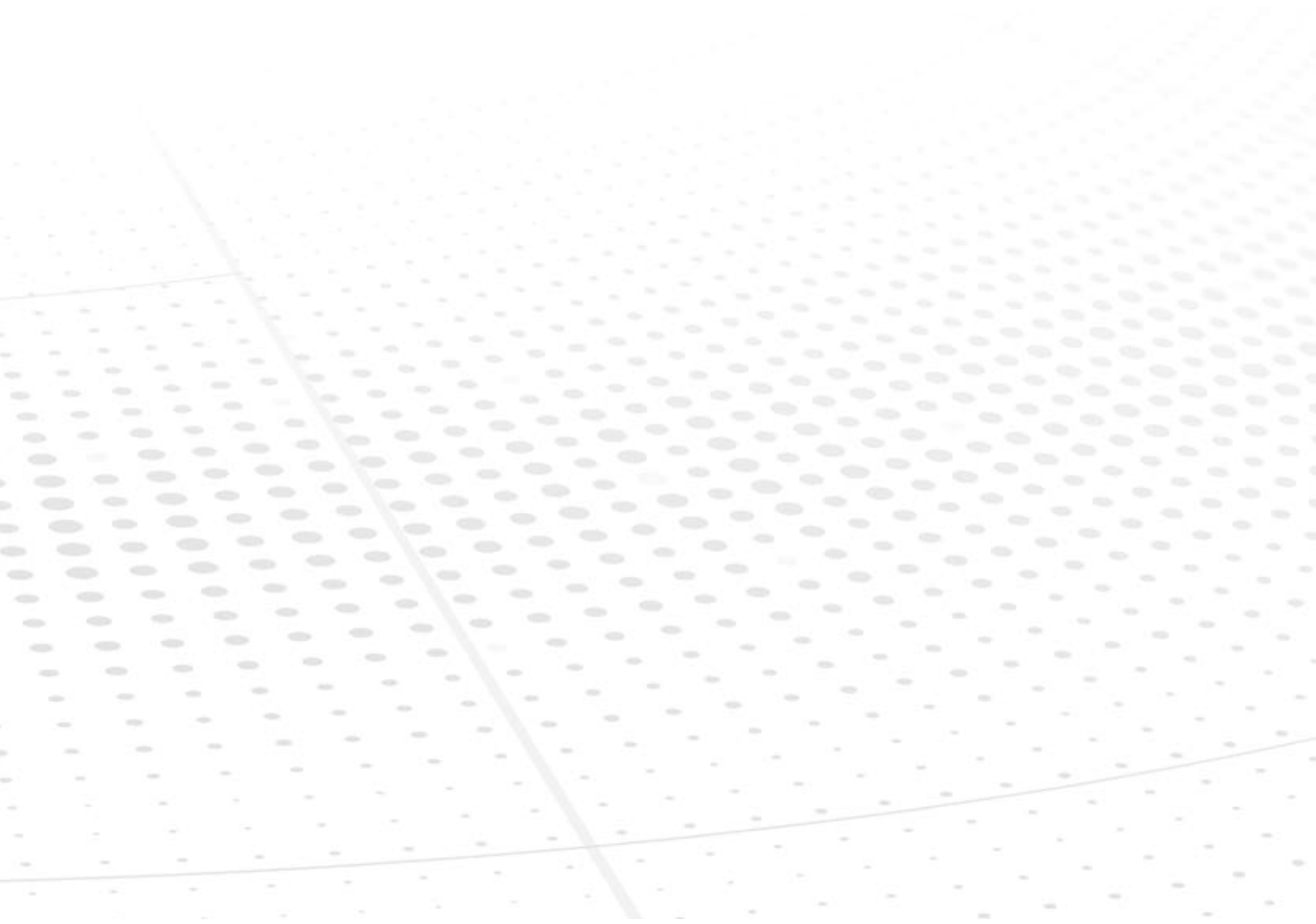


Three steps to success

1. Status and expertise
2. Implementation
3. Handover + operation

TR Worldwide





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.

Unidor

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

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



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