

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 36).

OR

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

OR

You have specific tasks which are not covered by standard sensors: Then we will work with you to develop solutions individually tailored to your task and show you what TR's innovative sensor technology can do (see page 208). Simply contact us and put us to the test. TR is near you, wherever you are in the world (see page 540).

2nd step

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

Optional – detailed selection in the TR selector

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

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

OR

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

Selection in TR product selector

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



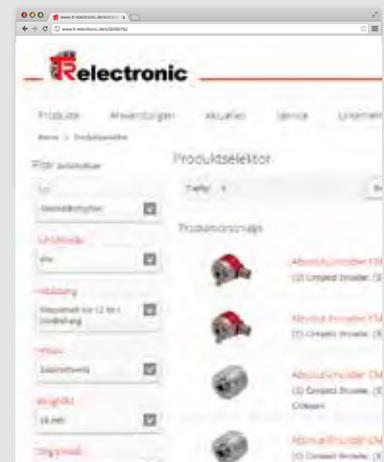
2.a) Scan QR code



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



3. Detailed selection in TR product selector



3rd step

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

Optional – further product information

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

Here you will find data sheets

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

Further product information

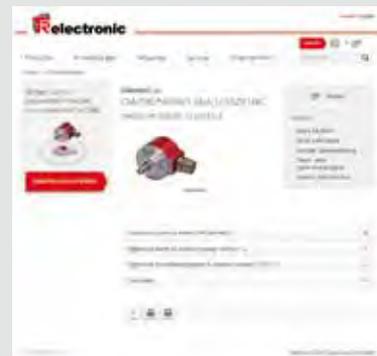
1. Enter order code into ...



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



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

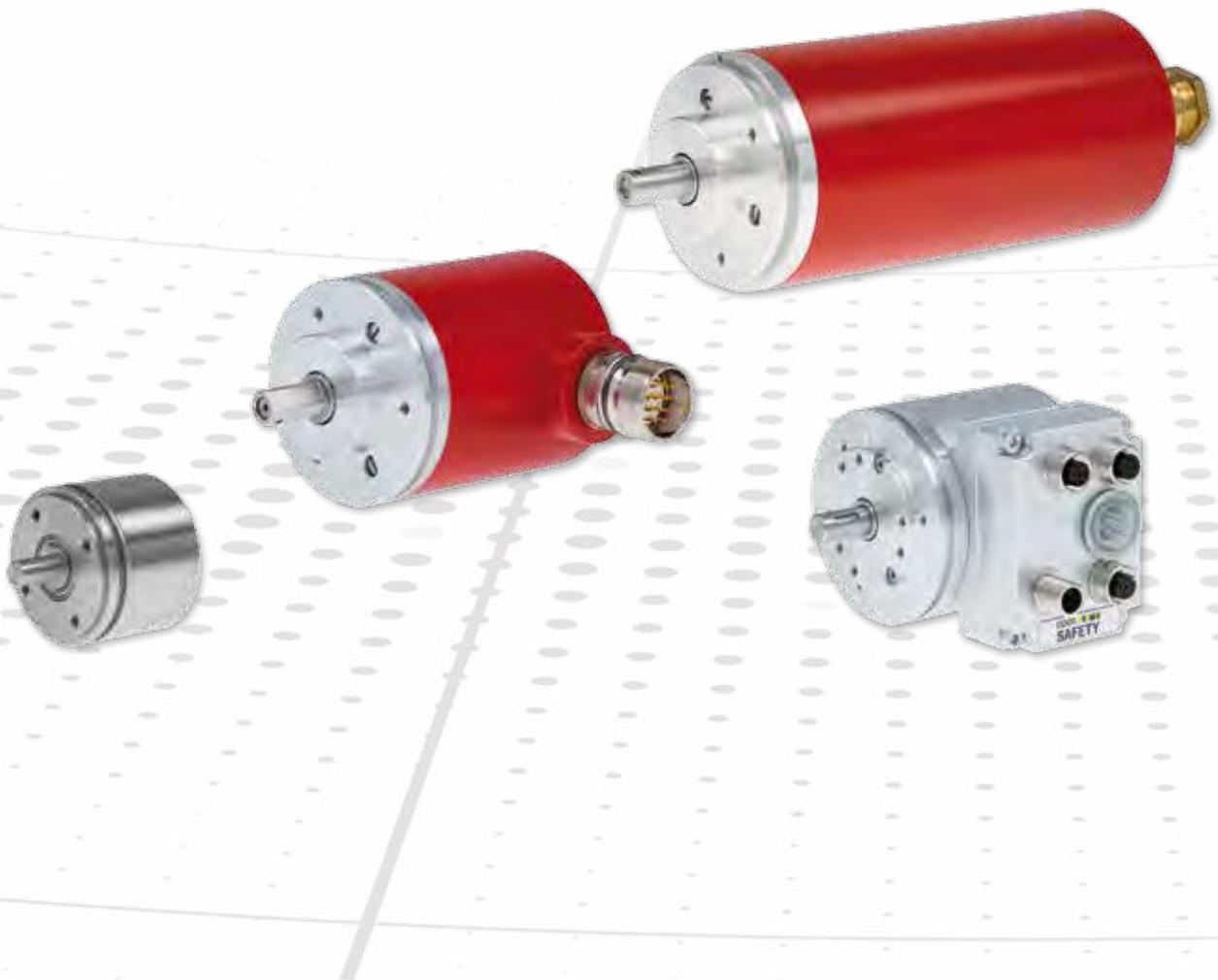


experience and the fresh inspiration provided by qualified new employees ensures a competitive advantage in terms of the functionality, quality and cost efficiency of our product range, both today and in the future.

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



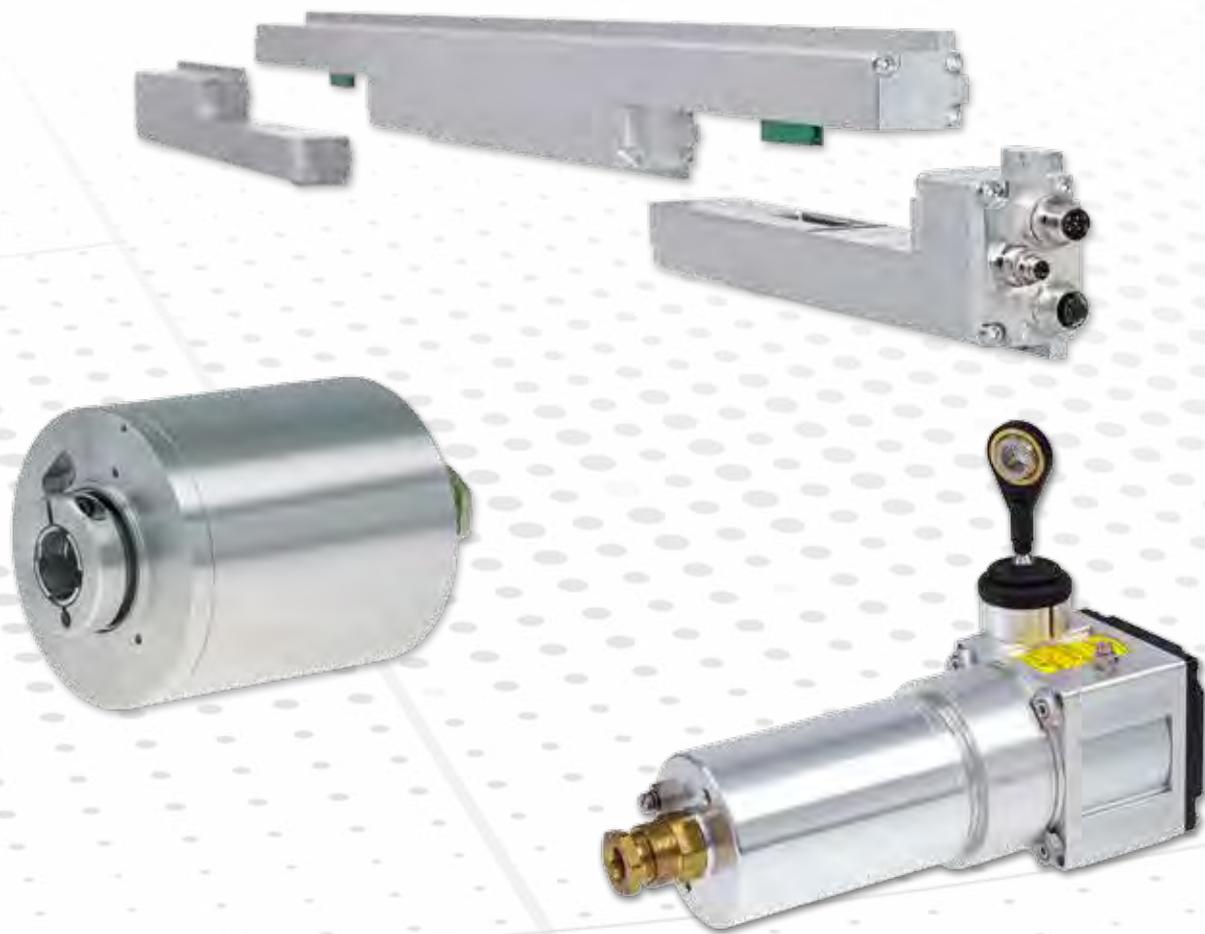
TR expertise



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

Functional Safety

Many applications in automation technology demand the highest safety requirements.

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

Development and production are certified by independent bodies.

Absolute rotary encoder with SIL3 / PLe

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

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

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

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

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

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

Incremental rotary encoder with SIL3 / PLe

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

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

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

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



Cascadable linear encoders up to 20 m

Wire-actuated encoders are subject to wear, while laser measuring systems cannot acquire several positions simultaneously in the same clear width. Magnetic tapes are susceptible to ferromagnetic chips, position marks read optically with readers can become soiled, and magnetostrictive measuring systems are limited in their measuring length. Glass scales are priceless from certain measurement lengths. With patented LMC 55 we close this gap: Up to 30 positions are acquired simultaneously. The moving part is a passive magnet, which does not require a power supply. The measuring system is only assembled to the full measuring length in the machine, and the individual parts are convenient (2 m long) to transport and store. The final measuring length is defined in situ by connecting the intermediate elements together to the desired overall length. Up to 20 m absolute position detection is supplied as standard (special lengths on request).

Advantages

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

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

Laser distance measurement up to 240 m

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

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

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

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

Advantages of LE200

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

Advantages of LLB65/LLB500

Analog and PROFIBUS-DP interface

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

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

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

Seal Pack – salt water-resistant housing

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

Further options

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

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

Intelligent compact drive technology

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

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

Interfaces

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

Wide variety of interfaces

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

Interface combinations

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

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

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

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

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

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

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

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

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.

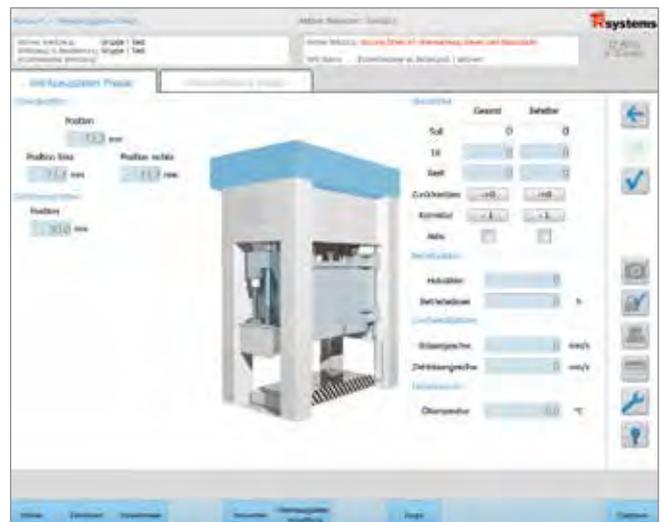
Individual visualization systems

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

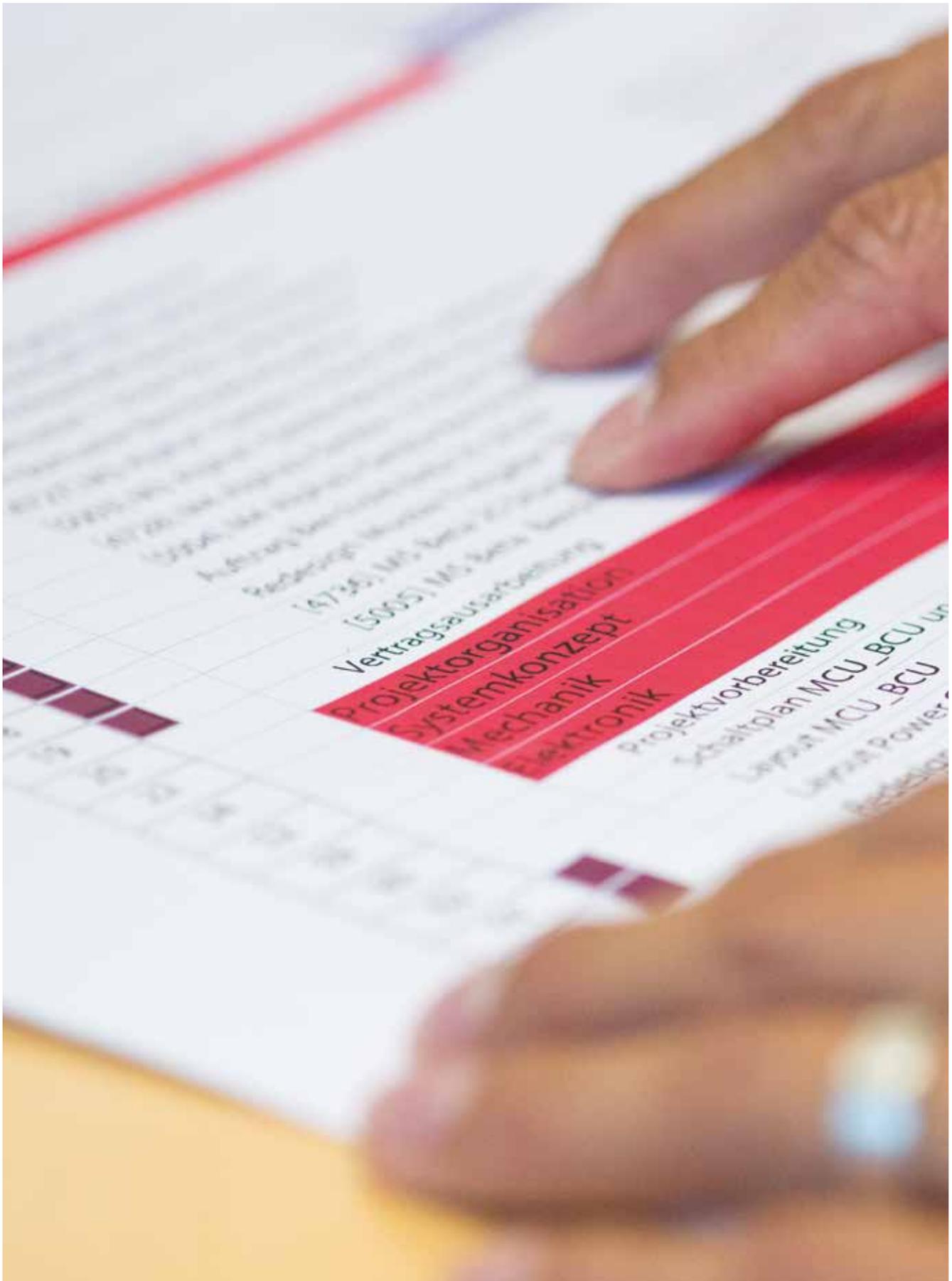
Deformations and material damage can mean the end for the system. It must therefore operate safely within defined load limiting ranges.

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.

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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 314
_ Draw-wire encoders	Page 270
_ Laser distance measurement.....	Page 364
_ Industrial PC	Page 494

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

Access information even faster:
by scanning the QR code.





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Printing technology and paper processing

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

Successful products in the field of printing technology and paper processing

_ Absolute rotary encoders	Page 36
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_ encoTRive compact drive	Page 386
_ Industrial PC	Page 494

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

Access information even faster:
 by scanning the QR code.





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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 36
- _ Heavy-duty absolute rotary encoders Page 192
- _ High-resolution linear measuring systems Page 356
- _ Sensors for punching and forming processes Page 534

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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_ Safety rotary encoders.....	Page 160
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All information and data can be found at:
www.tr-electronic.com/applications/event-technology

Access information even faster:
 by scanning the QR code.





Woodworking

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

Successful products in the field of woodworking

- _ Linear position sensors Page 316
- _ Decentralized positioning drives Page 386

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

Access information even faster:
by scanning the QR code.





Renewable energies

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

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

Successful products in the field of photovoltaic systems

- _ High-resolution rotary encoders..... Page 36
- _ Safety rotary encoders..... Page 160
- _ Decentralized positioning drives Page 386

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 36
- _ Programmable incremental rotary encoders Page 218
- _ Decentralized positioning drives Page 386

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

Access information even faster:
by scanning the QR code.





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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

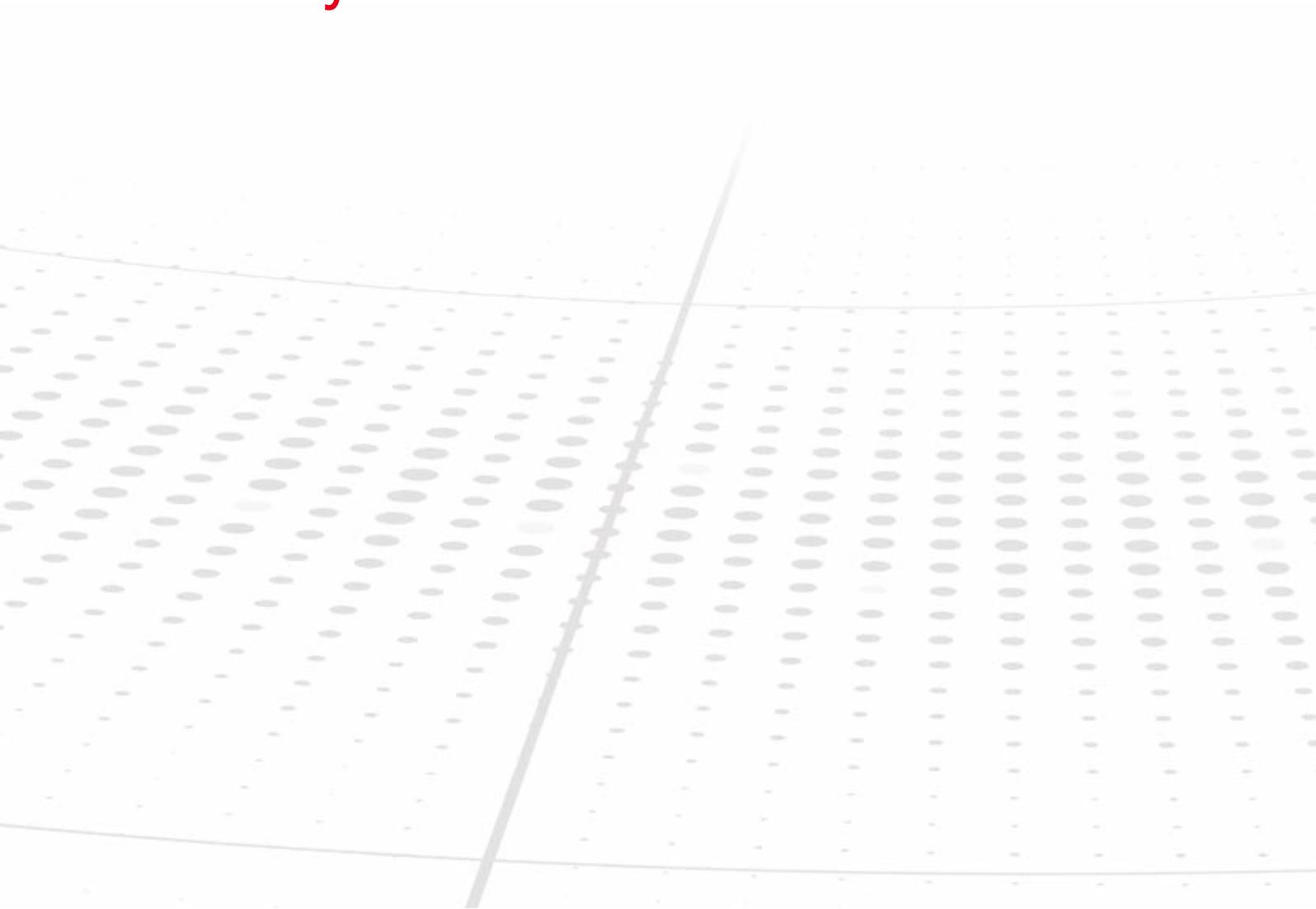
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All information and data can be found at:
www.tr-electronic.com/applications/plastics-processing

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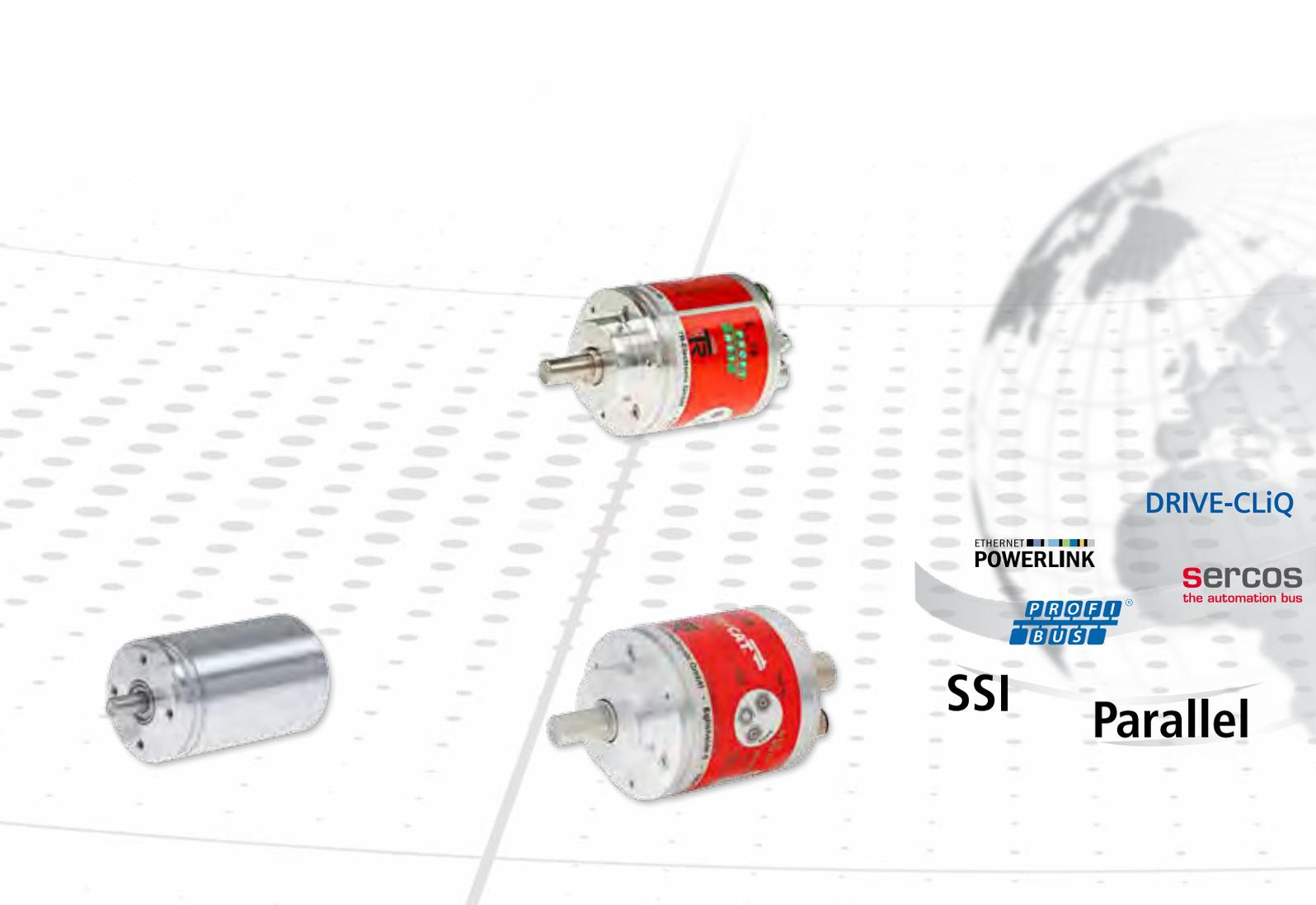
Rotary Encoders



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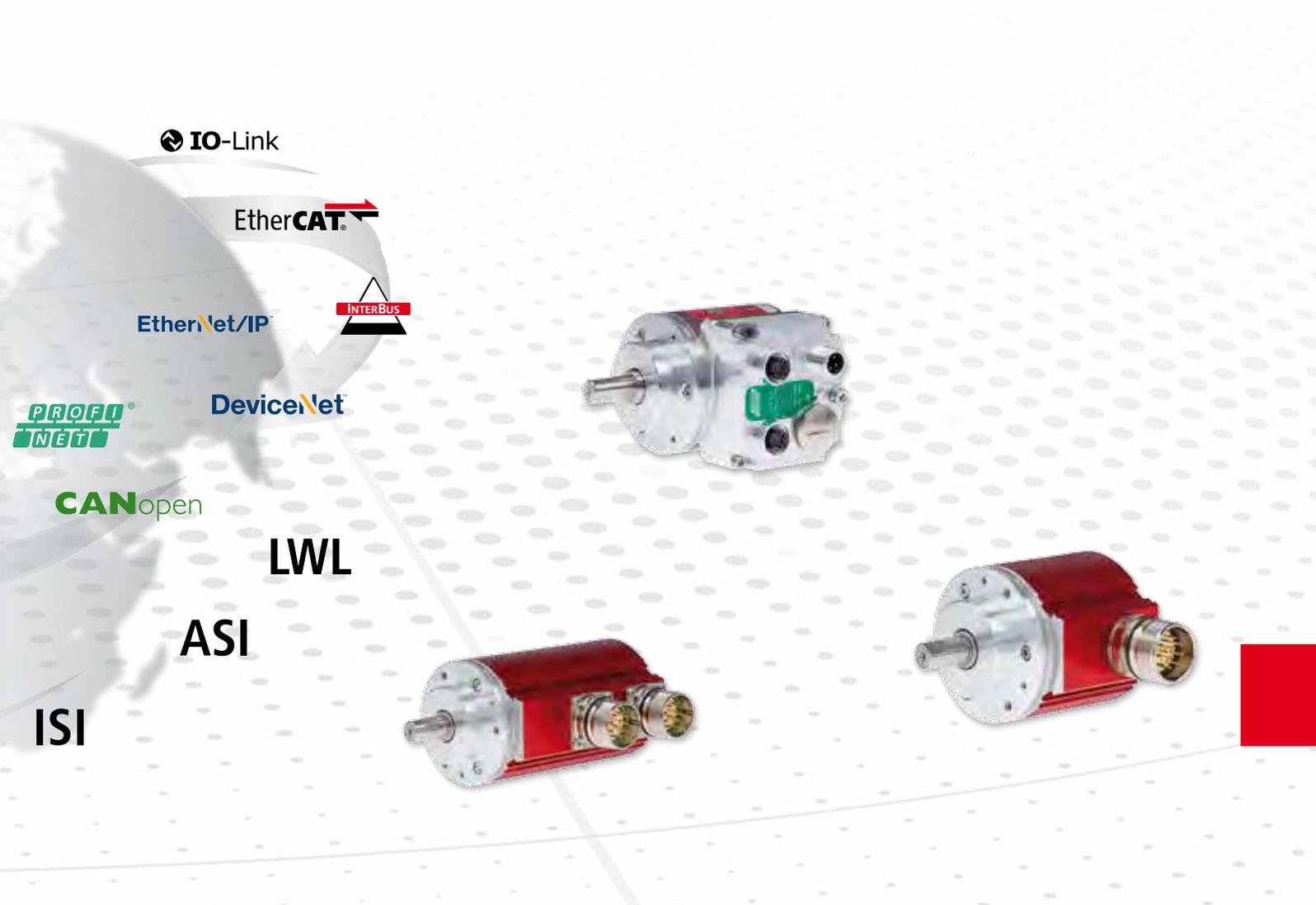
Absolute Rotary Encoders



Rotary encoders for industrial applications

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

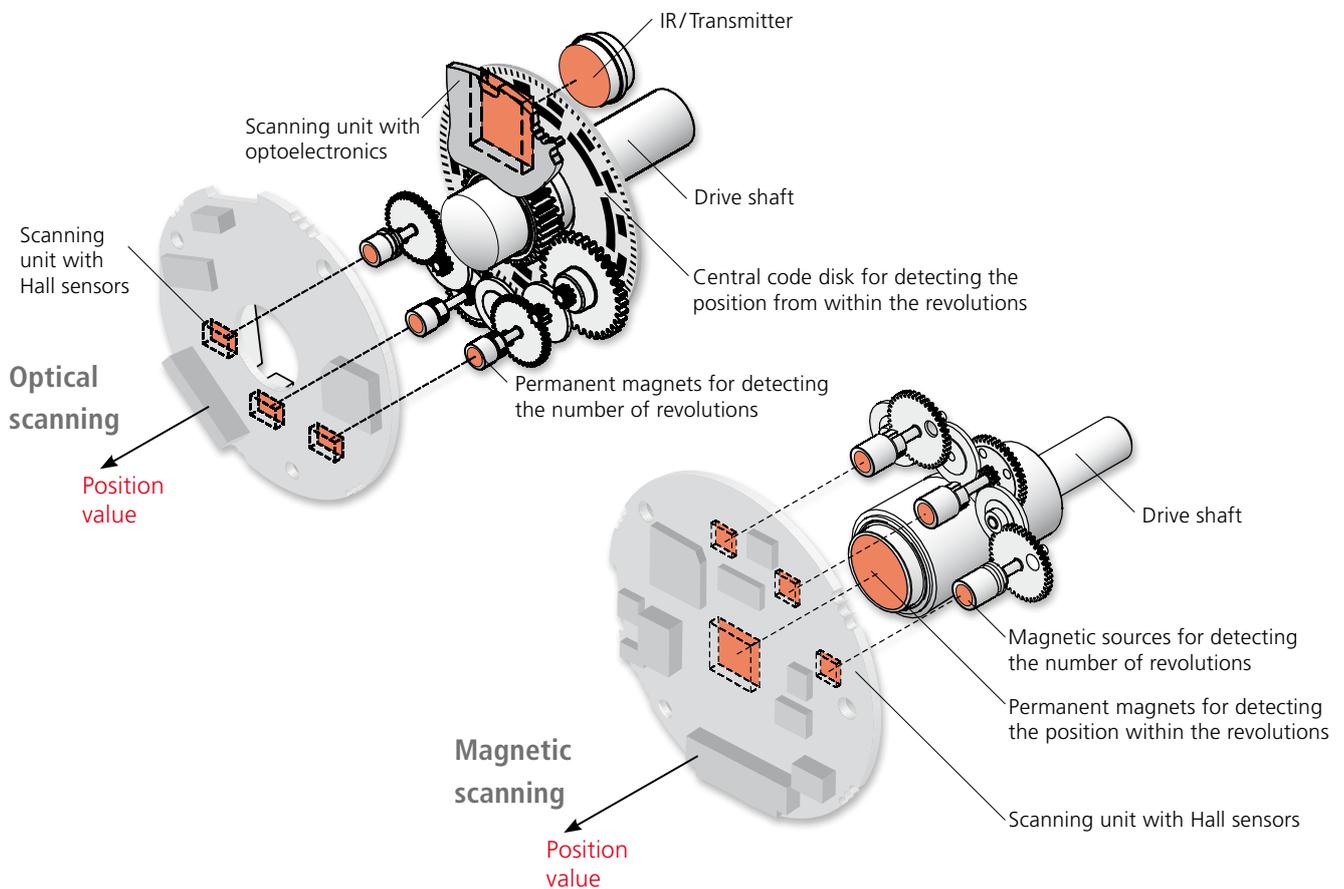
In addition to high-quality rotary encoders for almost every application, we also offer extensive accessories such as programming tools, displays and assembly components for quick and simple implementation and seamless integration into your processes.



Content

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Scanning – Optical and magnetic



Three detections for perfect cost-benefit ratio

O High-resolution optical scanning

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

E Optical scanning for standard applications

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

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

M Magnetic scanning for price-sensitive applications

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

Shaft types

Solid shaft



Blind shaft



Hollow shaft



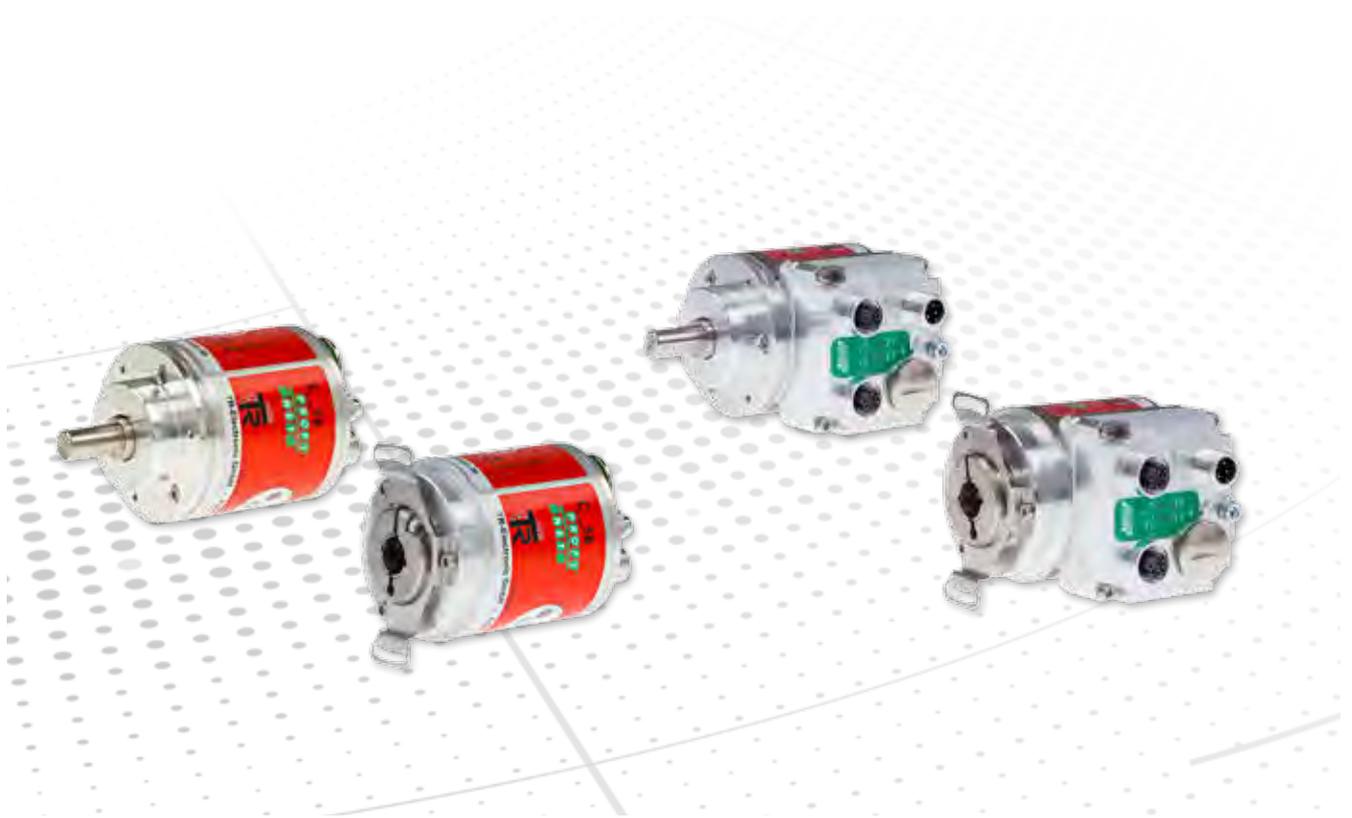
Persistent machine concept

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

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

Important: not all possible combinations will be shown.

C__582 – the next generation: Standard size with outstanding features



_ Efficient design

Everything the application needs – reduce to the max.

_ Robust magnetic multiturn rotary encoder CM_582

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

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

Plenty of shaft diameters, flanges and torque supports
make the magnetic encoders CM_582 fit into the mechanic
surroundings of many applications.

_ Precise optical multiturn encoder CE_582, CO_582

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

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

CE_582 and CO_582 add hollow-through shafts with
diameters up to 15 mm to the standard range of solid and
slip-on blind shafts and flanges.



_ Connectors axial or radial

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

_ Update time <1 ms

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

_ Parameterizable gearbox

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

_ Easy installation with open configuration options

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

_ Speed output with adjustable averaging

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

_ Alarms and diagnostics

How's about my machine? To know that at any time is one of the core aspects of industry 4.0. Be it capacity utilisation or upcoming services: C__582 provides all necessary alarms and diagnostic messages for long term machine and plant surveillance.

_ Latest communication standards for Industry 4.0

The new C__582 generation of industrial standard rotary encoders is rigorously equipped with state-of-the-art chip families.

_ "On the fly" preset for adjustment during the process

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

C__582 – the next generation: Standard size with outstanding features



_ Free mapping of process data in Ethernet Telegram

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

_ Software-Cams

Since industrial revolution, cams were a propriate way to control automated processes. At first with mechanical camshafts and then with electromechanic cam switches. Now, cam signals are calculated in the central control - or, even more comfortable - directly in C__582 ETC. Cam signals are mapped arbitrarily into the process data channel and are available to other bus nodes.

_ Distributed Clocks down to 100 μ s cycle time

For precise position and path control of moving axes, all sensors and actors involved must be synchronized. With EtherCAT, this is achieved by distributed clocks. The smallest possible cycle time in C__582 is 100 μ s.



_ Firmware Update via TCP/IP

Computer and smartphones are the role model: New functionality by new firmware. New firmware for C__582 EIP can be loaded via the asynchronous TCP/IP-cannel. Existing hardware is future-proof and can be equipped even for new applications.

_ Device Level Ring DLR

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



_ Encoderprofile

C__582 EPN consequently supports the EPN-Encoder profile of Profibus International standardisation organisation.

_ Profinet with IRT

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

_ Neighborhood detection

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

_ Fast Startup for quick system availability

C__582 PROFINET starts faster than any other bus rotary encoder. Once configured a stable, valid absolute position value is available in the PROFINET control just a few instants after restoration of supply. System startup is greatly accelerated and modular machine concepts in particular (with periodically decoupled modules) benefit directly from this technology.*

_ Media-Redundancy Protocol for highest reliability

One ring for reliability. The PROFINET interface of the C__582 supports the innovative Media Redundancy Protocol MRP. Normally PROFINET only supports a linear/tree structure. A redundant connection is not primarily provided as standard. MRP significantly increases availability with one simple device! Branches are connected to a ring with an additional line from the last node to the next switch. The appropriately configured nodes detect this. One of the nodes now disconnects this ring, by "ignoring" the second connection. If a connection fails (due to cable breakage or failure of a node), the nodes detect this and attempt to find another way to the rest of the system. The previously opened connection is now closed and all nodes are reconnected to the network.*

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

Numerous special functions within the 65 mm housing

Space for more functions within the 65 mm housing

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

More interface possibilities

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

Common combination possibilities for point-to-point interfaces

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

Combination of fieldbus and point-to-point interfaces

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

Interfaces for special market niches

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

Generous connection space for fieldbuses

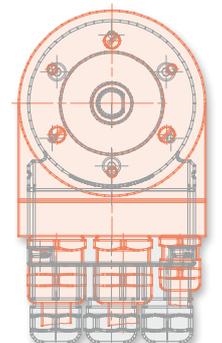
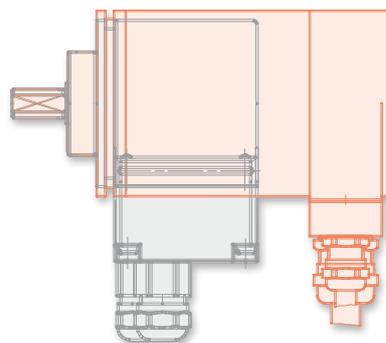
In special engineering applications, it has been proven that the use of cable from a roll to connect field devices saves costs. The cables will be cut and connected when installed. The fieldbus hood of the 65 mm series offers comfortable connection space. Less bend in the cable and a generous clamping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

Comparison of the models 58/65 mm-housing

58 mm-housing



65 mm-housing



58 mm-housing

65 mm-housing

Safety rotary encoders

Possible application areas

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

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

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

Common work areas of men and machines –

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

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

Synchronous run 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.

Safety rotary encoders



SIL and PL – two scales for safety

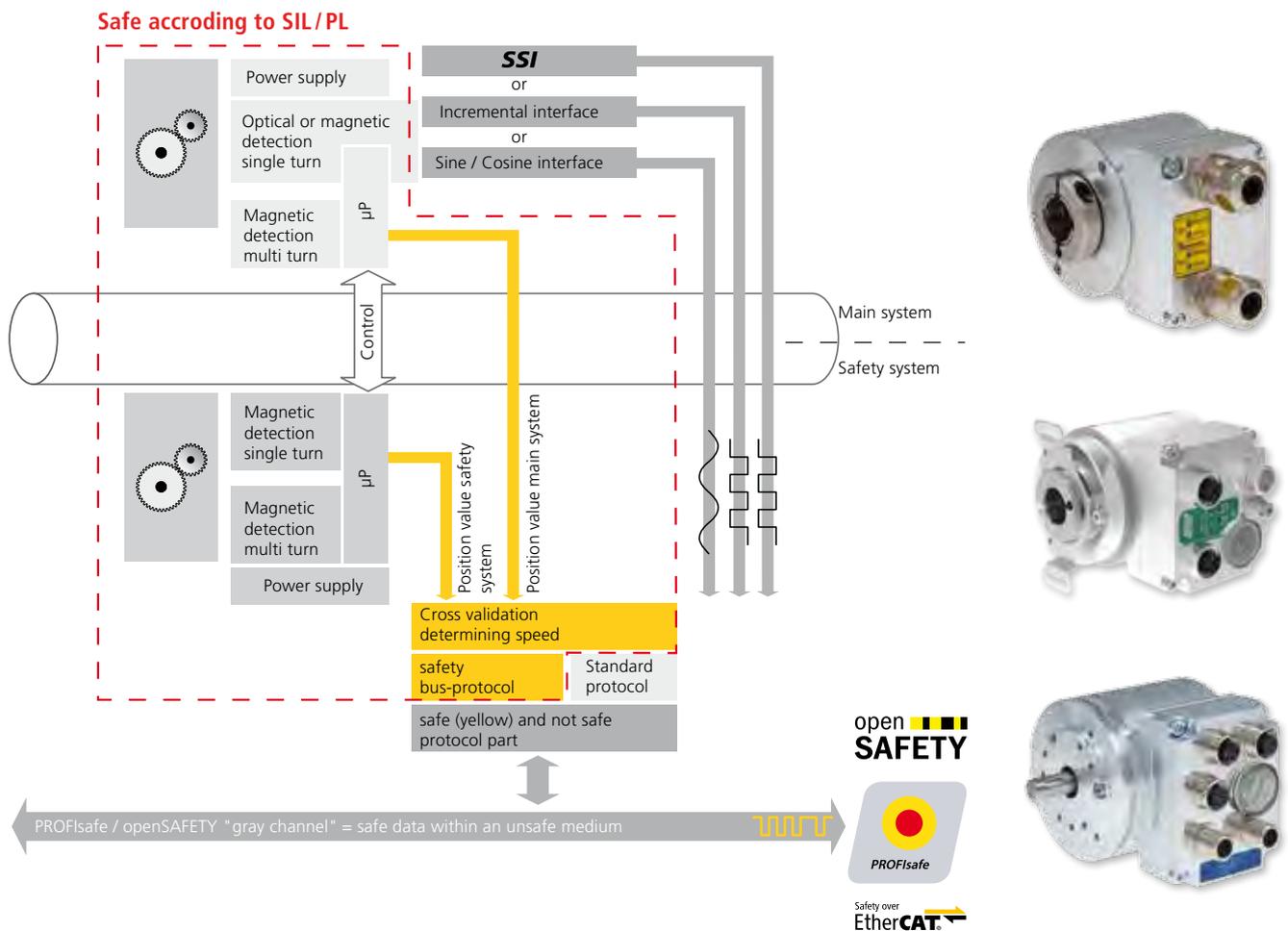
SIL

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

PL

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

Safety rotary encoders



Rotary encoder, safe according to SIL 3 / PL

Within the revolution in system one the shaft position is detected with an optical or magnetic 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 detection gives out incremental signals. Choose between SSI, rectangle or sine/cosine outputs. with various resolutions.



©Monhly/fotolia.com

Functional safety – plant safety and personal security

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

Current solution

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

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

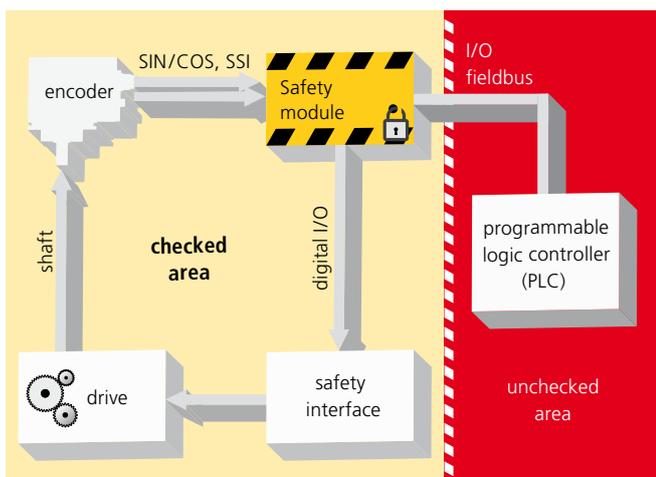
Certified solution

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

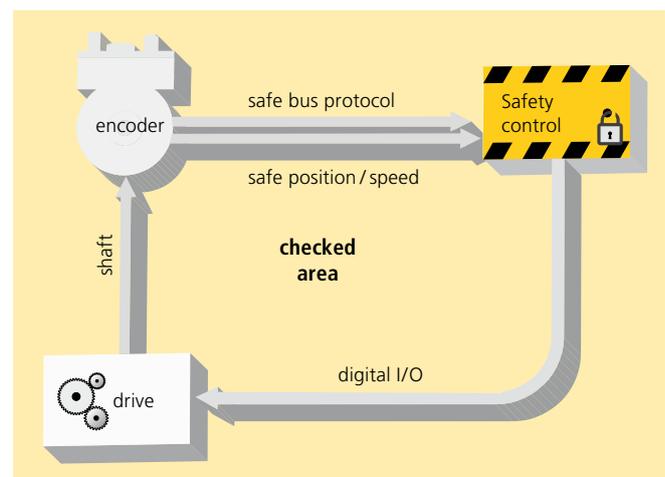
*German Association for Technical Inspection

Conventional Standard versus Integrated Safety

Conventional Standard



Integrated Safety with FS-encoder from TR



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 safety certified encoders

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.

CD_582+FS – functional safety in standard industrial form factor



Technology

_ Efficient design

Everything the application needs – reduce to the max.

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

CD_582+FS are developed and certified according the two leading standards for devices providing integrated safety. Most application standards refer to these basic standards and thus CD_582+FS fits into these applications.

_ safety validated process data

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



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

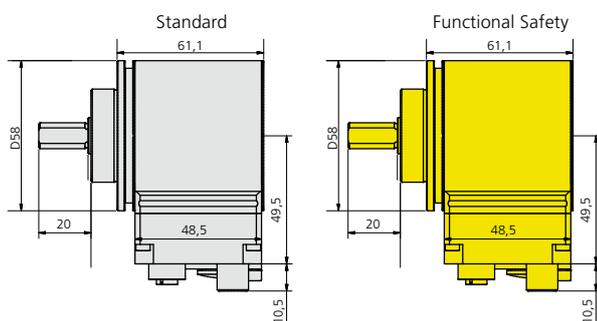
SIL 2 or SIL 3 – use the same mechanical and electrical features with precise the safety level your application needs.

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

CD_58+FS was designed with category 4 architecture in focus. That means that you can replace existing solutions with two separate encoders on a common shaft by this one-piece-solution.

Mechanics

_ Mounting space



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

_ Robust magnetic/optic multiturn rotary encoder CD_582M+FS

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

_ rugged double magnetic multiturn rotary encoder CD_582MM+FS

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

Solid shaft

Blind shaft

Hollow shaft



C__582 – the next generation: Standard form factor with so many possibilities

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

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

- Shafts with form closure

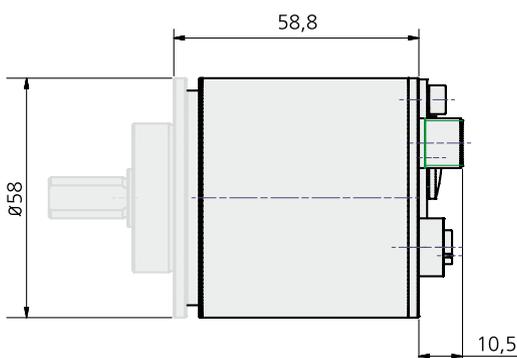
Solid shaft, blind shaft or hollow shafts are connected by form closure (keyway) to the driving shaft.



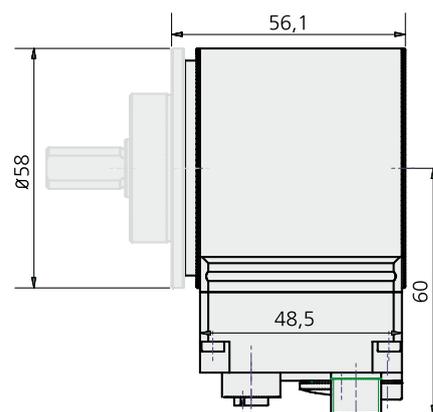
- Connectors axial or radial

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

Connectors axial



Connectors radial



_protective bearing



CD_582+FS can be equipped with a rugged bearing unit. This bearing unit handle big forces on the shaft. Application with driving chains or belts are possible.

Interface

_Parameterizable gearbox

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

_Easy installation with open configuration options

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

_Speed output with adjustable averaging

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

_Alarms and diagnostics

How's about my machine? To know that at any time is one of the core aspects of industry 4.0. Be it capacity utilisation or upcoming services: C__582 provides all necessary alarms and diagnostic messages for long term machine and plant surveillance.

_Latest communication standards for Industry 4.0"

The new C__582 generation of industrial standard rotary encoders is rigorously equipped with state-of-the-art chip families.

_Reset switch

CD_582+FS is equipped with a hardware reset switch. This resets the encoder to delivery state (factory settings) without the use of an engineering system or programming device.

C__582 – the next generation: Standard form factor with so many possibilities

PROFINET / PROFI-safe



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

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

_ TCI implementation

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

_ Legacy-Mode

CD_582+FS behaves identically to successful series CD_75 by setting up in legacy mode. Function blocks that are already in use in existing safety programmes may be re-used without big changes into new projects.



_ Encoder Profile 4.2

CD_582+FS EPN fulfils the Profinet Encoder Profile issued by Profibus-International user organisation for both, the grey and the secured data channel.

_ 32 bit data words

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

_ PROFINET with IRT

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

- _ Secondary interface: _ INK**
- _ SIN / COS**
- _ SSI**

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

_ Shared device / grey and safe world

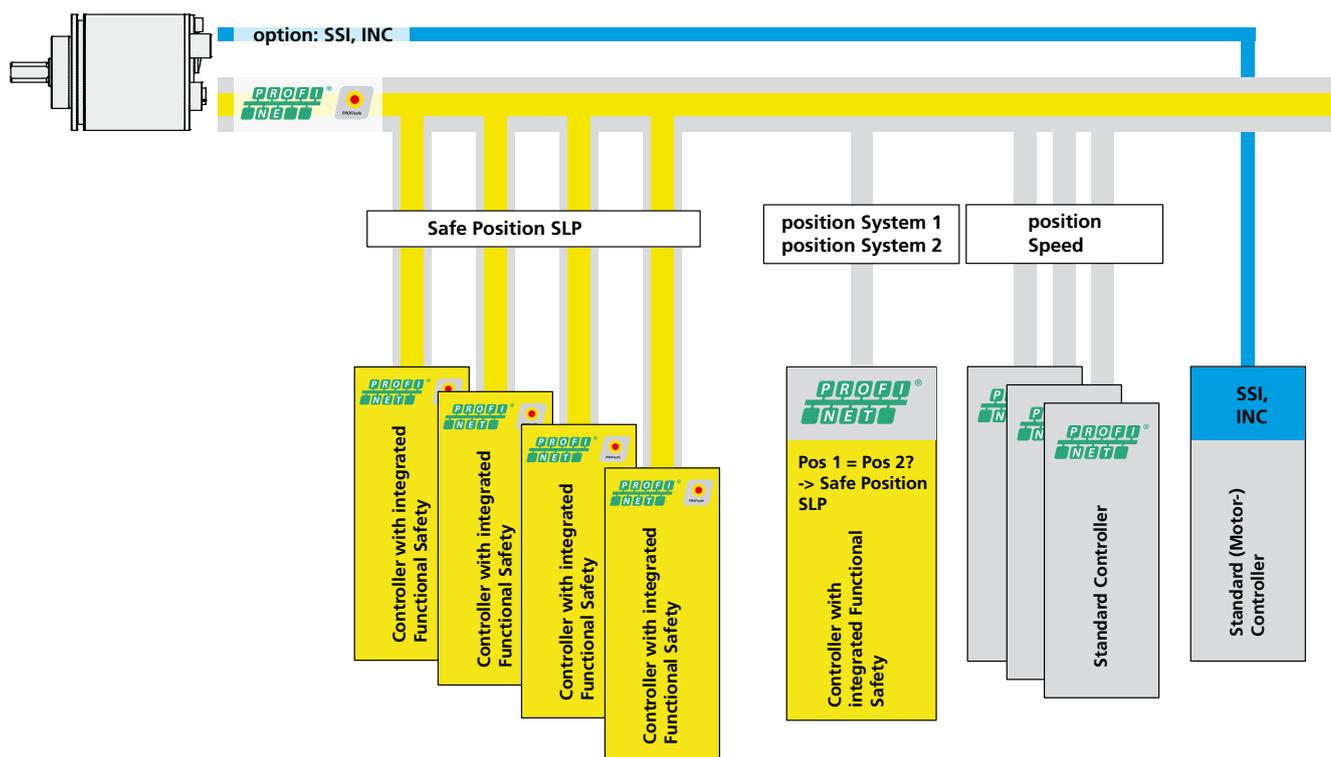
„Grey“ (non safe) position and speed values can be shared independently from one another. CD_58+FS can provide values the same time to a high speed controller and a safety control system.

_ Shared Device / up to 4 safety instances

Up to 4 safety controls can establish a secured communication channel to CD_582+FS. No more need to hand over secured position values from one to the other safety control.

_ Direct readout of the two encoder channels by bus

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



_ PROFISAFE V2.6.1

CD_582M+FS implements the basic protocol (BP) and extended Protocol (XP) according to PROFIsafe standard V2.6.1.

_ extended „F-Dest“-address

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

PROFINET / PROFIsafe

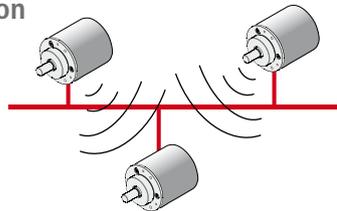
_ Reintegration after passivation

After a protocol failure, safety encoders enter a passive state. CD_582+FS can be reintegrated into safety control mechanism without a global system restart.

_ “On the fly” preset for adjustment during the process

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

_ Neighborhood detection



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

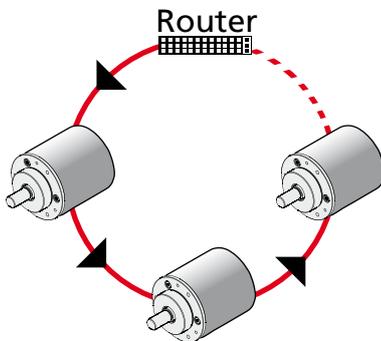
_ Fast Startup for quick system availability



The new CD_582M+FS PROFINET starts faster than any other bus rotary encoder. Once configured, a stable, valid absolute position value is available in the PROFINET control just a few instants after restoration of supply. System startup is greatly accelerated and modular machine concepts in particular (with periodically decoupled modules) benefit directly from this technology.*

*CD_582+FS EPN can be set up either for fast startup or media redundancy protocol.

Media-Redundancy Protocol for highest reliability



One ring for reliability. The PROFINET interface of the CD_582M+FS supports the innovative Media Redundancy Protocol MRP. Normally PROFINET only supports a linear/tree structure. A redundant connection is not primarily provided as standard. MRP significantly increases availability with one simple device! Branches are connected to a ring with an additional line from the last node to the next switch. The appropriately configured nodes detect this. One of the nodes now disconnects this ring, by "ignoring" the second connection. If a connection fails (due to cable breakage or failure of a node), the nodes detect this and attempt to find another way to the rest of the system. The previously opened connection is now closed and all nodes are reconnected to the network.*

Bus synchronized

Position detection of CD_582M+FS can be synchronized with bus clock. Unwanted dead times and jitter can be reduced to a minimum for perfect position control.

*CD_582+FS EPN can be set up either for fast startup or media redundancy protocol.

Absolute encoder with completely encapsulated electronics IM_36, CM_36S, CD_36S

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

Area of application

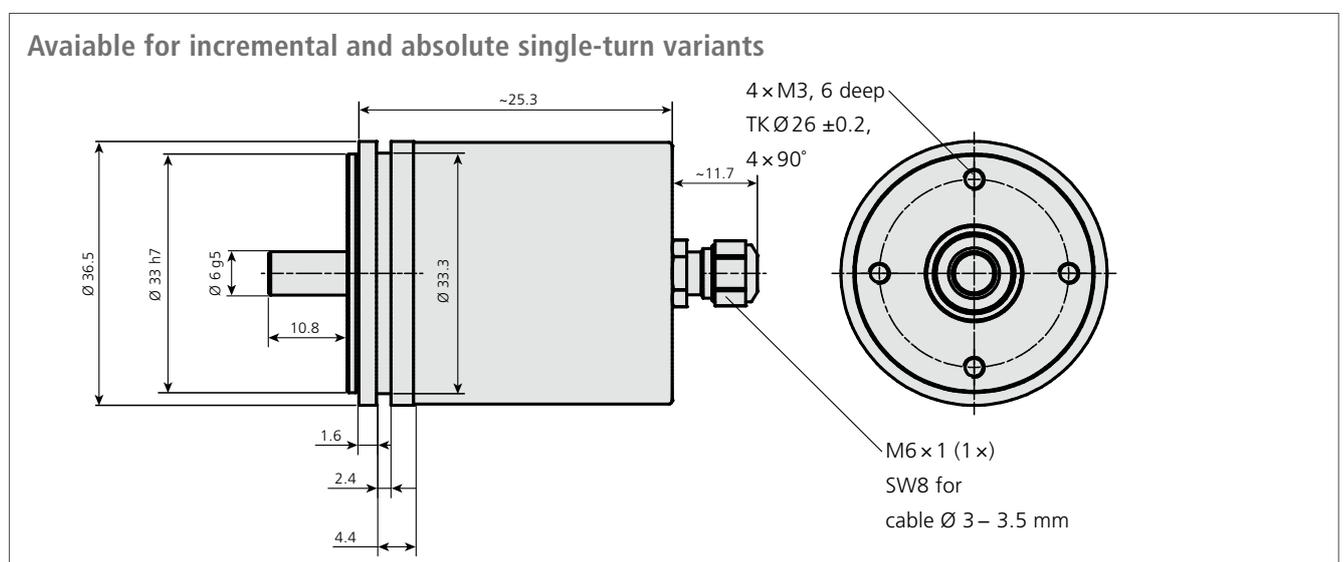
This standard applies to the IP protection classes for electrical fittings in road vehicles.



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

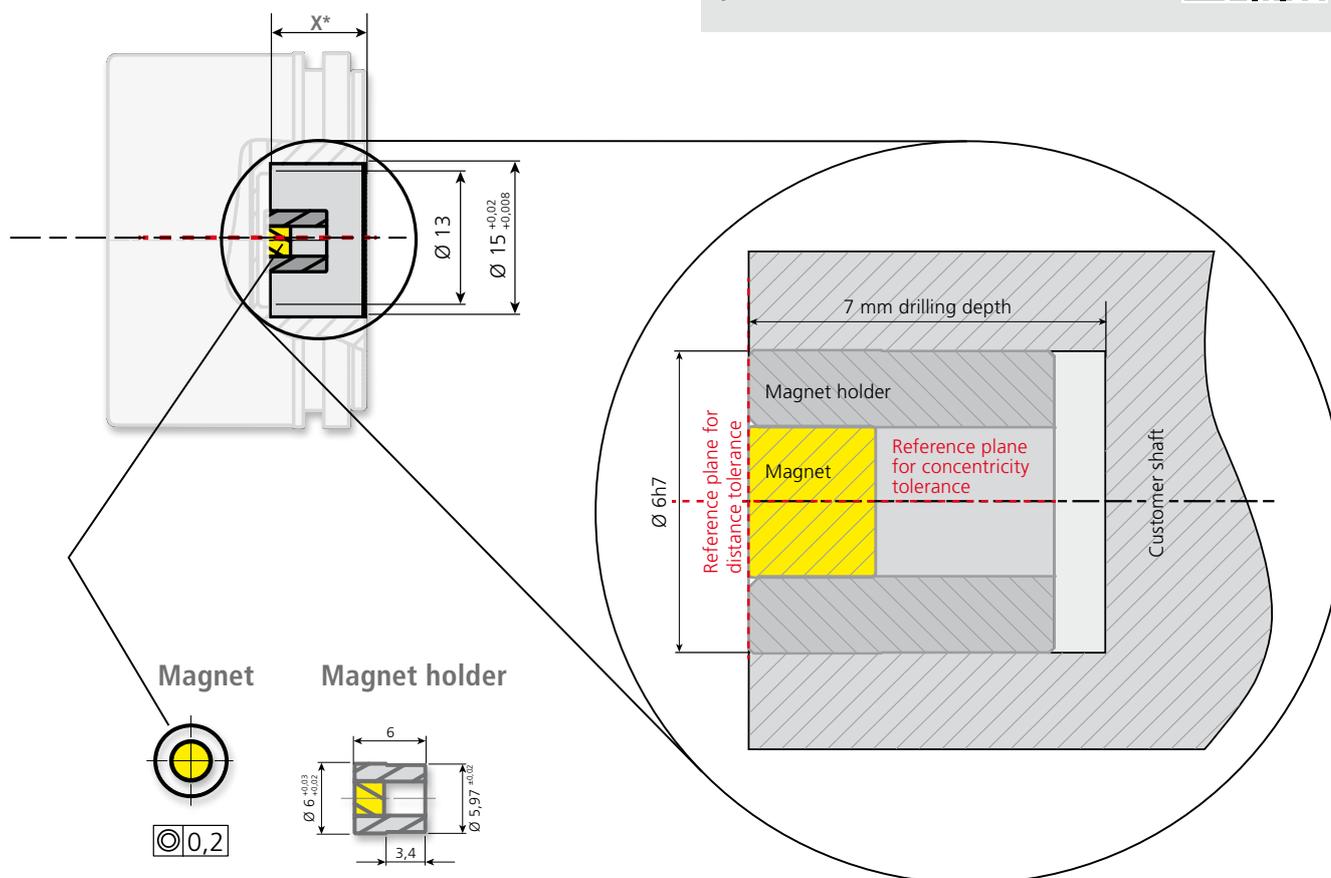
(order no. 49150092). The magnet holder is not part of delivery. Please order this item separately. Magnet holders in other sizes will be designed and delivered according to customers' specifications.

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.

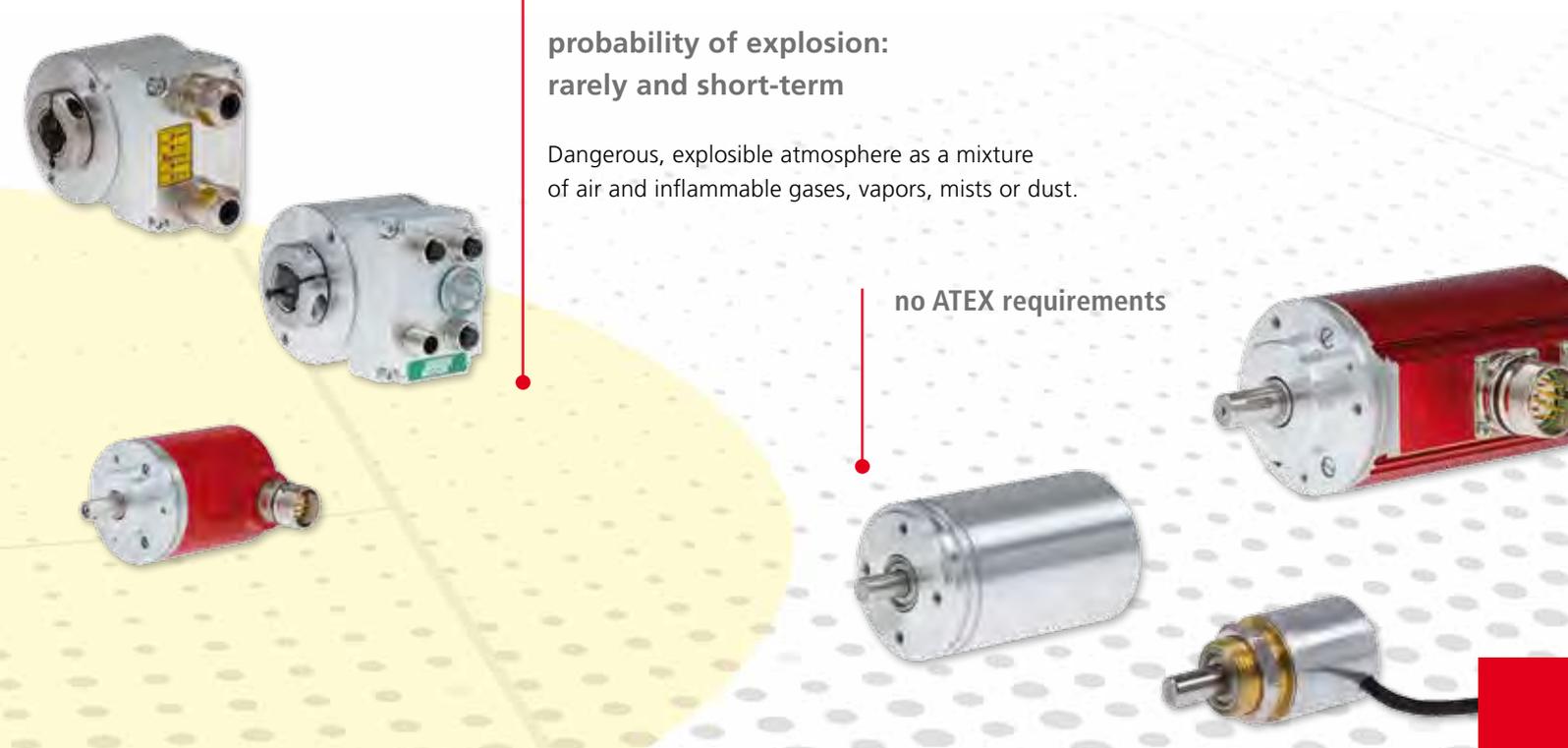
Additionally, a distinction is made between the risk category and the probability of a hazard occurring. Ultimately, the EX categories are allocated according to the degree of safety of the device. The table shows which specifications the device has to fulfill in order to be used in a specific zone.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

Zone 2 / 22

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

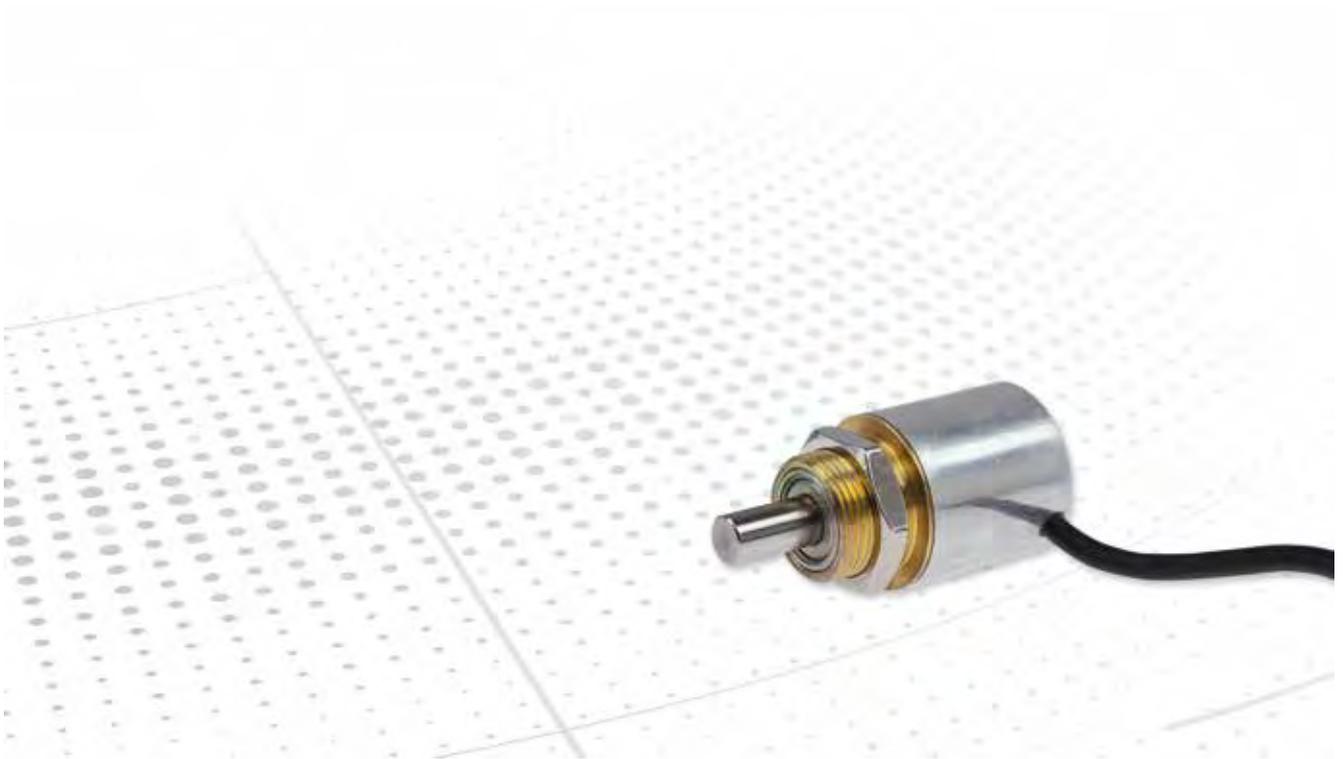
Dangerous, explosible atmosphere as a mixture of air and inflammable gases, vapors, mists or dust.

no ATEX requirements



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

Encoder - Family C__22 - Housing 22 mm



Tiny but an absolutely real encoder!

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

Application

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

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Magnet detection (M)

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

CMV22 - Analogue						
CMV22M-00008	4096	256	1/4"X12 M16X1	Open end	0,500 m	Analogue voltage
CMV22M-00013	4096	10	6,35GL/12 with groove M16X1	1X8P.M12-connector	0,360 m	Analogue voltage
CMV22M-00025	4096	256	1/4"X12 M16X1	Open end	0,500 m	Analogue current
CMV22M-00039	4096	4096	6GL/12,7 M16X1	Open end	1,000 m	Analogue voltage
CMV22S-00001	4096	1	1/4"X12 M16X1	Open end	0,500 m	Analogue voltage
CMV22S-00004	4096	1	1/4"X12 M16X1	Open end	0,500 m	Analogue current

CMV22 - SSI						
CMV22M-00005	4096	256	1/4"X12 M16X1	Open end	0,500 m	
CMV22M-00010	4096	256	1/4"X12 M16X1	Open end	0,500 m	
CMV22M-00037	4096	256	6GL/12,7 M16X1	Open end	10,000 m	
CMV22S-00003	4096	1	1/4"X12 M16X1	Open end	0,300 m	

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

Further product information

1. Enter order code into ...



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



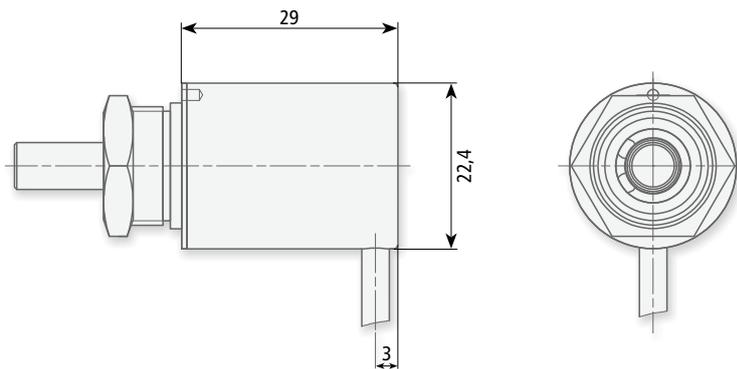
3. Choose desired information



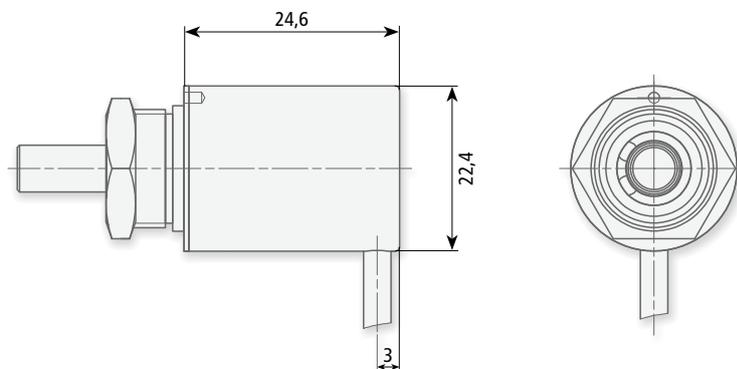
We will help you to select the most suitable products from the complete TR range. Please contact us (info@tr-electronic.de).

Dimensional Drawings

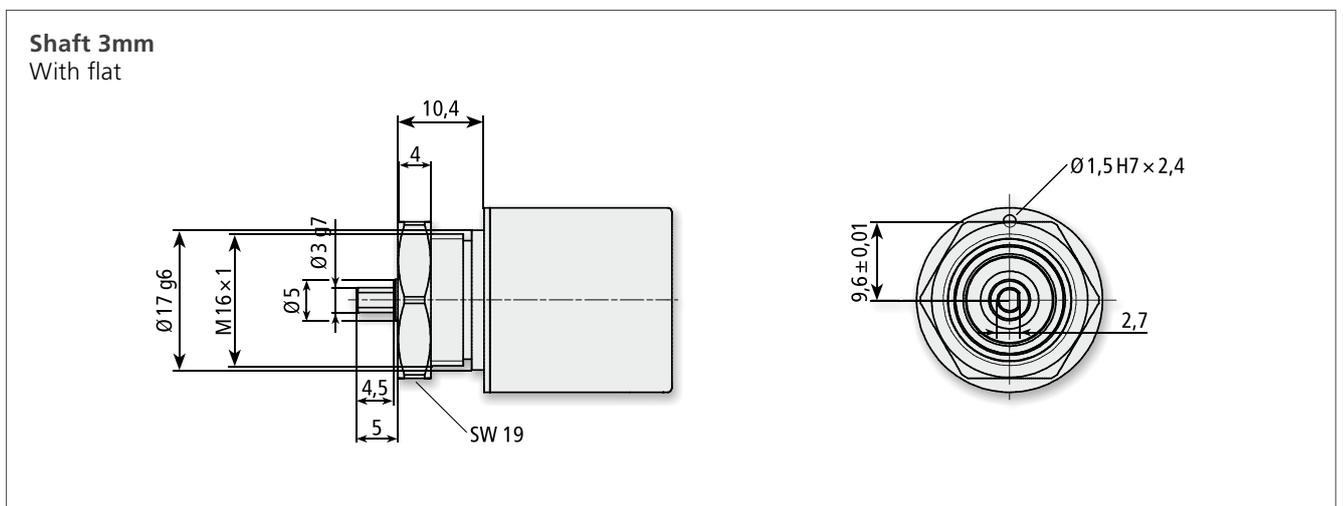
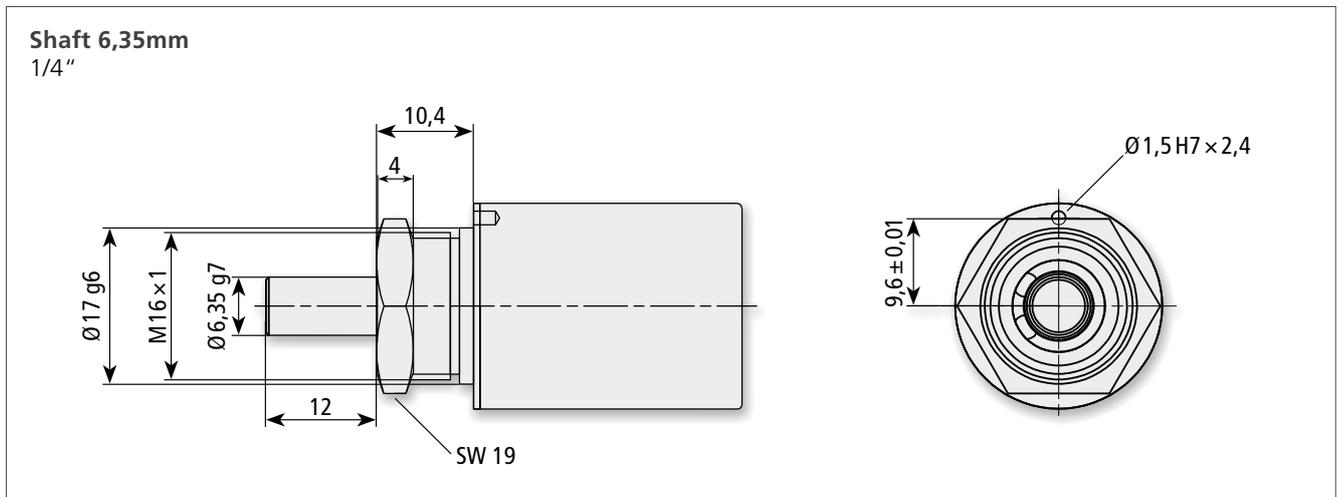
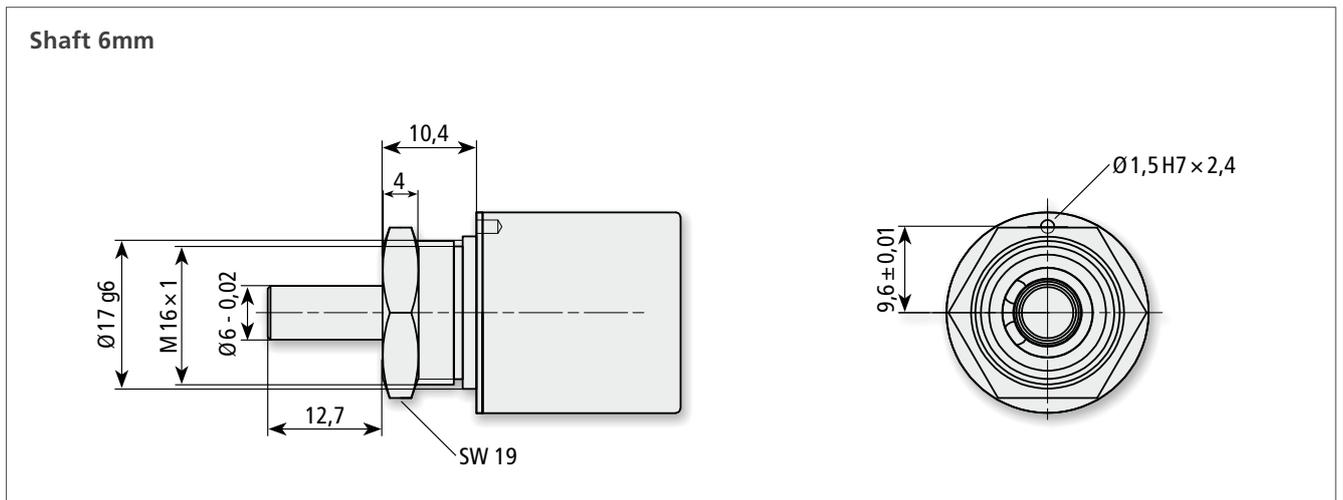
CMV22 Analogue



CMV22 SSI, ASI



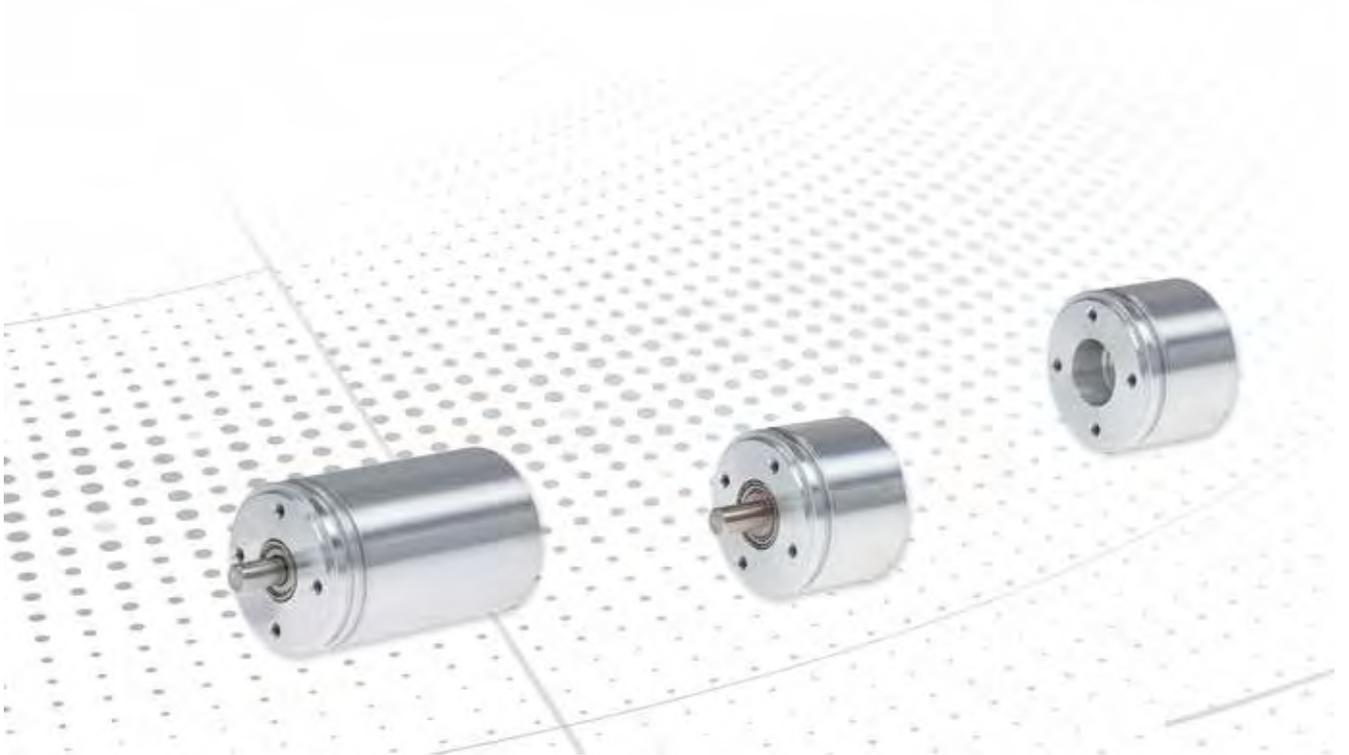
Shaft Types



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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Magnet detection (M)

Products	CMV36-S	CMV36-S+FS	CMV36-M
			
Detection	Magnet detection (M)	Magnet detection (M)	Magnet detection (M)
Single / multi	(S) Single	(S) Single	(M) Multi
Supply	11...27 VDC	11...27 VDC	11...27 VDC
Steps per turn	32, 40, 64, 80, 100, 128, 160, 200, 256, 320, 400, 500, 512, 1,000, 1,024, 1,600, 2,000, 2,048, 4,096, 8,192*	4096	32, 40, 64, 80, 100, 128, 160, 200, 256, 320, 400, 500, 512, 1,000, 1,024, 1,600, 2,000, 2,048, 4,096, 8,192*
Number of turns	1	1	4,096 (option: 16,777,216)
Shaft diameters available	6mm	6mm	6mm
Connectors	Cable gland axial	Cable gland axial	Cable gland axial, M12 axial (DRIVE CLiQ)
Maximum SIL/PL		SIL2/PLd	
Ambient temperature	-25...+70°C	-25...+70°C	-25...+70°C
Protection class	IP65 (option IP69k)	IP65 (option IP69k)	IP54 (option IP65)
Interface	SSI ASI Analog CAN	Analog	SSI  ASI CAN
Option, additional interfaces (on request)	INC	INC	INC
Weblink	www.tr-electronic.com/s/S007174		www.tr-electronic.com/s/S007175
QR-Code			

*Factory set

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

Magnet detection (M)

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

*Factory set

Magnet detection (M)

Optical 15 bit (E)

Optical 18 bit (O)

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

*Factory set

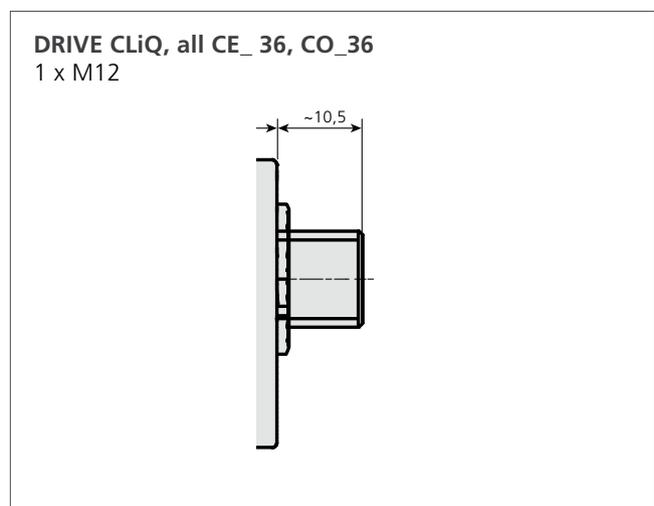
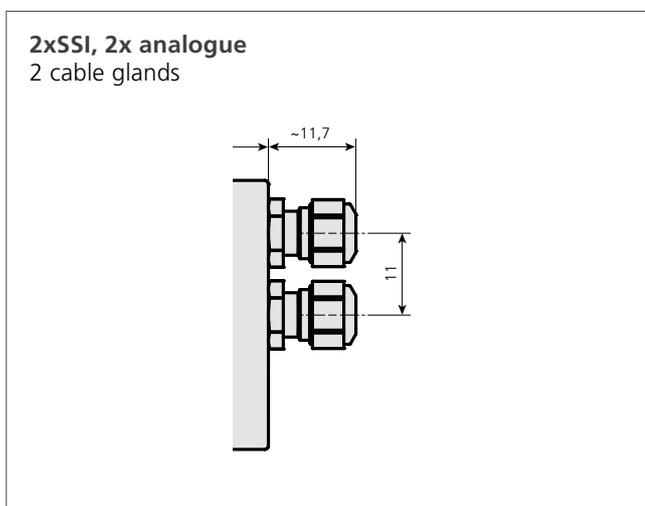
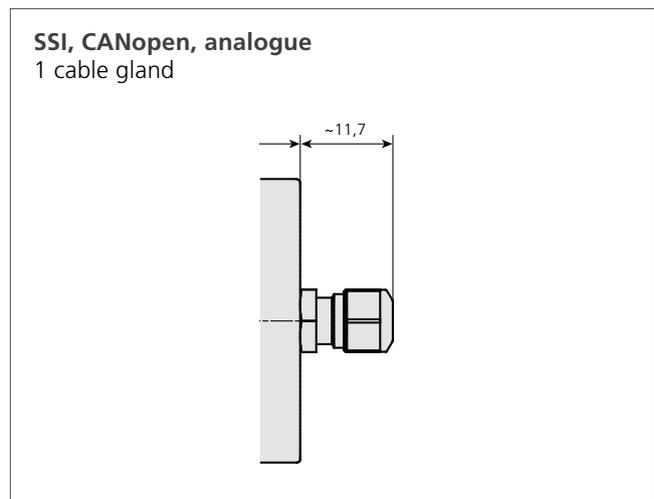
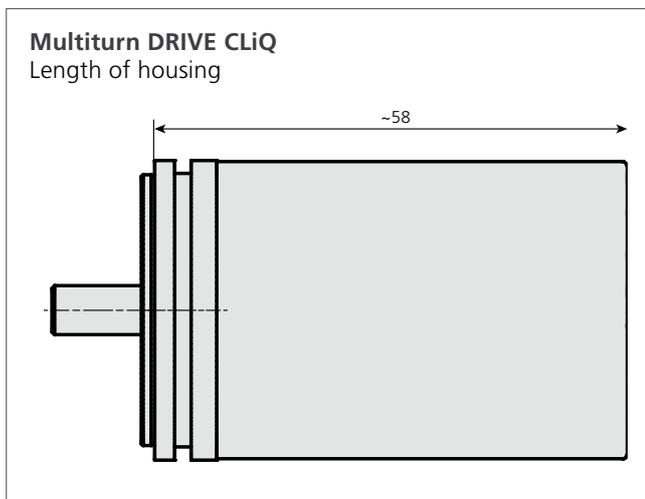
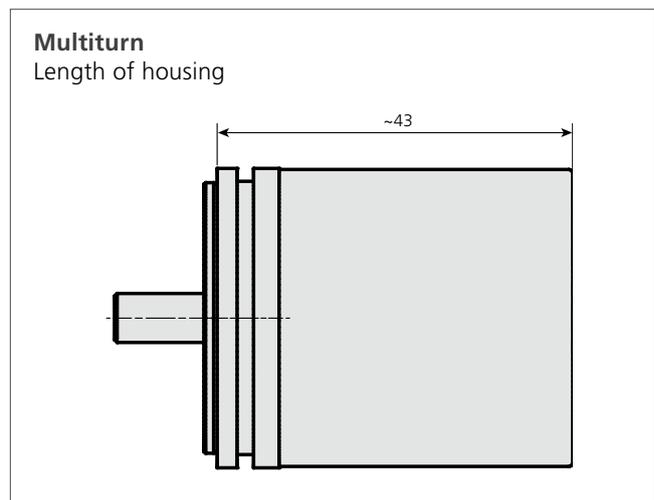
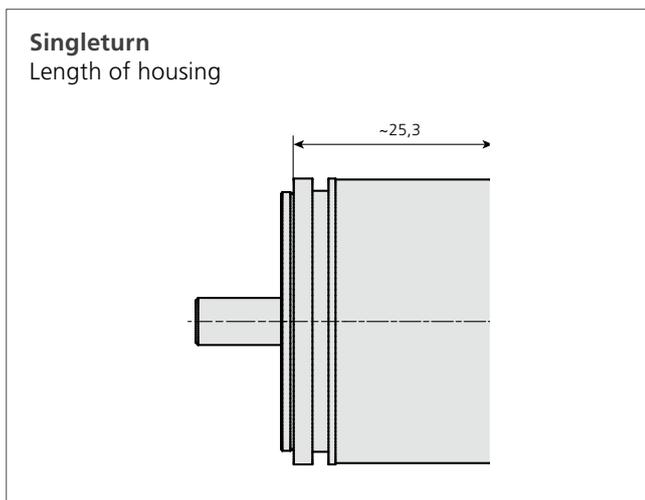
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Suggested Products

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

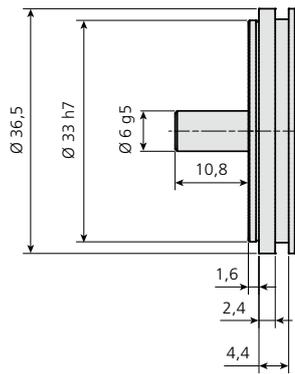
For further product information simply enter the order number in the search field at www.tr-electronic.com.

Dimensional Drawings

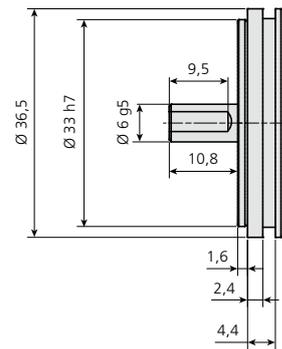


Flanges

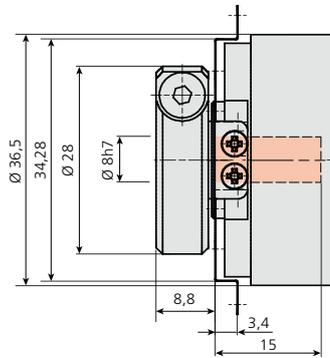
Solid shaft
6GL10,8 (round shaft)



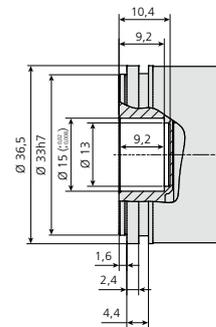
Solid shaft
6FL10,8 (shaft with flat)



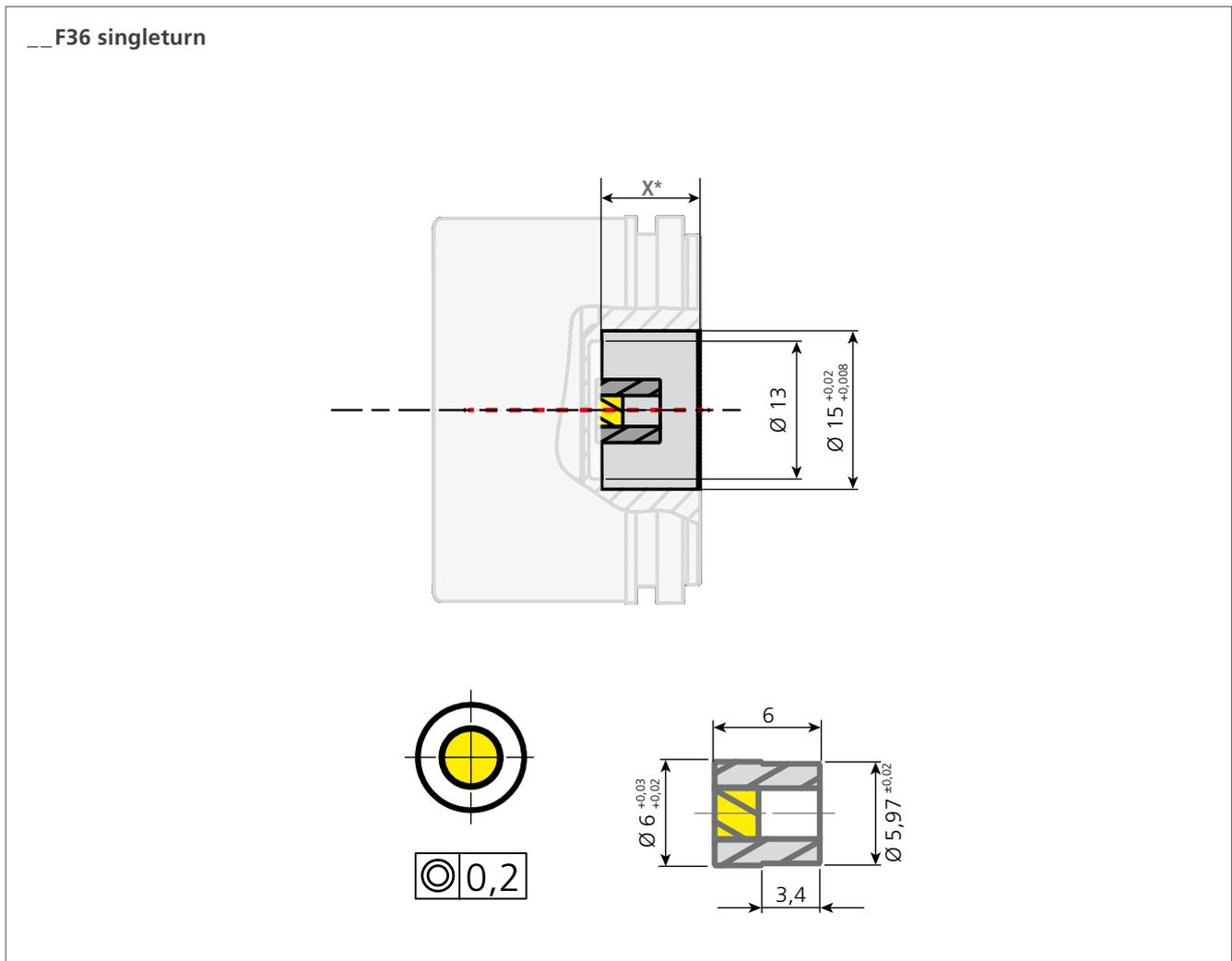
Blind shaft
8h7



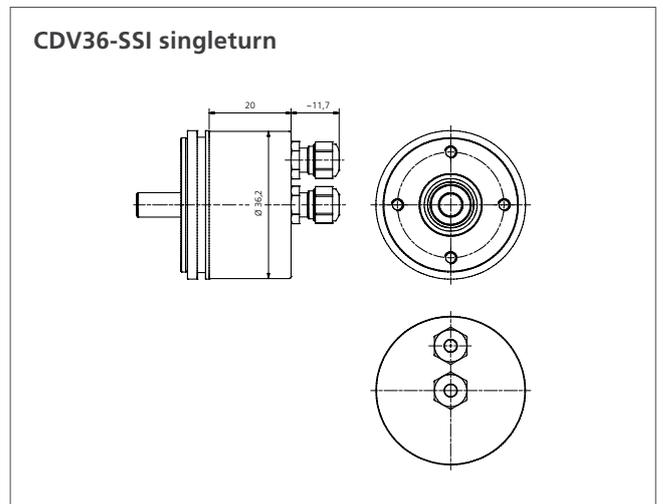
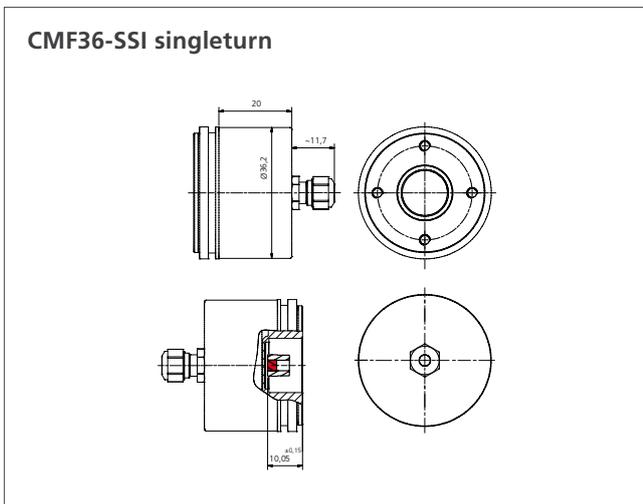
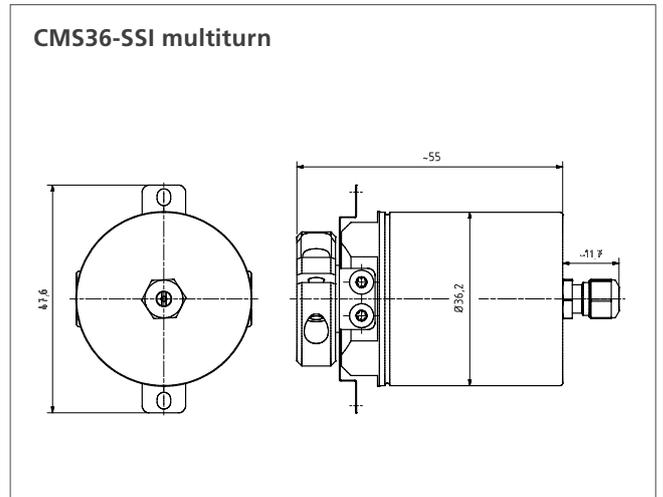
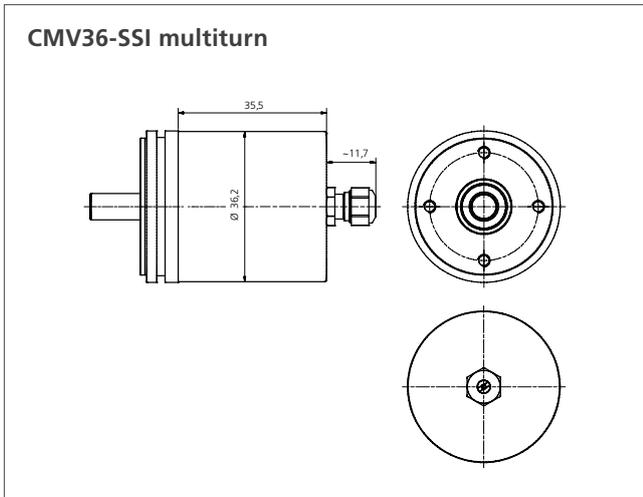
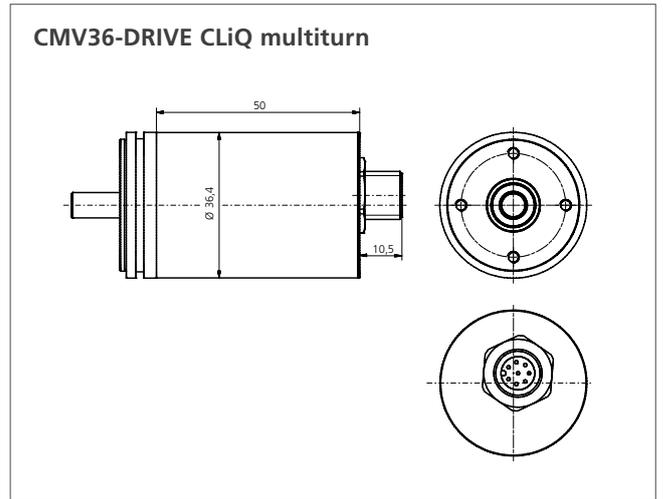
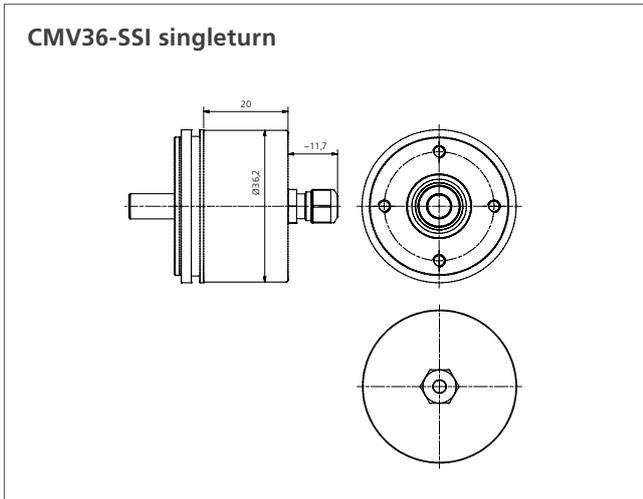
Bearing free



Assembly Examples

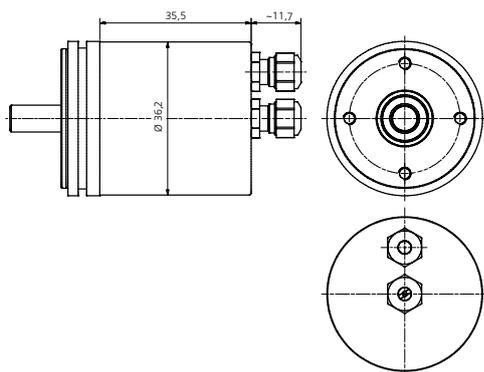


Samples

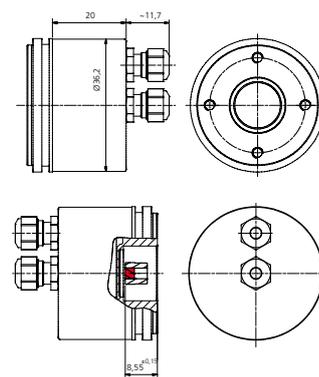


Samples

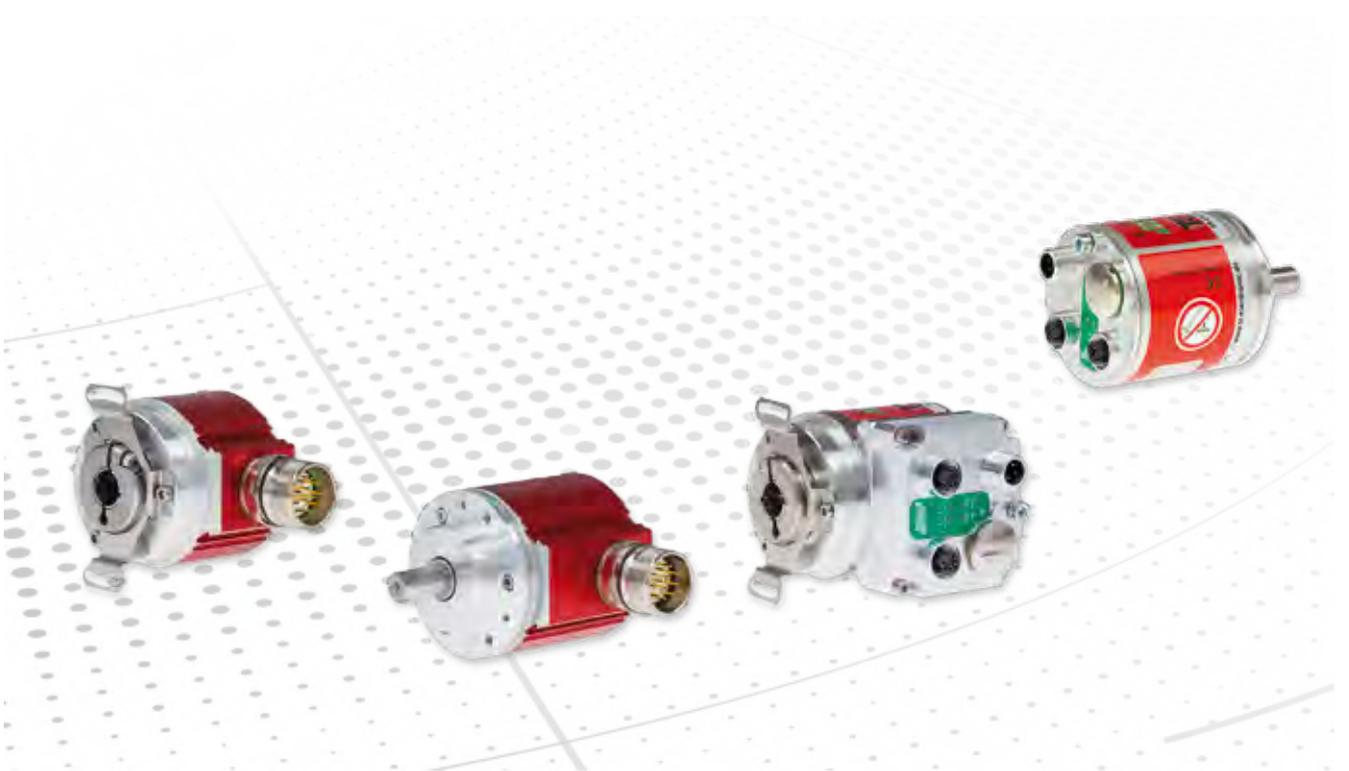
CDV36-SSI multiturn



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 for most types

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Magnet detection (M)

Product	CMV58	CMV582	CMH58
			
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 *	<= 25 bit *	<= 24 bit *
Steps per turn	<= 4096 *	<= 8192 *	<= 4096 *
Number of turns	<= 4096 *	<= 4096 *	<= 4096 *
Precision	± 1,0 ° / ± 0,5 °*	± 0,5 °	± 1,0 ° / ± 0,5 °*
Shaft diameters available	6...12mm	6, 8, 10, 12, 14, 1/4", 3/8", 1/2"	8, 10, 12mm
Connectors	Connector axial or radial *	Connector axial or radial *	Connector radial
Ambient temperature	-20...+70 °C	-20...+75 °C	-20...+70 °C
Protection class	IP65	IP65	IP54
ATEX-zone		Option 2/22	
Interface	SSI  Analog 	SSI       	SSI
Option, additional interfaces (on request)			
Weblink	www.tr-electronic.com/s/S006736	www.tr-electronic.com/s/S013306	www.tr-electronic.com/s/S006741
QR-Code			

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Magnet detection (M) Optical 15 bit (E)

Product	CMS58	CMS582	CEV58	
				
Detection	Magnet detection (M)	Magnet detection (M)	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 (12...30 VDC)*	11...27 VDC	
Full resolution	<= 24 bit *	<= 25 bit *	<= 33 bit *	
Steps per turn	<= 4096 *	<= 8192 *	<= 32768 *	
Number of turns	<= 4096 *	<= 4096 *	<= 256000 *	
Precision	± 1,0 ° / ± 0,5 °*	± 0,5 °	± 1 digit	
Shaft diameters available	8, 10, 12mm	6, 8, 10, 12, 14, 15, 1/4", 3/8", 1/2"	6...12mm	
Connectors	Connector axial or radial *	Connector axial or radial *	Cable gland or connector, radial or axial, Fieldbus hood radial *	
Ambient temperature	-20...+70 °C	-20...+75 °C	-20...+70 °C	
Protection class	IP65	IP65	IP65	
ATEX-zone		Option 2/22		
Interface	<p>SSI </p> <p>Analog </p>	<p>SSI </p> <p> EtherCAT </p> <p> EtherNet/IP </p> <p> IO-Link </p>	<p>SSI </p> <p>ASI </p> <p>Parallel </p> <p> Sercos </p> <p>CANopen </p>	
Option, additional interfaces (on request)			INC	
Weblink	www.tr-electronic.com/s/S006742	www.tr-electronic.com/s/S013307	www.tr-electronic.com/s/S006773	
QR-Code				

* depending on the interface

Optical 15 bit (E)

			
Optical 15 bit (E)			
(M) Multi (S) single			
11...27 VDC	11...27 VDC	11...27 VDC	11...27 VDC
<= 33 bit *			
<= 32768 *	<= 8192 *	<= 32768 *	<= 32768 *
<= 256000 *	<= 32768 *	<= 256000 *	<= 256000 *
± 1 digit	± 1 digit	± 1 digit	± 1 digit
6, 8, 10, 12, 14, 1/4", 3/8", 1/2"	8, 10, 12mm	6, 8, 10, 12, 14, 15, 1/4", 3/8", 1/2"	8, 10, 12mm
Connector axial or radial *	Cable gland or connector, radial, Fieldbus hood radial *	Connector radial	Cable gland or connector, radial or axial, Fieldbus hood radial *
-20...+75 °C	-20...+70 °C; option: -40...+85 °C	-20...+75 °C	-20...+70 °C; option: -40...+85 °C
IP65	IP54	IP54	IP65
Option 2/22		Option 2/22	
			
	INC		INC
www.tr-electronic.com/s/S013308	www.tr-electronic.com/s/S006740	www.tr-electronic.com/s/S013312	www.tr-electronic.com/s/S006743
			

* depending on the interface

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

Product	CES582	COV58	COV582	
				
Detection	Optical 15 bit (E)	Optical 18 bit (O)	Optical 16 bit (O)	
Single / multi	(M) Multi (S) single	(M) Multi (S) single	(M) Multi (S) single	
Supply	11...27 VDC	11...27 VDC	11...27 VDC	
Full resolution	<= 33 bit *	<= 36 bit *	<= 36 bit *	
Steps per turn	<= 32768 *	<= 262144 *	<= 262144 *	
Number of turns	<= 256000 *	<= 262144 *	<= 262144 *	
Precision	± 1 digit	± 1 digit	± 1 digit	
Shaft diameters available	6, 8, 10, 12, 14, 15, 1/4", 3/8", 1/2"	6...12mm	6, 8, 10, 12, 14, 1/4", 3/8", 1/2"	
Connectors	Connector axial or radial *	Connector radial or axial	Connector axial or radial *	
Ambient temperature	-20...+75 °C	-20...+70 °C	-20...+75 °C	
Protection class	IP65	IP65	IP65	
ATEX-zone	Option 2/22		Option 2/22	
Interface	      	    	       	
Option, additional interfaces (on request)		INC		
Weblink	www.tr-electronic.com/s/S013313	www.tr-electronic.com/s/S006738	www.tr-electronic.com/s/S013314	
QR-Code				

* depending on the interface

Optical 18 bit (O)

COH58	COH582	COS58	COS582
Optical 18 bit (O)			
(M) Multi (S) single			
11...27 VDC	11...27 VDC	11...27 VDC	11...27 VDC
<= 36 bit *			
<= 262144 *	<= 262144 *	<= 262144 *	<= 262144 *
<= 262144 *	<= 262144 *	<= 262144 *	<= 262144 *
± 1 digit	± 1 digit	± 1 digit	± 1 digit
8, 10, 12mm	6, 8, 10, 12, 14, 15, 1/4", 3/8", 1/2"	8, 10, 12mm	6, 8, 10, 12, 14, 15, 1/4", 3/8", 1/2"
Connector radial	Connector radial	Connector radial	Connector axial or radial *
-20...+70 °C	-20...+75 °C	-20...+70 °C	-20...+75 °C
IP54	IP54	IP65	IP65
	Option 2/22		Option 2/22
INC		INC	
www.tr-electronic.com/s/S006739	www.tr-electronic.com/s/S013315	www.tr-electronic.com/s/S006744	www.tr-electronic.com/s/S013316

* depending on the interface

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Double detection (D)

Product	CDV58	CDV58 MM	CDS58	
				
Detection	Double detection (D)	Double detection (D)	Double detection (D)	
Single / multi	(M) Multi	(M) Multi	(M) Multi	
Supply	11...27 VDC double	11...27 VDC double	11...27 VDC double	
Full resolution				
Steps per turn	<= 262144 *	4096/4096	<= 262144 *	
Number of turns	<= 256000 *	4096/4096	<= 256000 *	
Precision	± 1 digit	± 1 digit	± 1 digit	
Shaft diameters available	6...12mm	6...12mm	8, 10, 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		Option 2/22		
Interface	<p>SSI </p> <p>Parallel </p> <p> PROFINET </p> <p>CANopen </p> <p>DeviceNet</p>	<p>SSI</p>	<p>SSI </p> <p>Parallel </p> <p> PROFINET </p> <p>CANopen </p> <p>DeviceNet</p>	
Option, additional interfaces (on request)	INC		INC	
Weblink	www.tr-electronic.com/s/S006894	www.tr-electronic.com/s/S006894	www.tr-electronic.com/s/S006895	
QR-Code				

Double detection (D)

CDS58 MM	
Double detection (D)	
(M) Multi	
11...27 VDC double	
4096/4096	
4096/4096	
± 1 digit	
6...12mm	
Connector radial	
-20...+70 °C	
IP65	
Option 2/22	
SSI	
www.tr-electronic.com/s/S006895	
	

* depending on the interface

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Suggested Products

Order code	Steps per turn	Turns	Shaft / Flange	Connector position	Connector type	Remark
CEH582 -EIP(E) Optical 15 Bit, hollow shaft, Ethernet/IP						
CEH582M-00002	8192	4096	3/8" hollow through shaft	Radial	3x 4 pin M12	Clamping ring flange side
CEH582M-00005	32768	4096	12H7 hollow through shaft	Radial	3x 4 pin M12	Clamping ring flange side
CEH582-EPN (E) Optical 15 Bit, hollow shaft, PROFINET						
CEH582M-00003	8192	4096	10H7 hollow through shaft	Radial	3x 4 pin M12	Clamping ring flange side
CEH582M-00004	8192	4096	12H7 hollow through shaft	Radial	3x 4 pin M12	Clamping ring flange side
CEH582-ETC (E) Optical 15 Bit, hollow shaft, EtherCAT						
CEH582M-00007	8192	4096	10H7 hollow through shaft	Radial	3x 4 pin M12	Clamping ring flange side
CEH58-DN (E) Optical 15 bit, hollow shaft, DeviceNet						
CEH58S-00016	8192	1	12H7 hollow through shaft	Radial	2XM16X1,5	Fieldbus hood
CEH58-EPN (E) Optical 15 bit, hollow shaft, Profinet						
CEH58S-00043	8192	1	12H7 hollow through shaft	Radial	3x 4 pin M12	
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-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	
CEH582-EIP (E) Optical 15 Bit, blind shaft, Ethernet/IP						
CEH582M-00009	8192	4096	14H7 blind shaft	Axial	3x 4 pin M12	Clamping ring flange side
CEH582-EPN (E) Optical 15 Bit, blind shaft, PROFINET						
CEH582M-00001	8192	4096	15H7 blind shaft	Radial	3x 4 pin M12	Clamping ring flange side
CEH582M-00004	8192	4096	12H7 blind shaft	Axial	3x 4 pin M12	Clamping ring flange side
CEH582M-00007	8192	4096	12H7 blind shaft	Radial	3x 4 pin M12	Clamping ring flange side
CEH582S-00001	8192	1	15H7 blind shaft	Radial	3x 4 pin M12	Clamping ring flange side

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Order code	Steps per turn	Turns	Shaft / Flange	Connector position	Connector type	Remark
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CEV58-DN (E) Optical 15 bit, blind shaft, DeviceNet

CEV58M-00039	8192	4096	12H7 blind shaft	Radial	2XM16X1,5	Fieldbus hood
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CEV58-DQ (E) Optical 15 bit, blind shaft, DRIVECLiQ

CEV58M-00197	4096	4096	12H7 blind shaft	Axial	1X8P.M12-connector	Torque-Support
CEV58M-00211	4096	4096	10H7 blind shaft	Axial	1X8P.M12-connector	Torque-Support

CEV58-ETC (E) Optical 15 bit, blind shaft, EtherCAT

CEV58S-00025	8192	1	10H7 blind shaft	Radial	2x 4 pin M12 1x 4 pin M8	
CEV58S-00031	8192	1	12H7 blind shaft	Radial	2x 4 pin M12 1x 4 pin M8	

CEV58-PB (E) Optical 15 bit, blind shaft, Profibus

CEV58S-00013	8192	1	12H7 blind shaft	Radial	2XM16X1,5/1XM12X1,5	Fieldbus hood
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CEV58-SSI (E) Optical 15 bit, blind shaft, SSI

CEV58M-00015	8192	4096	12H7 blind shaft	Radial	M23, 12 pin	
CEV58S-00032	8192	1	10H7 blind shaft	Radial	M23, 12 pin	

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

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

CEV582-EPN (E) Optical 15 Bit, solid shaft, PROFINET

CEV582M-00024	4096	4096	6GL/10 ZB50	Radial	3x 4 pin M12	Absorber flange
CEV582M-00002	8192	4096	10FL/19,5 ZB36 3xM3+3xM4	Radial	3x 4 pin M12	
CEV582M-00011	8192	4096	10FL/19,5 ZB36 3xM3+3xM4	Radial	3x 4 pin M12	Reset Switch
CEV582M-00014	8192	4096	10FL/19,5 ZB50 D65	Radial	3x 4 pin M12	
CEV582M-00015	8192	4096	10GL/19,5 ZB36 D65	Axial	3x 4 pin M12	
CEV582M-00022	8192	4096	6GL/10 ZB50	Radial	3x 4 pin M12	Reset Switch
CEV582M-00025	8192	4096	10FL/19,5 ZB50	Axial	3x 4 pin M12	
CEV582M-00032	8192	4096	10FL/19,5 ZB36 3xM3+3xM4	Radial	3x 4 pin M12	Reset Switch
CEV582M-10687	8192	4096	10FL/19,5 ZB50 D65	Radial	3x 4 pin M12	
CEV582S-00005	8192	1	6GL/10 ZB50	Radial	3x 4 pin M12	Absorber flange
CEV582S-00004	32768	1	10FL/19,5 ZB36 3xM3+3xM4	Radial	3x 4 pin M12	Seal Pack

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Suggested Products

Order code	Steps per turn	Turns	Shaft / Flange	Connector position	Connector type	Remark
CEV582-ETC (E) Optical 15 Bit, solid shaft, EtherCAT						
CEV582M-00005	8192	4096	10FL/19,5 ZB36 3xM3+3xM4	Axial	3x 4 pin M12	
CEV582M-00006	8192	4096	10FL/19,5 ZB36 3xM3+3xM4	Radial	3x 4 pin M12	
CEV582M-00008	8192	4096	6GL/10 ZB50	Radial	3x 4 pin M12	
CEV582M-00013	8192	4096	10GL/19,5 ZB36 3xM3+3xM4	Axial	3x 4 pin M12	
CEV582M-00030	8192	4096	10FL/19,5 ZB36 D65	Radial	3x 4 pin M12	
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-00123	8192	1	10FL/19,5 ZB36 3xM3+3xM4	Radial	2x 5 pin M12	
CEV58S-00155	8192	1	10FL/19,5 ZB36	Radial	2x 5 pin M12 1x 4 pin M8	Speed
CEV58S-00261	8192	1	10FL/19,5 ZB36 3xM3+3xM4			
CEV58-DN (E) Optical 15 bit, solid shaft, DeviceNet						
CEV58S-00121	4096	1	6GL/10 ZB36 3xM3+3xM4	Radial	2XM16X1,5	Fieldbus hood
CEV58M-00206	8192	4096	10FL/19,5 ZB36	Radial	2XM16X1,5	Fieldbus hood
CEV58-DQ (E) Optical 15 bit, solid shaft, DRIVECLiQ						
CEV58M-00534	4096	4096	12NUT/25 ZB50	Axial	1X8PM12-connector	Shaft with groove
CEV58-EPL (E) Optical 15 bit, solid shaft, DRIVECLiQ						
CEV58M-00601	4096	4096	10FL/19,5 ZB36/D65	Axial	1X8PM12-connector	
CEV58-EPL (E) Optical 15 bit, solid shaft, Powerlink						
CEV58M-00582	8192	4096	10FL/19,5 ZB36	Axial	2x 4 pin M12 1x 4 pin M8	
CEV58M-00619	8192	4096	6GL/10 ZB50	Axial	2x 4 pin M12 1x 4 pin M8	
CEV58M-00823	8192	4096	6GL/10 ZB50	Axial	3x 4 pin M12	
CEV58-ETC (E) Optical 15 bit, solid shaft, EtherCAT						
CEV58M-00245	8192	4096	10FL/19,5 ZB36 3xM3+3xM4	Radial	3x 4 pin M12	
CEV58S-00109	8192	1	10FL/19,5 ZB36 3xM3+3xM4	Radial	2x 4 pin M12 1x 4 pin M8	

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Order code	Steps per turn	Turns	Shaft / Flange	Connector position	Connector type	Remark
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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	
CEV58M-00739	8192	4096	10FL/19,5 ZB36 3xM3+3xM4	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-SSI (E) Optical 15 bit, solid shaft, SSI

CEV58M-00025	4096	4096	10FL/19,5 ZB36	Radial	M23, 12 pin	
CEV58M-00679	4096	4096	10FL/19,5 ZB36 3xM3+3xM4	Radial	M23, 12 pin	
CEV58M-00051	8192	4096	10FL/19,5 ZB36, 15 mm thick	Radial	M23, 12 pin	
CEV58S-00002	8192	1	10FL/19,5 ZB36	Radial	M23, 12 pin	

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

CMS582-EIP (M) Magnet detection, blind shaft, Ethernet/IP

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

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

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

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Suggested Products

Order code	Steps per turn	Turns	Shaft / Flange	Connector position	Connector type	Remark
CMS582-ETC (M) Magnet detection, blind shaft, EtherCAT						
CMS582M-00009	8192	4096	12H7 blind shaft	Radial	3x 4 pin M12	Clamping ring flange side
CMS582M-00013	8192	4096	10H7 blind shaft	Axial	3x 4 pin M12	Clamping ring flange side
CMS58-A (M) Magnet detection, blind shaft, analogue						
CMS58M-00024	4096	16	12H7 blind shaft	Radial	M23, 12 pin	4...20 mA
CMS58-CO (M) Magnet detection, blind shaft, CANopen						
CMS58M-00015	2048	4096	12H7 blind shaft	Axial	2x 5 pin M12	
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	
CMS58-SSI (M) Magnet detection, blind shaft, SSI						
CMS58M-00004	4096	4096	12H7 blind shaft	Radial	M23, 12 pin	Preset V/R
CMV582-EIP (M) Magnet detection, solid shaft, Ethernet/IP						
CMV582M-00003	8192	4096	10FL/19,5 ZB36	Axial	3x 4 pin M12	
CMV582M-00004	8192	4096	10FL/19,5 ZB36	Radial	3x 4 pin M12	
CMV582M-00015	8192	4096	6GL/10 ZB50	Radial	3x 4 pin M12	
CMV582M-00018	8192	4096	3/8"FL/22,3 ZB36	Axial	3x 4 pin M12	
CMV582-EPN (M) Magnet detection, solid shaft, Profinet						
CMV582M-00001	8192	4096	10FL/19,5 ZB36	Axial	3x 4 pin M12	
CMV582M-00002	8192	4096	10FL/19,5 ZB36	Radial	3x 4 pin M12	
CMV582M-00007	8192	4096	10FL/19,5 ZB36 3xM3+3xM4	Axial	3x 4 pin M12	
CMV582M-00008	8192	4096	10FL/19,5 ZB36	Axial	3x 4 pin M12	With reset button
CMV582M-00009	8192	4096	10FL/19,5 ZB50	Radial	3x 4 pin M12	
CMV582M-00016	8192	4096	6GL/10 ZB50	Axial	3x 4 pin M12	
CMV582M-00022	8192	4096	10FL/19,5 ZB36/D65	Radial	3x 4 pin M12	
CMV582M-00025	8192	4096	6GL/10 ZB50	Radial	3x 4 pin M12	Reset Switch
CMV582-ETC (M) Magnet detection, solid shaft, EtherCAT						
CMV582M-00002	8192	4096	10FL/19,5 ZB36	Axial	3x 4 pin M12	
CMV582M-00006	8192	4096	10FL/19,5 ZB36	Radial	3x 4 pin M12	
CMV582M-00013	8192	4096	12FL/25 ZB36	Axial	3x 4 pin M12	

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Order code	Steps per turn	Turns	Shaft / Flange	Connector position	Connector type	Remark
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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...10 V
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-CO (M) Magnet detection, solid shaft, CANopen

CMV58S-00005	1024	1	6GL/10 ZB50	Axial	2x 5 pin M12	
CMV58M-00017	2048	4096	10FL/19,5 ZB36	Axial	2x 5pin M12	Us via bus

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-SSI (M) Magnet detection, solid shaft, SSI

CMV58M-00002	4096	4096	10FL/19,5 ZB36 3xM3+3xM4	Radial	M23, 12 pin	Preset V/R
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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

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	

COS582-EPN (O) Optical 18 Bit, blind shaft, PROFINET

COS582M-00001	262144	1	10H7 blind shaft	Axial	3x 4 pin M12	Clamping ring flange side
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COH58-PB (O) Optical 18 bit, blind shaft, Profibus

COS58S-00004	65536	1	12H7 blind shaft	Radial	2XM16X1,5/1XM12X1,5	Fieldbus hood
COS58M-00004	131072	4096	10H7 blind shaft	Radial	2XM16X1,5/1XM12X1,5	Fieldbus hood

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Suggested Products

Order code	Steps per turn	Turns	Shaft / Flange	Connector position	Connector type	Remark
COV582-EPN (O) Optical 18 Bit, solid shaft, PROFINET						
COV582M-00002	262144	4096	10FL/19,5 ZB36 D65	Radial	3x 4 pin M12	
COV582M-00003	262144	4096	10FL/19,5 ZB36 3xM3+3xM4	Axial	3x 4 pin M12	
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-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	
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-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	

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

Further product information

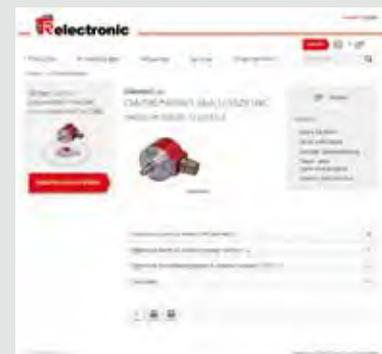
1. Enter order code into ...



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



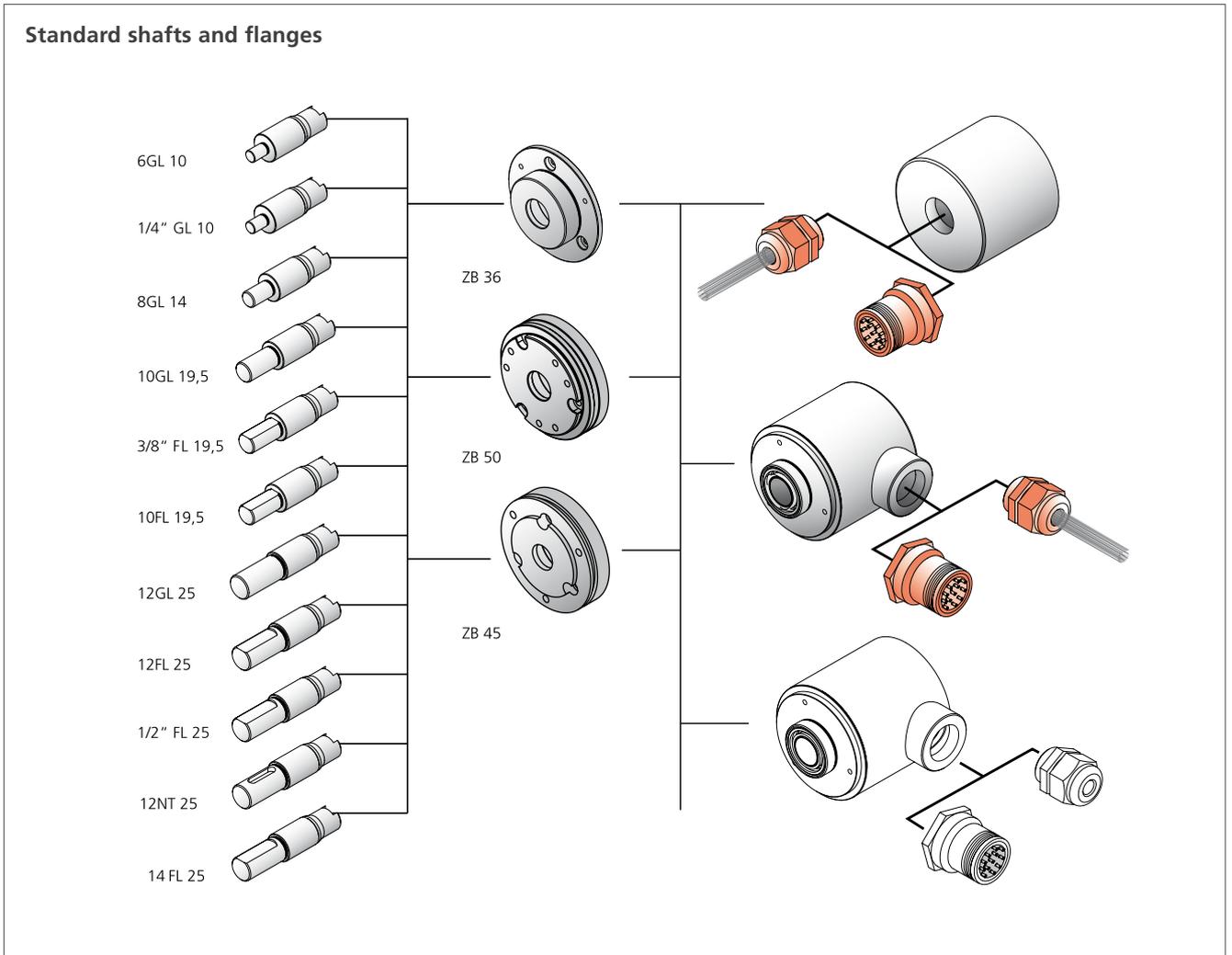
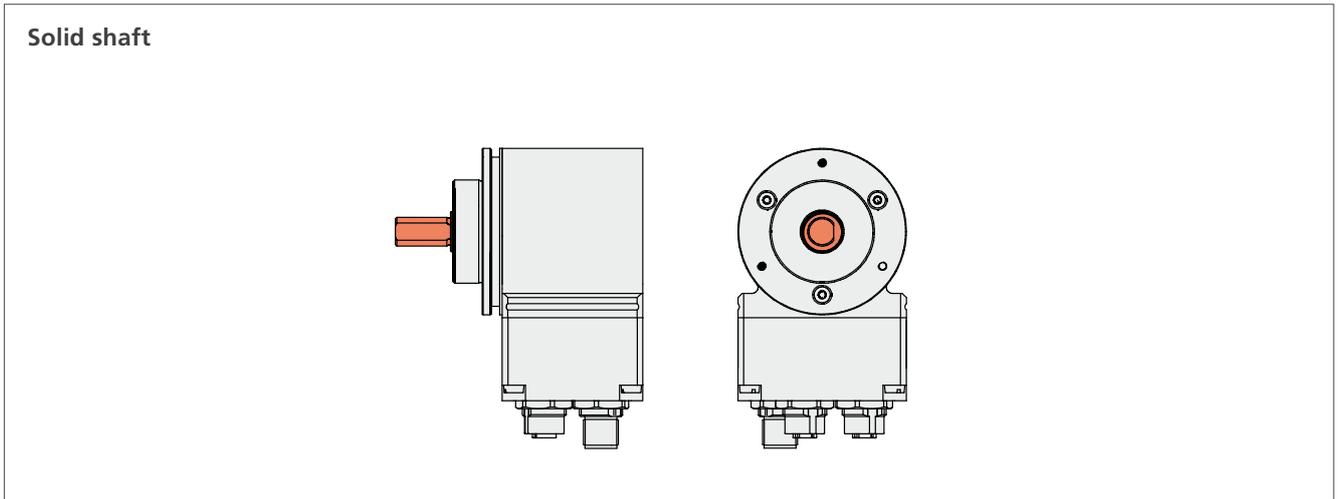
3. Choose desired information



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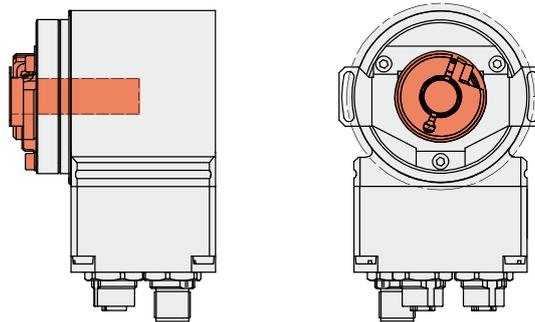
Shaft Types



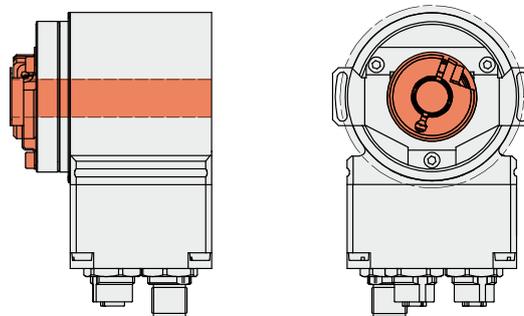
Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at www.tr-electronic.com or on request.

Shaft Types

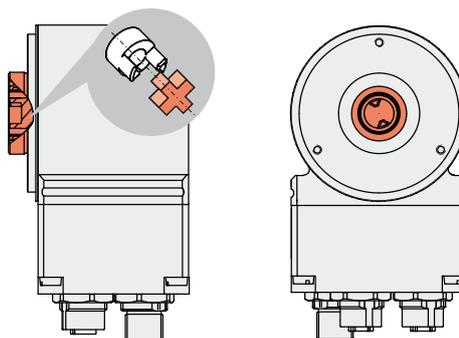
Blind shaft



Hollow shaft

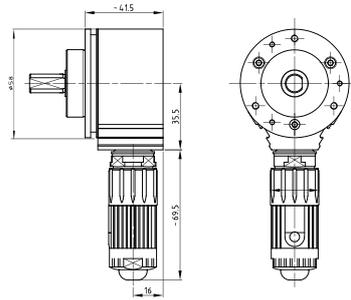


Integrated coupling

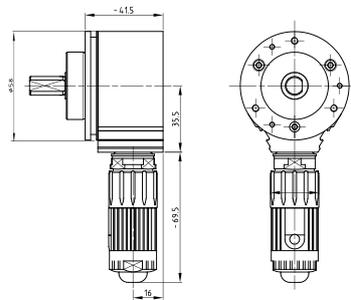


Dimensional Drawings

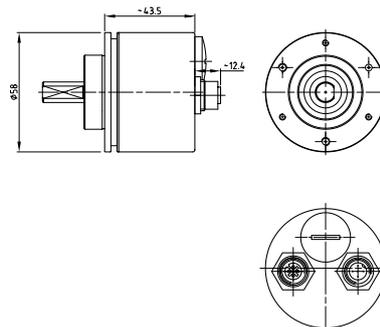
CMV58-SSI



CMV58 A
Analogue



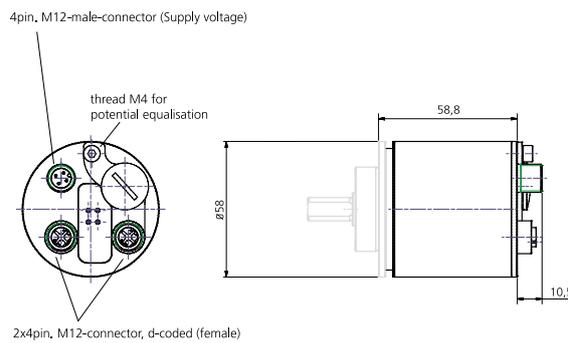
CMV58-CO
CANopen



Dimensional Drawings

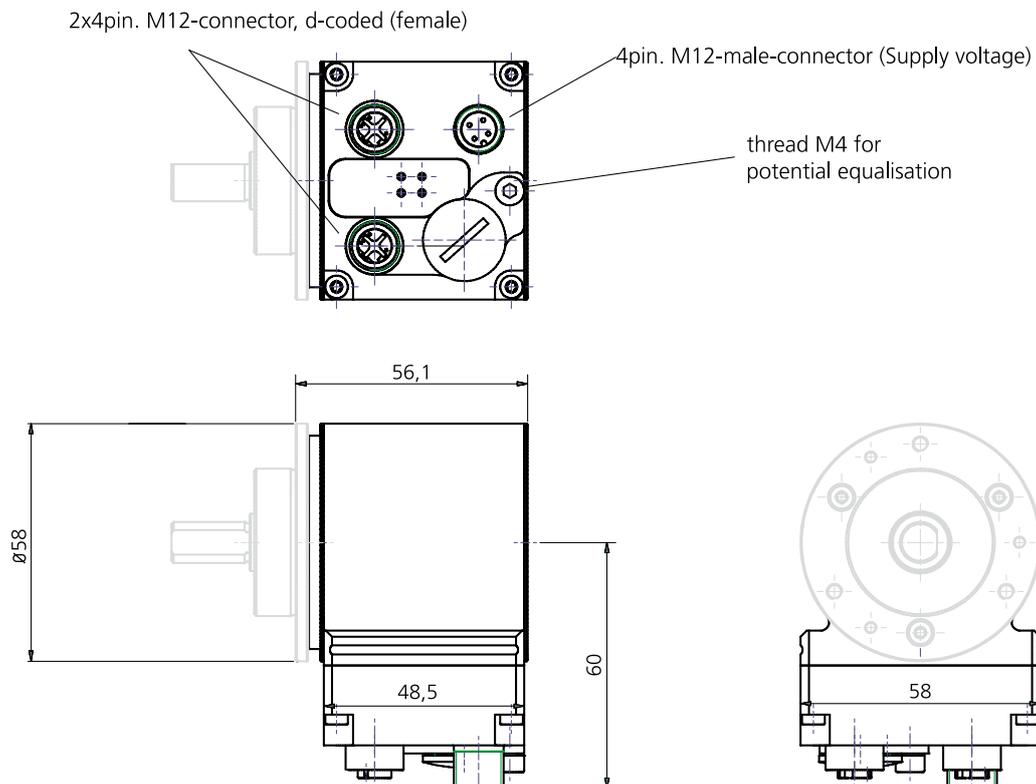
C_582 axial

PROFINET, EtherCAT, Ethernet/IP, PROFIBUS axial

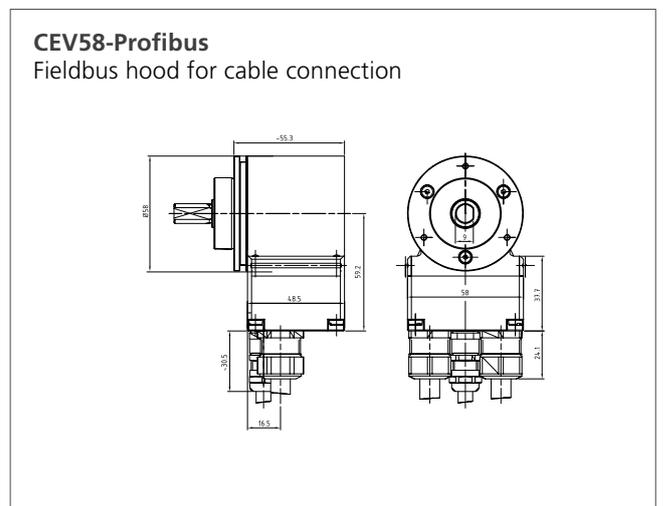
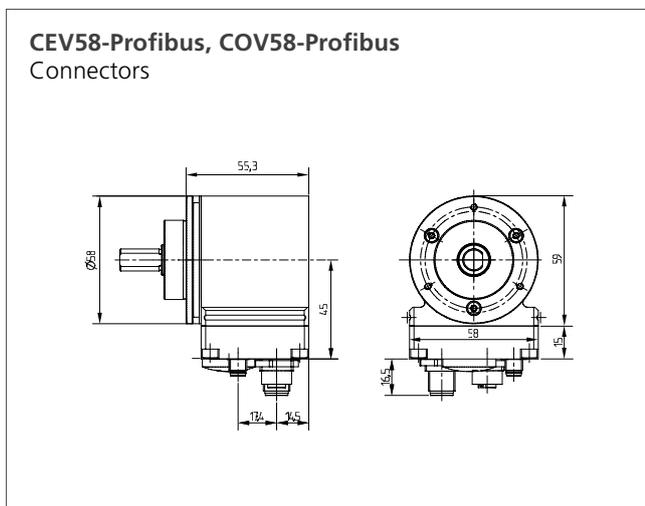
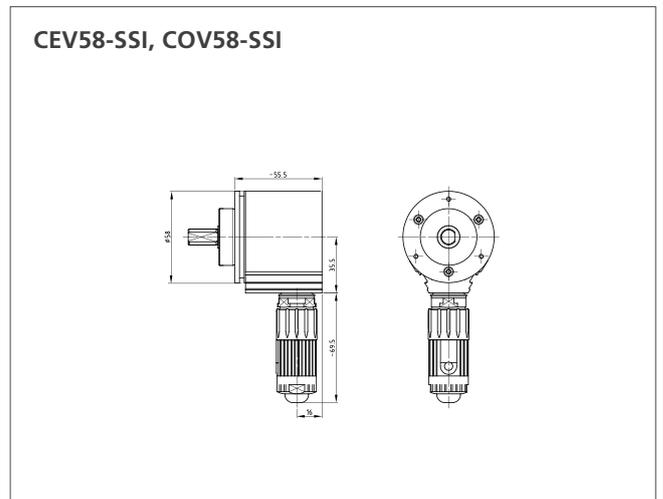
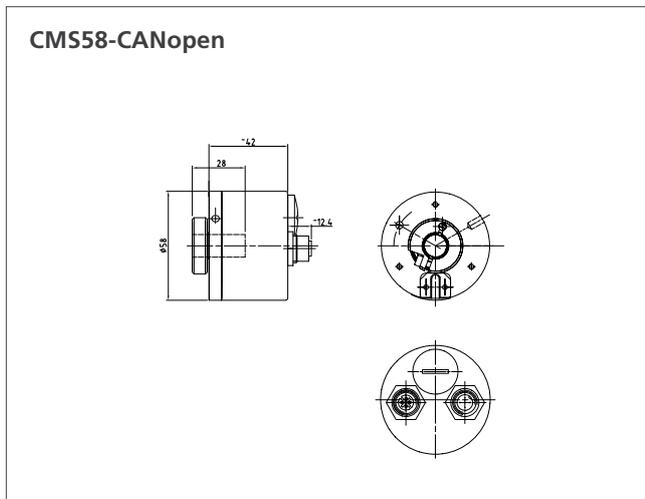
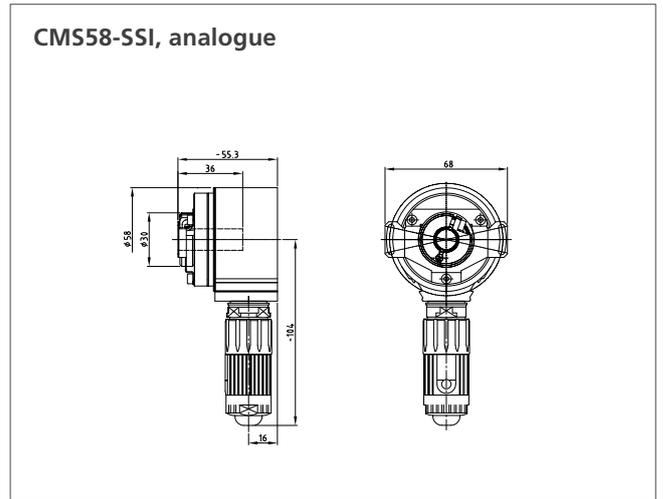
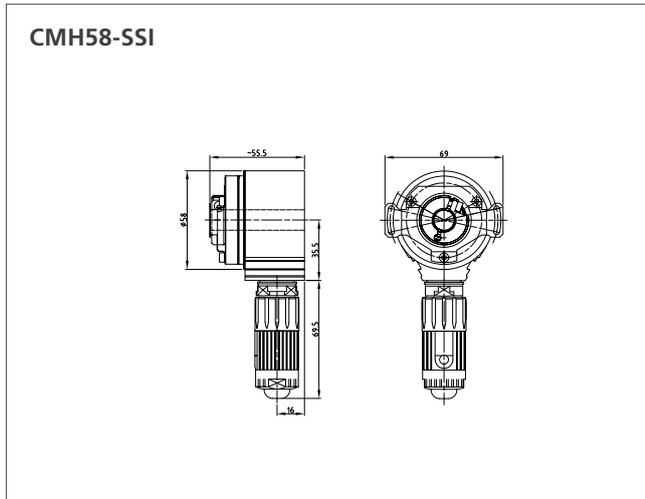


C_582 radial

PROFINET, EtherCAT, Ethernet/IP, PROFIBUS radial



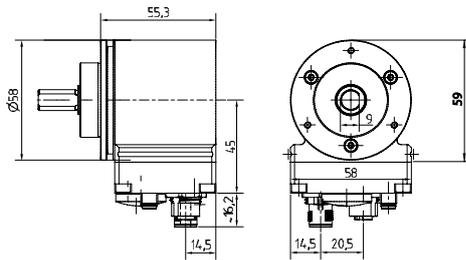
Dimensional Drawings



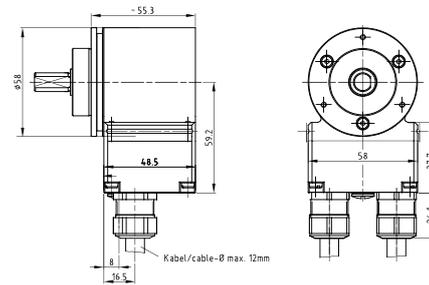
Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at www.tr-electronic.com or on request.

Dimensional Drawings

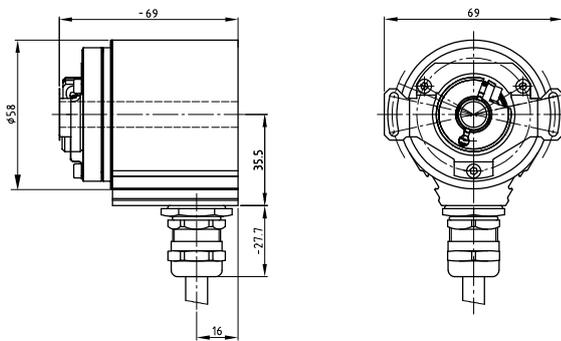
CEV58-CANopen, COV58-CANopen



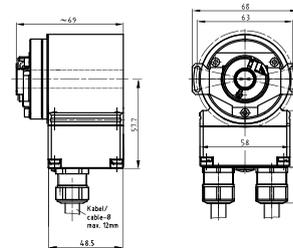
CEV58-DeviceNet



CEH58-SSI, COH58-SSI

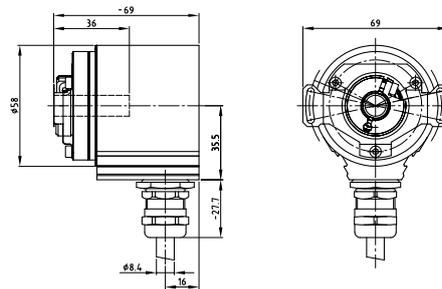


CEH58-DeviceNet

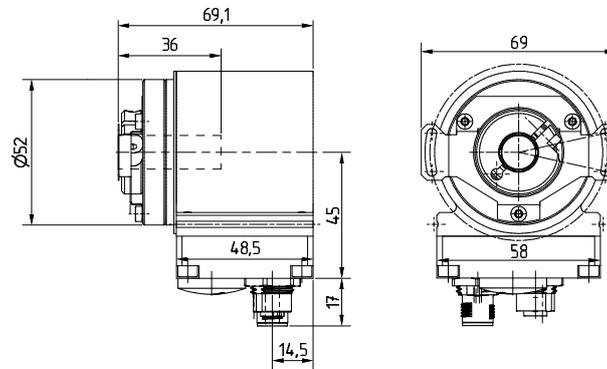


Dimensional Drawings

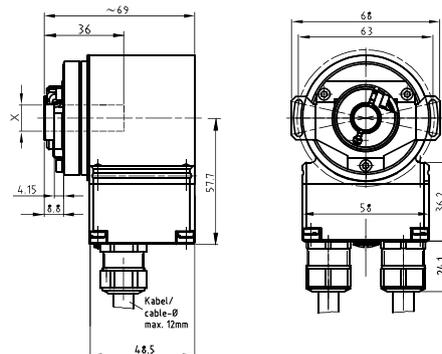
CE58-SSI



CE58-CANopen



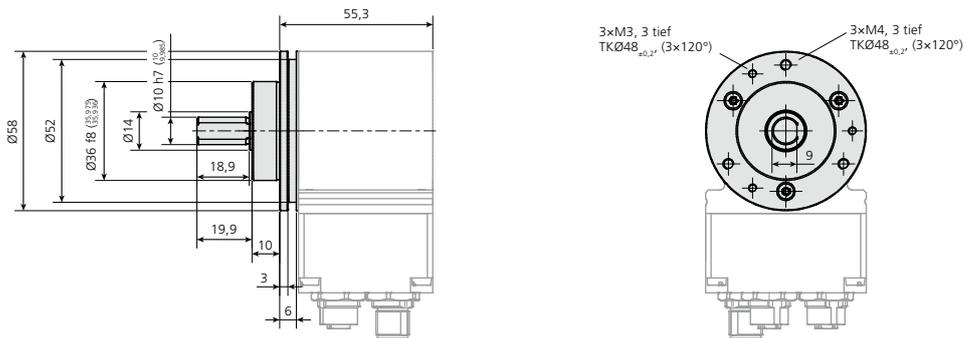
CE58-DeviceNet



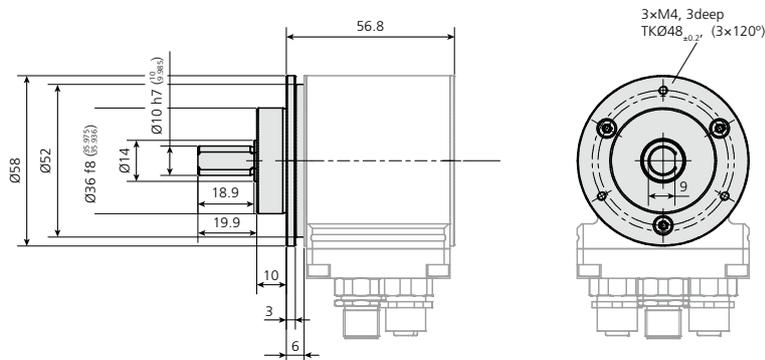
Dimensional Drawings

Standard flange ZB 36 M3/M4

Other drill patterns available

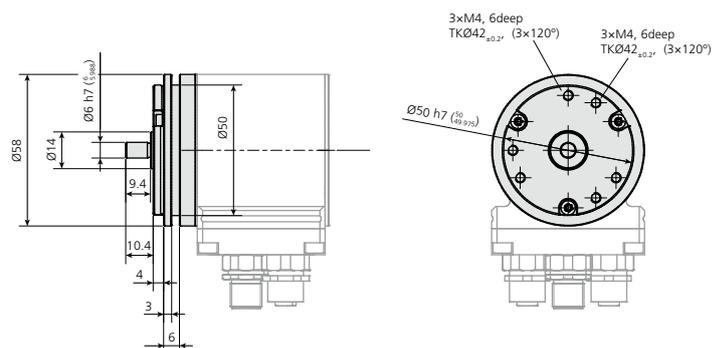


Standard flange ZB 36 M4



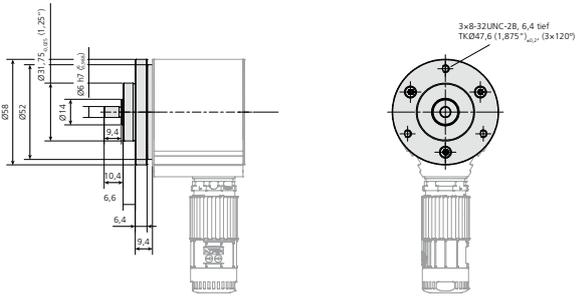
Standard flange ZB 50

Other drill patterns available

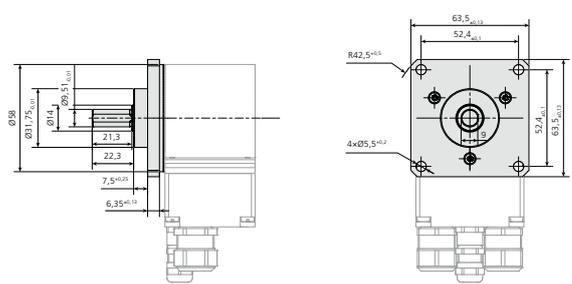


Flanges

Flange ZB 31,75 (1,25")

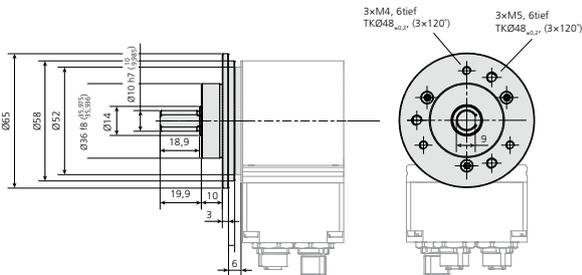


Square flange ZB 31,75 (1,25")



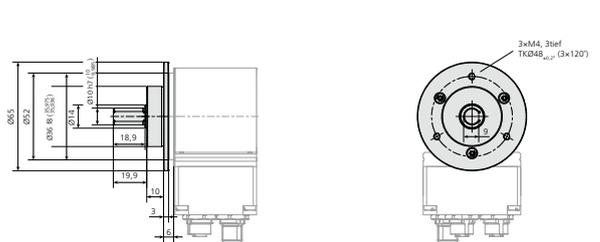
Flange option D65 ZB36 M3/M4

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



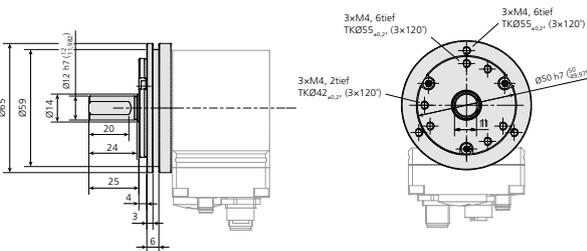
Flange option D65 ZB36 M4

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



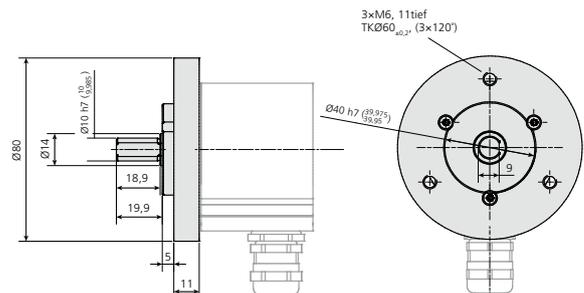
Flange option D65 ZB50

Fits encoder mounting places 65mm, ZB 50mm



Flange option D80 ZB40

Fits encoder mounting places 80 mm, ZB 40mm

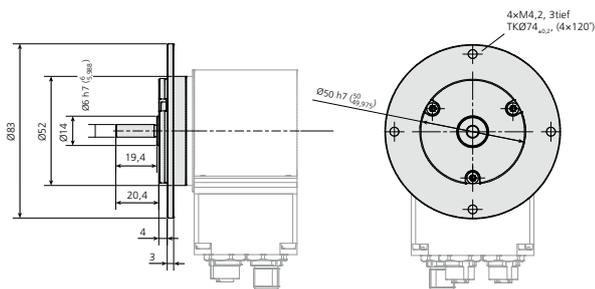


Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at www.tr-electronic.com or on request.

Flanges

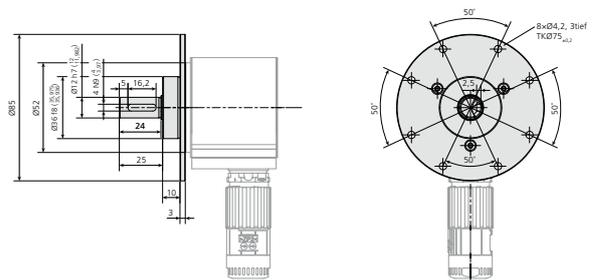
Flange option D83 ZB36

Fits encoder mounting places 83mm, ZB 50mm



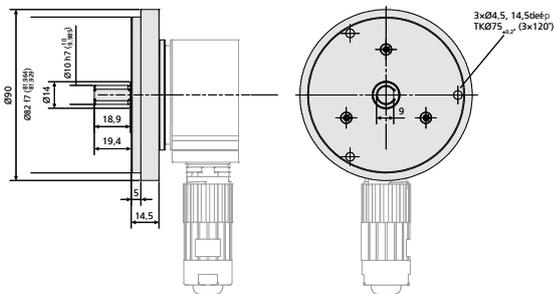
Flange option D85 ZB36

Fits encoder mounting places 85mm, ZB 36mm



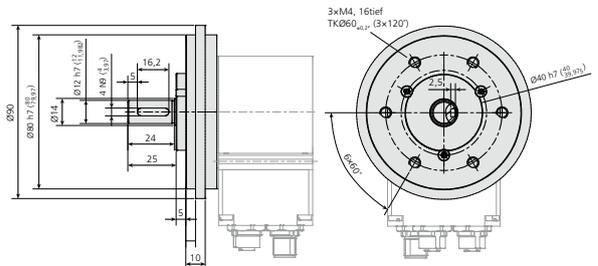
Flange option D90 ZB82

Fits encoder mounting places 90mm, ZB 82mm



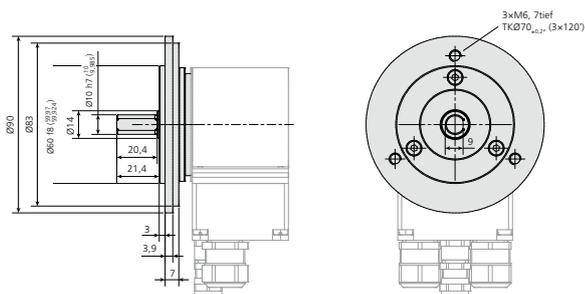
Flange option D90 ZB80,40

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



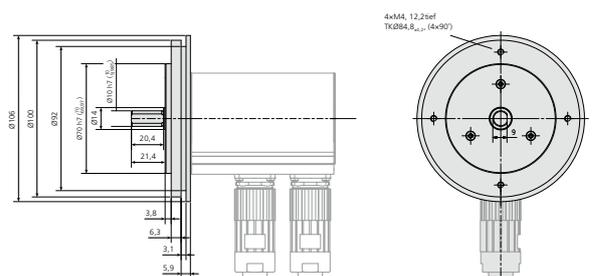
Flange option D90 ZB 60

Fits encoder mounting places 90mm, ZB 60mm



Flange option D106 ZB70

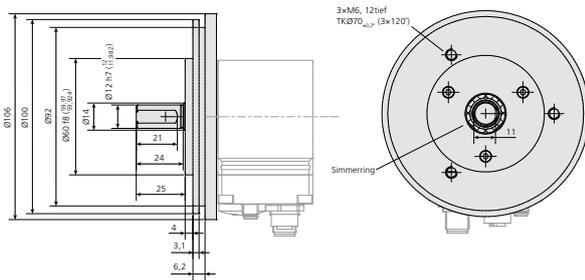
Fits encoder mounting places 106mm, ZB 70mm



Flanges

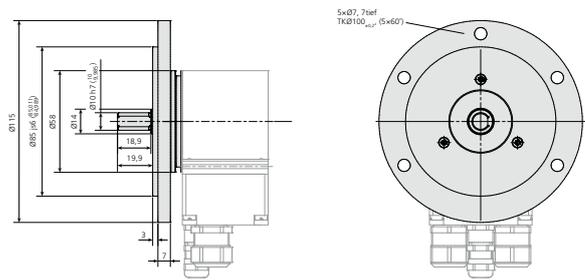
Flange option D106 ZB60

Fits encoder mounting places 106mm, ZB 60mm



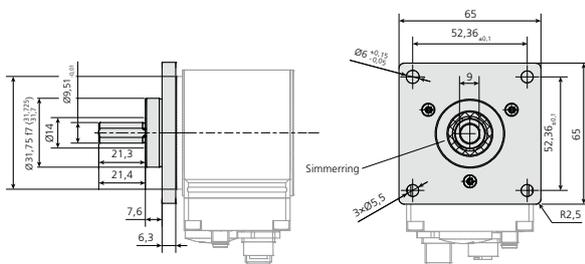
Flange option D115 ZB85

Fits encoder mounting places 115mm, ZB 85mm



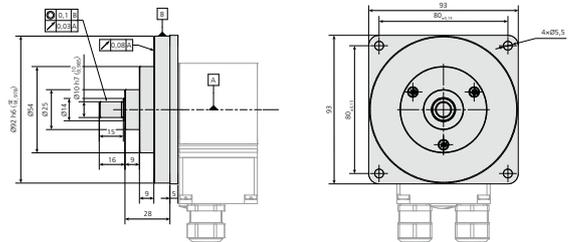
Flange option Q65

Square flange 65mm



Flange option Q93

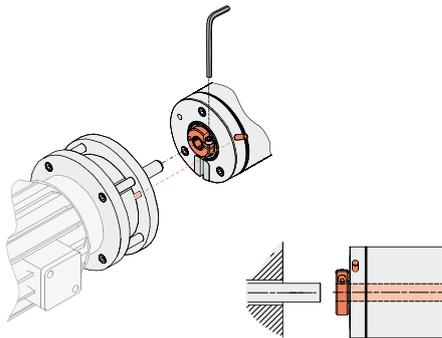
Square flange 93mm



Flanges

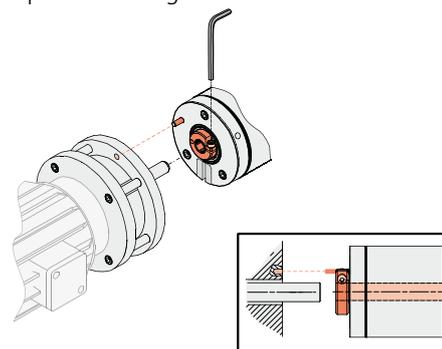
Blind- and hollow-shaft - encoder fixation

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



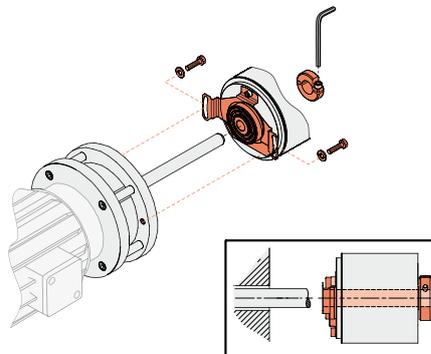
Blind- and hollow-shaft - encoder fixation

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



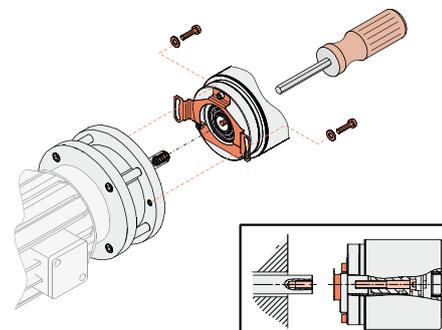
Blind- and hollow-shaft - encoder fixation

Sheet-metal torque support, here with clamping ring.



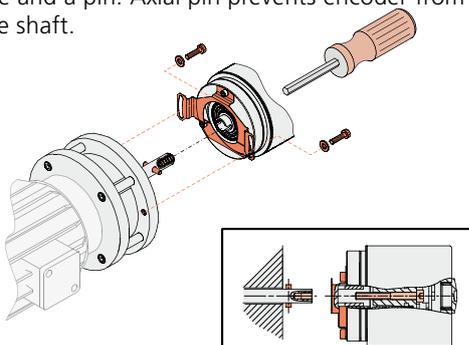
Blind- and hollow-shaft - encoder fixation

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



Blind- and hollow-shaft - shaft fixation

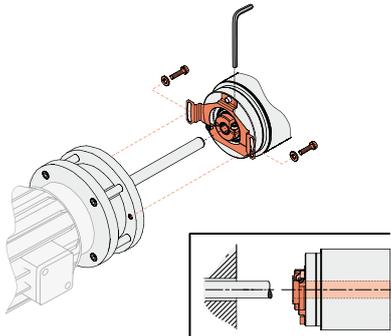
Transmission of torque is done by form closure by a V-groove and a pin. Axial pin prevents encoder from falling off the shaft.



Assembly Examples

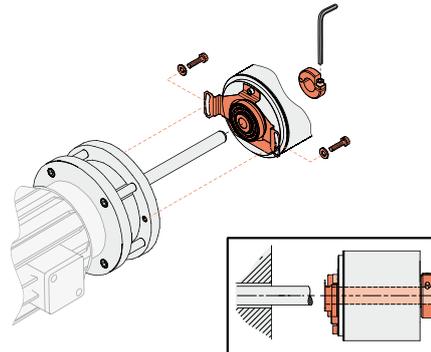
Blind- and hollowShaft - shaft fixation

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



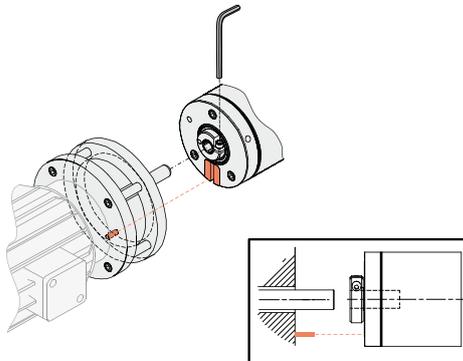
Blind- and hollow-shaft - shaft fixation

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



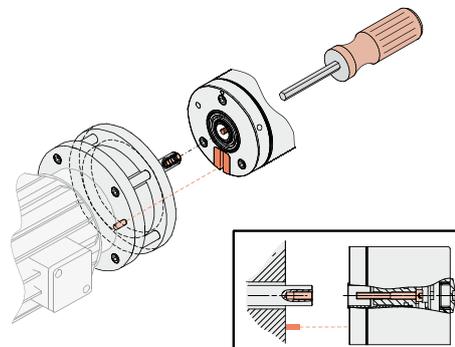
Blind shaft

Pin/groove axial, clamping ring



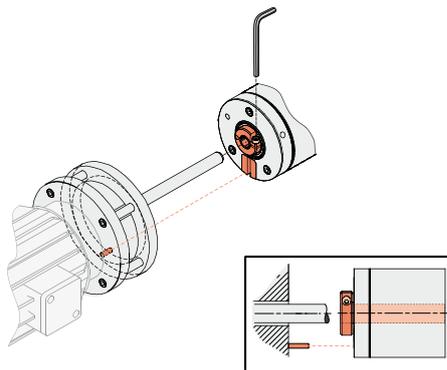
Blind shaft

Axial screw

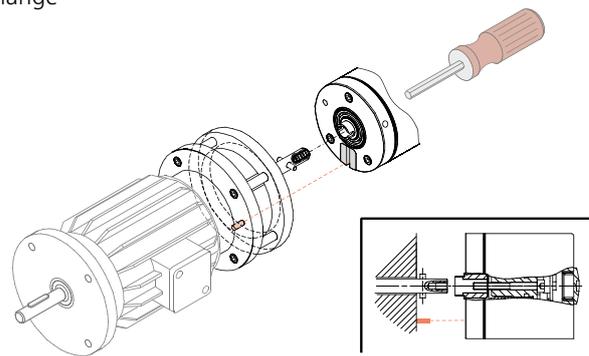


Assembly Examples

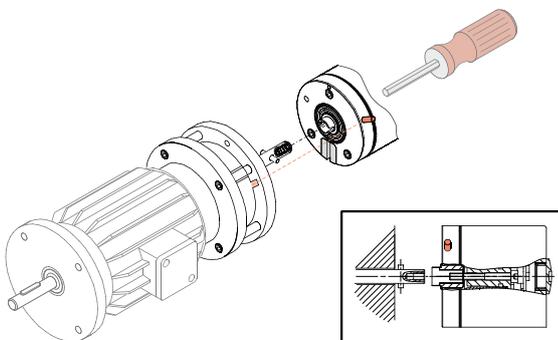
Hollow shaft - clamping ring flange side
Pin/groove, clamping ring flange side



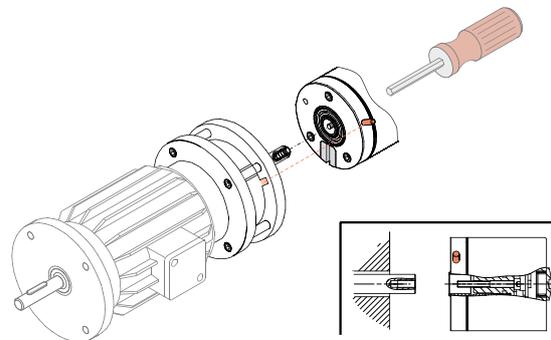
Blind shaft
V-groove, axial screw and pin in customer-provides flange



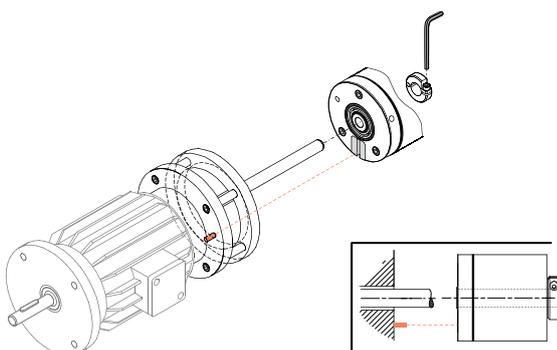
Blind shaft
V-groove, axial screw and pin in encoder flange



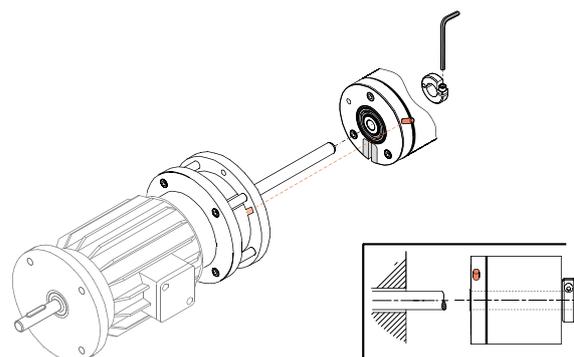
Blind shaft
Axial screw and radial pin in encoder flange



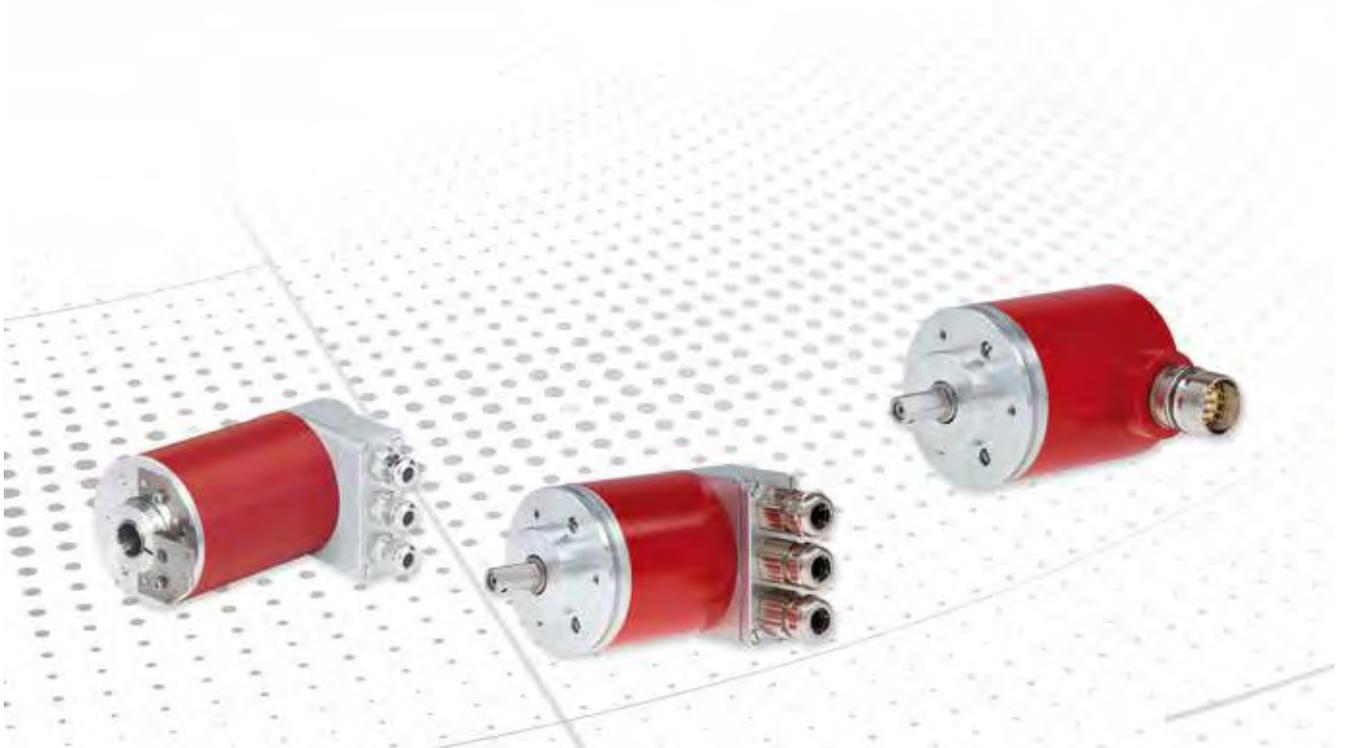
Hollow shaft - clamping ring hood side
Assembly hollow shaft, pin axial in encoder flange



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



Rotary Encoder - Family C__65 - Housing 65 mm



The 65 mm housing with room for more options

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

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

Contents

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

Magnet detection (M)

Optical 15 bit (E)

Product	CMV65	CEV65	CES65
			
Detection	Magnet detection (M)	Optical 15 bit (E)	Optical 15 bit (E)
Single / multi	(M) Multi (S) Single	(M) Multi (S) Single	(M) Multi (S) Single
Supply	11...27 VDC	11...27 VDC (A: 18...27VDC)	11...27 VDC (A: 18...27VDC)
Full resolution	<= 23 .. 24 bit	<= 25 ... 33 bit	<= 25 ... 33 bit
Steps per turn	2048 /2096	8192 / 32768	8192 / 32768
Number of turns	4096	32768 / 25600	32768 / 25600
Precision	± 1,0 °	± 1 digit	± 1 digit
Shaft diameters available	6...12mm	6...12mm	8, 10, 12mm
Connectors	Connectors axial or radial *	Cable gland or connector, radial or axial, fieldbus hood radial *	Cable gland or connector, radial or axial, fieldbus hood radial *
Ambient temperature	-20...+70 °C	-20...+70 °C	-20...+70 °C
Protection class	IP65	IP65	IP65
ATEX-zone			
Interface	SSI 	SSI Nocken Analog  ASI CANopen Parallel DeviceNet	SSI  Analog EtherNet/IP 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)

Product	COV65	AEV65
		
Detection	Optical 18 bit (O)	Optical 15 bit (E)
Single / multi	(M) Multi (S) Single	(M) Multi (S) Single
Supply	11...27 VDC (A: 18...27VDC)	11...27 VDC (A: 18...27VDC)
Full resolution	<= 36 bit	<= 33 bit
Steps per turn	262144	32768
Number of turns	25600	25600
Precision	± 1 digit	± 1 digit
Shaft diameters available	6...12mm	6...12mm
Connectors	Cable gland or connector, radial or axial, fieldbus hood radial *	Connectors axial or radial *
Ambient temperature	-20...+70 °C	-20...+60 °C
Protection class	IP65	IP64
ATEX-zone		2/22
Interface	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

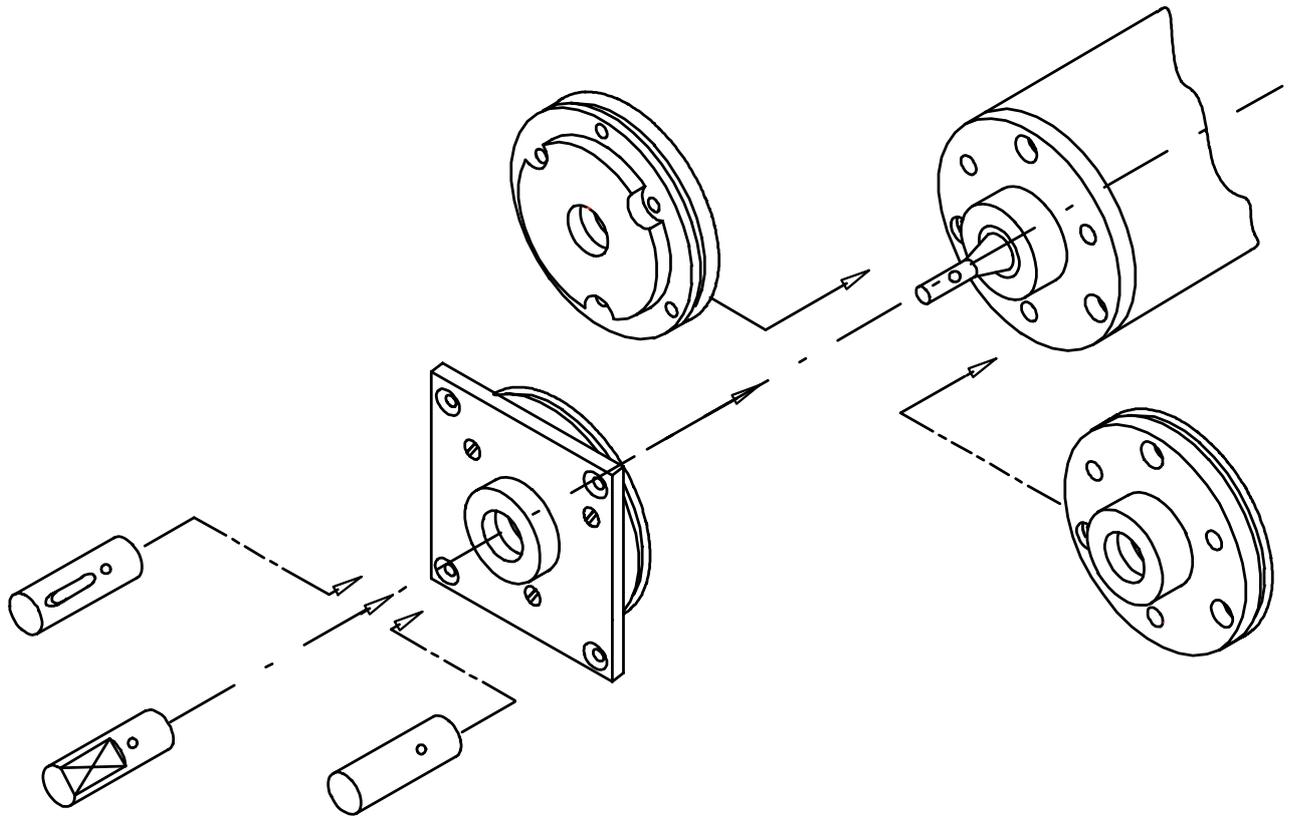
Order code	Steps per turn	Turns	Shaft / Flange	Connector position	Connector type	Remark
CEV65 PARALLEL PUSH PULL						
CEV65M-10498	4096	4096	10FL/19,5 - ZB36	Cable gland radial		
CEV65 SSI						
CEV65M-00444	4096	4096	10FL/19,5 - ZB36	Connector radial	M23, 12 pin	
CEV65 PROFIBUS DP						
CEV65M-01460	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.com.

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

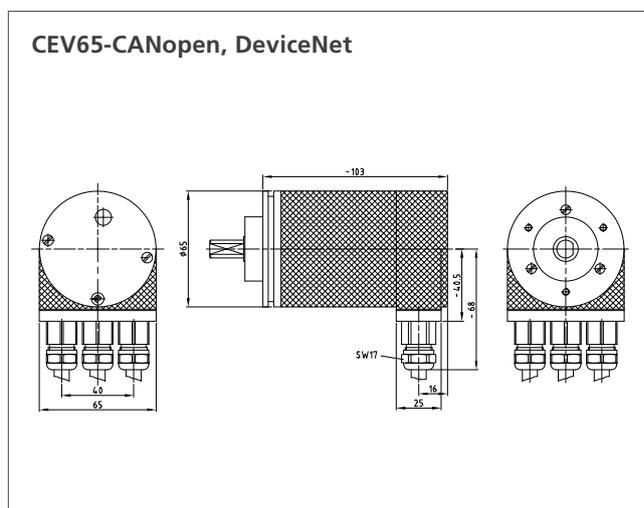
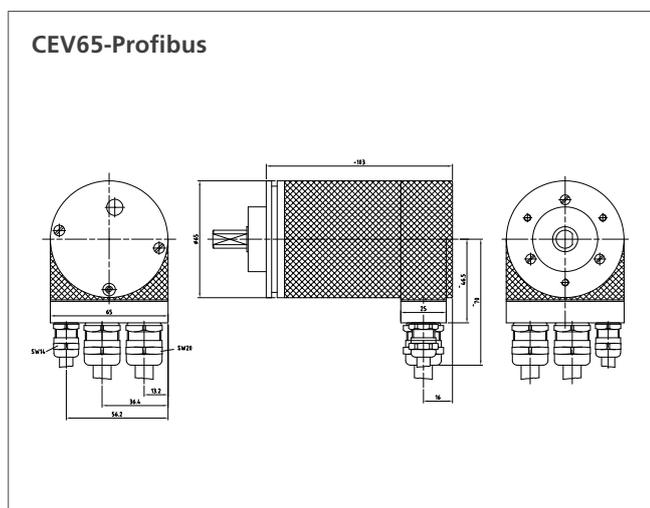
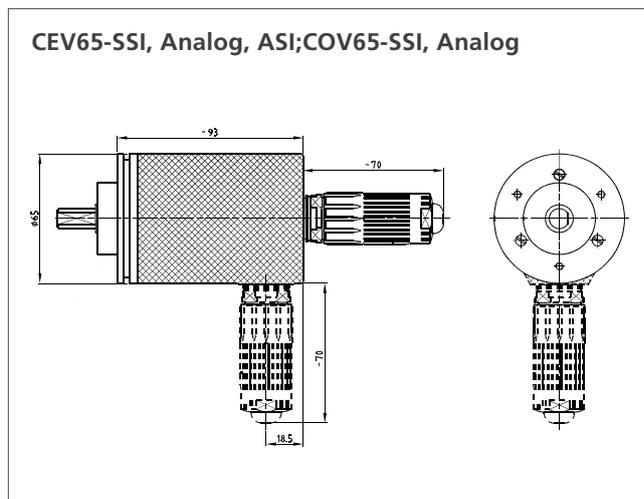
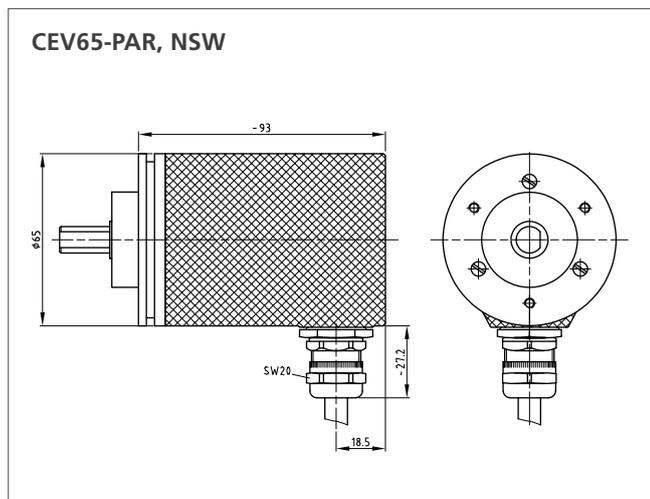
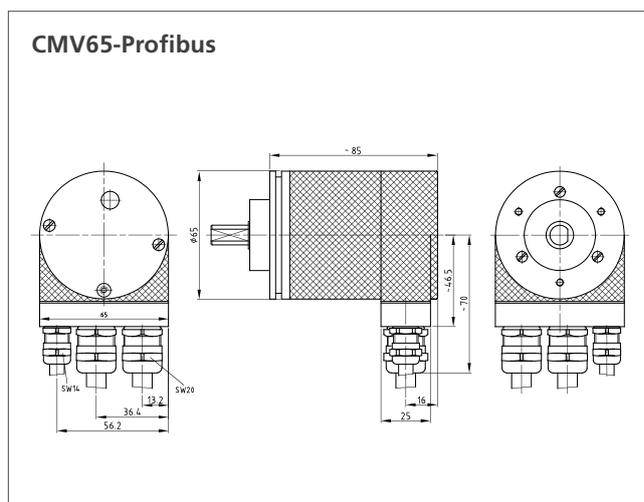
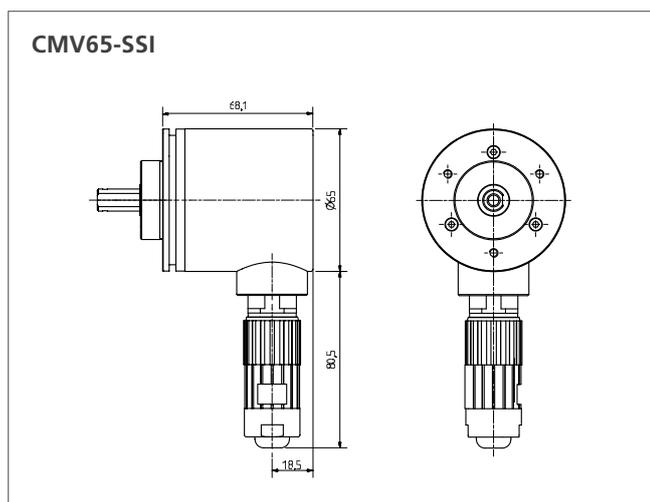


Fieldbus hood

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

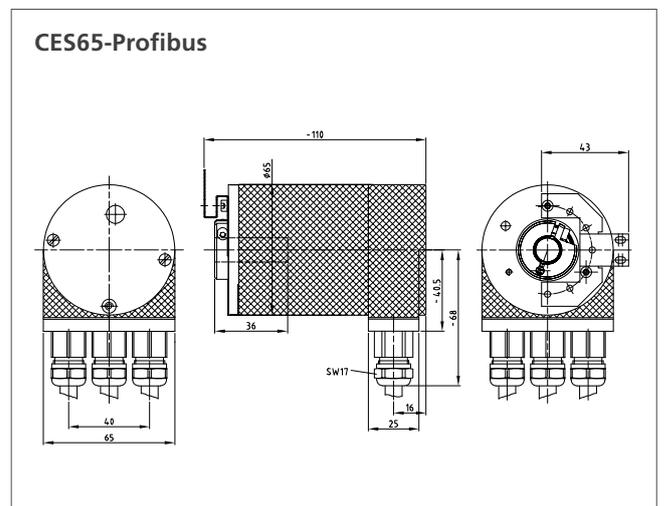
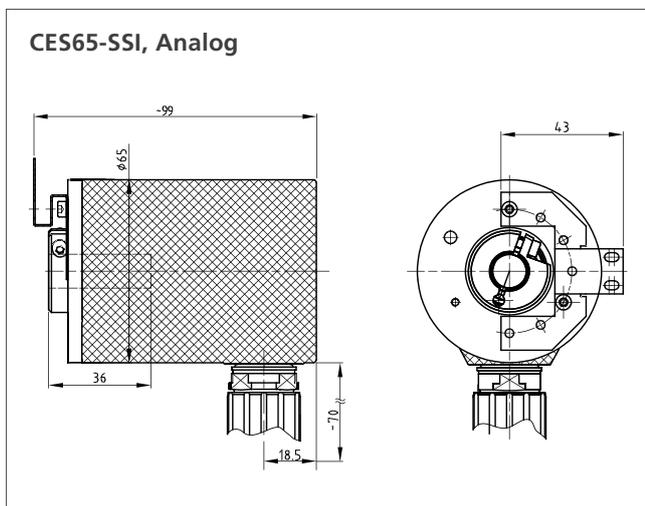
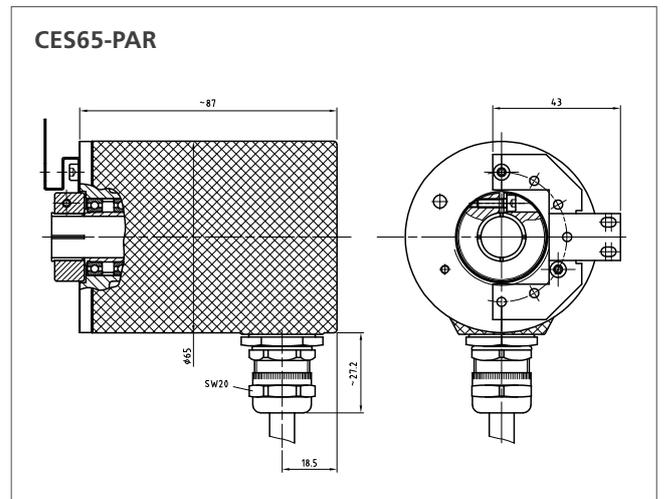
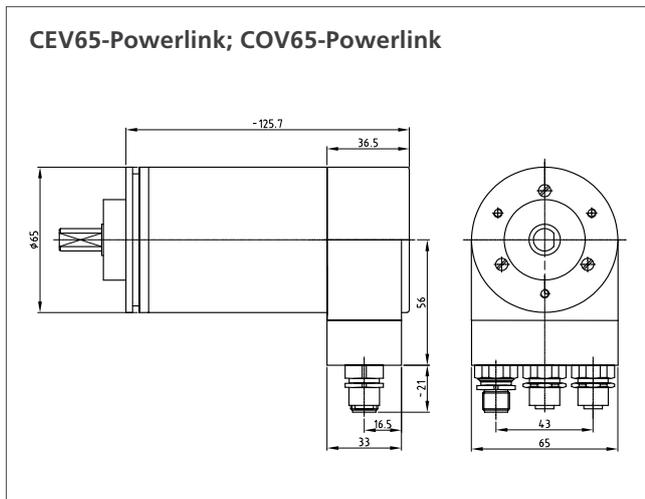
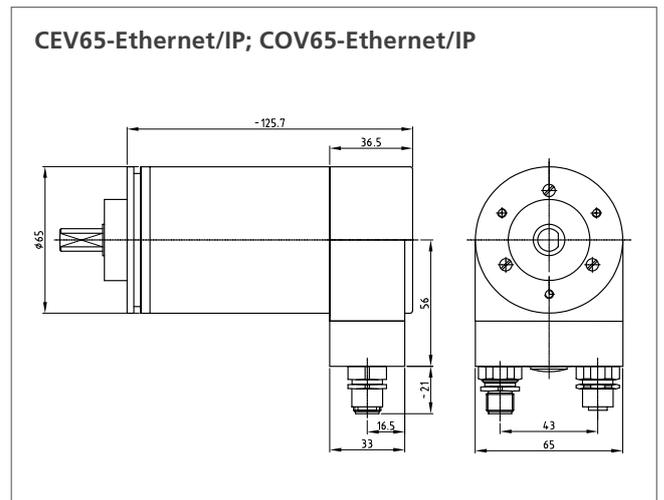
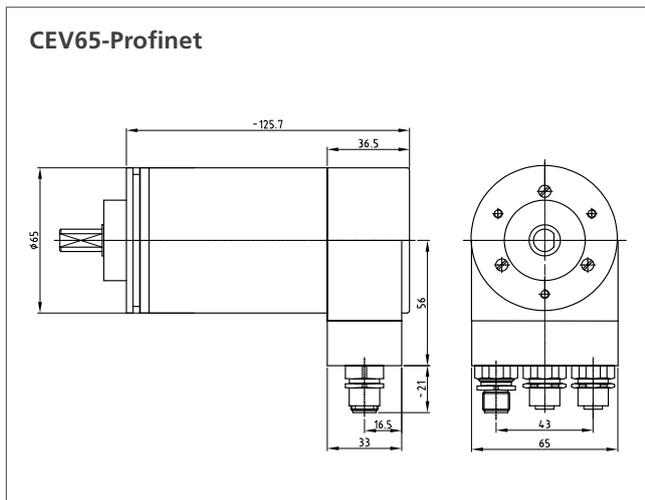


Dimensional Drawings



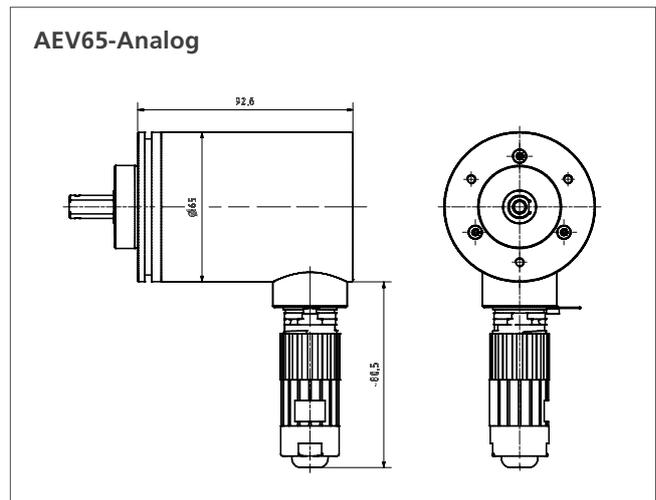
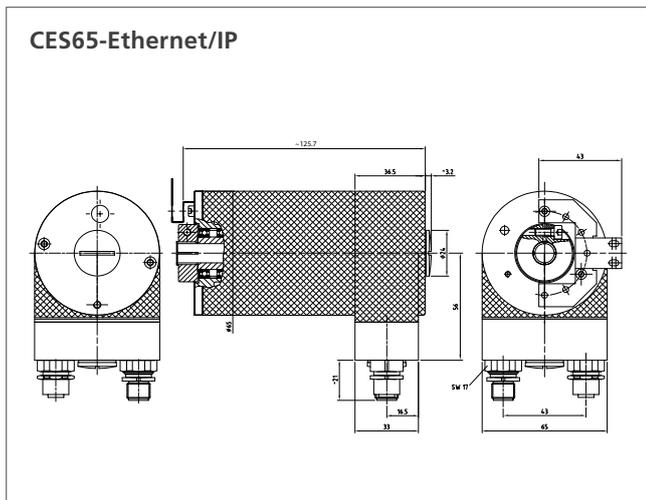
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Dimensional Drawings



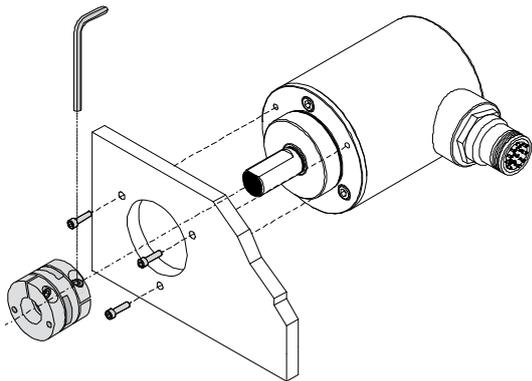
Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at www.tr-electronic.com or on request.

Dimensional Drawings

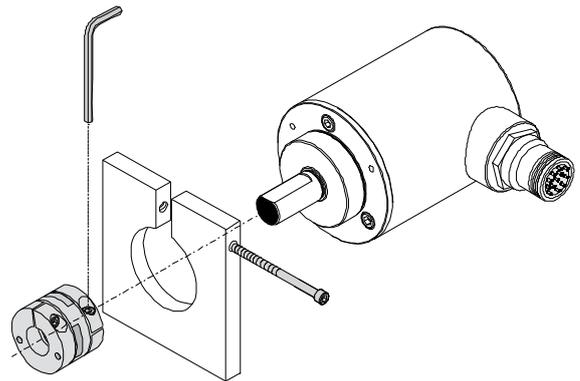


Assembly Examples

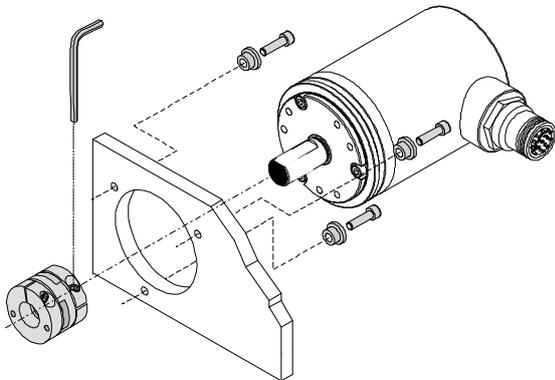
Solid shaft - screws in axial threads



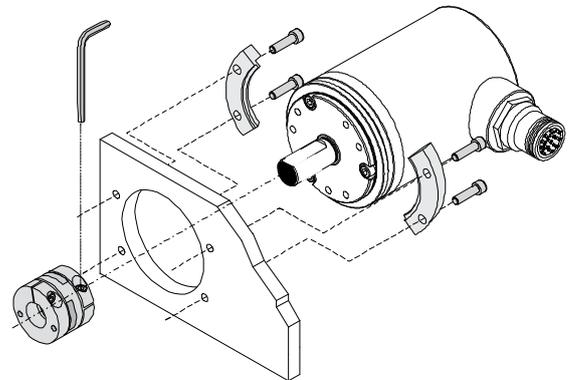
Solid shaft - clamping flange



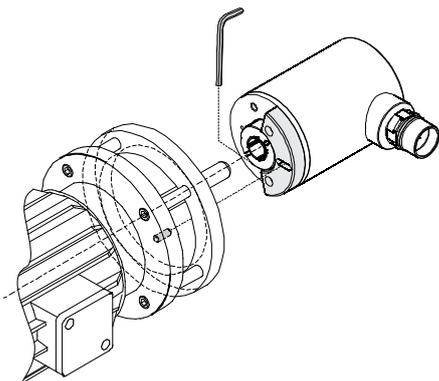
Solid shaft - servo clamps



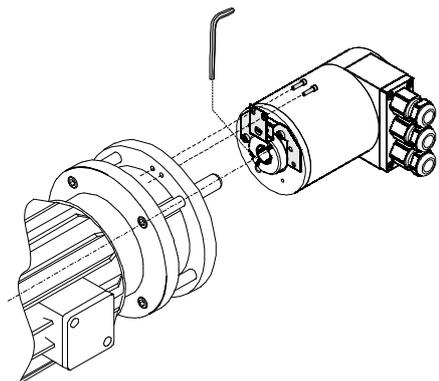
Solid shaft - clamping brackets



Blind shaft - groove / pin

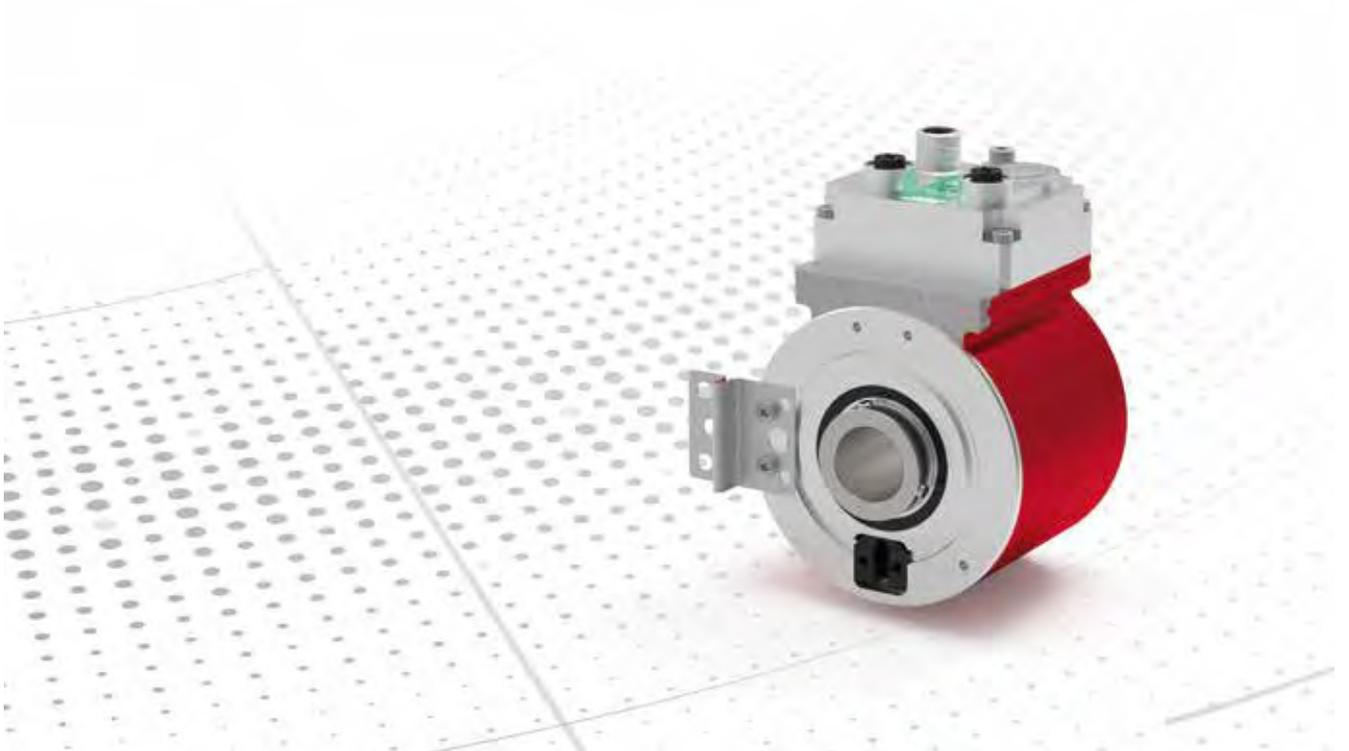


Blind shaft - torque support spring





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-Electronic. Two resolution classes meet your demands perfectly: CEH measures up to 15 bits per turn, COH up to 18 bits per turn. Both detections measure up to 256,000 absolute turns.

C_H80 is available for ATEX Zones 2/22 named A_H80. See chapter "Absolute rotary encoders - ATEX - Zone 2/22".

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Optical 15 bit (E)

Optical 18 bit (O)

Product	CEH80	CEH802	COH80
			
Detection	Optical 15 bit (E)	Optical 15 bit (E)	Optical 18 bit (O)
Single / multi	(M) Multi (S) Single	(M) Multi (S) Single	(M) Multi (S) Single
Supply	24 VDC (11...27)	24 VDC (11...27)	24 VDC (11...27)
Steps per turn	32768	32768	262144
Number of turns	256000	256000	262144
Shaft diameters available	10, 14, 16, 20, 24, 25, 27	10, 14, 16, 20, 24, 25, 27	10, 14, 16, 20, 24, 25, 27
Connectors	Connector radial (option: cable*)	3x M12	Connector radial (option: cable*)
Ambient temperature	0...+60 °C (option -20...+70 °C)	-20...+70°C	0...+60 °C (option -20...+70 °C)
Protection class	IP54	IP54	IP54
Interface	SSI	   	SSI
Option, additional interfaces (on request)	INC		INC
Weblink	www.tr-electronic.com/s/5008496		www.tr-electronic.com/s/5008497
QR-Code			

* depending on the interface

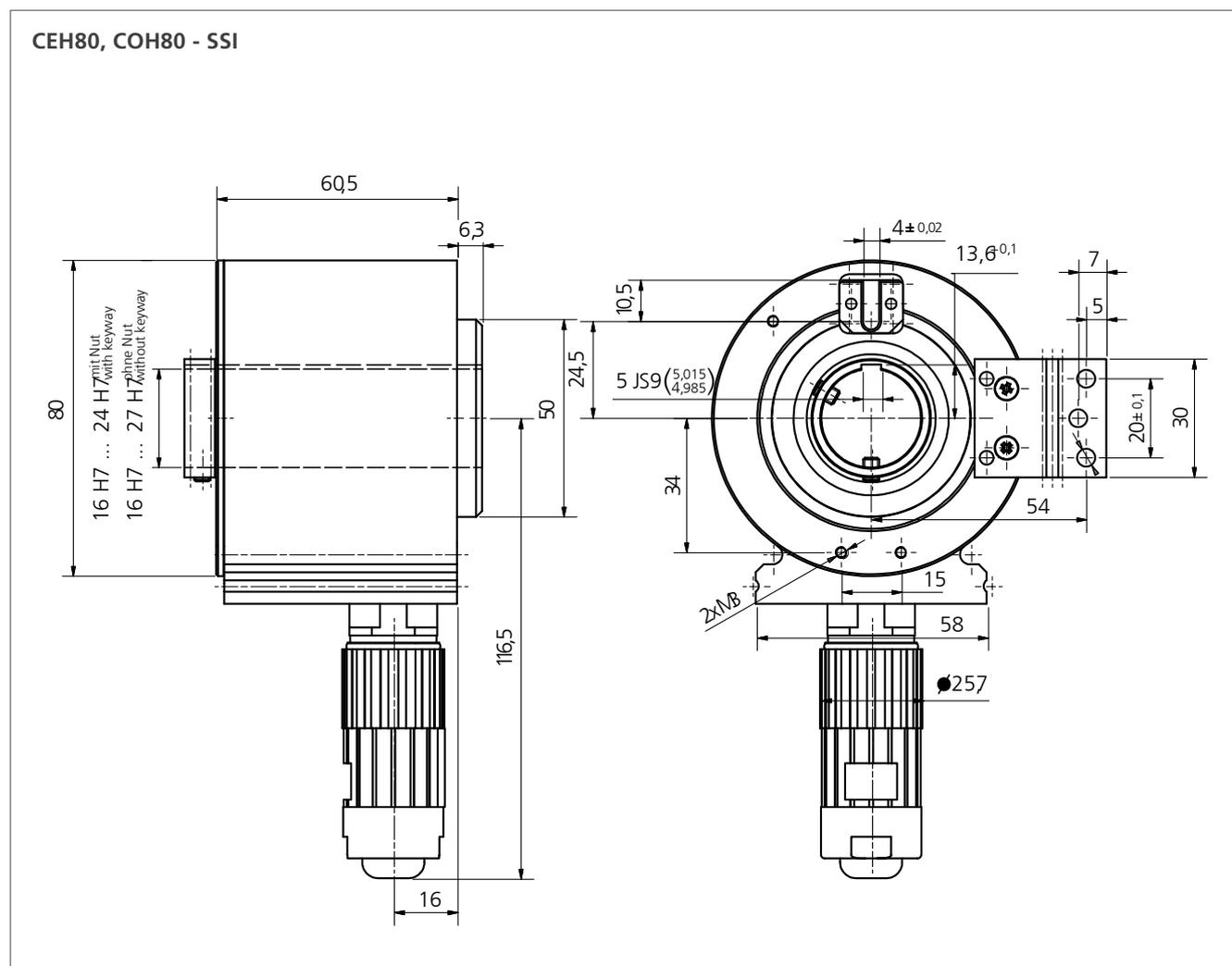
Can't find the right variant? Please contact us (info@tr-electronic.de)

Suggested Products

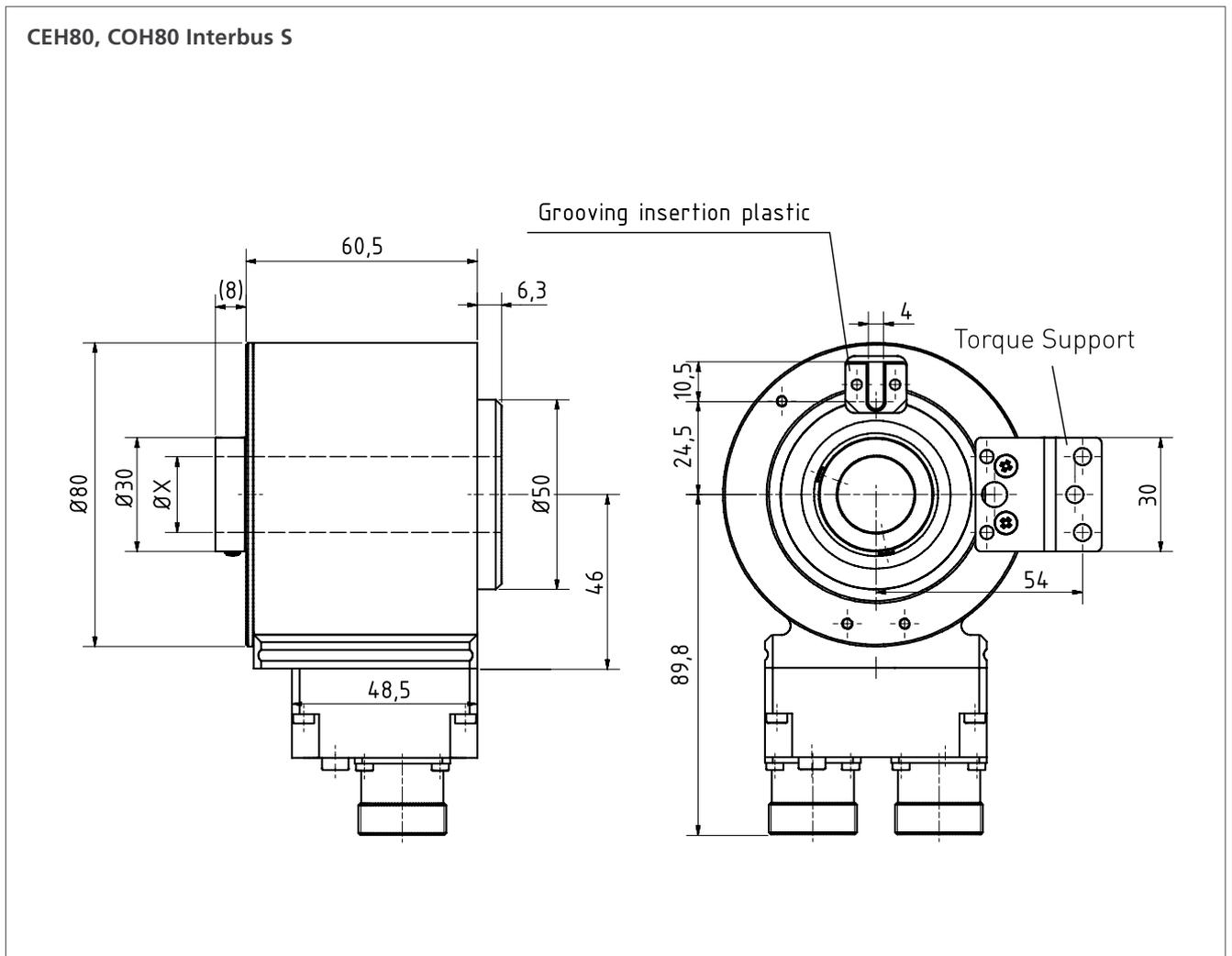
Order code	Steps per turn	Turns	Shaft	Connector position
CEH80 - EtherCAT				
CEH80M-00034	8192	4096	25H7	3x 4 pin M12
CEH80 - PROFIBUS				
CEH80M-00012	8192	4096	20H7	2x 5 pin M12 1x 4 pin M8
CEH80S-00015	8192	1	20H7	2x 5 pin M12 1x 4 pin M8
CEH80 - PROFINET				
CEH80M-00039	8192	4096	20H7	3x 4 pin M12
CEH80 - SSI				
CEH80M-00022	4096	4096	20H7	M23, 12 pin
CEH80M-00001	8192	4096	25H7	M23, 12 pin
CEH80S-00007	8192	1	25H7	M23, 12 pin
CEH802 - IBS				
CEH802M-00001	8192	4096	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
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 - SSI				
COH80S-00004	262144	1	16H7	M23, 12 pin

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

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			

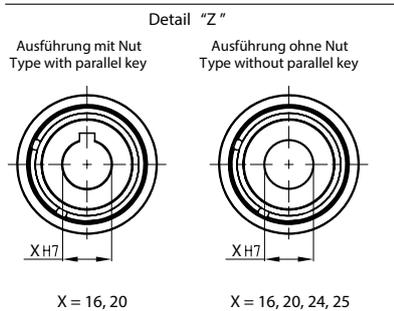
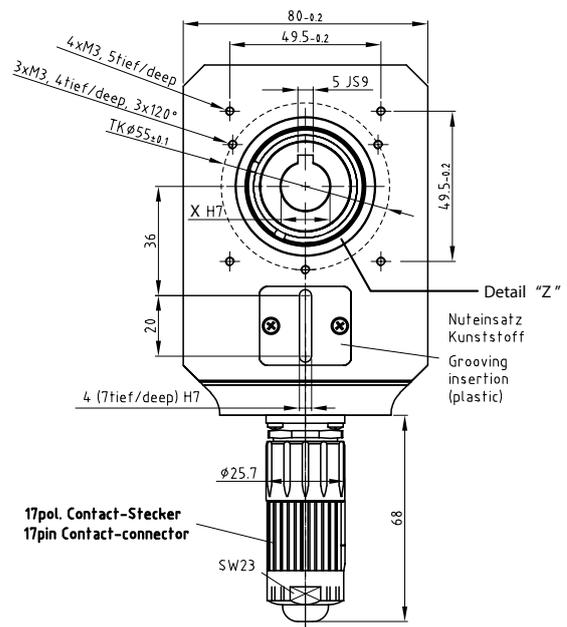
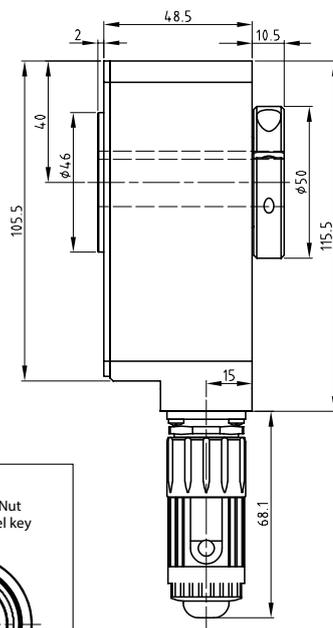
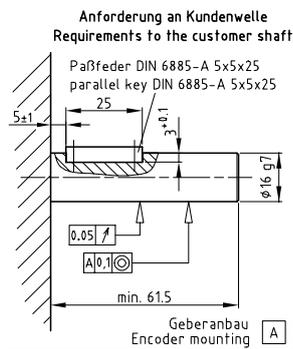
Can't find the right variant? Please contact us (info@tr-electronic.de)

Double detection (D)

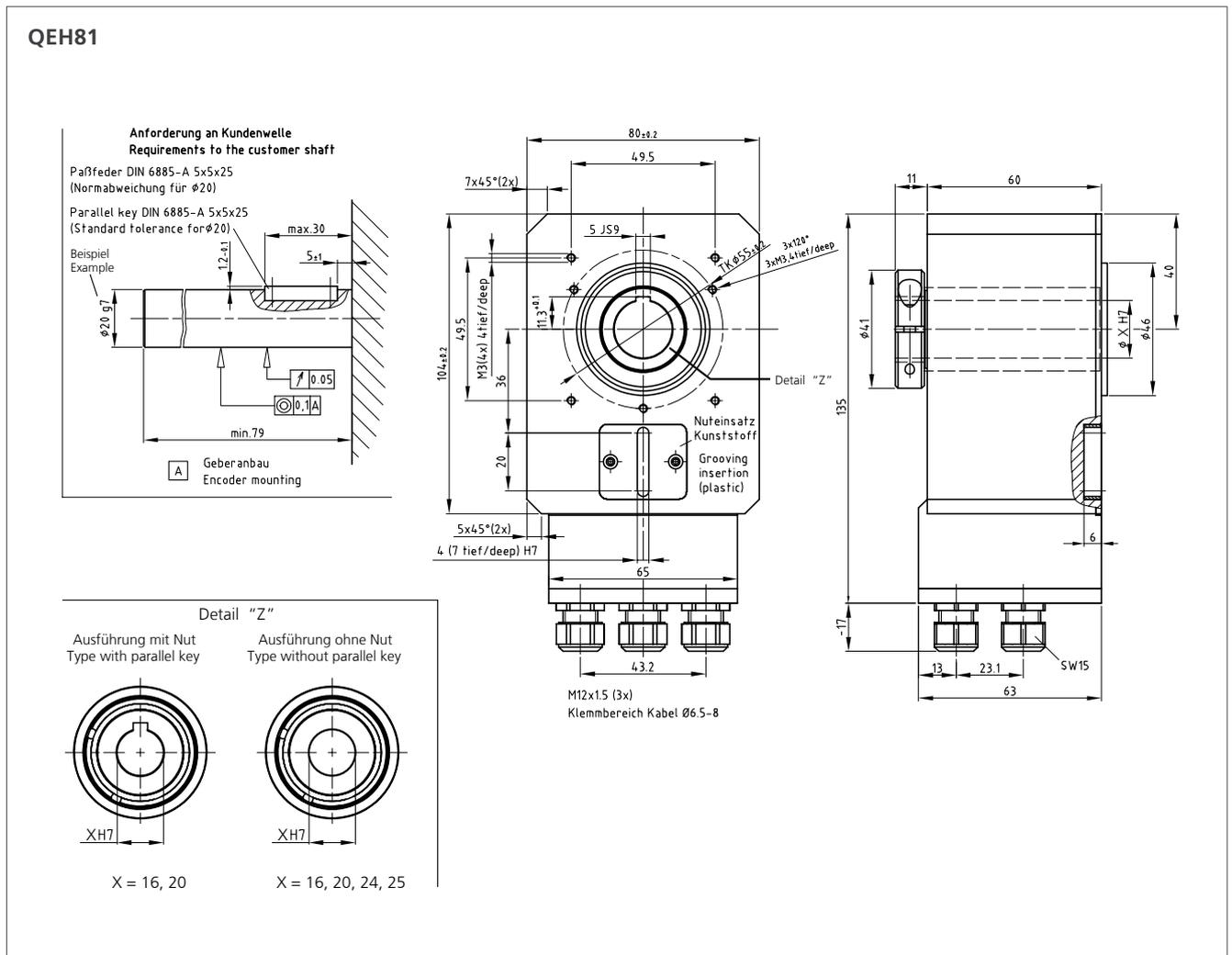
Products	QDH81 
Detection	Double detection (D)
Single / multi	(M) Multi (S) Single (2nd detection: Single)
Supply	24 VDC (11..27)
Steps per turn	<= 8192
Number of turns	<= 256000
Shaft diameters available	16, 20, 22, 24, 25
Connectors	Connector radial, connection hood with cable glands
Ambient temperature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

Dimensional Drawings

QEH80, QDH80

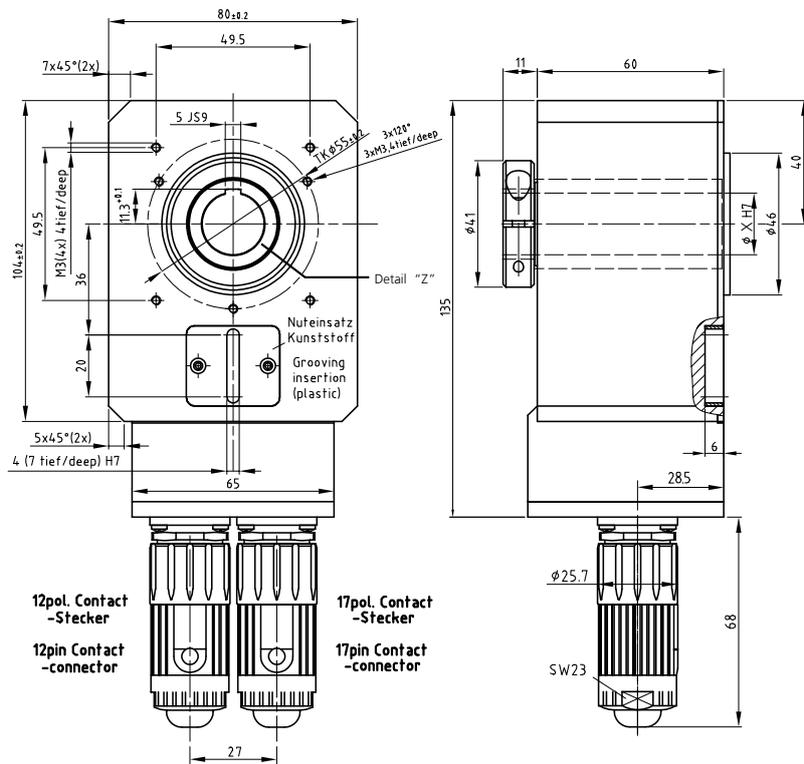
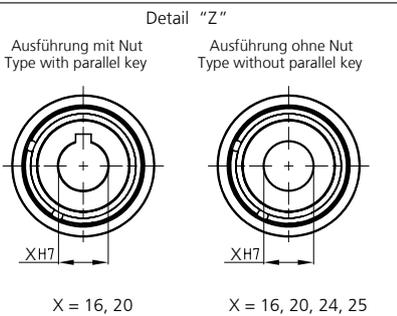
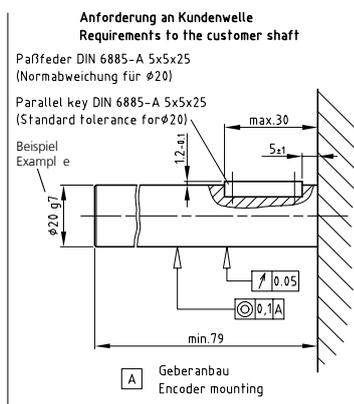


Dimensional Drawings

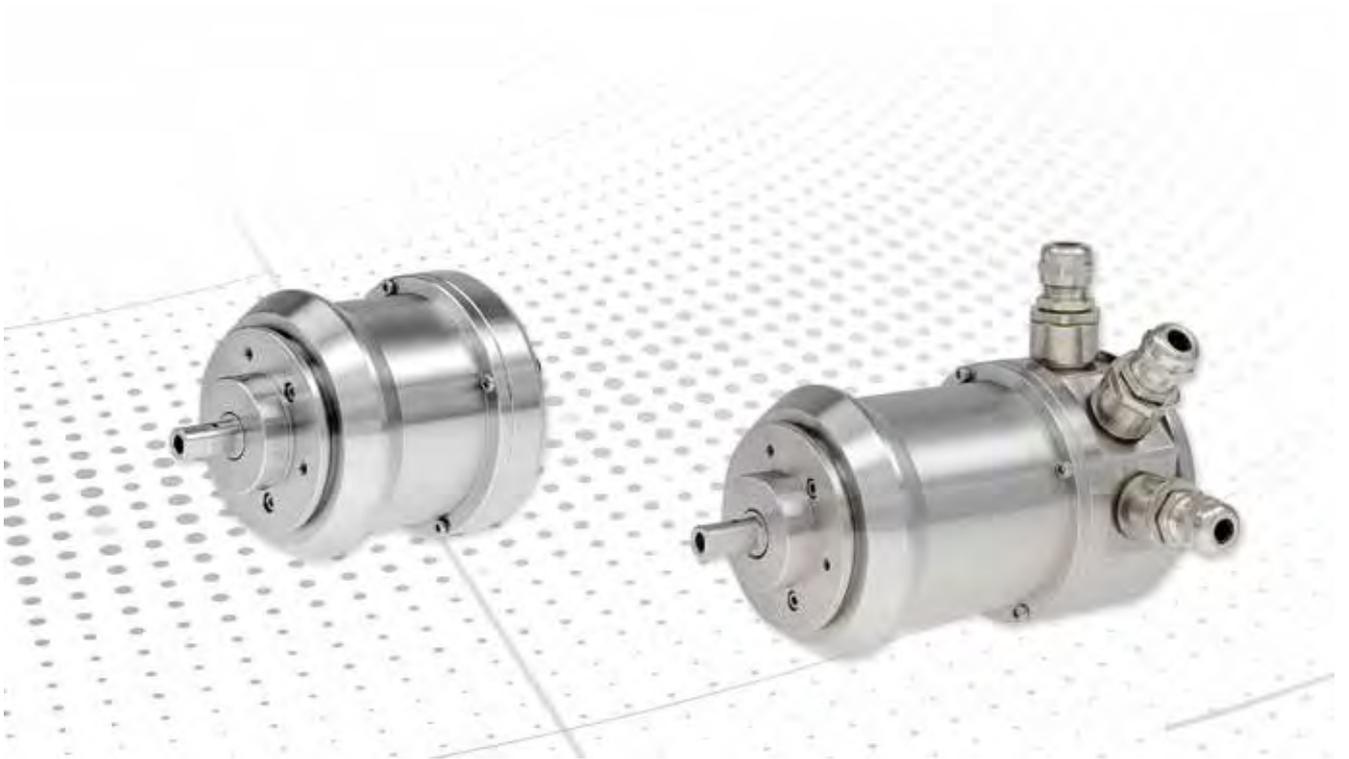


Dimensional Drawings

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.

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

Contents

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Stainless steel

Product	CEV84	CEV84 Field Bus	CEV84 Industrial Ethernet
			
Material	1.4305 (X12 Cr NiS 18 08 / 18 9)	1.4305 (X12 Cr NiS 18 08 / 18 9)	1.4305 (X12 Cr NiS 18 08 / 18 9)
Detection, Resolution choose from	C__58, L__58	C__58, L__58	C__58, L__58
Supply	11...27 VDC	11...27 VDC	11...27 VDC
Maximum rpm	3000 1/min	3000 1/min	3000 1/min
Mass (typical)	1,5..2,5 kg	1,5..2,5 kg	1,5..2,5 kg
Shaft diameters available	6, 10, 12 mm	6, 10, 12 mm	6, 10, 12 mm
Connectors	M23 axial / radial	Fieldbus hood / cable glands radial	3 x M12 axial
Ambient temperature	-20...+70 °C (option -40...+85 °C)	-20...+70 °C (option -40...+85 °C)	-20...+70 °C (option -40...+85 °C)
Protection class	IP68	IP68	IP68
ATEX			
Interface	SSI Parallel Analog	  	    
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-10054	8192	4096	10FL19,5 ZB36	Axial	3 x M12	
CEV84 - Powerlink						
CEV84M-10052	8192	4096	10FL19,5 ZB36	Axial	3 x M12	

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

Further product information

1. Enter order code into ...



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



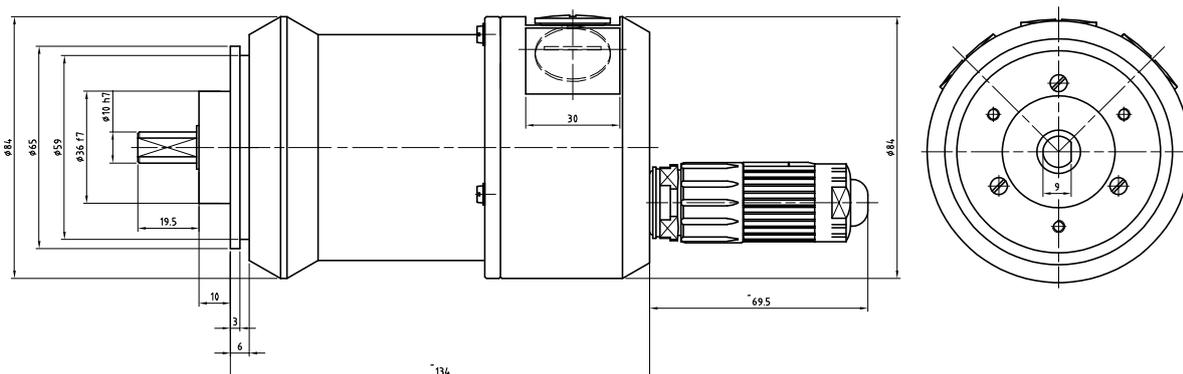
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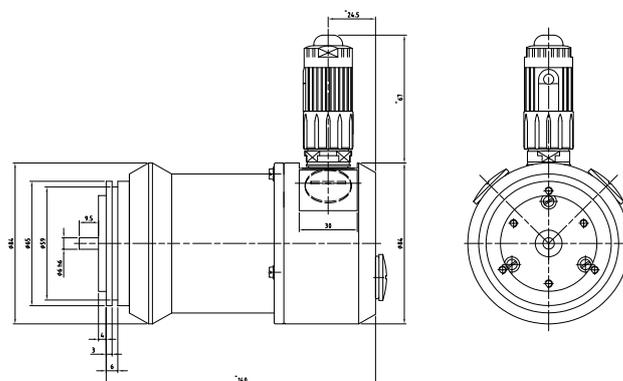
We will help you to select the most suitable products from the complete TR range. Please contact us (info@tr-electronic.de).

Dimensional Drawings

CEV84
SSI, Analog, PAR - axial



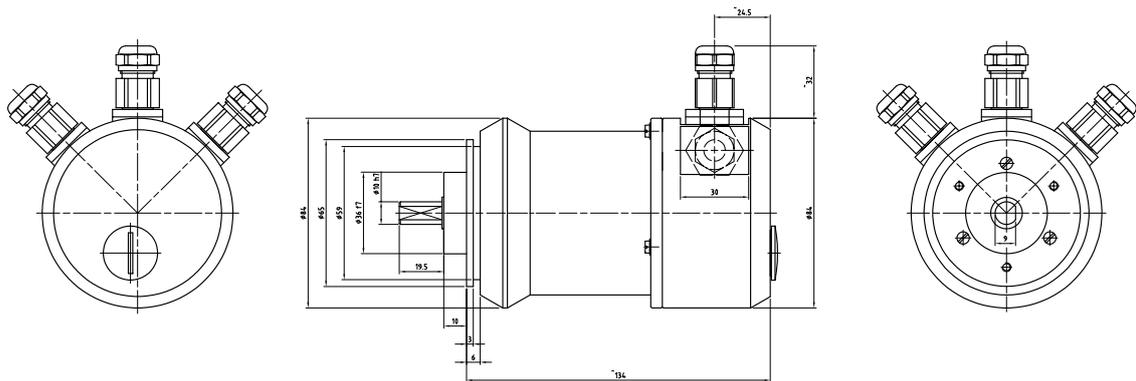
CEV84
SSI, Analog, PAR - radial



Dimensional Drawings

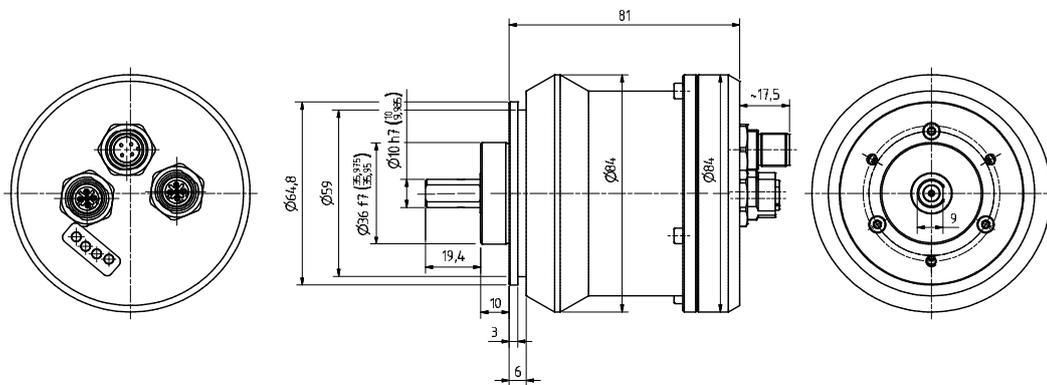
CEV84 Fieldbus

CANopen, CAN DeviceNet, Profibus



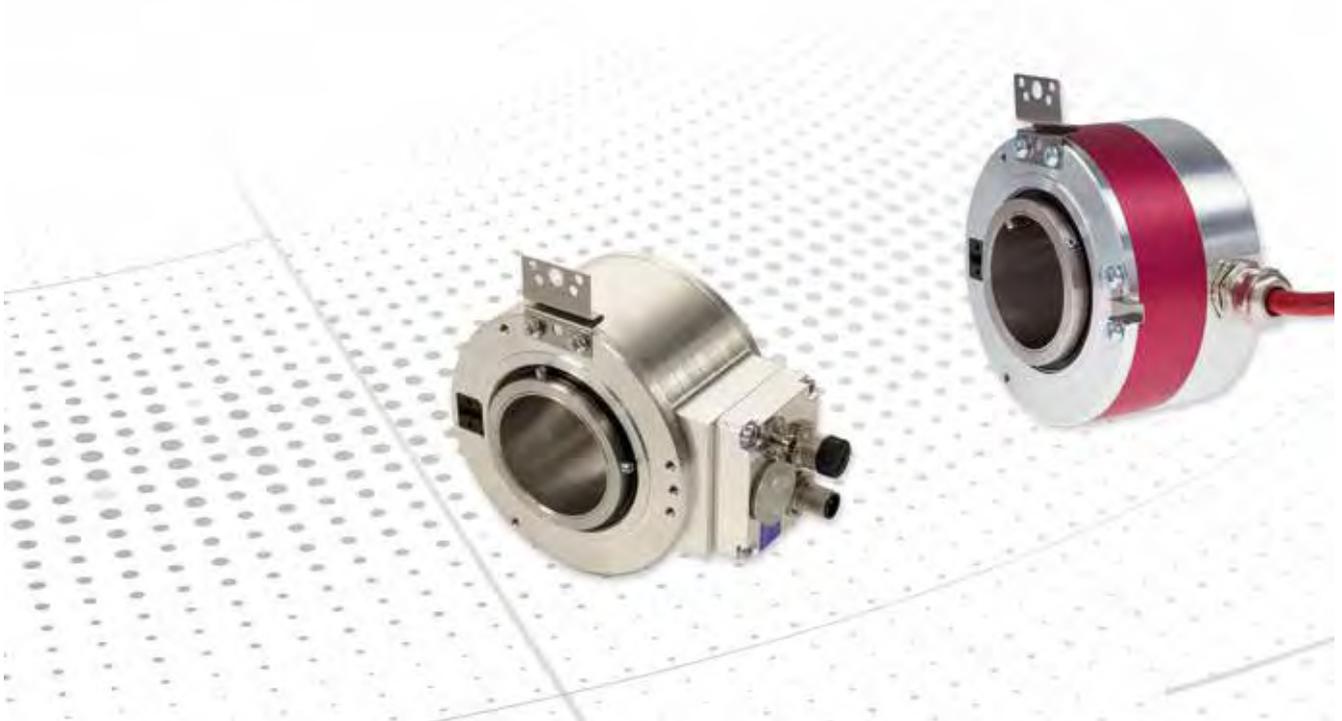
CEV84 Industrial Ethernet

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)

Product	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	   	   
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 / Flange	Connector position	Remark
CEH110 - SSI					
CEH110M-00001	4096	4096		Cable gland, 0,3 m cable, M23 12 pin	
CEH110M-00009	8192	4096		Cable gland, 3 cable, open end	
CEH110S-00002	8192	1		Cable gland, 0,3 m cable, M23 12 pin	
CEH110 - EPN					
CEH110M-00037	8.192	4096		3 x M12 4 pin, 1 x M12 8 pin	
CEH110M-00036	32.768	4096		3 x M12 4 pin, 1 x M12 8 pin	
COH110 - EtherCAT					
COH110M-00001	262144	4096		3 x M12 4 pin, 1 x M12 8 pin	
COH110S-00001	262144	1		3 x M12 4 pin, 1 x M12 8 pin	

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

Further product information

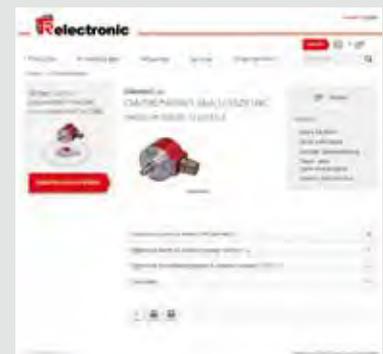
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2. Searchfield (top right) on www.tr-electronic.com

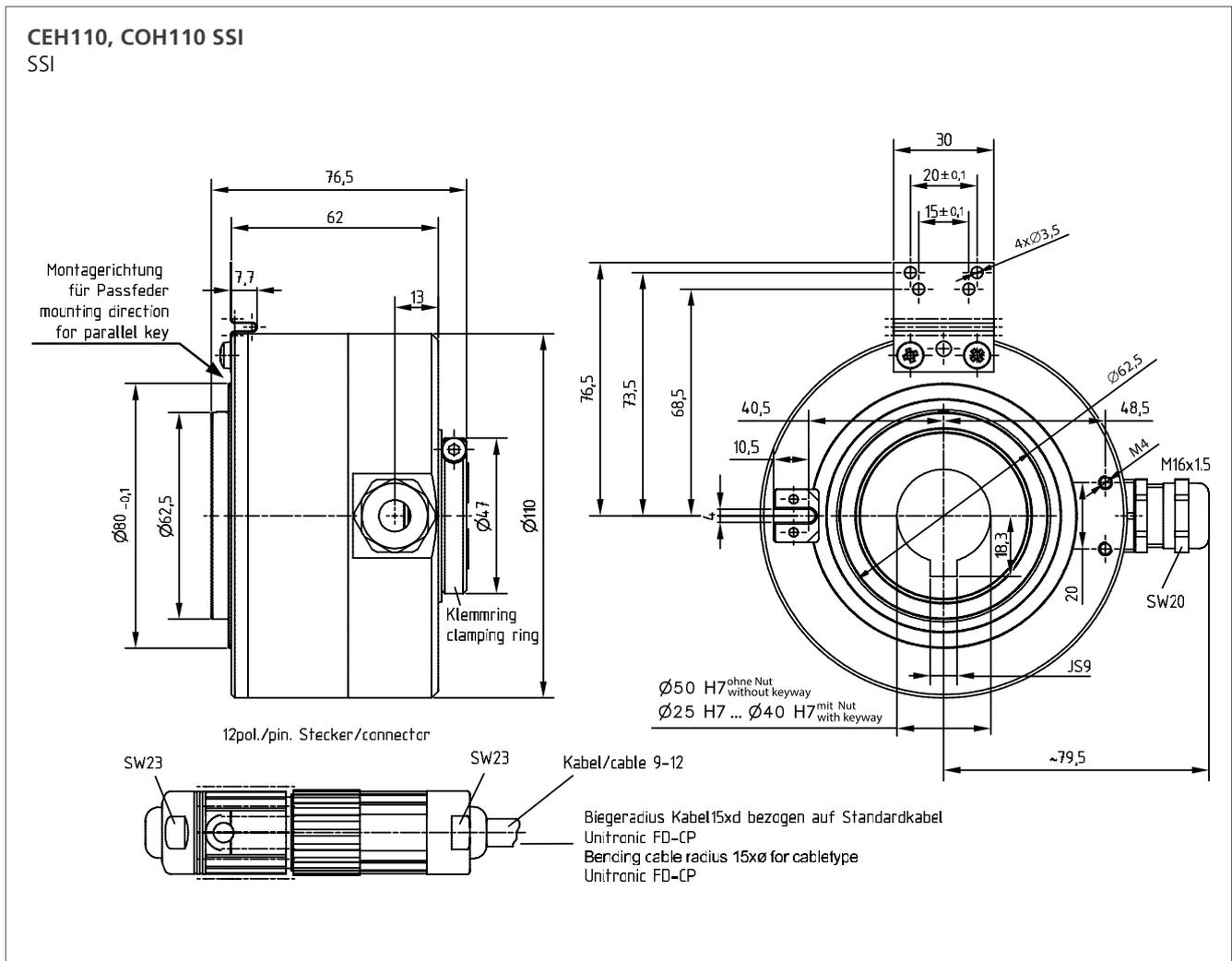


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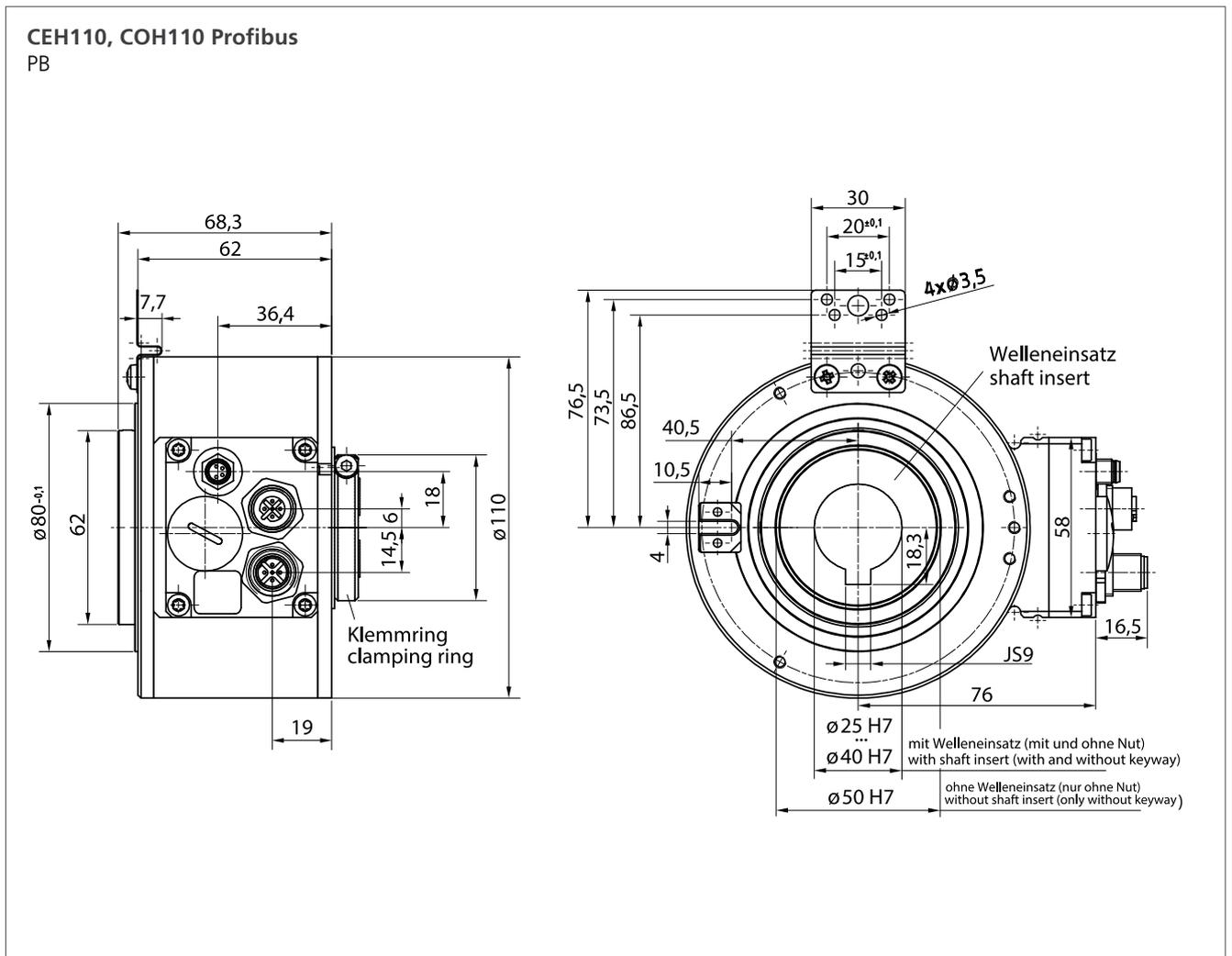


We will help you to select the most suitable products from the complete TR range. Please contact us (info@tr-electronic.de).

Dimensional Drawings

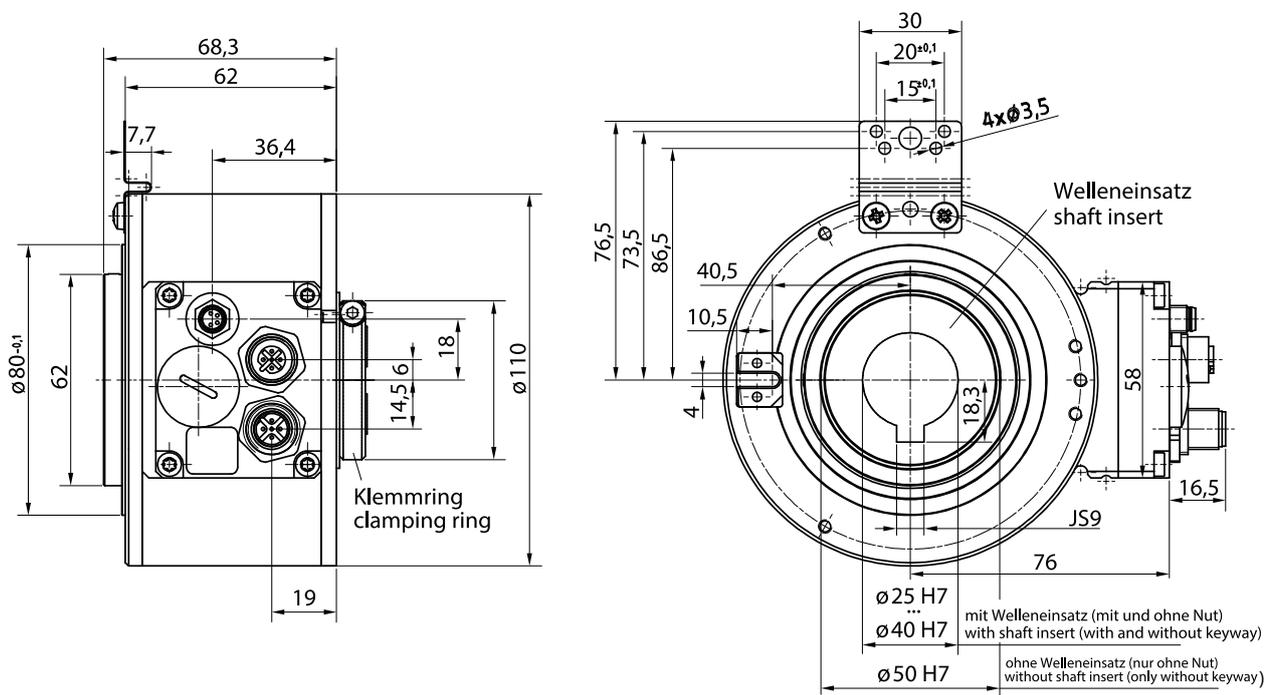


Dimensional Drawings

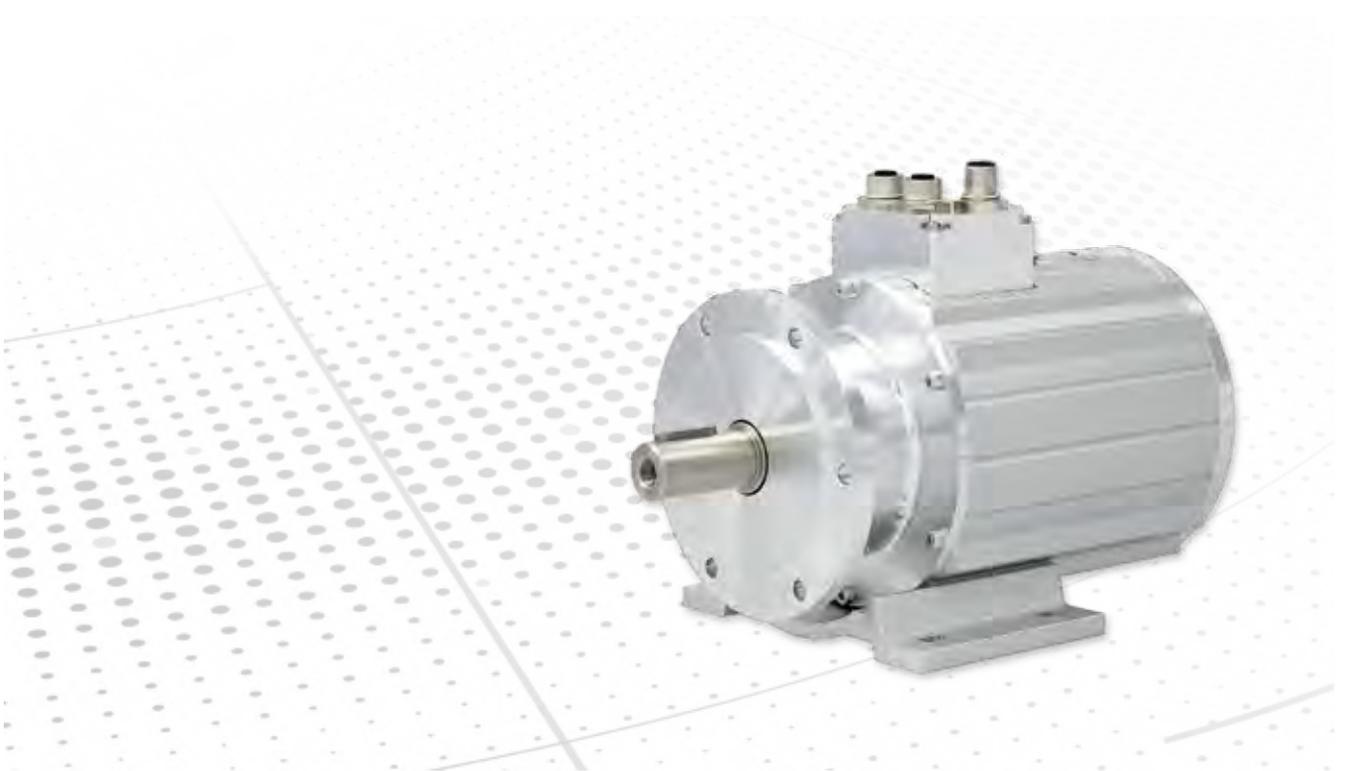


Dimensional Drawings

CEH110, COH110 Profibus
PB



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 hous-

ings made of aluminium and are equipped with heating or cooling elements if required. Internally, the detection and interface technology of the C__58, C__65, CD_75 (SIL) and I__58 series are used. With same mechanics, types for explosive atmospheres for Zones 2/22 are available.

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Housing option for rotary encoders

Encoder with protective housing

Double encoder with protective housing

Product	C_V115	AEV115	ADV115
			
Type	Housing option for rotary encoders	Encoder with protective housing	Double encoder with protective housing
Technical data encoder	See rotary encoders C__58 / C__65 / I__58	8192 / 256000	8192 / 256000
Shaft diameters available	12, 14, 20	12, 14, 20	12, 14, 20
Connectors	Cable gland / connector	Cable gland	Cable gland
Ambient temperature	-20...+60 °C	0...+40 °C	0...+40 °C
Protection class	IP65 (option IP67)	IP65	IP65
ATEX zone	Option 22	22	22
Interface	SSI DeviceNet Analog PROFIBUS Parallel EtherCAT Nocken EtherNet/IP  ETHERNET POWERLINK 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			

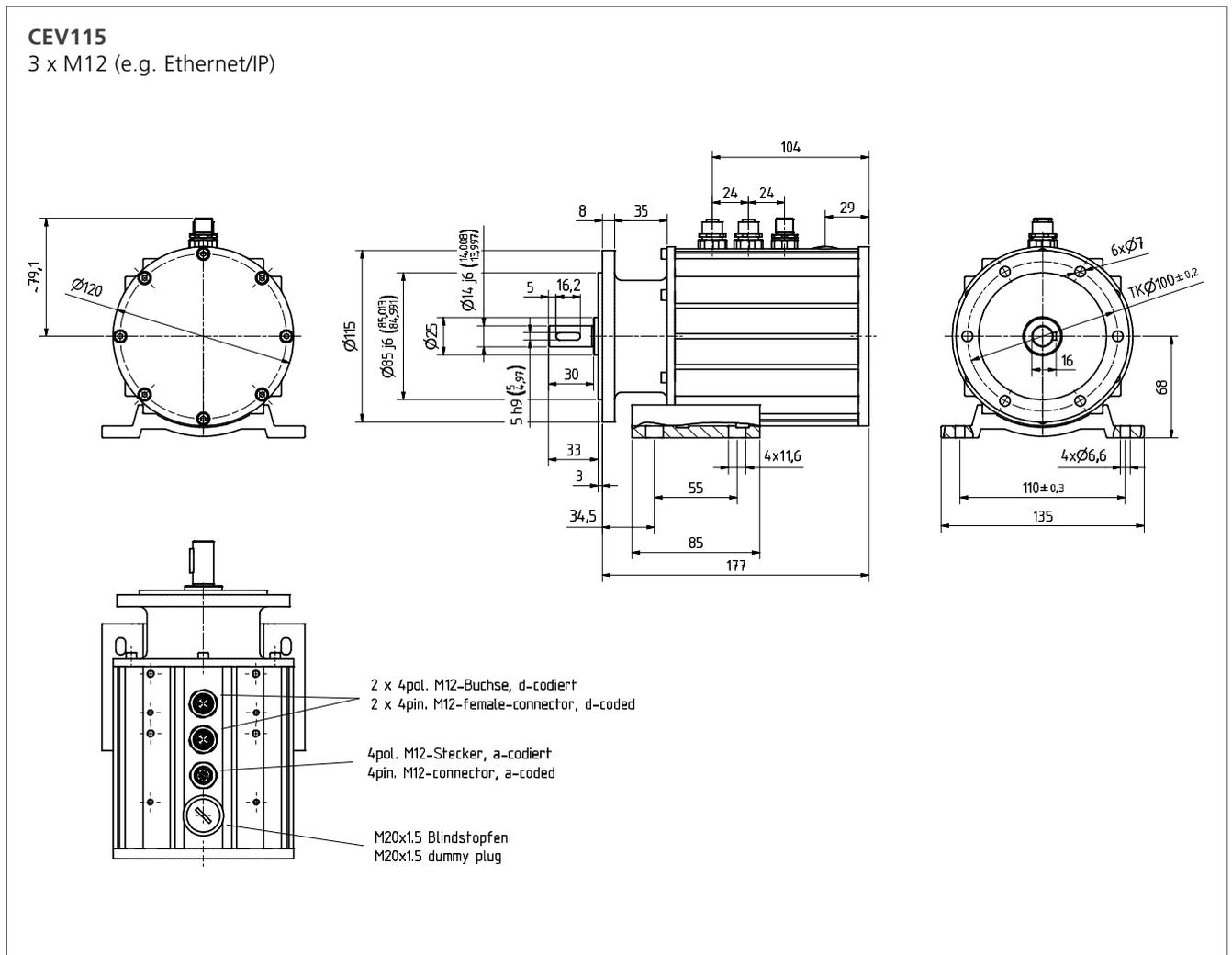
Can't find the right variant? Please contact us (info@tr-electronic.de)

Suggested Products

Order code	Steps per turn	Turns	Shaft / Flange	Connector position	Remark
CEV115 SSI					
CEV115M-01368	4096	4096	14 Keyway /33 ZB85	Cable gland, 10 m cable	
CEV115M-10021	4096	4096	20 Keyway /40 ZB85	M23 12 radial	Address 10 factory set
CEV115 Profibus					
CEV115M-10010	8192	4096	14 Keyway /33, ZB85	Fieldbus hood with 3 x PG 11 cable glands	
CEV115M-10005	8192	4096	14 Keyway /33, ZB85	Fieldbus hood with 3 x M16 cable glands	
CEV115 Profibus + SSI					
CEV115M-10024	4096	4096	20 Keyway /40 ZB85	Fieldbus hood with 3 x M16 cable glands	
CEV115 Ethernet/IP					
CEV115M-10055	8192	4096	14 Keyway /33 ZB85	3 x M12 radial	
CEV115M-10054	8192	4096	14 Keyway /33 ZB85	3 x M12, 1 x M23 radial	Heating integrated
CEV115 Profinet					
CEV115M-10060	8192	4096	20 Keyway /40 ZB85	3 x M12 radial	
CEV115 EtherCAT					
CEV115M-10061	8192	4096	20 Keyway /40 ZB85	3 x M12 radial	
CDV115 PB/SSI + SSI/INC					
CDV115M-00002	4096/4096	4096/4096	20 Keyway /40 ZB85	Fieldbus hood with 4 x M16 cable glands	Encoder 1 Profibus + SSI Encoder 2 SSI + INC
AEV115 Profibus					
AEV115M-00001	4096	4096	20 Keyway /40 ZB85	Fieldbus hood with 3 x M16 cable glands	
ADV115 Double encoder Profibus+SSI, SSI+INC					
ADV115M-00001	8192 / 8192	4096 / 4096	20 Keyway /40 ZB85	Fieldbus hood with 4 x M16 cable glands	Encoder 1 Profibus + SSI Encoder 2 SSI + INC

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

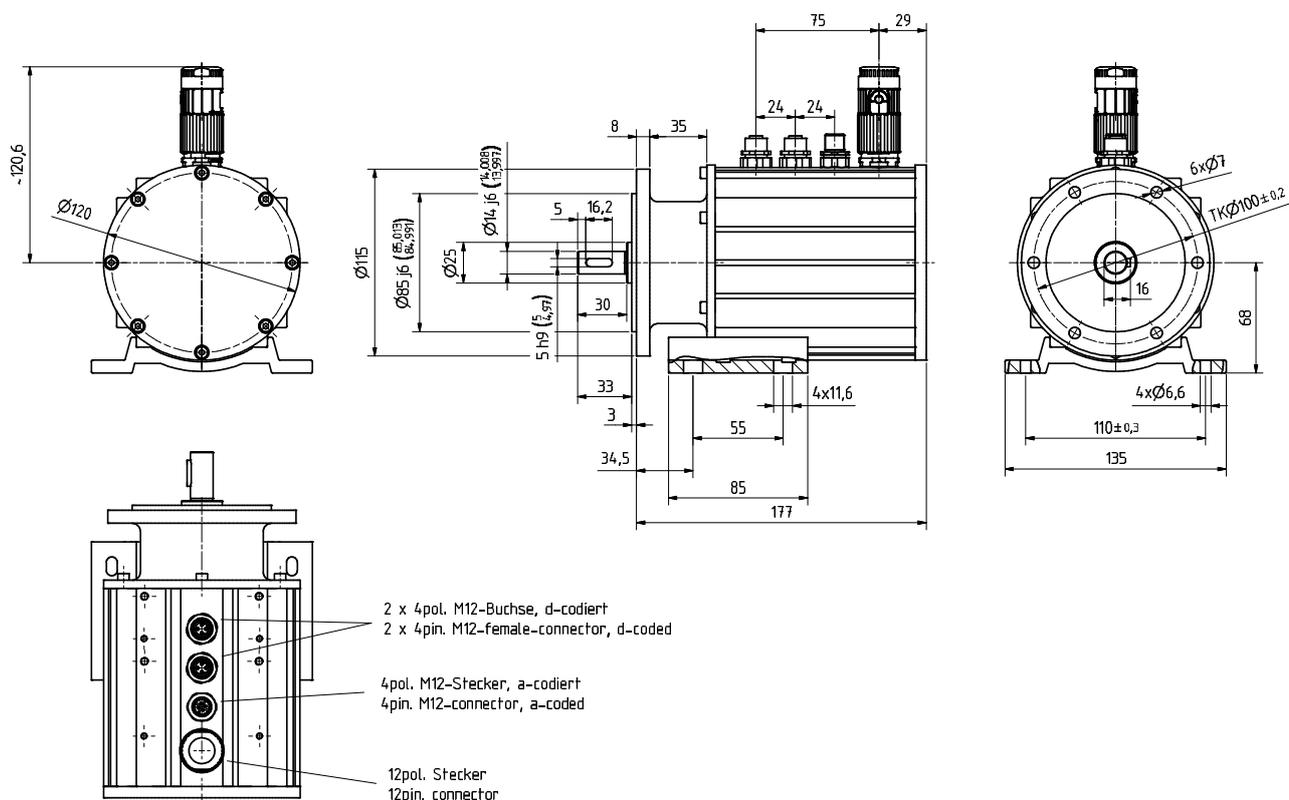
Dimensional Drawings



Dimensional Drawings

CEV115

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

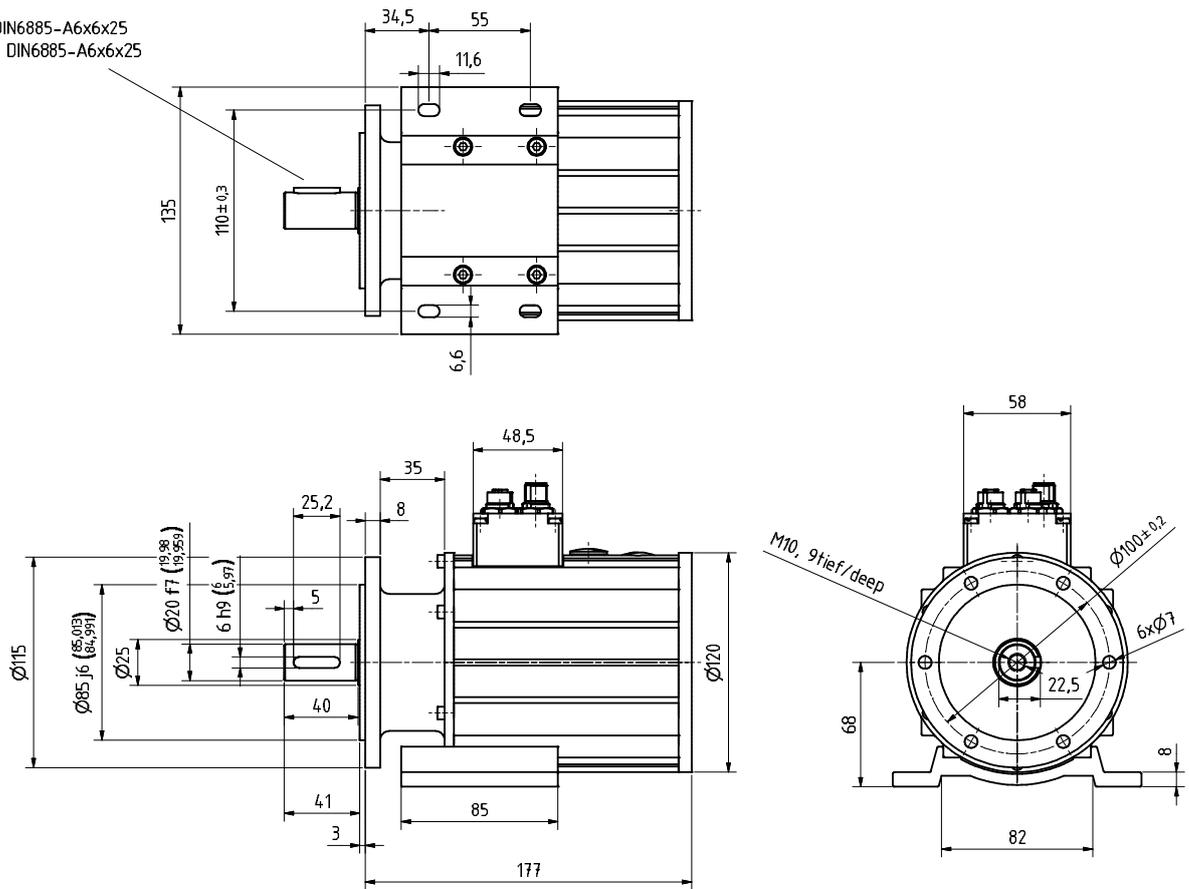


Dimensional Drawings

CEV115

Connector hood radial for PROFINET, EtherCAT

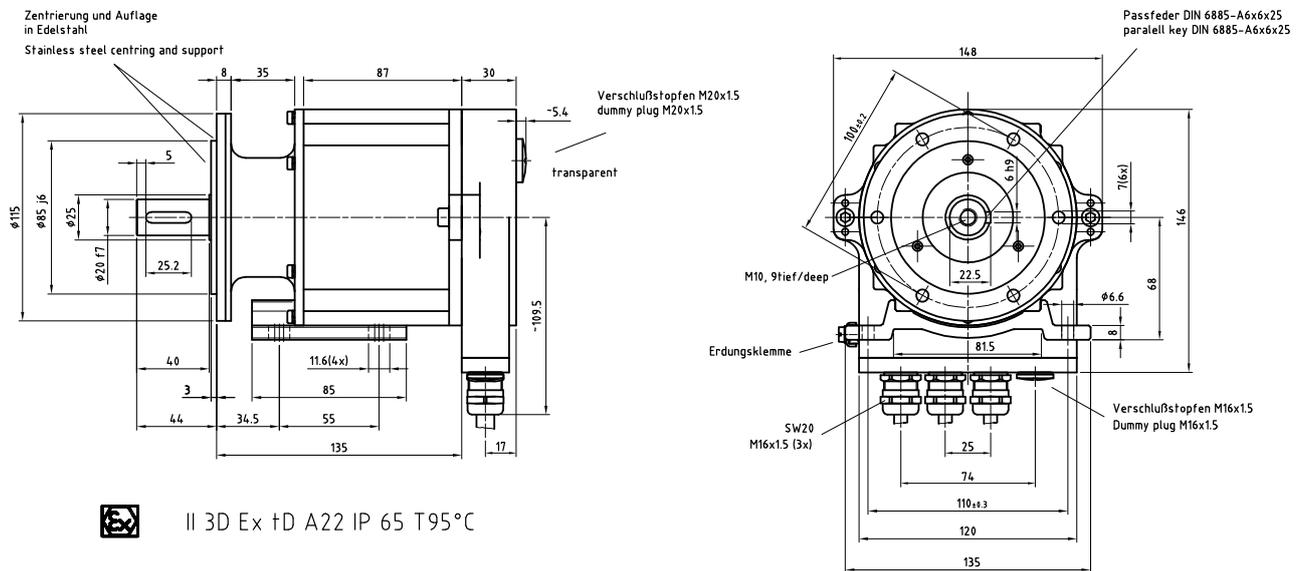
Passfeder DIN6885-A6x6x25
parallel key DIN6885-A6x6x25



Dimensional Drawings

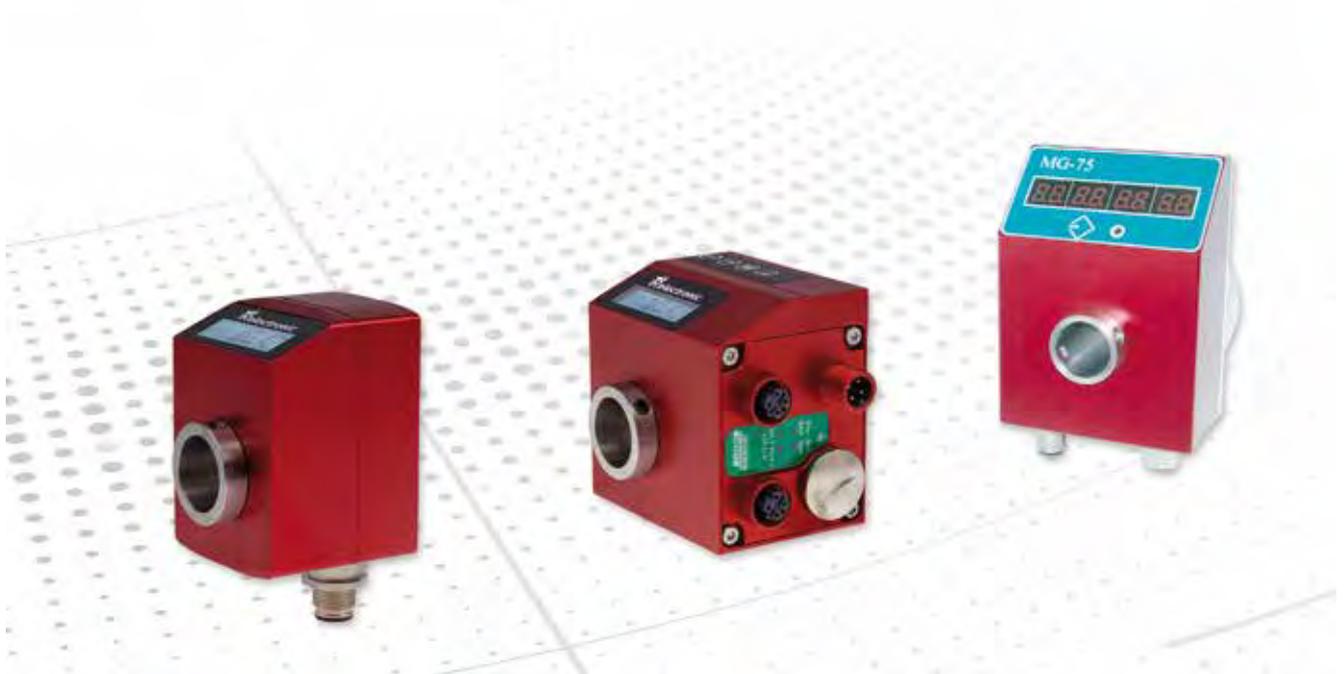
AEV115

Connection hood, same orientation as mounting foot





Encoder - Family M__Display - Position Indicators



When information is needed directly in the applications

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

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

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

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

Contents

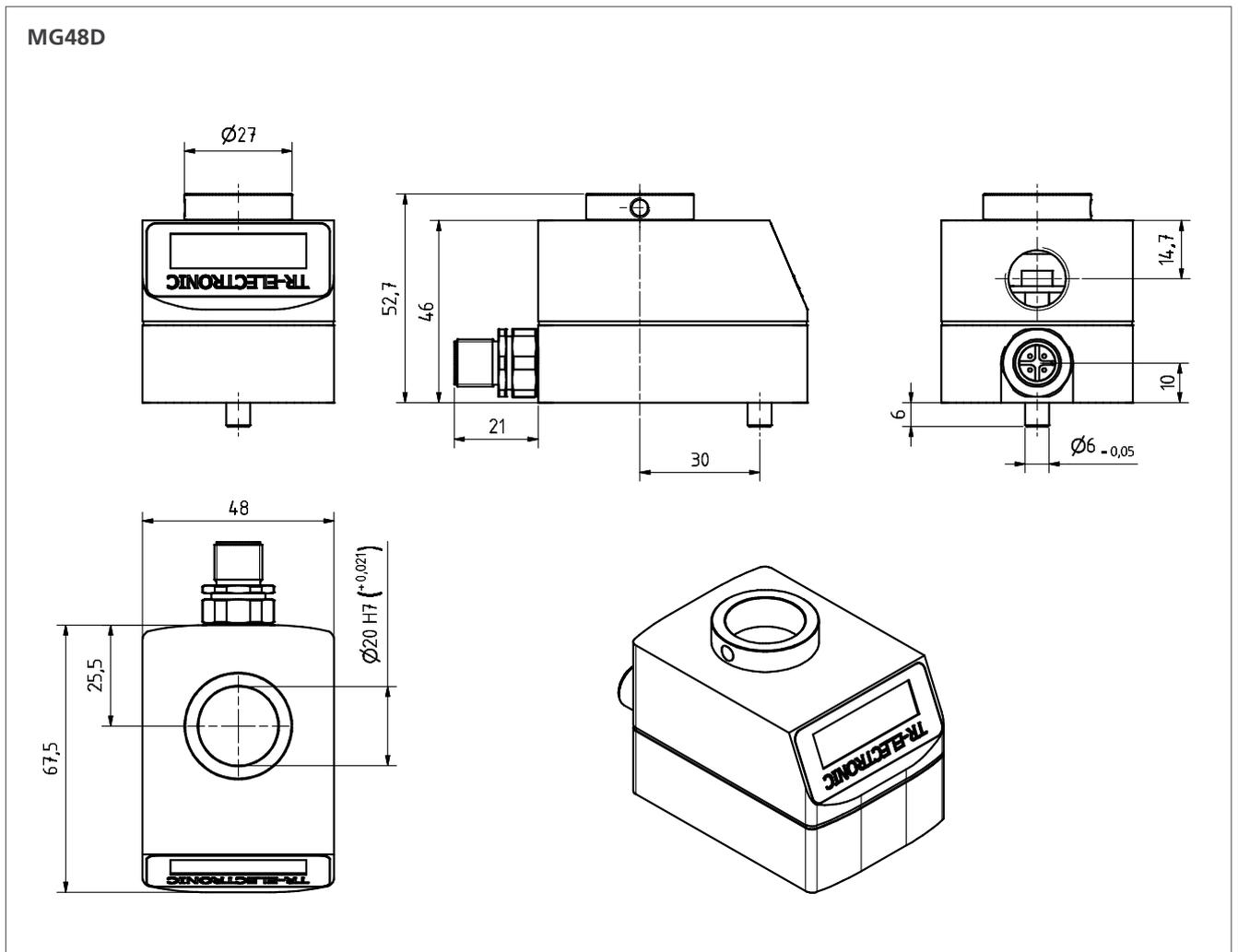
Products.....	155
Dimensional Drawings.....	156

Magnet detection (M)

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

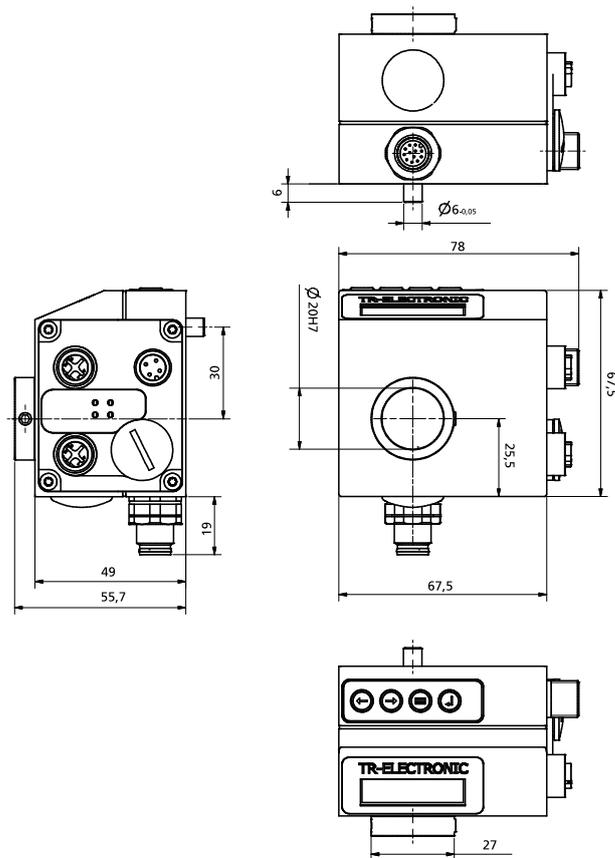
Can't find the right variant? Please contact us (info@tr-electronic.de)

Dimensional Drawings



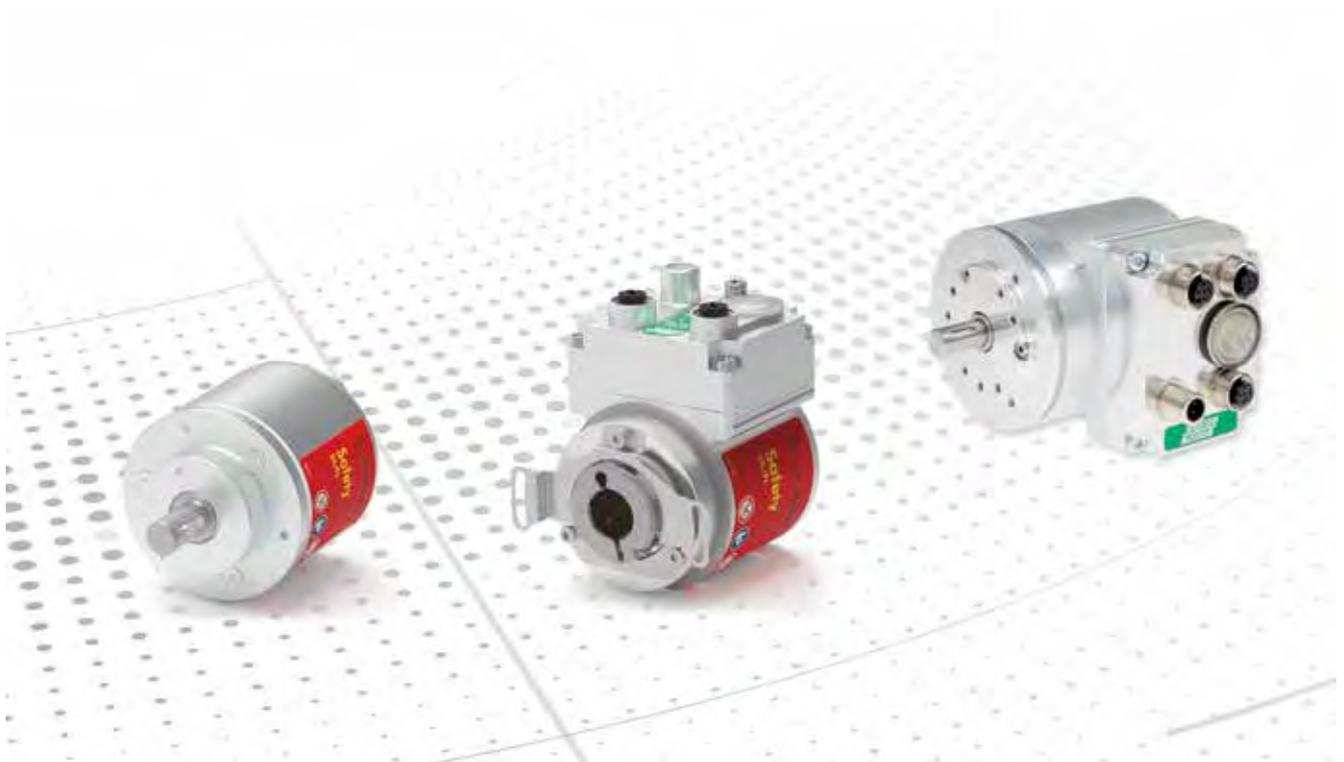
Dimensional Drawings

MG48D Industrial Ethernet





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 or FSoE via EtherCAT guarantee optimal

safety and precision. The ATEX-compliant housing variant offers additional protection in explosive atmospheres. No separate modules are necessary for reliable position output, and there is no need to separately program a safety module - you couldn't get a simpler or more cost-effective solution.

Contents

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Optical detection (E)

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

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

Magnetic detection (M)

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

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

Optical detection (E)

Magnetic detection (M)

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

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-PB (E) 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 (E) 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-00020	8192	32768	10Keyway/19,5 ZB36	Connector radial	4 x M12	Stainless steel
CDV75M-EPL (E) Double detection, solid shaft, Powerlink						
CDV75M-00021	8192	32768	10Keyway/19,5 ZB36	Connector radial	4 x M12	
CDV75M-PN (E) Double detection, solid shaft, EtherCAT						
CDV75M-00054	8192	32768	10Keyway/19,5 ZB50	Connector radial	4 x M12	TTL Incr -25°...60°C
CDV75M-PN (E) Double detection, both magnetic, solid shaft, EtherCAT						
CDV75M-00056	8192	32768	10Keyway/19,5 ZB50 D75	Connector radial	4 x M12	-40°C...+65°C
CDV75M-PN (M) Double detection, both magnetic, solid shaft, Profinet						
CDV75M-00061	8192	32768	10Keyway/19,5 ZB36	Connector radial	4 x M12	-40°C...+65°C
CDV75M-00043	8192	32768	10Keyway/19,5 ZB50	Connector radial	4 x M12	-40°C...+65°C
CDV75M-PN (M) Double detection, both magnetic, solid shaft, Powerlink						
CDV75M-00065	8192	32768	10Keyway/19,5 ZB50 D75	Connector radial	4 x M12	-40°C...+65°C
CDH75M-SSI (E) 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		

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

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

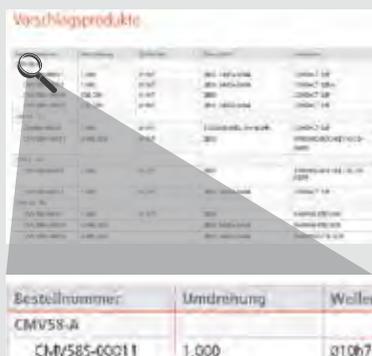
Suggested Products

Order code	Steps per turn	Turns	Shaft / Flange	Connector position	Connector type	Remark
CDH75M-PB (E) 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
CDH75M-PN (E) 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
CDH75M-00046	8192	32768	20H7/Keyway ZB46	Connector radial	5 x M12	TTL Incr -20°...70°C
CDH75M-EPL (E) Double detection, hollow shaft, Powerlink						
CDH75M-00026	8192	32768	20H7/Keyway slot for pin D4	Connector radial	4 x M12	
CDH75M-PN (E) Double detection, hollow shaft, EtherCAT						
CDH75M-00041	8192	32768	12H7/Keyway slot for pin D4	Connector radial	4 x M12	TTL Incr -25°...60°C

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

Further product information

1. Enter order code into ...



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

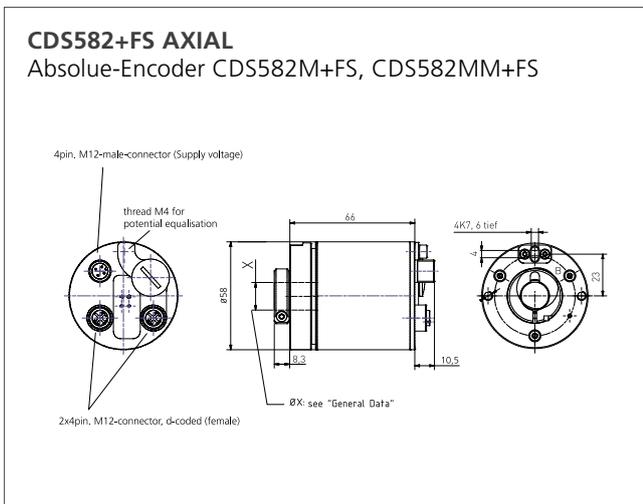
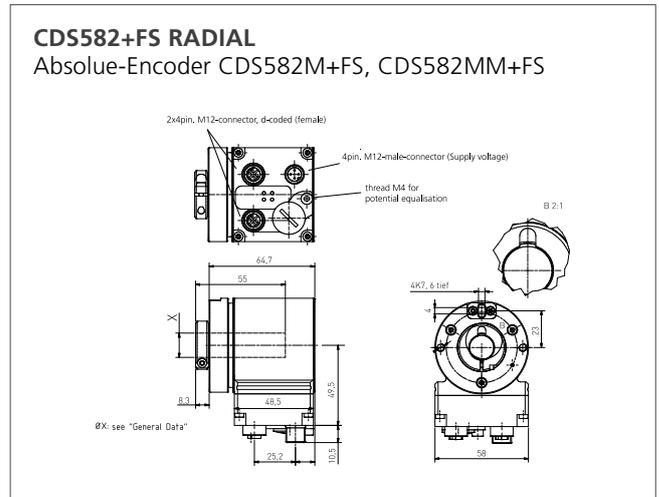
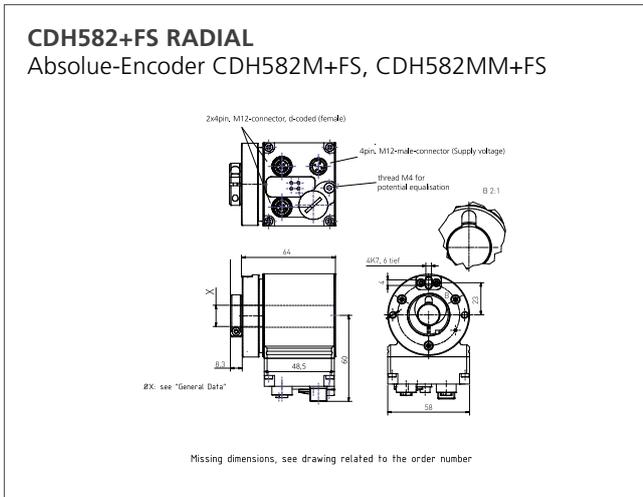
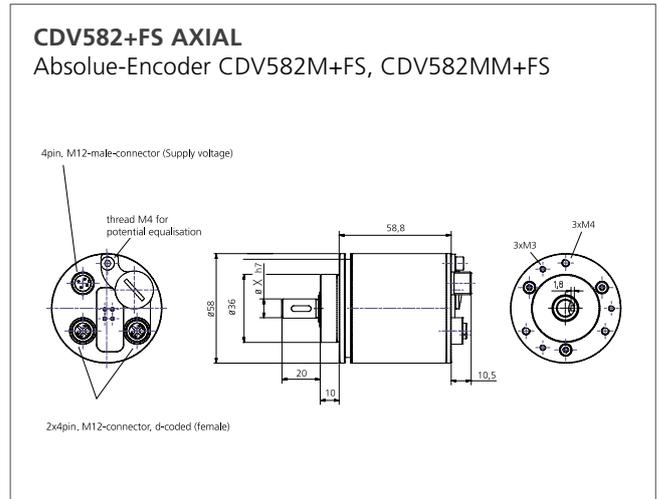
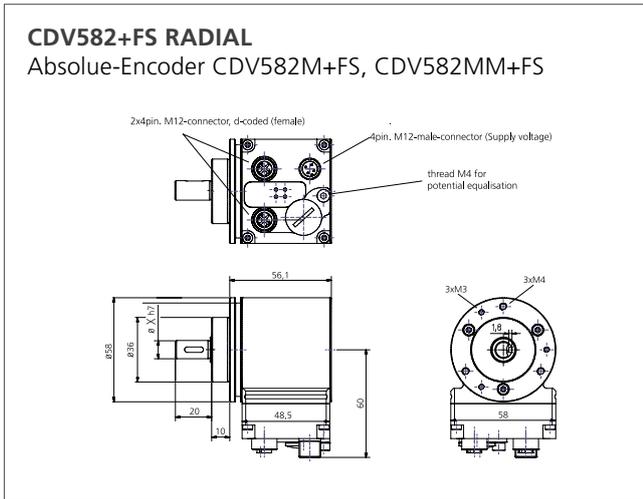


3. Choose desired information



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

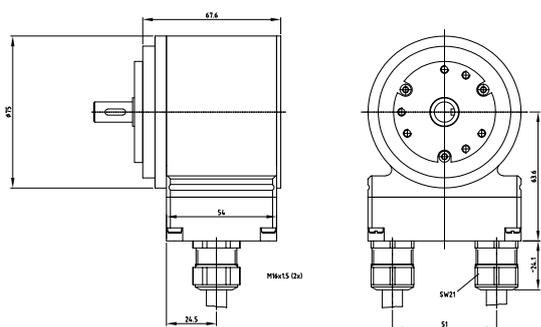
Dimensional Drawings



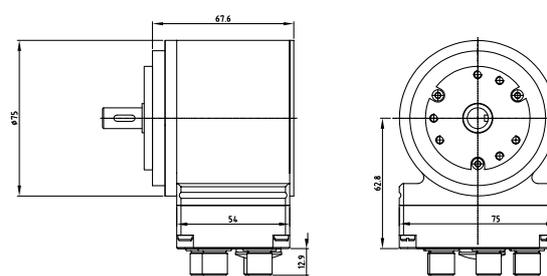
Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at www.tr-electronic.com or on request.

Dimensional Drawings

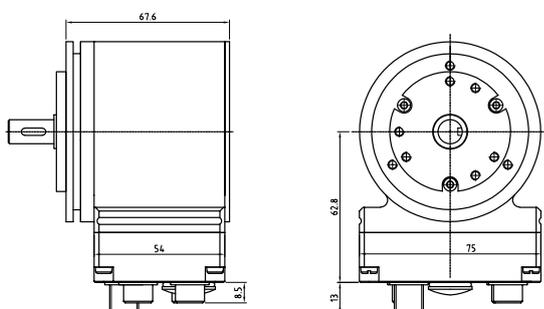
CDV75-SSI
Absolute encoder CDV75M - SSI



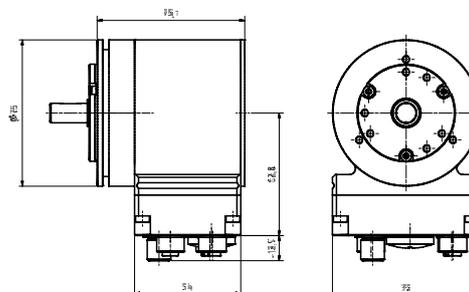
CDV75-PB
Absolute encoder CDV75M - PB



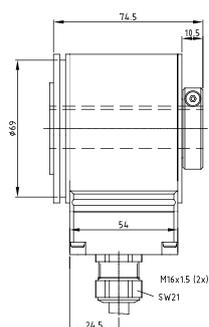
CDV75-PN / EPL / ETC
Absolute encoder CDV75M - PROFINET / PROFIsafe , -
Powerlink / openSAFETY ; - EtherCAT / FSoE



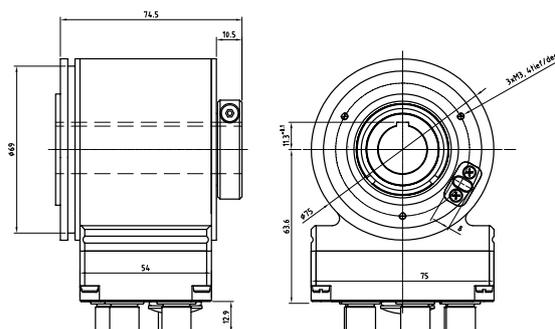
CDV75-PN
Absolute encoder CDV75M PROFINET / PROFIsafe+FS
SealPack



CDH75-SSI
Absolute encoder CDH75M - SSI



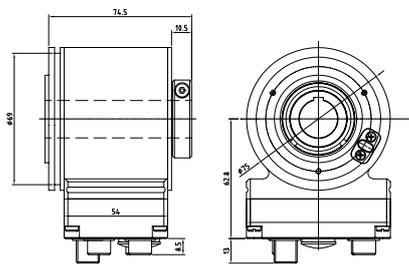
CDH75-PB
Absolute encoder CDH75M - PB



Dimensional Drawings

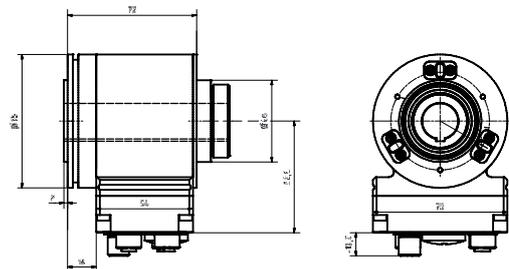
CDH75-PN / EPL / ETC

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



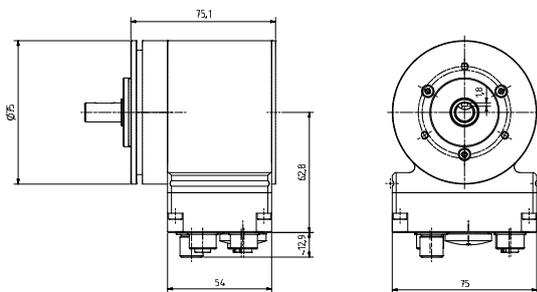
CDH75-PN

Absolute encoder CDH75M PROFINET / PROFIsafe+FS SealPack



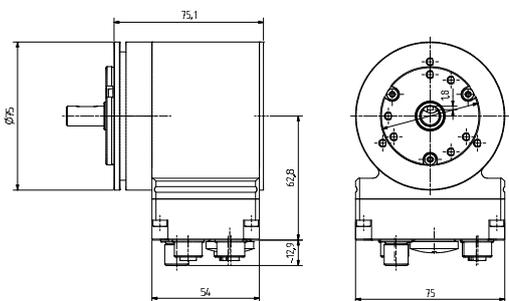
Seal Pack

Sample CDV75



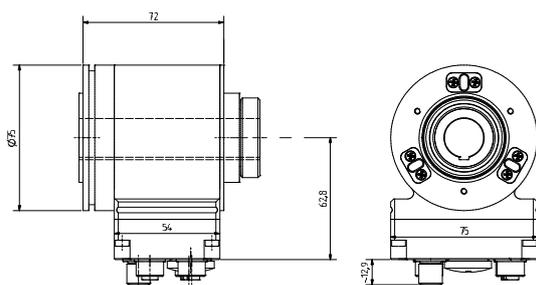
Stainless Steel

Sample CDV75



Seawater-resistant Aluminum

Sample CDH75





Rotary Encoders- Functional Safety - SIL2 / PLd



Functional safety up to SIL2 / PLd

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

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

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Optical detection (E)

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

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Magnetic detection (M)

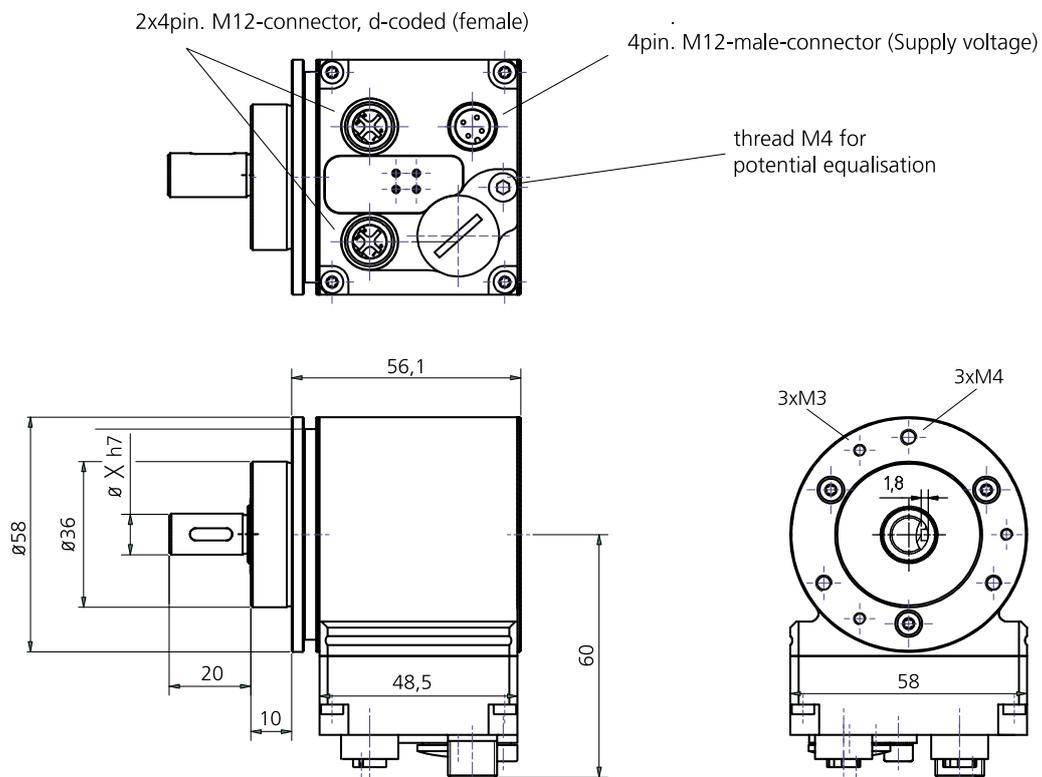
Product	CDV582MM+FS2	CDH582MM+FS2	CDS582MM+FS2
			
Detection	Magnetic detection (M)	Magnetic detection (M)	Magnetic detection (M)
Single / multi	(M) Multi	(M) Multi	(M) Multi
Supply	10...30 VDC	10...30 VDC	10...30 VDC
Full resolution	28 bit	28 bit	28 bit
Steps per turn	8192	8192	8192
Number of turns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

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

Dimensional Drawings

CDV582+FS RADIAL

Absolute-Encoder CDV582M+FS, CDV582MM+FS

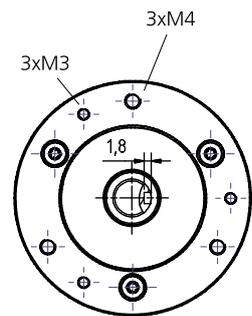
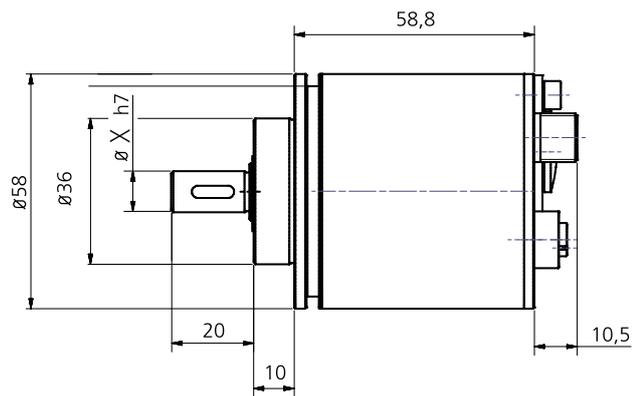
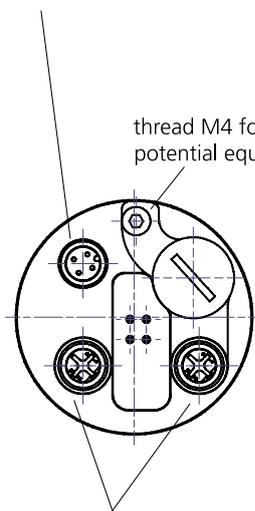


Dimensional Drawings

CDV582+FS AXIAL

Absolute-Encoder CDV582M+FS, CDV582MM+FS

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

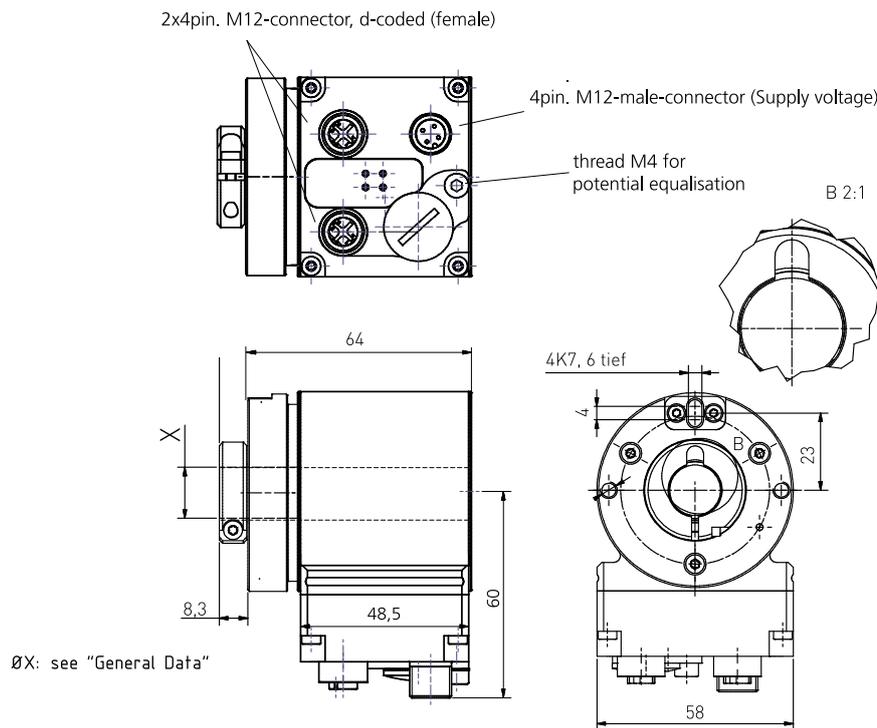


2x4pin. M12-connector, d-coded (female)

Dimensional Drawings

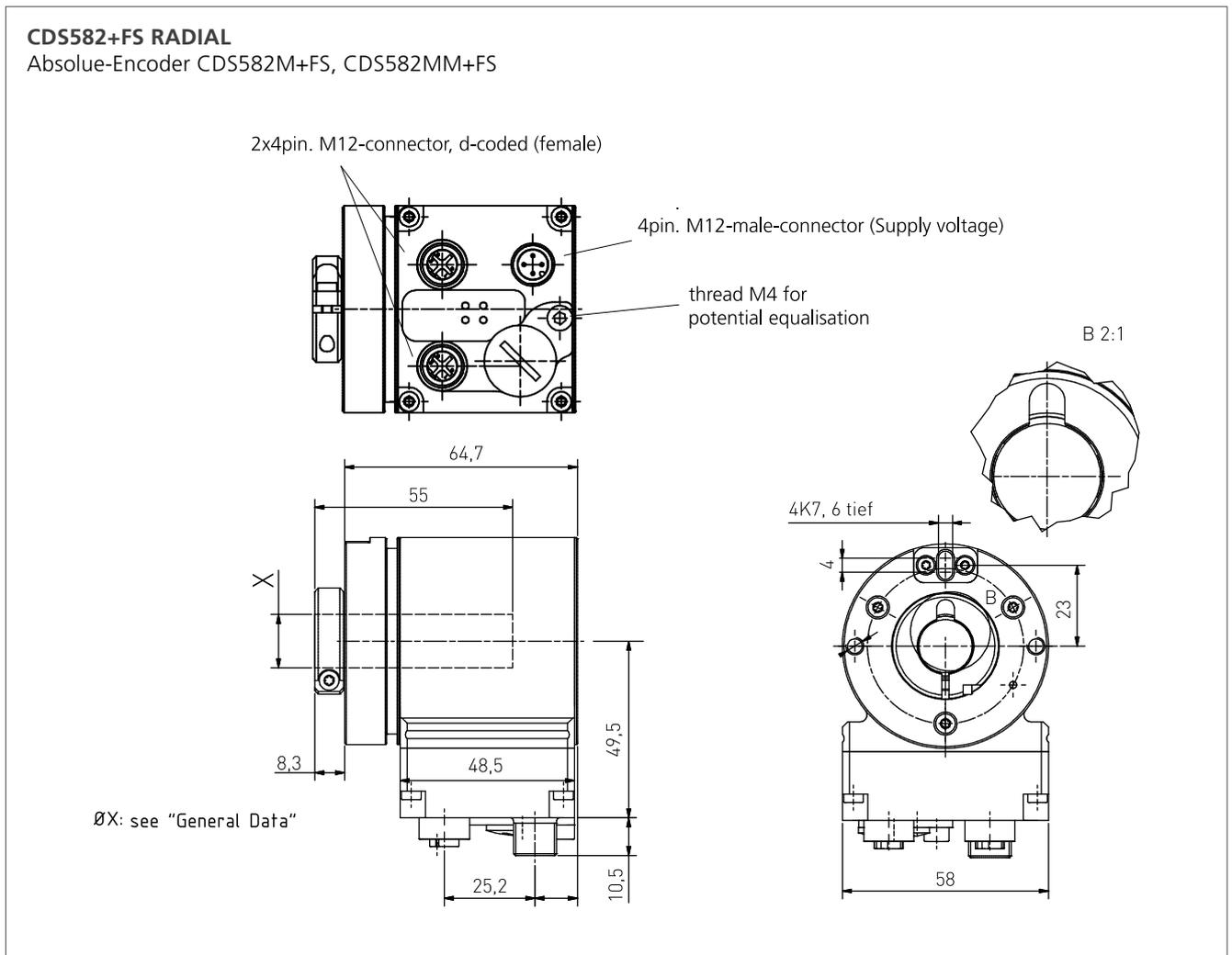
CDH582+FS RADIAL

Absolute-Encoder CDH582M+FS, CDH582MM+FS



Missing dimensions, see drawing related to the order number

Dimensional Drawings

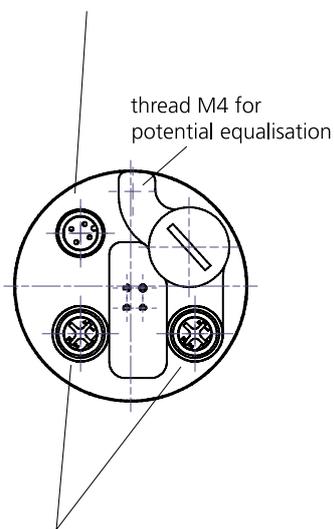


Dimensional Drawings

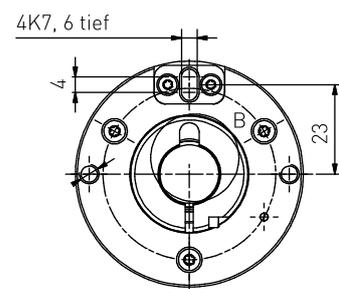
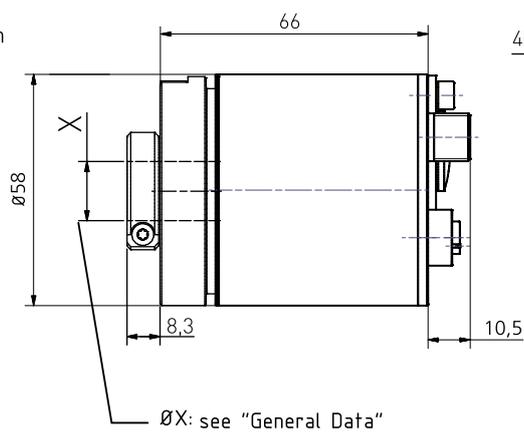
CDS582+FS AXIAL

Abslue-Encoder CDS582M+FS, CDS582MM+FS

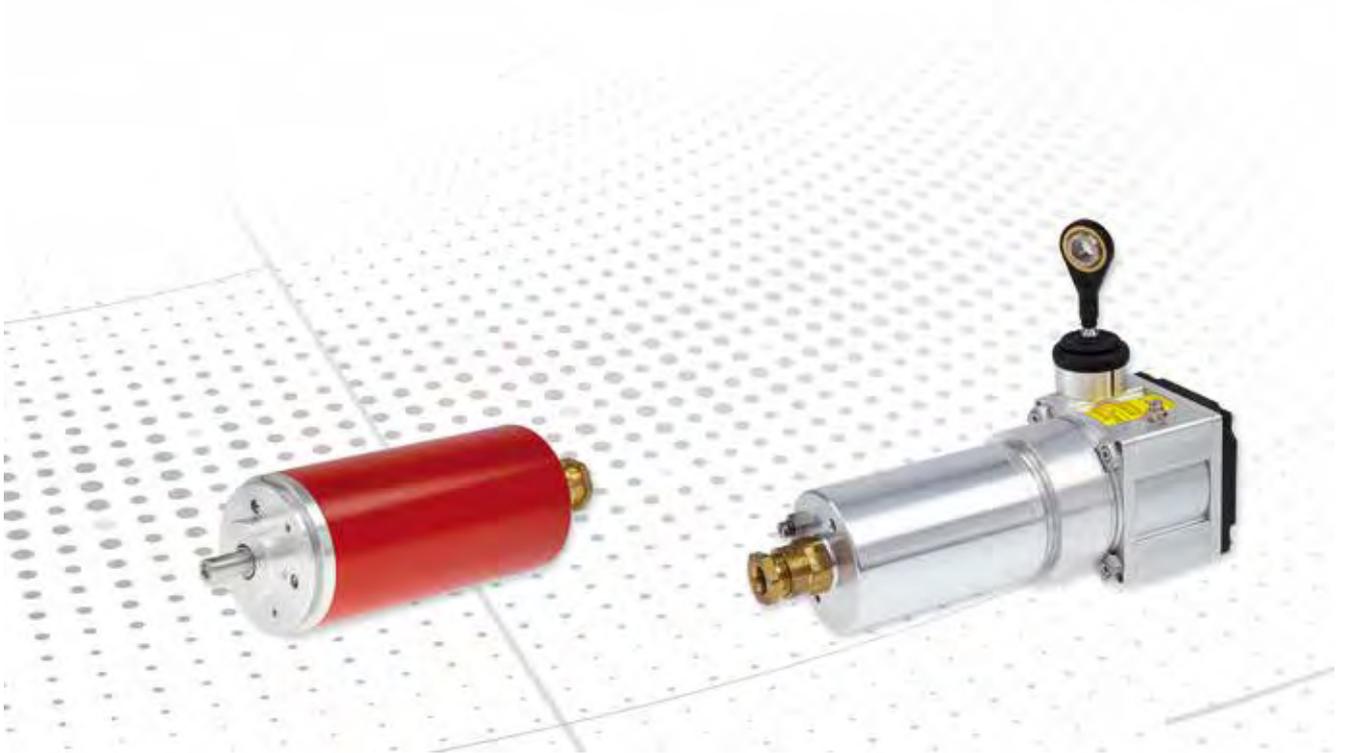
4pin. M12-male-connector (Supply voltage)



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



ATEX - Zone 1/21



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

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

Contents

Products.....	179
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Housing option for rotary encoders

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

* depending on the interface

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

Absolute rotary encoder SIL3/PLe

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

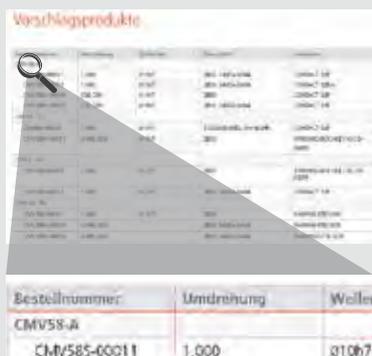
Suggested Products

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

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

Further product information

1. Enter order code into ...



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



3. Choose desired information

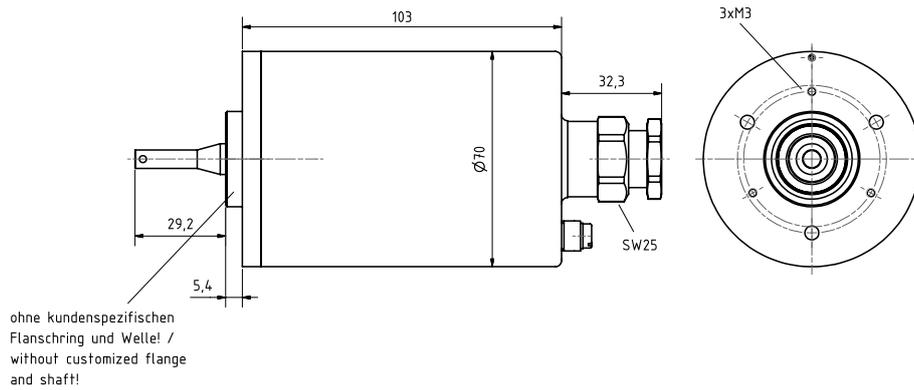


We will help you to select the most suitable products from the complete TR range. Please contact us (info@tr-electronic.de).

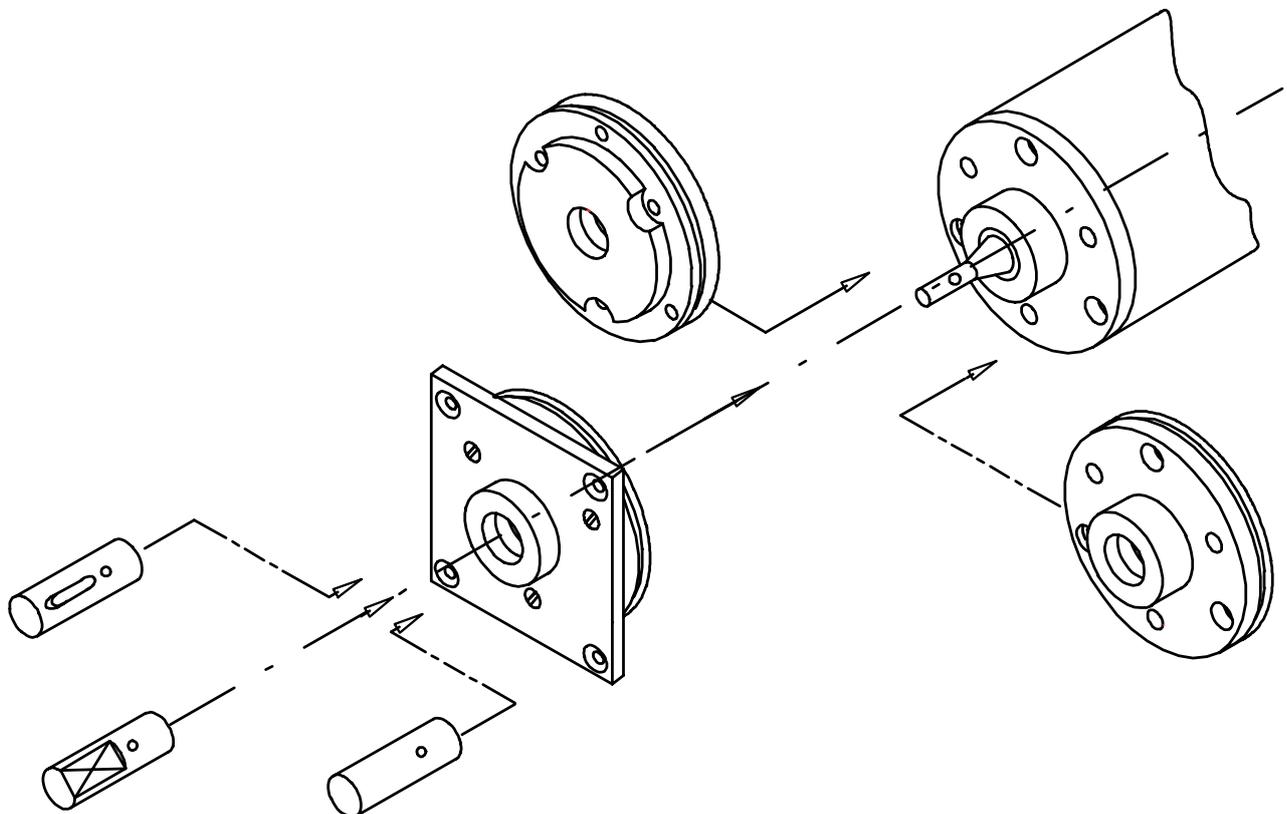
Dimensional Drawings

A_V70 Basic device without flange / shaft

Flange / shaft can be chosen from the C__65 family

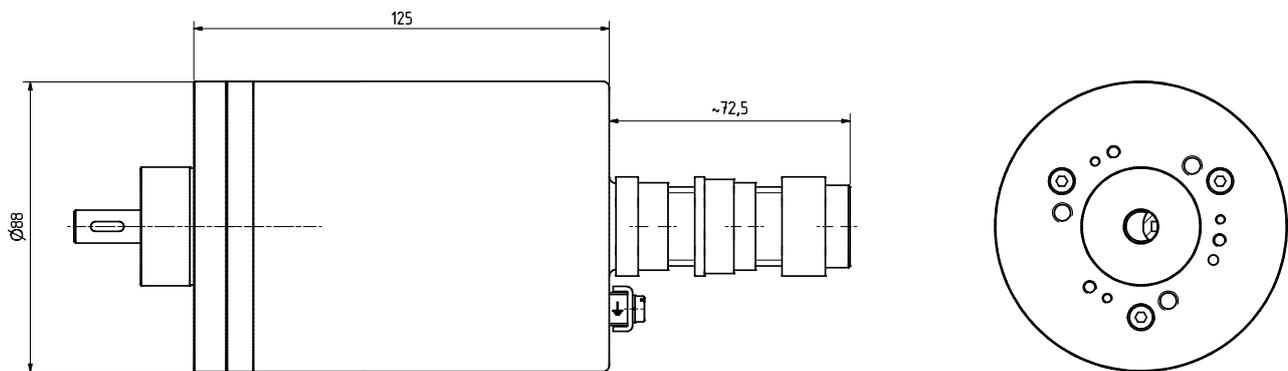


A_V70 Modular flange / shaft assembly

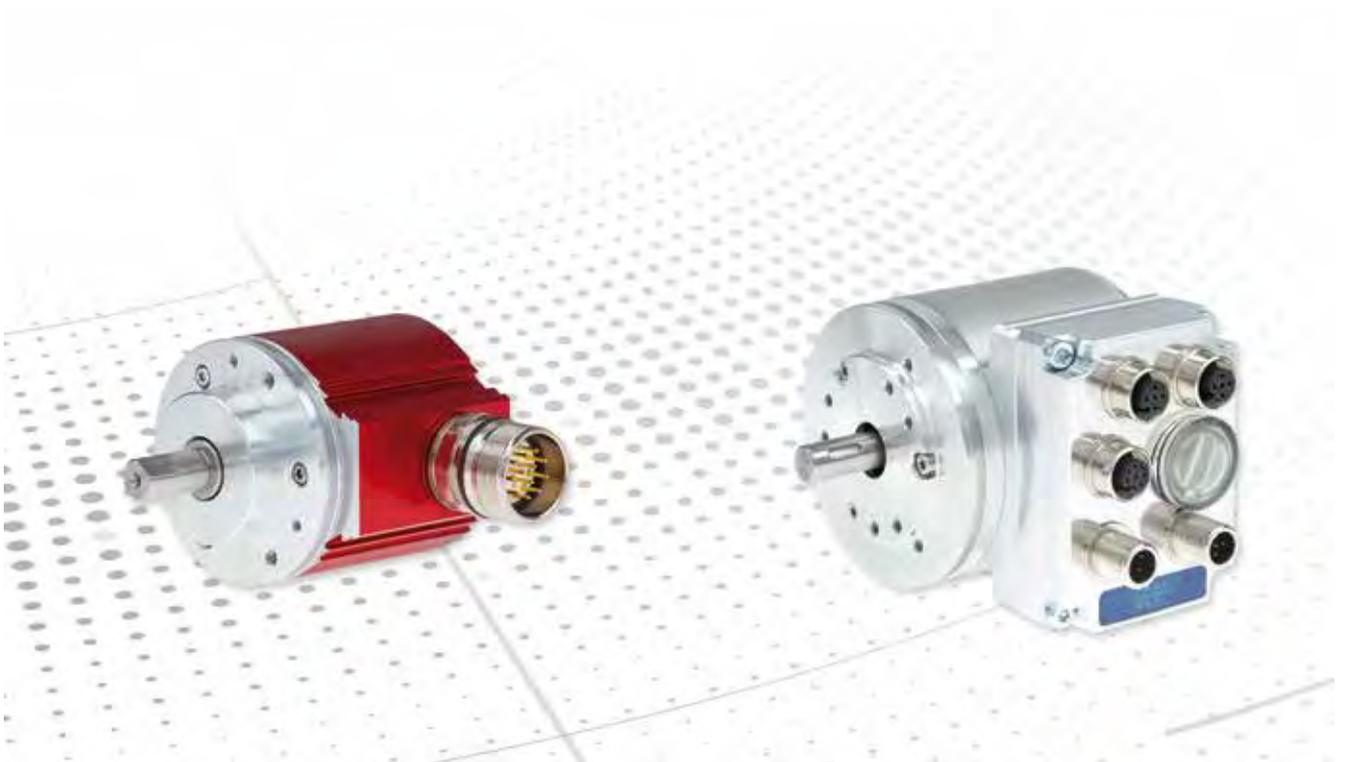


Dimensional Drawings

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.....	185
Suggested Products.....	188
Dimensional Drawings.....	189

A__58

Product	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

Product	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

AEV115	ADV115
	
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
	SSI 
SSI	SSI INC
www.tr-electronic.com/s/S008524	www.tr-electronic.com/s/S008525
	

* depending on the interface

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

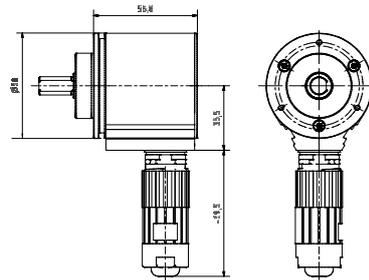
Suggested Products

Order code	Steps per turn	Turns	Shaft / Flange	Connector position	Remark
ATEX ADH75M-PB (D) Double detection, hollow shaft, Profibus					
ADH75M-00001	8192	32768	20H7/Keyway slot for pin D4	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	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	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	ATEX zone 2/22
ATEX AES58-SSI (E) Optical 15 bit, blind shaft, SSI					
AES58M-00001	8192	4096	10H7 blind shaft	Radial	ATEX zone 2 / 22
AEV115 Profibus					
AEV115M-00001	4096	4096	20Keyway /40	Fieldbus hood	ATEX zone 22
ATEX AEV58-SSI (E) Optical 15 bit, solid shaft, SSI					
AEV58M-00001	8192	4096	10FL/19,5 ZB36	Radial	ATEX zone 2 / 22
ATEX AEV58-PB (E) Optical 15 bit, solid shaft, Profibus					
AEV58M-00004	8192	4096	10FL/19,5 ZB36	Radial	ATEX zone 2 / 22
ATEX AEV58-EPN (E) Optical 15 bit, solid shaft, Profinet					
AEV58M-00006	8192	4096	10FL/19,5 ZB36	Radial	ATEX zone 2 / 22
AEV65 SSI+ANALOG					
AEV65M-00001	4096	4096	10FL/19,5 ZB36	Connector radial	ATEX zone 2/22
ATEX AMV58-ANA, Magnetic 12 Bit, solid shaft, Analogue					
AMV58M-00001	4096	4096	10FL/19,5 ZB36	Connector radial	ATEX zone 2/22 - Current

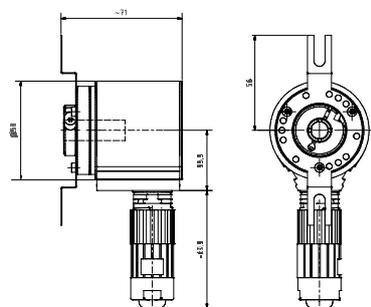
For further product information simply enter the order number in the search field at www.tr-electronic.com.

Dimensional Drawings

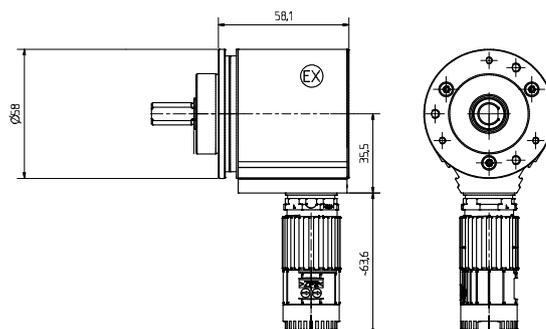
AEV58
ATEX zone 2/22



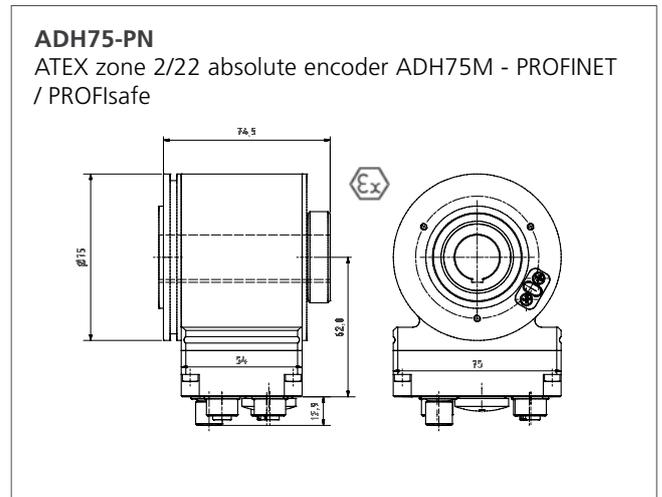
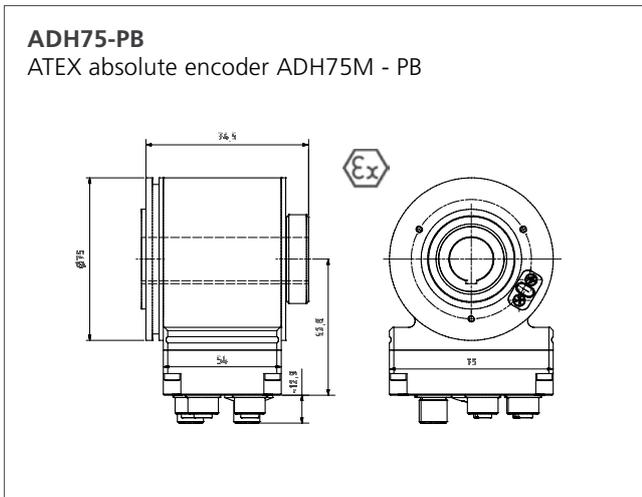
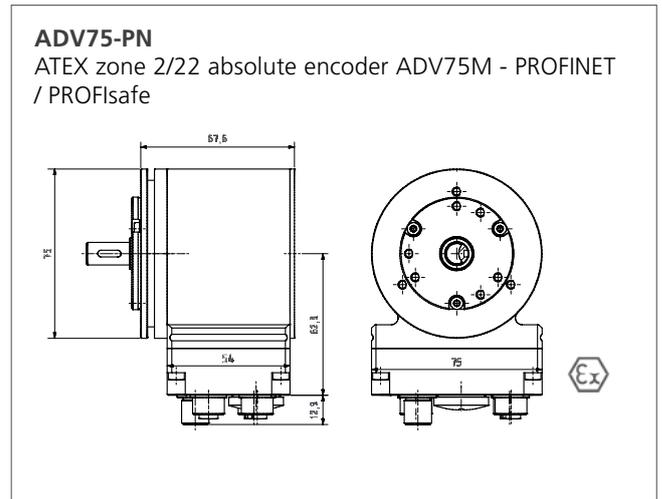
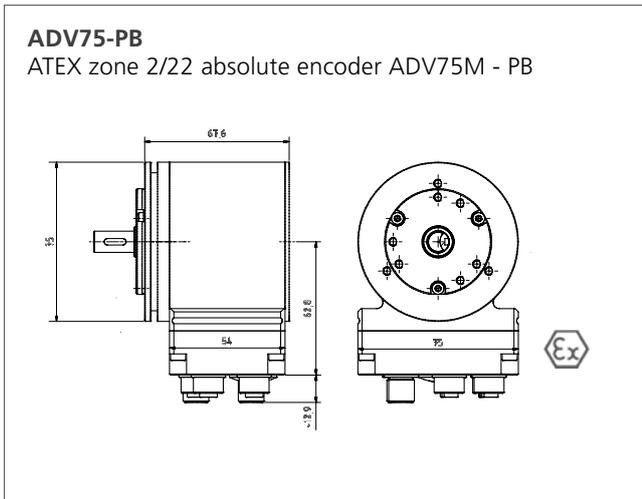
AES58
ATEX zone 2/22



AMV58
ATEX zone 2/22



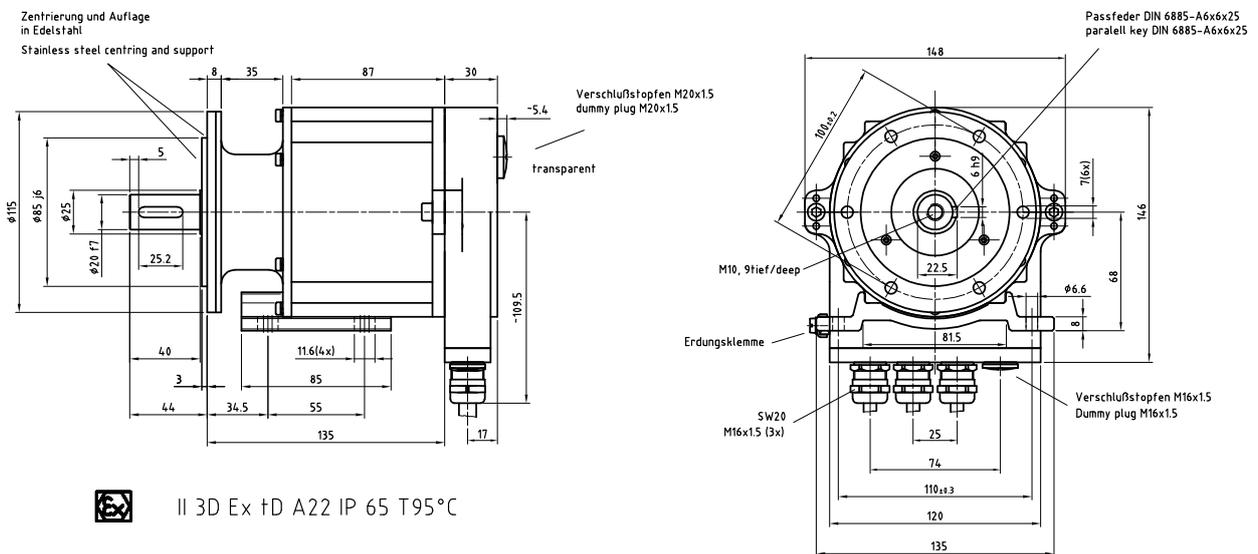
Dimensional Drawings



Dimensional Drawings

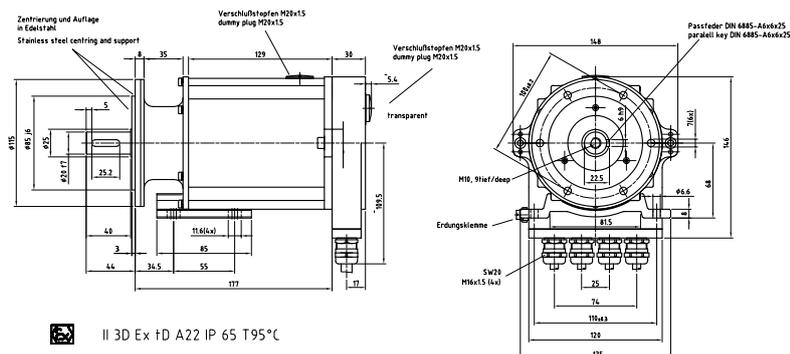
AEV115

Connection hood same orientation as mounting foot

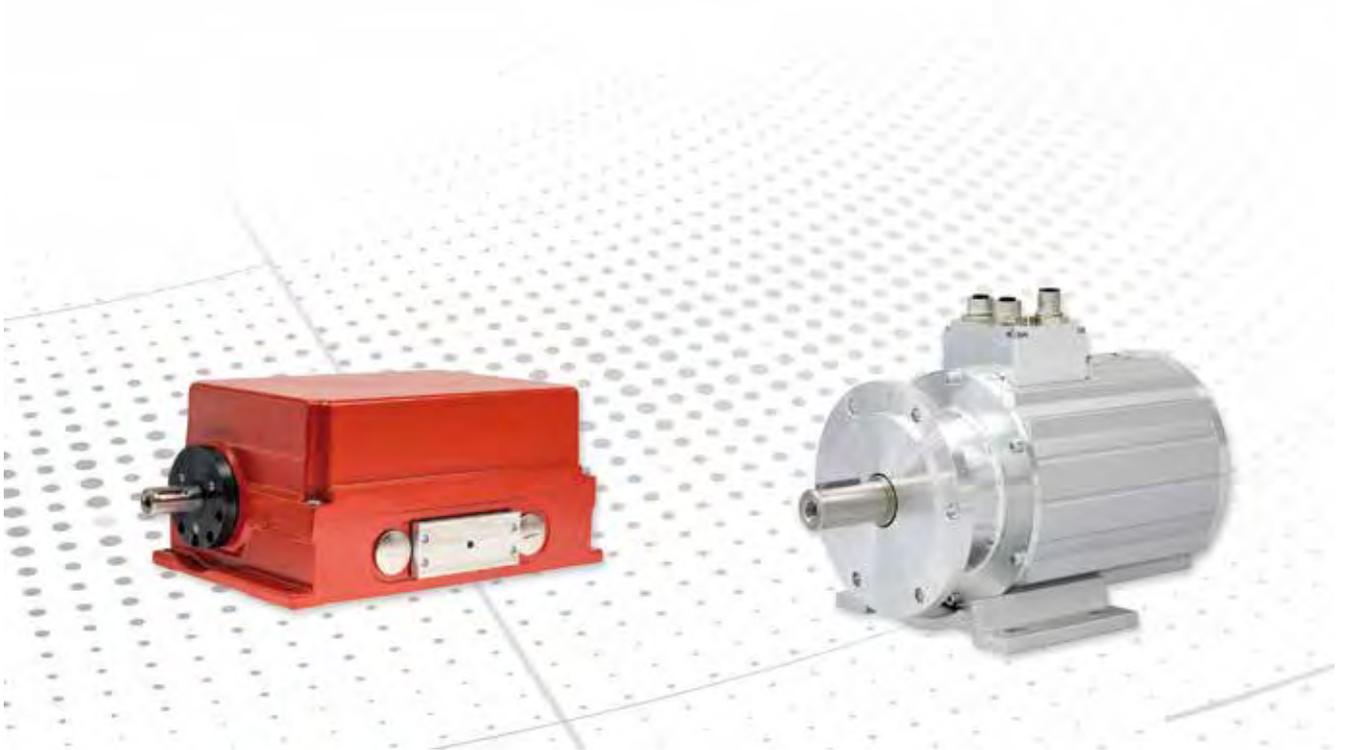


ADV115

Connection hood same orientation as mounting foot



Absolute Rotary Encoders - Heavy-Duty



Absolute rotary encoders for the most demanding conditions

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

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

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

Contents

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Stainless steel

Product	CEV84	CEV84 Field Bus	CEV84 Industrial Ethernet
			
Type	Stainless steel housing for C__58, I__58 [1.4305 (X12 Cr NiS 18 08 / 18 9)]	Stainless steel encoder [1.4305 (X12 Cr NiS 18 08 / 18 9)]	Stainless steel encoder [1.4305 (X12 Cr NiS 18 08 / 18 9)]
Technical data encoder	C__58, I__58	C__58, I__58	C__58, I__58
Shaft diameters available	6, 10, 12 mm	6, 10, 12 mm	6, 10, 12 mm
Connectors	M23 axial/radial	Fieldbus hood / cable glands radial	3 x M12 axial
Ambient temperature	-20...+70 °C (option -40...+85 °C*)	-20...+70 °C (option -40...+85 °C*)	-20...+70 °C (option -40...+85 °C*)
Protection class	IP68	IP68	IP68
ATEX zone			
Interface	SSI Parallel Analog	 DeviceNet CANopen	 ETHERNET POWERLINK EtherCAT SERCOS <small>the automation bus</small> EtherNet/IP
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			

*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

Product	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 DeviceNet Analog PROFIBUS Parallel EtherCAT Nocken EtherNet/IP  ETHERNET POWERLINK 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 DeviceNet Analog PROFIBUS Parallel EtherCAT Nocken EtherNet/IP PROFIBUS ETHERNET POWERLINK 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

Bestellnummer	Schritte je Umdrehung	Umdrehungen	Welle / Flansch	Anschluss	Hinweis
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-10054	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 Nut /33 ZB85	Kabelabgang mit 10 m Leitung	
CEV115M-10021	4096	4096	20 Nut /40 ZB85	M23 12 pin seitlich am Rohr	Adresse 10 fest eingestellt
CEV115 Profibus					
CEV115M-10010	8192	4096	14 Nut /33, ZB85	Feldbushaube mit 3 x PG 11 Kabelverschraubungen	
CEV115M-10005	8192	4096	14 Nut /33, ZB85	Feldbushaube mit 3 x M16 Kabelverschraubungen	
CEV115 Profibus + SSI					
CEV115M-10024	4096	4096	20 Nut /40 ZB85	Feldbushaube mit 3 x M16 Kabelverschraubungen	
CEV115 Ethernet/IP					
CEV115M-10055	8192	4096	14 Nut /33 ZB85	3 x M12 seitlich am Rohr	
CEV115M-10054	8192	4096	14 Nut /33 ZB85	3 x M12, 1 x M23 seitlich am Rohr	Heizung integriert
CEV115 Profinet					
CEV115M-10060	8192	4096	20 Nut /40 ZB85	3 x M12 seitlich am Rohr	
CEV115 EtherCAT					
CEV115M-10061	8192	4096	20 Nut /40 ZB85	3 x M12 seitlich am Rohr	

Für mehr Produkt-Informationen tragen Sie einfach die Bestellnummer in das Suchfeld auf www.tr-electronic.de ein.

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

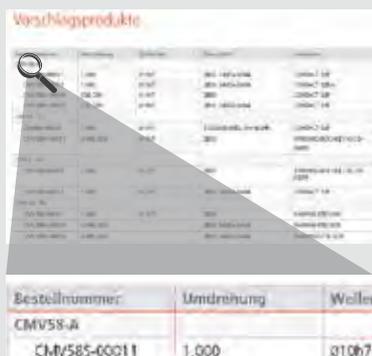
Suggested Products

Order code	Steps per turn	Turns	Shaft / Flange	Connector position	Remark
CDV115 PB/SSI + SSI/INC					
CDV115M-00002	4096/4096	4096/4096	20 Keyway /40 ZB85	Fieldbus hood with 4 x M16 cable glands	Encoder 1 Profibus + SSI Encoder 2 SSI + INC
AEV115 Profibus					
AEV115M-00001	4096	4096	20 Keyway /40 ZB85	Fieldbus hood with 3 x M16 cable glands	
ADV115 Double encoder Profibus+SSI, SSI+INC					
ADV115M-00001	8192 / 8192	4096 / 4096	20 Keyway /40 ZB85	Fieldbus hood with 4 x M16 cable glands	Encoder 1 Profibus + SSI Encoder 2 SSI + INC

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

Further product information

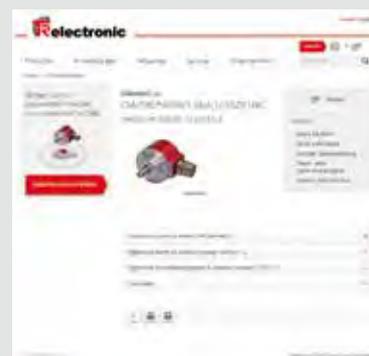
1. Enter order code into ...



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



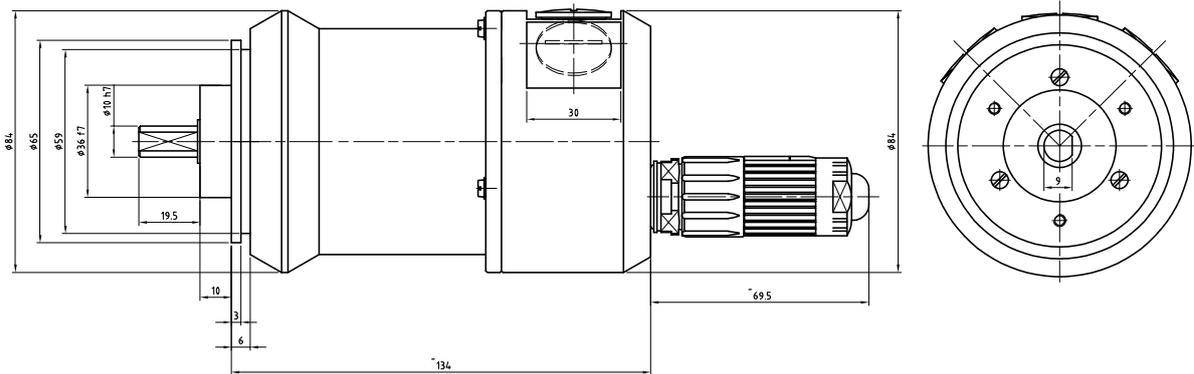
3. Choose desired information



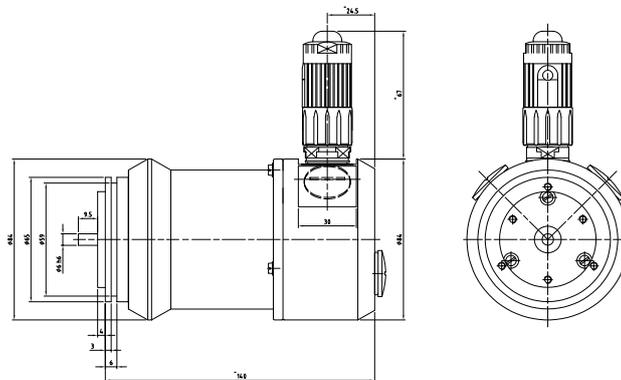
We will help you to select the most suitable products from the complete TR range. Please contact us (info@tr-electronic.de).

Dimensional Drawings

CEV84
SSI, Analog, PAR - axial

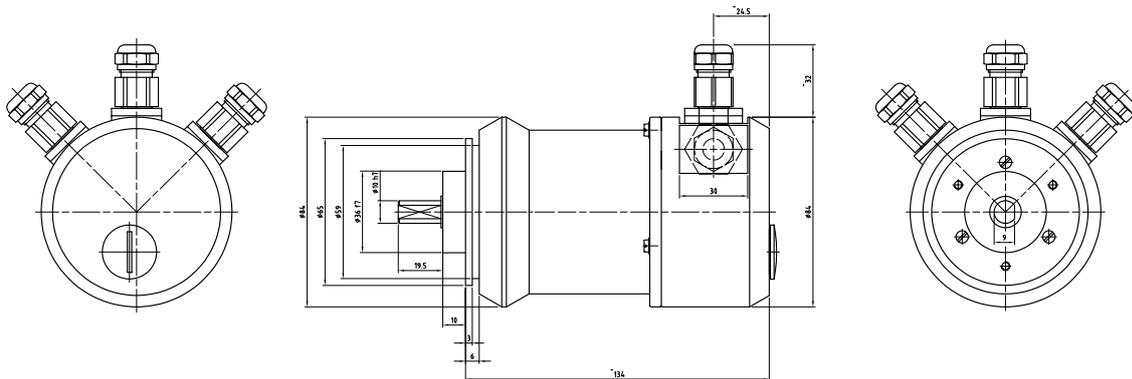


CEV84
SSI, Analog, PAR - radial

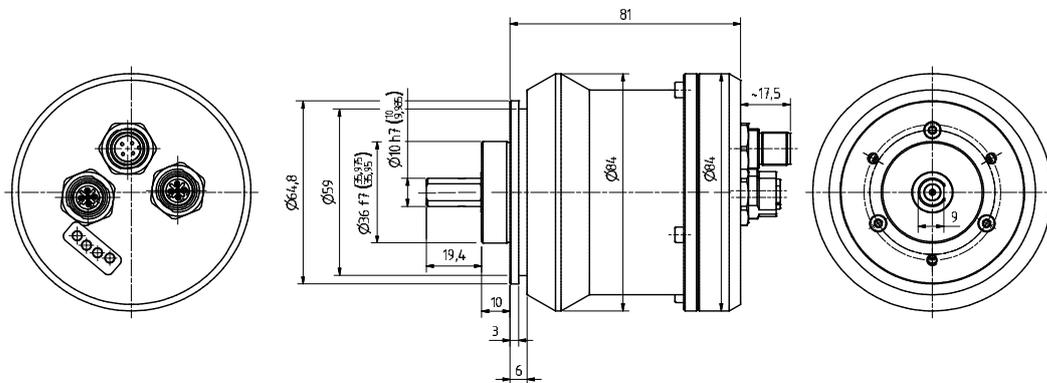


Dimensional Drawings

CEV84 Fieldbus
CANopen, CAN DeviceNet, Profibus



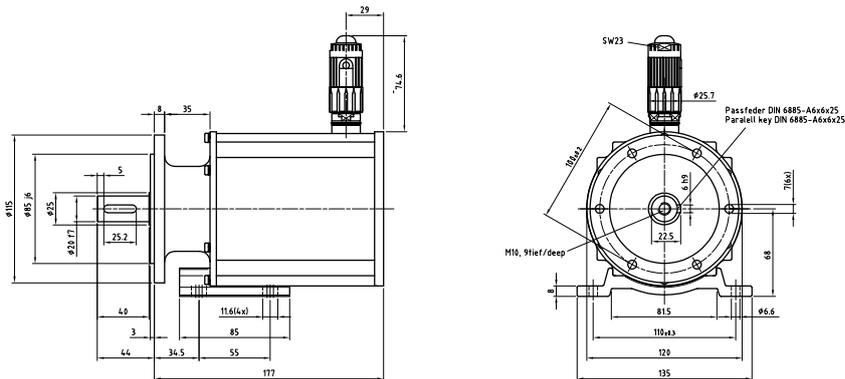
CEV84 Industrial Ethernet
EtherNet/IP, Sercos, EtherCAT, PROFINET IO, POWERLINK



Dimensional Drawings

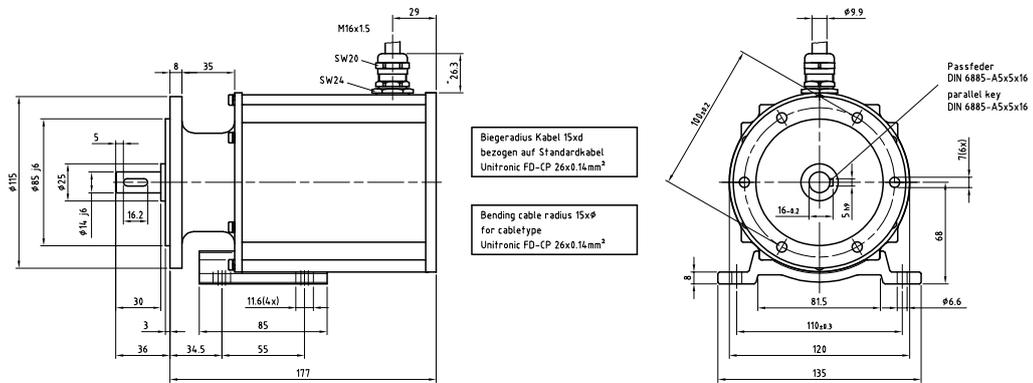
CEV115

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



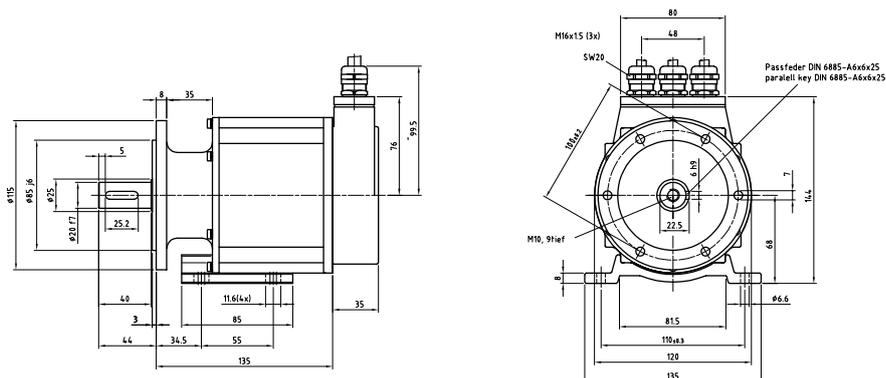
CEV115

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



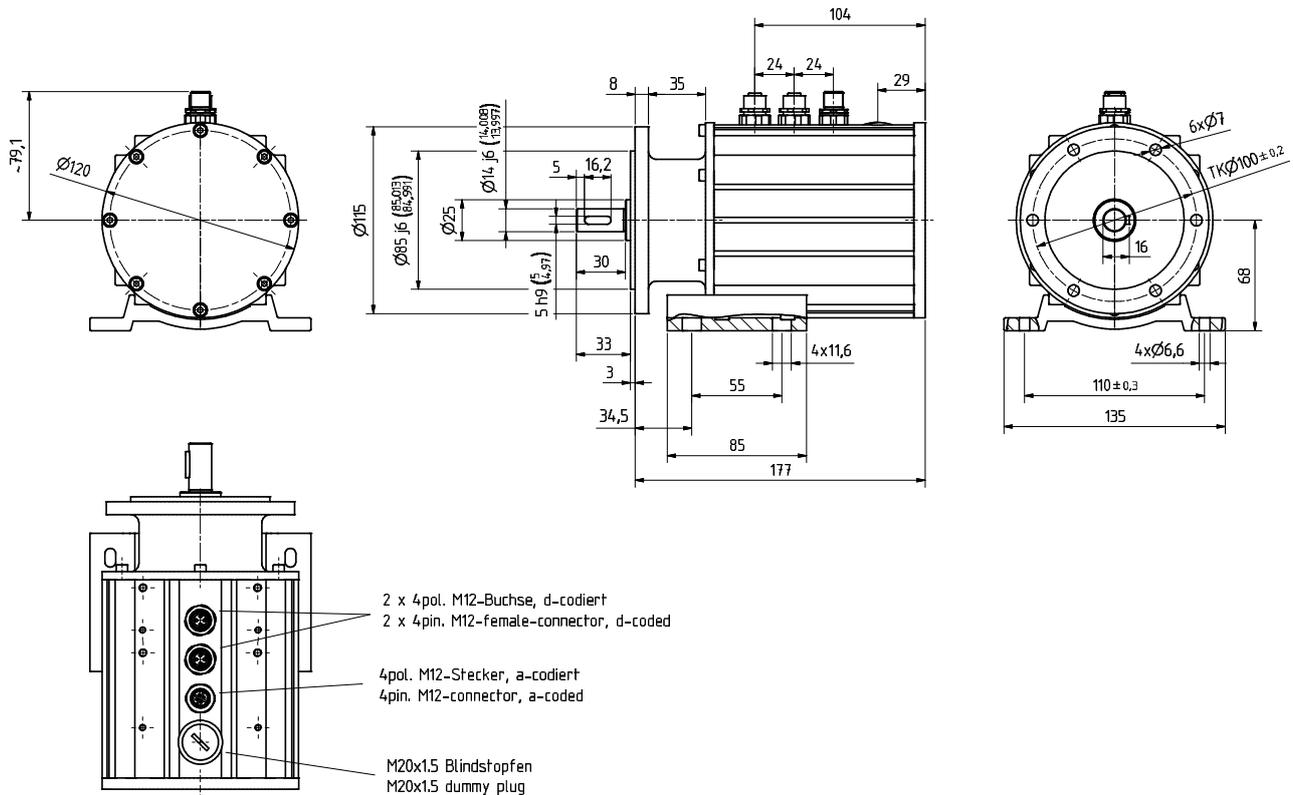
CEV115

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



Dimensional Drawings

CEV115
3 x M12 (e.g. Ethernet/IP)

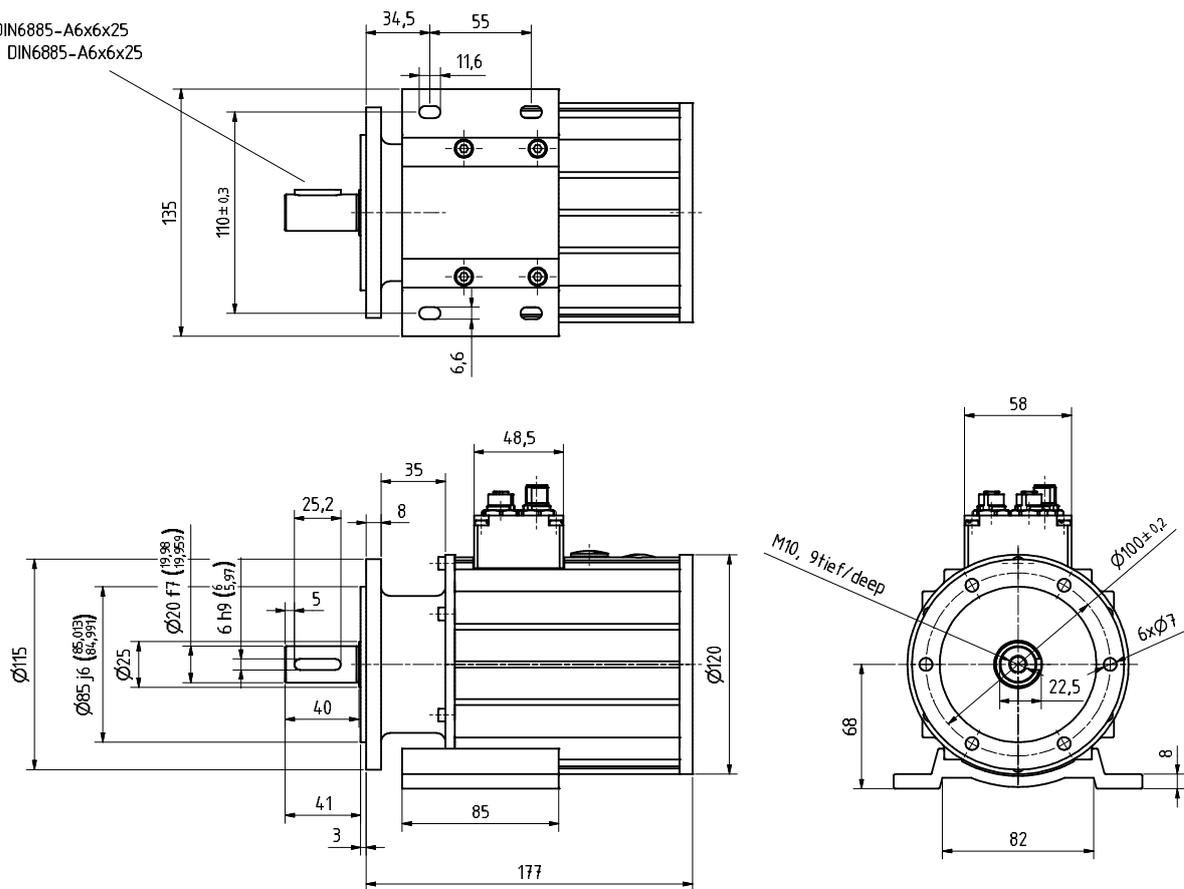


Dimensional Drawings

CEV115

Connector hood radial for PROFINET, EtherCAT

Passfeder DIN6885-A6x6x25
parallel key DIN6885-A6x6x25

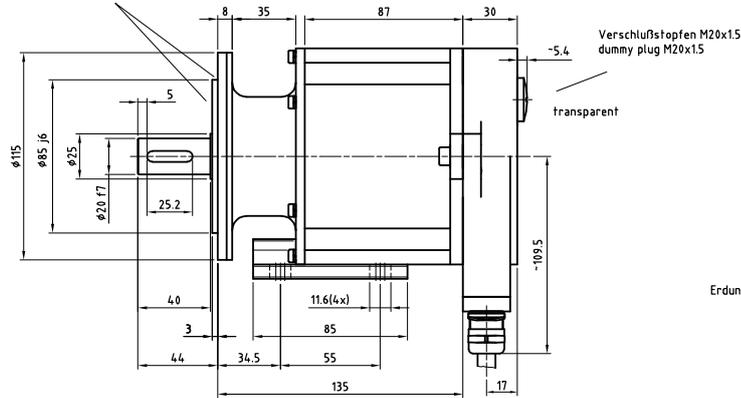


Dimensional Drawings

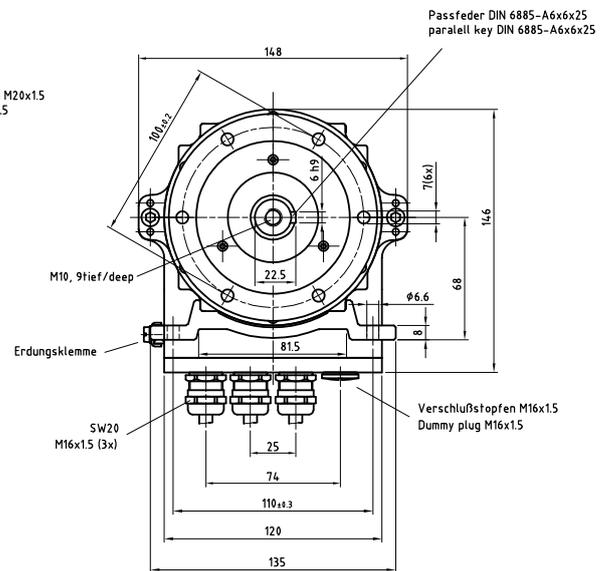
AEV115

Connection hood same orientation as mounting foot

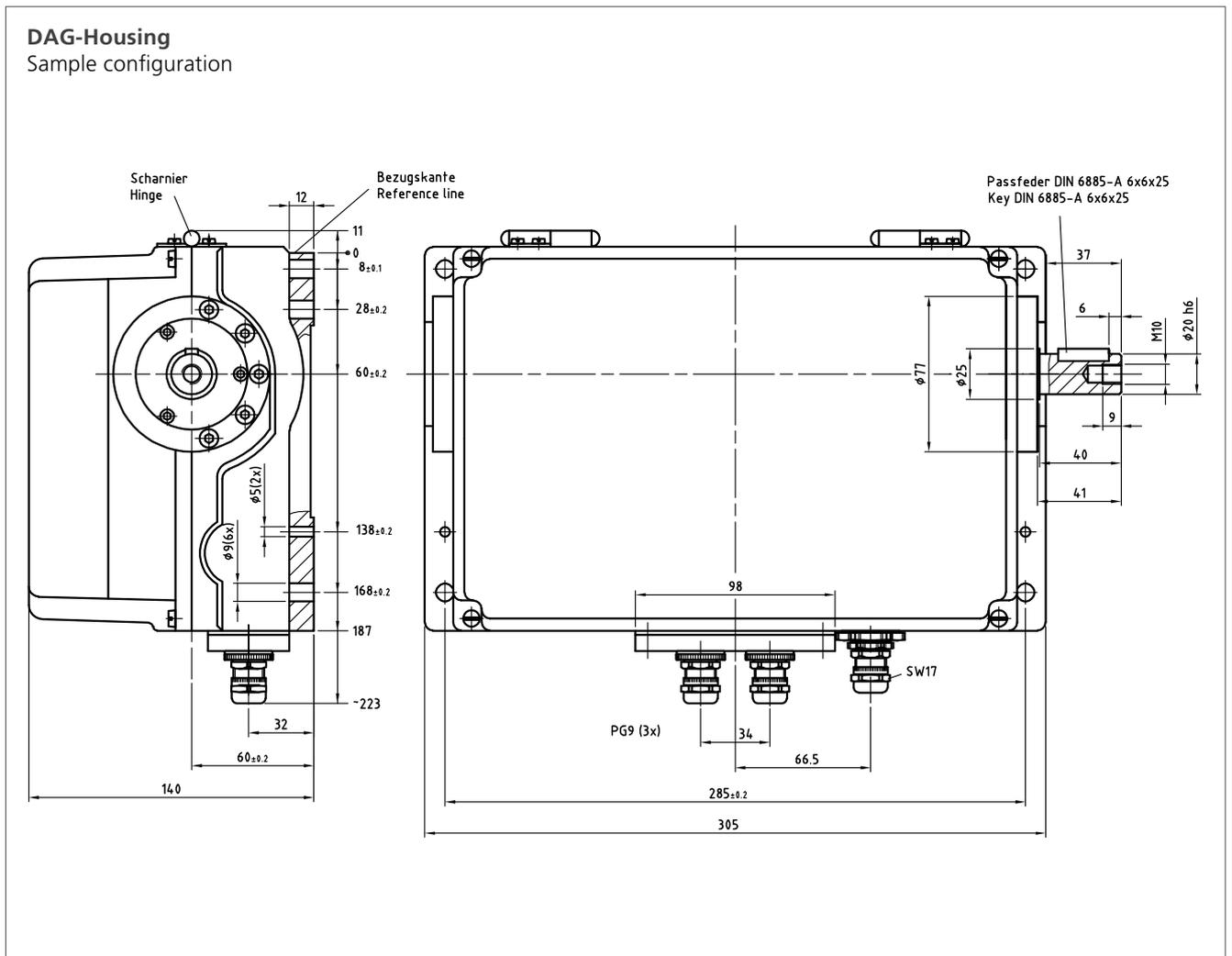
Zentrierung und Auflage
in Edelstahl
Stainless steel centring and support



II 3D Ex tD A22 IP 65 T95°C

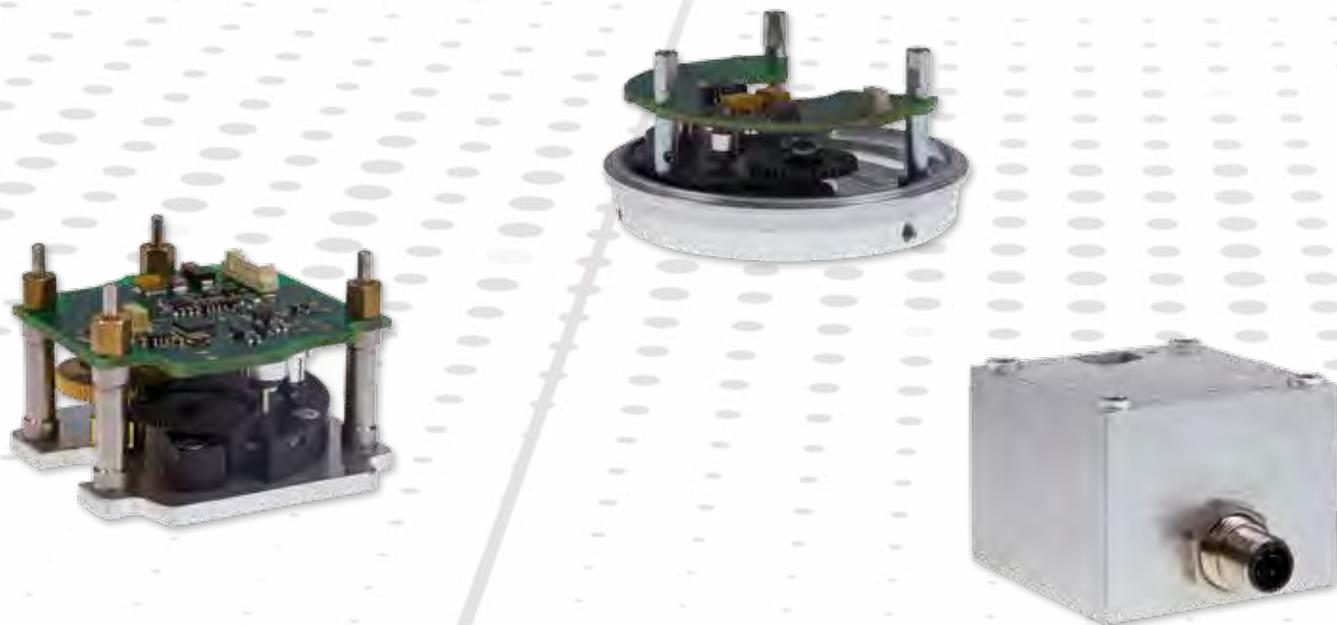


Dimensional Drawings





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!



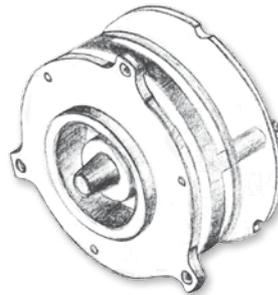
Contents

Kit encoder	210
10 steps	211

Kit Encoders – unlimited variations

Individual encoder kit

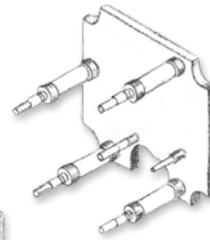
Each kit encoder is individual – it is uniquely customized, developed and built. An overview of all possible variations would result in an enormous catalog. These design sketches are intended to inspire you to set us a challenge. We would be delighted to develop optimization solutions for your application.



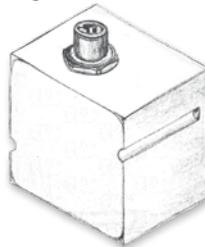
The shaft geometry can be optimally adapted to the mounting conditions of your drive.



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.

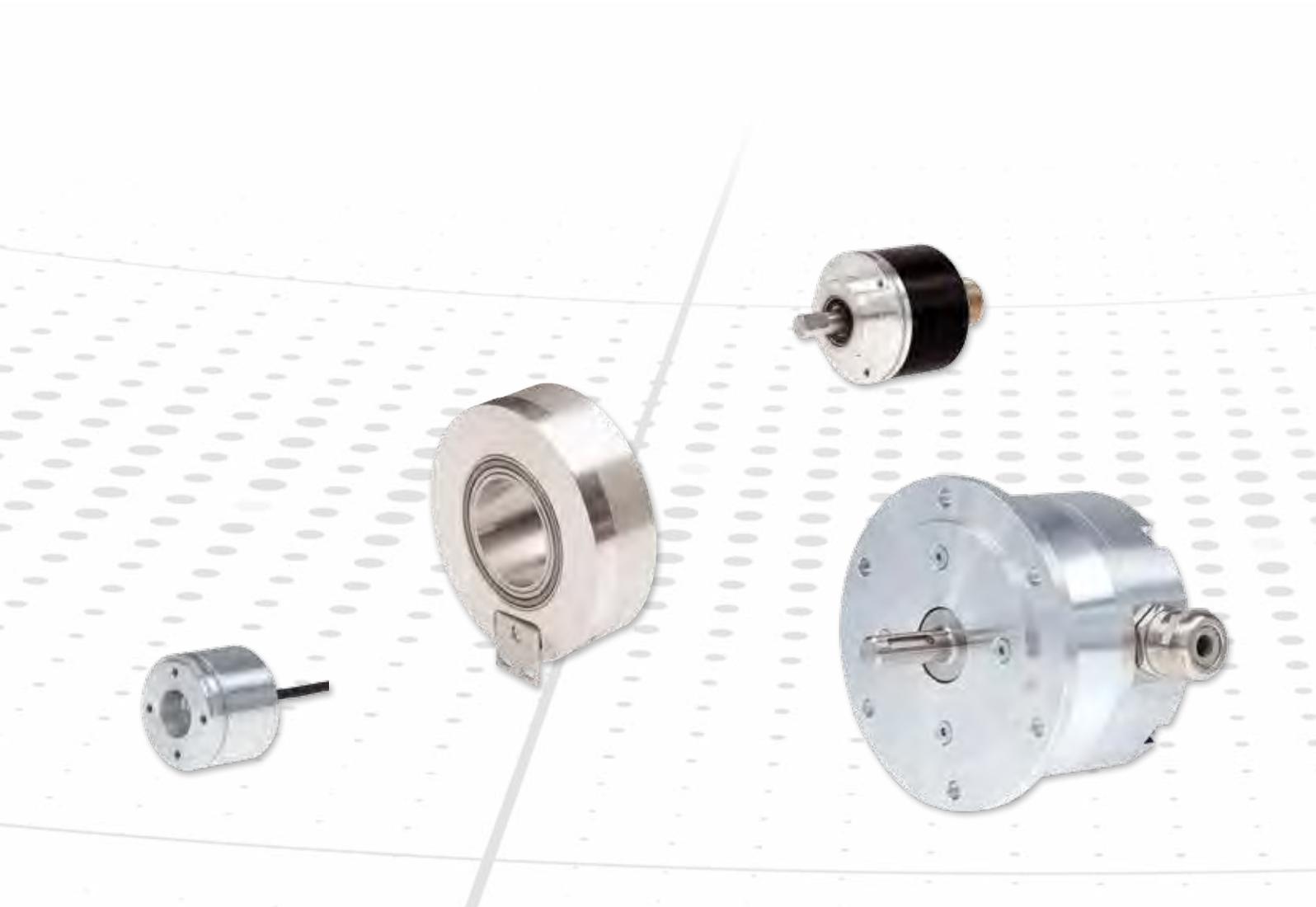
9. Other options

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 58 mm housing for almost all resolutions, our product portfolio

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

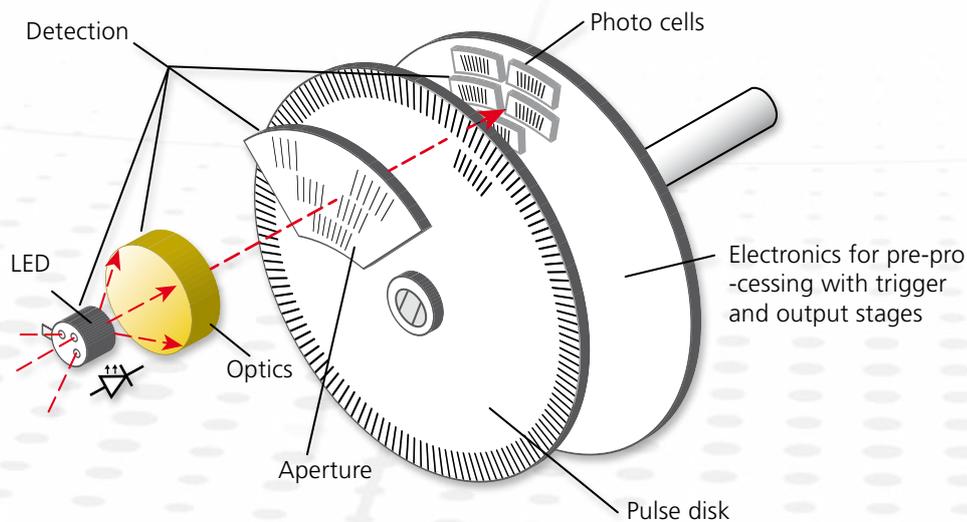
You will also find a multitude of housing options, e.g. ATEX-compliant housings and housings for use in aggressive media or for heavy mechanical stress (heavy-duty).



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Pulse Encoder mode of operation

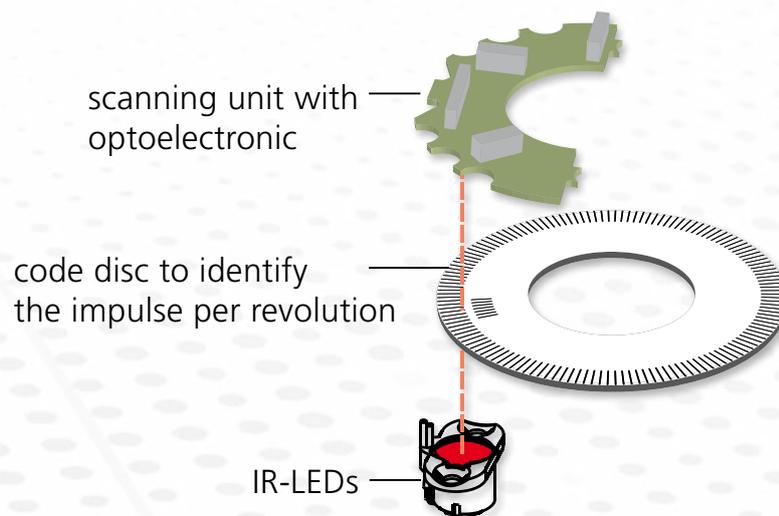


Consistent mechanical concept

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

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

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



Programmable incremental encoders The all-rounder in a 58 mm housing

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

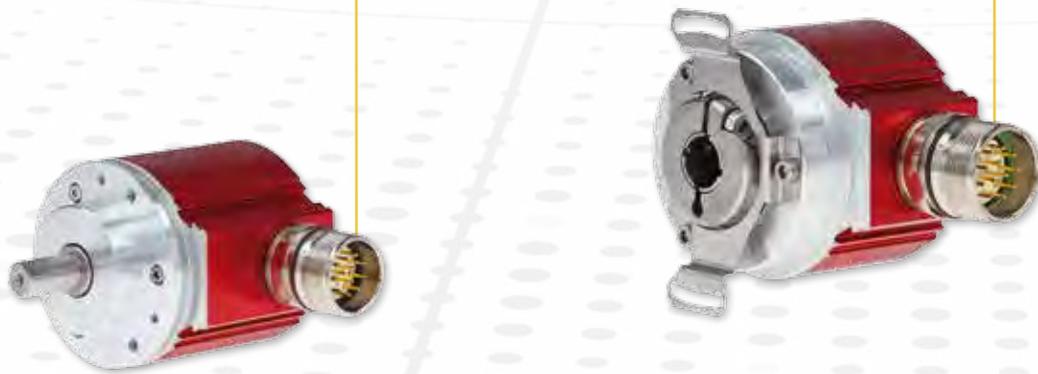
The new generation I_58:2 offers wide range input of 4.5 ... 32 V DC and number of graduation marks up to 62,450 increments per revolution as well as a hollow shaft diameter up to 15 mm or ½".

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

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

The resolution of these incremental rotary encoders is defined ex-factory by fitting a code 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.

Safety rotary encoders



SIL rotary encoders

The solution doesn't always have to be a big one. An incremental rotary encoder is sufficient for the safe detection of speed, direction of rotation or standstill. The use of certified components considerably facilitates validation of the complete application. TR-Electronic therefore offers the safety-certified incremental rotary encoder IE58+FS. The user can choose between square-wave signals (with TTL or HTL level) and sine-cosine interface. The rotary encoder is certified for applications up to SIL 3 or PLe depending on the chosen interface and safety module. The rotary encoder permits the operating modes SLS, SOS SSR, SDI and SSM in conjunction with an appropriate safety module.

This is partly due to the fact that the transmission channel can be checked by means of a simple calculation from the signal: The following must apply at any time: $\sin^2(t) + \cos^2(t) = 1$. If the calculated value differs, the safety module can go into a safe status. Another component of this high safety classification is the simple design with proven optical scanning with fixed resolution on the glass disk. 1024, 2048

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



- SLS
- SOS
- SSR
- SDI
- SSM

To fulfill the safety functions, the safety-oriented incremental rotary encoder IE58+FS is connected to a safety module available on the market, which then performs the relevant inspection. For the development and certification of the IE58+FS, modules from different manufacturers have been examined and compatibility with the IE58+FS established. The IE58+FS supplement the series of safety-oriented products with integrated safety (CD_75) with an important component for a modular safety concept, which allows the user to select the required evaluation module according to his or her own requirements.

Incremental Encoders - Family I__58 - Housing 58 mm



The all-rounder in a 58 mm housing

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

The new generation I__58:2 has wide range input of 4,5..32 V DC and number of periods per turn up to 65,536. Additionally, it provides hollow and blind shaft diameters up to 15 mm resp. 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 ... 27)	24 VDC (4,5 ... 27)	24 VDC (4,5 ... 27)
Steps per turn	$\geq 2 \dots \leq 10000$	$\geq 2 \dots \leq 10000$	$\geq 2 \dots \leq 10000$
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 65,536 pulses

Product	IOV58:2 	IOS58:2 	IOH58:2 	
Detection	Optical (O)	Optical (O)	Optical (O)	
Supply	24 VDC (4,5 ... 27)	24 VDC (4,5 ... 27)	24 VDC (4,5 ..27)	
Steps per turn	$\geq 2 \dots \leq 65536$	$\geq 2 \dots \leq 65536$	$\geq 2 \dots \leq 65536$	
Shaft diameters available	6, 8, 10, 12, 14, 1/4", 3/8", 1/2"	6, 8, 10, 12, 14, 15, 1/4", 3/8", 1/2"	6, 8, 10, 12, 14, 15, 1/4", 3/8", 1/2"	
Connectors	Connector or cable	Connector or cable	Connector or cable	
Ambient temperature	-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 (D)

<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>$\geq 2 \dots \leq 1024, 2048, 4096, 8192$</p>	<p>$\geq 2 \dots \leq 1024, 2048, 4096, 8192$</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>Square</p>	<p>Square</p>
<p>www.tr-electronic.com/s/S008486</p>	<p>www.tr-electronic.com/s/S008487</p>
	

Suggested Products

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

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

Suggested Products

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

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

Suggested Products

Order code	Steps per Turn	Channels	Shaft / Flange	Connector Position	Cable length	Remark
IES58:2*10000 INC_PP DMS 10H7 KRF						
IES582-00005	10.000*	(K1/K2)+Inv.; K0+Inv.	10H7	cable radial, open end	2 m	Torque support, clamping ring flange side
IES582-00007	10.000*	(K1/K2)+Inv.; K0+Inv.	10H7	M23, 12 pin, radial		Torque support, clamping ring flange side
IES582-00006	10.000*	(K1/K2)+Inv.; K0+Inv.	12H7	M23, 12 pin, radial		Torque support, clamping ring flange side
IES582-00008	10.000*	(K1/K2)+Inv.; K0+Inv.	12H7	M23, 12 pin, radial		Torque support, clamping ring flange side, TTL
IES58:2-00003	10.000*	(K1/K2)+Inv.; K0+Inv.	14H7	M23, 12 pin, radial		Torque support, clamping ring flange side
IES582-00003	10.000*	(K1/K2)+Inv.; K0+Inv.	14H7	M23, 12 pin, radial		Torque support, clamping ring flange side
IES582-00004	10.000*	(K1/K2)+Inv.; K0+Inv.	14H7	cable radial, open end	2 m	Torque support, clamping ring flange side
IES582-00001	10.000*	(K1/K2)+Inv.; K0+Inv.	15H7	cable radial, open end	2 m	Torque support, clamping ring flange side
IES582-00002	10.000*	(K1/K2)+Inv.; K0+Inv.	15H7	M23, 12 pin, radial		Torque support, clamping ring flange side

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

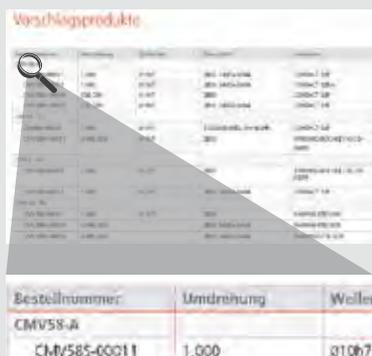
Suggested Products

Order code	Steps per Turn	Channels	Shaft / Flange	Connector Position	Cable length	Remark
IOV58:2*65536 INC_PP 50ZB6GL						
IOV582-00005	65.536*	(K1/K2)+Inv.;	6GL/10; ZB50	M12, 8 pin, radial		
IOV582-00007	65.536*	(K1/K2)+Inv.;	10FL/19,5; ZB36 3xM3+3xM4	M12, 8 pin, radial		
IOV582-00001	65.536*	(K1/K2)+Inv.; K0+Inv.	10 key /19,5; ZB36 3xM3+3xM4	M23, 12 pin, radial		TTL
IOV582-00009	65.536*	(K1/K2)+Inv.;	12 key /25; ZB36 3xM3+3xM4	M12, 8 pin, radial		

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

Further product information

1. Enter order code into ...



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



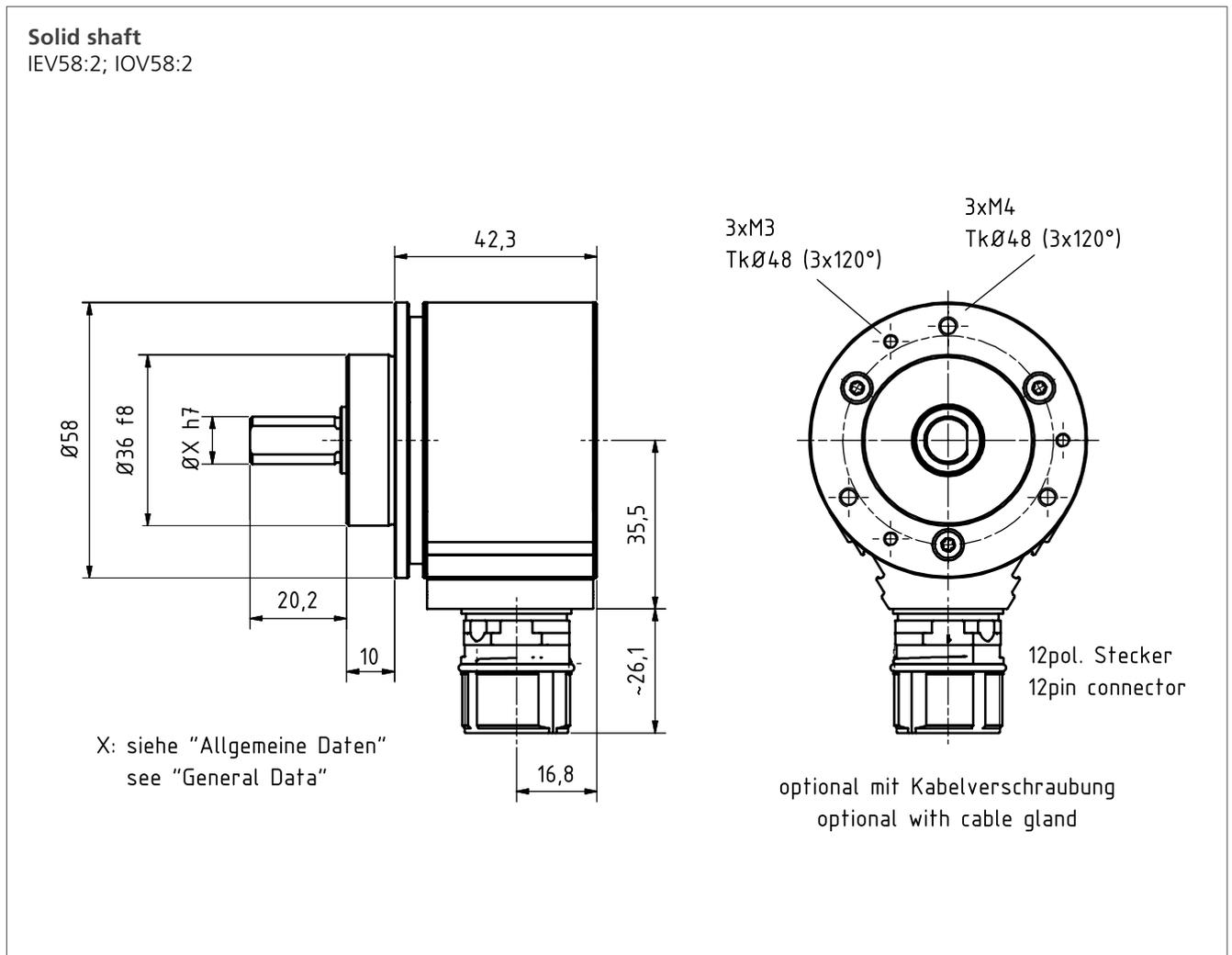
3. Choose desired information



* Programmable, preset

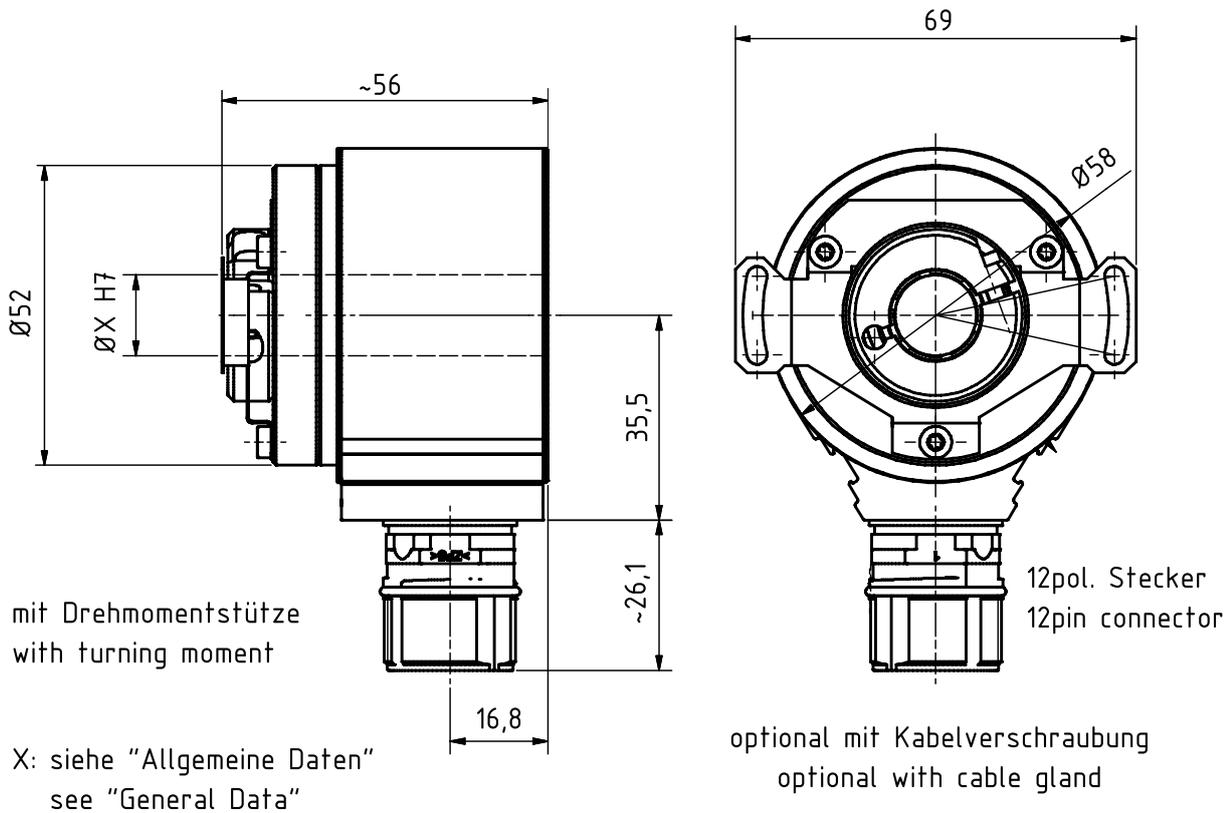
We will help you to select the most suitable products from the complete TR range. Please contact us (info@tr-electronic.de).

Dimensional Drawings

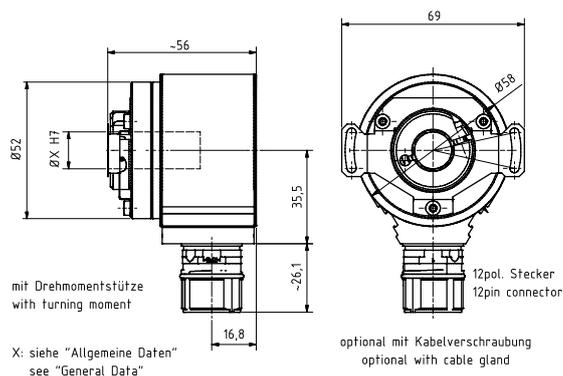


Dimensional Drawings

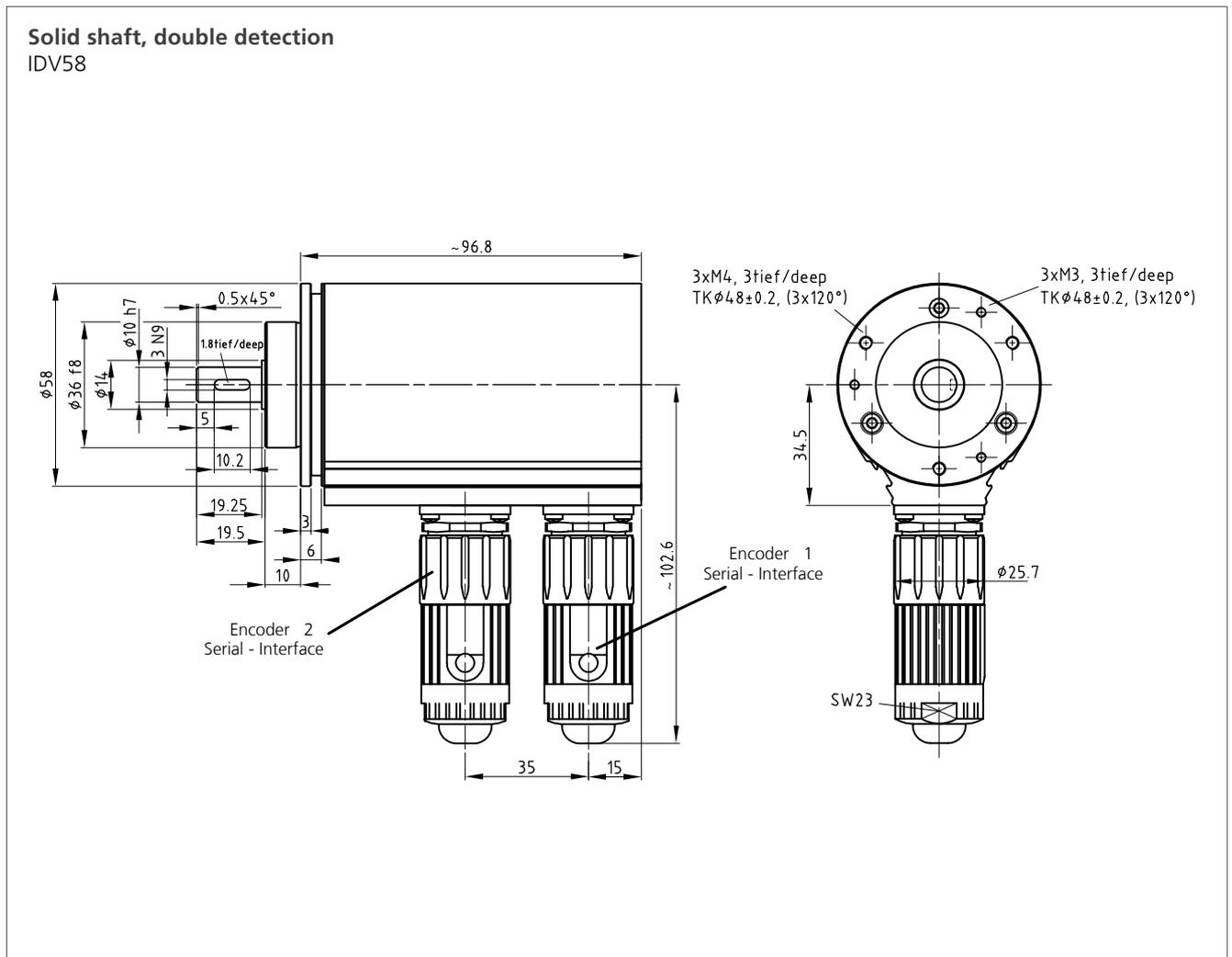
Hollow shaft IEH58:2; IOH58:2



Blind shaft IES58:2; IOS58:2

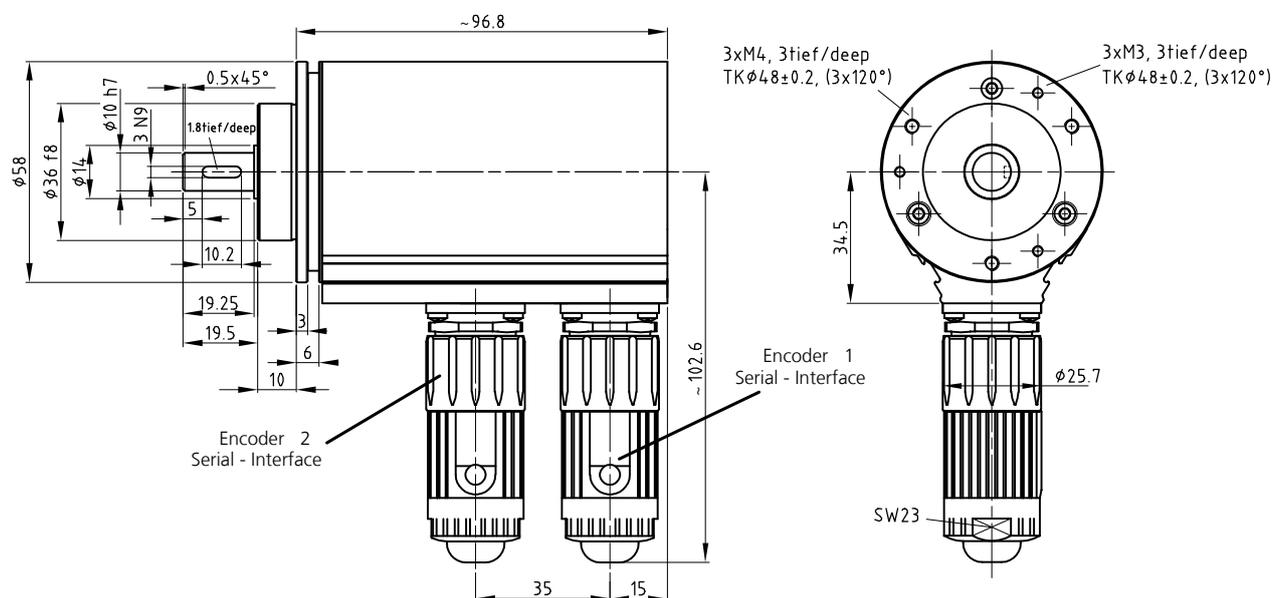


Dimensional Drawings

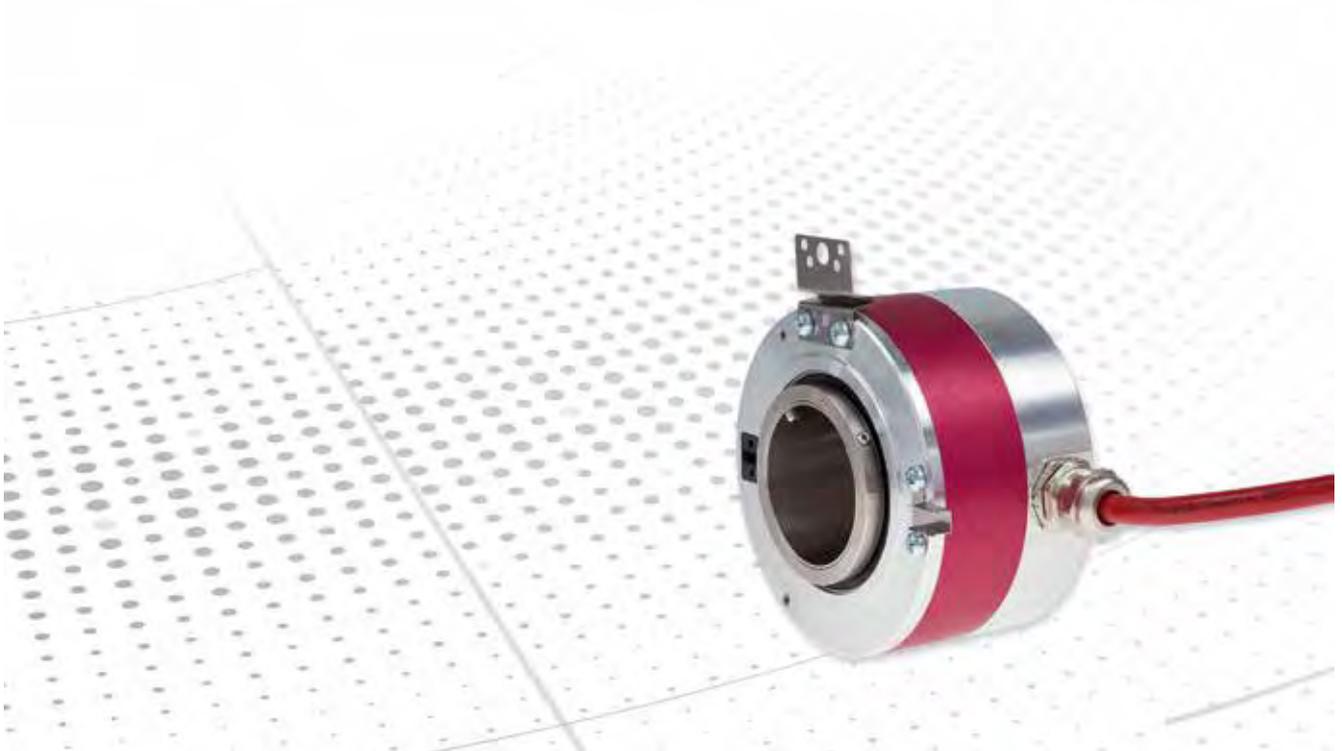


Dimensional Drawings

Solid shaft, double detection
IDV58



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

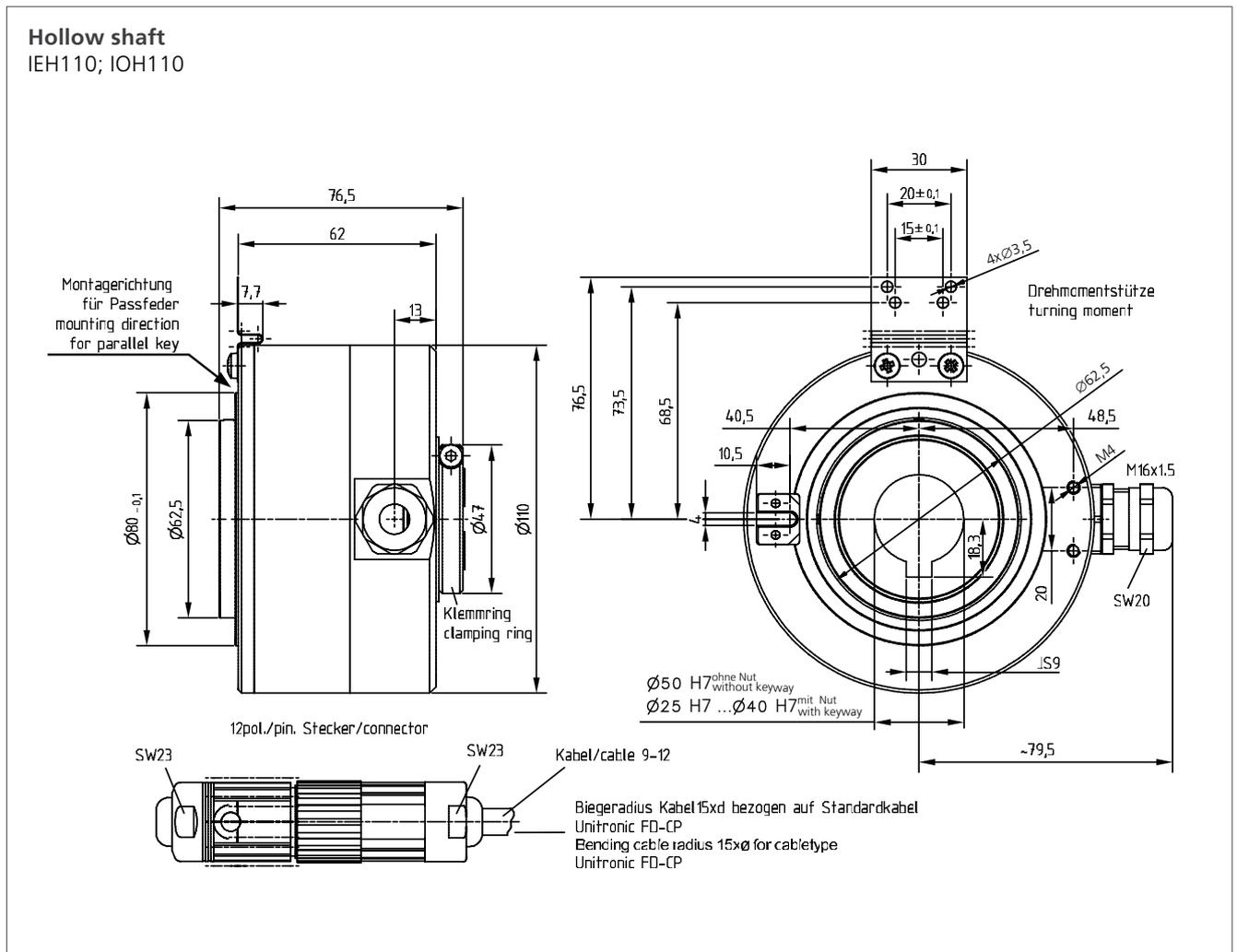
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Up to 8,192 pulses
Up to 36,000 pulses

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		

Can't find the right variant? 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.



Incremental Rotary Encoders - Resolution Factory Set



Resolution factory set

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

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

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

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Solid shaft

Product	IE35 	IMV36 	IE40 
Detection	Optical (E)	Magnet detection (M)	Optical (E)
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	8, 10, 16, 20, 25, 32, 40, 50, 64, 80, 100, 125, 128, 200, 250, 256, 400, 500, 512, 1024, 2048*	1...3.600
Shaft diameters available	4...6	See drawing	6
Connectors	Cable	Cable	Connector or cable
Ambient temperature	0...+80 °C	-40...+70 °C	0...+80 °C
Protection class	IP65	IP65	IP64
Interface	Square	Square	Square
Weblink	www.tr-electronic.com/s/S008423	www.tr-electronic.com/s/S008422	www.tr-electronic.com/s/S008424
QR-Code			

*Others on request

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

Solid shaft

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

*Others on request

Solid shaft Blind shaft

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

*Others on request

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

Blind shaft

Product	IS99 	IMF36 	IH58 	
Detection	Optical (E)	Magnet detection (P)	Optical (E)	
Supply	11...30 VDC	11...27 VDC (5 VDC ± 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, 25, 30, 200, 218, 360, 500, 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)

Hollow shaft

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

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

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

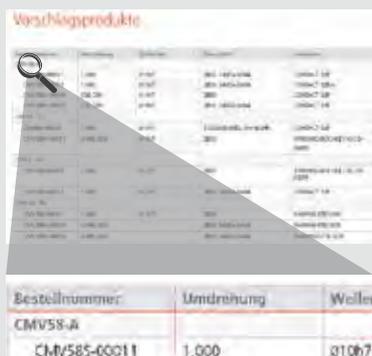
We will help you to select the most suitable products from the complete TR range. Please contact us (info@tr-electronic.de).

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

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

Further product information

1. Enter order code into ...



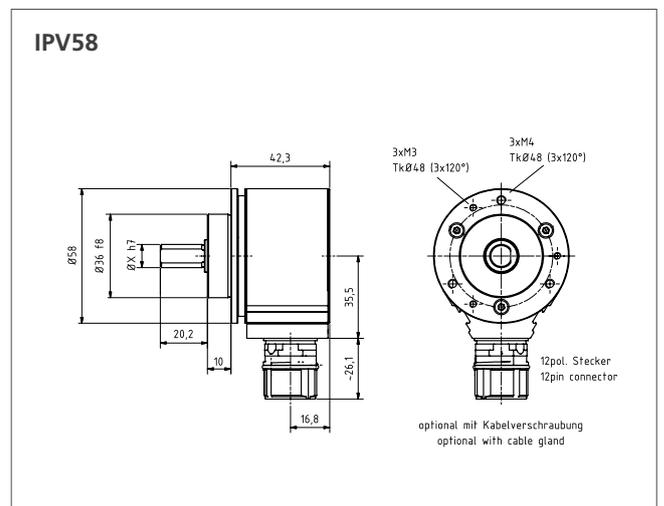
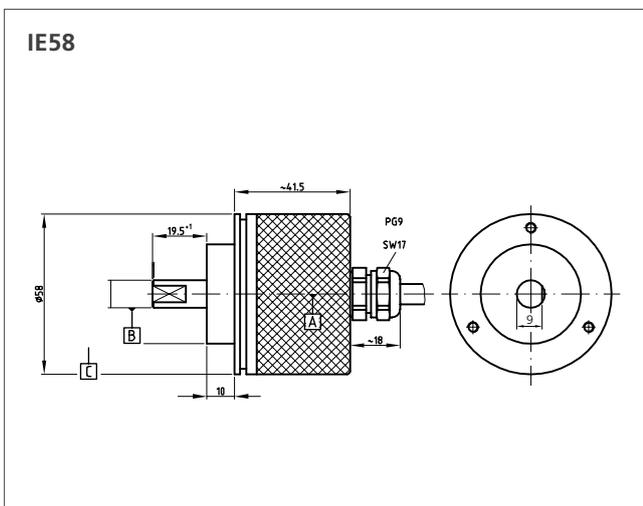
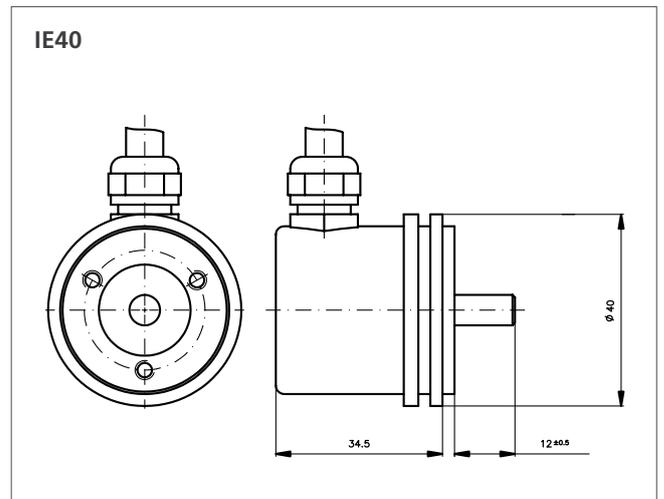
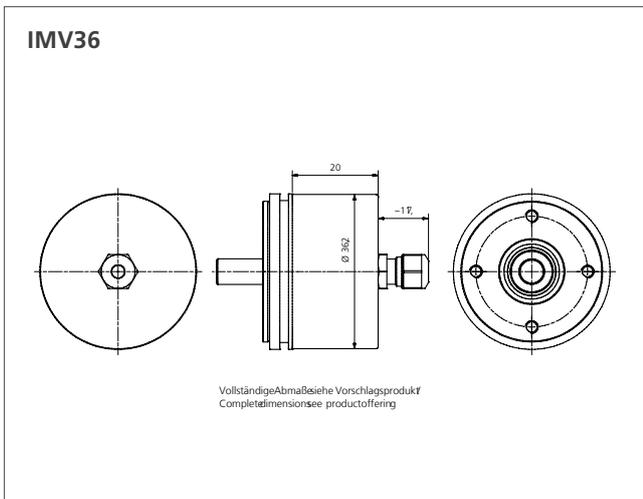
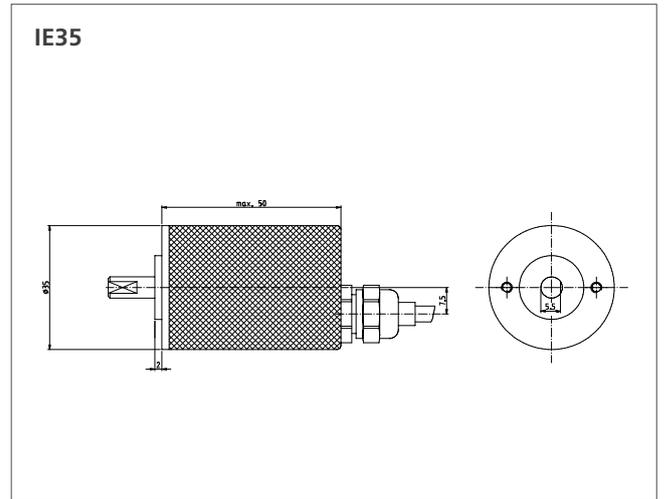
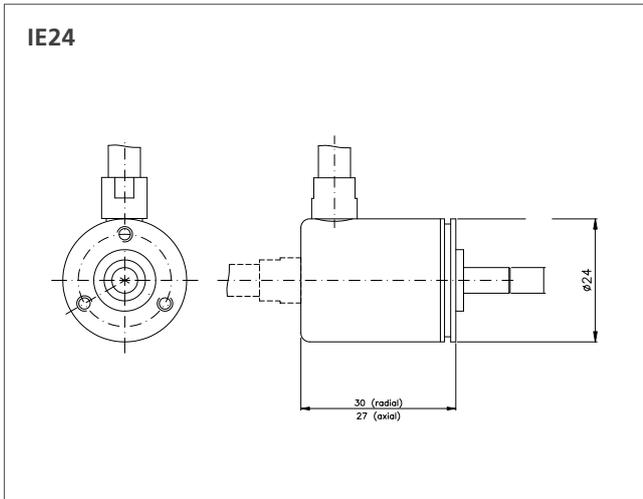
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3. Choose desired information

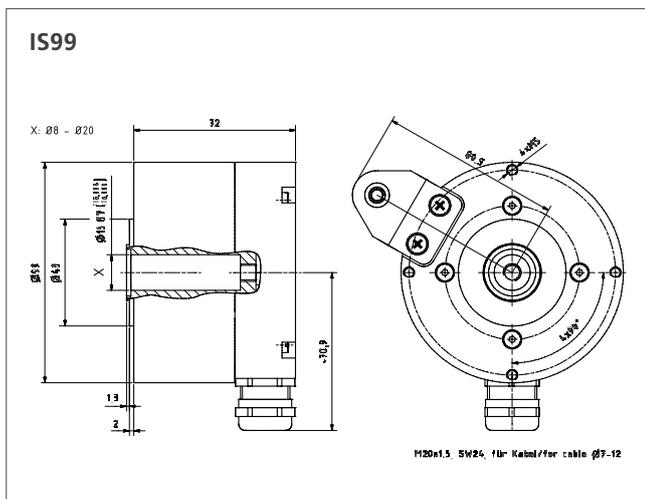
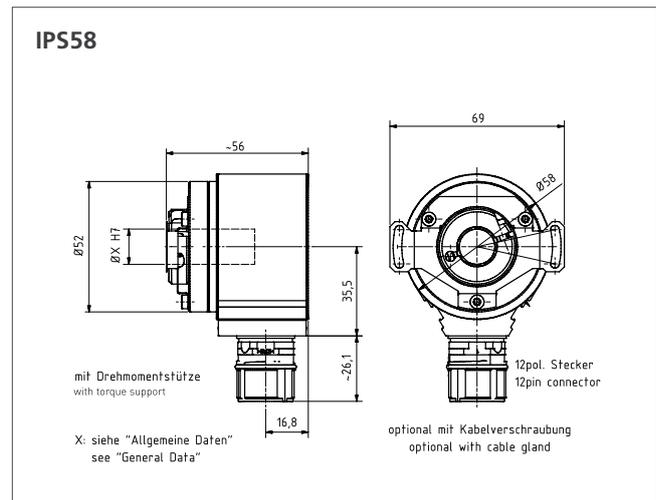
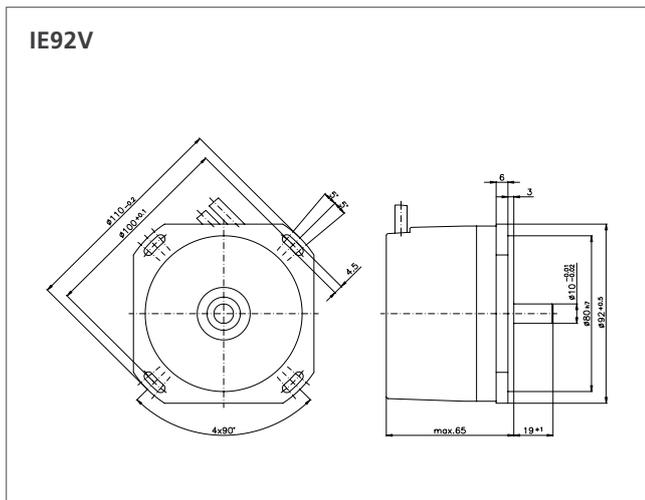


Dimensional Drawings

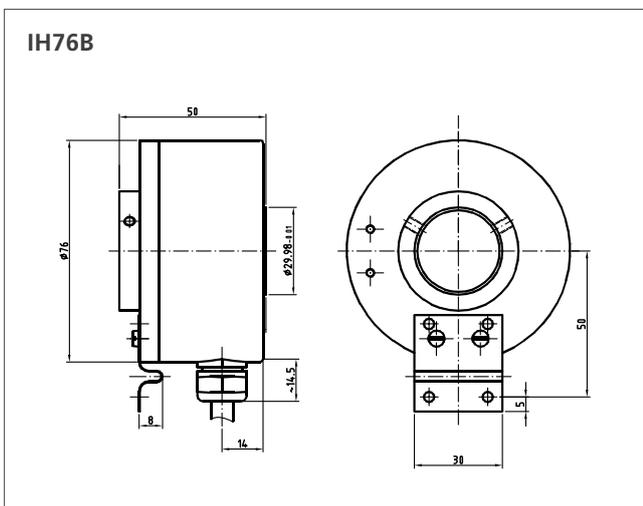
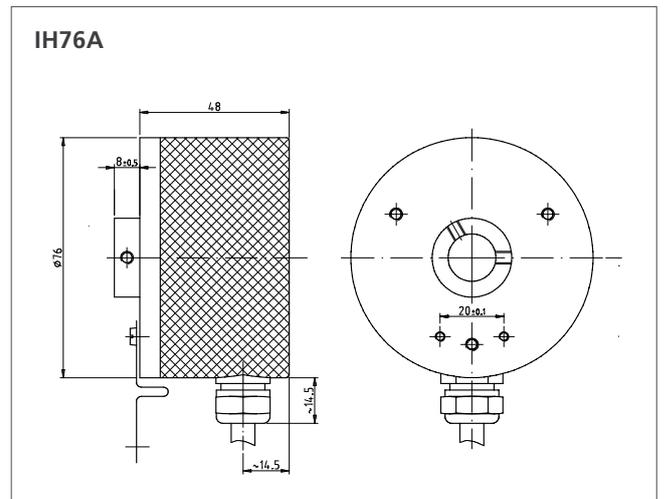
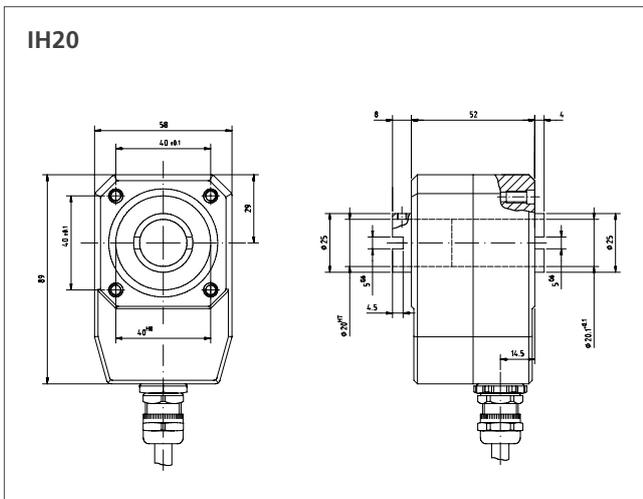
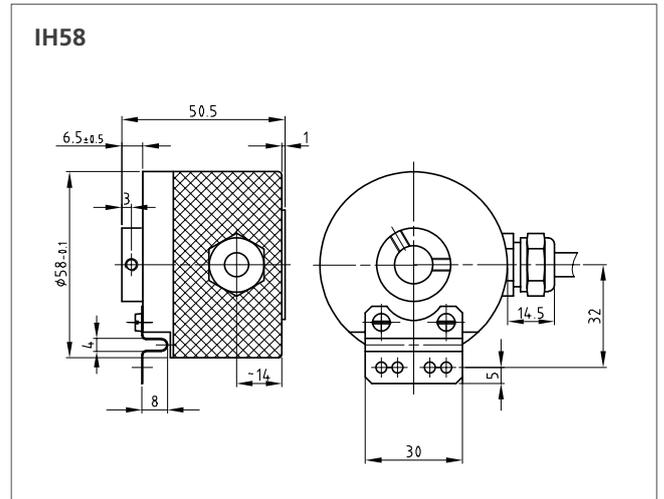
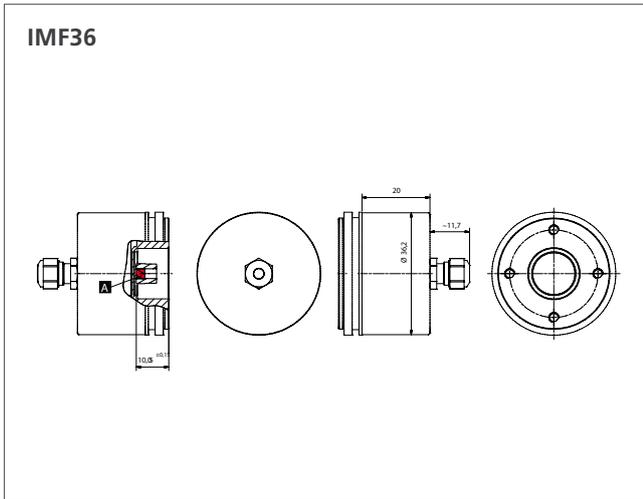


Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at www.tr-electronic.com or on request.

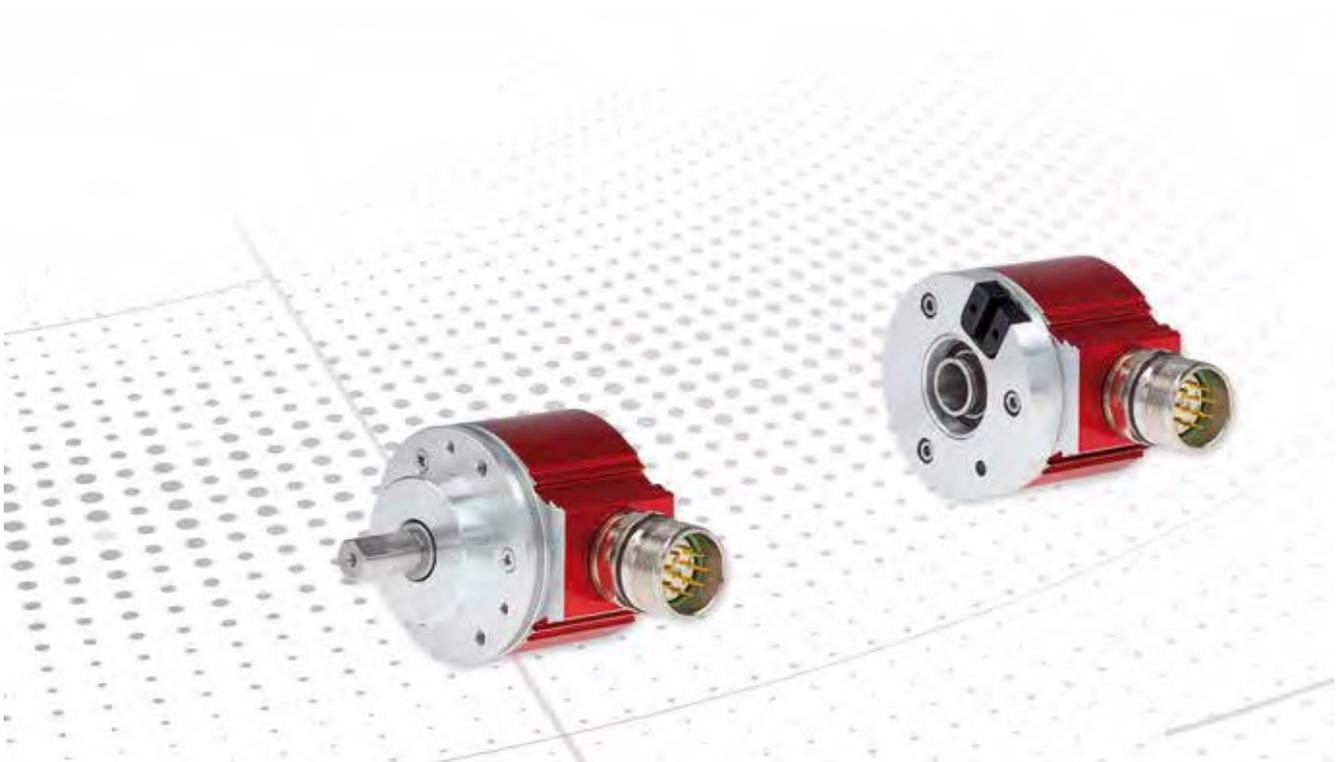
Dimensional Drawings



Dimensional Drawings



Incremental rotary encoders – I_58+FS - Housing 58 mm



Safety-oriented incremental rotary encoder

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

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

Contents

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Solid shaft

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

*depending on safety box used

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

Suggested Products

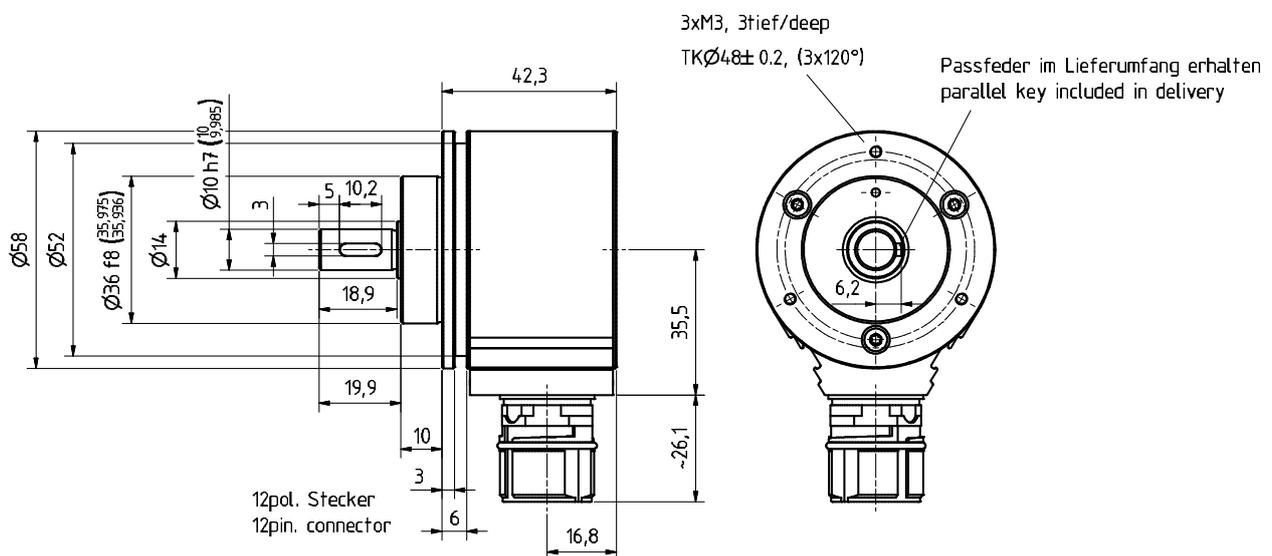
Order code	Steps per turn	Channels	Shaft / Flange	Connector position	Cable length	Remark
IH58+FS						
IH58-00001	1024	(K1/K2)+Inv; K0 + Inv	12H7/Keyway;	M12, 23 pin, radial		HTL
IH58-00002	1024	(K1/K2)+Inv; K0 + Inv	12H7/Keyway;	M12, 23 pin, radial		SIN/COS
IH58-00003	1024	(K1/K2)+Inv; K0 + Inv	12H7/Keyway;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

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

Dimensional Drawings

IE58+FS

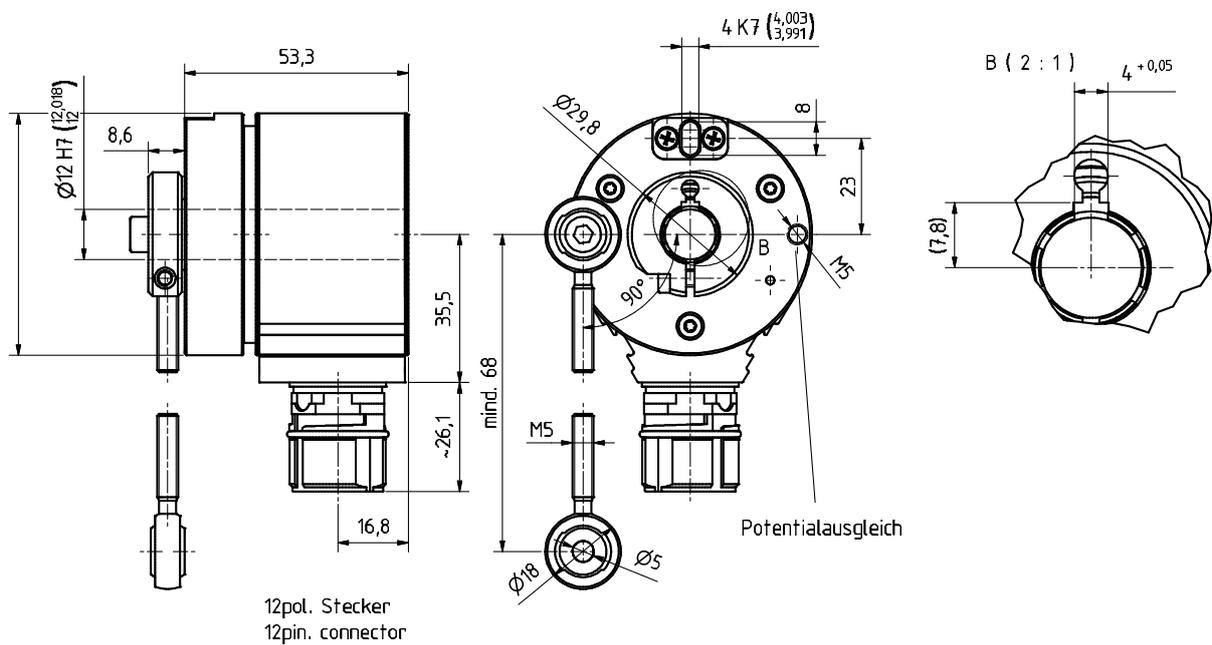
Incremental encoder with solid shaft - up to SIL3/Plc



Dimensional Drawings

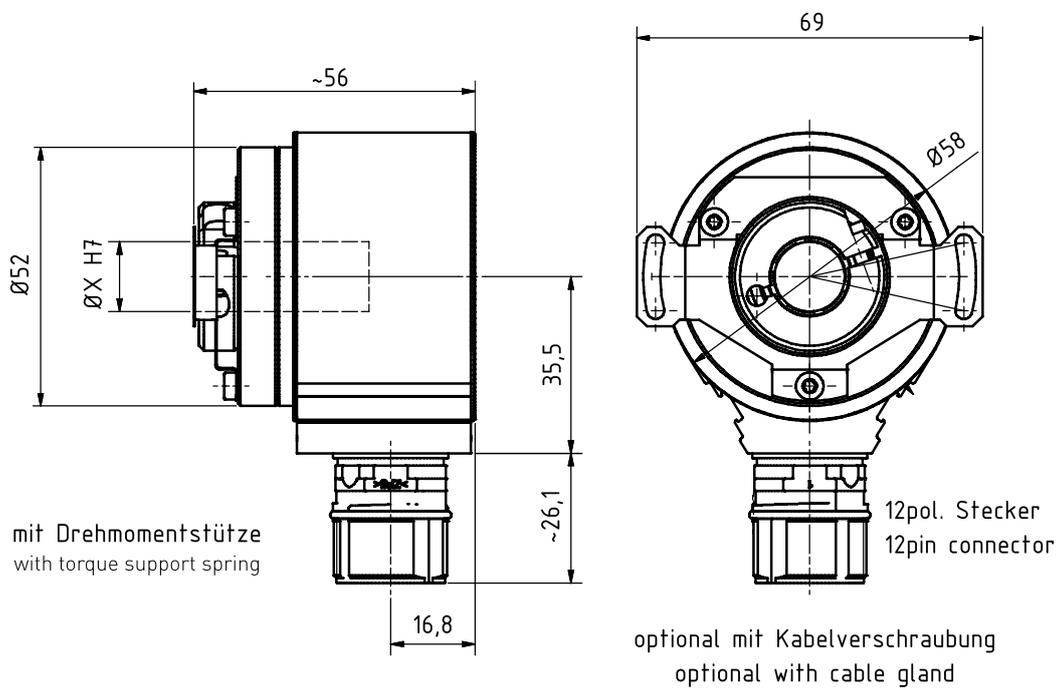
IH58+FS

Incremental encoder with hollow shaft - up to SIL3/Ple

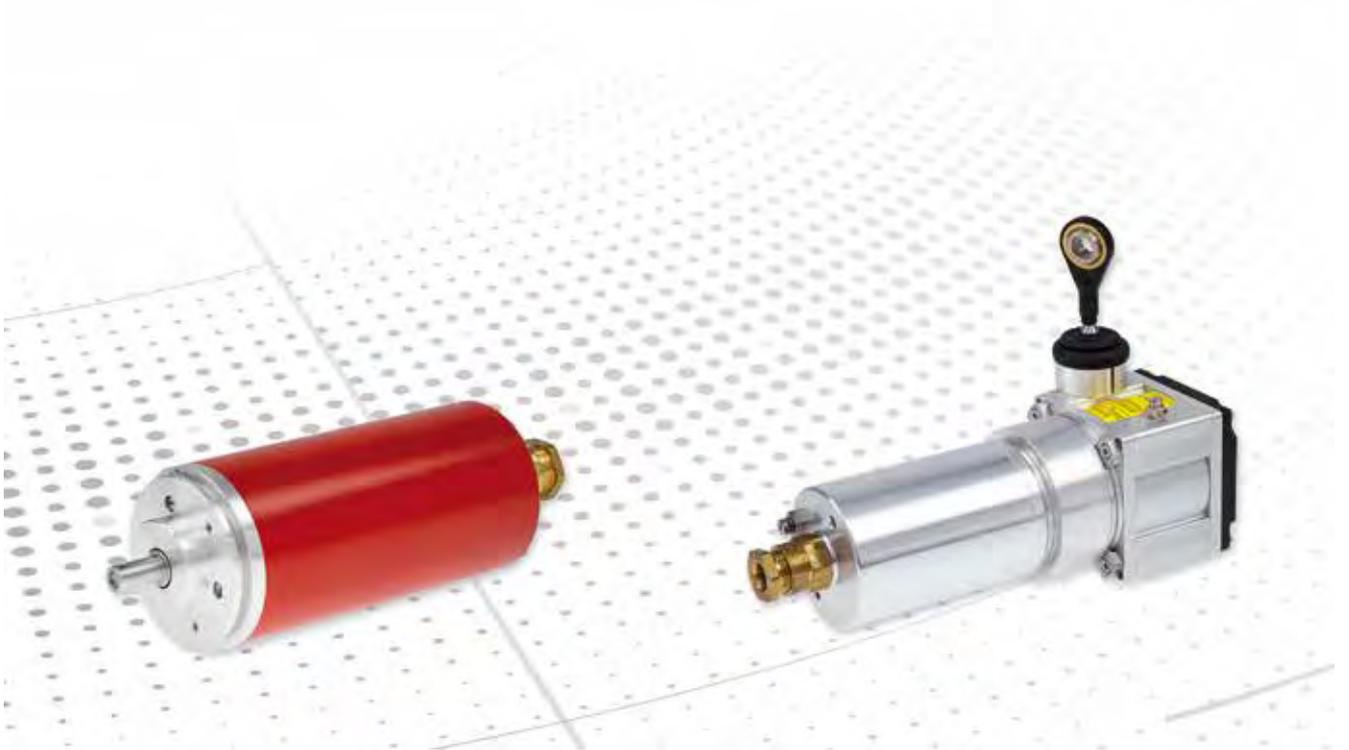


Dimensional Drawings

IS58+FS
Incremental encoder with blind shaft - up to SIL3/PLd



Incremental Encoders - ATEX - Zone 1/21



Protective housing for ATEX-zone 1/21 for rotary encoders I__58

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

Contents

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Housing option for rotary encoders

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

Suggested Products

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

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

Further product information

1. Enter order code into ...



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



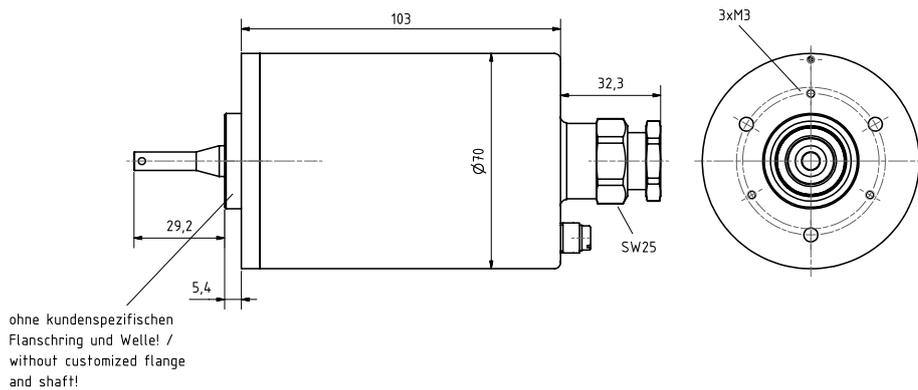
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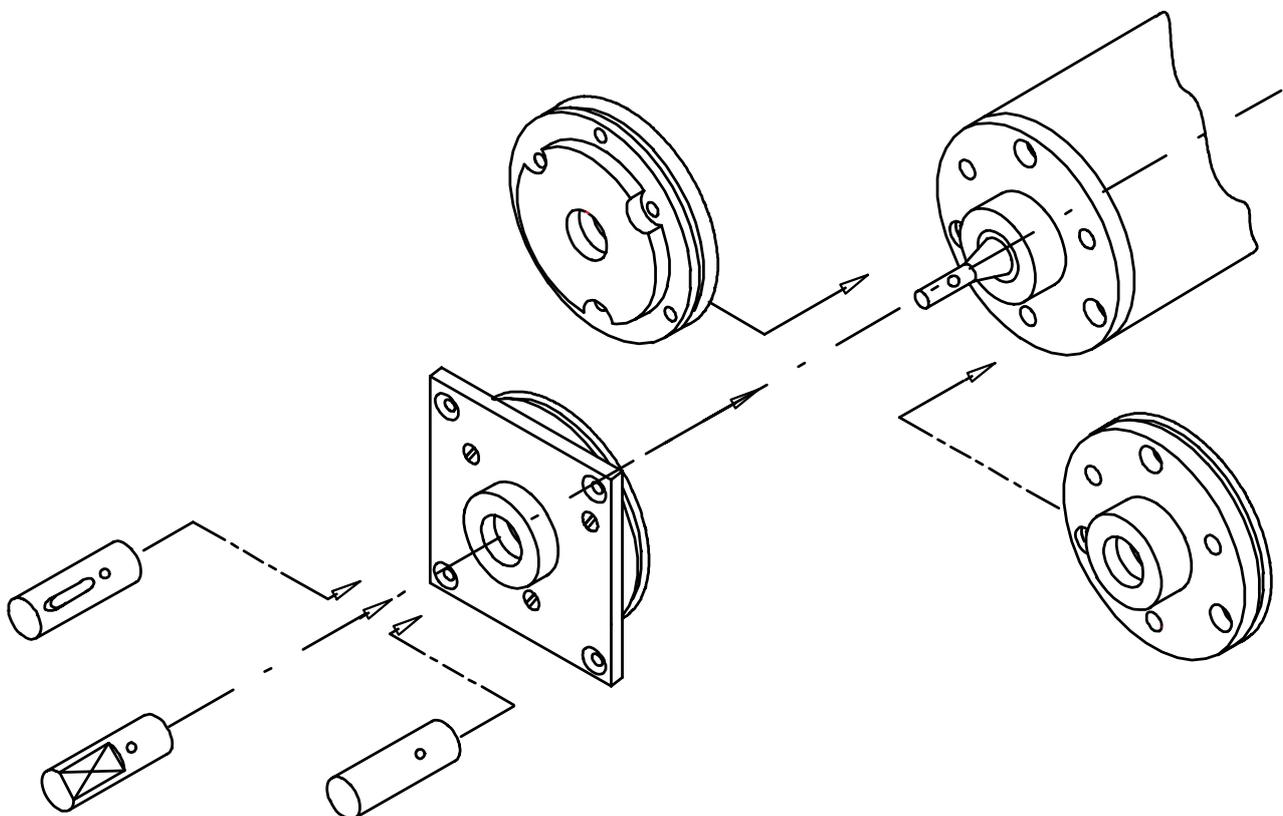
We will help you to select the most suitable products from the complete TR range. Please contact us (info@tr-electronic.de).

Dimensional Drawings

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



A_V70 Modular flange / shaft assembly



Incremental Encoders - ATEX - Zone 2/22



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

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

Contents

Products.....	259
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58 mm

Product	AEV58I:2	AES58I:2	AEH58I:2
			
Detection	Optical (E)	Optical (E)	Optical (E)
Supply	24 VDC (4,5 .. 32)	24 VDC (4,5 .. 32)	24 VDC (4,5 .. 32)
Steps per turn	$\geq 2 \dots \leq 10000$	$\geq 2 \dots \leq 10000$	$\geq 2 \dots \leq 10000$
Shaft diameters available	6, 8, 10, 12, 14, 1/4", 3/8", 1/2"	6, 8, 10, 12, 14, 15, 1/4", 3/8", 1/2"	6, 8, 10, 12, 14, 15, 1/4", 3/8", 1/2"
Connectors	Connector or cable	Connector or cable	Connector or cable
Ambient temperature	-30...+75 °C	-30...+75 °C	-30...+75 °C
Protection class	IP67 / shaft IP65	IP67 / shaft IP65	IP67 / shaft IP65
ATEX zone	2/22	2/22	2/22
Interface	Square	Square	Square
Weblink	www.tr-electronic.com/s/5008488	www.tr-electronic.com/s/5008489	www.tr-electronic.com/s/5008490
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	$\geq 2 \dots \leq 65536$	$\geq 2 \dots \leq 65536$	$\geq 2 \dots \leq 65536$	
Shaft diameters available	6, 8, 10, 12, 14, 1/4", 3/8", 1/2"	6, 8, 10, 12, 14, 15, 1/4", 3/8", 1/2"	6, 8, 10, 12, 14, 15, 1/4", 3/8", 1/2"	
Connectors	Connector or cable	Connector or cable	Connector or cable	
Ambient temperature	-30...+75 °C	-30...+75 °C	-30...+75 °C	
Protection class	IP67 / shaft IP65	IP67 / shaft IP65	IP67 / shaft IP65	
ATEX zone	2/22	2/22	2/22	
Interface	Square	Square	Square	
Weblink	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>ADH130I</p> 
<p>Housing option for rotary encoders</p>	<p>Double (D)</p>
<p>See rotary encoders I_58</p>	<p>11...30VDC</p>
<p>See rotary encoders I_58</p>	<p>1024</p>
<p>12, 14, 20</p>	<p>40, 45, 50, 55, 60 H7</p>
<p>Cable gland / connector</p>	<p>Cable</p>
<p>-20...+60 °C</p>	<p>-20...+60°C</p>
<p>IP65 (option IP67)</p>	<p>IP65</p>
<p>Option 22</p>	<p>2/22</p>
<p>See data encoder integrated</p>	<p>Square</p>
<p>www.tr-electronic.com/s/S008523</p>	<p>http://www.tr-electronic.com/s/S011358</p>
	

Suggested Products

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

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

Further product information

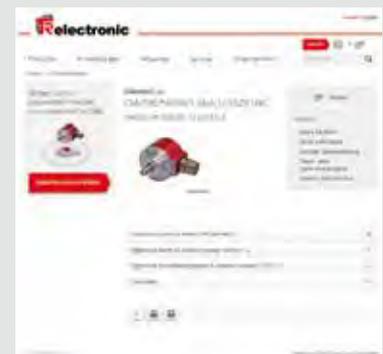
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2. Searchfield (top right) on www.tr-electronic.com

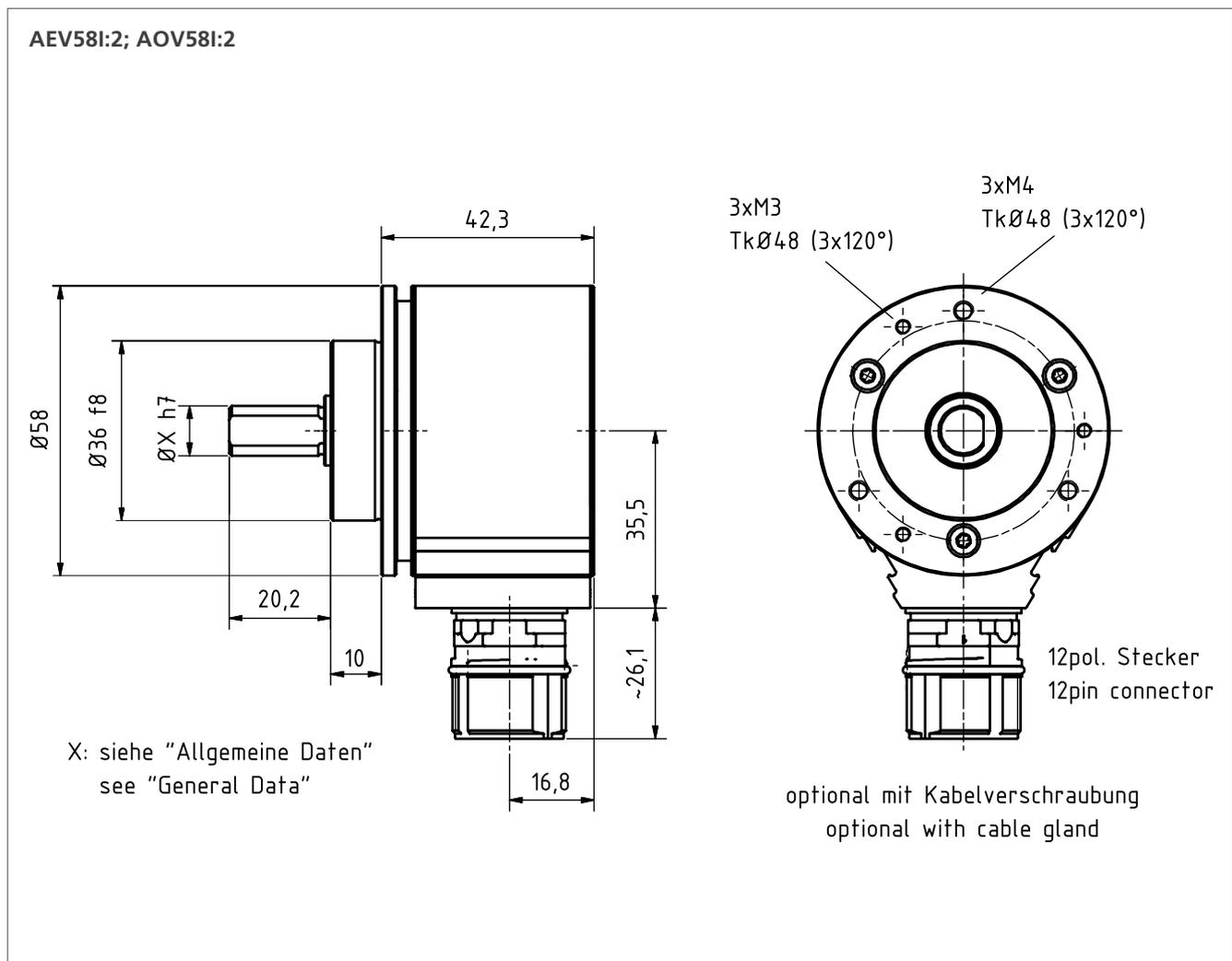


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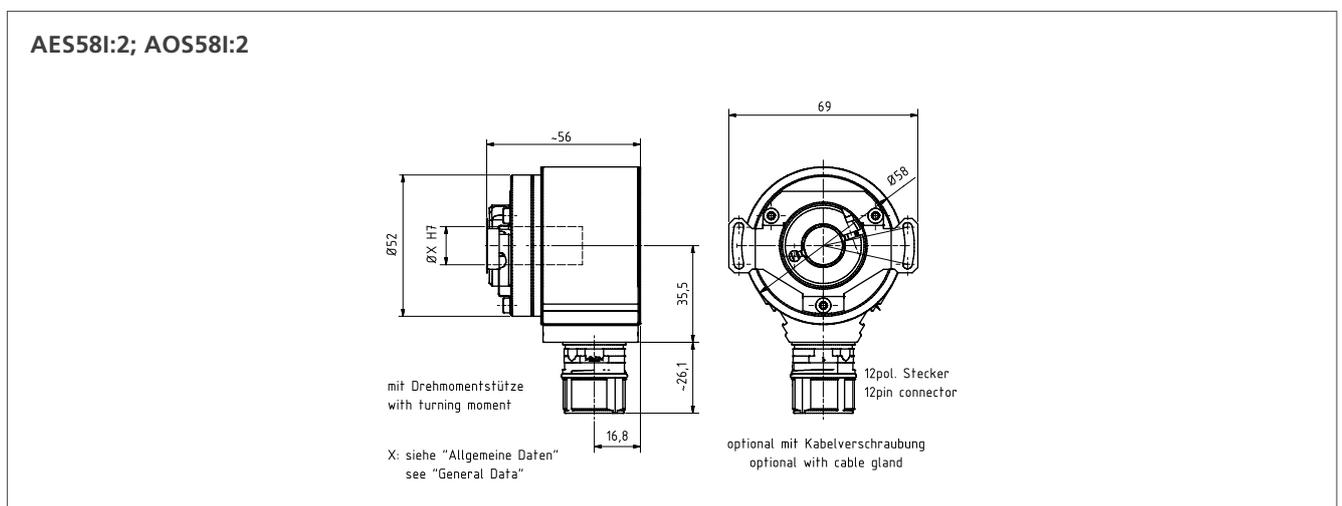
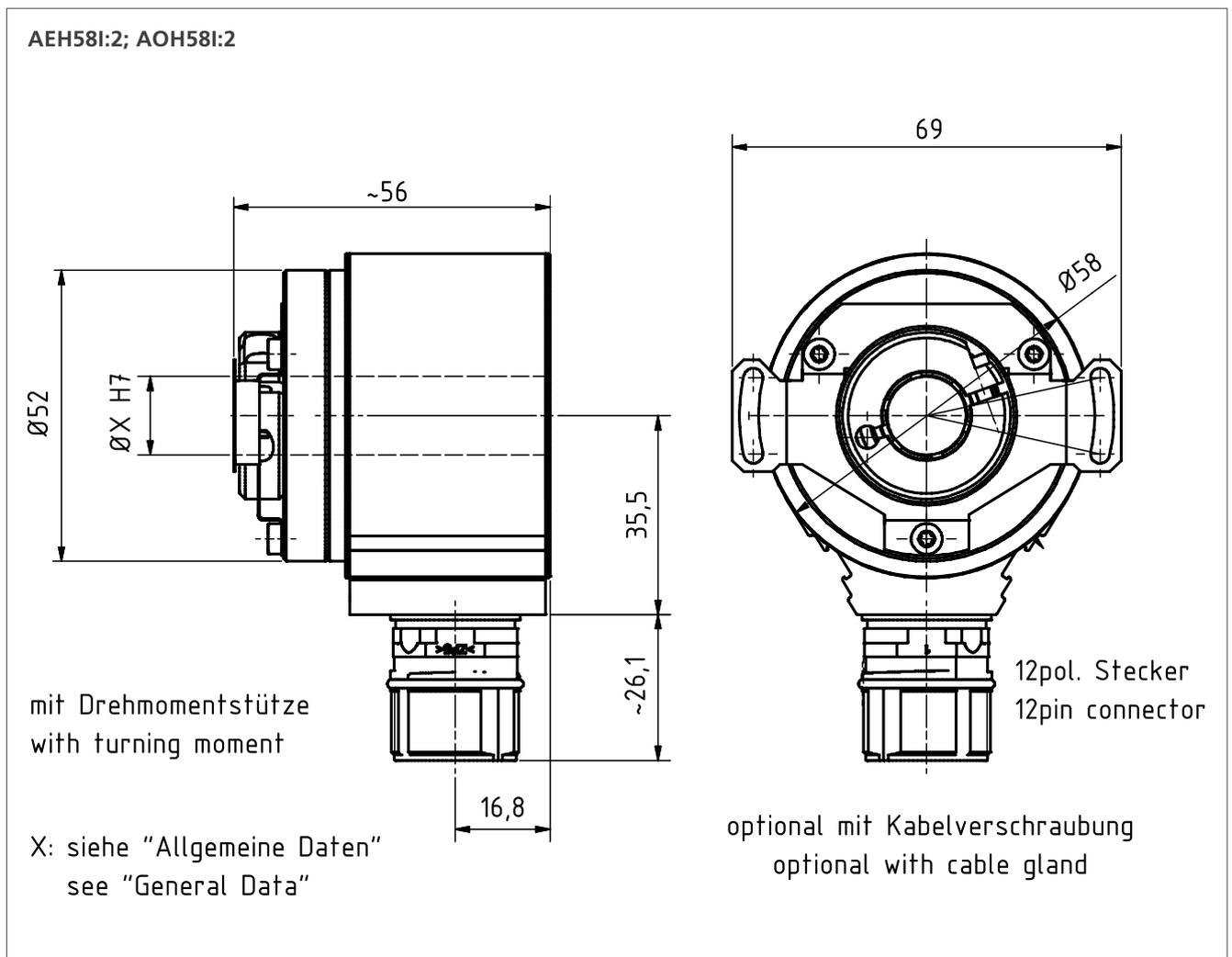


We will help you to select the most suitable products from the complete TR range. Please contact us (info@tr-electronic.de).

Dimensional Drawings

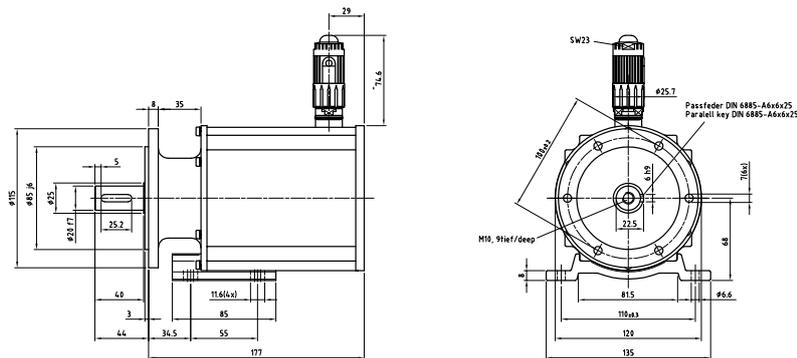


Dimensional Drawings

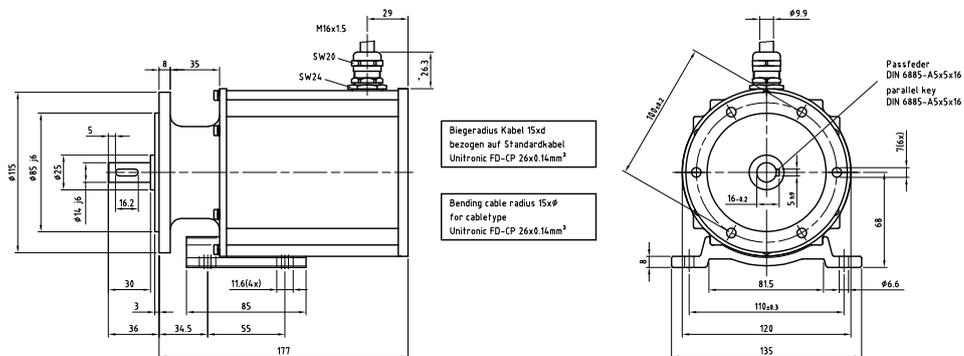


Dimensional Drawings

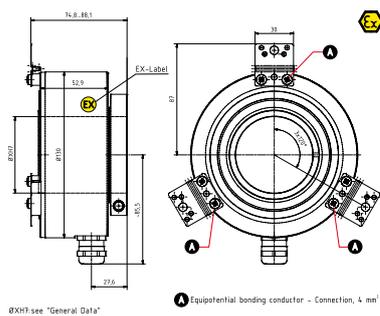
A_V115I
1 x M23 12 pin radial



A_V115I
1 x Cable gland radial



ADH130I



Incremental Rotary Encoder - Heavy-Duty



Resolution factory set

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

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

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		
IV99*2048 PUSH PULL 85ZB11N	2048	A,\A, B,\B, 0,\0	11 keyway /32 ZB85	Cable gland M20x1,5 radial		Push Pull
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		

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

Further product information

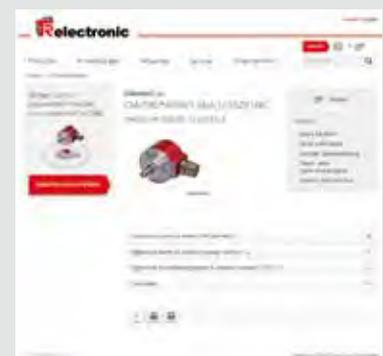
1. Enter order code into ...



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



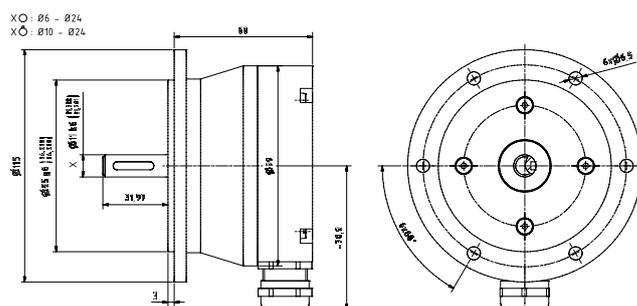
3. Choose desired information



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Dimensional Drawings

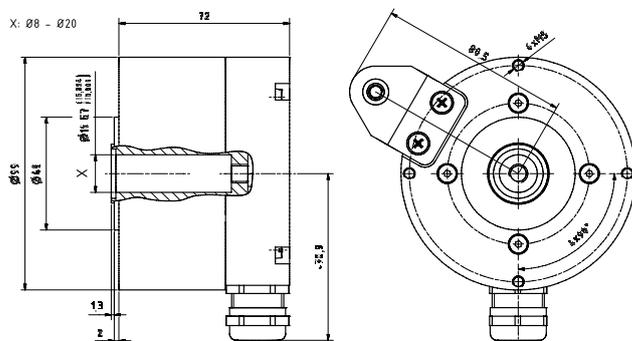
IV99



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

Vollständige Abmaße siehe Vorschlagsprodukt /
Complete dimensions see product offering

IS99



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

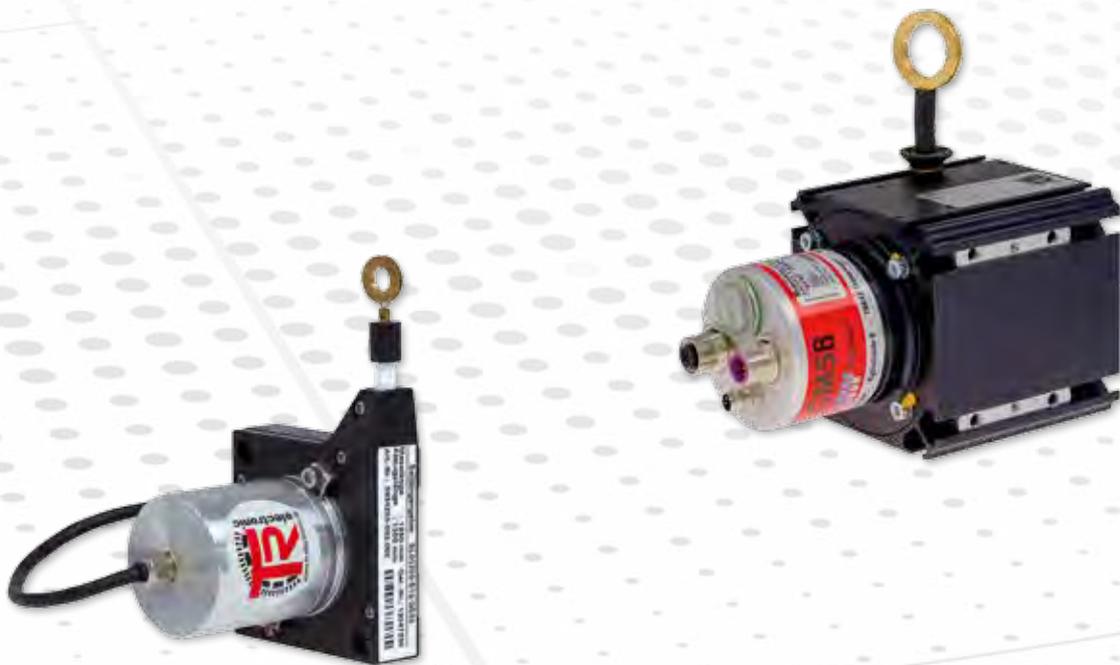
Wire-actuated Encoders



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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Wire-actuated Encoders



Linear position measurement with rotary encoders

Wire actuated encoders by TR-Electronic are equipped with absolute or incremental rotary encoders and fit the specific encoder series perfectly.

Three classes fulfill specific needs for different mechanical loads, duty cycle, service life, resolution resp. reproducibility.

Industrial

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

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

Standard

The WDS is suitable for normal automation tasks.

Basic

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

Contents

Products.....	273
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Application: basic

Application: standard

Product	WPS size 88 mm	SL00 size 55 mm	SL00 size 80 mm
			
Application	Basic	Standard	Standard
Available measurement lengths (m)	2,3; 5	1,25	3
Suits encoder series	58	36	58
Diameter of measurement wire	0,45 mm	0,45 mm	0,55 mm
Measurement wire made from	Stainless steel, covered with polyamide	Stainless steel, 1.4401	Stainless steel, 1.4401
Housing of drum	Plastic, PA 6 GF 30	Plastic, Noryl	Plastic, Noryl
Housing of spring			
Ratio	238,8 mm/turn. (typ.)	150 mm/turn (typ.)	230 mm/turn (typ.)
Options available			
Protection class	IP65	IP50	IP50
ATEX zone			
Interface	Analog	SSI  Analog  INC	SSI  Analog  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			

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Application: standard

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

Application: standard

Application: industrial

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

Application: industrial

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

Application: industrial

SL30 ATEX size 80 mm	SL30 ATEX size 130 mm
	
Industrial ATEX	Industrial ATEX
2; 3	10; 25
58 65 70 75 115	58 65 70 75 115
1,35 mm	0,81 mm
Stainless steel, 1.4401	Stainless steel, 1.4401
Aluminium anodized	Aluminium anodized
Plastic	Plastic
200 mm/turn (typ.)	333,21 mm/turn (typ.)
-30...+80 °C, wire brush, different deflection pulleys, bellow, fixed ball joint	-30...+80 °C, wire brush, different deflection pulleys, bellow, fixed ball joint
IP65	IP65
2	2
SSI  Analog  Parallel  INC 	SSI  Analog  Parallel  INC 
www.tr-electronic.com/s/S006909	www.tr-electronic.com/s/S006910
	

Suggested Products

Order code	Name	Measurement range	Interface	Remark
Standard WDS size 85mm				
CMW58M-00008	CMW58M*4096/4096 V000 SSI SLG*ME2,5M	2,50 m	SSI	
CMW58M-00009	CMW58M*4096/4096 PBS-DP SLG/ME2,5M	2,50 m	PROFIBUS DP	
Standard WDS size 96mm				
CM-W582M-00006	CMW582M*8192/4096 EPN ME 2M	2,00 m	PROFINET IO	radial, connector points down, B10: 450.000 cycles
CM-W582M-00008	CMW582M*4096/4096 EIP ME 2M	2,00 m	Ethernet/IP	axial, B10: 450.000 cycles
CM-W582M-00016	CMW582M*4096/4096 EPN ME 2M	2,00 m	PROFINET IO	axial, B10: 450.000 cycles
CM-W582M-00021	CMW582M*8192/4096 ETC SLG ME 2M	2,00 m	EtherCAT	radial, connector points down, B10: 450.000 cycles
CM-W582M-00026	CMW582M*8192/4096 EPN ME 2M	2,00 m	PROFINET IO	radial, connector points up, B10: 450.000 cycles
Standard WDS size 115mm				
CEW58M-00224	CEW58M*8192/4096 V000 PROFINET *ME10m	10,00 m	PROFINET IO	
CM-W582M-00010	CMW582M*8192/4096 EPN SLG*ME 5M	5,00 m	PROFINET IO	radial, connector points down, B10: 450.000 cycles
CM-W582M-00014	CMW582M*8192/4096 ETC SLG*ME 5M	5,00 m	EtherCAT	axial, B10: 450.000 cycles
CM-W582M-00018	CMW582M*8192/4096 EPN ME 5M	5,00 m	PROFINET IO	radial, connector points right, B10: 450.000 cycles
CM-W582M-00022	CMW582M*8192/4096 EPN ME 5m+ULR	5,00 m	PROFINET IO	radial, connector points up, with pulley, B10: 450.000 cycles
CM-W582M-00023	CMW582M*8192/4096 EPN ME 5m+DUR00	5,00 m	PROFINET IO	radial, connector points left, with double pulley, B10: 450.000 cycles
CM-W582M-00025	CMW582M*8192/4096 EPN ME 7,5m+ULR	7,50 m	PROFINET IO	
CMW58M-00002	CMW58M*4096/4096 PBS-DP SLG/ME5M	5,00 m	PROFIBUS DP	
CMW58M-00041	CMW58M*2048/4096 V000 CAN/OPEN ME 0-5M	5,00 m	CAN/OPEN	
CMW58M-00063	CMW58M*4096/4096 SSI SLG*ME5,0m	5,00 m	SSI	
CMW58M-00068	CMW58M*4096/4096 SSI ME5M+ULR	5,00 m	SSI	With single pulley
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°

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

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

Suggested Products

Order code	Name	Measurement range	Interface	Remark
Standard SL00 size 130mm				
CM-W582M-00003	CMW582M*8192/4096 EPN SL00_GS130	5,00 m	PROFINET IO	
CMW58M-00056	CMW58M*4096/4096 SSI SL130 5M	5,00 m	SSI	
Standard SL00 size 80mm				
CMW58M-00055	CMW58M*4096/4096 SSI SL80 3M	3,00 m	SSI	
Industrial WDS size 115mm				
CM-W582M-00024	CMW582M*8192/4096 EPN ME 5m+ULR	5,00 m	PROFINET IO	radial, connector points up, with pulley, B10: 1,5 mio cycles
Industrial SL30 size 80mm				
CEW58M-00020	CEW58M*4096/4096 V000 PROFIBUS *SL3002	2,00 m	PROFIBUS DP	
CEW58M-00127	CEW58M*8192/4096 V000 PROFIBUS *SL3003	3,00 m	PROFIBUS DP	
CEW58M-00132	CEW58M*8192/4096 V000 SSI SL3002	2,00 m	SSI	
CEW58M-00140	CEW58M*8192/4096 V000 SSI SL3003	3,00 m	SSI	
CEW58M-00171	CEW58M*8192/4096 V000 ETHERCAT *SL3003	3,00 m	EtherCAT	
CEW58M-00215	CEW58M*4096/4096 EIP SL3002	2,00 m	ETHERNET IP	
CEW58M-00221	CEW58M*8192/4096 V000 ETHERCAT *SL3002	2,00 m	EtherCAT	
CEW58M-00232	CEW58M*8192/4096 PROFINET *SL3003	3,00 m	PROFINET IO	
CEW58M-00241	CEW58M*8192/4096 EIP SL3003	3,00 m	ETHERNET IP	
CEW58M-00314	CEW58M*4096/4096 EPN *SL3002	2,00 m	PROFINET IO	
CM-W582M-00001	CMW582M*8192/4096 EPN SL3003	3,00 m	PROFINET IO	
Industrial SL30 size 190mm				
CEW58M-00115	CEW58M*4096/4096 V000 PROFIBUS *SL3050	50,00 m	PROFIBUS DP	

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

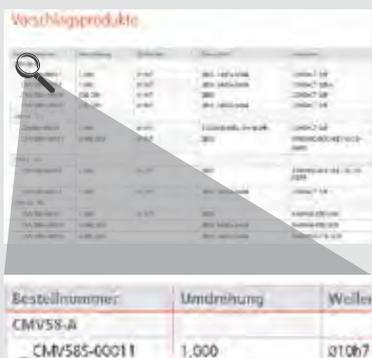
Suggested Products

Order code	Name	Measurement range	Interface	Remark
Industrial SL30 size 130mm				
CEW58M-00008	CEW58M*8192/4096 V000 PROFIBUS *SL3015	15,00 m	PROFIBUS DP	
CEW58M-00019	CEW58M*8192/4096 V000 SSI SL3005	5,00 m	SSI	
CEW58M-00022	CEW58M*4096/4096 V000 PROFIBUS *SL3020	20,00 m	PROFIBUS DP	
CEW58M-00029	CEW58M*8192/4096 V000 PROFIBUS *SL3010	10,00 m	PROFIBUS DP	
CEW58M-00065	CEW58M*8192/4096 V000 SSI SL3015	15,00 m	SSI	
CEW58M-00068	CEW58M*4096/4096 V000 SSI SL3030	30,00 m	SSI	
CEW58M-00092	CEW58M*8192/4096 V000 PROFIBUS *SL3025	25,00 m	PROFIBUS DP	
CEW58M-00134	CEW58M*8192/4096 V000 PROFIBUS *SL3005	5,00 m	PROFIBUS DP	
CEW58M-00141	CEW58M*8192/4096 V000 ETHERCAT *SL3010	10,00 m	EtherCAT	
CEW58M-00148	CEW58M*8192/4096 V000 SSI SL3020	20,00 m	SSI	
CEW58M-00156	CEW58M*8192/4096 V000 ETHERCAT *SL3005	5,00 m	EtherCAT	
CEW58M-00225	CEW58M*8192/8192 V000 PROFINET *SL3005	5,00 m	PROFINET IO	
CEW58M-00228	CEW58M*8192/4096 EPN SL3015	15,00 m	PROFINET IO	
CEW58M-00229	CEW58M*8192/4096 V000 SSI SL3010	10,00 m	SSI	
CEW58M-00231	CEW58M*8192/4096 V000 SSI SL3025	25,00 m	SSI	
CEW58M-00239	CEW58M*8192/4096 EPN *SL3010	10,00 m	PROFINET IO	
CEW58M-00242	CEW58M*8192/4096 EIP SL3005	5,00 m	Ethernet/IP	
Basic WPS size 88mm				
CMW58M-00048	CMW58M*4096/256 V000 ANALOG*ME5M „KIT“	5,00 m	ANALOG CURRENT	
ATEX Industrial SL30 size 130mm				
AEW58M-00001	AEW58M*8192/4096 V999 SSI SL3025ATEX		SSI	II 3G Ex nAc c IIC T5X

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

Further product information

1. Enter order code into ...

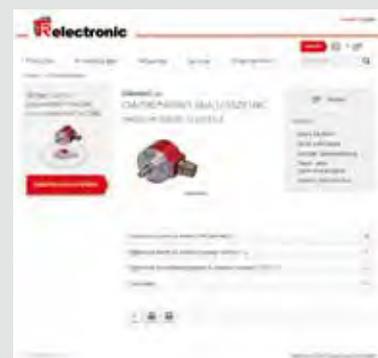


Bestellnummer	Umdrehung	Wellen
CMV55-A		
_CMV585-00011	1.000	Ø10h7

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

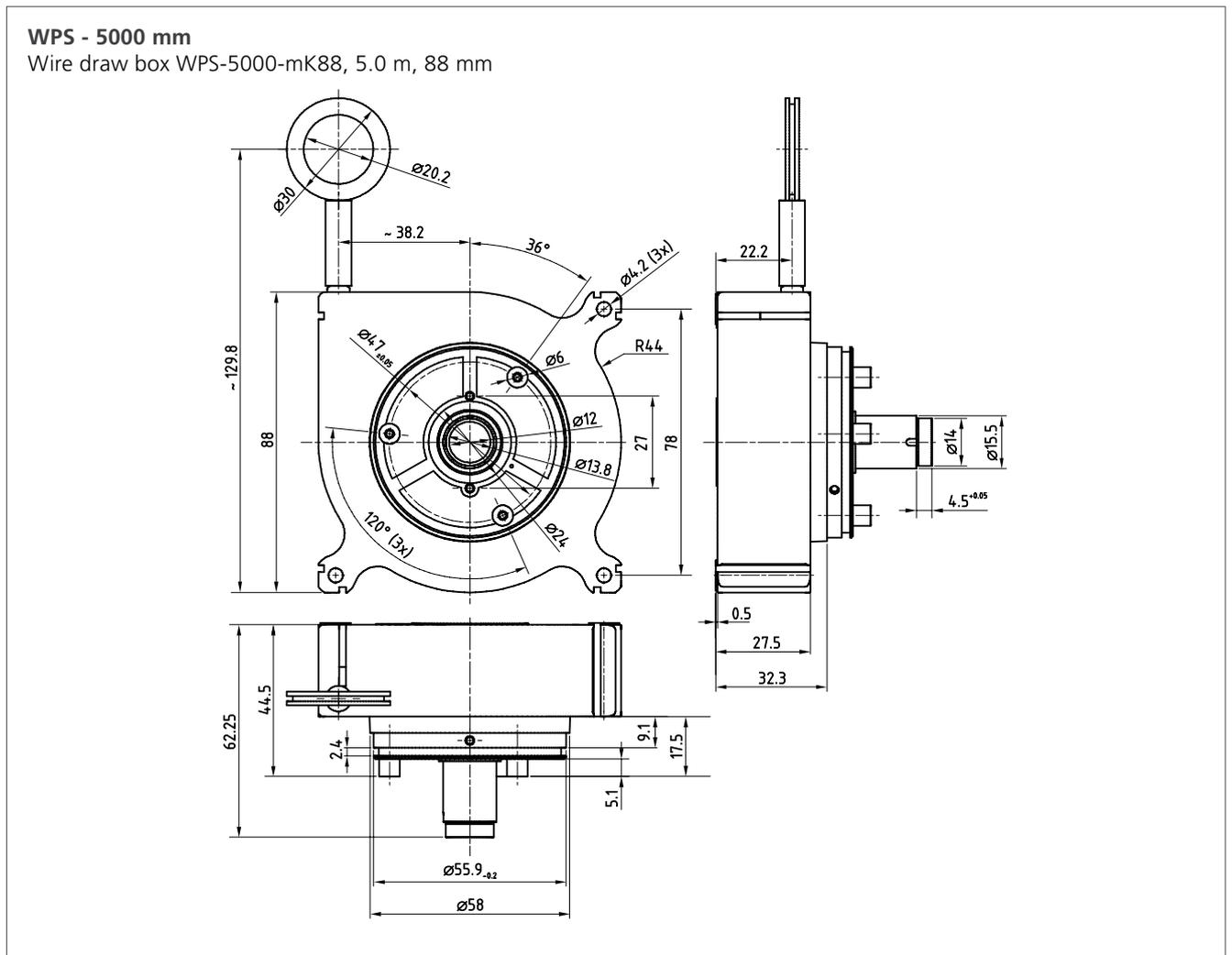


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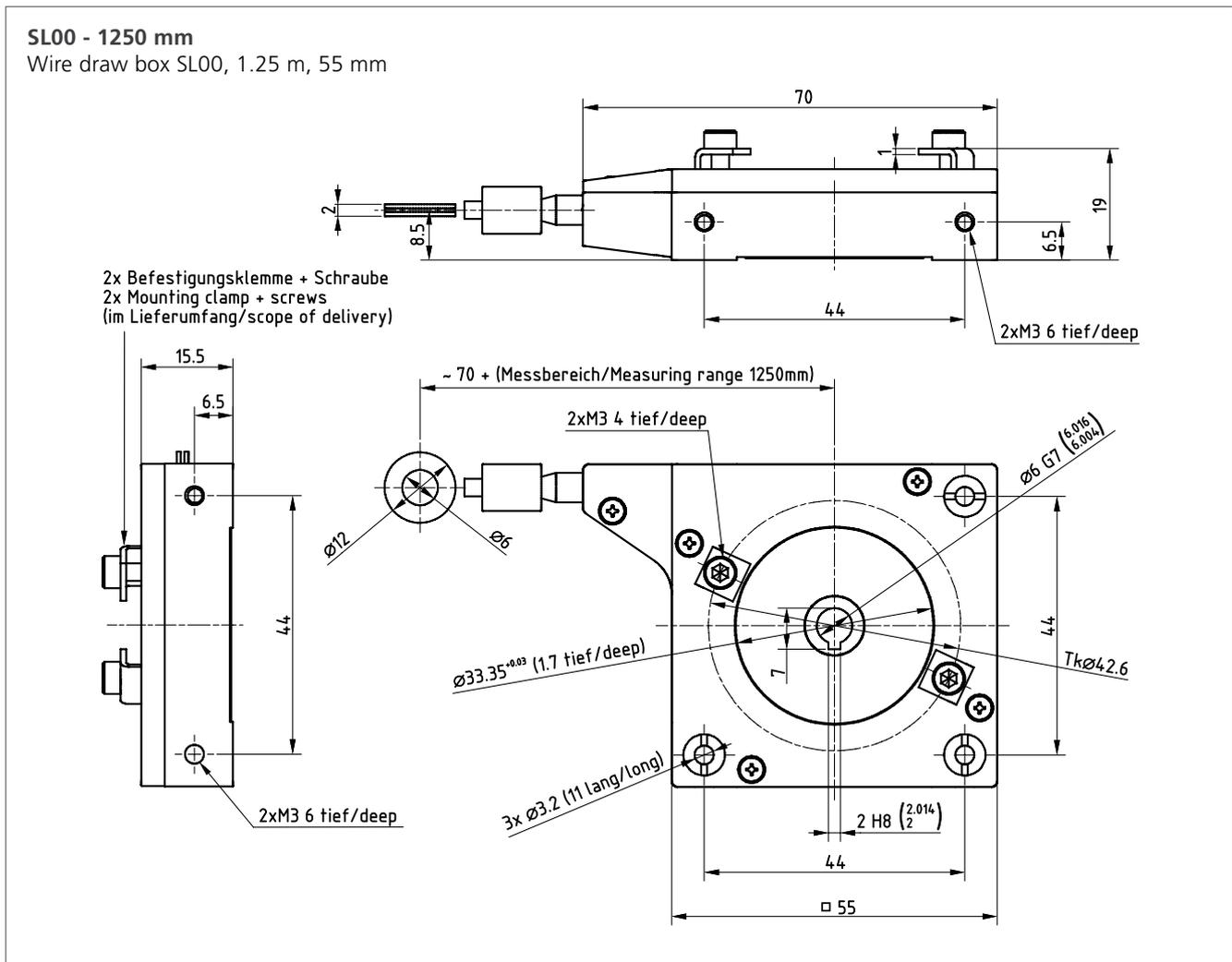


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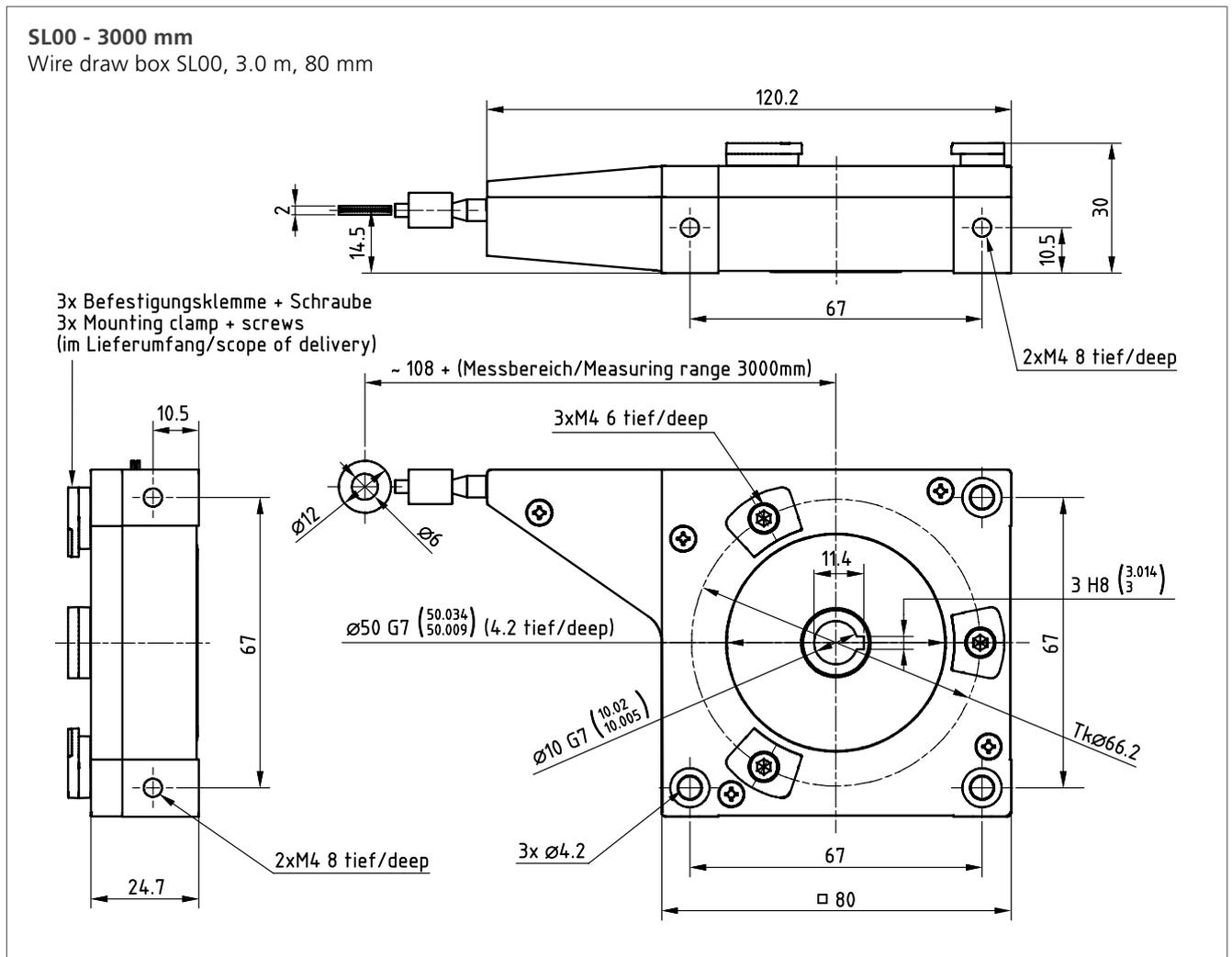
Dimensional Drawings



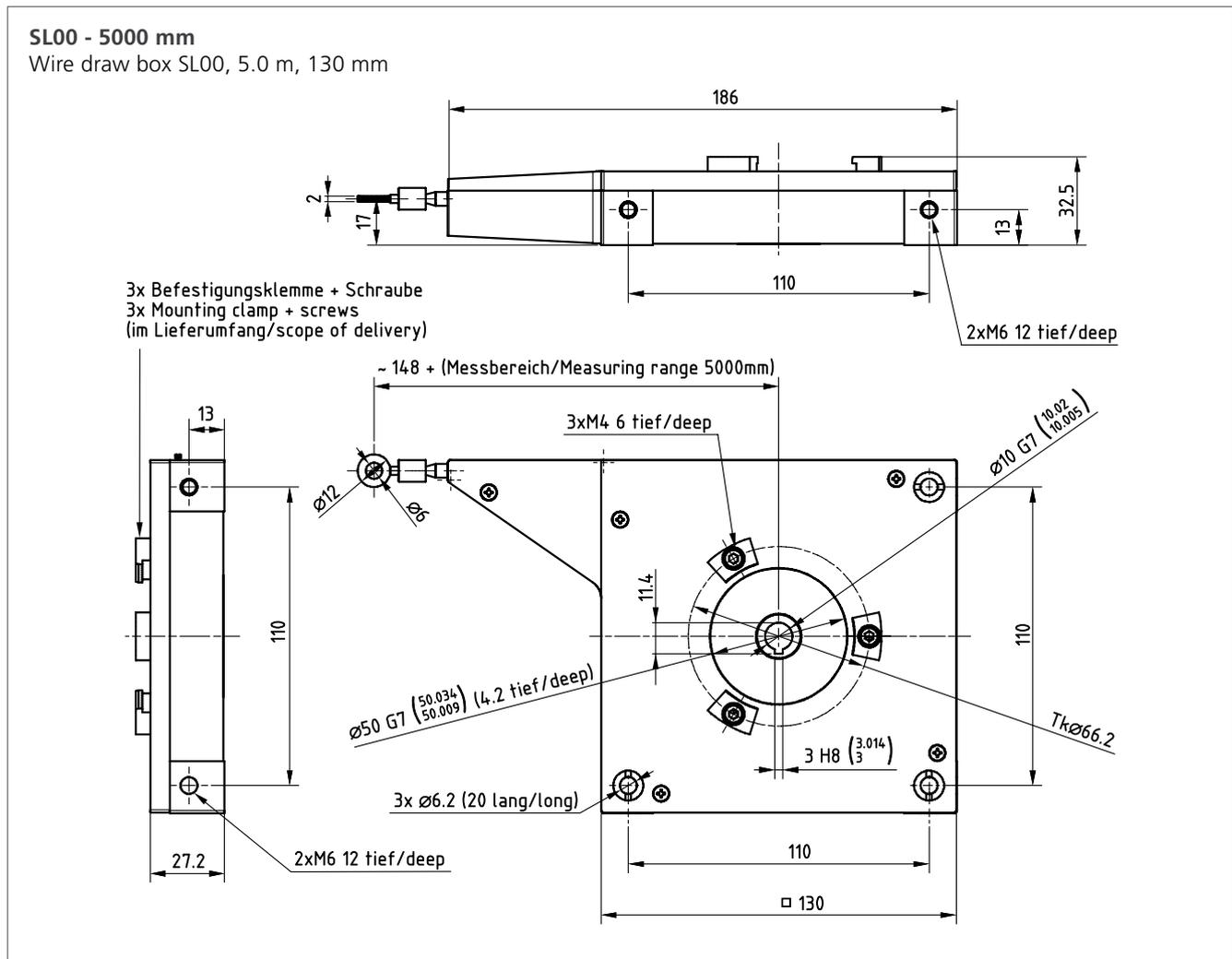
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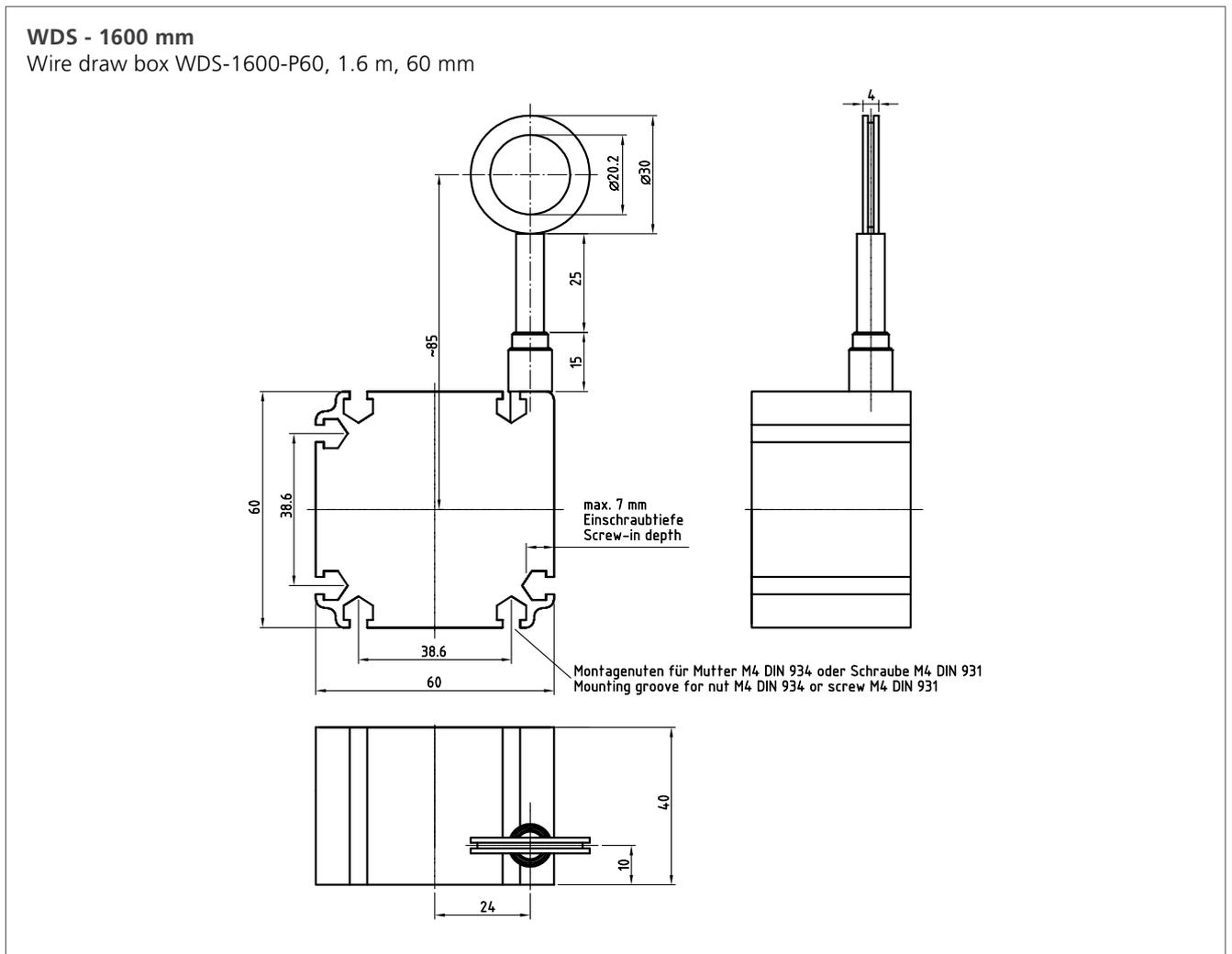
Dimensional Drawings



Dimensional Drawings



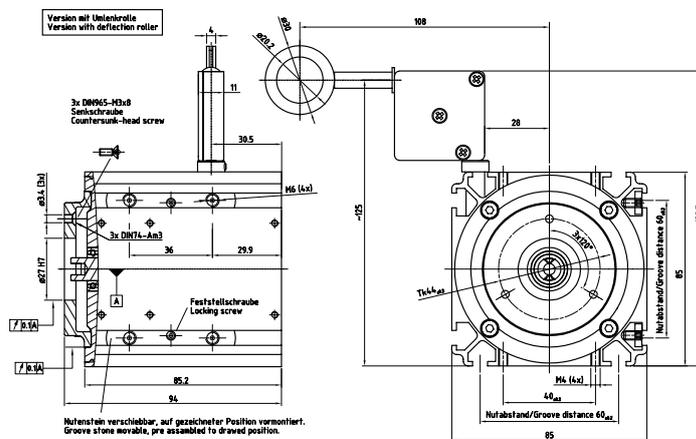
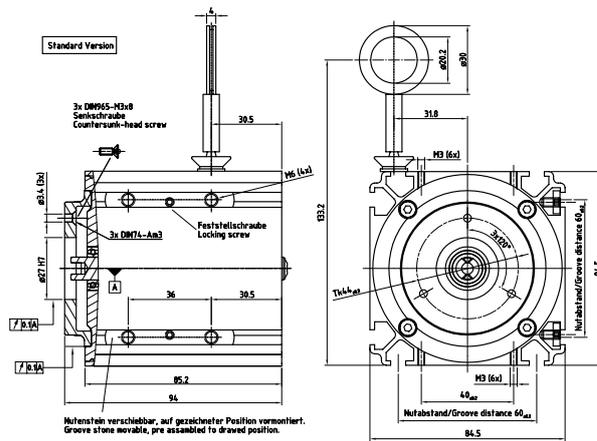
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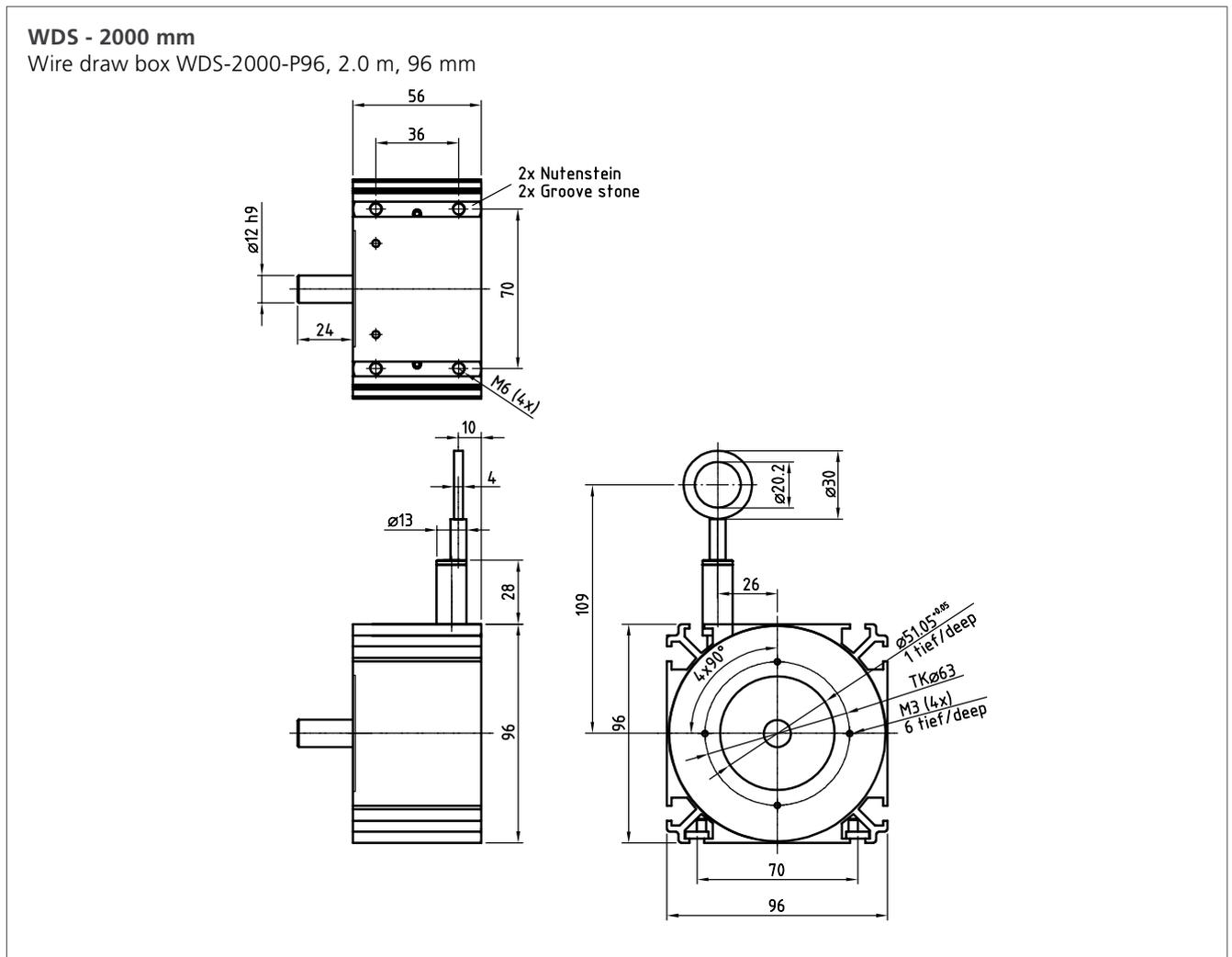
Dimensional Drawings

WDS - 2500 mm

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



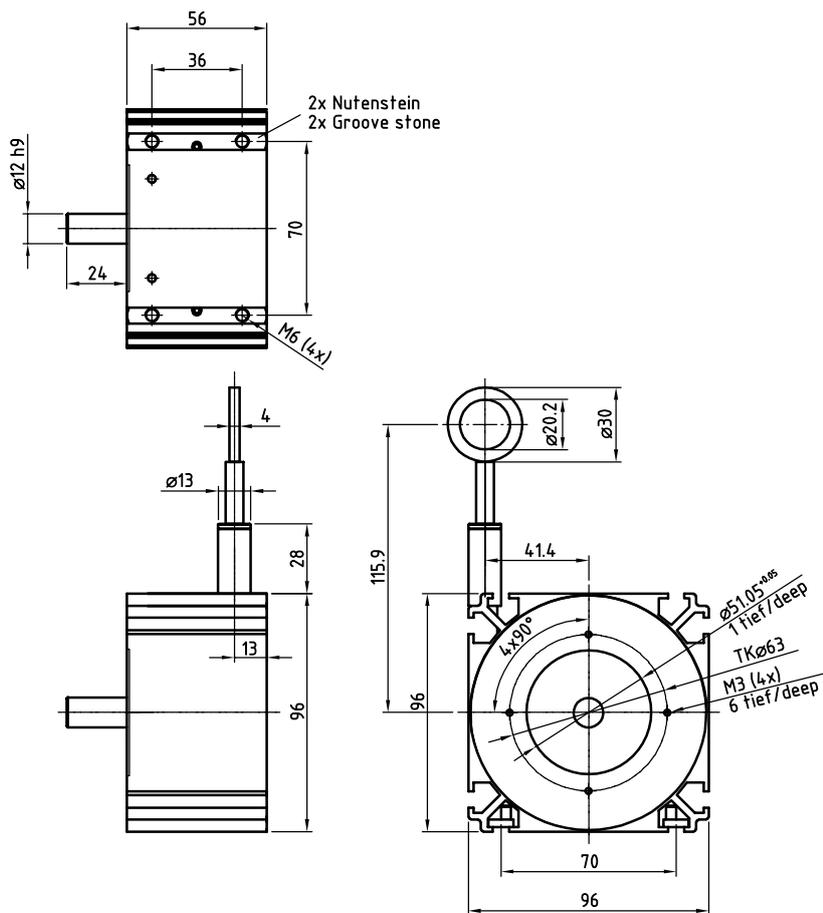
Dimensional Drawings



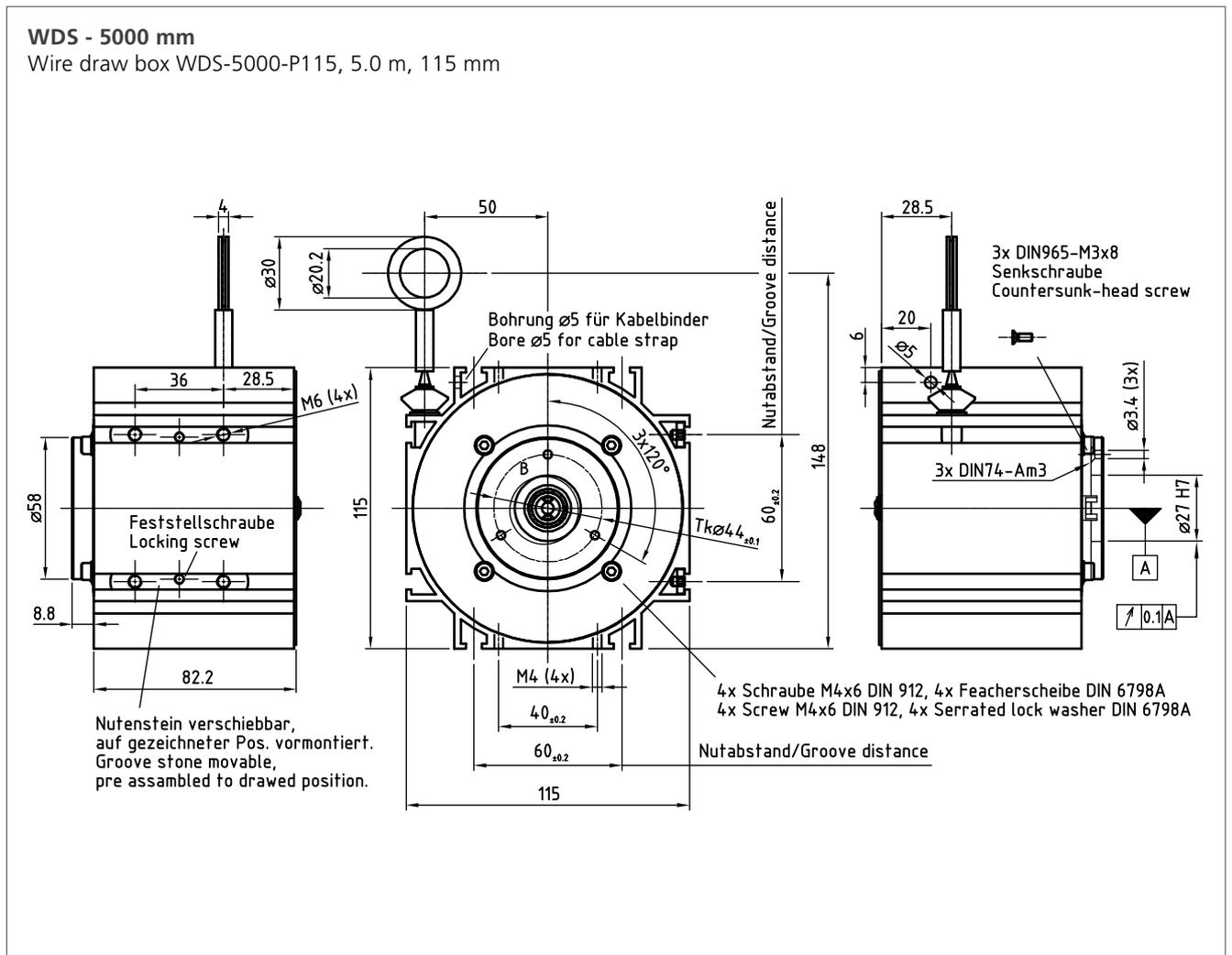
Dimensional Drawings

WDS - 3000 mm

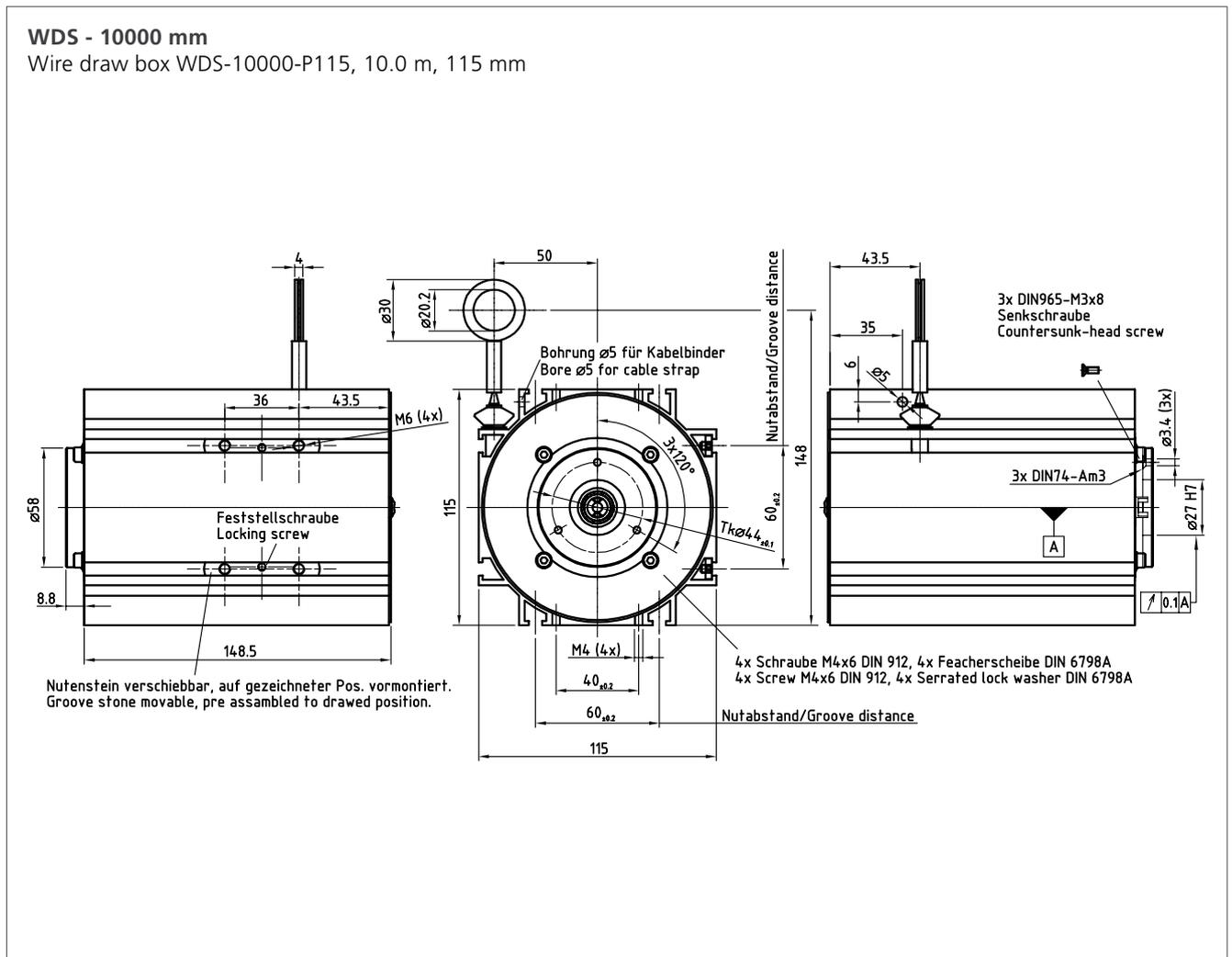
Wire draw box WDS-3000-P96, 3.0 m, 96 mm



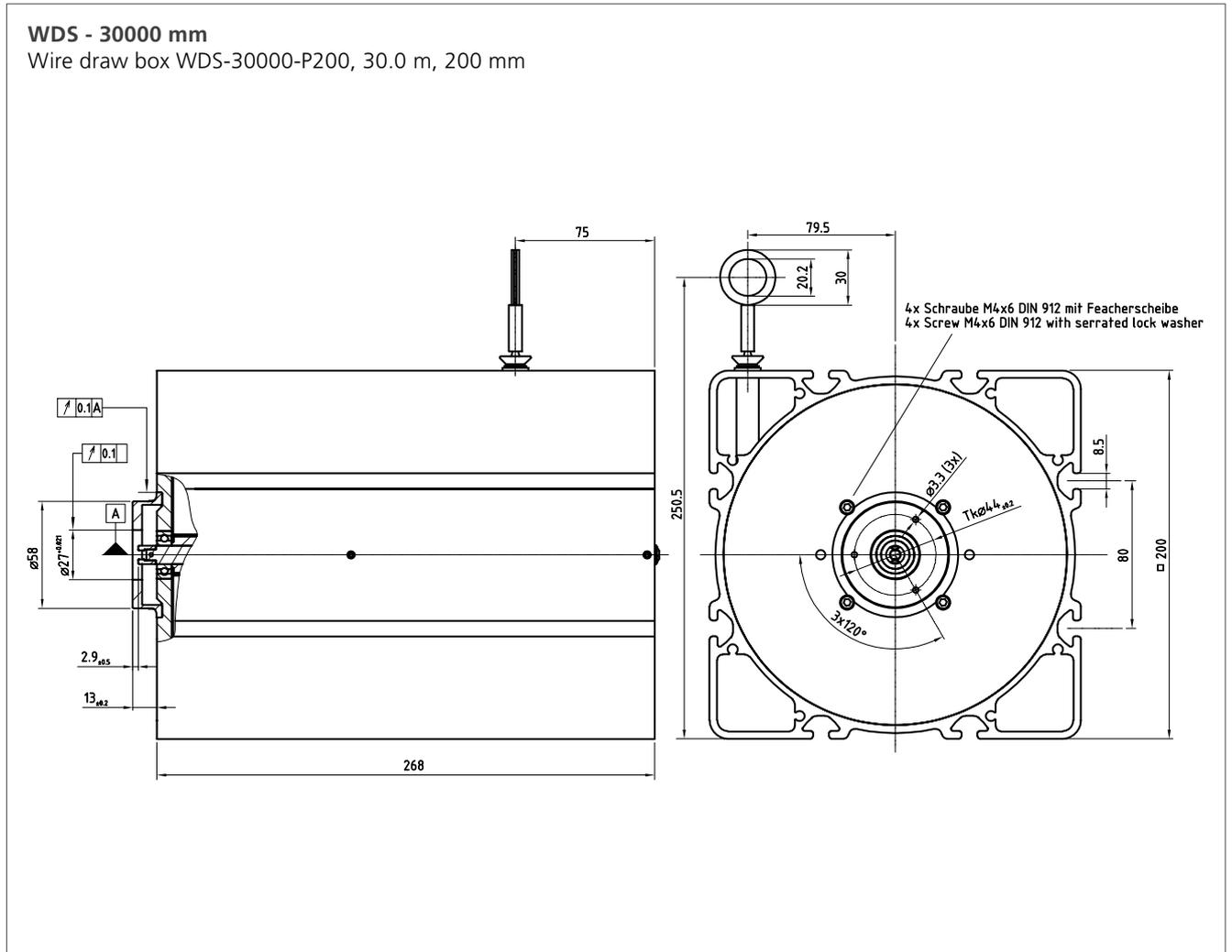
Dimensional Drawings



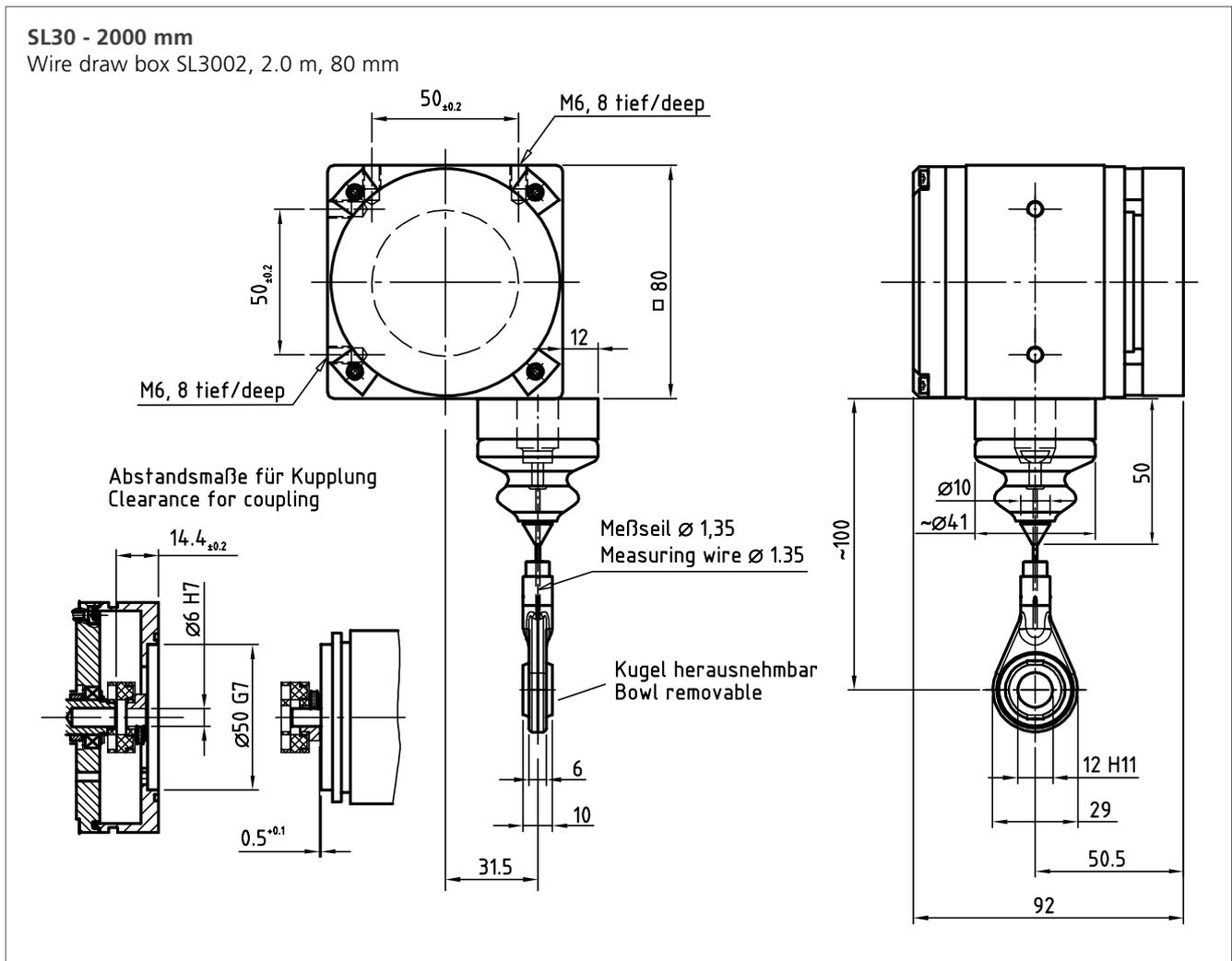
Dimensional Drawings



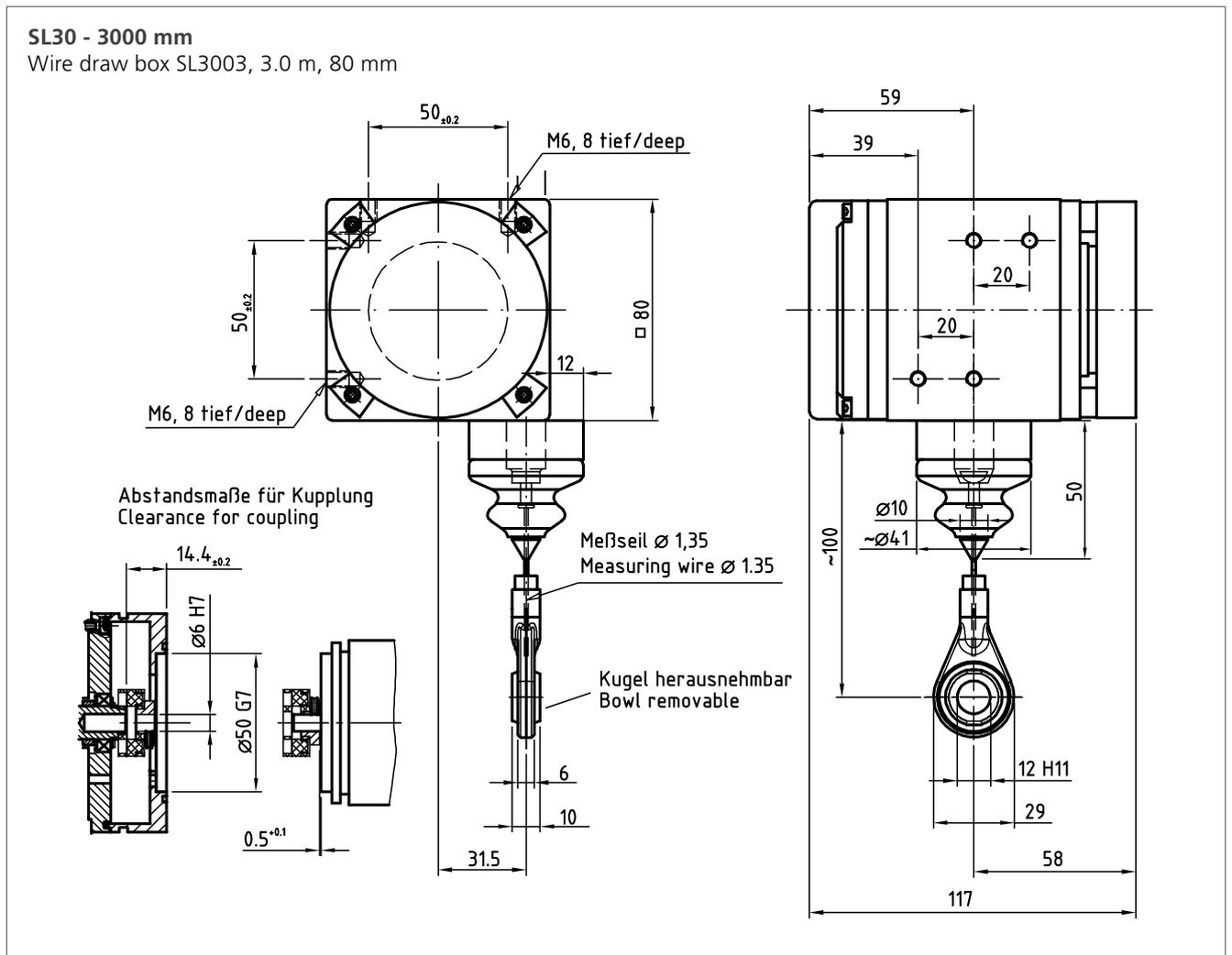
Dimensional Drawings



Dimensional Drawings



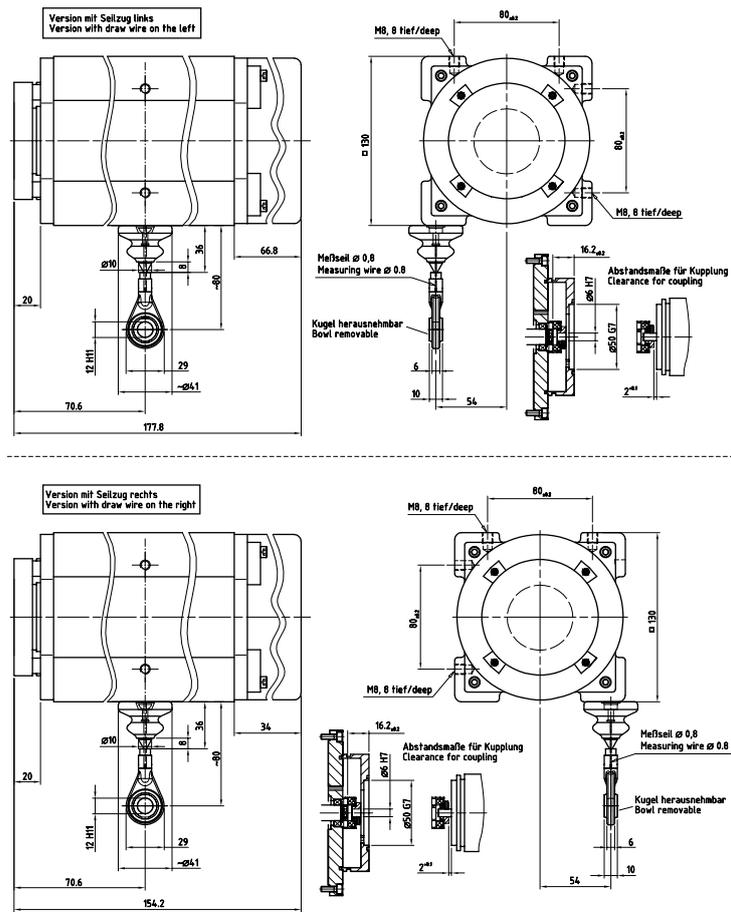
Dimensional Drawings



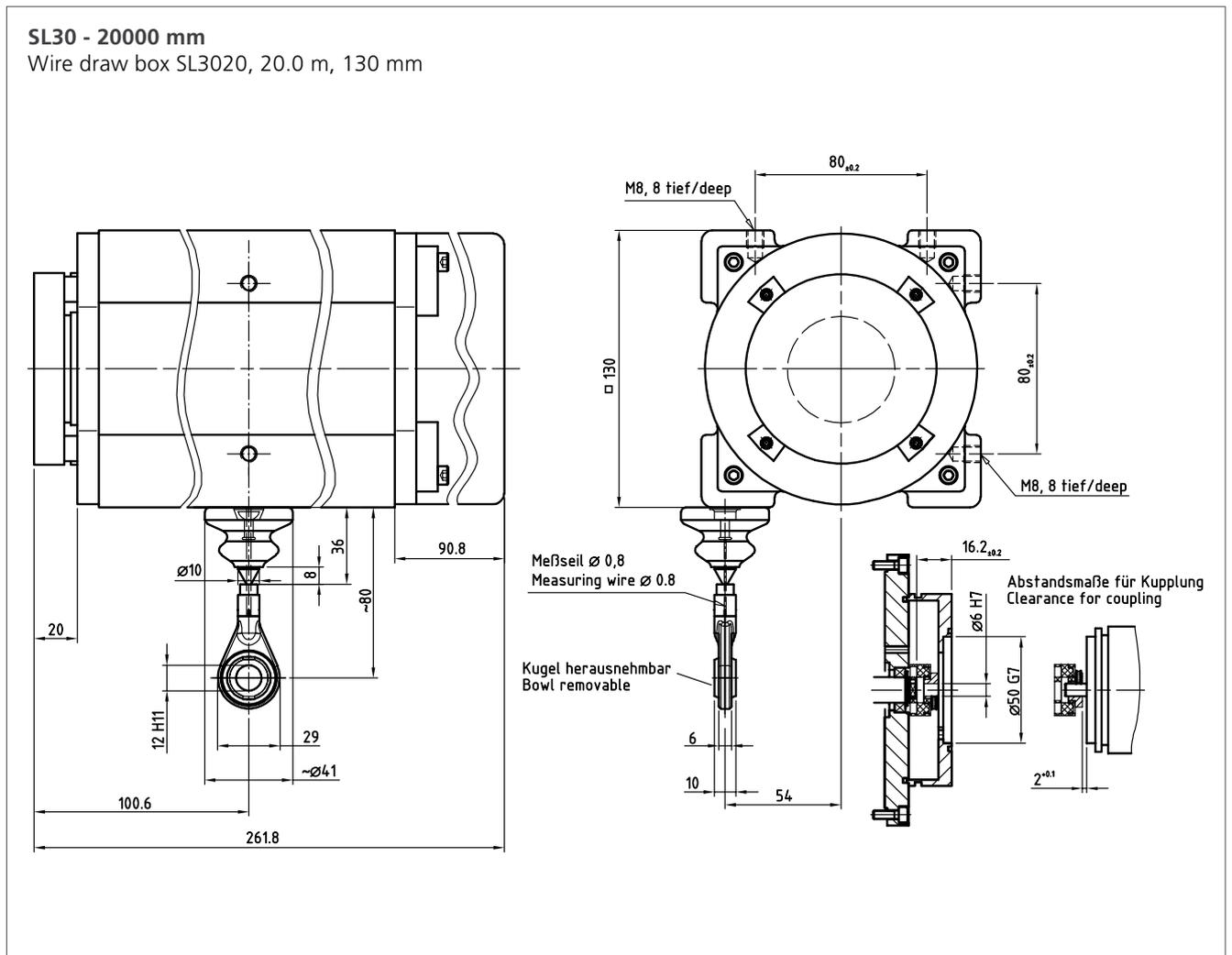
Dimensional Drawings

SL30 - 10000 mm

Wire draw box SL3010, 10.0 m, 130 mm



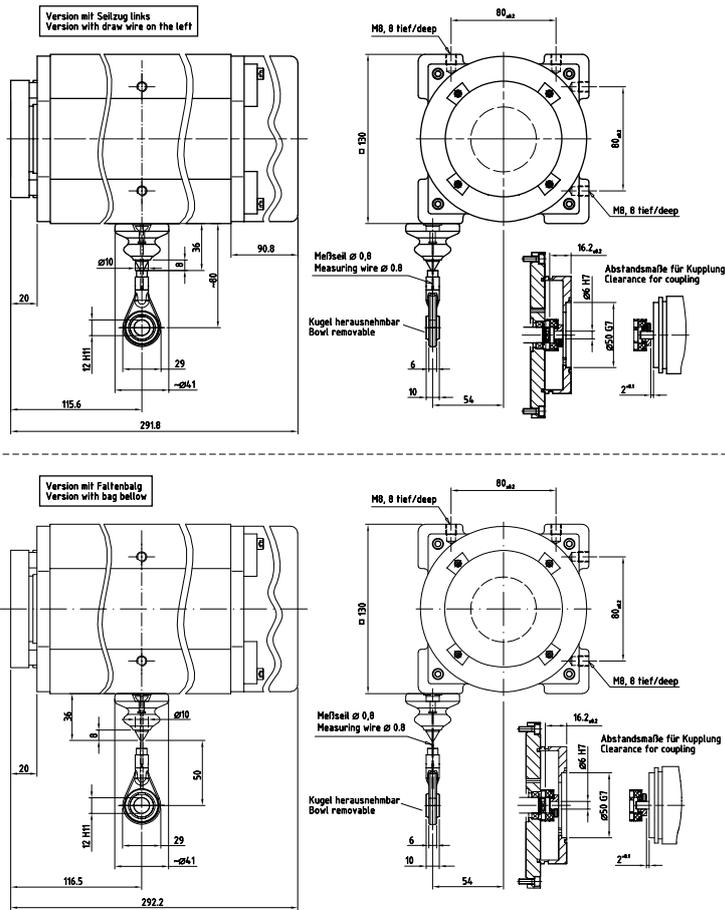
Dimensional Drawings



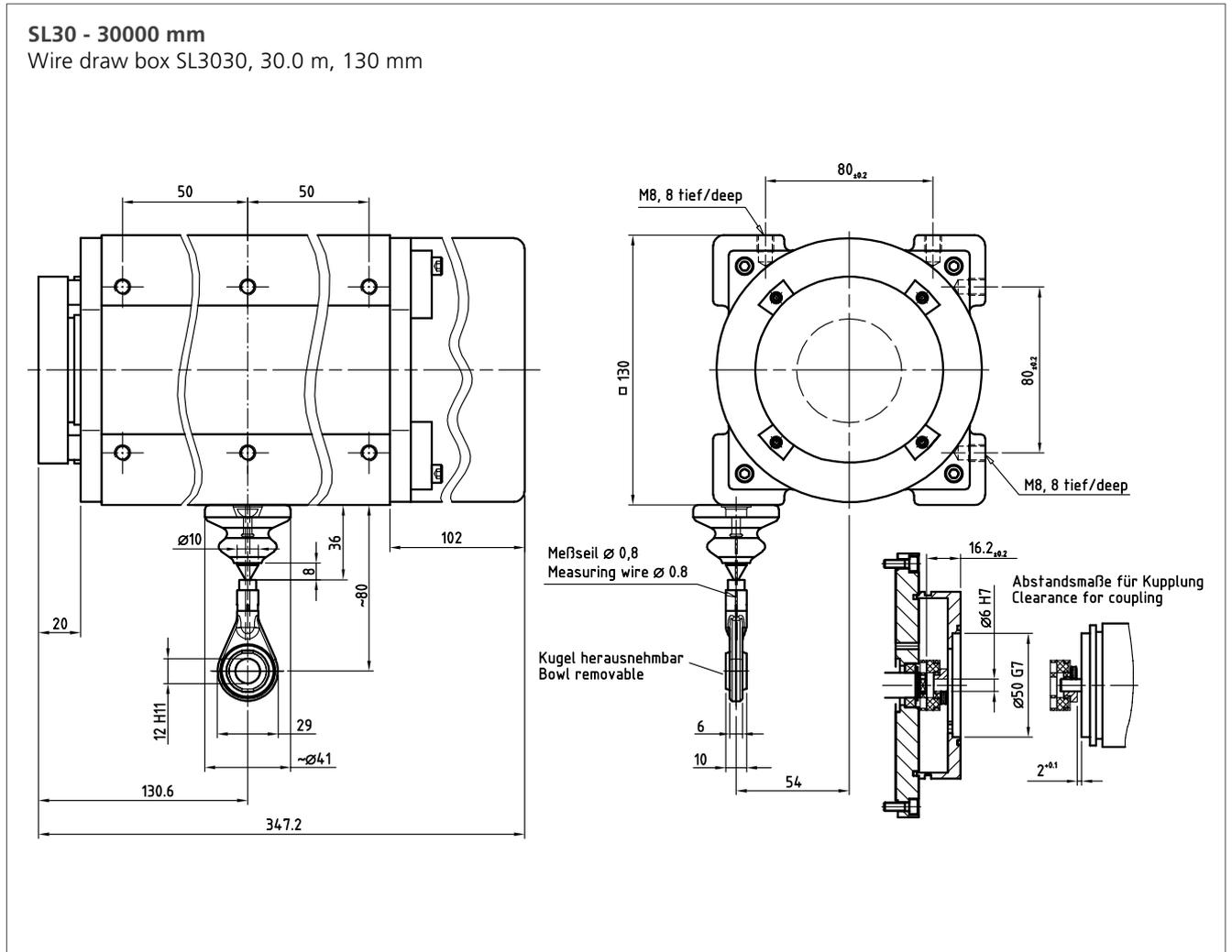
Dimensional Drawings

SL30 - 25000 mm

Wire draw box SL3025, 25.0 m, 130 mm



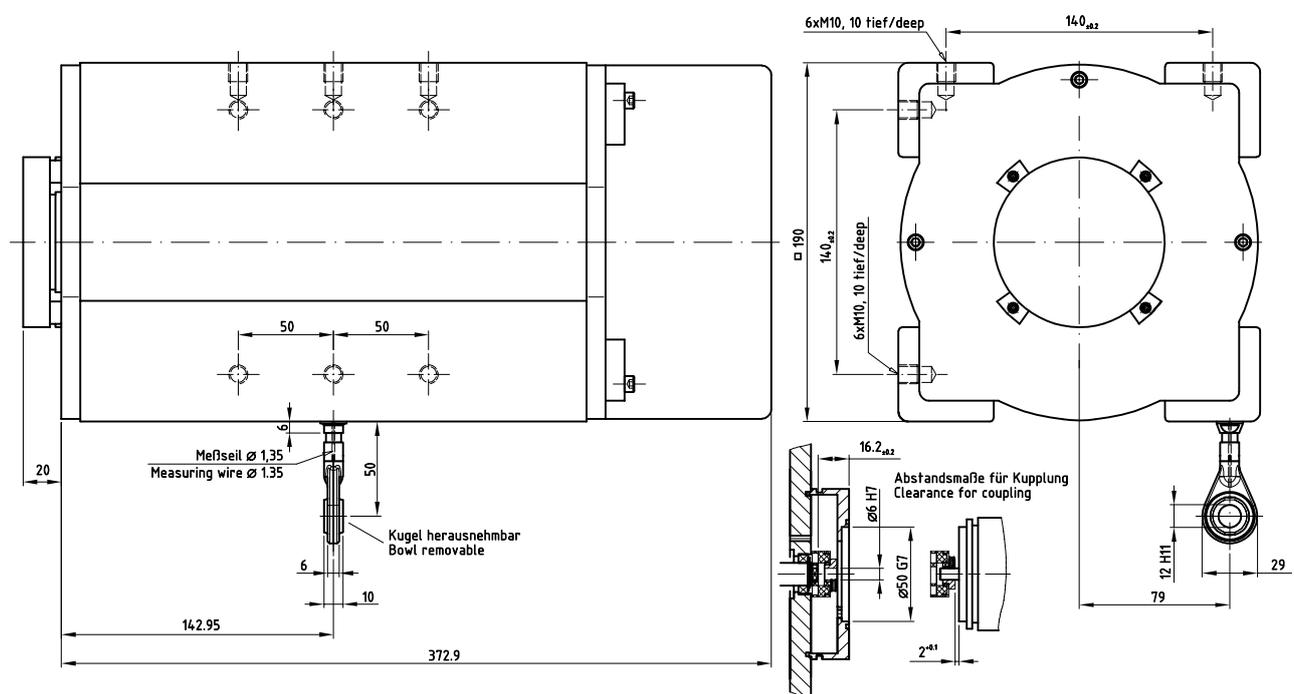
Dimensional Drawings



Dimensional Drawings

SL30 - 40000 mm

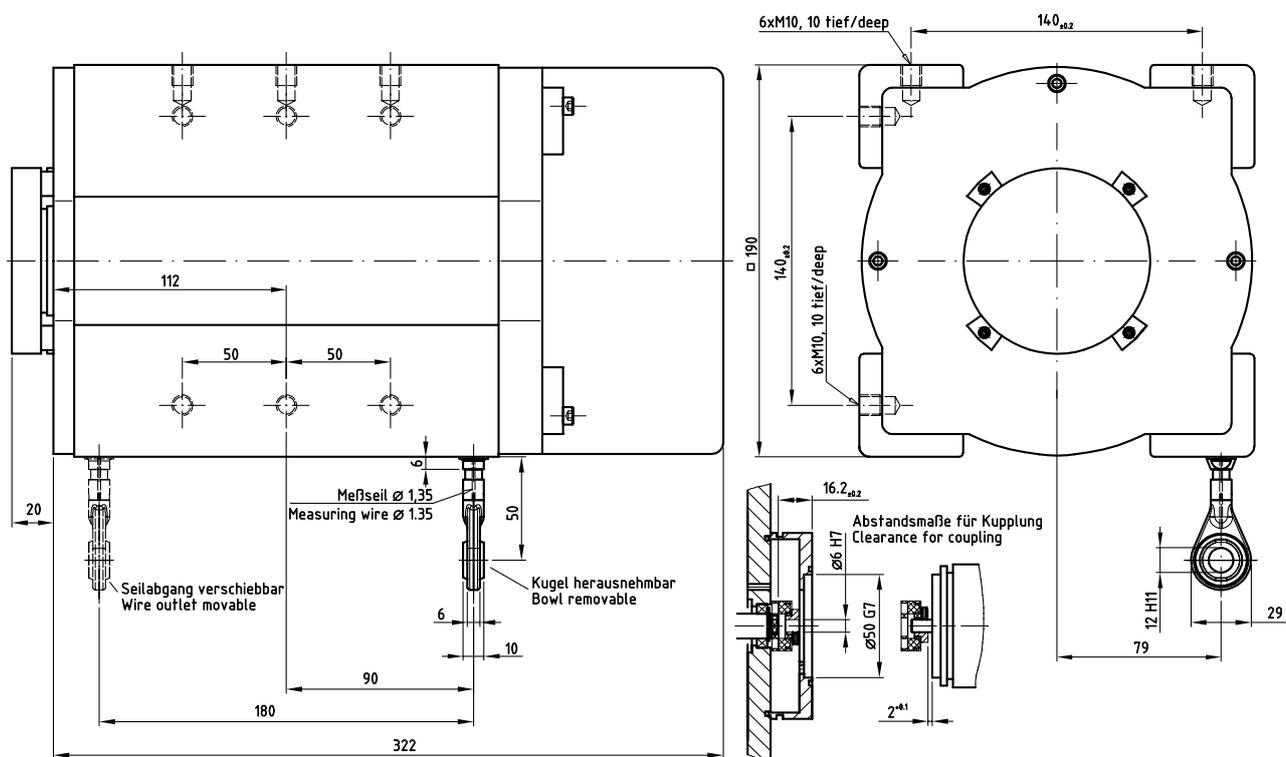
Wire draw box SL3040, 40.0 m, 190 mm



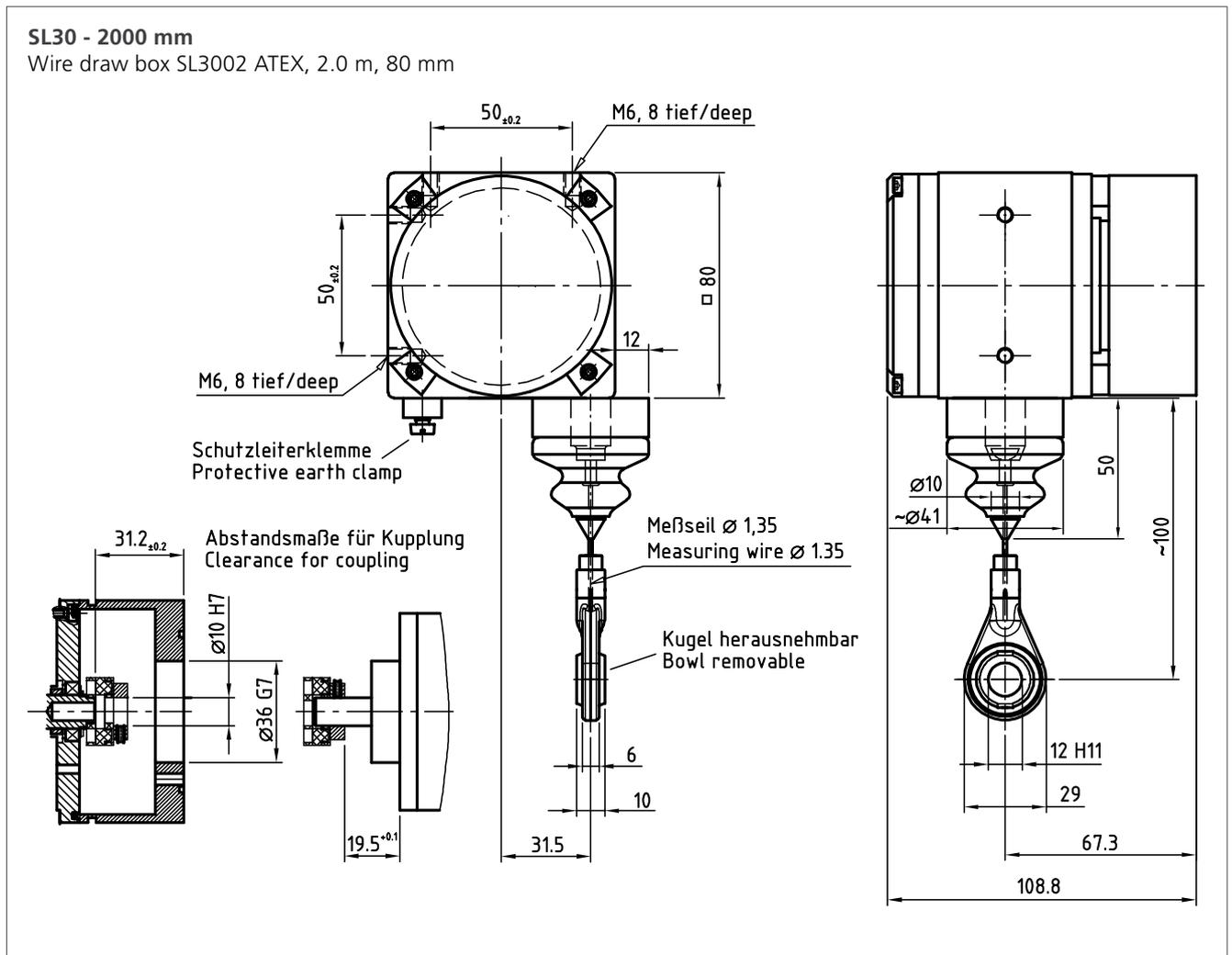
Dimensional Drawings

SL30 - 60000 mm

Wire draw box SL3060, 60.0 m, 190 mm



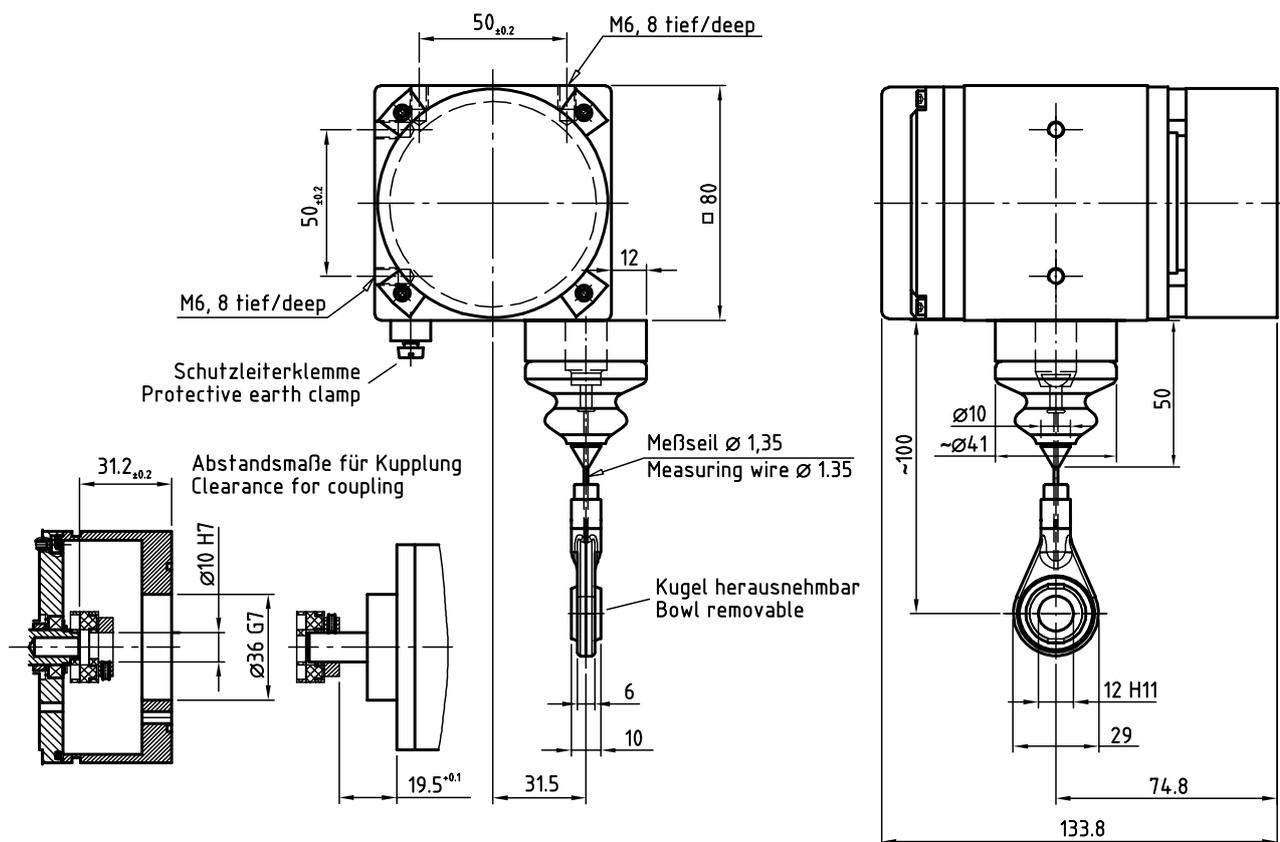
Dimensional Drawings



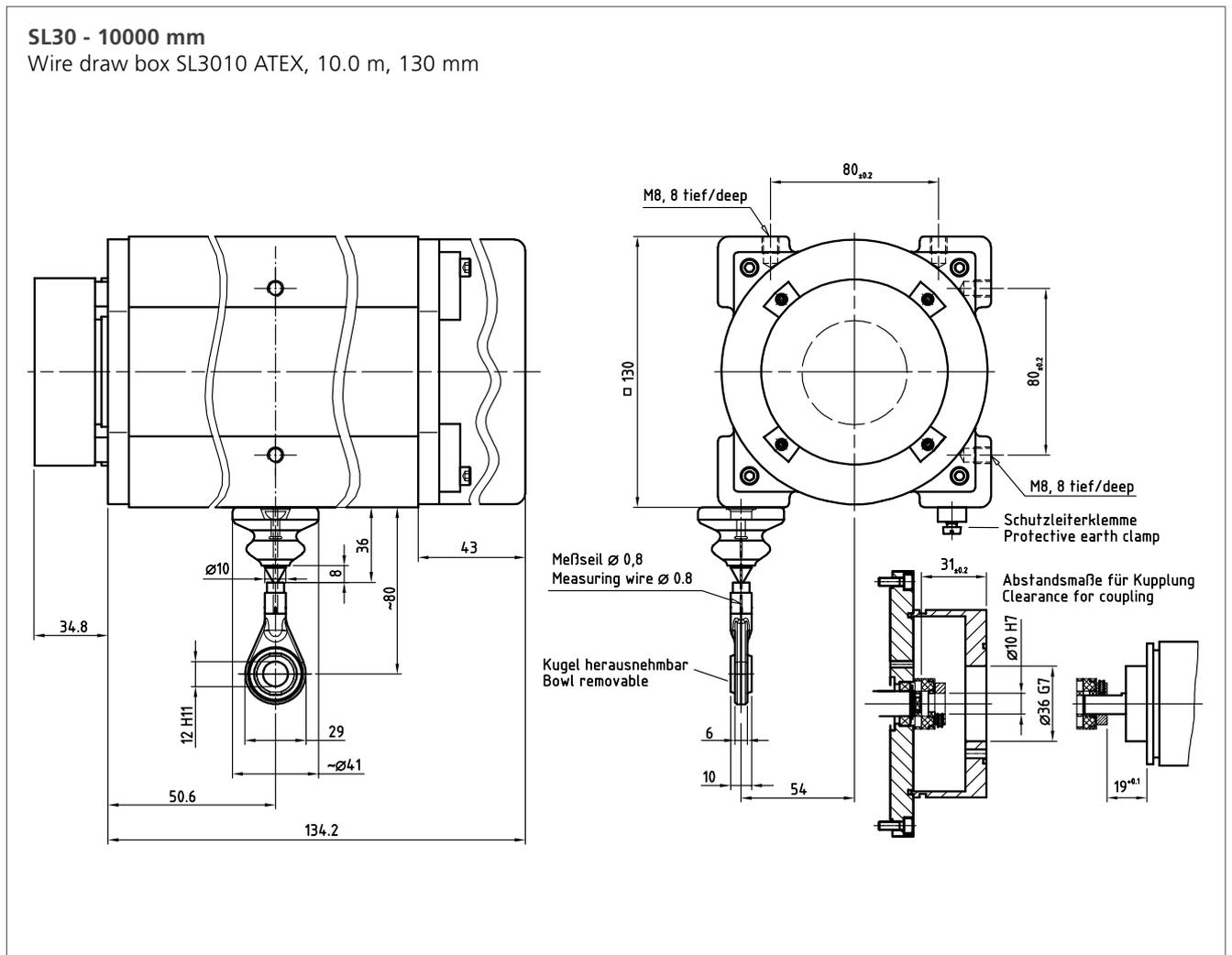
Dimensional Drawings

SL30 - 3000 mm

Wire draw box SL3003 ATEX, 3.0 m, 80 mm



Dimensional Drawings



Dimensional Drawings

Ball joint

Standard for SL30, SL30 ATEX



Alternative rope ends

On request for SL30, SL30ATEX



Wire outlet

With bellow; SL30, SL 30 ATEX



Brush attachment

Option for SL30, SL 30 ATEX



Compressed air attachment

Option for SL30, SL 30 ATEX



Dimensional Drawings

Guide pulley

Option for SL30, SL 30 ATEX



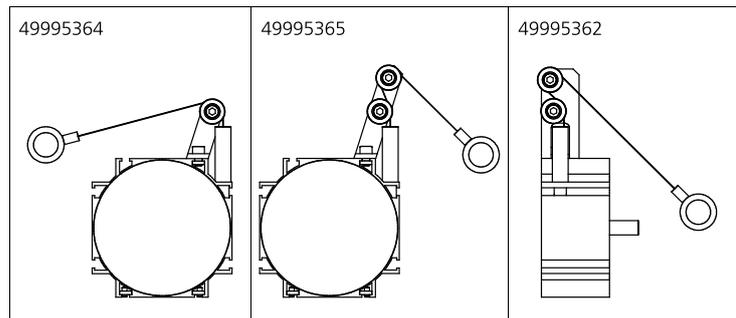
Double guide pulley

Option for SL30, SL 30 ATEX

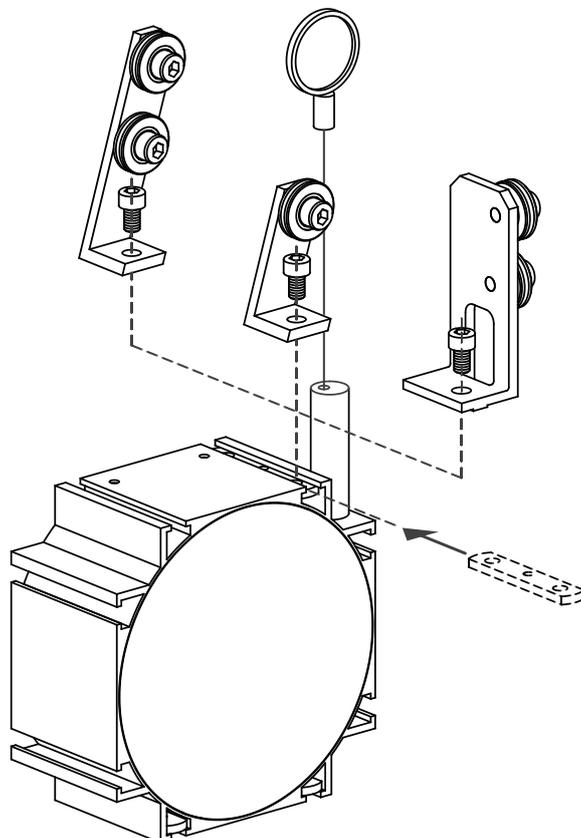


Dimensional Drawings

Guide Pulleys for WDS size 115 „Standard“ For rope diameter 0,45 mm



Guide Pulleys for WDS Assembly



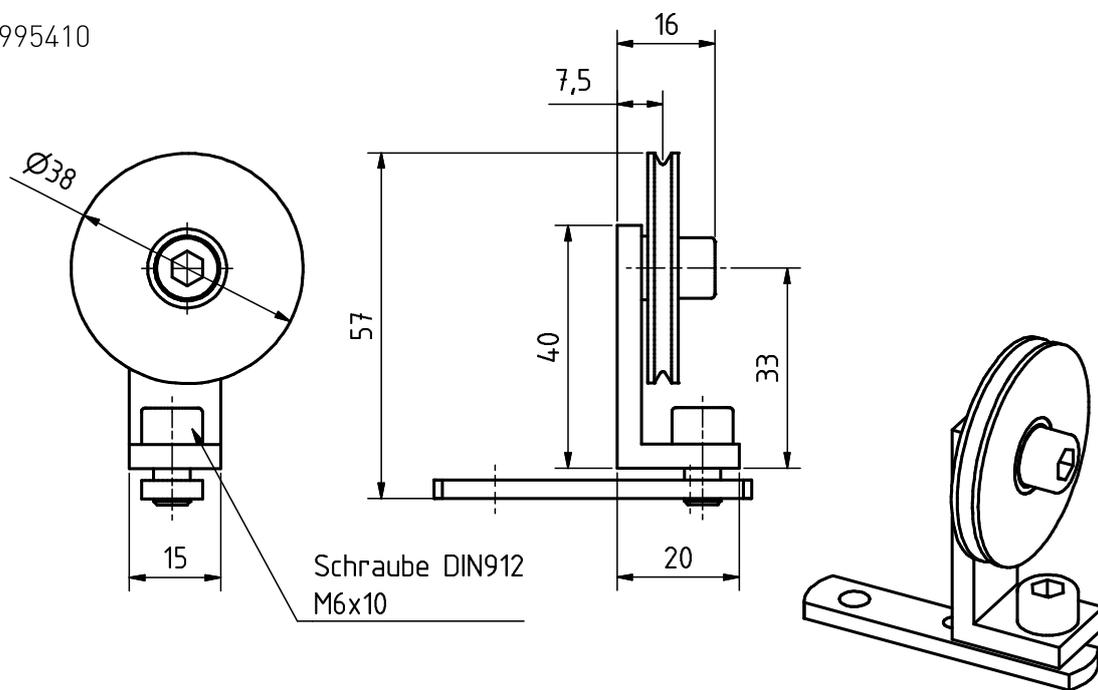
Shown is only wire draw box without encoder

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

Dimensional Drawings

Guide Pulleys for WDS size 115 „Industrial“
 For rope diameter 1 mm

49995410



Linear Encoders

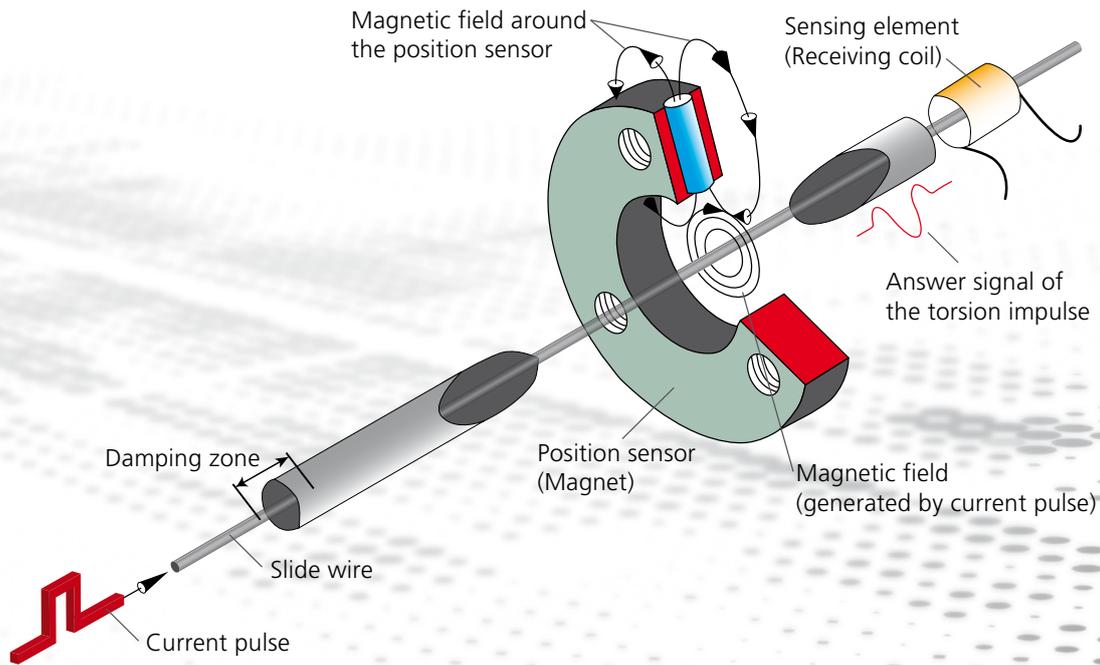




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Magnetostriction



Functional description

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

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

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

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

LMP146



LMR48



LMP30



Contents

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Contact Free up to 20 m - LMC55	320	Plastic Housing.....	346

Linear encoder with magnetostriction - how to find the perfect fit

The right type for your application

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

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

e.g.: **LMRI46**



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

e.g.: **LMP30**



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

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



Power that fulfils your needs

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

Industrial

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



Standard

- _ Resolution 0,01 mm
 - _ Stroke up to 3.000 mm
 - _ Direct interfaces (SSI, Analog), CAN
- e.g.: **LMRS34**



Basic

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



Three Measuring Systems in One – LMR70



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

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

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

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

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

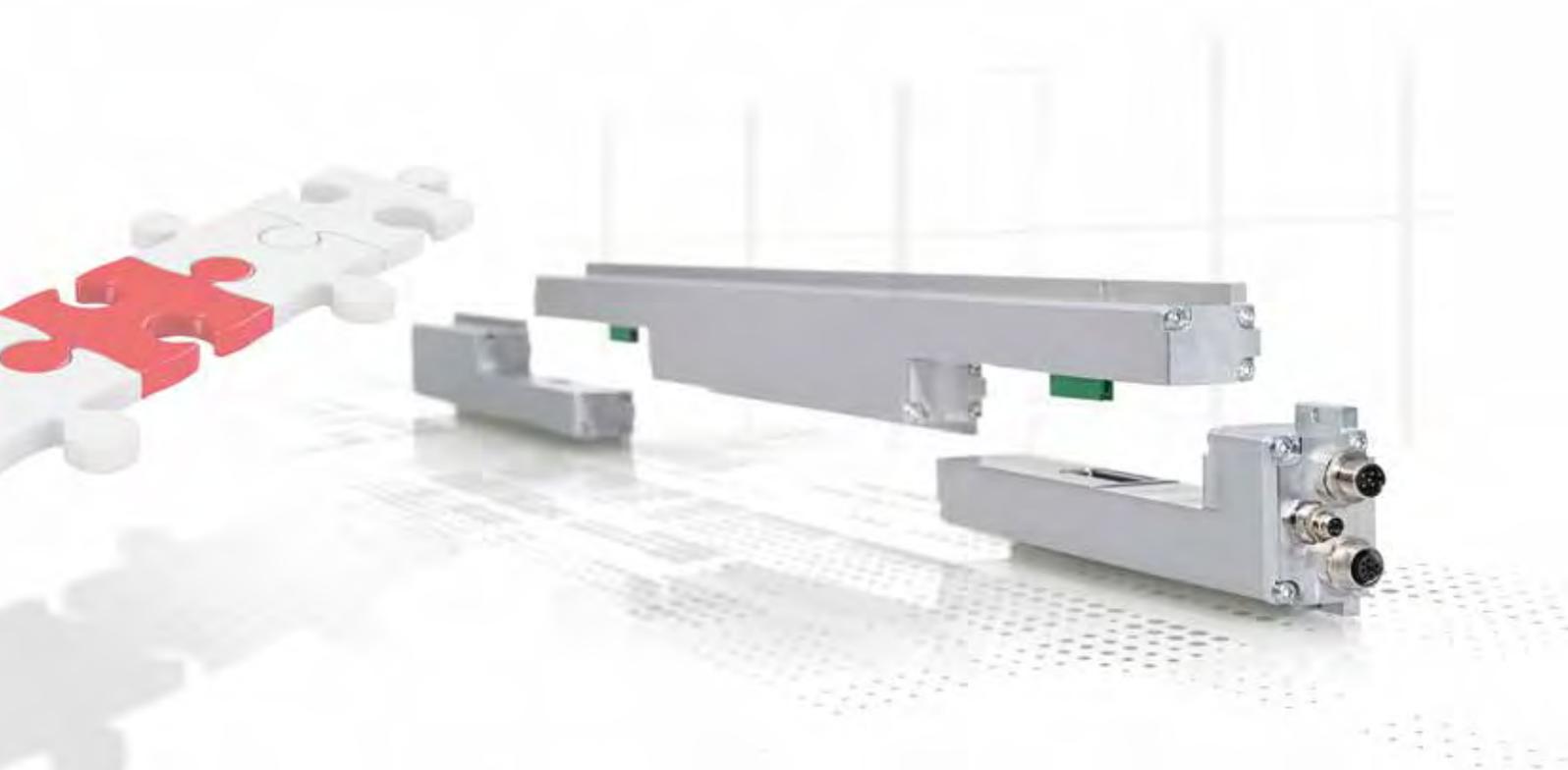
Each user decides for himself whether to operate the measuring systems on their own or to increase reliability with triangulation or a "2 from 3" evaluation.

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

The LMR 70 measuring systems measure up to 2 m.

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

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



Measure reliably over long distances

Wire-actuated encoders are subject to wear, and laser measuring systems cannot acquire several positions simultaneously in the same clear width. Magnetic tapes are susceptible to ferromagnetic chips, position marks read optically with readers can become soiled, magnetostrictive measuring systems are limited in their measuring length, and glass scales are unaffordable with increasing measurement lengths.

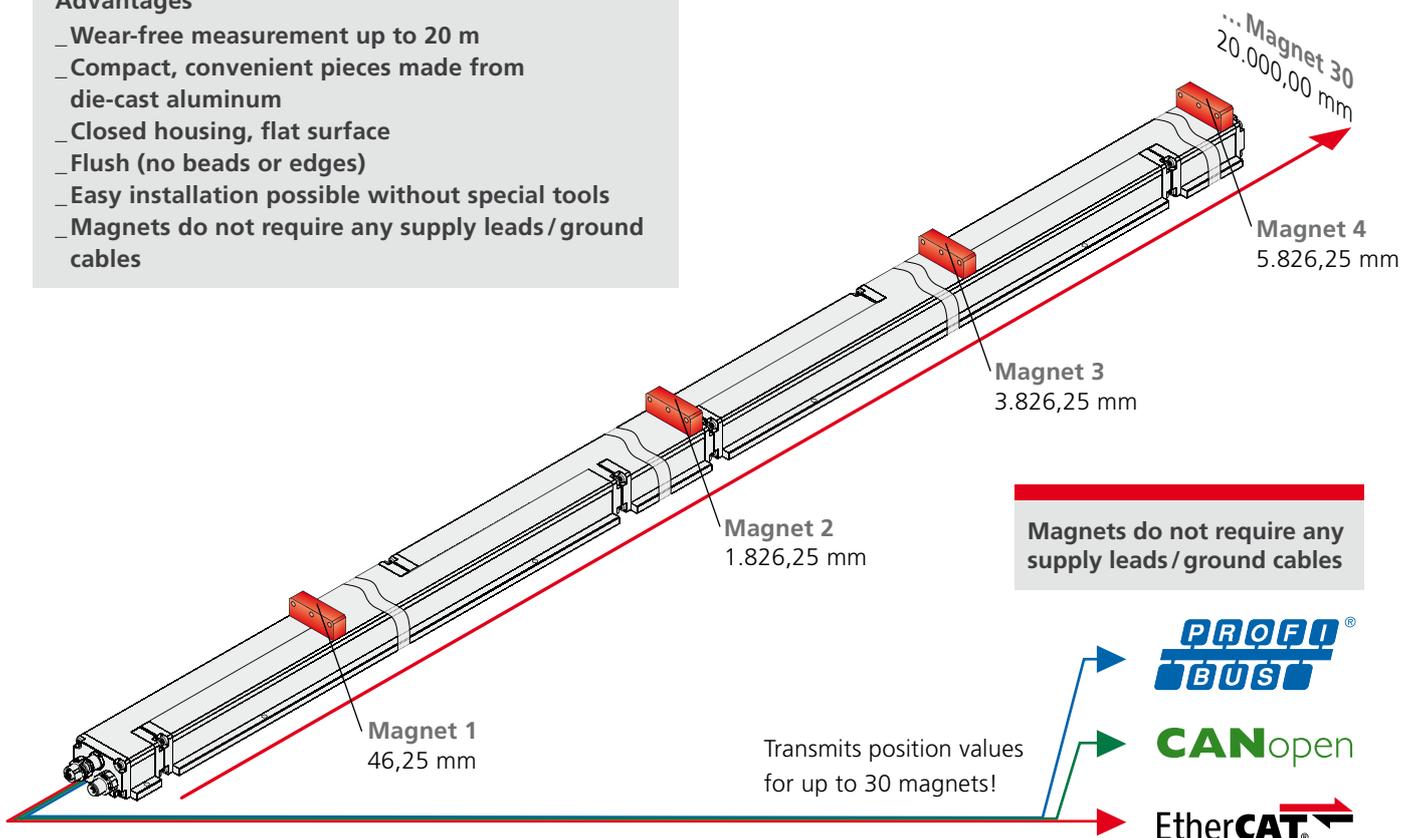
With LMC55 we have closed this gap: up to 30 positions are acquired simultaneously. The moving part is a passive magnet, which does not require power supply. The measuring system is only assembled to the full measuring length in

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

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

Advantages

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



Magnets do not require any supply leads / ground cables

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

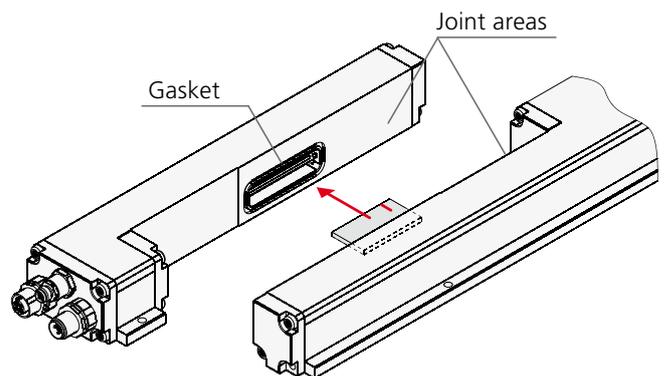
The type 2 end component forms the end element in conjunction with a type 1 slave.

Correct configuration before measurement

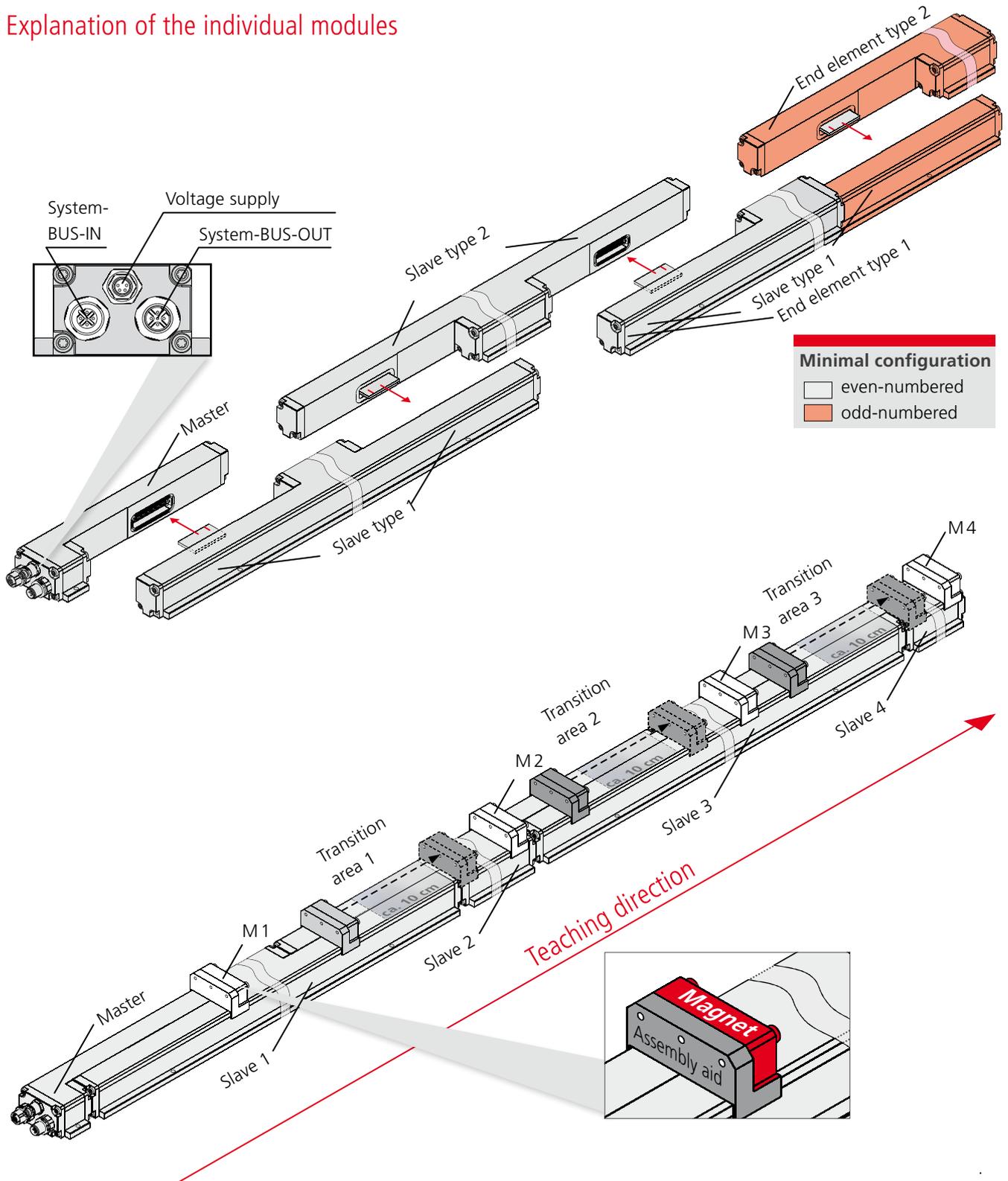
Before the measuring system can be operated, e.g. on PROFIBUS, the mechanically installed individual components, the so-called slaves, must first be detected using the teach-in function.

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



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.

Contents

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LMRI46

LMRS34

LMRB48

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

*depends on interface

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

LMRB48/46
LMRB27
LMRB27

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

* depends on interface

LMR70

	<p>LMR70</p> 
	(R) Tube
	50...2000 mm
	70 (triple redundant)
	24 VDC, -20...+20 %
	12 bit or 16 bit
	$\pm 0,10 \text{ mm} \leq 1500 \text{ mm}$ $\pm 0,15 \text{ mm} > 1500 \text{ mm}$
	0,04mm
	$0,02 \text{ mm} \leq 1500 \text{ mm}$ $0,1 \text{ mm} > 1500 \text{ mm}$
	-40...+85 °C
	IP65
	Tube tip support
	Any desired
	Cr/Ni-Alloy
	600 bar, static
	<p>Analog</p>
	www.tr-electronic.com/s/S008380
	

Suggested Products

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

LMRI46 Analog					
339-00009	LMRI_46*250 ANA_U+JUSTAGE	Voltage, 16 bit, cable gland, 2 m, open end	250,00 mm	340,00 mm	16 BIT;
339-00057	LMRI_46*480 ANA_I+JUSTAGE	Current, 16 bit, cable gland, 2 m, open end	480,00 mm	570,00 mm	16 BIT;
339-00062	LMRI_46*200 ANA_I+JUSTAGE	Current, 16 bit, 8pin	200,00 mm	290,00 mm	16 BIT;
339-00217	LMRI_46*200 ANA_I+JUSTAGE	Current, 16 bit, 8pin	200,00 mm	290,00 mm	16 BIT;

LMRI46 EtherCAT					
339-00041	LMRI_46*200 ETC	R 0,005 MM 2x4pinM12 1x4pinM8, 2 magnets	200,00 mm	290,00 mm	0,005 mm

LMRI46 PROFIBUS					
339-00030	LMRI_46*1050 PB	R 0,001 MM 2x4pinM12 1x4pinM8	1050,00 mm	1140,00 mm	0,001 mm
339-00061	LMRI_46*200 PB	R 0,001 MM 2x4pinM12 1x4pinM8	200,00 mm	290,00 mm	0,001 mm
339-00063	LMRI_46*600 PB	R 0,001 MM 2x4pinM12 1x4pinM8	600,00 mm	690,00 mm	0,001 mm

LMRI46 PROFINET					
339-00008	LMRI_46H*550 EPN	R 0,005 MM 2x4pinM12 1x4pinM8	550,00 mm	640,00 mm	0,005 mm
339-00034	LMRI_46*200 EPN	R 0,005 MM 2x4pinM12 1x4pinM8	200,00 mm	290,00 mm	0,005 mm
339-00064	LMRI_46*300 EPN	R 0,005 MM 2x4pinM12 1x4pinM8	300,00 mm	390,00 mm	0,005 mm

LMRI46 SSI					
339-00002	LMRI_46H*605 SSI	R 0,001 mm, cable gland, 5 m, open end	605,00 mm	695,00 mm	0,001 mm
339-00013	LMRI_46*204 SSI	R 0,005 mm, M23, 12 pin	204,00 mm	294,00 mm	0,005 mm
339-00026	LMRI_46*1055 SSI	R 0,001 mm, cable gland, 3m, open End	1055,00 mm	1150,00 mm	0,001 mm
339-00055	LMRI_46*755 SSI	R 0,002 mm, cable gland, 7 m, open end	755,00 mm	845,00 mm	0,002 mm
339-00068	LMRI_46*495 SSI	R 0,001 mm, cable gland, 5m, open End	495,00 mm	585,00 mm	0,001 mm

LMR70 Analogue					
335-00001	LMR_70*180 ANA_I+JUSTAGE		180,00 mm	264,00 mm	16 BIT;

LMRB27 Profibus					
341-00003	LMRB_27*300 PB	Cable sensor - connection terminal 2 m	300,00 mm	393,00 mm	0,1 mm

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

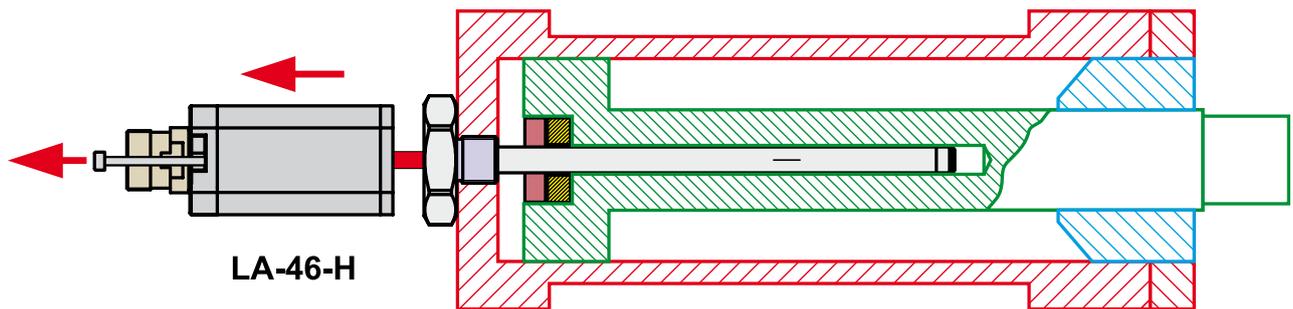
We will help you to select the most suitable products from the complete TR range. Please contact us (info@tr-electronic.de).



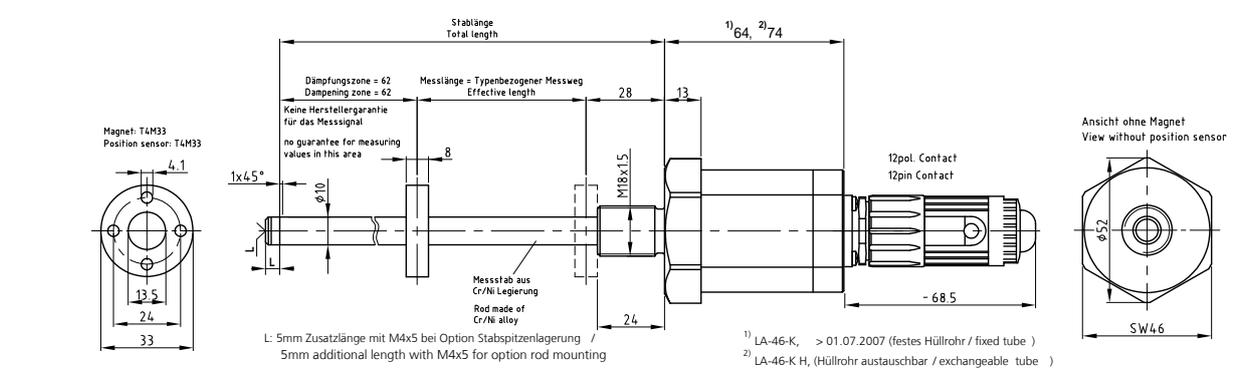
Dimensional Drawings

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

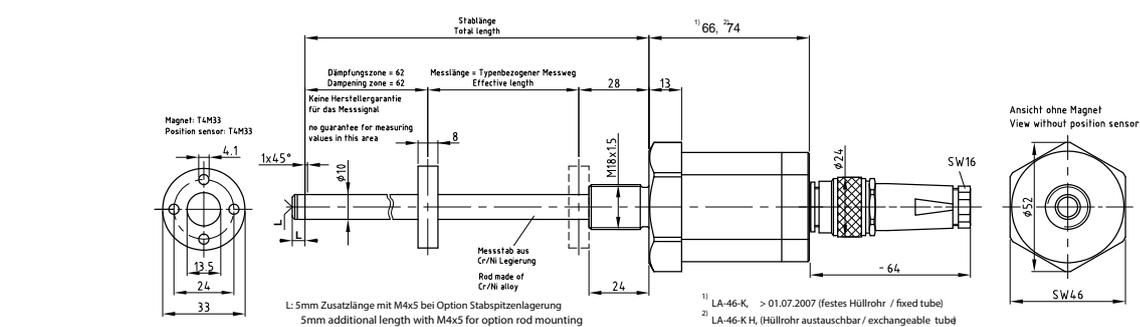
Tube resides in cylinder, oil stays pressurized. Change in length, see following drawings



LA, LMRI 46 SSI

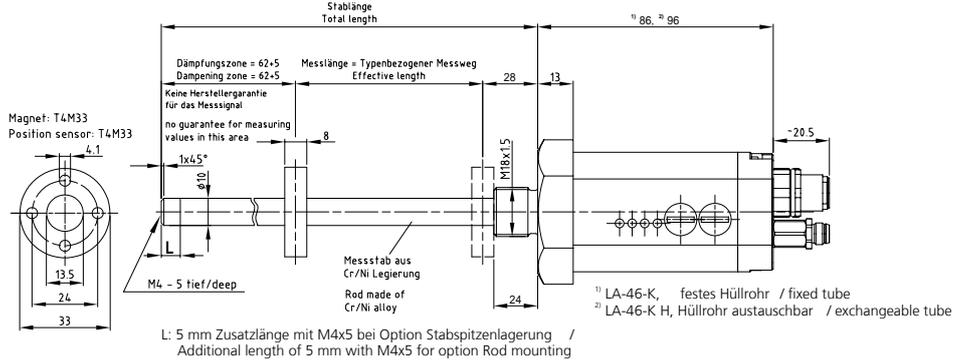


LA, LMRI 46 Analog

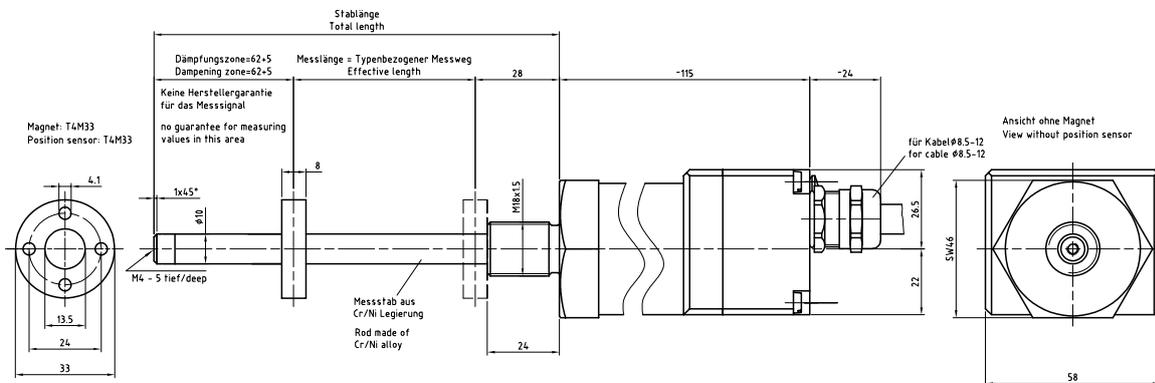


Dimensional Drawings

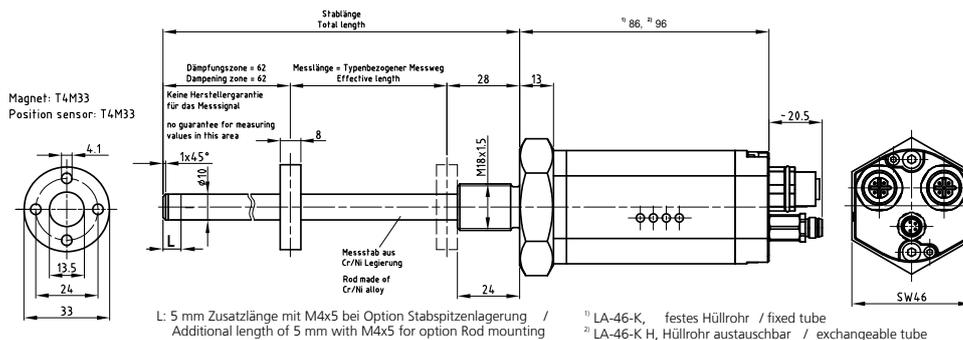
LA, LMRI 46 Profibus, CANopen PB, CO



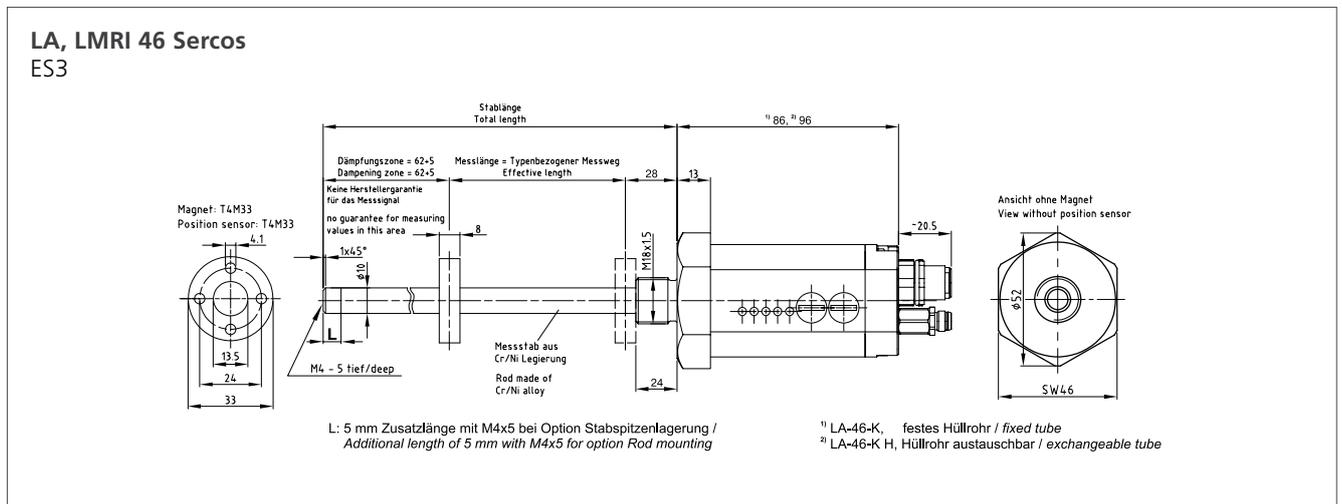
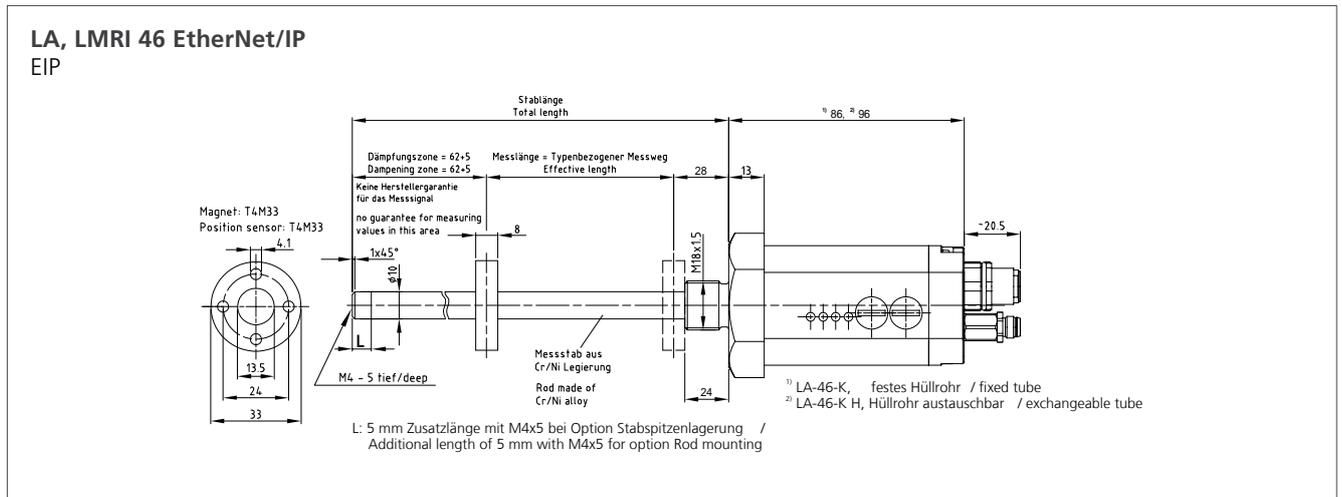
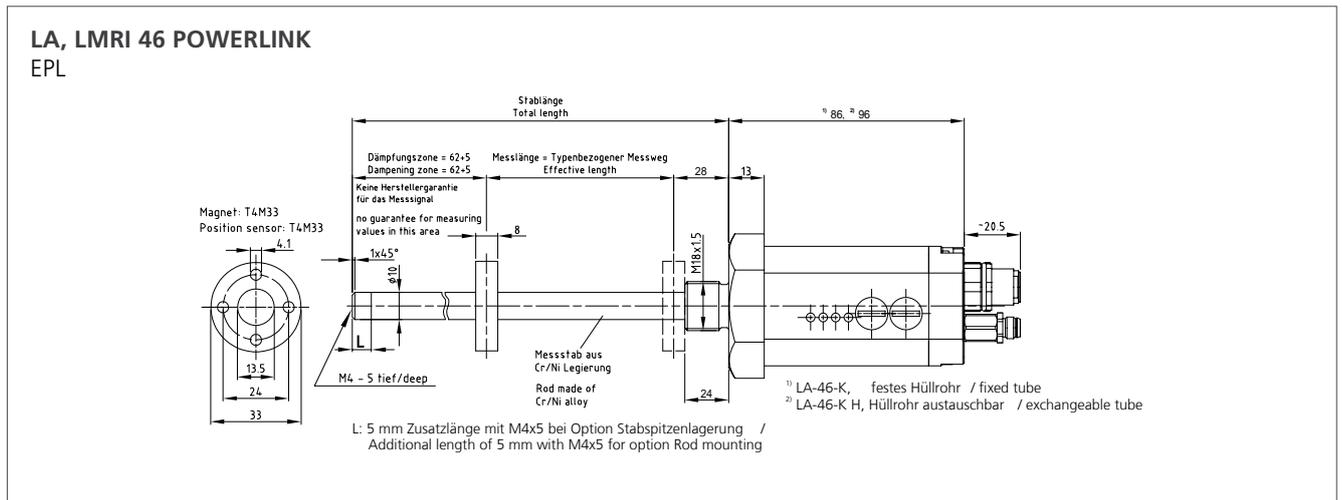
LA, LMRI 46 CAN DeviceNet DN



LA, LMRI 46 EtherCAT, PROFINET IO ETC, EPN

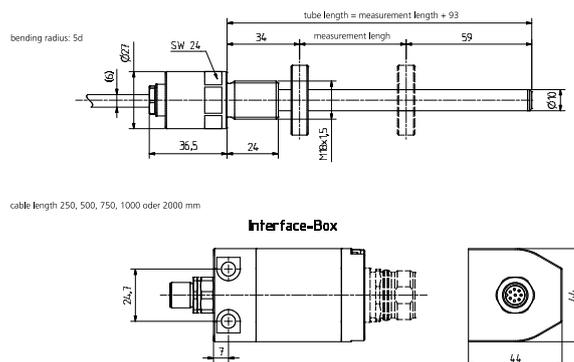


Dimensional Drawings

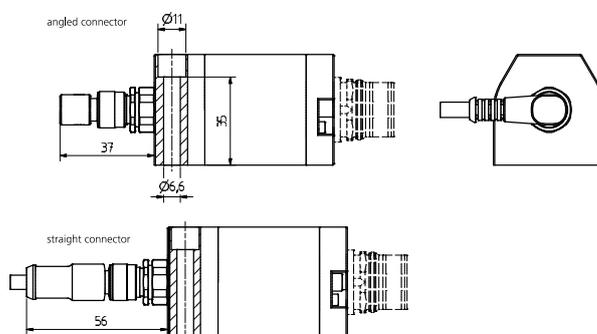


Dimensional Drawings

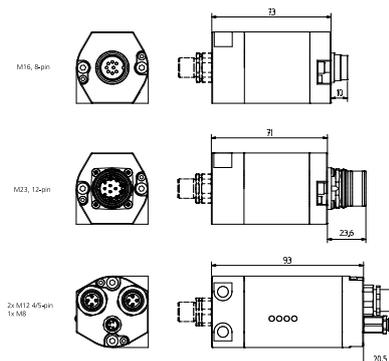
LMRB27 Sensorhead



LMRB27 Interface Box

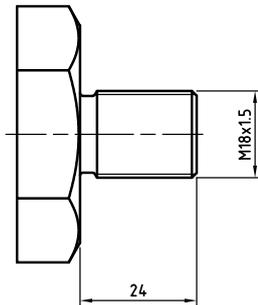


LMRB27 Connections

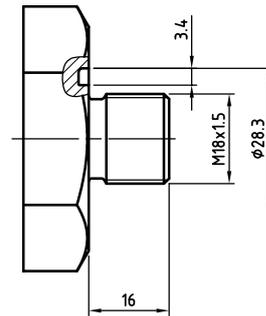


Dimensional Drawings

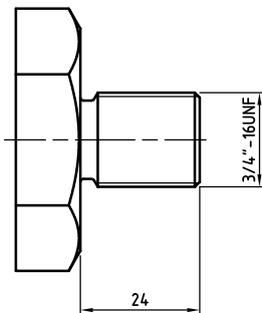
LA, LMRI 46 Flange type M18 x 1,5
O-Ring gasket in thread undercut



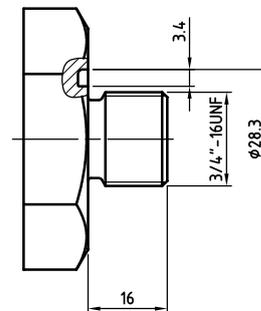
LA, LMRI 46 flange type M18 x 1,5 with groove (LA46/42)
O-Ring gasket in addl. groove



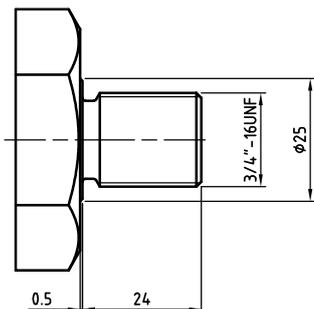
LA, LMRI 46 flange type 3/4" - 16UNF
O-Ring gasket in thread undercut



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

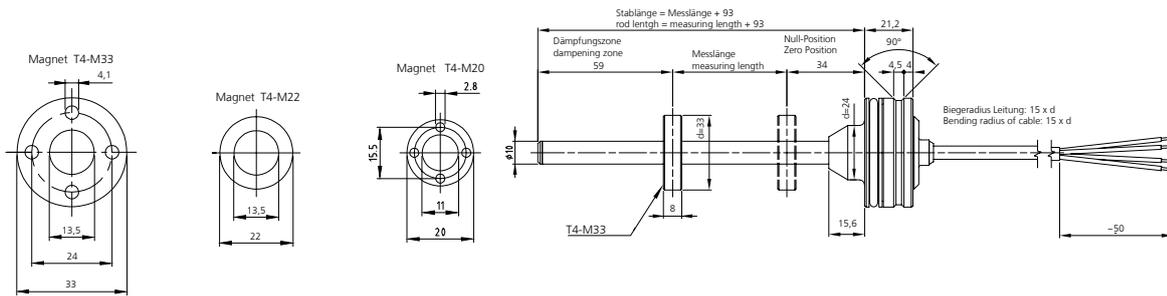


LA, LMRI 46 flange type 3/4" - 16UNF with chamfer
Chamfer on flange

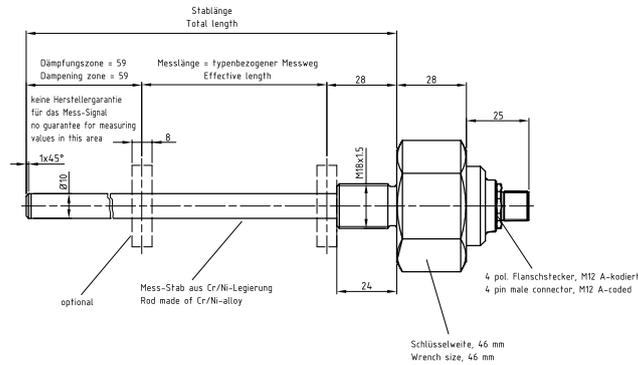


Dimensional Drawings

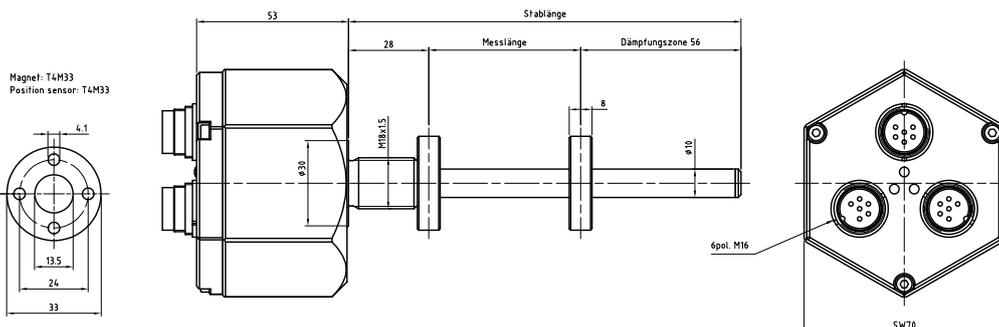
LMR 48 SSI, Analog, CAN SSI, ANA, CAN



LMR 48/46 Analog ANA



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



Linear Encoder - Magnetostriction - Profile Housing



The universal standard for absolute position detection.

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

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LMPI46

LMP30

LMPB48

Product	LMPI46	LMP30	LMPB48
			
Mechanic type	(P) Profile	(P) Profile	(P) Profile
Range	50...4000 mm*, in steps	50...4000 mm*, in steps	30...3000 mm*, in steps
Size	46	30	48
Supply voltage	24 VDC, -20...+10 %*	24 VDC, -20...+10 %*	24 VDC +- 20%; 9...36 VDC *
Resolution	0,001 mm	0,01mm *	0,05 mm
Linearity defect	typical $\pm 15 \mu\text{m}$ $\pm 30 \mu\text{m} < 1000 \text{ mm}$ $\pm 0,1 \text{ mm } 1000 \text{ mm}-1500 \text{ mm}$ $\pm 0,15 \text{ mm } > 1500 \text{ mm}$	$\pm 0,15 \text{ mm } \leq 1500 \text{ mm}$ $\pm 0,20 \text{ mm } > 1500 \text{ mm}$	$< 0,01 \% \text{ FS}, \geq 60 \mu\text{m}$ $\pm 0,1 \% \text{ FS} *$
Reproducibility	0,005 mm	0,005 mm *	$< 0,005 \% \text{ FS } \geq 50 \mu\text{m}$ $\pm 0,1 \% \text{ FS} *$
Hysteresis	typical $< 6 \mu\text{m}$ $< 15 \mu\text{m} < 1000 \text{ mm}$ $0,1 \text{ mm } 1000 \text{ mm}-1500 \text{ mm}$ $0,15 \text{ mm } > 1500 \text{ mm}$	$0,02 \text{ mm } \leq 1500 \text{ mm}$ $0,1 \text{ mm } > 1500 \text{ mm}$	$\pm 0,1 \% \text{ FS} *$
Temperature coefficient	$< 8 \mu\text{m}/^\circ\text{C} \leq 500 \text{ mm}$ $< 15 \text{ ppm}/^\circ\text{C} > 500 \text{ mm} *$	$< 8 \mu\text{m}/^\circ\text{C} \leq 500 \text{ mm}$ $< 15 \text{ ppm}/^\circ\text{C} > 500 \text{ mm} *$	100 ppm/ $^\circ\text{C}$
Ambient temperature	-20...+70 $^\circ\text{C}$; 0...+70 $^\circ\text{C}$	-20...+70 $^\circ\text{C}$; 0...+70 $^\circ\text{C}$	-40...+75 $^\circ\text{C}$; -20...+75 $^\circ\text{C}$
Protection class	IP65	IP65	IP67
Options	Multimagnet*, ATEX-zone 2/22,	Multimagnet*	
Orientation	Any desired	Any desired	Any desired
Material	Aluminum extruded profile	Aluminum extruded profile	Aluminum extruded profile
Interface	SSI  Analog    CANopen   	SSI  Analog  ISI    CANopen	SSI  Analog
Weblink	www.tr-electronic.com/s/5011362	www.tr-electronic.com/s/5008395	www.tr-electronic.com/s/5008396
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 LMP30 SSI

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

Linear encoder profile housing Analogue LMP30 A

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

Linear encoder profile housing Profibus LMP30 PB

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

Linear encoder profile housing Profinet LMP30 PN

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

Linear encoder profile housing Powerlink LMP30 ETC

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

Linear encoder profile housing EtherCAT LMP30 ETC

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

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

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

* depends on interface

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

Linear encoder profile housing Powerlink LMP30 ETC

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

322-00560	LMP_30*300 EPN	2x M12, 1 x M8	300,00 mm	421,00 mm	0,005 mm
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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 LMPBB48 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 SSI LMPB48 SSI

333-00023	LMP_48*1000 SSI	1xM12, 8pin	1.000,00 mm	1.089,00 mm	0,01 mm
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Linear encoder profile housing Analogue LMPB48 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

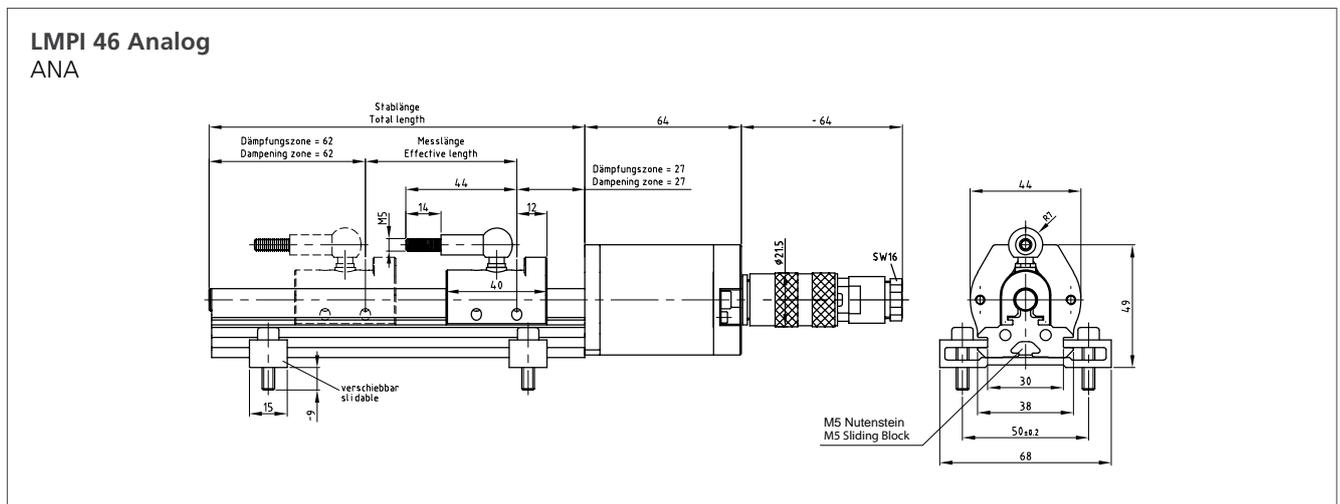
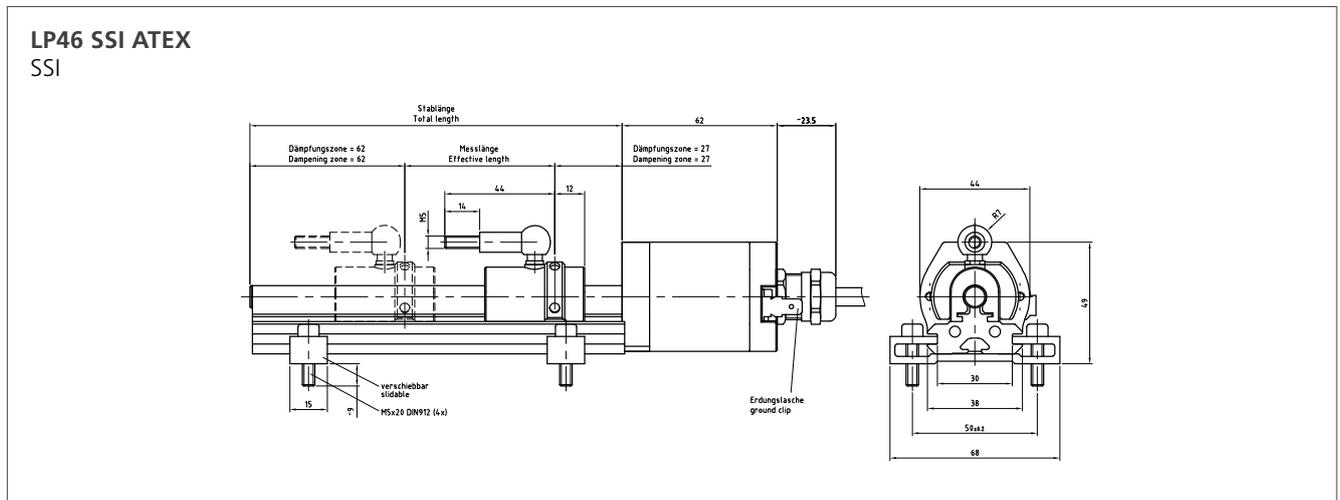
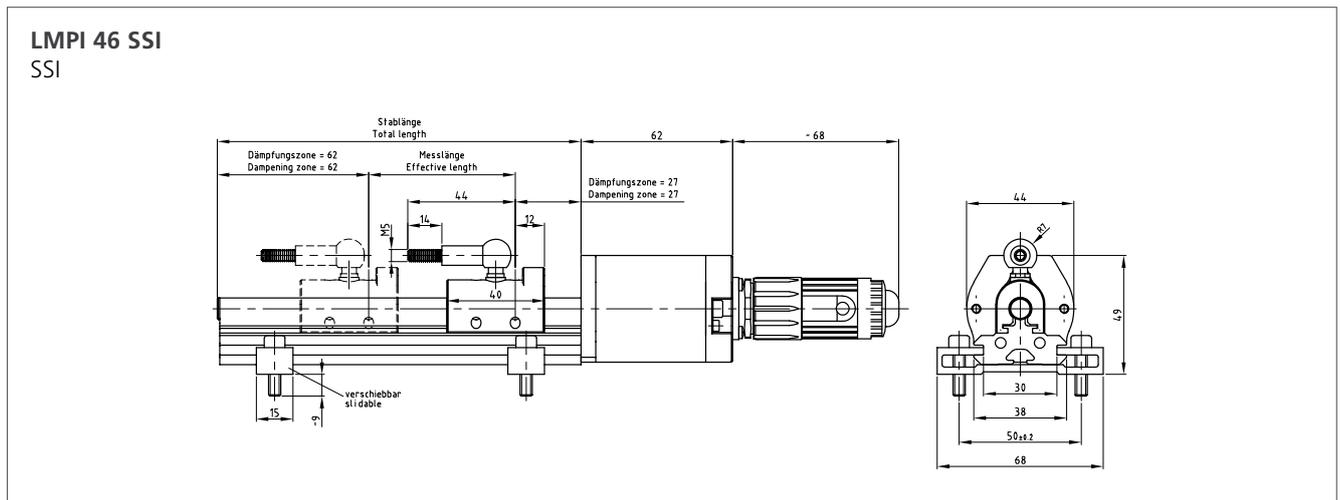
Linear encoder profile housing CAN LMPB48 CAN

333-00001	LMP_48*750 CAN OPEN	1x M12, 5 pin	750,00 mm	839,00 mm	0,05 mm
333-00017	LMP_48*300 CAN OPEN	1x M12, 5 pin	300,00 mm	389,00 mm	0,05 mm

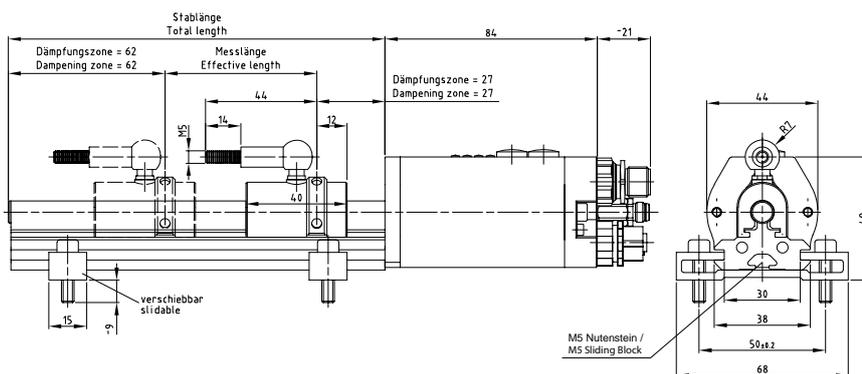
For further product information simply enter the order number in the search field at www.tr-electronic.com.

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

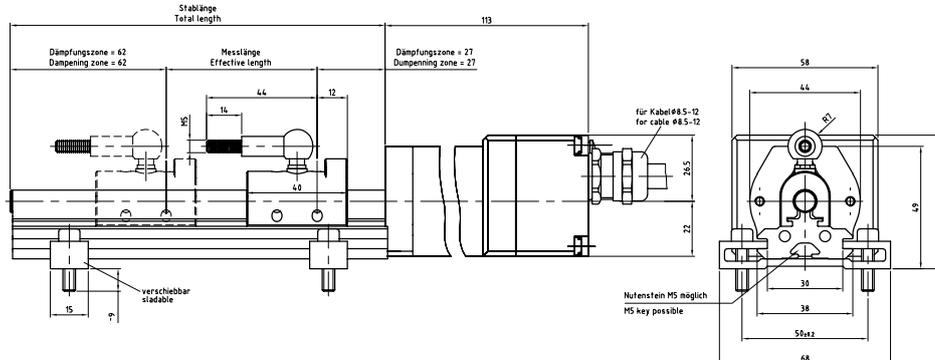
Dimensional Drawings



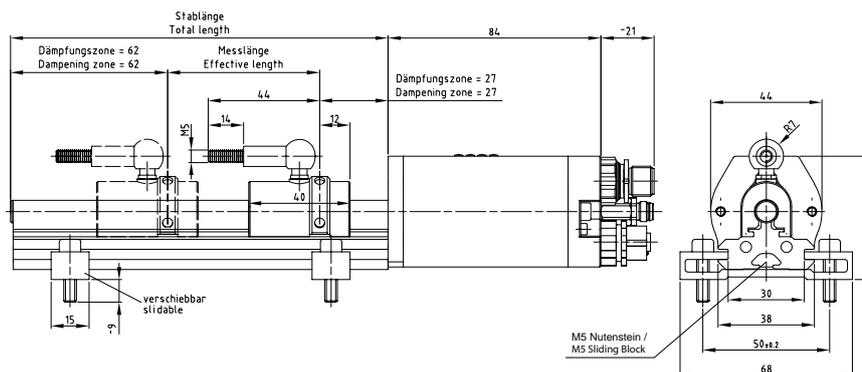
LMPI 46 Profibus, CANopen PB, CO



LMPI 46 CAN DeviceNet DN

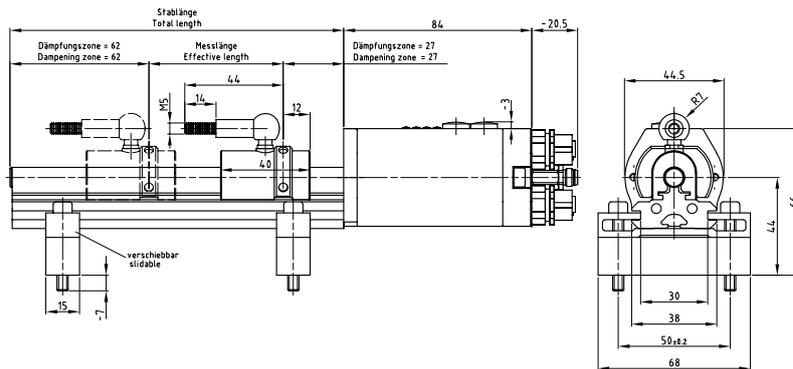


LMPI 46 EtherCAT, PROFINET IO ETC, EPN

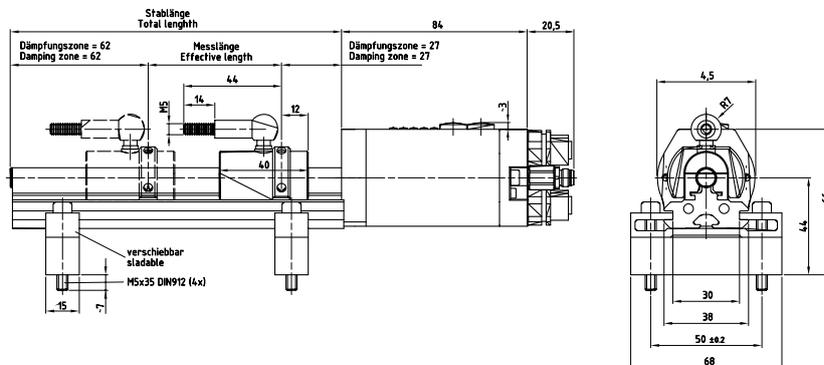


Dimensional Drawings

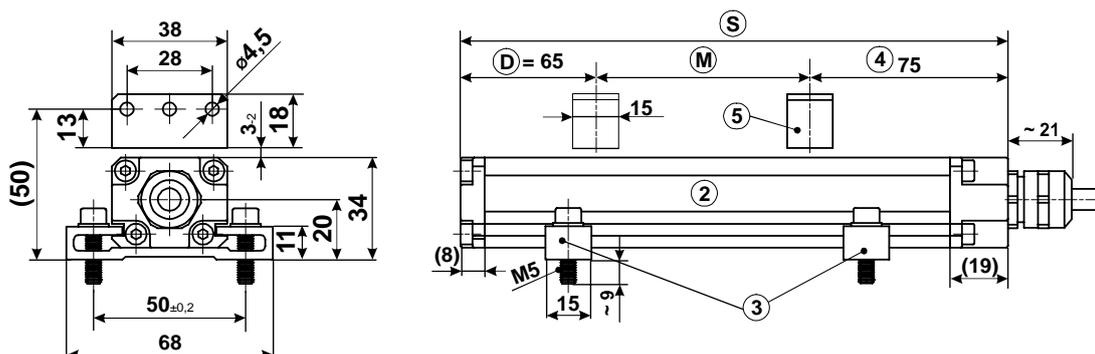
LMPI 46 EtherNet/IP, POWERLINK
EIP, EPL



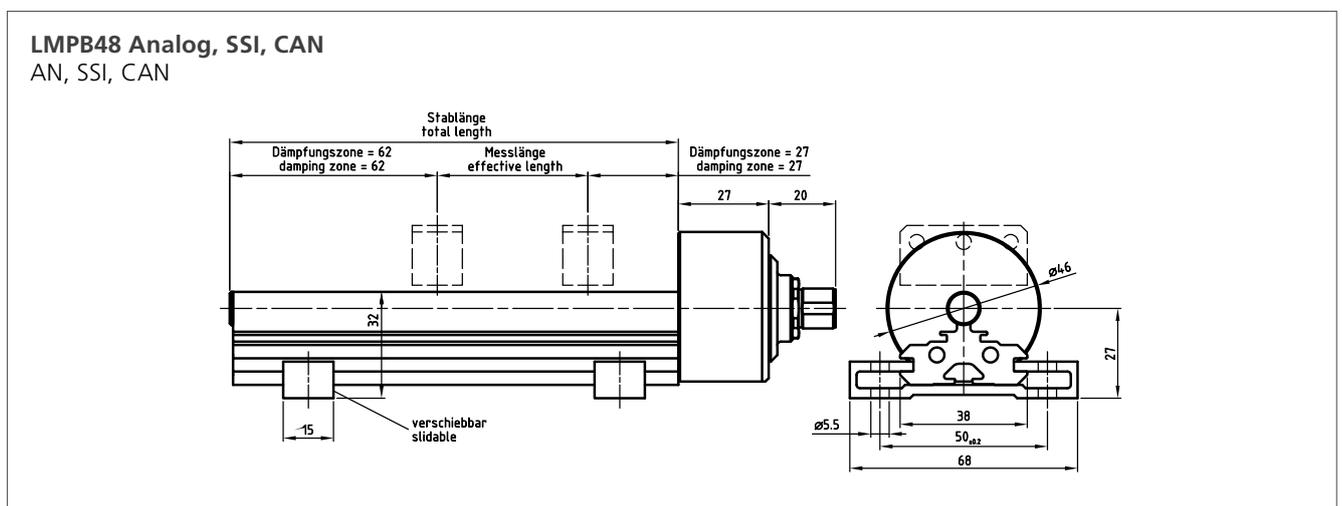
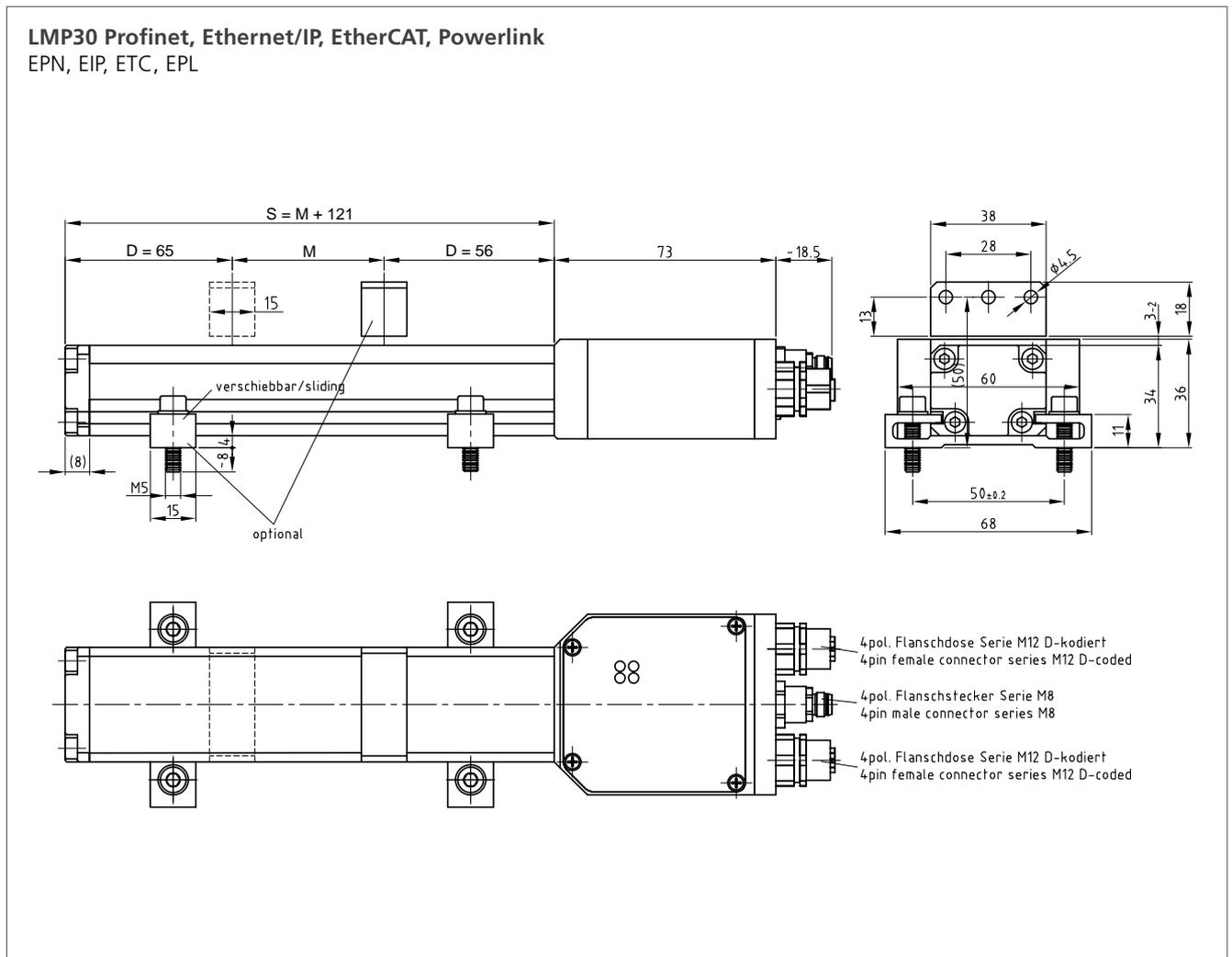
LMPI 46 Sercos
ES3



LMP30 SSI, Analog
SSI, ANA

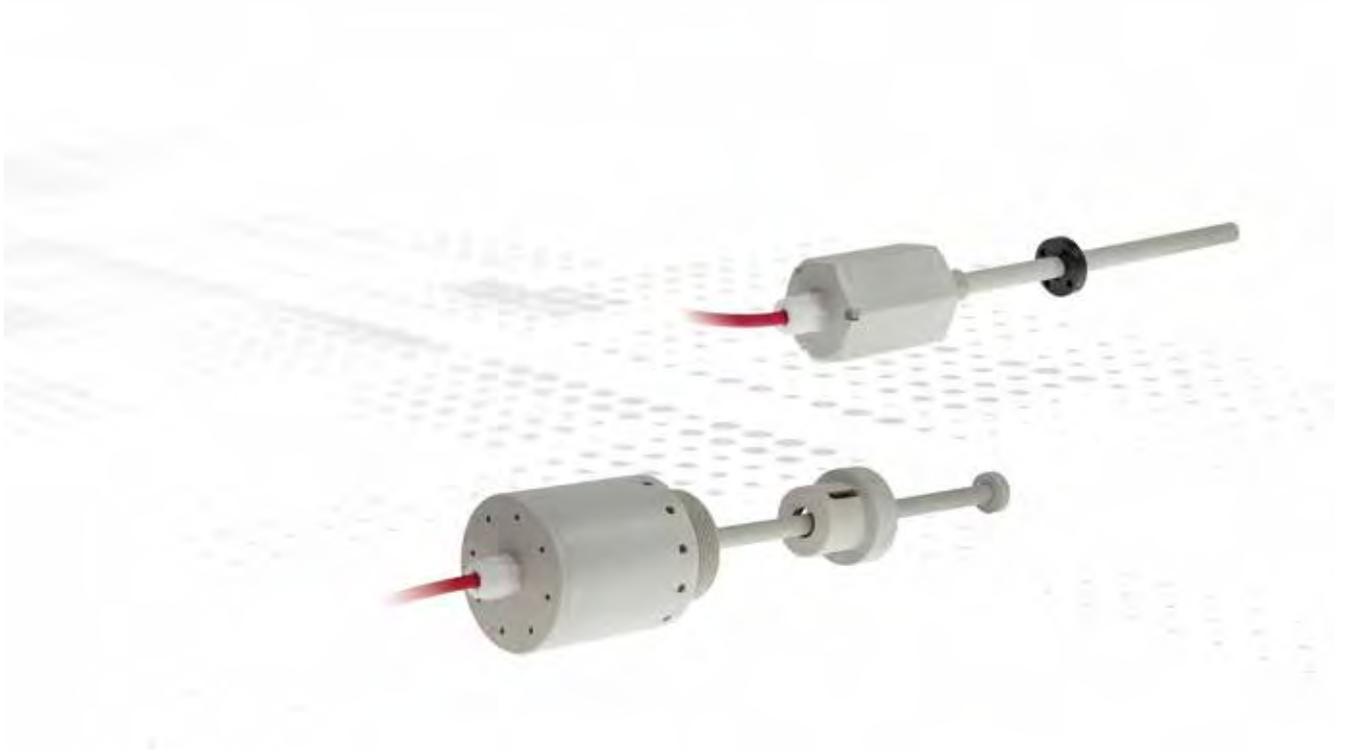


Dimensional Drawings





Linear Encoder with Plastic Housing



For aggressive surroundings

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

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

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LA50

LA80

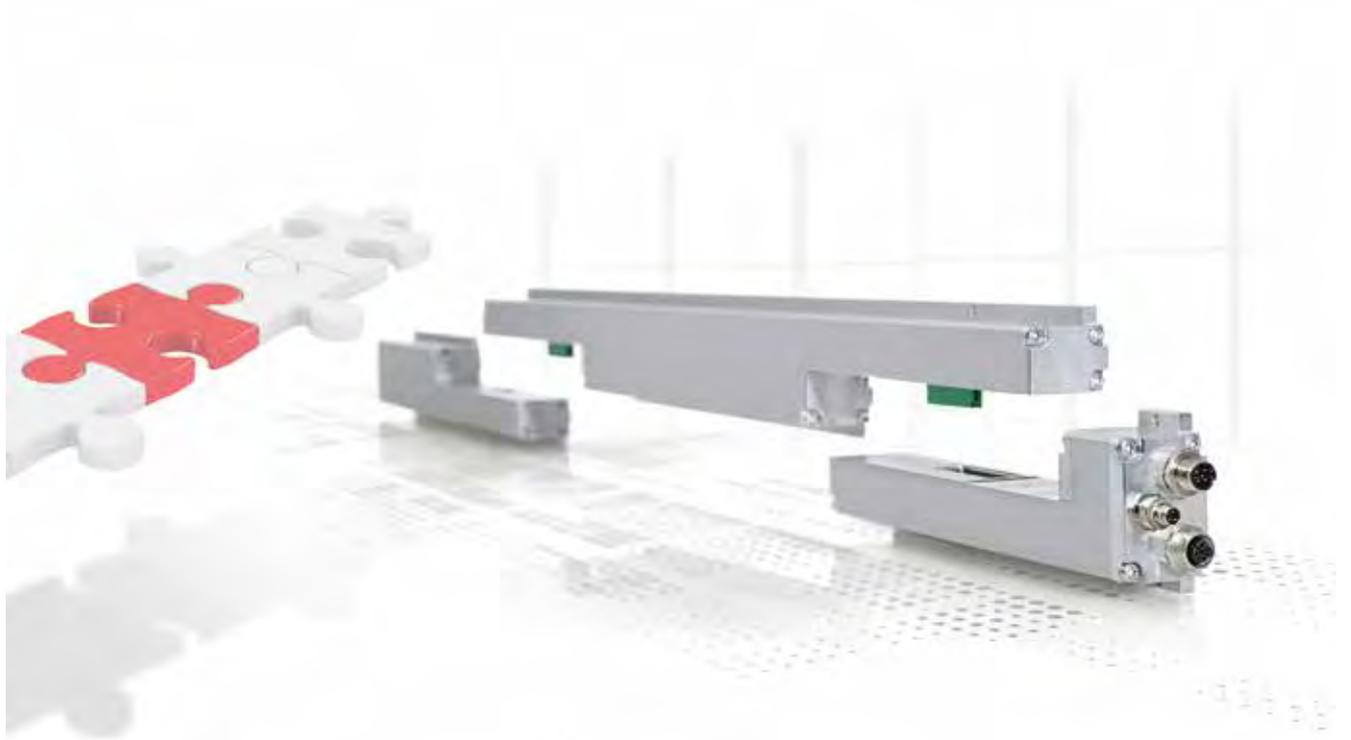
Product	LA50	LA80
		
Mechanic type	(R) Tube (plastic)	(R) Tube (plastic)
Range	100 ... 1000 mm (in steps)	100 ... 1000 mm (in steps)
Size	50	80
Supply voltage	24 VDC, -20...+10 %	24 VDC, -20...+10 %
Resolution	0,001 mm	0,01 mm
Linearity deviation	± 0,10 mm	< 0,05 %
Reproducibility	0,005 mm	0,01 mm
Hysteresis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



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 / modul
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

Ordering code	Article description	Range
LMC55 Master		
326M-00001	PROFIBUS	
326M-00002	CANopen	
326M-00003	EtherCAT	
LMC55 middle part		
326S-00002	Type 1	2.000 mm
326S-00001	Type 2	2.000 mm
LMC55 end element type 1		
326E-00009	type 1	250 mm
326E-00005	type 1	500 mm
326E-00011	type 1	750 mm
326E-00017	type 1	850 mm
326E-00004	type 1	1.000 mm
326E-00013	type 1	1.250 mm
326E-00001	type 1	1.500 mm
326E-00015	type 1	1.750 mm
326E-00015	type 1	2.000 mm
LMC55 end element type 2		
326E-00010	type 2	250 mm
326E-00006	type 2	500 mm
326E-00012	type 2	750 mm
326E-00018	type 2	850 mm
326E-00003	type 2	1.000 mm
326E-00014	type 2	1.250 mm
326E-00002	type 2	1.500 mm
326E-00016	type 2	1.750 mm
326E-00008	type 2	2.000 mm

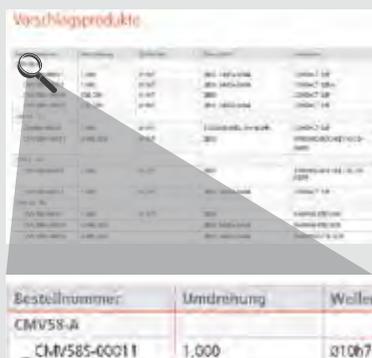
For further product information simply enter the order number in the search field at www.tr-electronic.com.

Suggested Products

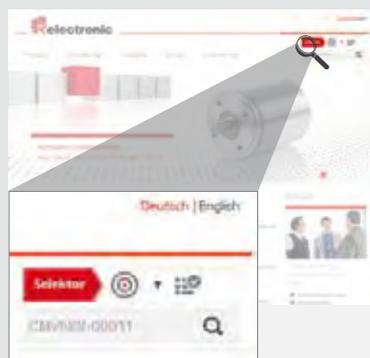
Ordering code	Article description	Range
Magnet		
49155009	Magnet T1-S5520	Distance to sensor: max. 3mm
49155032	Magnet T2-S5520N	Distance to sensor: max. 8 mm
Bus terminator		
40803-40005	PROFIBUS, B-coded, 220 Ω	
62000-1366	CANopen, A-coded, 120 Ω	

Further product information

1. Enter order code into ...



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

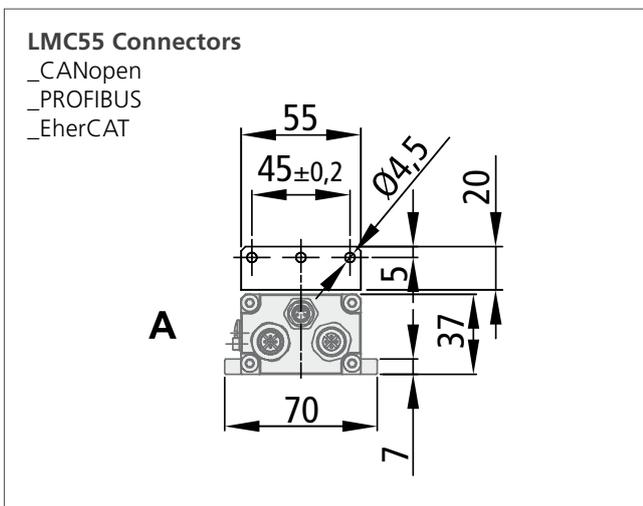
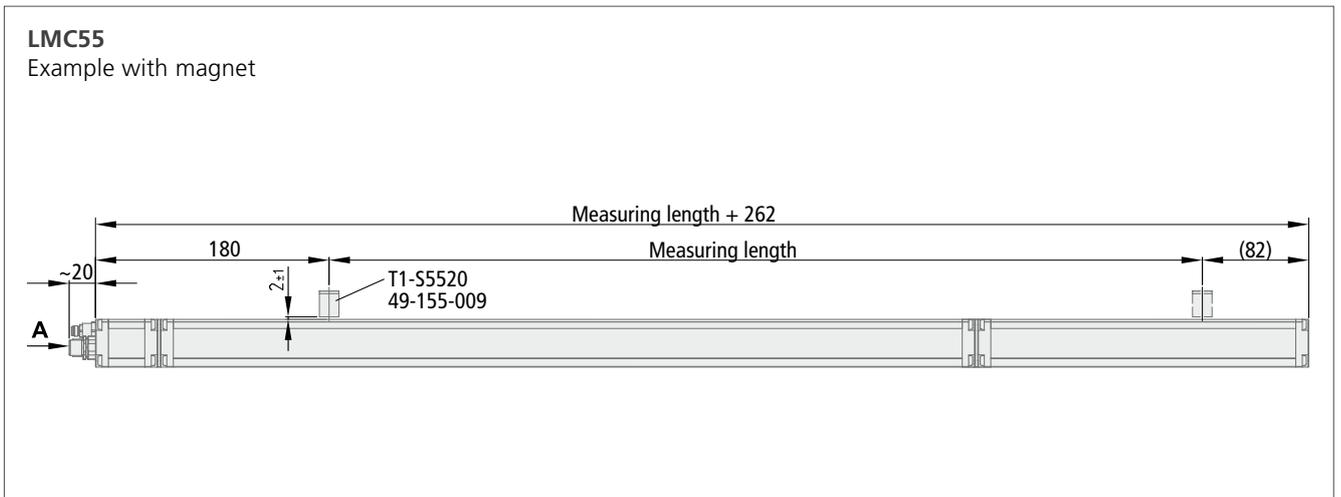
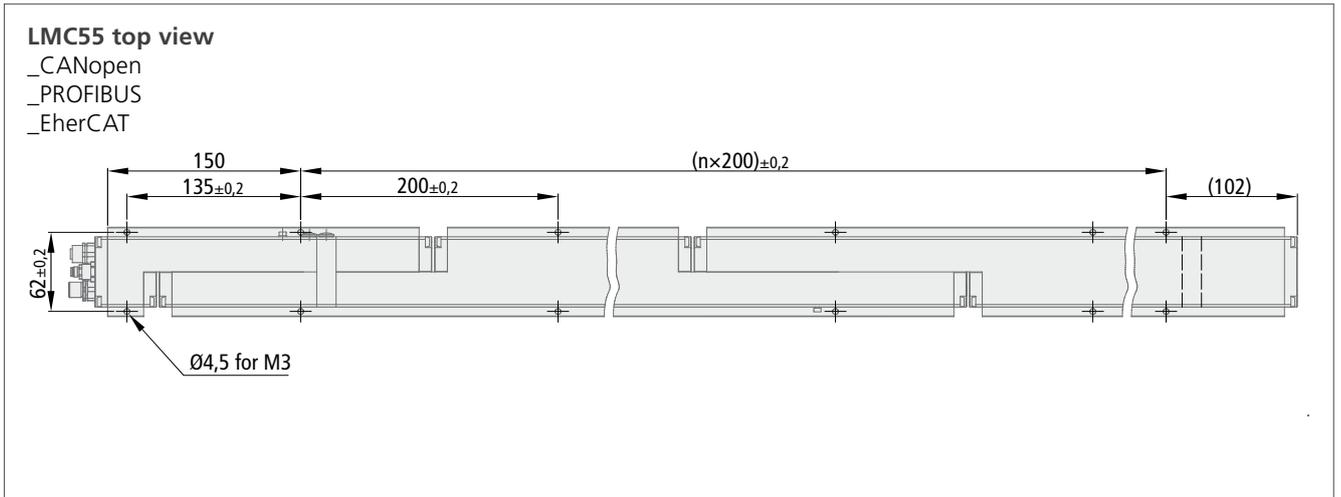


3. Choose desired information



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

Dimensional Drawings





Glass Scale/Transformation



High-resolution absolute position sensors with glass scale

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

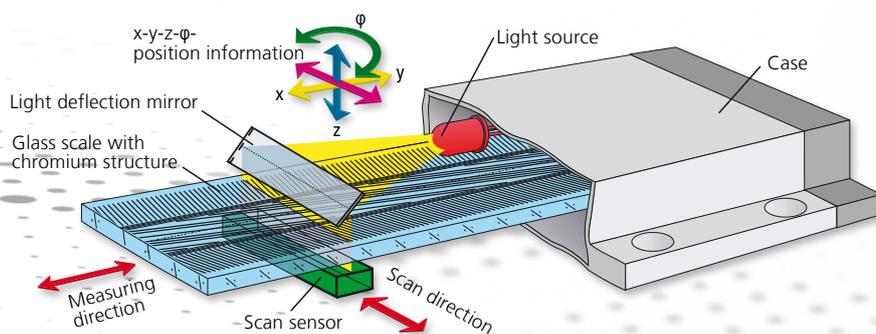
Evaluating the measurement signals, the coded measurement position is determined by the sensor signal and thanks to the additional measurement information, guidance and adjustment errors are completely corrected.

With a smallest measurement step of $0.1\ \mu\text{m}$ our transformation measurement systems are especially suitable for applica-

tions with high demands on resolution and accuracy.

Due to their robust construction, they find their application even in machines with strong vibrations. With absolute detection, no more referencing is necessary – even when using only the incremental interface, controls can benefit from the virtual referencing.

On request, the measurement system sends a number of incremental signals that represent the absolute position value read by the sensor. The counter in the control is loaded with the absolute position information without any mechanical movement of the axis. As detection is absolute, the only limitation in travel speed is given by mechanics with approx.



10 m/s. The measurement system always provides valid measurement values.

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

- _ Features measuring slide, also features several sensing heads within the same system, e.g. for the positioning of several cutting blades in paper cutters.
- _ Features mechanically non-interacting measuring axis, suitable for application in running production.
- _ With special protective housing for heavy-duty applications, e.g. directly on rolling production lines.

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Linear Encoders - Transformation (Glass Scale)



The rugged, absolute glass scale for precise measurement directly on your manufacturing line

High-resolution glass scales made by TR-Electronic work even in the harsh conditions of a manufacturing facility. Due to the internal absolute detection, a current absolute reading value is available shortly after power up and without any mechanical referencing. With the feature “virtual referencing”, even systems that use only the incremental track can take full advantage of absolute measurement. Different executions fit different applications.

LT-S - Measurement system with sliders, that can hold multiple sliders on one glass track. This system is mechanically compatible with incremental scales of other manufacturers.

With optional inlets for sealing air, this measurement system can be used in dusty surroundings.

LT-PI - The rugged version for normal production applications. Either as a probe sensing system or with a spring-loaded probe. This is the system for accurate measurement in your machine.

LT-RV - In extreme conditions, the protective housing of LT-RV keeps the electronics safe even with strong vibration and shock.

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Slider

Touch probe

Heavy-duty touch probe

Product	LT-S	LT-PI	LT-RV
			
Mechanic execution	Slider	Encapsulated touch rod probe measurement system	Heavy-duty touch rod probe measurement system
Range	140 ... 3040 mm (steps of 100 mm)	100, 200 mm	400, 520 mm (up to 800 mm on request)
Reproducibility	< 0,2µm	< 0,2µm	< 0,2µm
Supply	24 VDC (8...30)	24 VDC (8...30)	24 VDC (8...30)
Resolution	0,1µm, 0,2µm, 0,5µm, 1µm, 2µm, 5µm, 10µm	0,1µm, 0,2µm, 0,5µm, 1µm, 2µm, 5µm, 10µm	0,1µm, 0,2µm, 0,5µm, 1µm, 2µm, 5µm, 10µm
Division incremental signal	0,4µm, 1µm, 2µm, 4µm, 10µm, 20µm, 40 µm	0,4µm, 1µm, 2µm, 4µm, 10µm, 20µm, 40 µm	0,4µm, 1µm, 2µm, 4µm, 10µm, 20µm, 40 µm
Signal level incremental	TTL, HTL	TTL, HTL	TTL, HTL
Division sin/cos	10µm, 20µm, 40µm	10µm, 20µm, 40µm	10µm, 20µm, 40µm
Ambient temperature	0°C...65°C (option -20°C...65°C)	-10 ... +60°C	0 °C...40 °C (option -10...+60°C)
Protection class	IP53	IP66	IP65
Options	Multiple sliders, sealing air	Spring loaded sensing probe	
Maximim speed	10 m/s	10 m/s	10 m/s
Orientation	Any desired	Any desired	Any desired
Interface	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	0,1 µm
3200-00180	LT140-S SSI		140 mm	3 m cable, connector M23 12 pin	0,1 µm
3200-00108	LT240-S SSI		240 mm	3 m cable, connector M23 12 pin	0,1 µm
3200-00002	LT340-S SSI		340 mm	3 m cable, connector M23 12 pin	0,1 µm
3200-00004	LT440-S SSI		440 mm	3 m cable, connector M23 12 pin	0,1 µm
3200-00021	LT540-S SSI		540 mm	3 m cable, connector M23 12 pin	0,1 µm
3200-00135	LT640-S SSI		640 mm	3 m cable, connector M23 12 pin	0,1 µm
3200-00005	LT740-S SSI		740 mm	3 m cable, connector M23 12 pin	0,1 µm
3200-00007	LT840-S SSI		840 mm	3 m cable, connector M23 12 pin	0,1 µm
3200-00142	LT940-S SSI		940 mm	3 m cable, connector M23 12 pin	0,1 µm
3200-00001	LT1040-S SSI		1.040 mm	3 m cable, connector M23 12 pin	0,1 µm
3200-00014	LT1140-S SSI		1.140 mm	3 m cable, connector M23 12 pin	0,1 µm
3200-00149	LT1240-S SSI		1.240 mm	3 m cable, connector M23 12 pin	0,1 µm
3200-00152	LT1340-S SSI		1.340 mm	3 m cable, connector M23 12 pin	0,1 µm
3200-00153	LT1440-S SSI		1.440 mm	3 m cable, connector M23 12 pin	0,1 µm
3200-00154	LT1540-S SSI		1.540 mm	3 m cable, connector M23 12 pin	0,1 µm

For further product information simply enter the order number in the search field at www.tr-electronic.com. We will help you to select the most suitable products from the complete TR range. Please contact us (info@tr-electronic.de).

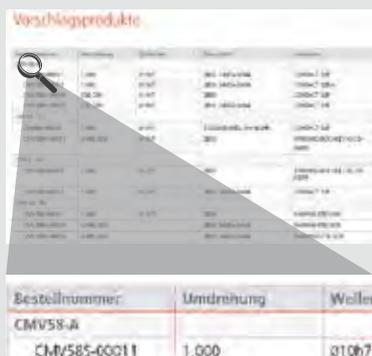
Suggested Products

Ordering code	Name	Remark	Measurement length	Tube length	Resolution
LT-S Slider measurement system					
3200-00155	LT1640-S SSI		1.640 mm	3 m cable, connector M23 12 pin	0,1 µm
3200-00156	LT1840-S SSI		1.840 mm	3 m cable, connector M23 12 pin	0,1 µm
3200-00157	LT2040-S SSI		2.040 mm	4 m cable, connector M23 12 pin	0,1 µm
3200-00160	LT2240-S SSI		2.240 mm	4 m cable, connector M23 12 pin	0,1 µm
3200-00161	LT2440-S SSI		2.440 mm	4 m cable, connector M23 12 pin	0,1 µm
3200-00163	LT2840-S SSI		2.840 mm	4 m cable, connector M23 12 pin	0,1 µm
3200-00171	LT3040-S SSI		3.040 mm	4 m cable, connector M23 12 pin	10,0 µm

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

Further product information

1. Enter order code into ...



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



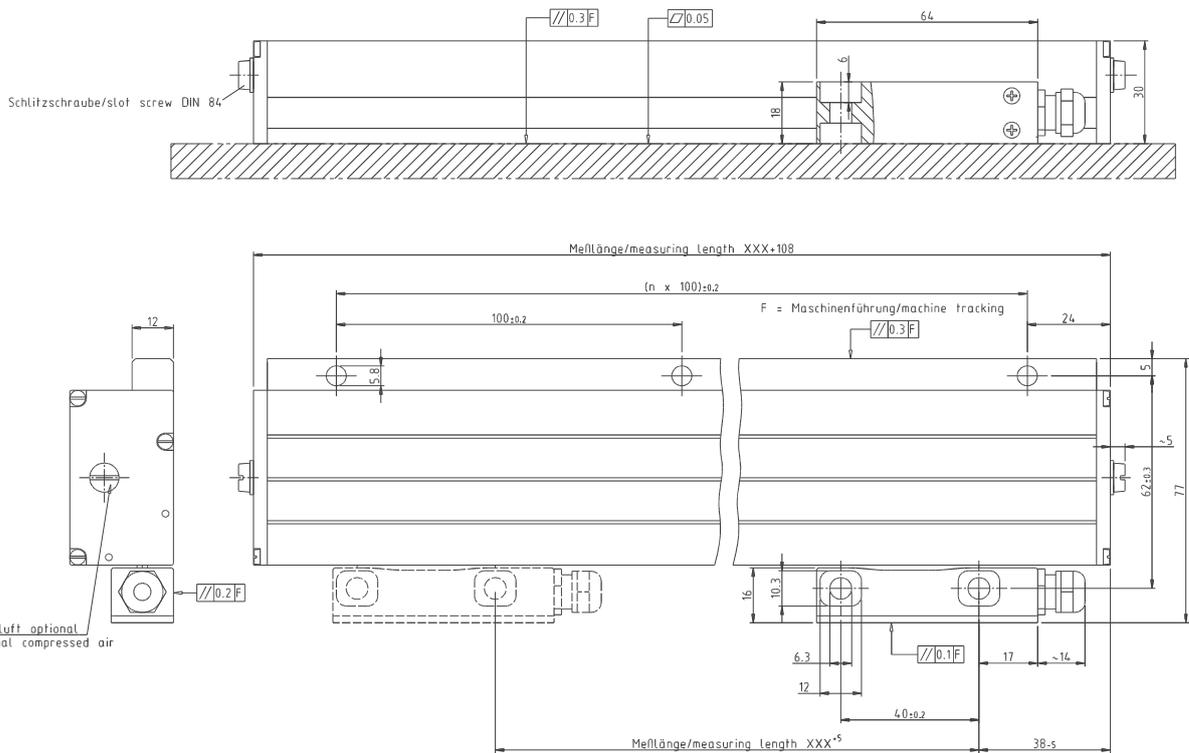
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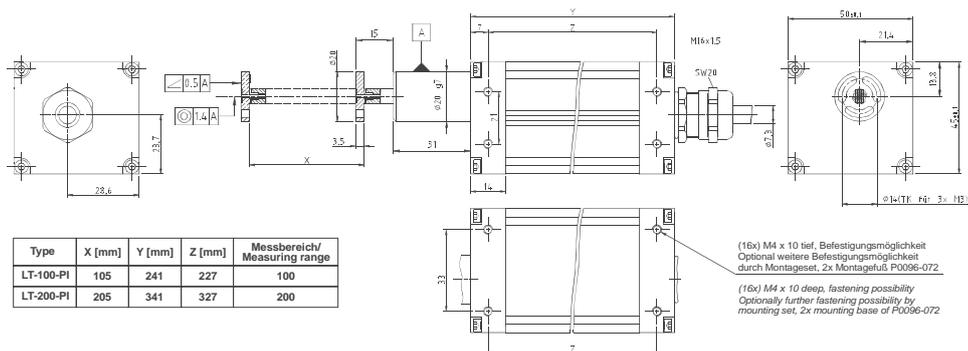
We will help you to select the most suitable products from the complete TR range. Please contact us (info@tr-electronic.de).

Dimensional Drawings

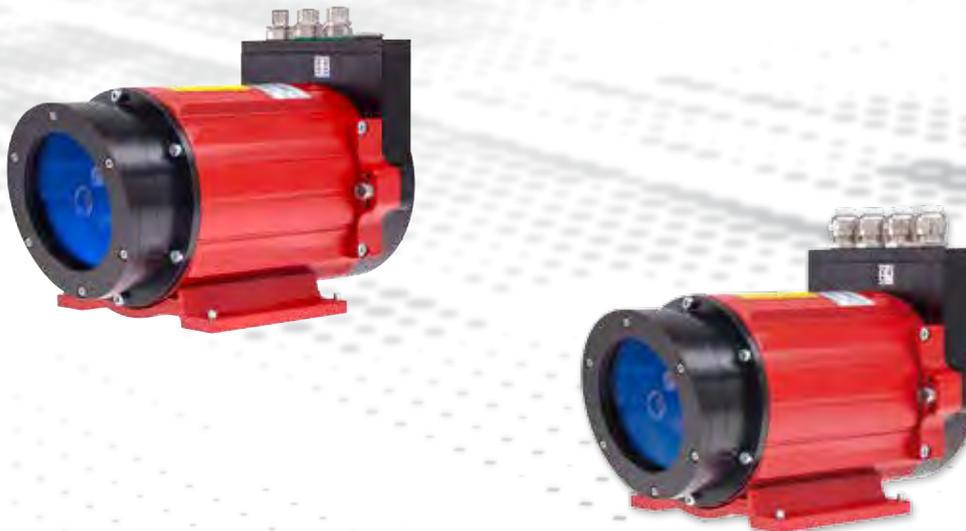
LT-S Slider



LT-PI 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
- _ Flexible programming
- _ Option with Integrated heating
- _ Option with high-temperature Laser diode for 70°C ambient temperature
- _ Option with external cooling for 100°C ambient temperature
- _ Customized adaptations upon request

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Position detection for closed loop application up to 240 m

Product	LE200	LE200 – long range
		
Supply voltage	18 ... 27 VDC	18 ... 27 VDC
_ Integrated heating	24 ... 30 VDC	24 ... 30 VDC
Current consumption, no load	< 350 mA	< 350 mA
_ Integrated heating	< 2,5 A	< 2,5 A
Measuring range	0,2 – 125 m	0,2 – 170 m, 195 m, 240 m
Linearity deviation (12 m, standard)	±3 mm	±3 mm
Reproducibility	±2 mm	±2 mm
Light source	Laser diode, red light	Laser diode, red light
Wave length λ	670 nm	670 nm
Radiant power	Pmax < 1 mW	Pmax < 1 mW
Laser protection class	2	2
Measurand output/refresh rate	1.000 values / s	1.000 values / s
Integration time	1 ms	1 ms
Working temperature	0 ... +50 °C	0 ... +50 °C
Working temperature (+ heating)	-30 ... +50 °C	-30 ... +50 °C
Storage temperature	-20 ... +75 °C (dry)	-20 ... +75 °C (dry)
Protection class	IP65	IP65
Vibration	<50m/s 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)	        	        
Weblink	www.tr-electronic.com/s/S007232	www.tr-electronic.com/s/S007232
QR-Code		

Suggested Products

Ordering code	Range	Delivery
LE200 SSI		
2200-04002	50 m	with reflector 200 × 200 mm
2200-01002	170 m	with reflector panel 554 × 480 mm
2200-02002	195 m	with reflector panel 554 × 480 mm
2200-03002	240 m	with reflector panel 554 × 480 mm
2200-00002	125 m	with reflector 200 × 200 mm
LE200 PROFIBUS+SSI		
2200-04102	50 m	with reflector 200 × 200 mm
2200-01102	170 m	with reflector panel 554 × 480 mm
2200-02102	195 m	with reflector panel 554 × 480 mm
2200-03102	240 m	with reflector panel 554 × 480 mm
2200-00102	125 m	with reflector 200 × 200 mm
LE200 Interbus S		
2200-01202	170 m	with reflector panel 554 × 480 mm
2200-00202	125 m	with reflector 200 × 200 mm
LE200 CANopen		
2200-04302	50 m	with reflector 200 × 200 mm
2200-01302	170 m	with reflector panel 554 × 480 mm
2200-02302	195 m	with reflector panel 554 × 480 mm
2200-03302	240 m	with reflector panel 554 × 480 mm
2200-00302	125 m	with reflector 200 × 200 mm
LE200 DeviceNET		
2200-04402	50 m	with reflector 200 × 200 mm
2200-02402	195 m	with reflector panel 554 × 480 mm
2200-03452	240 m	with reflector panel 554 × 480 mm
2200-00402	125 m	with reflector 200 × 200 mm
LE200 Ethernet/IP		
2200-01702	170 m	with reflector panel 554 × 480 mm
2200-02752	195 m	with reflector panel 554 × 480 mm
2200-03702	240 m	with reflector panel 554 × 480 mm
2200-00702	125 m	with reflector 200 × 200 mm

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

Suggested Products

Ordering code	Range	Delivery
LE200 PROFINET		
2200-04802	50 m	with reflector 200 × 200 mm
2200-01802	170 m	with reflector panel 554 × 480 mm
2200-02802	195 m	with reflector panel 554 × 480 mm
2200-03802	240 m	with reflector panel 554 × 480 mm
2200-00802	125 m	with reflector 200 × 200 mm
LE200 EtherCAT		
2200-00902	125 m	with reflector 200 × 200 mm

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

Further product information

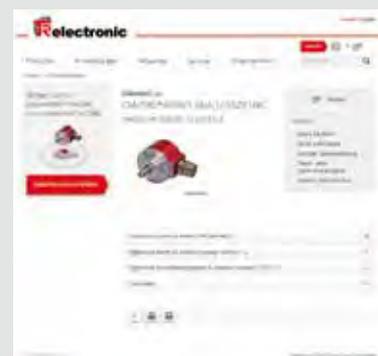
1. Enter order code into ...



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

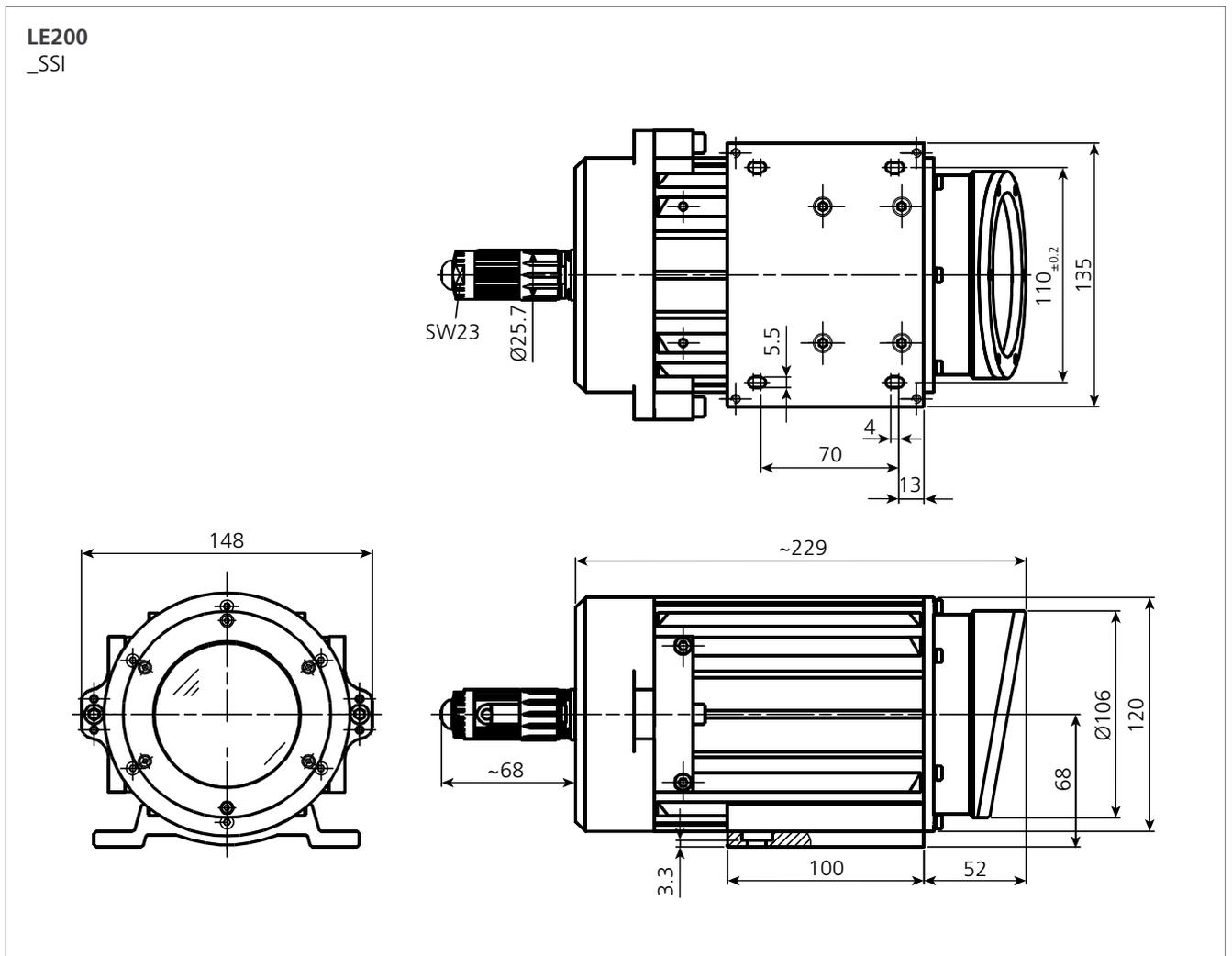


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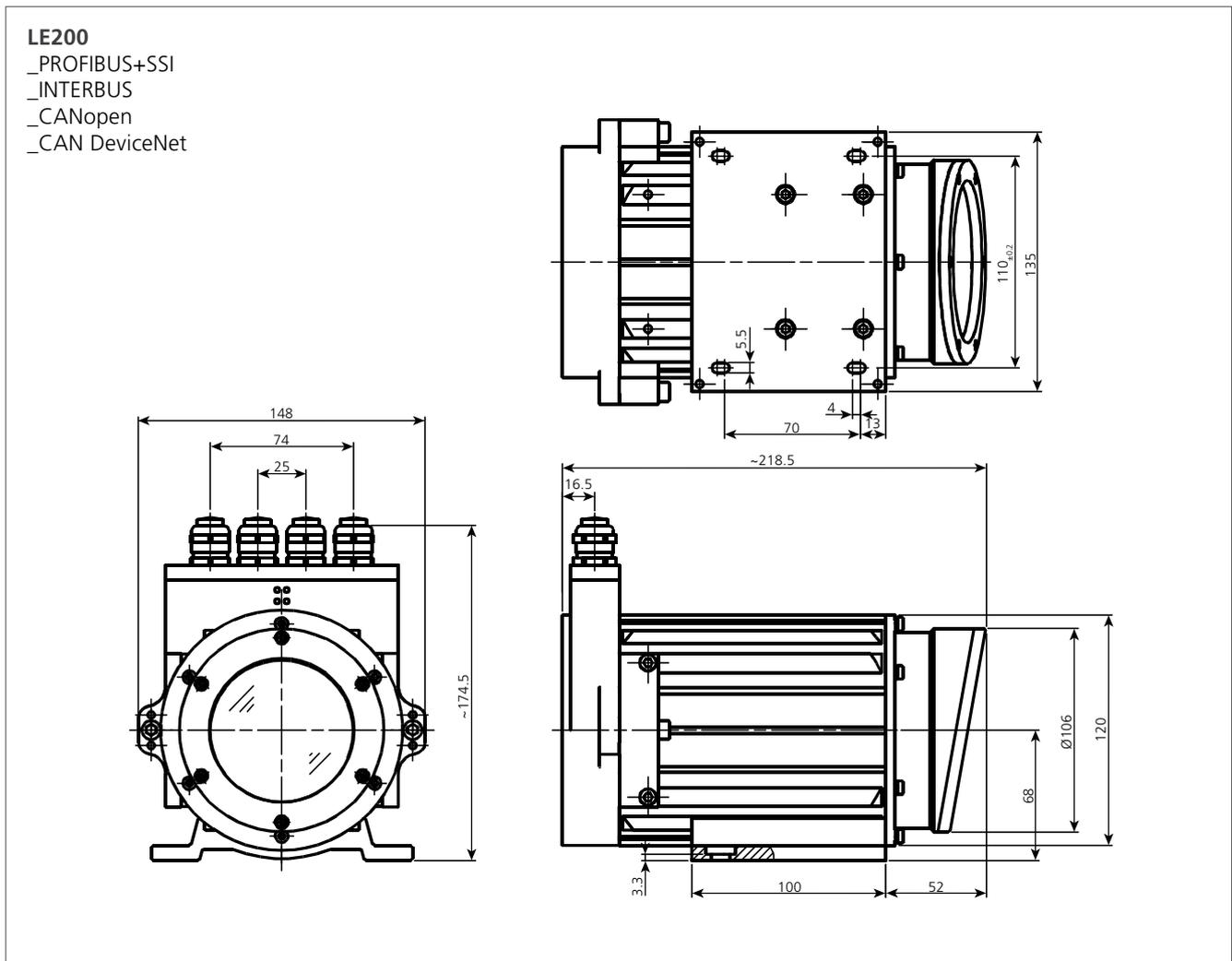


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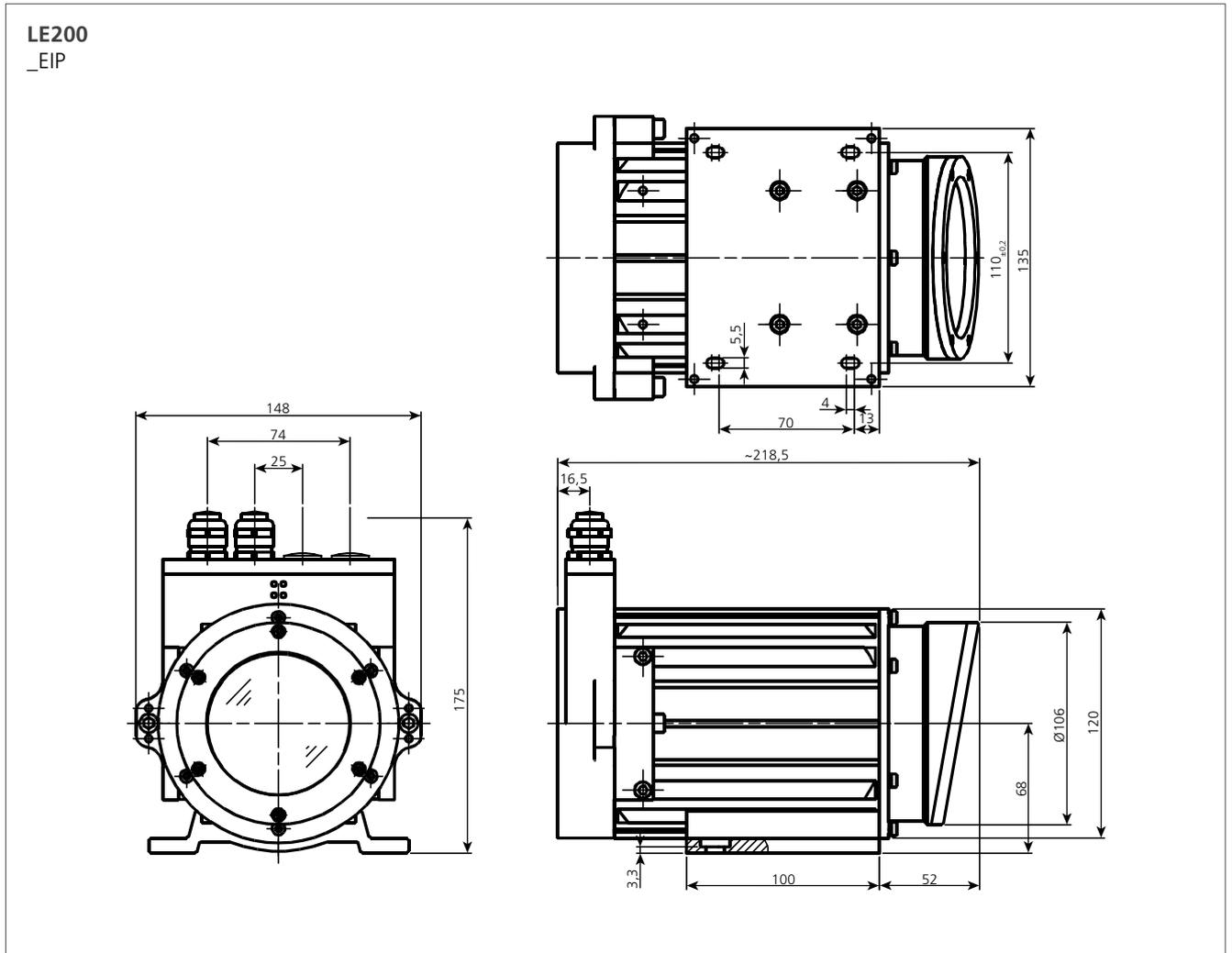
Dimensional Drawings



Dimensional Drawings

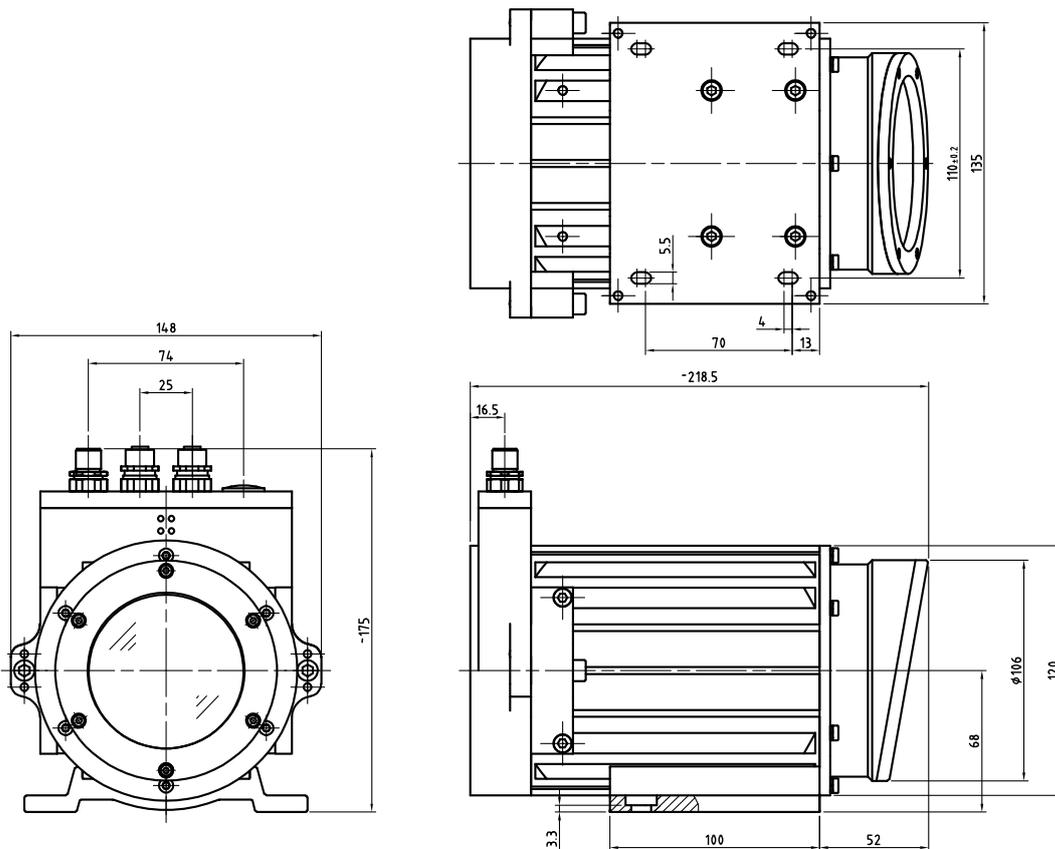


Dimensional Drawings



Dimensional Drawings

LE200
_EPN
_ETC



Laser Distance Measuring Systems – LLB65 / LLB500



Non-contact measurement on natural surfaces

Laser distance measuring systems LLB65 and LLB500 can measure up to 65 m on natural surfaces without a special target plate. The measuring time and the maximum speed of the target depend on the surface. LLB500 can measure up to 500 m with a target plate.

- _ Analog, SSI and PROFIBUS-DP interface
- _ RS232 -, RS422 - - interface
- _ Detection of positions
- _ Non-contact distance measurement
- _ Distance measurements on natural surfaces:
 - _ 0,05 m up to approx. 65 m
 - _ LLB500 with reflector panel up to 500 m
- _ Programmable
- _ Option with integrated heating

Contents

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Position detection up to 65 m

Product	LLB65 (H) - A	LLB65 - PB	LLB500 (H)-A
			
Supply voltage	9 ... 30 VDC	13 ... 30 VDC	9 ... 30 VDC
_ Integrated heating	24 ... 30 VDC	–	24 ... 30 VDC
Current consumption, no load	< 0,6 A	< 0,6 A	< 0,6 A
_ Integrated heating	< 2,5 A	–	< 2,5 A
Measuring range	typically 0,05 m ... 65 m	typically 0,05 m ... 65 m	With target plate: 0,5 m ... 500 m Without target plate: 0,05 m ... 65 m
Linearity deviation (12 m, standard)	0,1 mm	0,1 mm	0,1 mm
Reproducibility	±1,5 mm ... ±3 mm at 2	±1,5 mm ... ±3 mm at 2	±1,0 mm ... ±3 mm at 2
Time for a measurement	typically 0,3 ... 4 s	typically 0,3 ... 4 s	typically 0,15 ... 4 s
Light source	Laser diode, red light	Laser diode, red light	Laser diode, red light
Laser protection class	2	2	2
Mass	690 g, 720 g (with heating)	950 g	690 g, 720 g (with heating)
Working temperature	-10 ... +50 °C	-10 ... +50 °C	-10 ... +50 °C
Working temperature (+ heating)	-40 ... +50 °C	–	-40 ... +50 °C
Storage temperature	-40 ... +70 °C (dry)	-40 ... +70 °C (dry)	-40 ... +70 °C (dry)
Protection class	IP65	IP65	IP65
Vibration	<50m/s ² , sine 50 ... 2,000 Hz	<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	<300m/s ² , half sine 11 ms Hz
Addl. Interfaces	RS232, RS422, digital outputs		RS232, RS422, digital outputs
Interface (others on request)	Analog	Analog 	SSI Analog
Weblink	www.tr-electronic.com/f/LLB65-A-1-GB-1	www.tr-electronic.com/f/LLB65-PB-1-GB-1	www.tr-electronic.com/f/LLB500-A-1-GB-1
QR-Code			

Position detection up to 500 m

Product	LLB500-PB	LLB500F (H)-A
		
Supply voltage	13 ... 30 VDC	9 ... 30 VDC
_ Integrated heating	–	24 ... 30 VDC
Current consumption, no load	< 0,6 A	< 0,6 A
_ Integrated heating	–	< 2,5 A
Measuring range	With target plate: 0,5 m ... 500 m Without target plate: 0,05 m ... 65 m	With target plate: 0,5 m ... 500 m Without target plate: 0,05 m ... 65 m
Linearity deviation (12 m, standard)	0,1 mm	0,1 mm
Reproducibility	±1,5 mm ... ±3 mm at 2	±1,0 mm ... ±3 mm at 2
Time for a measurement	typically 0,3 ... 4 s	typically 0,004 ... 4 s
Light source	Laser diode, red light	Laser diode, red light
Laser protection class	2	2
Mass	950 g	690 g, 720 g (with heating)
Working temperature	-10 ... +50 °C	-10 ... +50 °C
Working temperature (+ heating)	–	-40 ... +50 °C
Storage temperature	-40 ... +70 °C (dry)	-40 ... +70 °C (dry)
Protection class	IP65	IP65
Vibration	<50m/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
Addl. Interfaces	Digital outputs	RS232, RS422, digital outputs
Interface (others on request)	Analog 	SSI Analog
Weblink	www.tr-electronic.com/f/LLB500-PB-1-GB-1	www.tr-electronic.com/f/LLB500-A-1-GB-1
QR-Code		

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

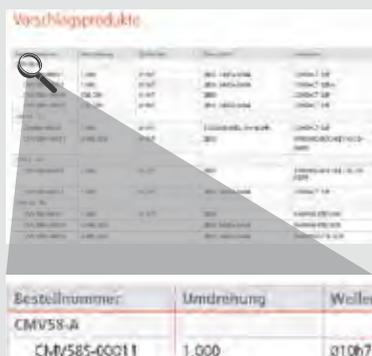
Suggested Products

Ordering code	Interface
LLB65 - 65 m without target panel (Option up to 80m)	
LLB65-00100	PROFIBUS ($\pm 1,5$ mm)
LLB65-00101	PROFIBUS (± 3 mm)
LLB65-00600	Analog ($\pm 1,5$ mm)
LLB65-00601	Analog (± 3 mm)
LLB65-00610	Analog ($\pm 1,5$ mm) with heating
LLB65-00611	Analog (± 3 mm) with heating
LLB500 - 65 m without target panel (Option up to 80m), 500 m with target panel. Target panel not included	
LLB500-00100	PROFIBUS ($\pm 1,5$ mm)
LLB500-00101	PROFIBUS (± 3 mm)
LLB500-00600	SSI + Analog ($\pm 1,0$ mm)
LLB500-00601	SSI + Analog (± 3 mm)
Target panel for LLB 500	
49500040	210 x 297mm, aluminium, red

Für mehr Produkt-Informationen tragen Sie einfach die Bestellnummer in das Suchfeld auf www.tr-electronic.de ein.

Further product information

1. Enter order code into ...



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

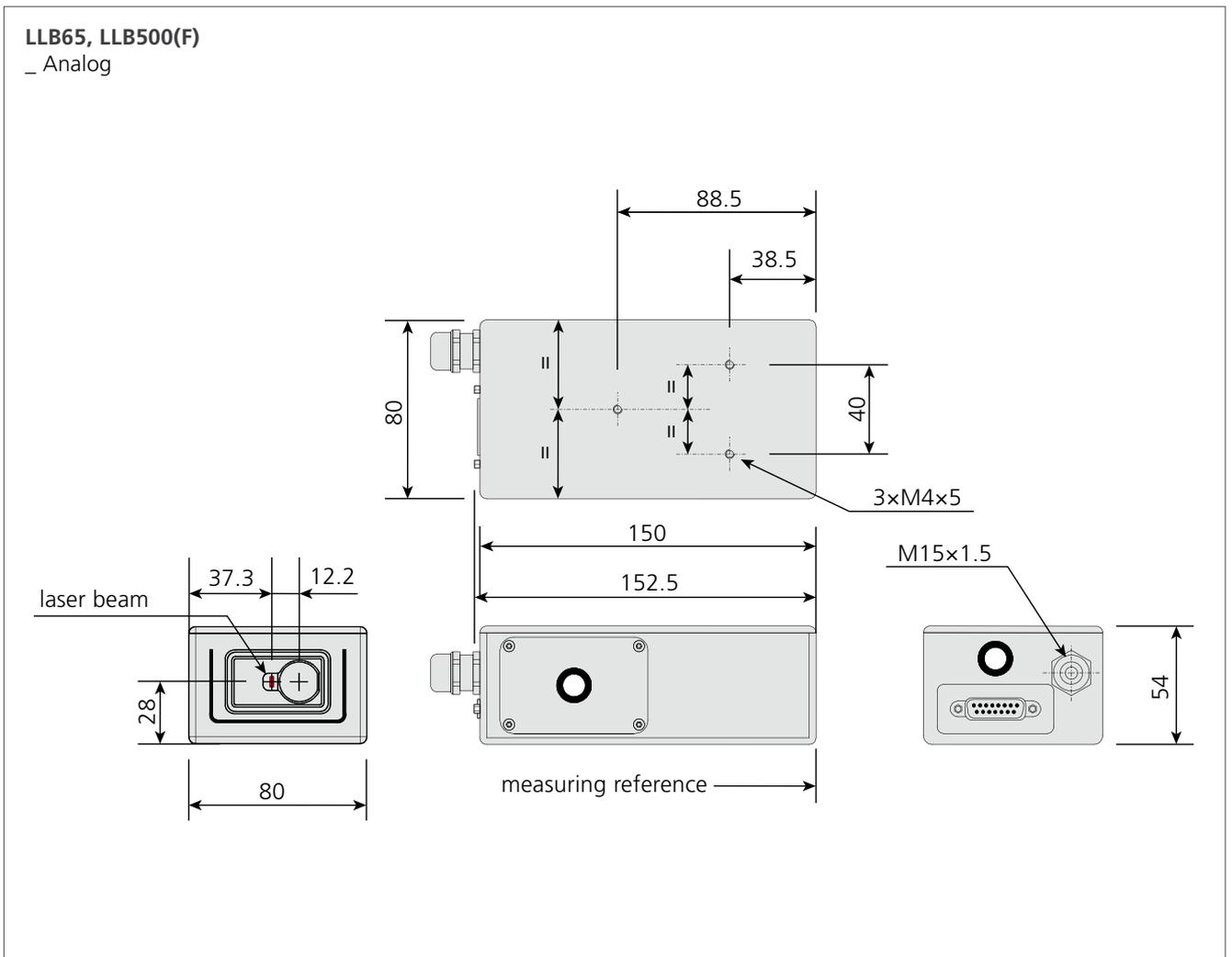


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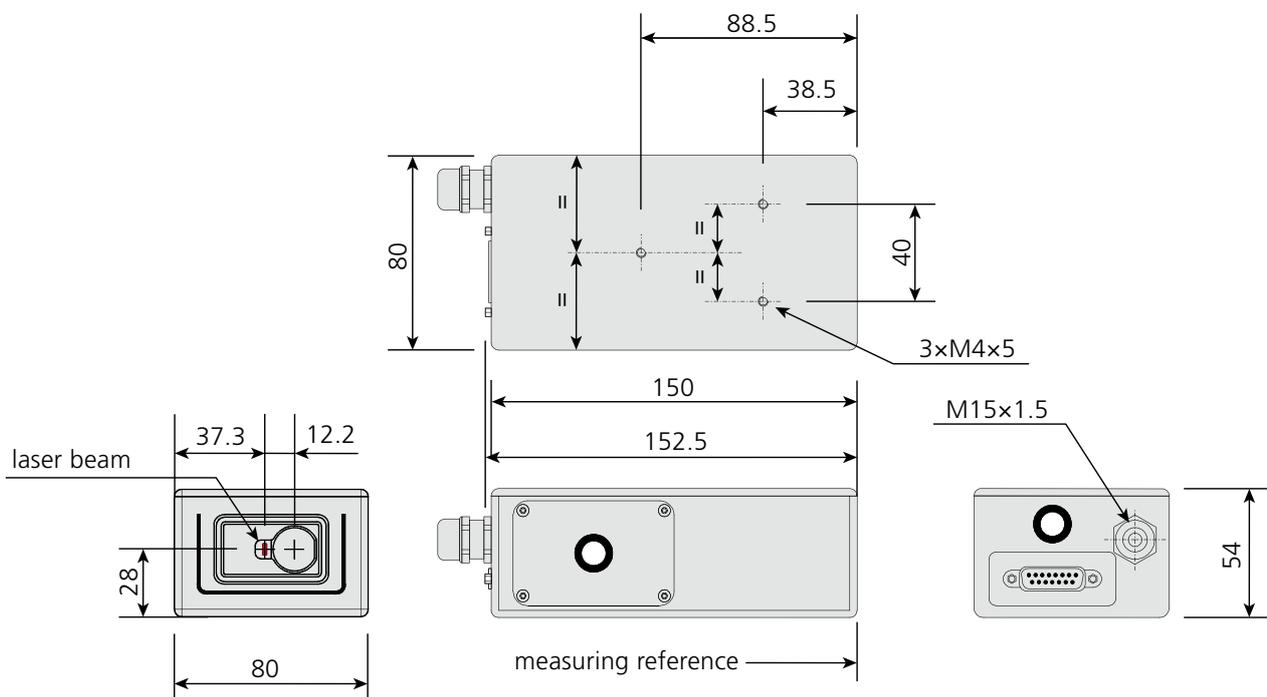
We will help you to select the most suitable products from the complete TR range. Please contact us (info@tr-electronic.de).

Dimensional Drawings



Dimensional Drawings

LLB65, LLB500(F)
_ Analog



Barcode Positioning System – BE901



Non-contact measurement up to 10 km

Barcode positioning systems of type BE-901 are optical measuring systems which use visible red laser light to determine the position of the BE-90 relative to a permanently mounted barcode tape. Typically the BE-901 is mounted on a (rail-) guided vehicle, whose position is to be determined. The position information is determined to within a millimeter using the information of the fixed barcode tape and made available to the primary system.

- _ Interfaces: SSI und PROFIBUS
- _ Easy installation and activation
- _ Movements (curved systems)
- _ Non contact position measurement
- _ Position detection up to 10,000 m
- _ Parameterizable via USB

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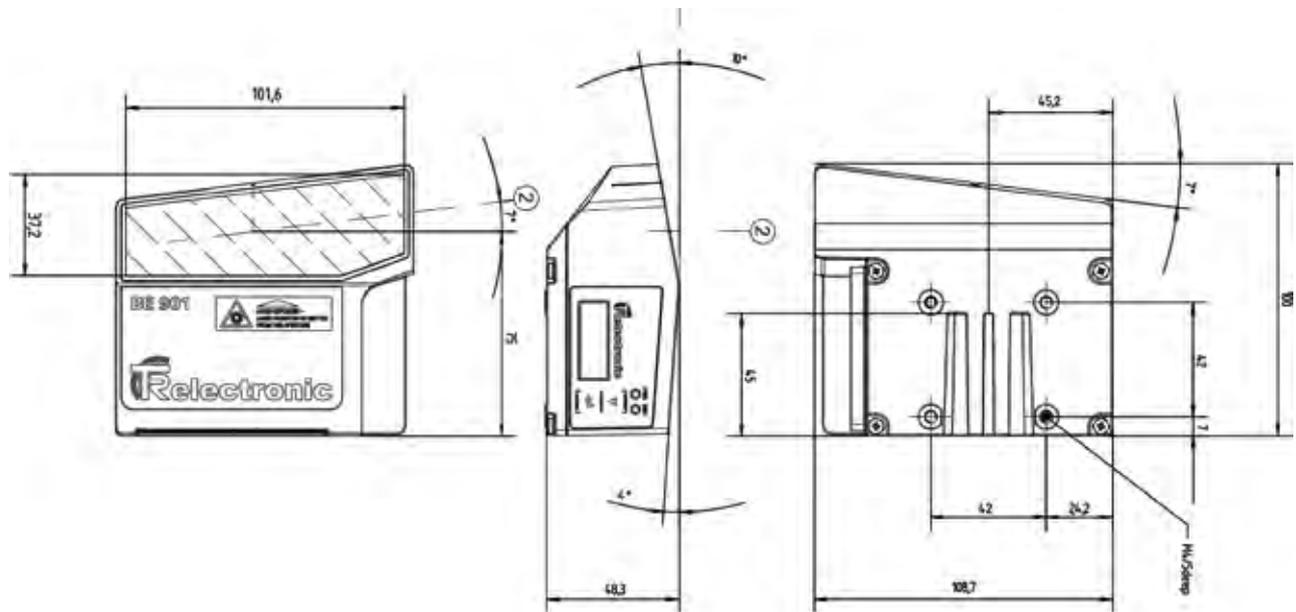
Barcode Positioning System

Product	BE901 - SSI	BE901 - PB
		
Supply voltage	10 ... 30 VDC	10 ... 30 VDC
Power consumption	3,2 W	5 W
Range	10.000 m	10.000 m
Scanning rate		
Reproducible accuracy		
Integration time		
Measurement value output	500 values/sec.	500 values/sec.
Scanning depth	90 ... 170 mm	90 ... 170 mm
Light source	Laser diode, 655 nm	Laser diode, 655 nm
Housing	Die-cast aluminium	Die-cast aluminium
Mass	580 g without connection block	580 g without connection block
Working temperature	-5...+50 °C	-5...+50 °C
Working temperature (+ heating)	-35 ... +50 °C	-35 ... +50 °C
Air humidity	max. 90% rel. humidity	max. 90% rel. humidity
Protection class	IP65	IP65
Vibration		
Service Interface	USB	USB
Interface (others on request)	SSI	
Weblink	http://www.tr-electronic.com/s/S011970	http://www.tr-electronic.com/s/S011969
QR-Code		

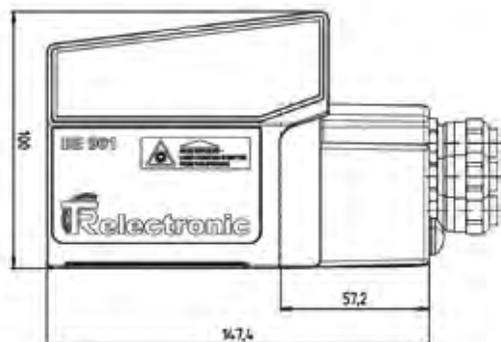
Can't find the right variant? Please contact us (info@tr-electronic.de)

Dimensional Drawings

BE901
_SSI, _PB

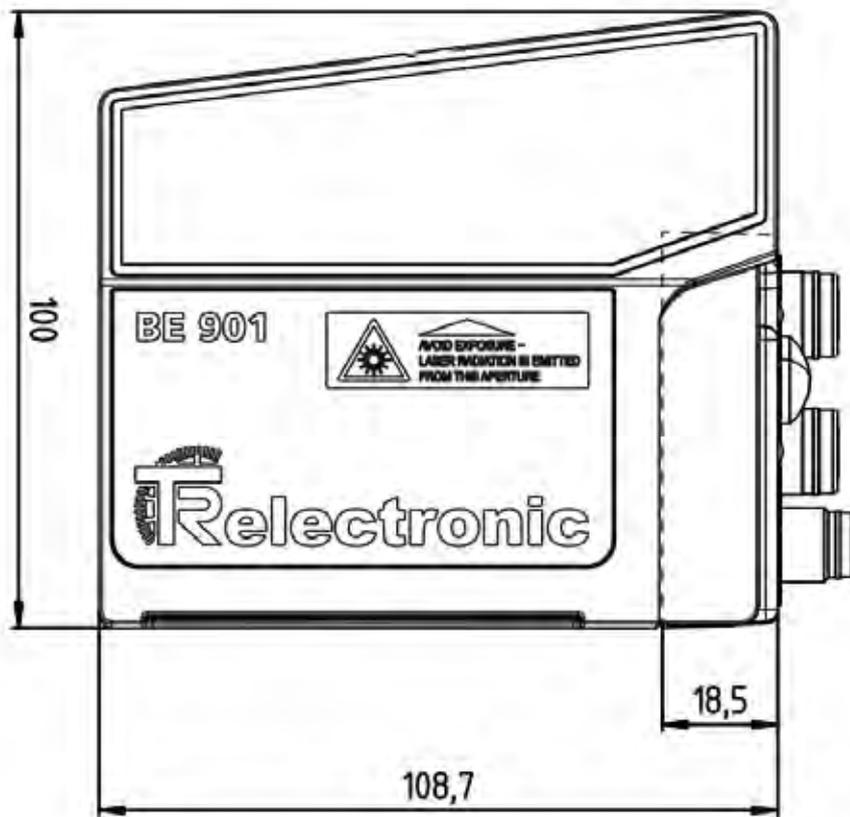


BE 901 + Connection hood
Cable glands

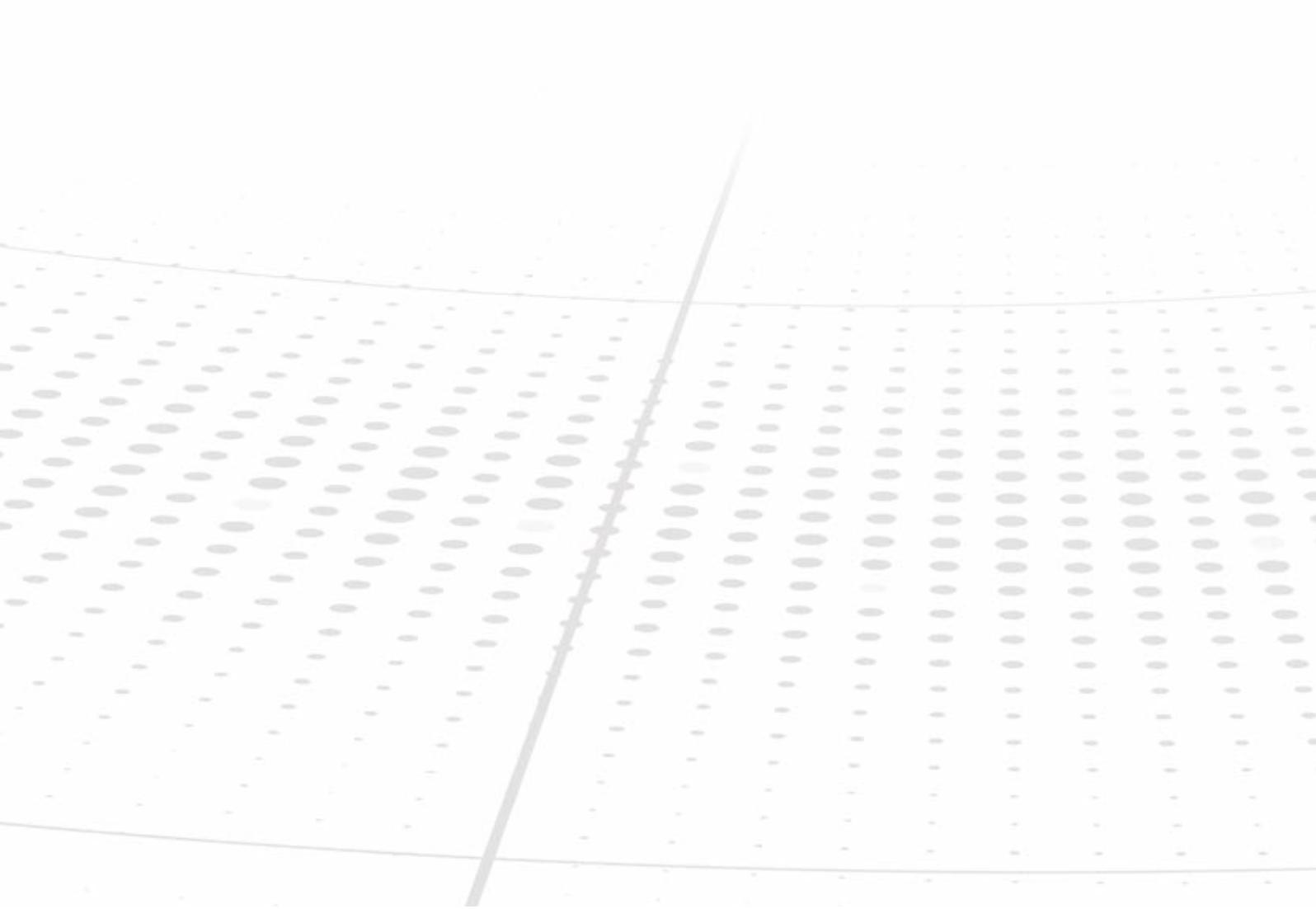


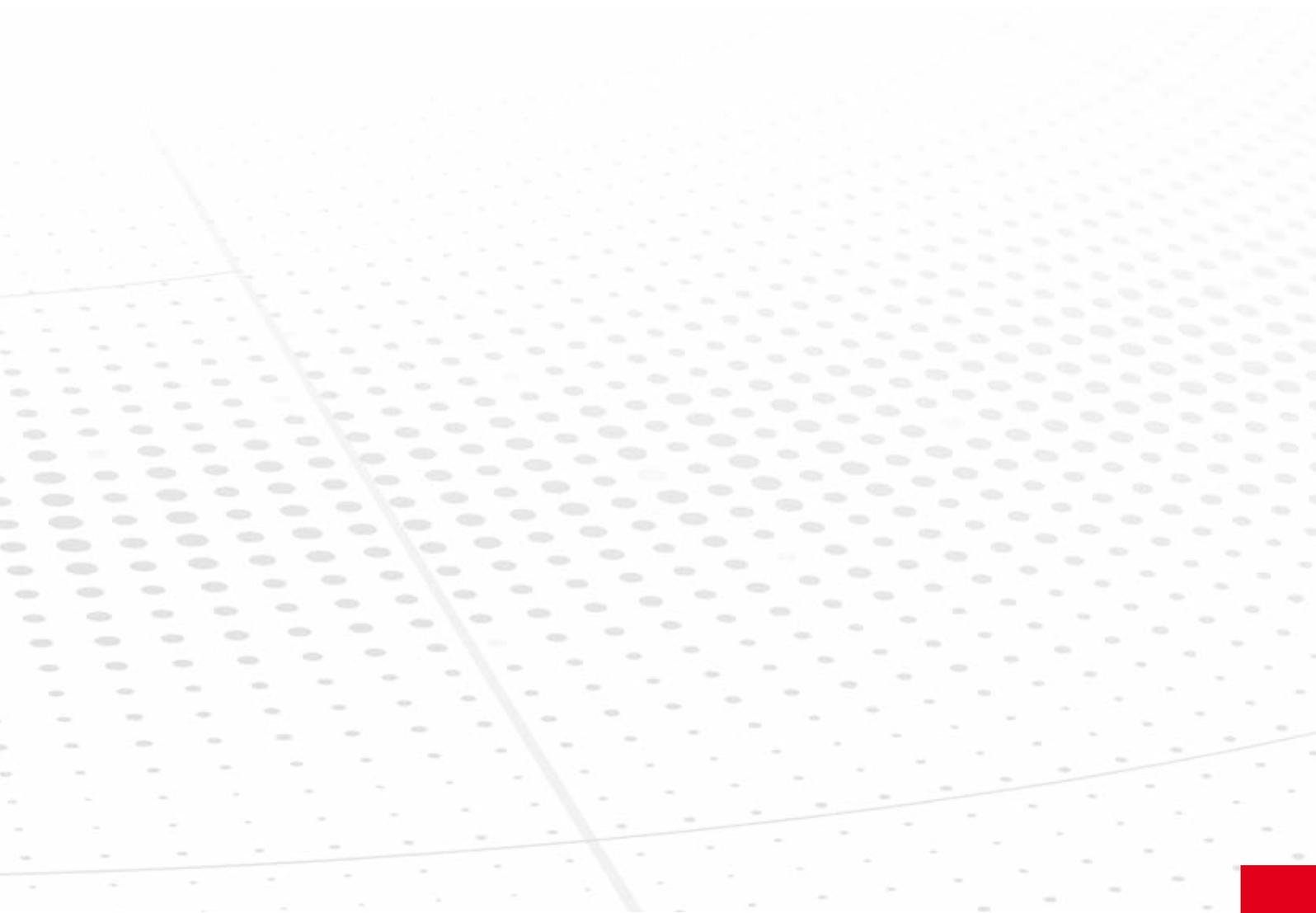
Dimensional Drawings

BE 901 + Connection hood
M12

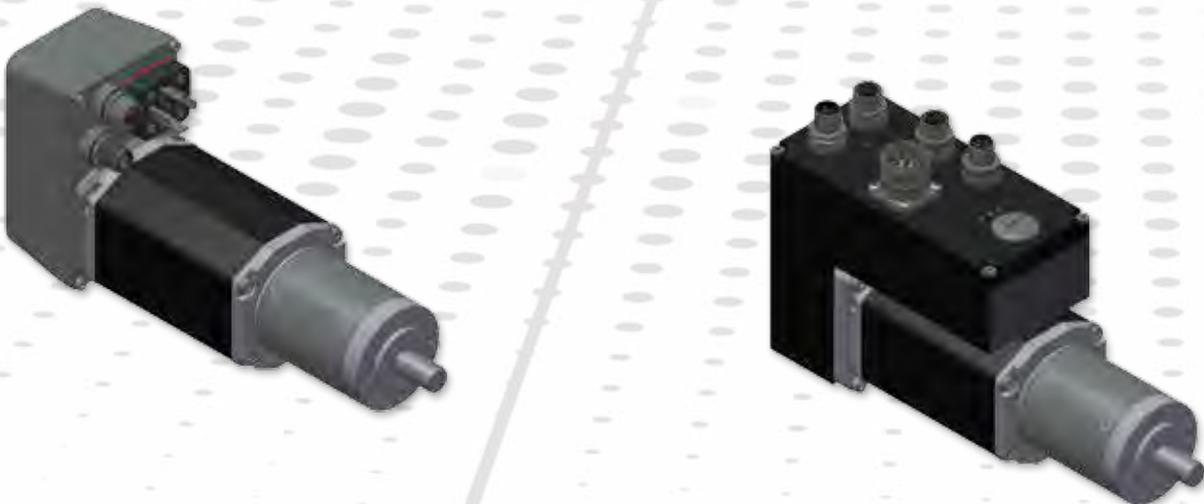


Motion





Motion – Intelligent Compact Drives



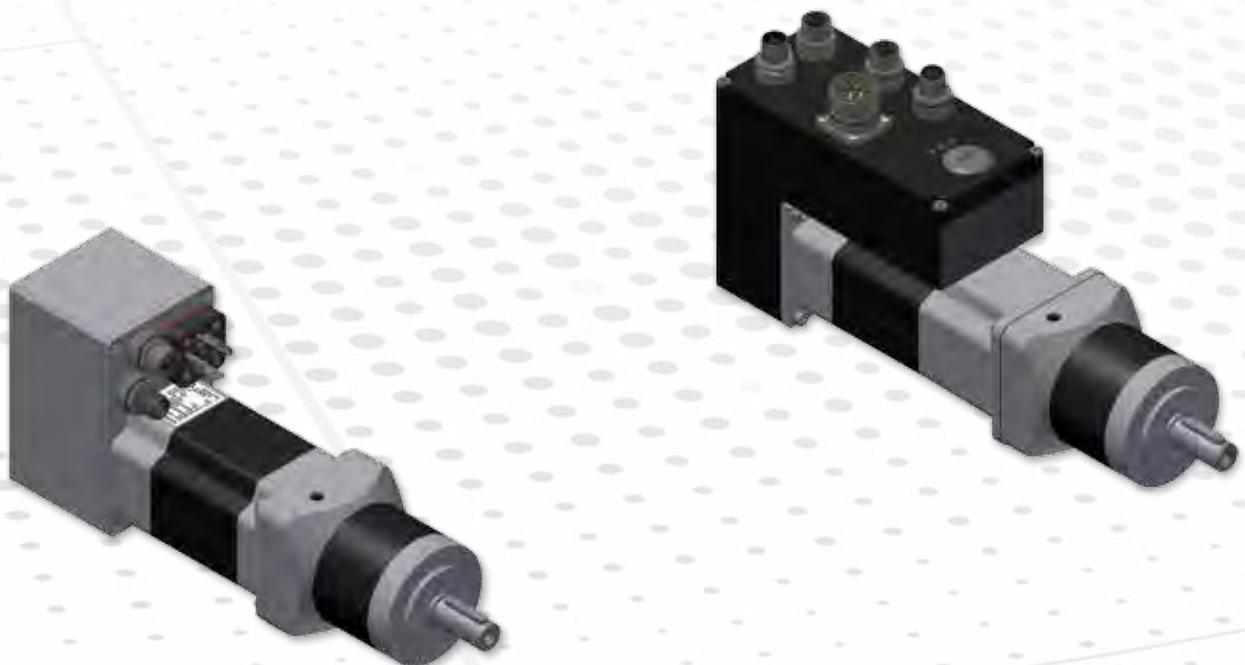
Intelligent compact drives integrate absolute rotary encoder, motor and control technology

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

1,000 min⁻¹ per s

20 ms

1–2°

without

1,000 h

Positioning Drive

As auxiliary or main drive for ...

- _ cyclic format adjustments
- _ dynamic rough settings
- _ fine adjustments
- _ speed

For use in ...

- _ woodworking machines
- _ package ejection machines
- _ profile measuring machines
- _ X-ray analyzing devices

Controller structure

Dynamics

Real time

Accuracy

Inputs and outputs

Lifetime

Performance

Processing Drive

As main drive for ...

- _ precise positioning
- _ a synchronized and cyclic transfer
- _ sensor coupled position measurement
- _ application optimized portal systems

For use in ...

- _ accurate grinding machines
- _ inspection machines
- _ tool controlling modules
- _ tire testing facilities

PID

10,000 min⁻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 Market

TR-Electronic – Helps You to Face the Challenges of Knowing and reacting to the demands of the market is the key to success. Today, innovative drive technology has to transfer technology trends and specific user requirements into new products. Aspects like mechatronics, electronics and software must be custom-fit and industry-sector-specific. The challenges is to increase machine productivity, while simplifying the design and operation.

In combination with automation technology, the encoTRive intelligent positioning and actuating drives maximise the innovative potential of modern machinery or retrofiting. Our encoTRive integrates and tunes all important required electrical, electronic and mechanical components. encoTRive is a fully functional drive unit ready to be connected. The advantage of using decentralized drive technology is felt when realizing modular concepts, retrofits, making acquisitions or when used in machines and equipment where large measurements occur. Both aspects of innovation – automation and integration – enable progressive machine concepts. Besides the already automated main processes, the auxiliary

functions have to be electromotive automated. This demands new and integrated drive technology concepts. Standardization and fieldbus systems play a dominant role.

To create a perfect combination of innovation, increased performance and flexibility, you have to be able to choose from a variety of multiple drive configurations and you must be able to make optimal changes between those configurations. For this purpose, we designed and adapted the variety of the individual encoTRive models. The wide range of applications go from simple tasks for the actuating drives up to complex highly accurate tasks for positioning drives.

Decentralized Drive Technology with encoTRive

The name encoTRive is the brand for our complete drive technology product line. It is derived from the two components **absolute Encoder and DRive**, modified and exchanged with our company abbreviation **TR**.

Integration is the first trademark. Enclosed are the power and positioning electronics, zero voltage safe encoder, fieldbus technology and gear. It is also available with optional holding brake and different I/O.

Variety Diversity is the second trademark. This is due to the diverse electronic functionality, numerous gear ratios and a wide range of gear types. Further options include radial or axial shaft, solid or hollow shaft, a moderate backlash or backlash-free. This is accomplished by using a planetary, worm or special gears.

Cross-Range Compatibility is the third trademark. All series are based on a common software platform. Only the MD and MP series differ in their absolute encoder and electronics. However, they use an identical platform and use the same electric motor and gear box.

MD 300, Version PROFIBUS



Individual models are constructed for application categories. For automation tasks with different requirements we offer drives with optimal performance levels.

- _ **Actuating Drive MA (Stellantriebe)**
- _ **Positioning Drive MP (Positionierantriebe)**
- _ **Drive in Core Process MD (Prozessantriebe)**

This structure is supported by a standard platform in the implementation of firmware, interfaces and bus. In practice

this means, there is considerably less effort in engineering and maintenance. System costs and installation times decrease as well. Available bus systems are: PROFIBUS, PROFINET and CANopen, enhanced through busses based on newer EtherNet technologies.

The encoTRive series opens with its standard decentralized concept, a new level of automation technology that applies all mechanical engineering applications, in particular in industries like packaging, press, wood, glass, print, plastics, textile and machine tools.

Series Features

- _ design according to application classification
- _ implementing software platform
- _ position measurement with fail-safe multi turn absolute encoder
- _ integration into a mechatronic system
- _ variant diversity through modularity
- _ operating modes, positioning and speed control
- _ control completely decentralized within the drive

Working Features

- _ high resolution, 1.024 or 4.096 steps per revolution
- _ long range, 4.096 or 65.536 revolutions
- _ precise positioning up ± 2 increments
- _ smooth running even at low speed
- _ limitable with software limit switch
- _ set parameters according to bus standards

Design of MD, MP and MA series

Based on its standard products, TR also develops customer- and application-specific drives. The series range from simple modifications, for example in plug connectors, to drives with new drive motors and additional bus interfaces.

- 10 different electric motors
- 11 gear types (axial and rectangular shaft output)

Electronics and drives of the MD series

The absolute encoder and the electronics are arranged in extension of the motor axis and on the side of the motor.

The connector cover accommodates not only the bus interface but also the application module for PROFIBUS and PROFINET. There is 1 standard M23 connector for power, logic and holding brake. In addition, there are 4 M12 connectors for bus IN/OUT and digital I/O. A sixth connector serves for communication with a PC featuring an RS-232 interface.



Electronics and drives of the MP series

The absolute encoder and the electronics are arranged in extension of the motor axis.

The electronics is simpler in its design and features less functionality than the MD series. The electronics housing is smaller as well. As a result, there is less output power during continuous operation. During intermittent operation or short-time operation, the same output and the same torque are available, but they are limited to shorter make and cycle times.



Electronics and drives of the MA series

The electronics is especially configured for short-time operation and moderate intermittent operation. The electric motors are brushed DC motors.

The absolute encoder and the electronics of the MA 025 are arranged in extension of the output shaft of the gear. The measurement involves the position of the gear shaft. The series features two defined types each with a driving torque of 2 and 4 Nm.

The absolute encoder and the electronics of the MA xxx (-055/ -100/ -130) are attached to the electric motor. This series features different power stages, torques and gear types.



Detachably mounted gears with coupling and clamping hub

Most of the precision gears are mounted to the electric motor such that they can be detached. This is the most flexible solution for project businesses, special machine building, and medium-size series.

Gear types range from economy planetary gears to low-backlash servo gears. Driving torques of up to 180 Nm are accessible for reinforced gears.



Non-detachably mounted gear with direct connection

All simple gears are permanently mounted to the electric motor. Coupling, clamping hub, gearbox flange and gearbox bearing are not applicable. For this purpose, the shaft of the electric motor features a pinion which couples directly to the first stage of the gear.

The gear types available are planetary gears and worm gears. The output direction of the gear shaft of drives with worm gear is set to one of the four possible directions.



Collection of drive series

	Electronics MA	MP	MD	
<p>DC (brushed)</p> <p>PROFIBUS CANopen PROFINET EtherCAT</p>	<p>MAxxx S</p> 			
<p>EC (electronically commutated)</p> <p>PROFIBUS PROFINET CANopen EtherCAT</p>		<p>MP xxx</p> 		
<p>EC (electronically commutated)</p> <p>PROFIBUS PROFINET CANopen EtherCAT</p>		<p>MP200</p> <p>MP220/280</p> 	<p>MD 300</p> 	

Possible component combinations

Motors		Gears	
 055  100  130		Simple gears	
		Standard  PLG 52	Reinforced  PLG 63
 060  100  140  180		 SG 80 H	 SGF 120 H
		 SG 80 WL1	 SGF 120 WL1
 200 without break  with break  220 without break  with break  280 without break  with break		Precision gears	
		Standard  PLE 60	Reinforced  PLE 80
		 WPLE 60	 WPLE 80

Process drive MD 300

The MD 300 series features comprehensive electronic functions and high-quality gears. Various gear series are available in several overall sizes and reductions.

The drives that can be configured based on these gears can be used as process drives or as auxiliary drives when special requirements must be met with regard to electronics, accuracy and mechanical flexibility.

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



Fits perfect

- _ for precise positioning
- _ for cyclic and pulsed positioning
- _ for simultaneous use of decentralized I/Os
- _ in machine tools
- _ in inspection machines
- _ in special machines

Technical data		MD 300	
Nominal voltage	VDC	24	48
Nominal torque S1 (S3)	Nm	0.60 (1.10)	0.60 (1.10)
Nominal power S1 (S3)	W	136 (178)	273 (357)
Nominal speed S1 (S3)	min ⁻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	

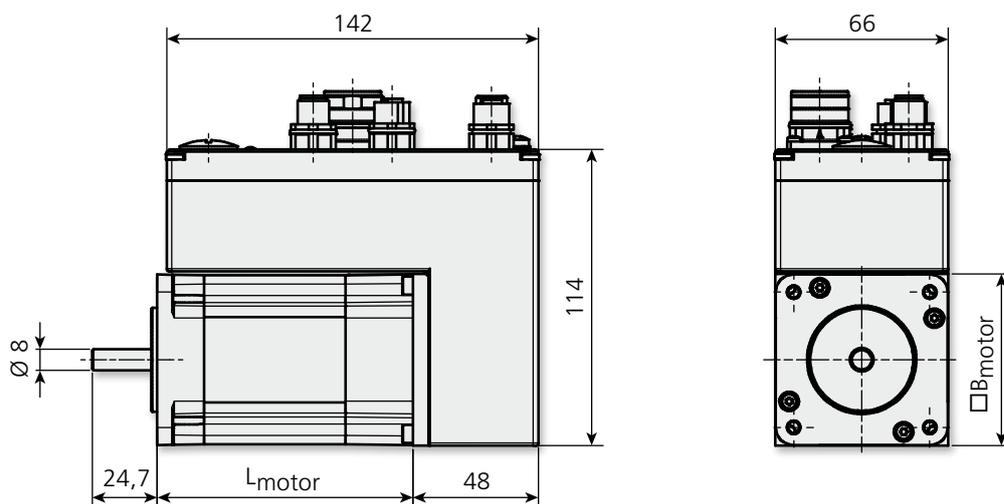
Definitions

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

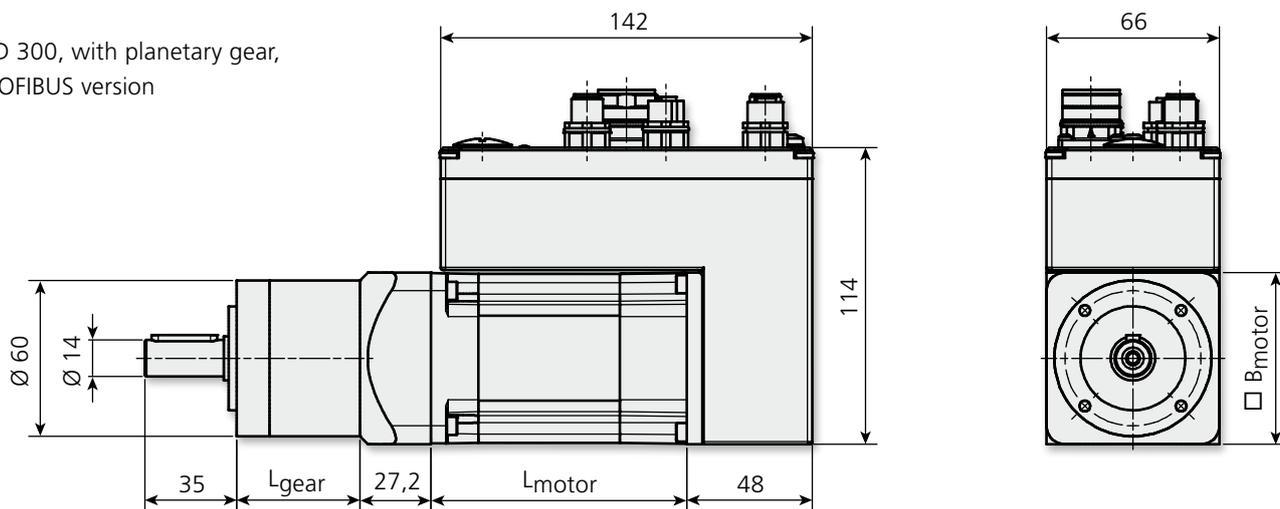
True absolute encoder
Fail-safe position information through electromechanical principle of measurement

Drawings

MD 300, without gear,
PROFIBUS version



MD 300, with planetary gear,
PROFIBUS version



Motor design

Brake	L _{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

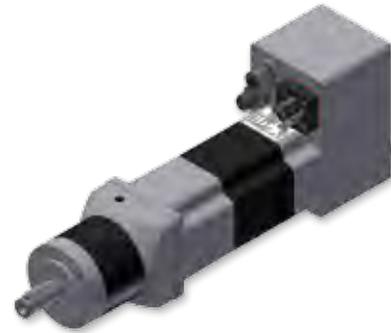
Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at www.tr-electronic.com or on request.

Positioning drive MP 200

The MP 200 series features numerous electronic functions and high-quality gears. Various gear series are available in several overall sizes and reductions.

The drives that can be configured based on these gears can be used as positioning drives or as auxiliary drives when special requirements must be met with regard to accuracy and mechanical flexibility.

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



Fits perfect

- _ for demanding positioning
- _ for precise format setting
- _ for high-precision pulsed positioning
- _ in transfer lines
- _ in testing devices
- _ in special machines

Technical data		MP 200	
Nominal voltage	VDC	24	48
Nominal torque S1 (S3)	Nm	0.40 (1.10)	0.40 (1.10)
Nominal power S1 (S3)	W	91 (178)	182 (357)
Nominal speed S1 (S3)	min ⁻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		65,536 revolutions	
_ Positioning range		±0.7° / ±8 steps	
_ Positioning accuracy			
Gear		Planetary gear / angular planetary gear	
_ Type		3 ... 512	
_ Reductions		up to 44 (70) Nm, reinforced up to 120 (192) Nm	
_ Torques S1 (S3)			
Interfaces		 (V0/V1)  (402)  (IO) 	
Options		Holding brake 	

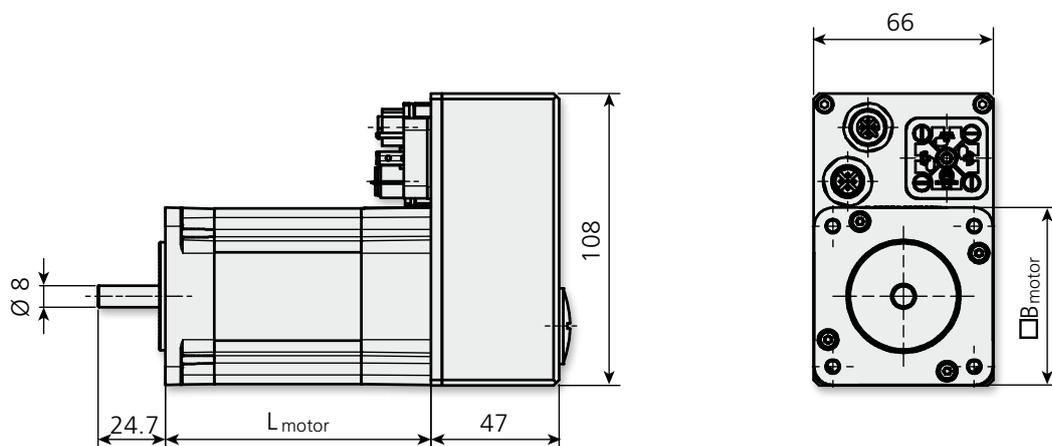
Definitions

- S1**
Continuous operation
- S3**
Intermittent operation
25 %, 4 min
Make time 1 min
Cycle time 4 min
Max. torque 1.10 Nm

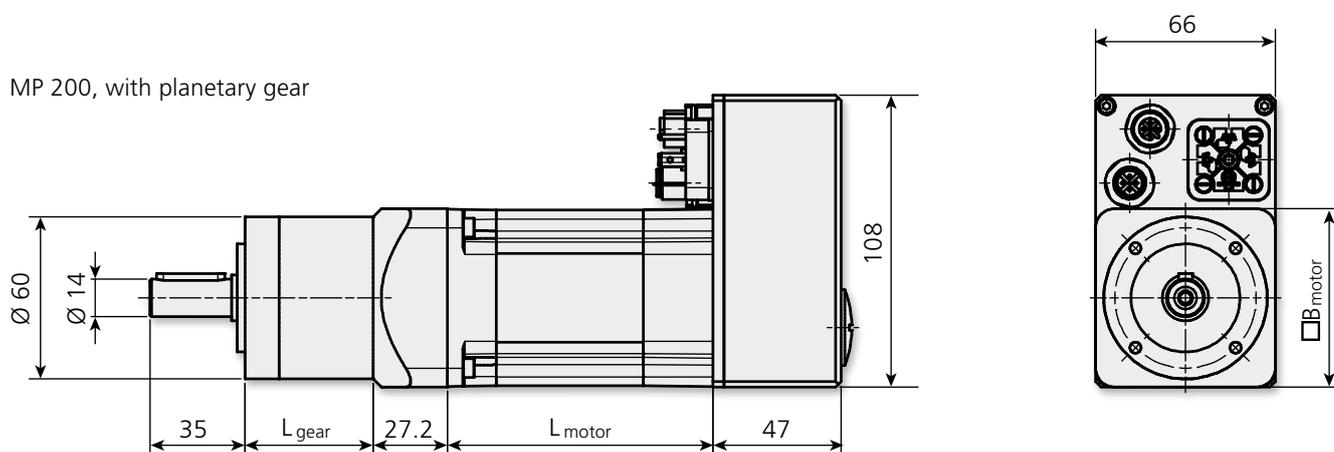
True absolute encoder
Fail-safe position information through electromechanical principle of measurement

Drawings

MP 200, without gear



MP 200, with planetary gear



Motor design

Type series	L_{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.

Positioning drive MP 220 / 280

MP 280 complements the MP 200 series with a model with a peak torque of 2 Nm. MP 220 is a much shorter version of the MP 200 with standard torque. MP220 / 280 can be offered with the same gearbox as the MP 200 series - only the motor-side geometry is adapted to the modified motors. With MP 280, applications are in reach that require a high torque during short time. As with the MP-200, many gearbox types are available: The perfect solution for special machine construction or for use in machines with multiple applications.



Fits perfect

- _ vertical positioning
- _ acceleration of heavy loads
- _ to overcome initial friction
- _ woodworking machines
- _ packaging machines
- _ in assembly and handling units

Technical data		MP 220	MP 280
Nominal voltage	VDC	48	48
Nominal torque S1 (S2)	Nm	0,40 (1,4)	0,40 (2,0)
Nominal power S1 (S2)	W	167 (586)	167 (837)
Nominal speed S1 (S2)	min ⁻¹	4.000 (4.000)	4.000 (4.000)
Nominal current S1 (S2)	A	4,5 (16)	4,5 (20)
Inertia torque	g cm ²	360	700
Electric motor		EC, electronically commutated motor	
_ Technology		IP 54, motor shaft IP 41	
_ Protection class			
Encoder		Absolute encoder, multi turn	
_ Technology		0.088° / 4,096 steps per revolution	
_ Positioning resolution		65,536 revolutions	
_ Positioning range		±0.7° / ±8 steps	
_ Positioning accuracy			
Gear		Planetary gear / angular planetary gear	
_ Type		3 ... 512	
_ Reductions		up to 44 (70) Nm, reinforced up to 120 (192) Nm	
_ Torques S1 (S3)			
Interfaces		 (V0/V1) CANopen (402)  (IO)	
Options		Haltebremse	

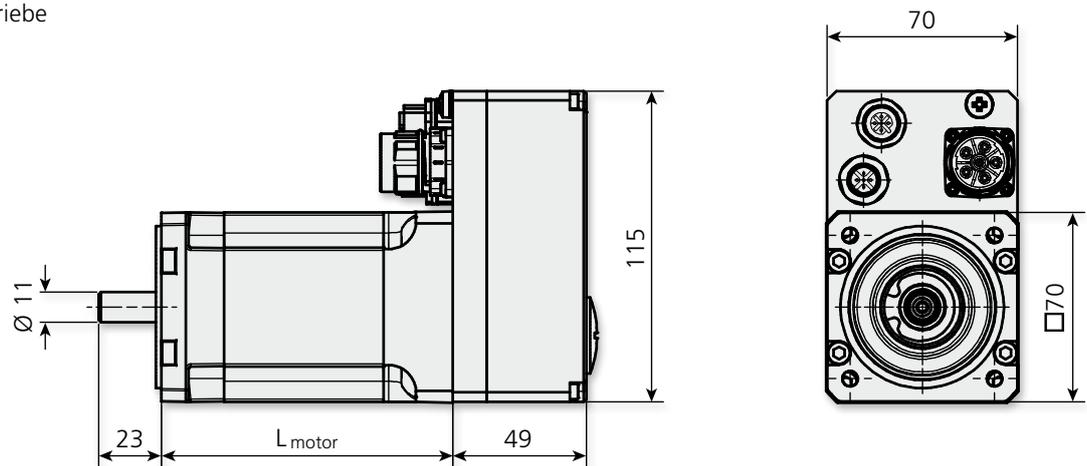
definition

- S1**
Continuous operation
- S2**
short-time operation
2 min

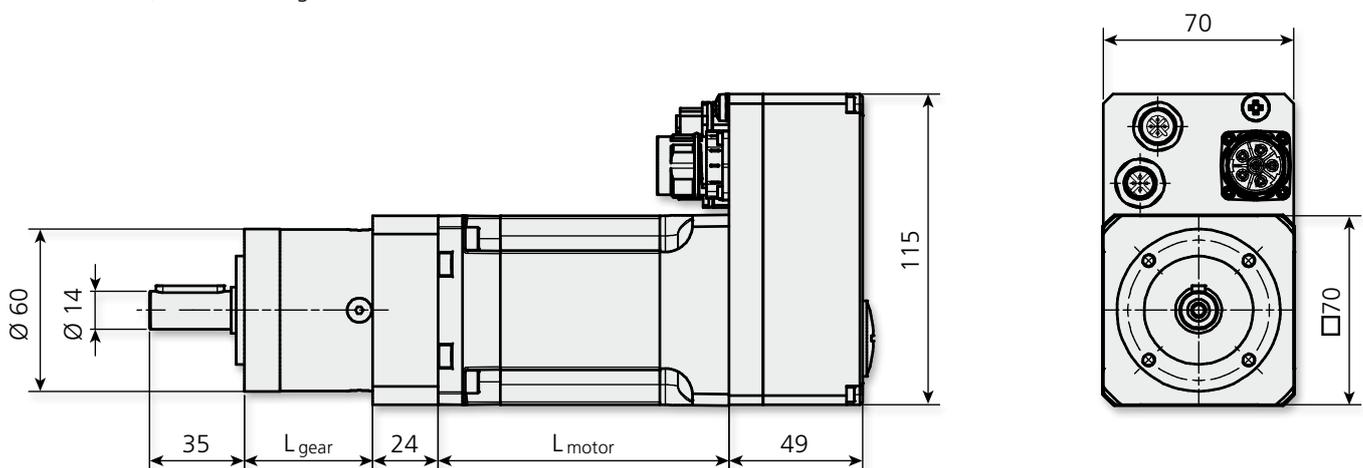
True absolute encoder
Fail-safe position information through electromechanical principle of measurement

Drawings

MP 220/280, ohne Getriebe



MP 220/280, mit Planetengetriebe



Motor design MP 220

break	L _{motor}
yes	108,5 mm
no	75,5 mm

Motor design MP 280

break	L _{motor}
yes	140 mm
no	107 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 overall sizes and reductions. The drives that can be configured based on these gears can be used as positioning drives or as auxiliary drives when simple requirements must be met with regard to electronics and mechanics. This type series is particularly suited for mass production with defined drive configurations.



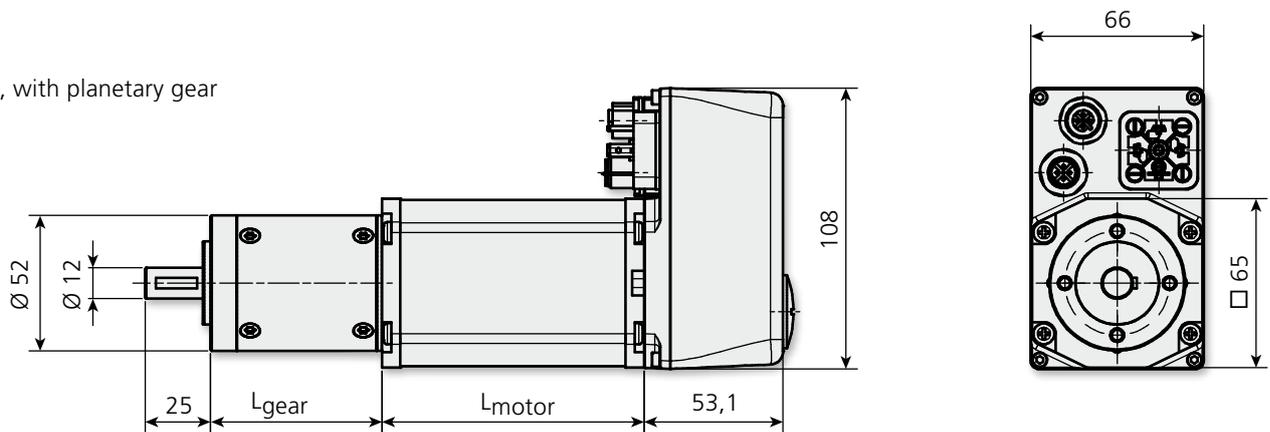
Fits perfect

- _ for easy positioning
 - _ for coarse format setting
 - _ for high-precision constant travel
- _ in handling systems
 - _ in assembly devices
 - _ in special machines

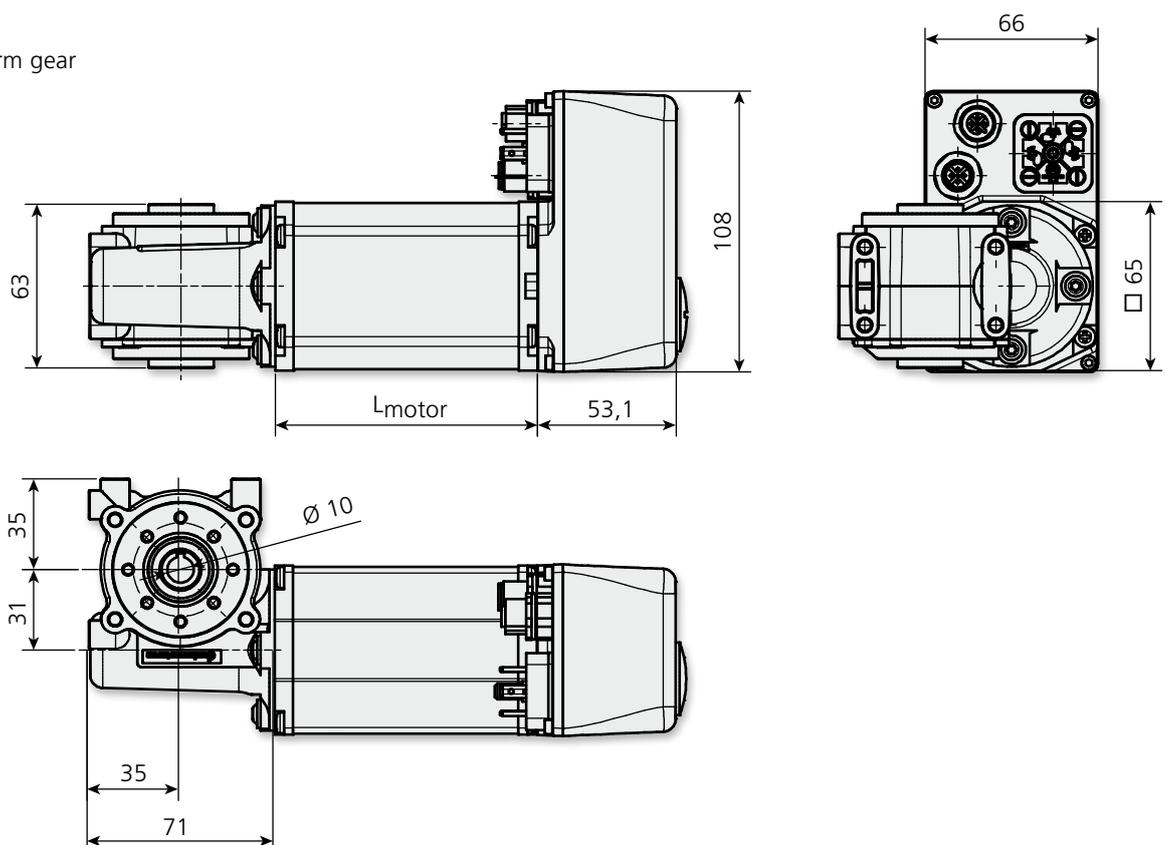
Technical data		MP 060	MP 100	MP 140	MP 180
Nominal voltage	VDC	24	24	42	24
Nominal torque S1	Nm	0.17	0.26	0.40	0.49
Nominal power S1	W	55	84	120	166
Nominal speed S1	min ⁻¹	3,080	3,090	2,860	3,240
Nominal current S1	A	4.0	5.6	4.5	9.5
Inertia torque	gcm ²	72	128	172	129
Electric motor		EC, electronically commutated motor with neodymium magnet 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)  (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

Positioning drive MP xxx (-060, -100, -140, -180)

The MP xxx series is characterized by numerous electronic functions and simple gears. The gears available are planetary and worm gears in several overall sizes and reductions. The drives that can be configured based on these gears can be used as positioning drives or as auxiliary drives when simple requirements must be met with regard to electronics and mechanics. This type series is particularly suited for mass production with defined drive configurations.



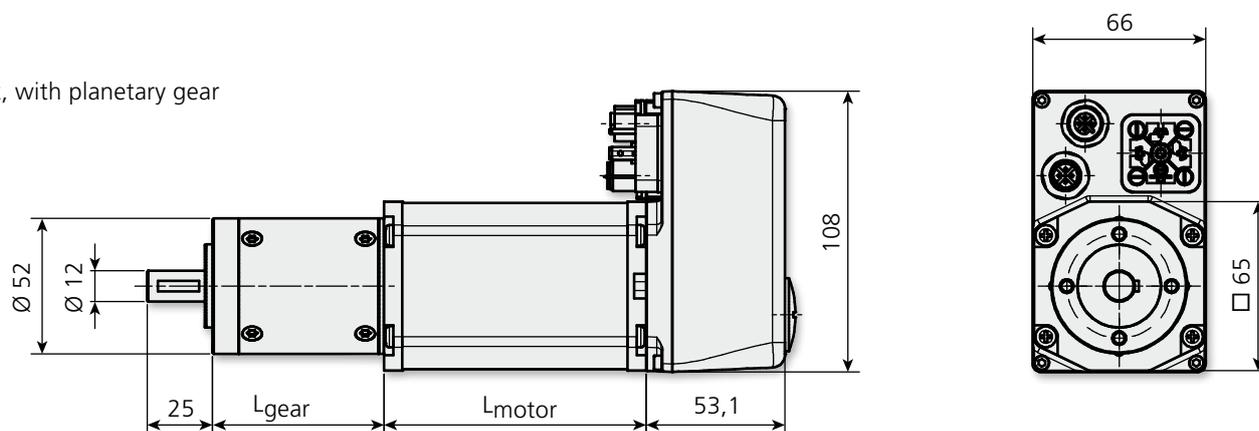
Fits perfect

- _ for easy positioning
 - _ for coarse format setting
 - _ for high-precision constant travel
- _ in handling systems
 - _ in assembly devices
 - _ in special machines

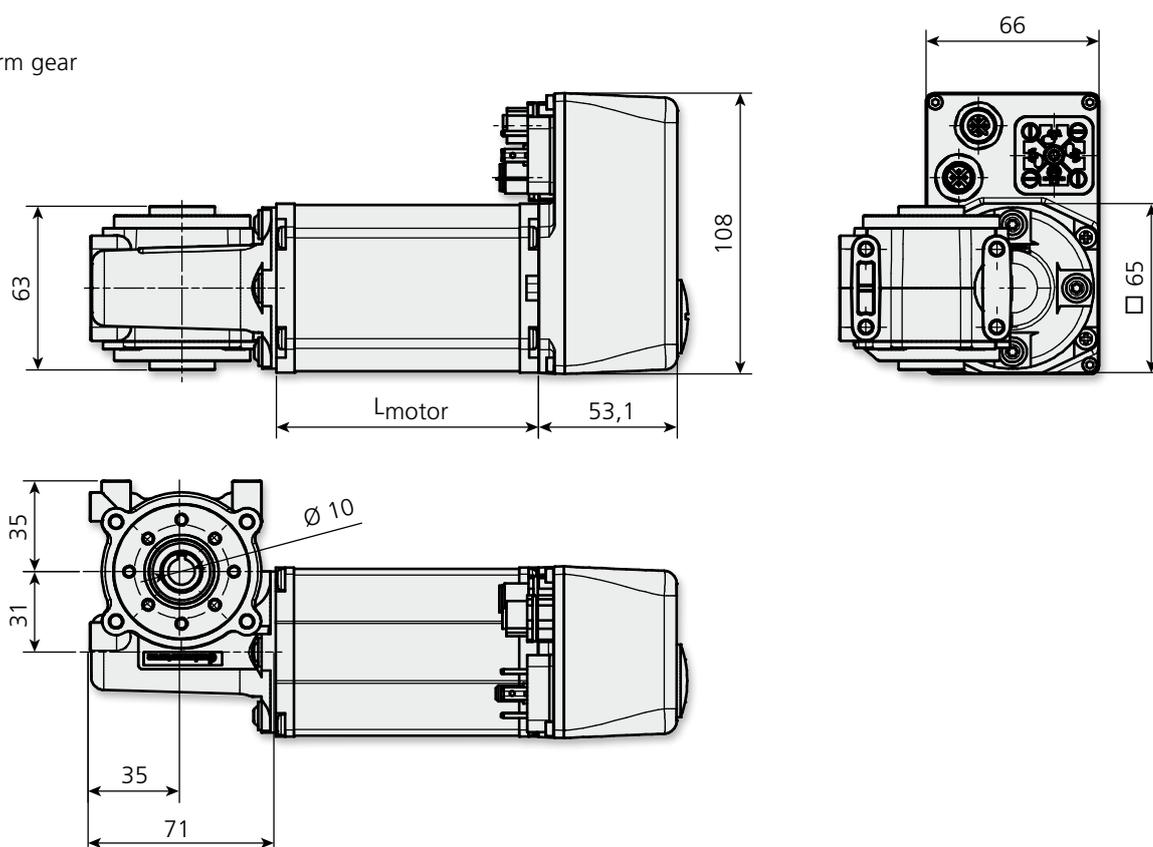
Technical data		MP 060	MP 100	MP 140	MP 180
Nominal voltage	VDC	24	24	42	24
Nominal torque S1	Nm	0.17	0.26	0.40	0.49
Nominal power S1	W	55	84	120	166
Nominal speed S1	min ⁻¹	3,080	3,090	2,860	3,240
Nominal current S1	A	4.0	5.6	4.5	9.5
Inertia torque	gcm ²	72	128	172	129
Electric motor		EC, electronically commutated motor with neodymium magnet 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)  (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 overall sizes and reductions. The drives are designed for occasional adjustment tasks when simple requirements must be met with regard to electronics, mechanics and service life. The MA xxx series is particularly suited for mass production with defined drive configurations.



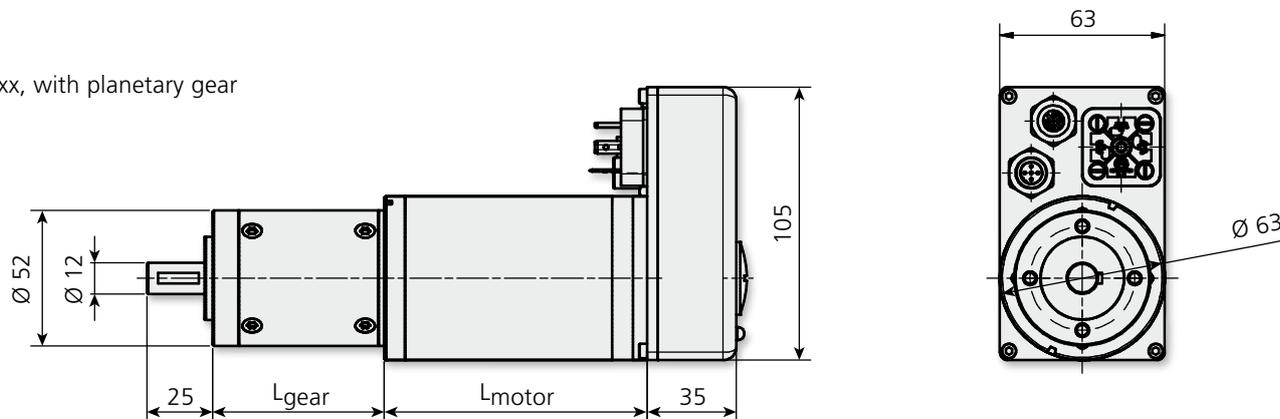
Fits perfect

- _ for setting stops
- _ for positioning guide rails
- _ for aligning spray nozzles
- _ in woodworking machines
- _ in packaging machines
- _ in coating machines

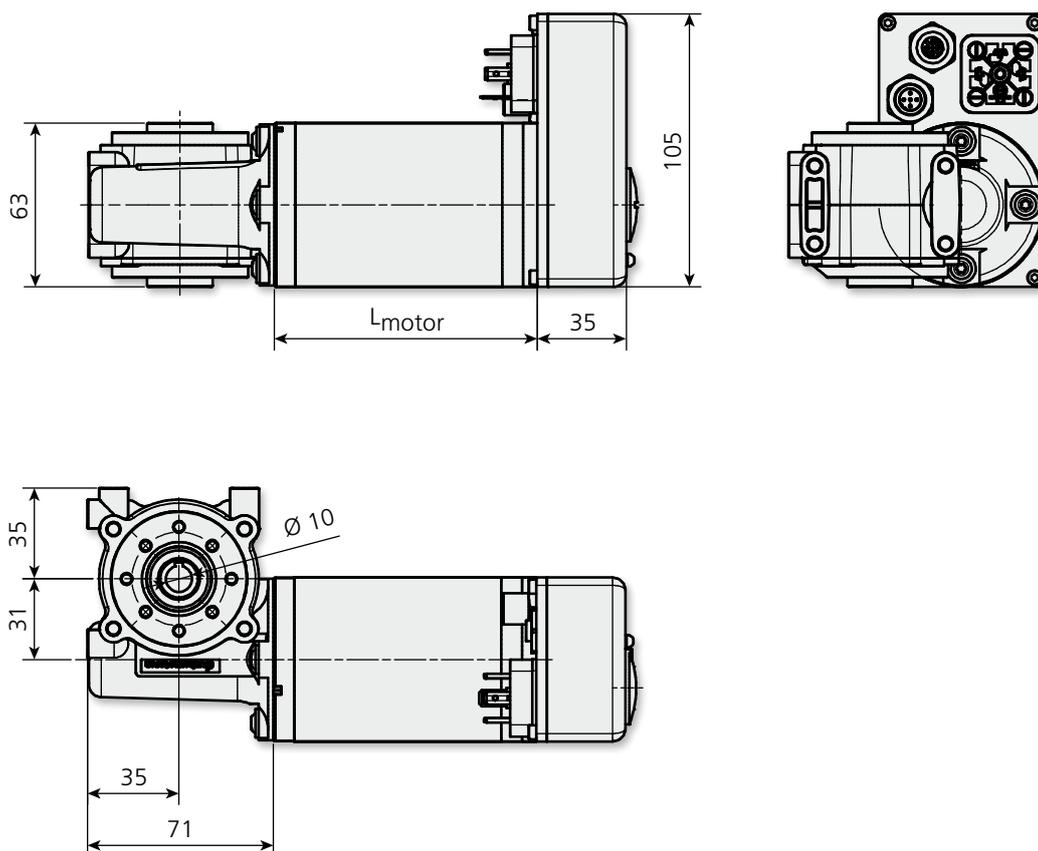
Technical data		MA 055	MA 100	MA 130
Nominal voltage	VDC	24	24	48
Nominal torque S1	Nm	0.14	0.27	0.32
Nominal power S1	W	44	86	107
Nominal speed S1	min ⁻¹	3,000	3,050	3,750
Nominal current S1	A	2.7	4.9	4.5
Inertia torque	gcm ²	400	750	750
Electric motor		DC, brushed motor IP 50		
_ Technology				
_ Protection 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		   		
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.

Precision Gears for MD 300, MP 200 / 220 / 280

Planetary Gear PLE 60

Permanent Operation/Periodic Duty up to 44/70 Nm

The PLE 60 is the perfect economical alternative to servo planetary gears. The motor and gear are connected with a detachable coupling and clamping hub. Friction losses are negligible. The gear is suitable for all applications in where it is adequate to have a backlash of approximately 15 arcmin.

Features

- _ low backlash (10-12-15 arcmin), (1-2-3)-stage
- _ high level of efficiency (96-94-90 %), (1-2-3)-stage
- _ high admissible shaft forces (600/500) N, (axial/radial)



up to 44/70 Nm

- _ high short-term overload factor 1,60
- _ arbitrary mounting position
- _ lifetime lubrication

Angular Planetary Gear WPLE 60

Permanent Operation/Periodic Duty up to 44/70 Nm

The WPLE 60 is the 90° angle version to the PLE 60. The motor and gear are connected with a detachable coupling and clamping hub. Friction losses are negligible. A bevel gear 1:1 is in front of the PLE 60.

Features

- _ low backlash, (16-18-21 arcmin), (1-2-3)-stage
- _ high level of efficiency (94-92-88 %), (1-2-3)-stage
- _ high admissible shaft forces (600/500) N, (axial/radial)



up to 44/70 Nm

- _ high short term overload factor 1,60
- _ arbitrary mounting position
- _ lifetime 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

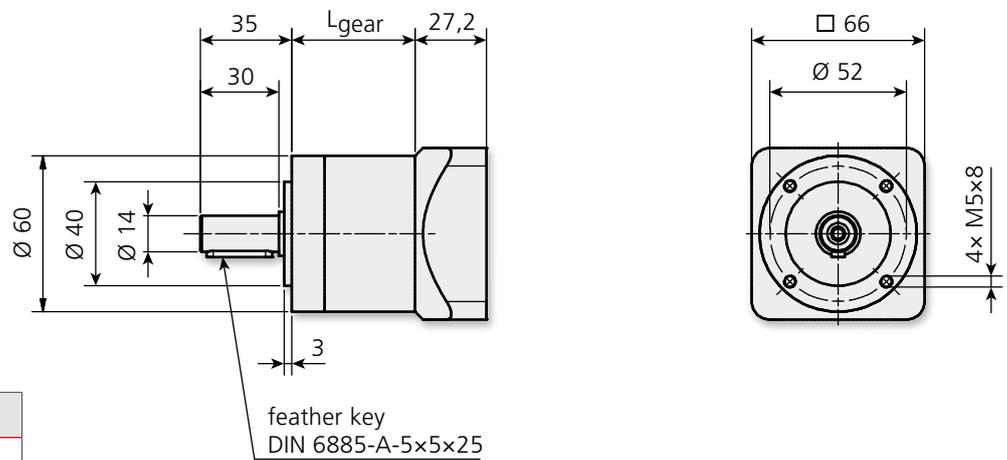
- _ 4 different reductions $i = (30 \dots 100)$
- _ high load-dependent efficiency
- _ high allowed radial force 1.500 N



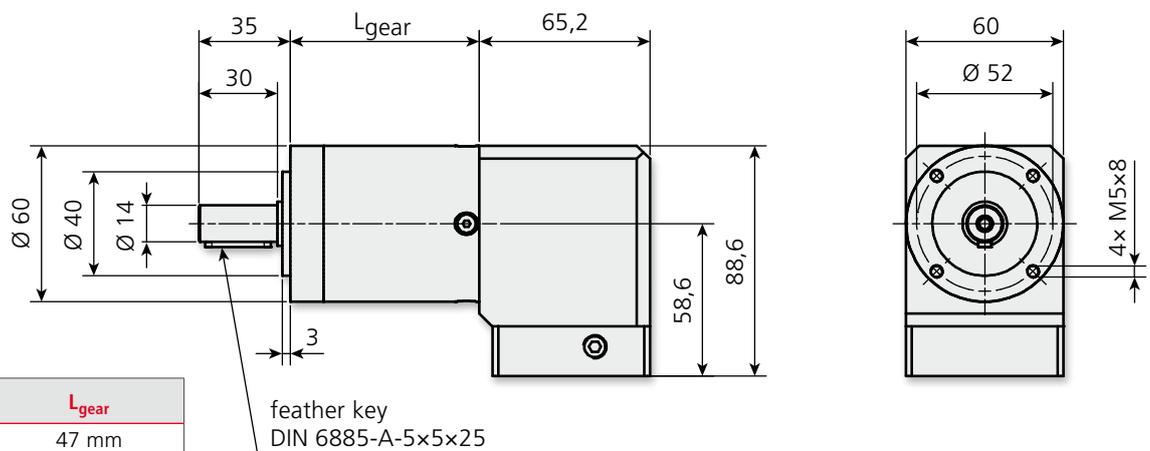
Backlash-free

- _ short-term overload 100 %
- _ any installation position
- _ lifetime lubrication

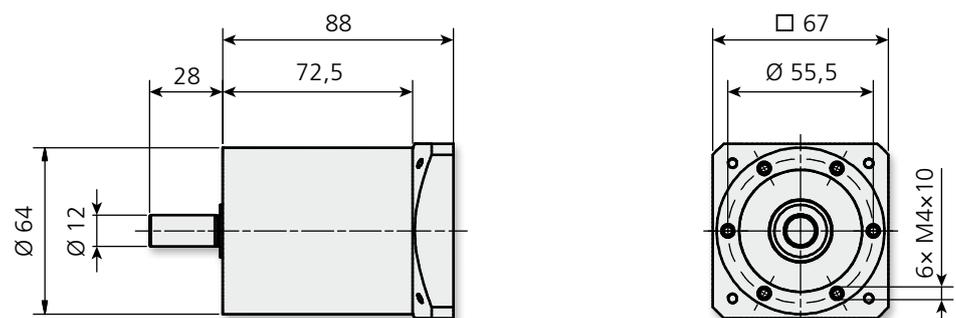
Drawings



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



Enhanced Precision Gears for MD 300, MP 200 / 220 / 280

Planetary Gear PLE 80

Permanent Operation/Periodic Duty up to 130/208 Nm

The PLE 80 is the perfect economical alternative to servo planetary gears. The motor and gear are connected with a detachable coupling and clamping hub. Friction losses cannot be neglected. The gear is suitable for all applications where it is adequate to have a backlash of approximately 15 arcmin.

Features

- _ low backlash (7-9-11 arcmin), (1-2-3)-stage
- _ high level of efficiency (96-94-90 %), (1-2-3)-stage
- _ high admissible shaft forces, (1.200/950 N), (axial-radial)
- _ high short term overload factor 1,60
- _ arbitrary mounting position
- _ lifetime lubrication



130/208 Nm

Angular Planetary gear WPLE 80

Permanent Operation/Periodic Duty up to 130/208 Nm

The WPLE 80 is the 90° angle version to the PLE 80. The motor and gear are connected with a detachable coupling and clamping hub. Friction losses can not be neglected. A bevel gear 1:1 is in front of the PLE 80. The gear backlash increases by an angle part of 6 arcmin.

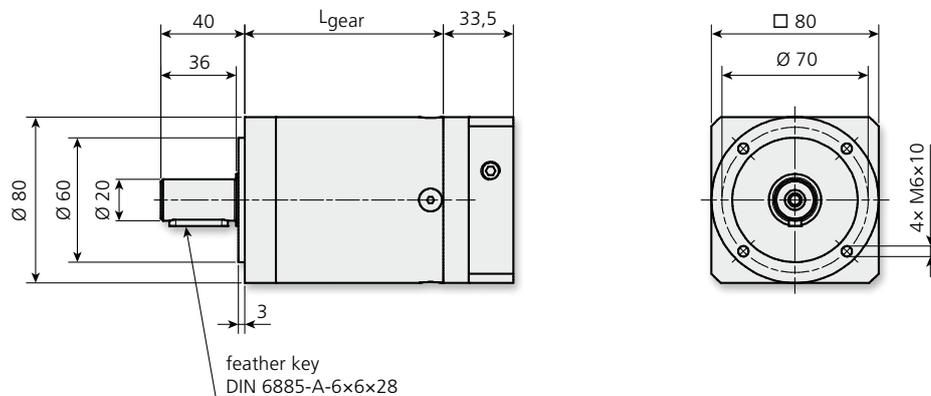
Features

- _ low backlash (13-15-17 arcmin), (1-2-3)-stage
- _ high level of efficiency (94-92-88 %), (1-2-3)-stage
- _ high admissible shaft forces, (1.200/950 N), (axial-radial)
- _ high short term overload factor 1,60
- _ arbitrary mounting position
- _ lifetime lubrication

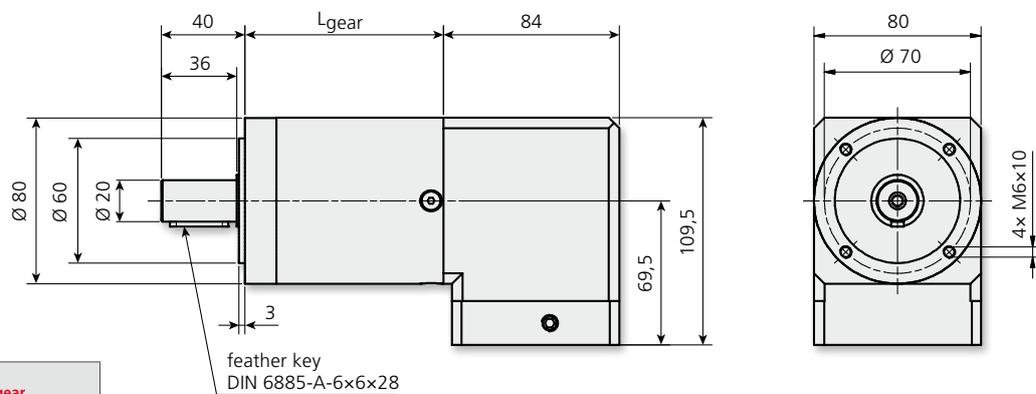


bis 130/208 Nm

Drawings



Gear stages	L_{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 MP xxx, MA xxx

Planetary gear PLG 52

Continuous torque up to 24 Nm

The PLG 52 is a gear with simple circumferential backlash and is non-detachably connected to the motor. It is suitable for any application in which the circumferential backlash is approx. 1° and the startup frequency does not have to meet special requirements. Friction losses can be neglected.

Features

- _ backlash (1-1-1,5)°, (1-2-3) -stage
- _ level of efficiency (90-81-73) %, (1-2-3) -stage
- _ admissible shaft forces, (300/350) N, (axial/radial)
- _ output shaft with double ball bearing
- _ arbitrary mounting position
- _ lifetime lubrication



up to 24 Nm

Worm gear SG 80, with solid shaft

Continuous torque up to 10 Nm

The SG 80 is a worm gear with one-sided shaft and is non-detachably connected to the motor. It is suitable for applications with confined installation spaces and low circumferential backlash requirements. Friction losses can be neglected.

Features

- _ backlash 1°
- _ level of efficiency (70...25) % bei 1.500 min^{-1}
- _ admissible shaft forces, (300/350) N, (axial/radial)
- _ output shaft offset by 31 mm
- _ arbitrary mounting position
- _ lifetime lubrication



up to 10 Nm

Worm gear SG 80 H

Continuous torque up to 10 Nm

The SG 80 H is the hollow shaft version of the SG 80 and is non-detachably connected to the motor. It is push-fitted and excellently suitable for applications with highly confined installation spaces and low circumferential backlash requirements. Friction losses can be neglected.

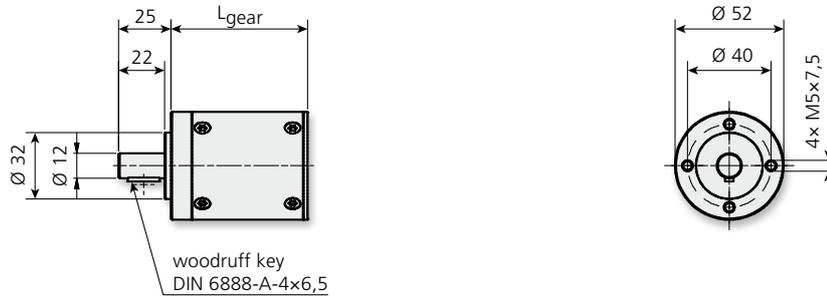
Features

- _ backlash 1°
- _ level of efficiency (70...25) % bei 1.500 min^{-1}
- _ admissible shaft forces, (300/350) N, (axial/radial)
- _ output shaft offset by 31 mm
- _ arbitrary mounting position
- _ lifetime lubrication

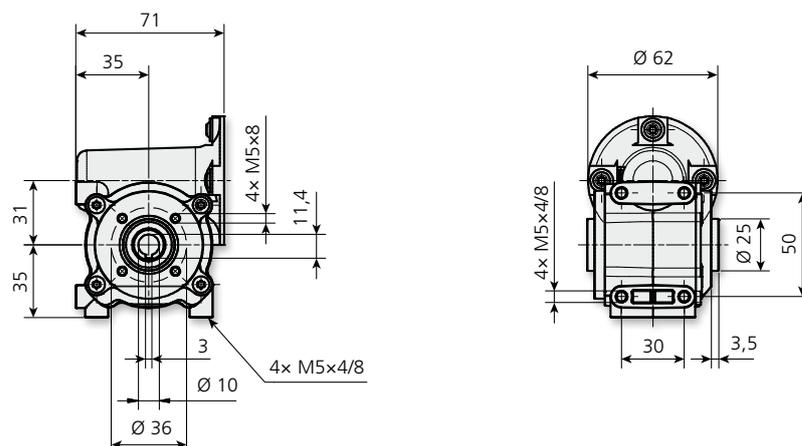
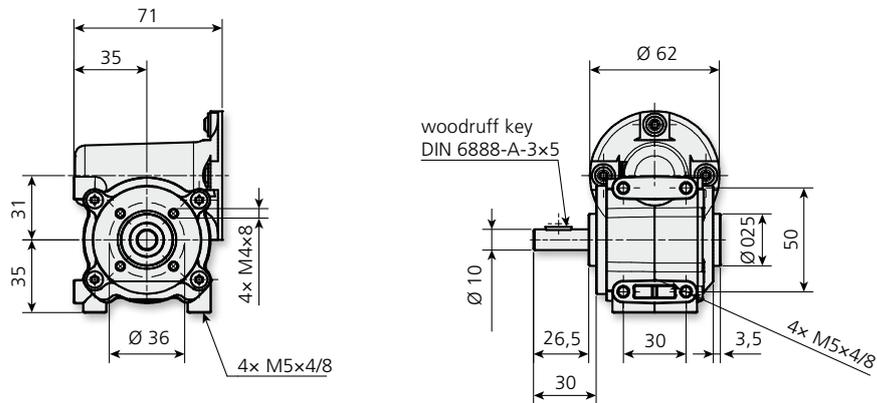


up to 10 Nm

Drawings



Gear stages	$L_{\text{Gear box}}$
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.

Reinforced simple gears for MP xxx, MA xxx

Planetary gear PLG 63

Continuous torque up to 100 Nm

The PLG 63 is a gear with simple circumferential backlash and is non-detachably connected to the motor. It is suitable for any application in which the circumferential backlash is approx. 1° and the startup frequency does not have to meet special requirements. Friction losses can be neglected.

Features

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



up to 100 Nm

- _ output shaft with double ball bearing
- _ any installation position
- _ lifetime lubrication

Worm gear SGF 120, with solid shaft

Continuous torque up to 30 Nm

The SGF 120 is a worm gear with one-sided shaft and is non-detachably connected to the motor. It is particularly suited for applications with confined installation spaces and low circumferential backlash requirements. Friction losses can be neglected.

Features

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



up to 30 Nm

- _ output shaft offset by 31 mm
- _ any installation position
- _ lifetime lubrication

Worm gear SGF 120 H

Continuous torque up to 30 Nm

The SGF 120 H is the hollow shaft version of the SGF 120 and is non-detachably connected to the motor. It is push-fitted and excellently suitable for applications with highly confined installation spaces and low circumferential backlash requirements. Friction losses can be neglected.

Features

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

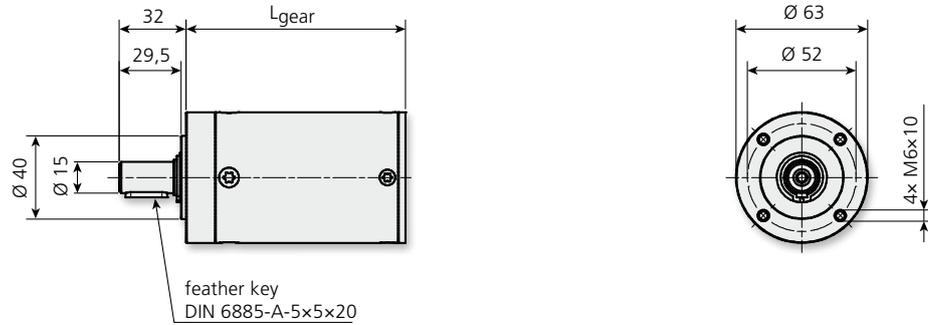


up to 30 Nm

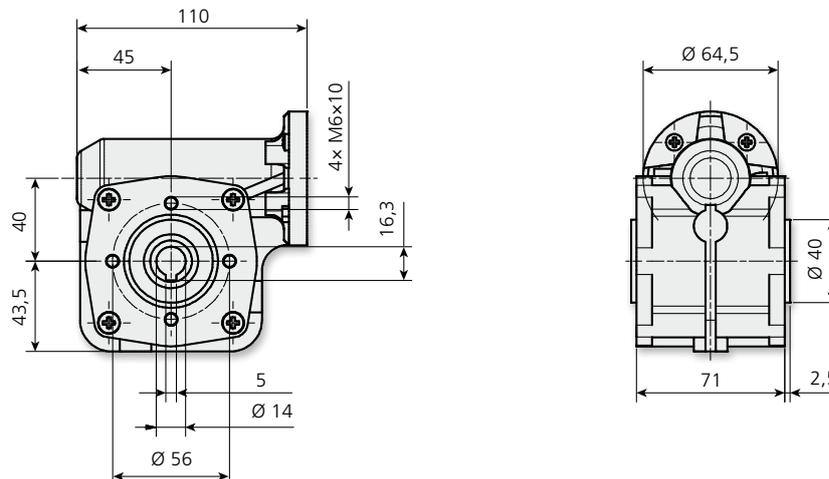
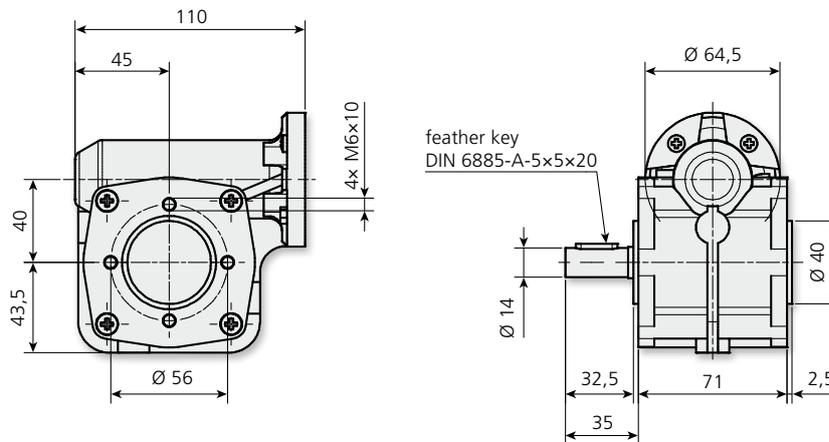
Features

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

Drawings



Gear stages	L _{gear}
1	62,5 mm
2	83 mm
3	105 mm



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

Interfaces

PROFIBUS



The drive version with PROFIBUS DP is based on the device profile PROFIdrive V3.0 and is assigned to application class 3 - position drive with decentralized positioning control (single axis point-to-point). The device profile V3.0 allows free configuration of process data telegrams as an essential enhancement to V2.0 with a fixed pre-defined telegram structure.

The appropriate communication profile is PROFIBUS DP VO/V1 with cyclic and acyclic data traffic. All common bit rates are accessible and get adjusted automatically based on a bus analysis. In the case a drive has a digital input, a handheld device can be connected. Simple processing operations are possible without any bus connection. If the bus is in operation, the input is for connecting hardware limit switches, or together with digital output, they serve as logical I/O module at the PROFIBUS.

Features

- _ positioning and speed control
- _ cyclic and acyclic communication according to PROFIBUS DP VO/V1
- _ free configurable process data telegrams according to device profile PROFIdrive V3.0
- _ voltage failure-safe update possibility

PROFINET



The encoTRive drives with PROFINET use the same device profile PROFIdrive V3.0 as PROFIBUS DP. When migrating from PROFIBUS to PROFINET, the control logic and the PZD configuration remain the same. Logical programming adjustments do not occur. The range of PROFIBUS functions is fully integrated into PROFINET. PROFINET offers some additional functions. There is an alarm telegram in case of trouble when the cycle times are too low and there are more addressable nodes.

The projecting is carried out with the same tools used for PROFIBUS. Together with the identical program and processing logic, the change from PROFIBUS to PROFINET is solely a matter of the communication technology.

Features

- _ no bus termination necessary
- _ address assignment via software
- _ the protocol analysis can be done with freely available Ethernet tools (for example with Wireshark™)
- _ the topology is simplified by star, lines, tree and ring structures as well as arbitrary hybrid forms

Technical Communication Data

Communication profile	PROFIBUS - DP	PROFINET-IO
Range of functions	DP-V0 and DP-V1	Conformance Class A, Real Time Class1
Device profile	Profidrive V3.0, Application Class 3	
Transfer	cyclic (process data), acyclic (alarm and time uncritical parameters)	
Process data configuration	free or over standard protocols	
Max. participants	max. 96	>1000
Terminating resistance	MD: internal, MP/MA: external	needless

Function blocks for PROFIBUS and PROFINET

The available demo function blocks allow commissioning any drive type without having to know the parameter features and the telegram sequences.

The interfaces of the individual function blocks are identical for Profibus and Profinet.

	Description
Parameter PIV	Function block for parameterizing individual parameters using the cyclic PIV channel (parameter identification value)
Parameter DPV1	Function block for parameterizing individual parameters using the acyclic data channel (DPV1)
Control PCD	Function block for commissioning and activating the drive using the cyclic PCD channel (processdata)
Demo Control PCD	Demo program for using the Control PCD function block to cyclically approach two positions in positioning mode

CANopen

CANopen

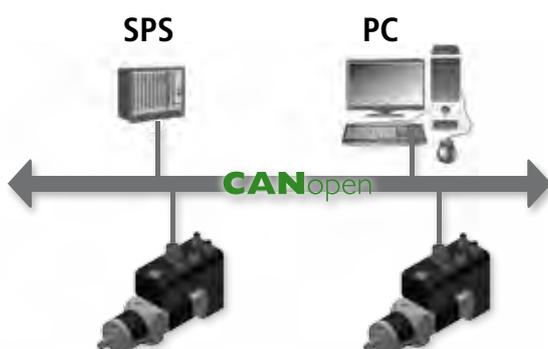
The drive version with CANopen is based on the device profile CiA DSP 402 – drives and motion control. The device profile permits a free configuration of process telegrams through PDO mapping of application objects. Available are 4 RxPDO and 4 TxPDO.

The associated communication profile is CiA DS 301 – CANopen application layer and communication profile.

CANopen defines, for distributed industrial automation systems, a standardized protocol based on CAN. All common bit rates are accessible and set over a DIP-switch. The fast exchange of process data uses a process data object (PDO), the access to the entries within the object directory happens over service data object (SDO). All drive specific information is summed up within the object directory.

Features

- _ installation of the GSD (ML) file within the projecting tool
- _ positioning and speed control
- _ cyclic and acyclic communication with PDO/SDO
- _ free configurable process data telegram according to the communication profile CiA DS 301
- _ each transmission direction with up to 4 PDOs



Technical Communication Data

Communication profile	CANopen
Device profile	CiA DS 301-DP
Geräteprofil	CiA DSP 402
Address range	0 ... 127
Address adjustment	hardware, DIP-switch
Bitrates	10/20/50/100/125/250/ 500/800/1.000 kBit/s
Process data configuration	free or over standard protocols
Terminating resistance	MD: internal, MP/MA: external
Transfer	cyclic (PDO), acyclic (SDO)

Electrical and mechanical accessories

EncoTRive-Control-Device-Tool (EDT)

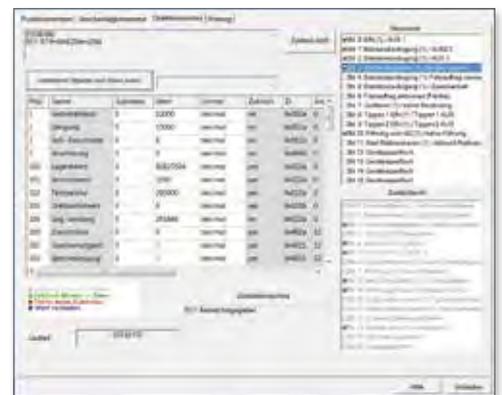
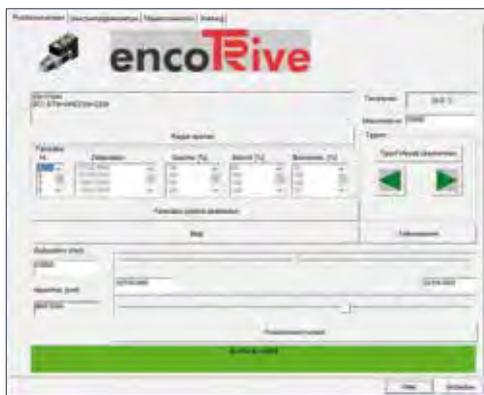
EDT is the parameterization and diagnosis tool for all drives of the EncoTRive product family. It is accessed via predefined interfaces. In case of PROFIBUS, these interfaces are the Hilscher Master Class 1/2, Siemens CP5xxx and other interface cards. In addition, a PC can be connected to the MD type series via an integrated interface converter (RS-232).

The elements of the user interface are subdivided into logical subgroups. The user interface can therefore be controlled intuitively. There are two menu items for **positioning** and **speed control** modes which easily allow starting traveling operations. At the same time, current actual values are displayed, such as position and velocity.

A table consisting of the objects of the object directory lists the cyclic parameters in different colors. The control word and the status word are broken down to bit level. This allows free access to both the individual state transitions and the resulting states. The individual actions are directly performed at the level of the status machine. The command order can be defined as desired.

Technical data

- _ parameterization and diagnosis tool
- _ connection options to PC via RS-232 or interface cards
- _ intuitive user interface
- _ input of position and velocity
- _ freely accessible state transitions



Converter PC-USB to CANopen for the EDT

The PC-USB to CANopen converter enables the connection to CANopen networks via an USB interface. The converter is ideal for mobile use due to its compact plastic housing.



Technical Data

- _ transmission rate up to 1 Mbit/s
- _ connection to PC over USB 1.1, compatible to USB 2.0
- _ connection to CAN-Bus over D-Sub, 9-pole according to CiA® 102
- _ voltage supply over USB
- _ CAN specification 2.0A (11-Bit-ID) and 2.0B (29-Bit-ID)
- _ time-stamp resolution approx. 42 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 executing simple drive functions without bus connection, for example, on initial commissioning or during service work. It is designed as a portable component and features a 5 m long connecting cable.

When it is fitted without bus connection or when PROFIBUS communication is interrupted, the hand-held panel automatically obtains control change rights. Monitoring algorithms ensure that the control change rights are assigned either only to the hand-held operator panel or only to the PROFIBUS master.

The hand-held operator panel holds the control change rights until either an acknowledgement is made via the control or a restart is carried out.

Features

- _jog into positive or negative direction up to the software limit switch
- _Indicator for software limit min., max. and reference
- _setting a reference point
- _fault acknowledgement



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

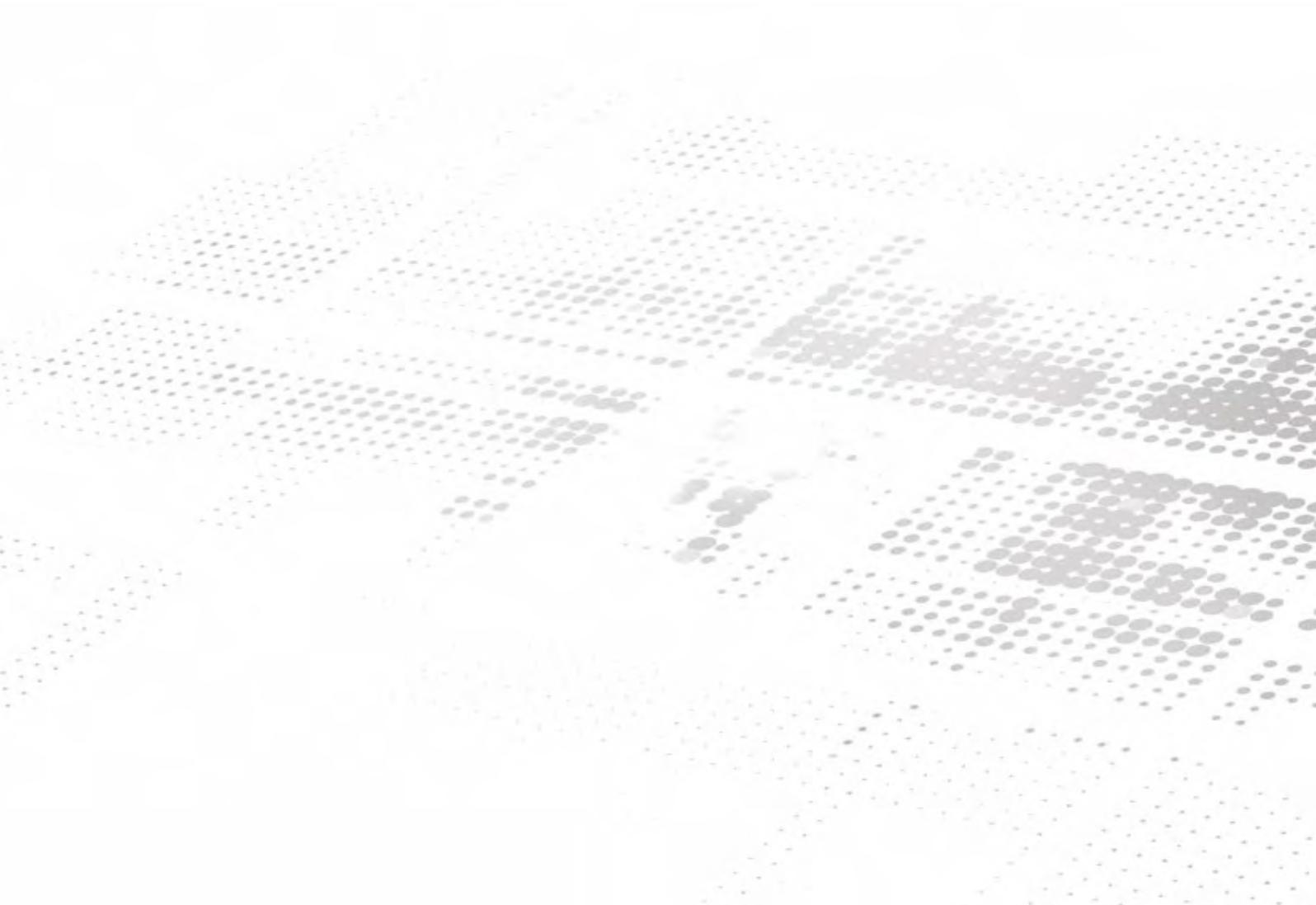
The demo kits contain all components required for fast commissioning. For this purpose, the power supply unit and the drive are already pre-wired. Commissioning only requires that the bus lines be established by means of configurable plug connectors.

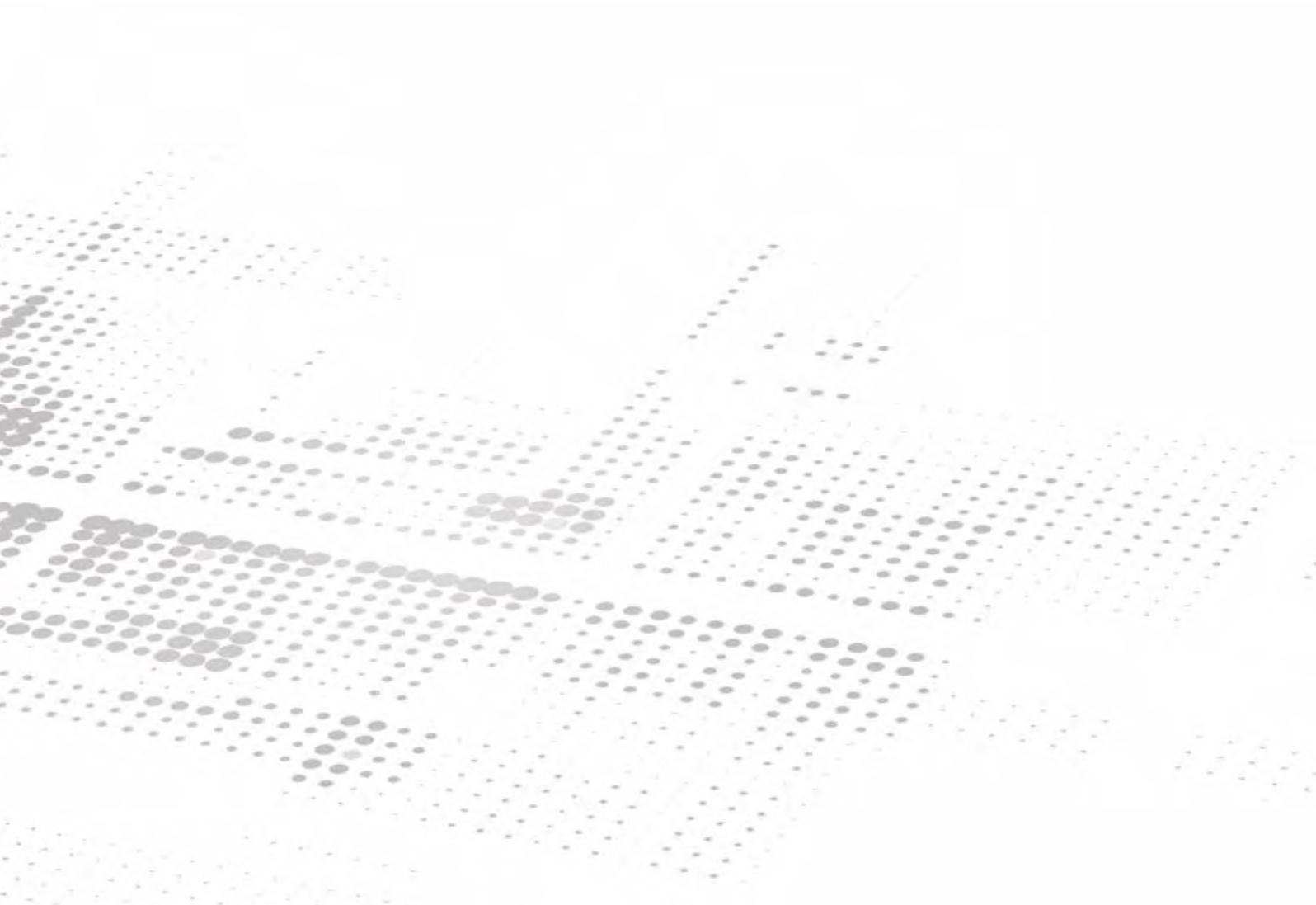


EncoTRive demo kit contents

- _ encoTRive as chosen
- _ wired power supply unit
230/110 VAC at 24/48 VDC
- _ configurable connector set
- _ RS-232 connecting cable
- _ Bus cable
- _ PC-USB to CANopen adapter,
including driver
- _ demo function blocks
- _ encoTRive Device Tool (EDT)
- _ documentation

Zubehör

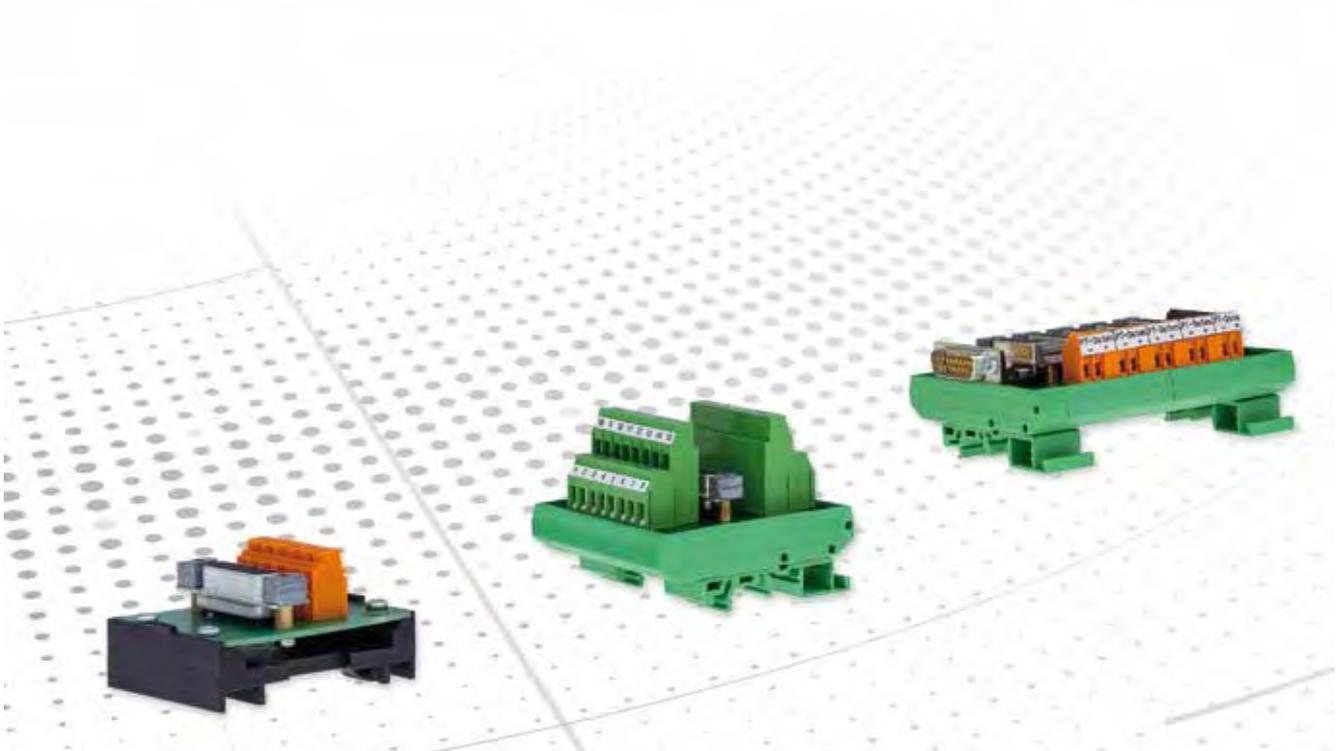




Inhalte

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Für Lineargeber	480

Programming Tools



Electronic helpers for configuration and connection

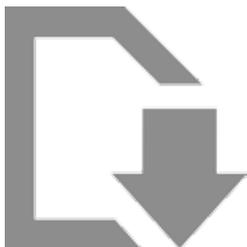
If you use TR-Electronic measuring technology with fieldbuses or industrial ethernet, you can configure these measuring systems conveniently with the relevant tools provided by your control system (e.g. Simatic Manager...). The necessary files (EDS/GSD/XML...) can be found on our website at any time: For an increasing number of devices (including the article numbers specified in this catalog as "Suggested Products") you can simply enter the article number in the search field on our website. You will then find everything you need

in the "Setup File" in the Download area for this device. Setup packages are available for the various interfaces in the Service and Download area (in the chapter GSD-/EDS-/XML files). Further information on finding the software for your specific model can be found in the package. Of course you can also obtain the suitable files for your devices from your usual contact.

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Software

Product	GSD-/EDS-/XML-Files 	TR-Winprog 
Group	Software	Software
Description	Load the software packages for your fieldbus or industrial ethernet system from our homepage - anytime you want	Programming tool for sensors made by TR-Electronic with direct interfaces
Suitable software		
Operating system		
Technology		
Transferred signals		
Interface	       	SSI ISI Analog Parallel
Weblink	www.tr-electronic.com/service/downloads/file-download.html	www.tr-electronic.com/service/downloads/software.html
QR-Code		

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	
Suitable software	TRWINprog	TRWINprog, EPROGW32, LTProg	EPROGW32, EPROG DOS	
Operating system	WIN 95 se ... WIN 10	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
Suitable software		
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		

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

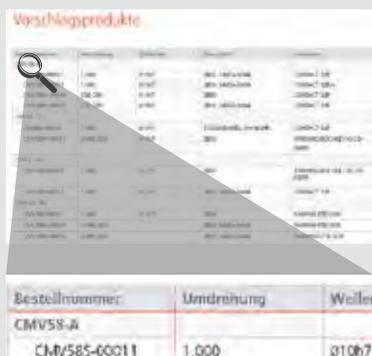
Suggested Products

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	

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

Further product information

1. Enter order code into ...



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

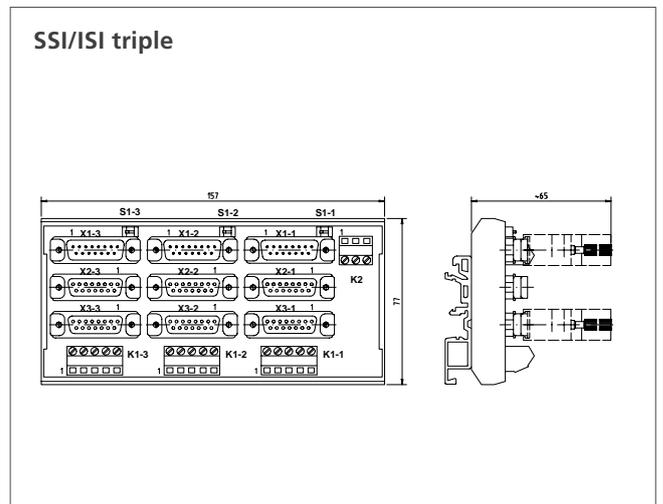
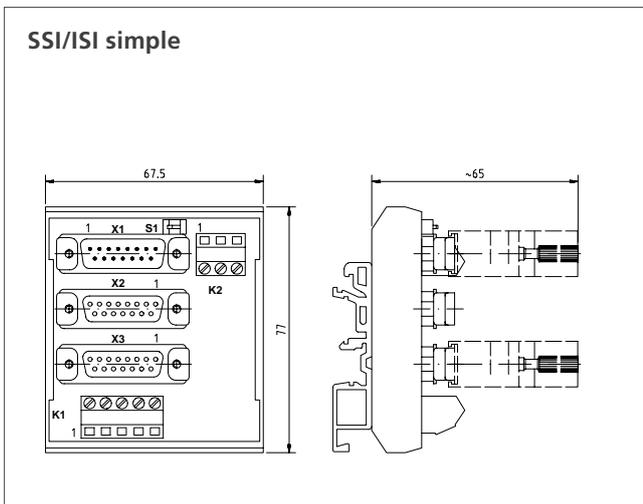
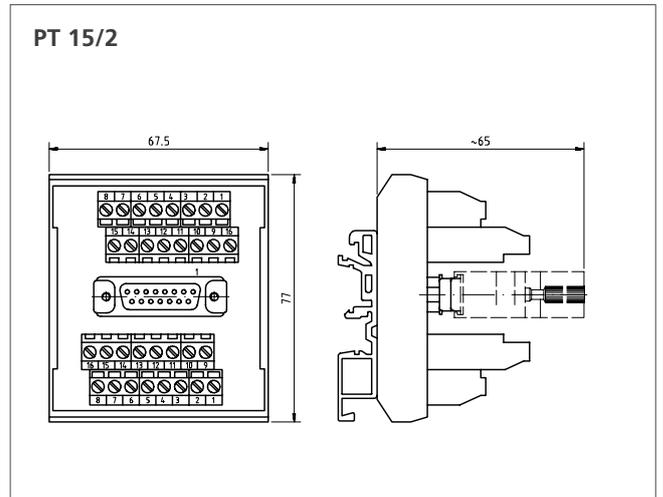
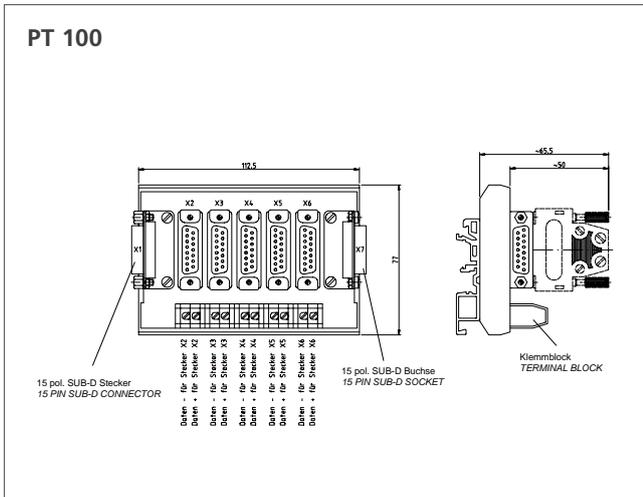
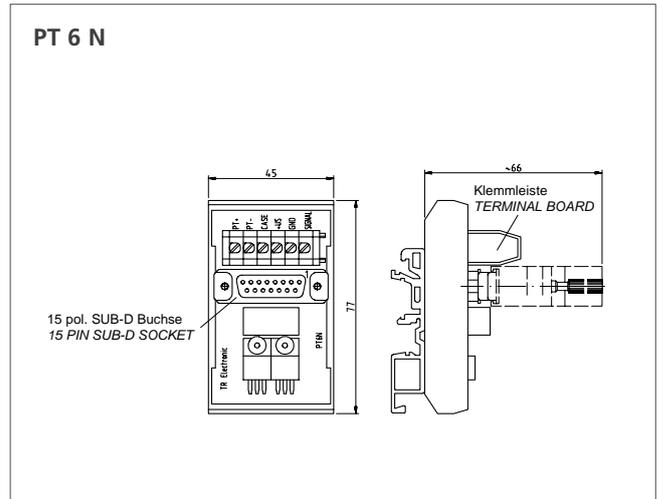
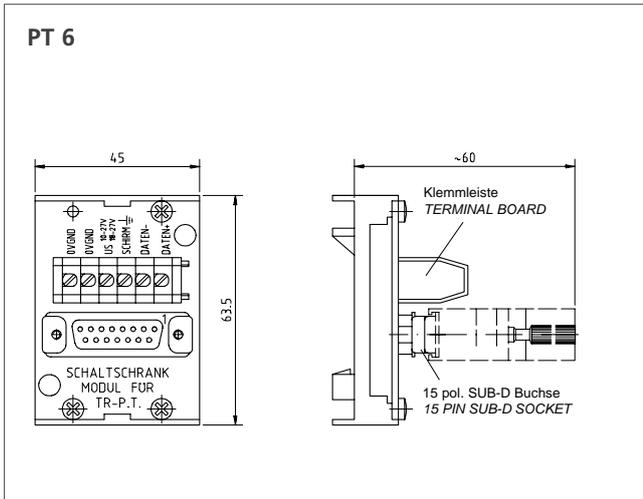


3. Choose desired information



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

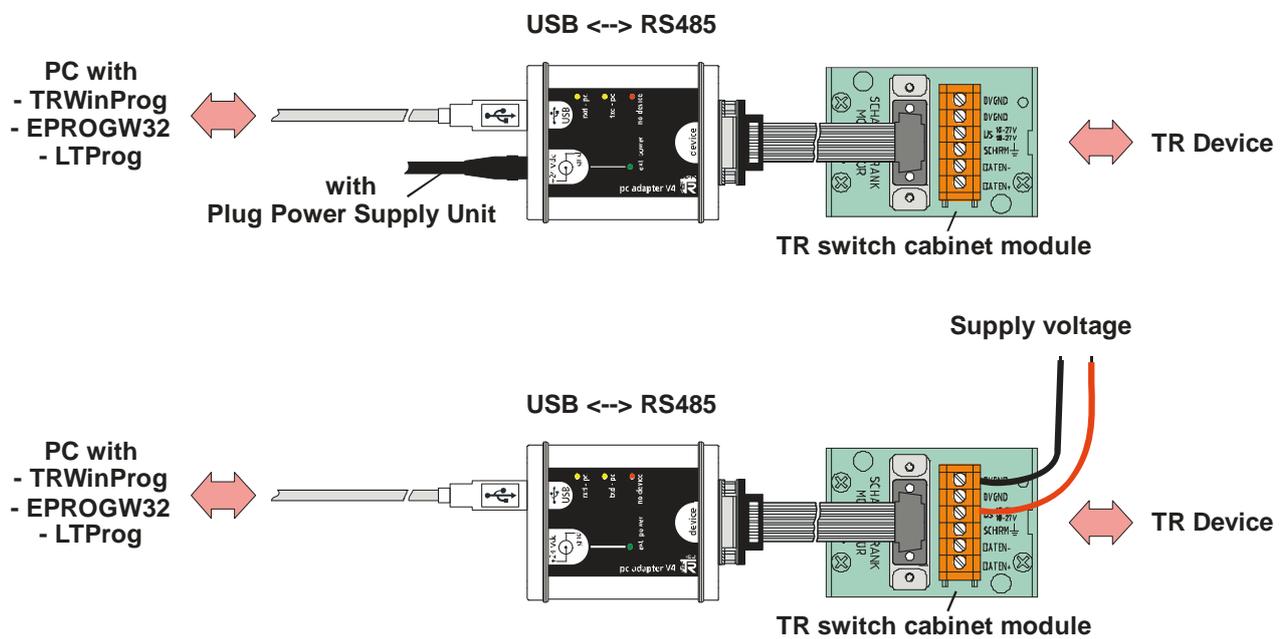
Dimensional Drawings



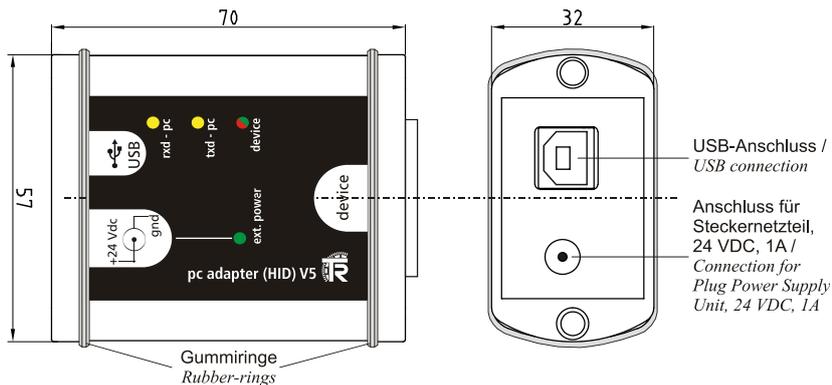
Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at www.tr-electronic.com or on request.

Dimensional Drawings

PC-Adapter V4 / V5 Connections



PC-Adapter V4 / V5 Dimensions



Accessories - Electronic Accessories - Signal Processing



Signal processing

Many tasks can be solved with standard interfaces, from a simple incremental signal through to high speed industrial ethernet. However, sometimes it is the little helpers that enable a quick and effective solution to be achieved - from the distribution of an incremental signal to a number of control systems through to the transmission of encoder values from one fieldbus to another. We present a few of these aids on

the following pages. Do you have an idea, which you cannot implement? We are confident that we can find the right solution for it!

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Converter

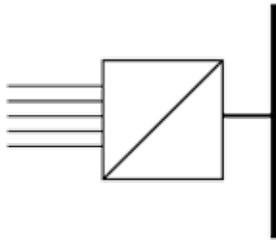
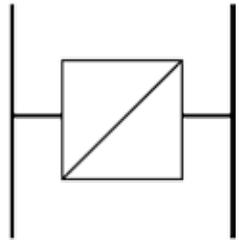
Product	PU 10 	PU 20 	PU 30 
Group	Converter	Converter	Converter
Description	SSI -> Parallel	Parallel -> SSI	2 x SSI -> Parallel
Suitable software			
Technology	Master (produces SSI Clock) or listening mode (uses external SSI Clock)	Chechsum as option	2 x PU 10, Output channels galvanically isolated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

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

Converter

Product	IT 10 	IV 20 	IV 30 	
Group	Converter	Converter	Converter	
Description	Incremental -> 2 x incremental divided up to 1:4096	Incremental -> 6 x incremental	Incremental -> 6 x incremental	
Suitable software				
Technology	Galvanically isolated, signal levels can be chosen for each output	Input / output side galvanically isolated, signal levels can be chosen for each output	All input / output galvanically isolated, signal levels can be chosen for each output	
Transferred signals	A, A/, B, B/, 0, 0/	A, A/, B, B/, 0, 0/	A, A/, B, B/, 0, 0/	
Interface	<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>AnalogBox</p> 	<p>TA-MINI-UNI</p> 
<p>Converter</p>	<p>Converter</p>	<p>Converter</p>	<p>Display</p>
<p>Transmits encoder signals from direct interfaces into fieldbusses</p>	<p>Transmits signals from one fieldbus into another</p>	<p>16 x Analog in for PROFINET or EtherCAT</p>	<p>Programmable display for SSI or TR-specific programming interfaces</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>16 x 0..10V; 0(4)...20mA</p>	<p>8 digit - depending on encoder/ display configuration</p>
			<p>http://www.tr-electronic.de/f/TR-V-TI-GB-0301</p>
			

Display

Product	FOD 10 	ADP010 	ADP001 
Group	Display	Display	Display
Description	Display for fiber optic I/O	Programmable Display for SSI for front panel installation. Min/max memory, encoder scaling, offset...	Programmable Display for SSI for DIN-rail installation. Min/max memory, encoder scaling, offset...
Suitable software			
Operating system			
Technology	Decimal point is transmitted via FO telegram, alternatively with soldering bridge.	With addl. Analogue output	With addl. Analogue output
Transferred signals	6 digit + decimal point		
Interface	LWL	SSI Analog	SSI Analog
Weblink	www.tr-electronic.de/f/TR-V-TI-GB-0320	www.tr-electronic.de/f/TR-V-TI-GB-0341	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	Items delivered	For TR-software
Converter for absolute signals			
491-00002	PU 10 - SSI -> Parallel		
492-00001	PU 20 - Parallel -> SSI		
491-00100	PU 30 - 2x SSI -> Parallel		
Converter for incremental signals			
490-00007	IT 10 - 1 x INC -> 2 x INC with divider		
490-00006	IV 20 - 1 x INC -> 6 x INC		
493-00100	IV 30 - 1 x INC -> 6 x INC, galvanically isolated, input level RS 422		
493-00101	IV 30 - 1 x INC -> 6 x INC, galvanically isolated, input level HTL		
Display			
485-80020	TA - MINI - UNI		
485-00230	ADP 010 - front panel installation		
485-00220	ADP 001 - DIN Rail		

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

Further product information

1. Enter order code into ...



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



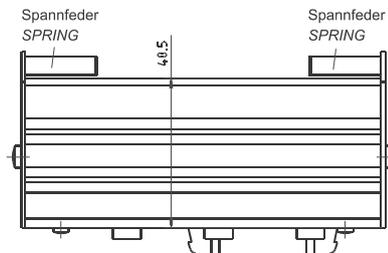
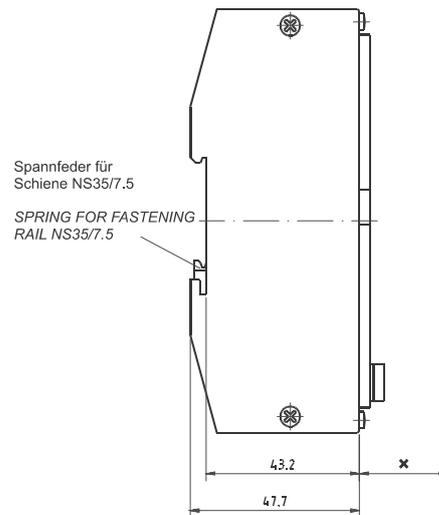
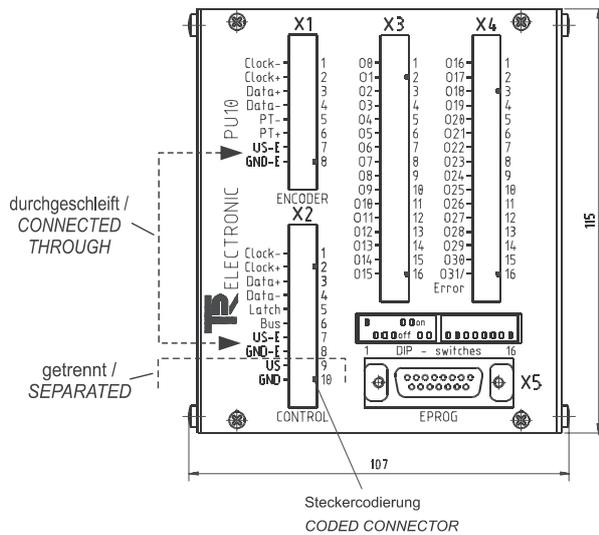
3. Choose desired information



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

Dimensional Drawings

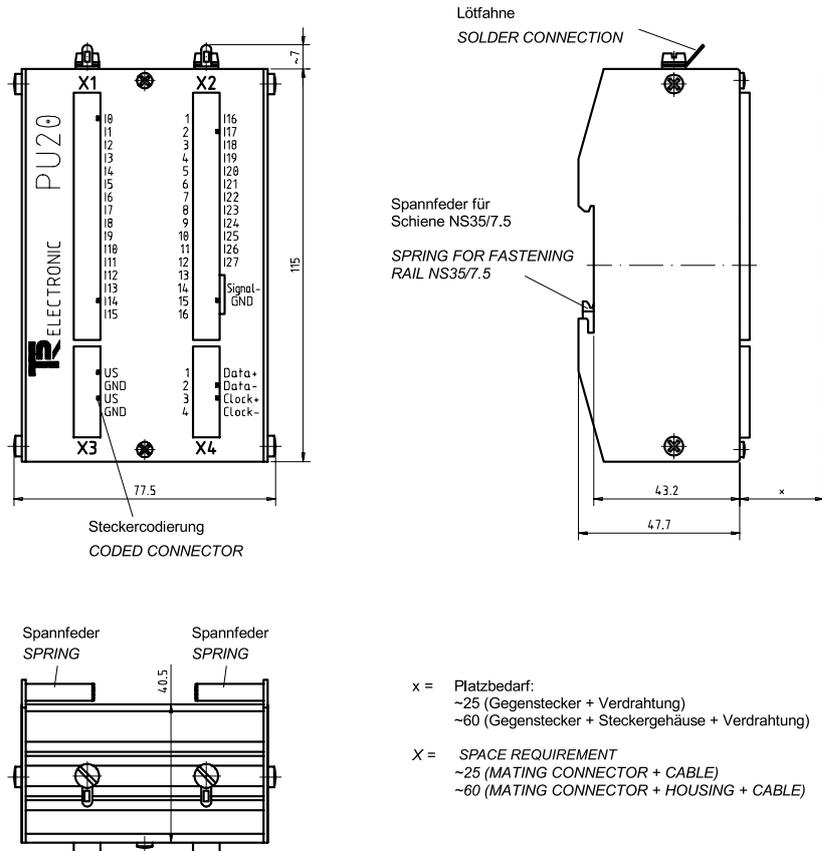
PU 10
SSI -> Parallel



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

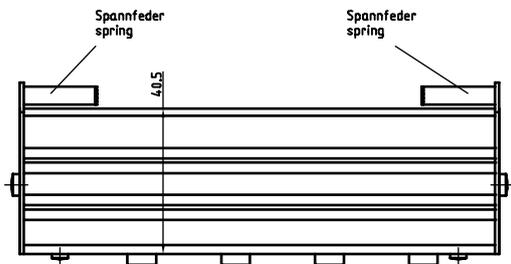
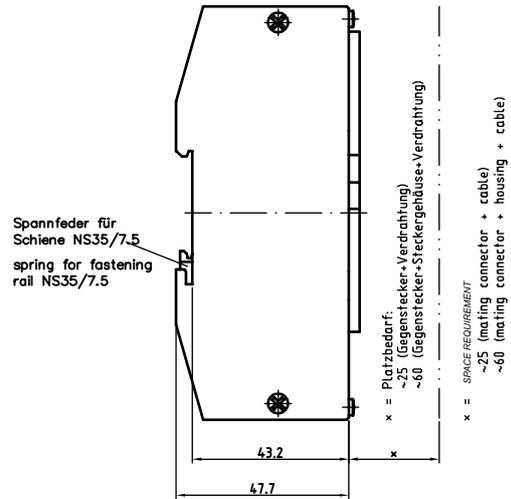
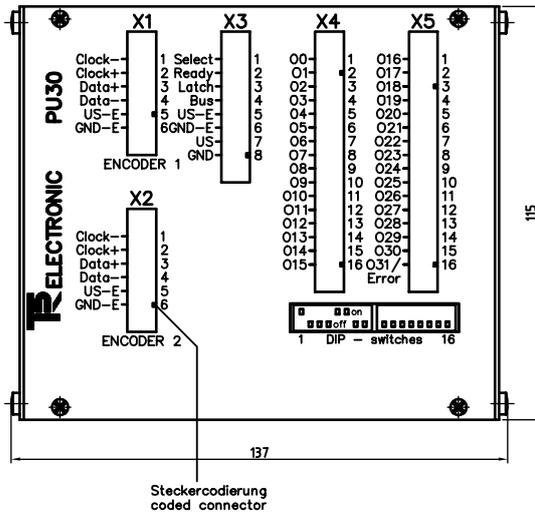
Dimensional Drawings

PU 20
Parallel -> SSI



Dimensional Drawings

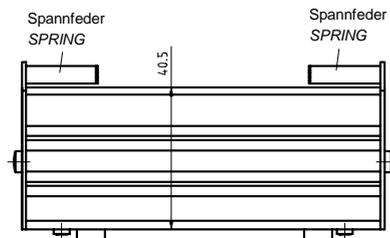
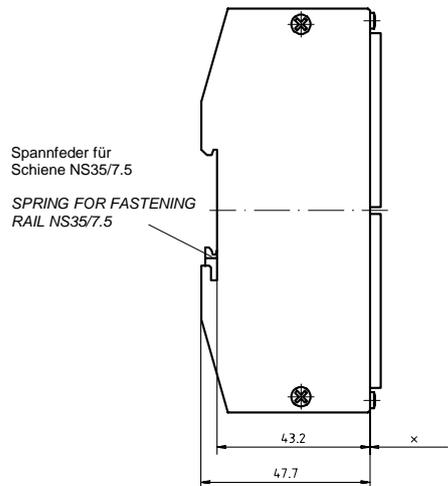
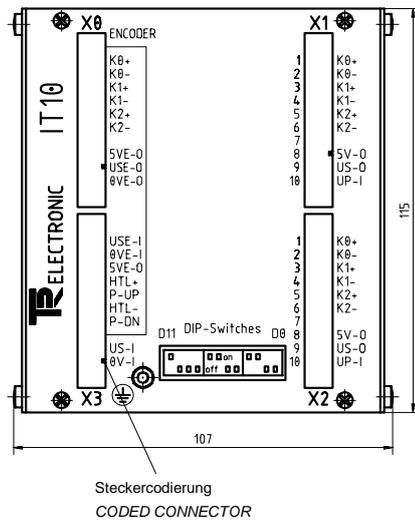
PU 30
2 x SSI -> Parallel



Dimensional Drawings

IT 10

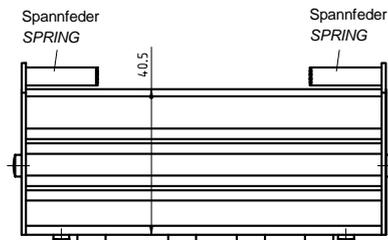
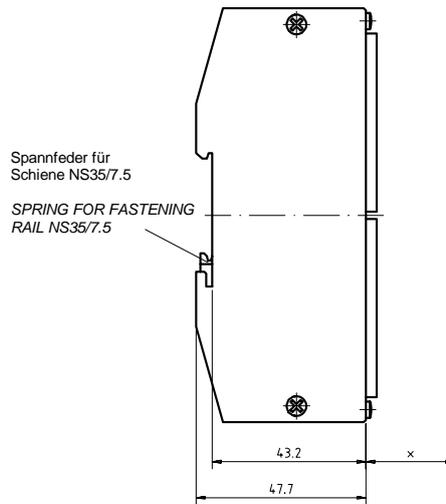
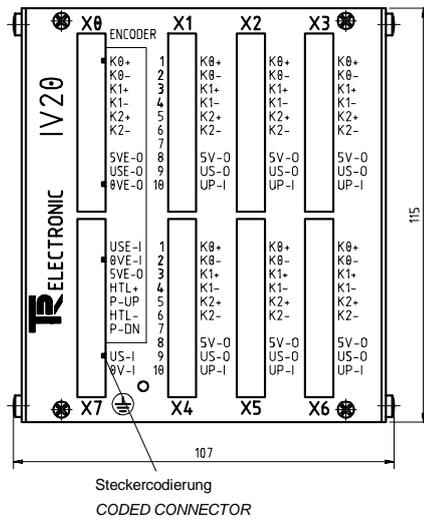
Incremental -> 2 x Incremental divided up to 1:4096



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

Dimensional Drawings

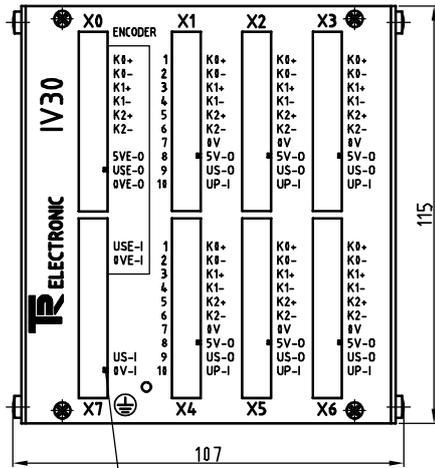
IV 20
Incremental -> 6 x Incremental



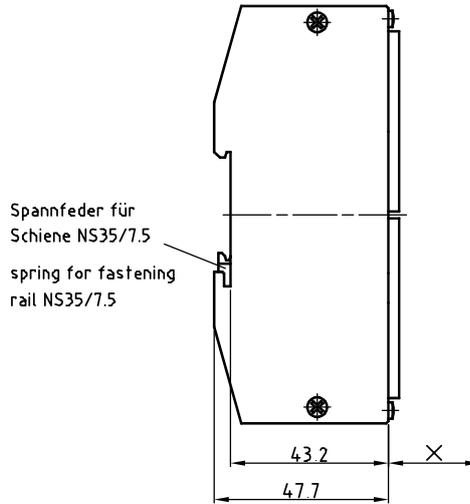
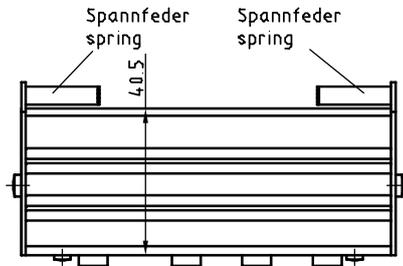
- x = Platzbedarf:
~25 (Gegenstecker + Verdrahtung)
~60 (Gegenstecker + Steckergehäuse + Verdrahtung)
- X = SPACE REQUIREMENT
~25 (MATING CONNECTOR + CABLE)
~60 (MATING CONNECTOR + HOUSING + CABLE)

Dimensional Drawings

IV 30
Incremental -> 6 x Incremental



Steckerkodierung
coded connector



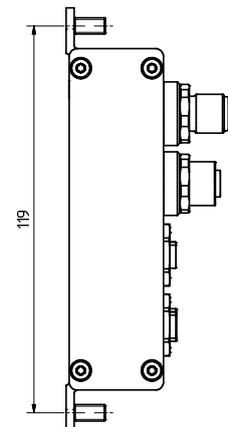
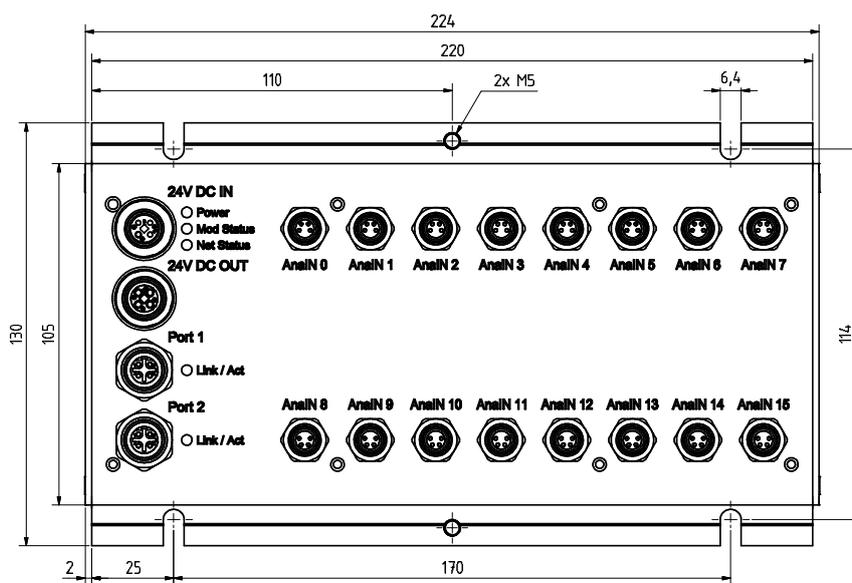
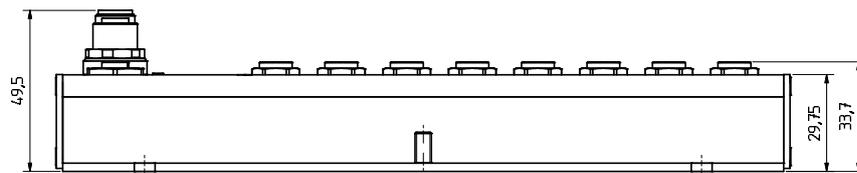
x = Platzbedarf:
~25 (Gegenstecker+Verdrahtung)
~60 (Gegenstecker+Steckergehäuse+Verdrahtung)

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

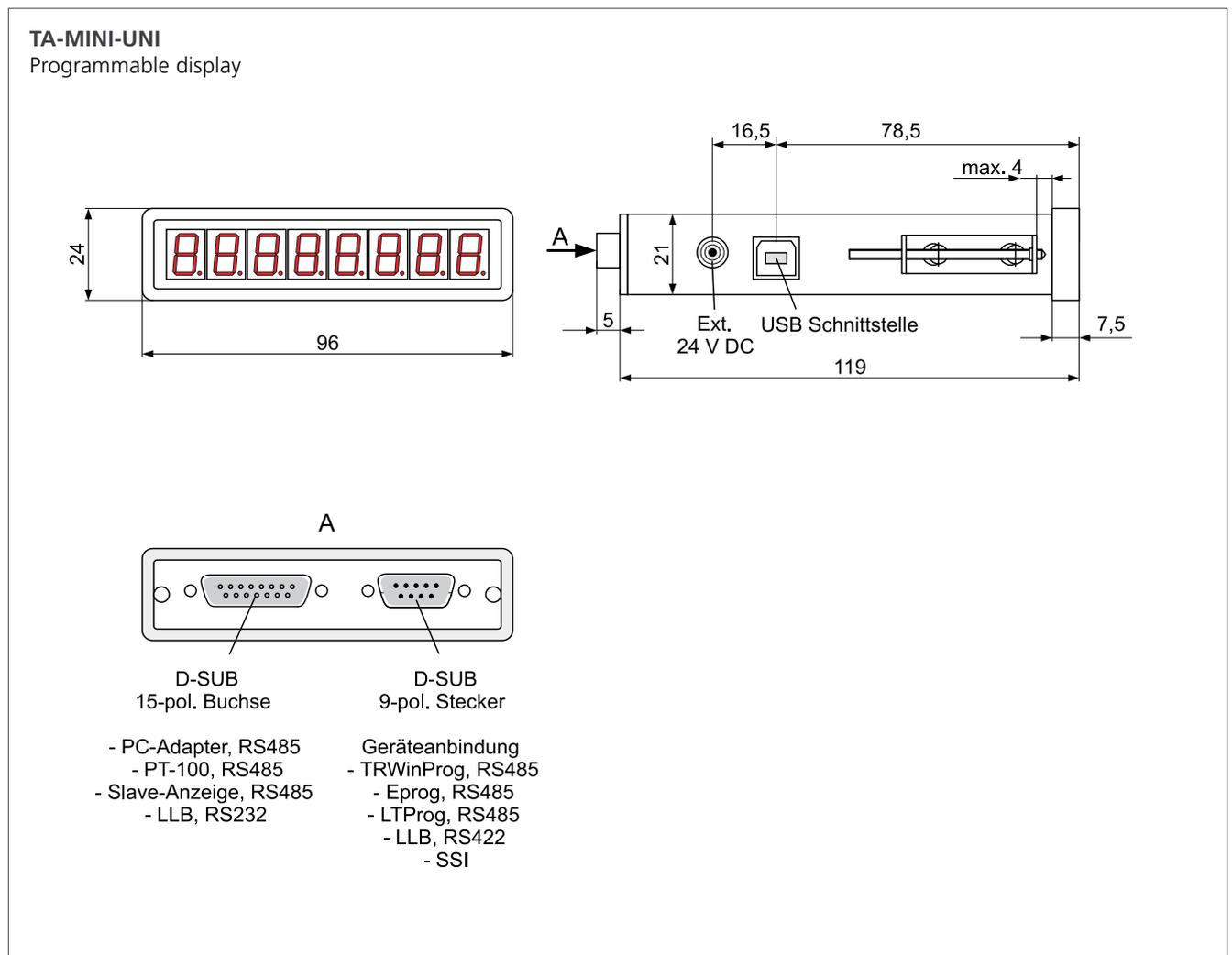
Dimensional Drawings

AnalogBox

16xAnalog -> EPN / ETC

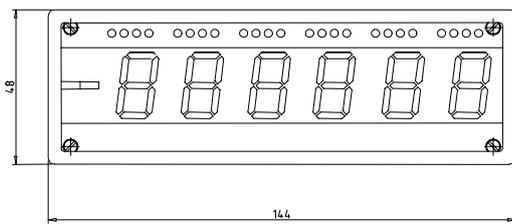


Dimensional Drawings

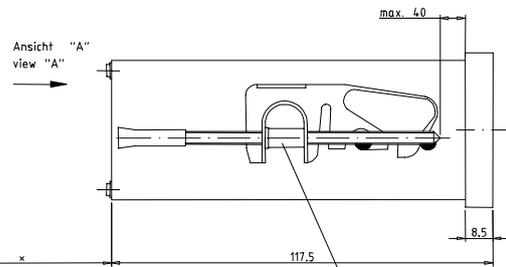


Dimensional Drawings

FOD 10 Display for FiberOptic I/O



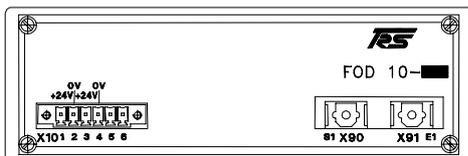
-60 (mating connector+housing+cable)
 -25 (mating connector + cable)
 x = needed height:
 ...-60 (Gegenseitiger-Steckerabschluss-Verdrahtung)
 -25 (Gegenseitiger-Verdrahtung)
 x = Platzbedarf:



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

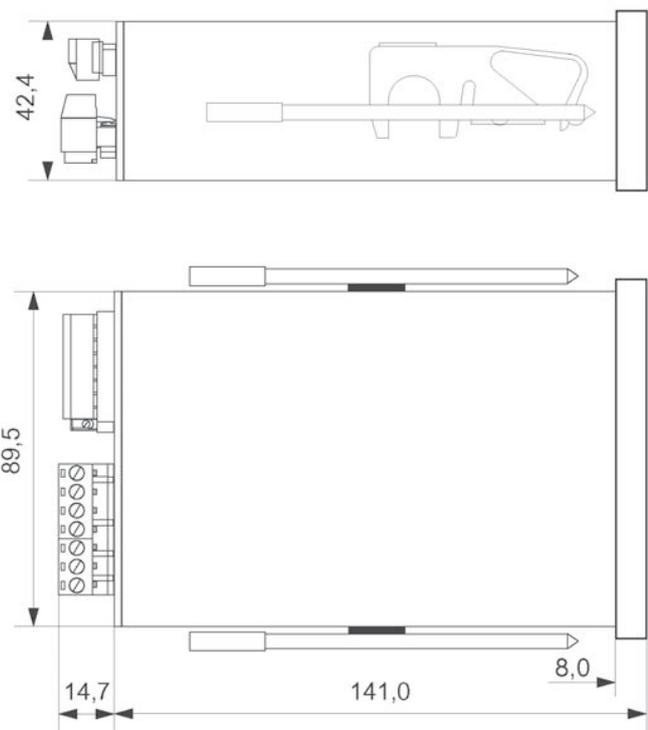
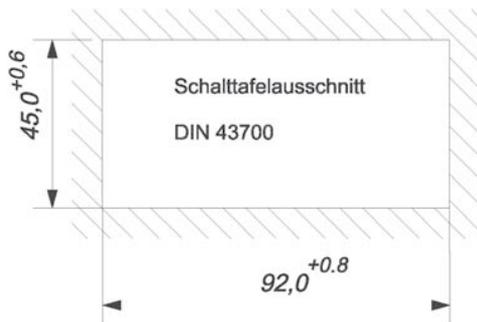
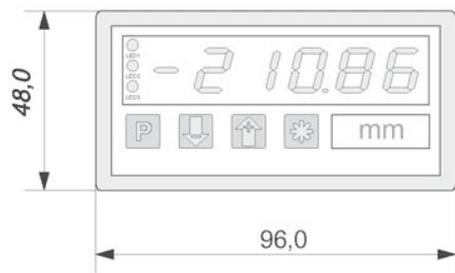
Ansicht "A"
 view "A"



Dimensional Drawings

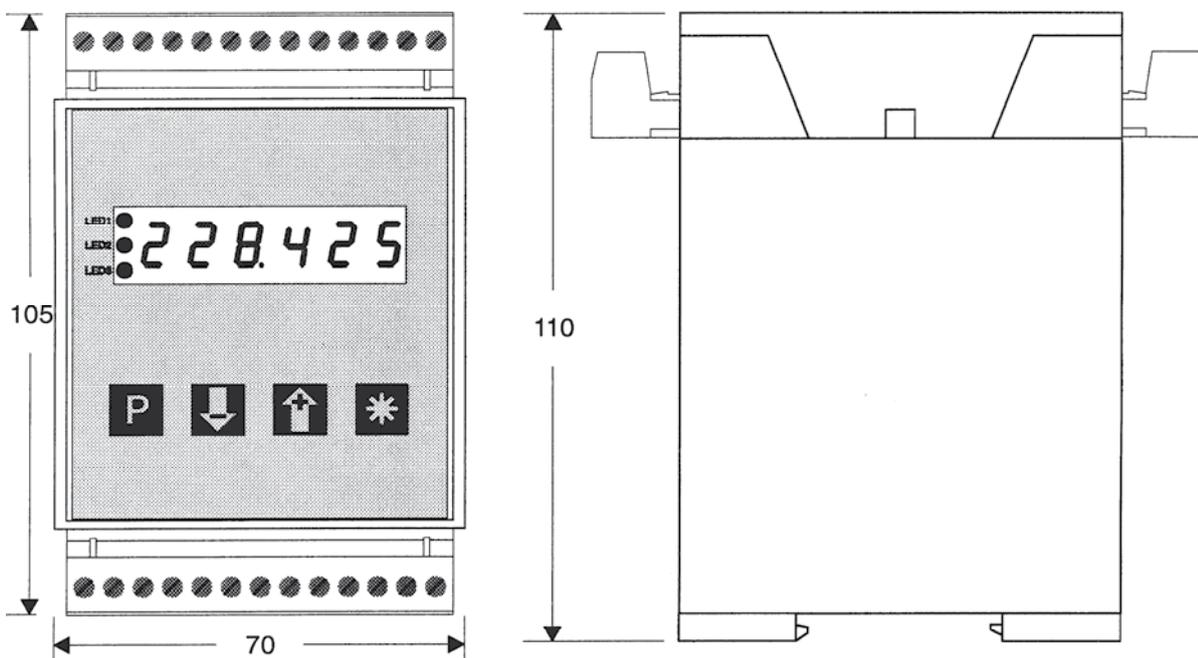
ADP010

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

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Couplings

Product	Coupling CPS Standard 	Coupling CPS Compact 	Coupling CPS Impuls Plus 
Group	Couplings	Couplings	Couplings
Description	The perfect choice for common-practice shaft encoders. This line provides an outstanding combination of precision and minimal restoring forces.	Compact Short axial design. This line is specially designed for encoder applications where the coupling must be integrated into an axially limited installation space.	A product line for maximum measuring system resolution. It is perfect for shaft encoders whose high resolution is ensured by fine-tuned signal sequences per revolution.
Shaft diameters	4...20 mm in Steps	6...20 mm in Steps	4...20 mm in Steps
Ordering	CPS 8.1, CPS 10.1, CPS 15.1	CPS 9.1, CPS 14.1	CPS 8.2, CPS 9.2, CPS 10.2, CPS 14.2, CPS 15.2
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-0410
QR-Code			

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

Product	Coupling CPS Industry 	Coupling SED 	Coupling EKN 	
Group	Couplings	Couplings	Couplings	
Description	A product line for rugged industrial encoders with large shaft diameters.	The bellows compensates for angular errors between drive and encoder shaft.	This coupling enables good decoupling in the event of vibrations of the drive shaft.	
Shaft diameters	10...40 mm in Steps	6, 8, 10, 12 mm	6, 8, 10, 12 mm	
Ordering	CPS 22.1, CPS 22.2 CPS 23.1, CPS 23.2 CPS 30.1, CPS 30.2	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				

Couplings

Bearing modules

<p>Coupling GEL</p> 	<p>Bearing-Module 58</p> 	<p>Bearing-Module 65</p> 	<p>Bearing-Module 100</p> 
<p>Couplings</p>	<p>Bearing modules</p>	<p>Bearing modules</p>	<p>Bearing modules</p>
<p>The GEL coupling bridges large distances between drive and encoder shaft.</p>	<p>Bearing module 58 serves as a collar bearing for our 58 mm encoders, to absorb increased bearing load. A typical application is the use of rotary encoders with chain, pulley and friction wheels.</p>	<p>Bearing module 65 serves as a collar bearing for our 65 mm encoders, to absorb increased bearing load. A typical application is the use of rotary encoders with chain, pulley and friction wheels.</p>	<p>Bearing module 100 serves as a collar bearing for our 100 mm encoders, to absorb increased bearing load. A typical application is the use of rotary encoders with chain, pulley and friction wheels.</p>
<p>10, 12, 14 mm</p>	<p>10, 12 mm</p>	<p>See shaft range type 65</p>	<p>See shaft range type 65</p>
<p>Accessory</p>	<p>As option with an encoder -> pre-assembled or for retrofitting</p>	<p>As option with an encoder -> pre-assembled or for retrofitting</p>	<p>As option with an encoder -> pre-assembled or for retrofitting</p>
<p>www.tr-electronic.de/f/TR-V-TI-GB-0430</p>	<p>www.tr-electronic.de/f/TR-V-TI-GB-0439</p>	<p>www.tr-electronic.de/f/TR-V-TI-GB-0440</p>	<p>www.tr-electronic.de/f/TR-V-TI-D-0441</p>
			

Bearing modules

Product	Absorber flange 58 	Absorber flange 65 	Absorber module 65	
Group	Bearing modules	Bearing modules	Bearing modules	
Description	The absorber flange decouples the Cxx-58 measuring system at 10g from impacts and vibrations from 60 Hz when mounted horizontally and from 900 Hz when mounted vertically. This variant can be used wherever the usual arrangement of 6 mm shaft, 50 mm centering collar is used.	The absorber flange decouples the Cxx-65 measuring system at 10g from impacts and vibrations from 350 Hz when mounted horizontally. This variant can be used wherever the usual arrangement of 6 mm shaft, 50 mm centering collar is used.	The absorber flange decouples the Cxx-65 measuring system from impacts and vibrations. The encoder shaft is decoupled from the drive shaft with the EKN bellows coupling, which is ordered separately.	
Shaft diameters	6 mm	6 mm	6, 8, 10, 12 mm	
Ordering	As option with an encoder -> pre-assembled	As option with an encoder -> pre-assembled	As option with an encoder -> pre-assembled	
Weblink	www.tr-electronic.com/f/TR-V-TI-GB-0463	www.tr-electronic.com/f/TR-V-TI-GB-0462	www.tr-electronic.de/f/TR-V-TI-GB-0460	
QR-Code				

Bearing modules Installation

	Absorber module 100	Mounting Brackets 	Clamps 	Deflection pulleys for wire actuated encoders 
	Bearing modules	Installation	Installation	Installation
	The absorber flange decouples the Cxx-100 measuring system from impacts and vibrations. The encoder shaft is decoupled from the drive shaft with the EKN bellows coupling, which is ordered separately.	Clamping shoes are adapted to the outer diameter of the encoder and fully engage in the circumferential groove of the encoder flange.	Servo-clamps are universally usable and engage over a small area of the circumferential groove of the encoder flange.	Deflection pulleys guide the measurement wire safely and precisely even with changing pull-off angles. Fits our wire-actuated encoders type WDS
	6, 8, 10, 12 mm			
	As option with an encoder -> pre-assembled	Accessory	Accessory	As option with an encoder -> pre-assembled or for retrofitting
	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	www.tr-electronic.de/f/TR-ECE-TI-DGB-0254
				

Suggested Products

Order code	Type	Parameter	Dimensions
Coupling Standard CPS 8, no form closure, 1 coupling element			
34000090	CPS 8/1 6/5	For shaft diameter from/to	6mm / 5mm
34000053	CPS 8/1 6/6	For shaft diameter from/to	6mm / 6mm
34000054	CPS 8/1 6/10	For shaft diameter from/to	6mm / 10mm
34000104	CPS 8/1 8/10	For shaft diameter from/to	8mm / 10mm
34000197	CPS 8/1 10/10	For shaft diameter from/to	10mm / 10mm
Coupling Standard CPS 10, no form closure, 1 coupling element			
34000075	CPS 10/1 10/10	For shaft diameter from/to	10mm / 10mm
34000325	CPS 10/1 12/12	For shaft diameter from/to	12mm / 12mm
34000172	CPS 10/1 6/6	For shaft diameter from/to	6mm / 6mm
34000077	CPS 10/1 6/10	For shaft diameter from/to	6mm / 10mm
Coupling Standard CPS 15, no form closure, 1 coupling element			
34000151	CPS 15/1 6/6	For shaft diameter from/to	6mm / 6mm
34000031	CPS 15/1 6/10	For shaft diameter from/to	6mm / 10mm
34000206	CPS 15/1 6/12	For shaft diameter from/to	6mm / 12mm
34000334	CPS 15/1 6/14	For shaft diameter from/to	6mm / 14mm
34000231	CPS 15/1 6/20	For shaft diameter from/to	6mm / 20mm
34000320	CPS 15/1 8/12	For shaft diameter from/to	8mm / 12mm
34000050	CPS 15/1 10/10	For shaft diameter from/to	10mm / 10mm
34000061	CPS 15/1 10/12	For shaft diameter from/to	10mm / 12mm
34000230	CPS 15/1 10/16	For shaft diameter from/to	10mm / 16mm
34000021	CPS 15/1 10/20	For shaft diameter from/to	10mm / 20mm
34000062	CPS 15/1 12/12	For shaft diameter from/to	12mm / 12mm
34000029	CPS 15/1 12/20	For shaft diameter from/to	12mm / 20mm
Coupling Standard CPS 15, with form closure, 1 coupling element			
34000307	CPS 15/1 10N/10N	For shaft diameter from/to	10mm (key) / 10mm (key)
34000166	CPS 15/1 10N/18N	For shaft diameter from/to	10mm (key) / 18mm (key)
34000349	CPS 15/1 14N/20N	For shaft diameter from/to	14mm (key) / 20mm (key)
Coupling Compact CPS 9, no form closure, 1 coupling element			
34000087	CPS 9/1 5/10	For shaft diameter from/to	5mm / 10mm
34000100	CPS 9/1 6/6	For shaft diameter from/to	6mm / 6mm
34000038	CPS 9/1 6/10	For shaft diameter from/to	6mm / 10mm
34000035	CPS 9/1 8/10	For shaft diameter from/to	8mm / 10mm
34000025	CPS 9/1 10/10	For shaft diameter from/to	10mm / 10mm

For further product information simply enter the order number in the search field at www.tr-electronic.com.
We will help you to select the most suitable products from the complete TR range. Please contact us (info@tr-electronic.de).

Suggested Products

Order code	Type	Parameter	Dimensions
Coupling Compact CPS 9, no form closure, 2 coupling elements			
34000339	CPS 9/2 6/8	For shaft diameter from/to	6mm / 8mm
34000338	CPS 9/2 6/10	For shaft diameter from/to	6mm / 10mm
34000290	CPS 9/2 10/10	For shaft diameter from/to	10mm / 10mm
Coupling Compact CPS 14, no form closure, 1 coupling element			
34000178	CPS 14/1 6/20	For shaft diameter from/to	6mm / 20mm
34000308	CPS 14/1 8/10	For shaft diameter from/to	8mm / 10mm
34000140	CPS 14/1 10/10	For shaft diameter from/to	10mm / 10mm
34000270	CPS 14/1 10/12	For shaft diameter from/to	10mm / 12mm
34000188	CPS 14/1 12/12	For shaft diameter from/to	12mm / 12mm
Coupling Compact CPS 14, with form closure, 1 coupling element			
34000332	CPS 14/1 12N/20N	For shaft diameter from/to	12mm (key) / 20mm (key)
34000167	CPS 14/1 14N/22N	For shaft diameter from/to	14mm (key) / 22mm (key)
Coupling Compact CPS 14, no form closure, 2 coupling elements			
34000358	CPS 14/2 6/10	For shaft diameter from/to	6mm / 10mm
34000354	CPS 14/2 6/20	For shaft diameter from/to	6mm / 20mm
34000068	CPS 14/2 10/10	For shaft diameter from/to	10mm / 10mm
34000207	CPS 14/2 10/14	For shaft diameter from/to	10mm / 14mm
34000352	CPS 14/2 10/15	For shaft diameter from/to	10mm / 15mm
34000293	CPS 14/2 10/22	For shaft diameter from/to	10mm / 22mm
34000147	CPS 14/2 12/13	For shaft diameter from/to	12mm / 13mm
Coupling Compact CPS 14, with form closure, 2 coupling elements			
34000233	CPS 14/2 10N/14N	For shaft diameter from/to	10mm (key) / 14mm (key)
Coupling Impuls Plus CPS 8, no form closure, 2 coupling elements			
34000162	CPS 8/2 6/6	For shaft diameter from/to	6mm / 6mm
34000006	CPS 8/2 10/10	For shaft diameter from/to	10mm / 10mm
34000304	CPS 8/2 10/10	For shaft diameter from/to	10mm / 10mm
34000224	CPS 8/2 10/7	For shaft diameter from/to	10mm / 7mm

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

Suggested Products

Order code	Type	Parameter	Dimensions
Coupling Impuls Plus CPS 10, no form closure, 2 coupling elements			
34000093	CPS 10/2 5/4	For shaft diameter from/to	5mm / 4mm
34000092	CPS 10/2 5/5	For shaft diameter from/to	5mm / 5mm
34000055	CPS 10/2 6/6	For shaft diameter from/to	6mm / 6mm
34000072	CPS 10/2 6/10	For shaft diameter from/to	6mm / 10mm
34000266	CPS 10/2 6/12	For shaft diameter from/to	6mm / 12mm
34000298	CPS 10/2 8/8	For shaft diameter from/to	8mm / 8mm
34000048	CPS 10/2 8/10	For shaft diameter from/to	8mm / 10mm
34000291	CPS 10/2 9/10	For shaft diameter from/to	9mm / 10mm
34000044	CPS 10/2 10/10	For shaft diameter from/to	10mm / 10mm
34000343	CPS 10/2 10/11	For shaft diameter from/to	10mm / 11mm
34000026	CPS 10/2 10/12	For shaft diameter from/to	10mm / 12mm
34000027	CPS 10/2 12/12	For shaft diameter from/to	12mm / 12mm
Coupling Impuls Plus CPS 10, with form closure, 2 coupling elements			
34000198	CPS 10/2 10N/10N	For shaft diameter from/to	10mm (key) / 10mm (key)
34000326	CPS 10/2 10N/12N	For shaft diameter from/to	10mm (key) / 12mm (key)
34000034	CPS 10/2 12N/12N	For shaft diameter from/to	12mm (key) / 12mm (key)

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

Suggested Products

Order code	Type	Parameter	Dimensions
Coupling Impuls Plus CPS 15, no form closure, 2 coupling elements			
34000022	CPS 15/2 10/10	For shaft diameter from/to	10mm / 10mm
34000161	CPS 15/2 4/18	For shaft diameter from/to	4mm / 18mm
34000091	CPS 15/2 6/6	For shaft diameter from/to	6mm / 6mm
34000060	CPS 15/2 6/8	For shaft diameter from/to	6mm / 8mm
34000058	CPS 15/2 6/10	For shaft diameter from/to	6mm / 10mm
34000263	CPS 15/2 6/11	For shaft diameter from/to	6mm / 11mm
34000045	CPS 15/2 6/12	For shaft diameter from/to	6mm / 12mm
34000254	CPS 15/2 6/14	For shaft diameter from/to	6mm / 14mm
34000102	CPS 15/2 6/15	For shaft diameter from/to	6mm / 15mm
34000250	CPS 15/2 7/12	For shaft diameter from/to	7mm / 12mm
34000084	CPS 15/2 8/10	For shaft diameter from/to	8mm / 10mm
34000208	CPS 15/2 8/12	For shaft diameter from/to	8mm / 12mm
34000237	CPS 15/2 8/18	For shaft diameter from/to	8mm / 18mm
34000262	CPS 15/2 8/8	For shaft diameter from/to	8mm / 8mm
34000194	CPS 15/2 9/10	For shaft diameter from/to	9mm / 10mm
34000081	CPS 15/2 10/11	For shaft diameter from/to	10mm / 11mm
34000064	CPS 15/2 10/12	For shaft diameter from/to	10mm / 12mm
34000057	CPS 15/2 10/14	For shaft diameter from/to	10mm / 14mm
34000078	CPS 15/2 10/16	For shaft diameter from/to	10mm / 16mm
34000108	CPS 15/2 10/18	For shaft diameter from/to	10mm / 18mm
34000039	CPS 15/2 10/20	For shaft diameter from/to	10mm / 20mm
34000217	CPS 15/2 11/11	For shaft diameter from/to	11mm / 11mm
34000356	CPS 15/2 11/15	For shaft diameter from/to	11mm / 15mm
34000355	CPS 15/2 11/16	For shaft diameter from/to	11mm / 16mm
34000306	CPS 15/2 11/17	For shaft diameter from/to	11mm / 17mm
34000330	CPS 15/2 12/11	For shaft diameter from/to	12mm / 11mm
34000047	CPS 15/2 12/12	For shaft diameter from/to	12mm / 12mm
34000096	CPS 15/2 12/14	For shaft diameter from/to	12mm / 14mm
34000345	CPS 15/2 12/16	For shaft diameter from/to	12mm / 16mm
34000109	CPS 15/2 12/18	For shaft diameter from/to	12mm / 18mm
34000242	CPS 15/2 12/20	For shaft diameter from/to	12mm / 20mm
34000323	CPS 15/2 14/14	For shaft diameter from/to	14mm / 14mm
34000229	CPS 15/2 20/20	For shaft diameter from/to	20mm / 20mm

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

Suggested Products

Order code	Type	Parameter	Dimensions
Coupling Impuls Plus CPS 15, with form closure, 2 coupling elements			
34000219	CPS 15/2 6N/12N	For shaft diameter from/to	6mm (key) / 12mm (key)
34000218	CPS 15/2 8N/10N	For shaft diameter from/to	8mm (key) / 10mm (key)
34000132	CPS 15/2 10N/10N	For shaft diameter from/to	10mm (key) / 10mm (key)
34000350	CPS 15/2 10N/11N	For shaft diameter from/to	10mm (key) / 11mm (key)
34000063	CPS 15/2 10N/12N	For shaft diameter from/to	10mm (key) / 12mm (key)
34000105	CPS 15/2 10N/14N	For shaft diameter from/to	10mm (key) / 14mm (key)
34000069	CPS 15/2 10N/15N	For shaft diameter from/to	10mm (key) / 15mm (key)
34000336	CPS 15/2 10N/16*N	For shaft diameter from/to	10mm (key) / 16mm (key)
34000173	CPS 15/2 10N/19N	For shaft diameter from/to	10mm (key) / 19mm (key)
34000088	CPS 15/2 10N/20N	For shaft diameter from/to	10mm (key) / 20mm (key)
34000139	CPS 15/2 11N/11N	For shaft diameter from/to	11mm (key) / 11mm (key)
34000086	CPS 15/2 12N/12N	For shaft diameter from/to	12mm (key) / 12mm (key)
34000148	CPS 15/2 12N/14N	For shaft diameter from/to	12mm (key) / 14mm (key)
34000251	CPS 15/2 12N/16N	For shaft diameter from/to	12mm (key) / 16mm (key)
34000070	CPS 15/2 14N/14N	For shaft diameter from/to	14mm (key) / 14mm (key)
34000278	CPS 15/2 14N/16N	For shaft diameter from/to	14mm (key) / 16mm (key)
34000213	CPS 15/2 14N/20N	For shaft diameter from/to	14mm (key) / 20mm (key)
Coupling Industry CPS 22, no form closure, 1 coupling element			
34000253	CPS 22/1 6/22	For shaft diameter from/to	6mm / 22mm
34000299	CPS 22/1 10/10	For shaft diameter from/to	10mm / 10mm
34000280	CPS 22/1 10/16	For shaft diameter from/to	10mm / 16mm
34000315	CPS 22/1 12/25	For shaft diameter from/to	12mm / 25mm
34000324	CPS 22/1 14/23	For shaft diameter from/to	14mm / 23mm

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

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

Suggested Products

Order code	Type	Parameter	Dimensions
Coupling Industry CPS 22, no form closure, 2 coupling elements			
34000316	CPS 22/2 10/10	For shaft diameter from/to	10mm / 10mm
34000238	CPS 22/2 10/14	For shaft diameter from/to	10mm / 14mm
34000313	CPS 22/2 10/19	For shaft diameter from/to	10mm / 19mm
34000043	CPS 22/2 10/20	For shaft diameter from/to	10mm / 20mm
34000171	CPS 22/2 10/25	For shaft diameter from/to	10mm / 25mm
34000111	CPS 22/2 14/16	For shaft diameter from/to	14mm / 16mm
34000257	CPS 22/2 20/22	For shaft diameter from/to	20mm / 22mm
Coupling Industry CPS 22, with form closure, 1 coupling element			
34000243	CPS 22/1 15N/20N	For shaft diameter from/to	15mm (key) / 20mm (key)
34000244	CPS 22/1 20N/20N	For shaft diameter from/to	20mm (key) / 20mm (key)
Coupling Industry CPS 22, with form closure, 2 coupling elements			
34000193	CPS 22/2 8N/30N	For shaft diameter from/to	8mm (key) / 30mm (key)
34000346	CPS 22/2 10N/15N	For shaft diameter from/to	10mm (key) / 15mm (key)
34000314	CPS 22/2 10N/20N	For shaft diameter from/to	10mm (key) / 20mm (key)
34000189	CPS 22/2 10N/30N	For shaft diameter from/to	10mm (key) / 30mm (key)
Coupling Industry CPS 23, no form closure, 2 coupling elements			
34000271	CPS 23/2 8/20	For shaft diameter from/to	8mm / 20mm
Coupling Industry CPS 23, no form closure, 1 coupling element			
34000303	CPS 23/1 8/25	For shaft diameter from/to	8mm / 25mm
Coupling Industry CPS 23, no form closure, 2 coupling elements			
34000180	CPS 23/2 8/30	For shaft diameter from/to	8mm / 30mm
Coupling Industry CPS 23, no form closure, 1 coupling element			
34000310	CPS 23/1 10/18	For shaft diameter from/to	10mm / 18mm
34000142	CPS 23/1 10/30	For shaft diameter from/to	10mm / 30mm
34000099	CPS 23/1 12/28	For shaft diameter from/to	12mm / 28mm

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

Suggested Products

Order code	Type	Parameter	Dimensions
Coupling Industry CPS 23, no form closure, 2 coupling elements			
34000200	CPS 23/2 10/12	For shaft diameter from/to	10mm / 12mm
34000076	CPS 23/2 10/15	For shaft diameter from/to	10mm / 15mm
34000247	CPS 23/2 10/20	For shaft diameter from/to	10mm / 20mm
34000143	CPS 23/2 12/12	For shaft diameter from/to	12mm / 12mm
34000279	CPS 23/2 12/20	For shaft diameter from/to	12mm / 20mm
34000032	CPS 23/2 20/20	For shaft diameter from/to	20mm / 20mm
Coupling Industry CPS 23, with form closure, 1 coupling element			
34000209	CPS 23/1 12N/20N	For shaft diameter from/to	12mm (key) / 20mm (key)
34000245	CPS 23/1 14N/20N	For shaft diameter from/to	14mm (key) / 20mm (key)
34000204	CPS 23/1 15N/20N	For shaft diameter from/to	15mm (key) / 20mm (key)
Coupling Industry CPS 23, with form closure, 2 coupling elements			
34000079	CPS 23/2 10N/25N	For shaft diameter from/to	10mm (key) / 25mm (key)
34000357	CPS 23/2 12N/10N	For shaft diameter from/to	12mm (key) / 10mm (key)
34000327	CPS 23/2 12N/20N	For shaft diameter from/to	12mm (key) / 20mm (key)
34000196	CPS 23/2 14N/14N	For shaft diameter from/to	14mm (key) / 14mm (key)
34000331	CPS 23/2 16N/20N	For shaft diameter from/to	16mm (key) / 20mm (key)
34000328	CPS 23/2 18N/14N	For shaft diameter from/to	18mm (key) / 14mm (key)
34000305	CPS 23/2 20N/20N	For shaft diameter from/to	20mm (key) / 20mm (key)
34000329	CPS 23/2 28N/14N	For shaft diameter from/to	28mm (key) / 14mm (key)
Coupling Industry CPS 30, no form closure, 1 coupling element			
34000080	CPS 30/1 12/14	For shaft diameter from/to	12mm / 14mm
34000098	CPS 30/1 12/38	For shaft diameter from/to	12mm / 38mm
34000337	CPS 30/1 38/10	For shaft diameter from/to	38mm / 10mm
Coupling Industry CPS 30, no form closure, 2 coupling elements			
34000318	CPS 30/2 10/20	For shaft diameter from/to	10mm / 20mm
34000347	CPS 30/2 10/30	For shaft diameter from/to	10mm / 30mm
34000267	CPS 30/2 12/12	For shaft diameter from/to	12mm / 12mm

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

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

Suggested Products

Order code	Type	Parameter	Dimensions
Coupling Industry CPS 30, with form closure, 1 coupling element			
34000285	CPS 30/1 14N/15N	For shaft diameter from/to	14mm (key) / 15mm (key)
Coupling Industry CPS 30, with form closure, 2 coupling elements			
34000344	CPS 30/2 10N/16N	For shaft diameter from/to	10mm (key) / 16mm (key)
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
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	12mm

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

Suggested Products

Order code	Type	Parameter	Dimensions
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
Clamps			
49115002	Clamp type A (round with shoulder)	See Drawing	D1: 11 mm
49115004	Clamp type A (round with shoulder)	See Drawing	D1 : 14 mm
49115003	Clamp type B (with flat, without shoulder)	See Drawing	D1: 22 mm
49115001	Clamp type C (with flat, with shoulder)	See Drawing	D1: 14 mm, A2: 5 mm
49115005	Clamp type C (with flat, with shoulder)	See Drawing	D1: 14 mm, A2: 3,2 mm
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	

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

Further product information

1. Enter order code into ...



Bestellnummer	Umdrehung	Wellen
CMV55-A		
_CMV585-00011	1.000	Ø10h7

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



3. Choose desired information



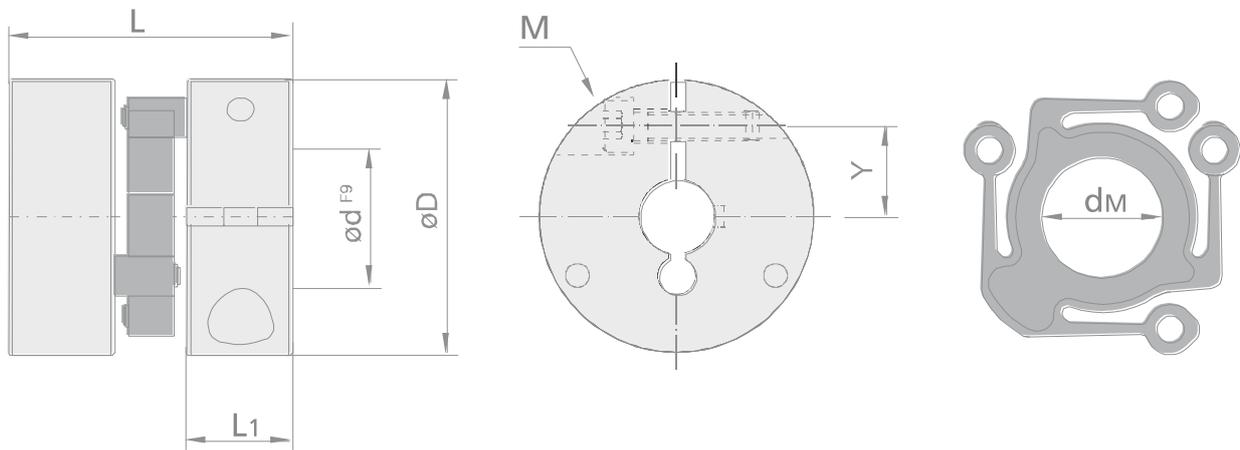
We will help you to select the most suitable products from the complete TR range. Please contact us (info@tr-electronic.de).

Dimensional Drawings



Dimensional Drawings

Coupling CPK



Dimensional Drawings

Coupling CPK Dimensions

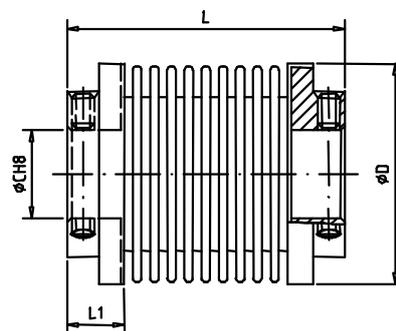
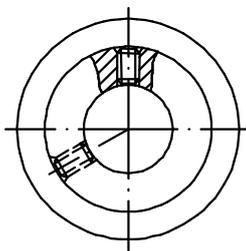
C P S	Characteristic data						Dimensions in mm										weight m (g)	inertia J (g cm ²)	
	torque M (Nm)		max. power (kw)	max. displacement			geometry					clamping screw							
	max.	duration		standard value	radial Vr (mm)	axial Va (mm)	angle Vw (°)	outside Ø D ⁽¹⁾	nominal length L	boring Ø d max.	plate breadth L _p	element boring Ø d _m ⁽¹⁾	size	length	distance Y	starting torque M (Nm)			
8/1	0.7	0.3	0.03	0.4	0.3	1.5	19	16.3	10	5.6	7	UNC 2	6	6.4	0.4	8	8		
8/2	1.4	0.6	0.05	0.4	0.3	1	19	20.3	10	5.6	7	UNC 2				9	9		
9	1	0.7	0.05	0.5	0.3	1	25	19	12.7	7.0	10.2	M 2.5	12	8	0.7	20	20		
9/1	1	0.7	0.05			1.5		20.5											
9/2	2	1.4	0.1			1.0		26											
10/1	1	0.7	0.05	1	0.3	1.5	25	25.5	12	9.5	10.2	M 3	12	7.7	1.3	25	20		
10/2	2	1.4	0.1			1		31								30	30		
14	3	2	0.1	1	0.3	1	37	21	7.0	14	M 3	12	14	1.3	50	100			
14/1	3	2	0.1		0.5	1.5		24									22	50	100
14/2	6	4	0.2		0.5	1		32										60	110
15/1	3	2	0.1	1	0.5	1.5	37	30	20	10	14	M 4	16	12.4	3	60	110		
15/2	6	4	0.2			1		38								70	120		
22	10	7	0.5	1.5	0.5	1	56	35	34	12	18	M 5	20	21	5.7	180	800		
22/1	10	7	0.5		0.7	1.5		39								180	800		
22/2	18	14	1		0.7	1		51								200	900		
23/1	10	7	0.5	1.5	0.7	1.5	56	44.5	30	15	18	M 6	25	19.3	8	220	920		
23/2	18	14	1			1		57								240	1020		
30	22	15	0.75	2	0.5	1	75	50.5	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⁾ If shaft has $d \leq d_m - 2x$, radial displacement must be taken into account.

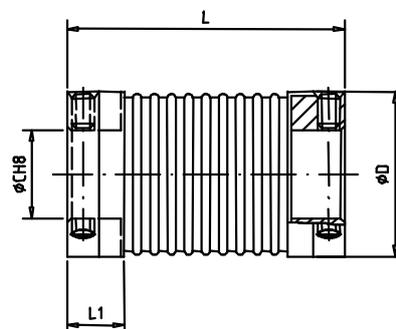
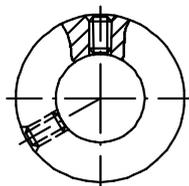
Dimensional Drawings

Coupling SED

Typ SED 10090 A



Typ SED 1450 A



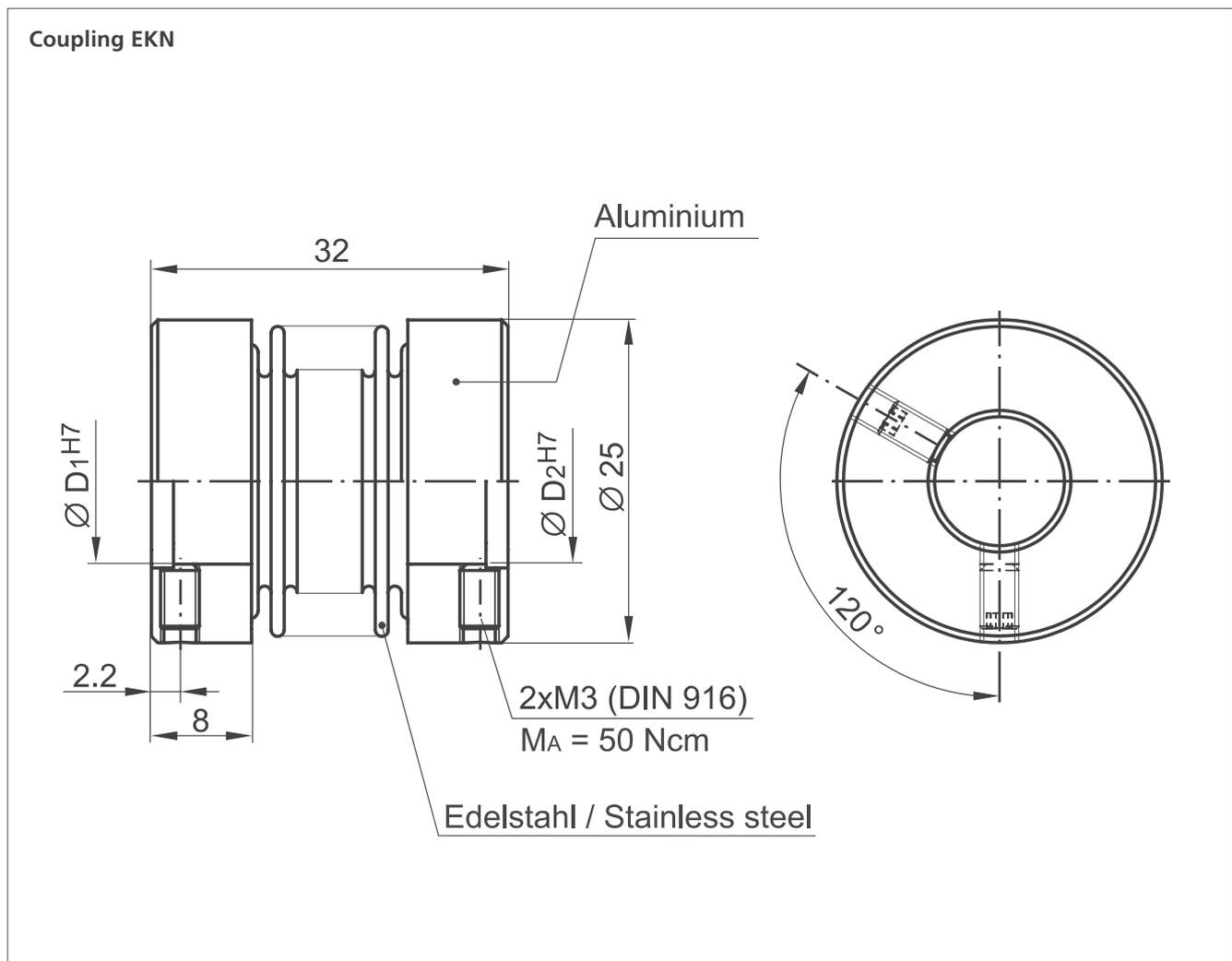
Dimensional Drawings

Coupling SED
Dimensions

Type	hole-Ø	article-No.
SED 10090 A	6/6	34-000-073
SED 10090 A	6/10	34-000-007
SED 10090 A	8/8	34-000-074
SED 10090 A	10/10	34-000-008
SED 10090 A	10/12	34-000-019
SED 10090 A	12/12	34-000-009

Type	hole-	article-No.
SED 1450 A	6/10	34-000-065
SED 1450 A	10/10	34-000-018

Dimensional Drawings



Dimensional Drawings

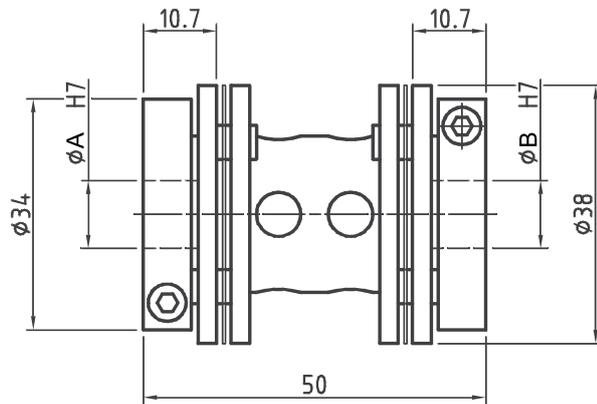
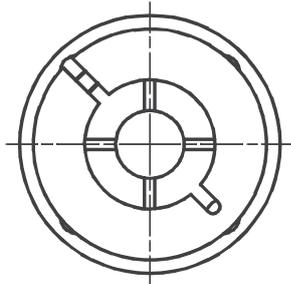
Coupling EKN
Dimensions

Type	Ø D1 H7	Ø D2 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



Dimensional Drawings

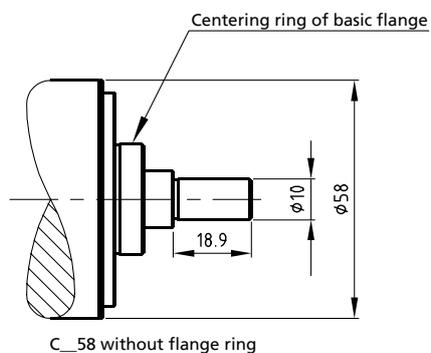
Coupling GEL
Dimensions

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

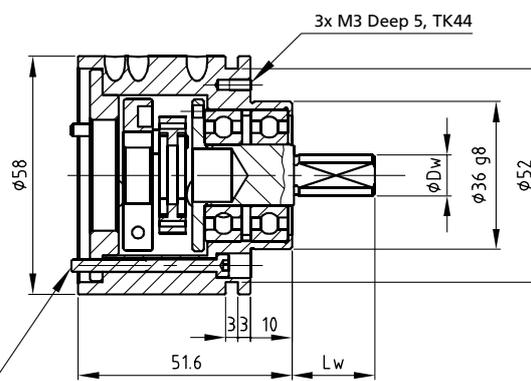
Dimensional Drawings

Bearing-Module 58

Encoder to be connected
(not included)



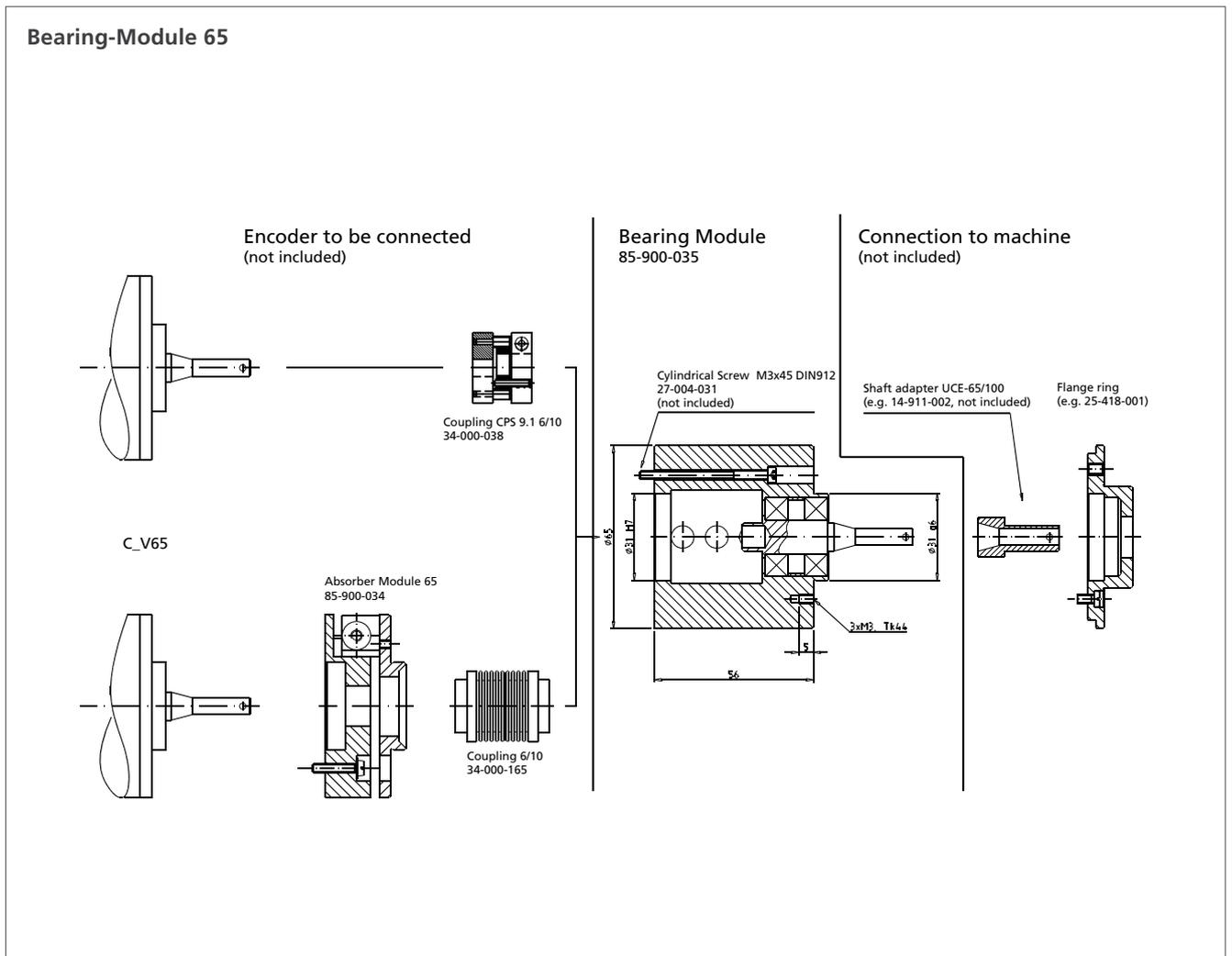
Bearing-Modul



Cylindrical Screw M3 x 35 DIN 912
27-004-086
(3 pc. included)

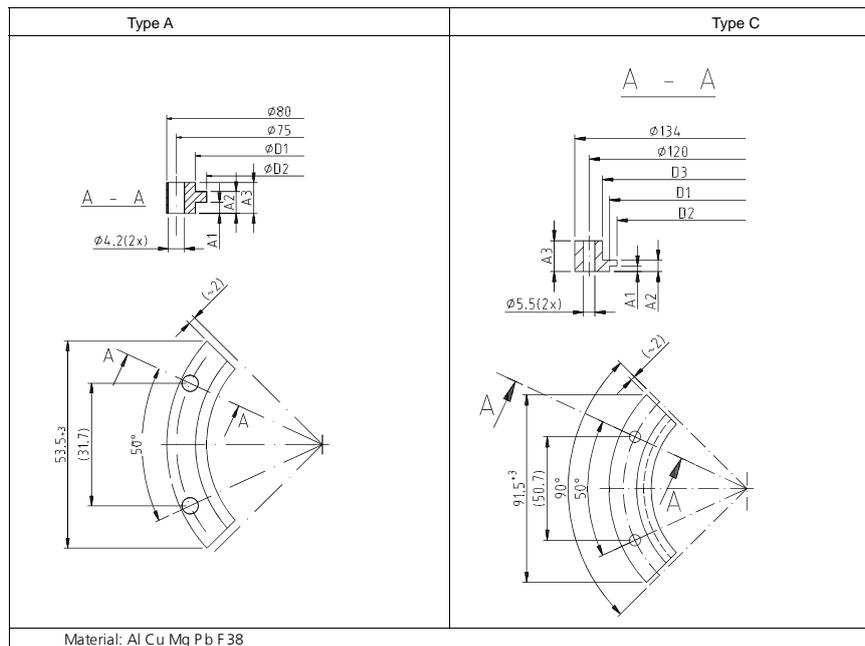
Art-Nr.	Dw	Lw	Remark
85-900-077	10	20mm	with flat 1mm
85-900-078	12	25mm	without flat

Dimensional Drawings



Dimensional Drawings

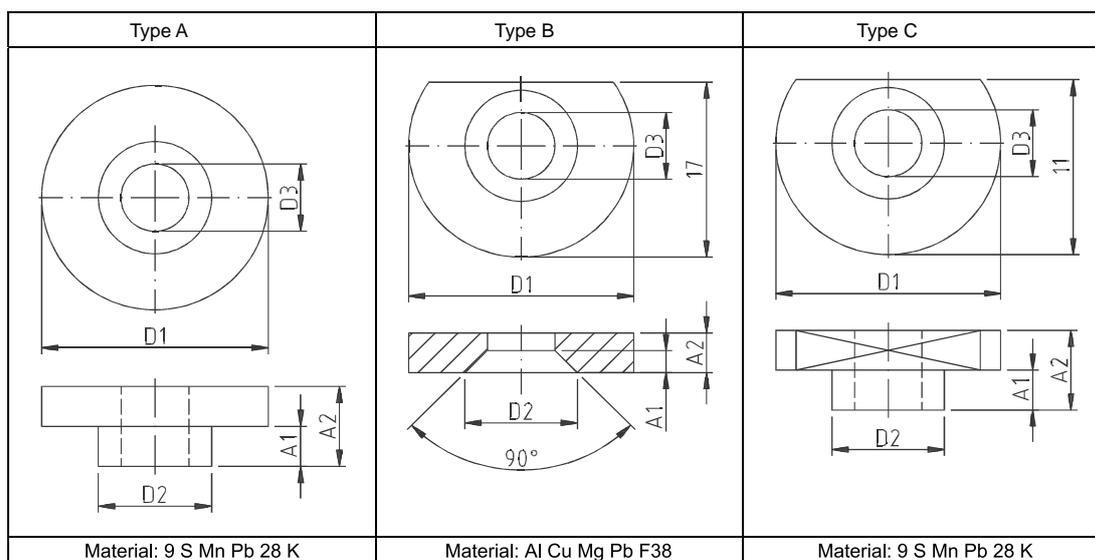
Mounting brackets



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

Dimensional Drawings

Clamps



Type	Ø D1	Ø D2	Ø D3	A1	A2	Article-No
A	11	7	4,2	1,3	2,5	49-115-002
A	14	7	4,2	2,5	5	49-115-004
B	22	6,6	3,4	1,6	2,5	49-115-003
C	14	7	4,2	2,5	5	49-115-001
C	14	7	4,2	1,5	3,2	49-115-005

Accessories for Linear Encoders



Linear encoders

TR-Electronic linear encoders can be integrated seamlessly into different environments. Magnet rings, floats, magnet sliders; clamps and spacers help to fit the magnetostrictive encoders into your application. Additional reflectors for our laser-based measurement systems allow bigger targets in case the vehicle does not 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.

Content

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Dimensional Drawings.....	488

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 magnet 	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				

	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
	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
49155032	T2-S5520N (for LMC55) - distance max 8 mm	Plastic	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.com.

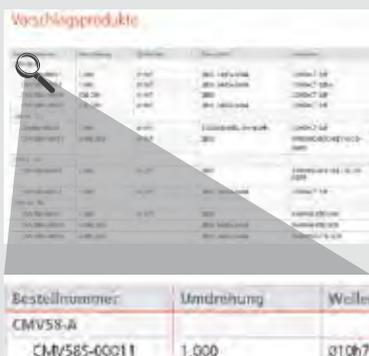
Suggested Products

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

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

Further product information

1. Enter order code into ...



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



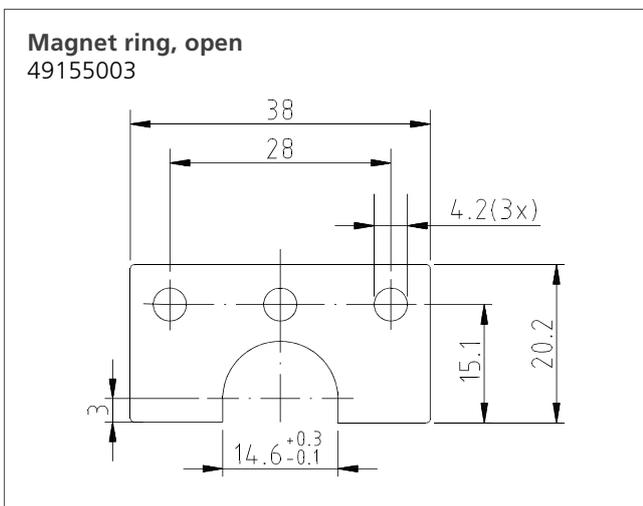
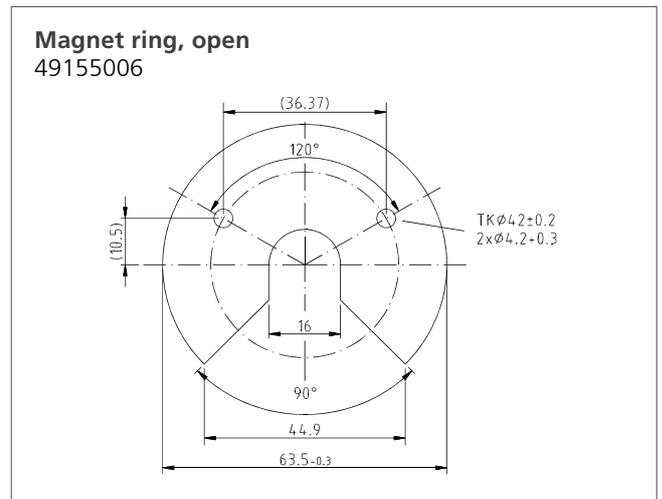
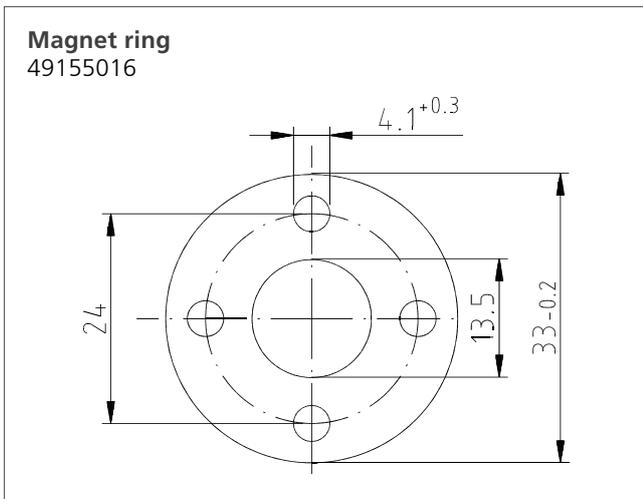
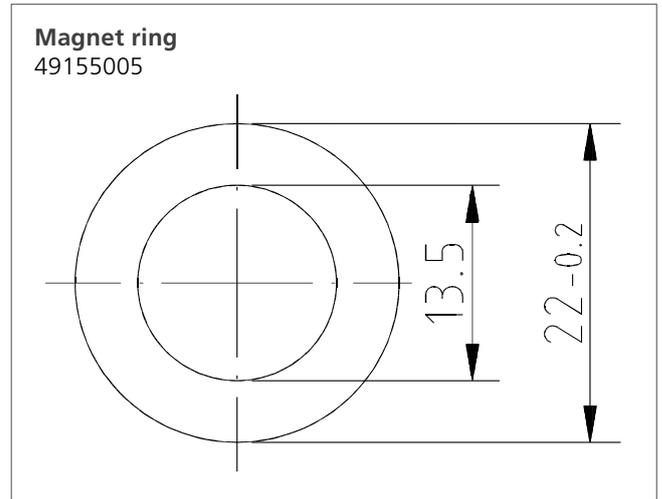
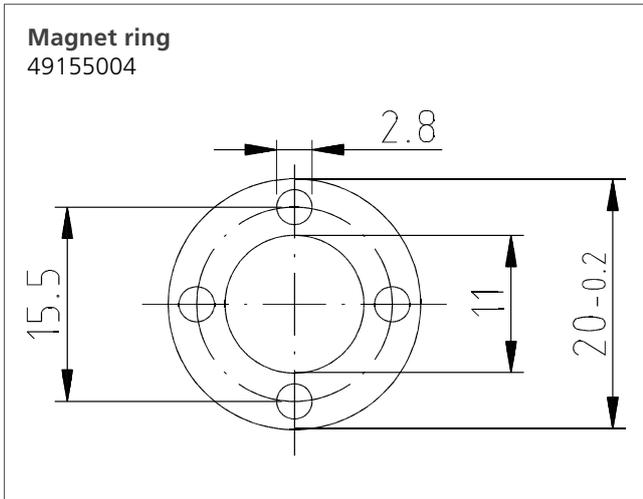
3. Choose desired information



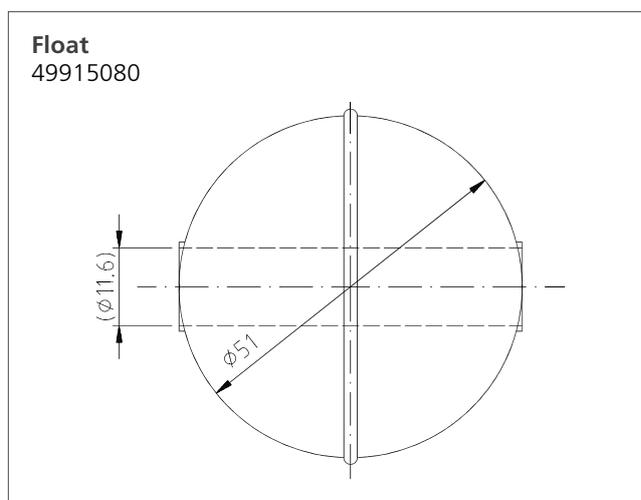
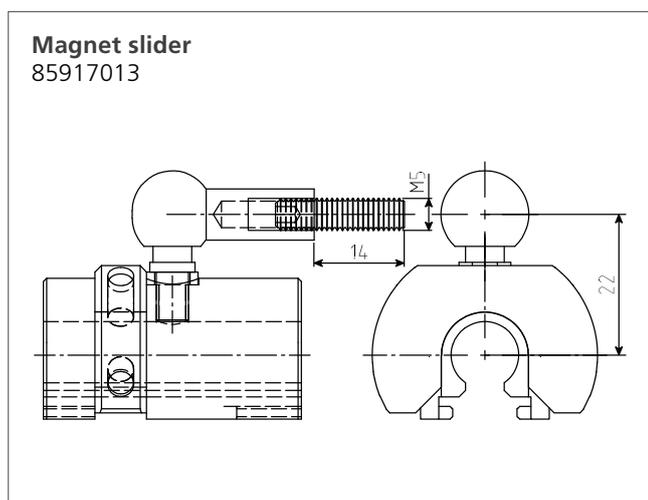
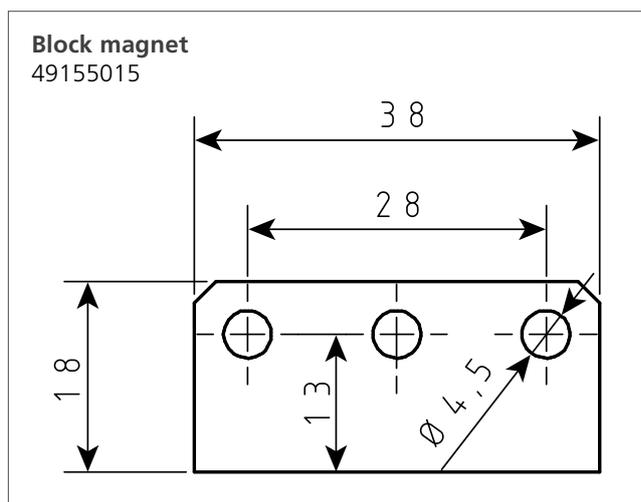
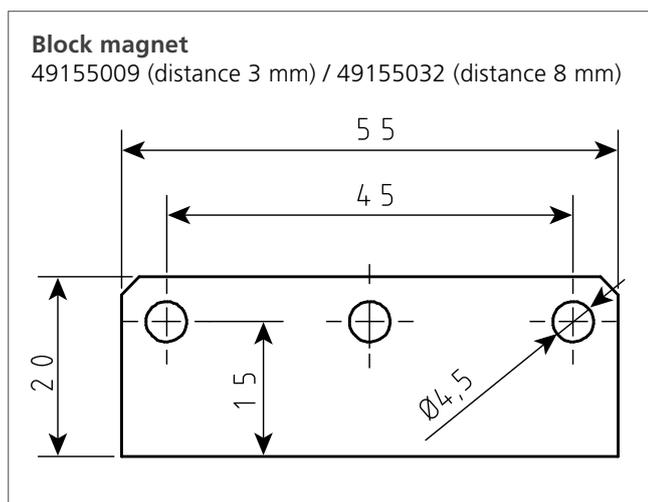
*Devices LE 200 >125 m are adjusted to reflectors >125 m. Even with shorter distance measured, use reflectors >125 m.

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

Dimensional Drawings



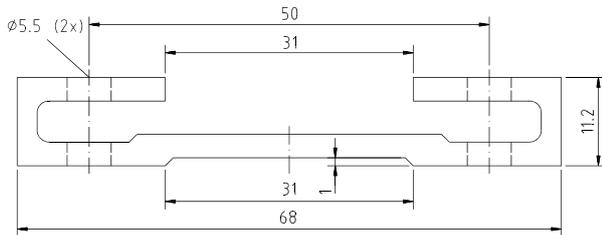
Dimensional Drawings



Dimensional Drawings

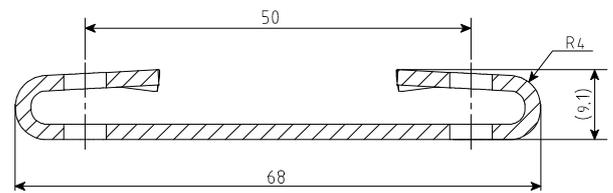
Clamping bracket

49917001, as kit incl. screws: 85917002



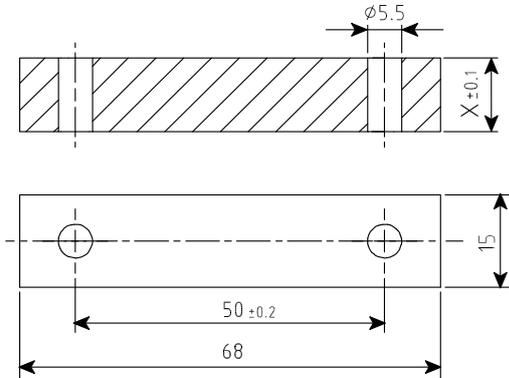
Clamping bracket

49917057



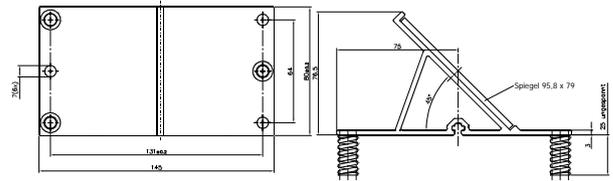
Spacer

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



Deviation mirror for LE

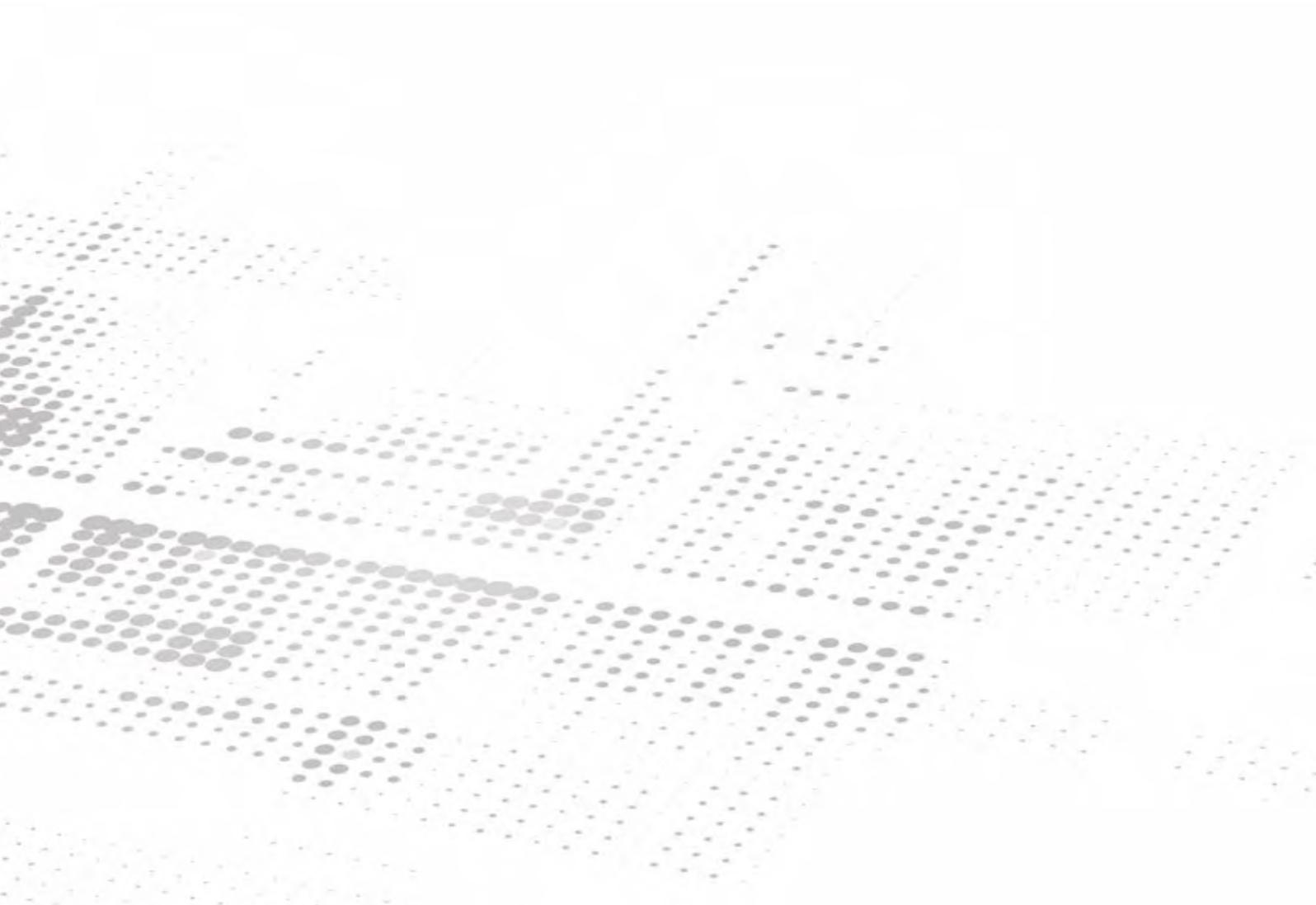
49500033





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 ergonomical. 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")	396.0 mm (15.6")	439.4 mm (17.3")
Screen resolution	1280*800	1366*768	1920*1080
Screen format	16:10 WXGA	16:9 WXGA	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 / 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); eMMC (embedded Multimedia Card)	SD (Secure Digital Memory Card); eMMC (embedded Multimedia Card)	SD (Secure Digital Memory Card); eMMC (embedded Multimedia Card)
Operating system	Android; Linux	Android; Linux	Android; Linux
interface	LAN; USB 2.0; RS 232/422/485*; CAN*; Ethercat*; Profibus*	LAN; USB 2.0; RS 232/422/485*; CAN*; Ethercat*; Profibus*	LAN; USB 2.0; RS 232/422/485*; CAN*; Ethercat*; Profibus*
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QR-Code			

Please ask for your desired configuration about feasibility and availability: info@trsystems.de

notion.A tablet
notion.A computer

Product	notion.A tablet	notion.A computer	notion.A computer	
				
Screen diagonal	469.9 mm (18.5")	256.0 mm (10.1")	396.0 mm (15.6")	
Screen resolution	1366*768	1280*800	1366*768	
Screen format	16:9 WXGA	16:10 WXGA	16:9 WXGA	
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 / IP20	
Case mounting	VESA 75 / 100	VESA 75 / 100	VESA 75 / 100	
CPU	ARM Cortex	Intel® Atom™ Dual-Core	Intel® Atom™ Dual Core	
Drive	SD (Secure Digital Memory Card); eMMC (embedded Multimedia Card)	CFast (CompactFlash ATA Serial Transfer); 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; Linux	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; RS 232/422/485*; CAN*; Ethercat*; Profibus*	LAN; USB 2.0; USB 3.0; RS232; Realtime-LAN	LAN; USB 2.0; USB 3.0 RS232; Fieldbuses; Realtime-LAN	
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QR-Code				

notion.A computer

notion.A terminal

notion.A computer	notion.A computer	notion.A computer	notion.A terminal
			
439.4 mm (17.3")	469.9 mm (18.5")	546.1 mm (21.5")	256.0 mm (10.1")
1920*1080	1366*768	1920*1080	1280*800
16:9 Full HD	16:9 WXGA	16:9 Full HD	16:10 WXGA
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 / IP20	IP65 / IP54
VESA 75 / 100	VESA 75 / 100	VESA 75 / 100	VESA 75 / 100
Intel® Atom™ Quad-Core	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);	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	Windows® Embedded Standard 7; Windows® 7 Professional; Windows® Embedded 8 Standard; Windows® 8 Professional	
LAN; USB 2.0; USB 3.0; RS232; Fieldbuses; Realtime-LAN	LAN; USB 2.0; USB 3.0; RS232; Fieldbuses; Realtime-LAN	LAN; USB 2.0; USB 3.0; RS232; Fieldbuses; Realtime-LAN	VGA; DVI; USB; KVM-Extender
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
			

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notion.A terminal

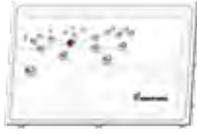
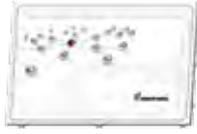
Product	notion.A terminal 	notion.A terminal 	notion.A terminal 	
Screen diagonal	396.0 mm (15.6")	439.4 mm (17.3")	469.9 mm (18.5")	
Screen resolution	1366*768	1920*1080	1366*768	
Screen format	16:9 WXGA	16:9 Full HD	16:9 WXGA	
Touch screen	Glass touch (multitouch)	Glass touch (multitouch)	Glass touch (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 / IP54	IP65 / IP54	IP65 / IP54	
Case mounting	VESA 75 / 100	VESA 75 / 100	VESA 75 / 100	
CPU				
Drive				
Operating system				
interface	KVM-Extender	VGA; DVI; USB; KVM-Extender	VGA; DVI; USB; KVM-Extender	
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notion.A terminal
 notion.B 200
 notion.C tablet

notion.A terminal	notion.B 200	notion.C tablet	notion.C tablet
			
546.1 mm (21.5")		178.0 mm (7.0")	256.0 mm (10.1")
1920*1080		800*480	1280*800
16:9 Full HD		5:3 WVGA	16:10 WXGA
Glass touch (multitouch)	Keyboard, mouse	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	IP20	IP65 / IP20	IP65 / IP20
VESA 75 / 100	Mounting bracket: DIN rail	Recessed mounting	Recessed mounting
	Intel® Atom™ Quad-Core; AMD Quad Core; Intel® Core™ i5; Intel® Core™ i7	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); eMMC (embedded Multimedia Card)	SD (Secure Digital Memory Card); eMMC (embedded Multimedia Card)
	Windows® Embedded Standard 7; Windows® 7 Professional; Windows® Embedded 8 Standard; Windows® 8 Professional	Android; Linux	Android; Linux
VGA; DVI; USB	LAN; USB 2.0; USB 3.0; RS232; Fieldbuses; Realtime-LAN	LAN; USB 2.0; RS 232/422/485*; CAN*; Ethercat*; Profibus*	LAN; USB 2.0; RS 232/422/485*; CAN*; Ethercat*; Profibus*
www.tr-electronic.de/f/TRS-DOC-000817	www.tr-electronic.de/f/TRS-DOC-000873	www.tr-electronic.de/f/TRS-DOC-000819	www.tr-electronic.de/f/TRS-DOC-000819
			

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notion.C tablet

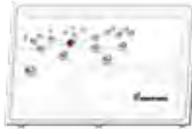
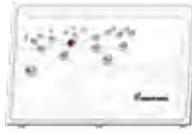
Product	notion.C tablet 	notion.C tablet 	notion.C tablet 	
Screen diagonal	396.0 mm (15.6")	439.4 mm (17.3")	546.1 mm (21.5")	
Screen resolution	1366*768	1920*1080	1920*1080	
Screen format	16:9 WXGA	16:9 Full HD	16:9 Full HD	
Touch screen	Glass touch (multitouch)	Glass touch (multitouch)	Glass touch (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	ARM Cortex	ARM Cortex	
Drive	SD (Secure Digital Memory Card); eMMC (embedded Multimedia Card)	SD (Secure Digital Memory Card); eMMC (embedded Multimedia Card)	SD (Secure Digital Memory Card); eMMC (embedded Multimedia Card)	
Operating system	Android; Linux	Android; Linux	Android; Linux	
interface	LAN; USB 2.0; RS 232/422/485*; CAN*; Ethercat*; Profibus*	LAN; USB 2.0; RS 232/422/485*; CAN*; Ethercat*; Profibus*	LAN; USB 2.0; RS 232/422/485*; CAN*; Ethercat*; Profibus*	
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notion.C computer

notion.C computer	notion.C computer	notion.C computer	notion.C computer
			
178.0 mm (7.0")	256.0 mm (10.1")	307.0 mm (12.1")	396.0 mm (15.6")
800*480	1280*800	1280*800	1366*768
5:3 WVGA	16:10 WXGA	16:10 WXGA	16:9 WXGA
Glass touch (multitouch)	Glass touch (multitouch)	Glass touch (multitouch)	Glass touch (multitouch)
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;	Intel® Atom™ Quad-Core;	Intel® Atom™ Quad-Core	Intel® Atom™ Quad-Core;
SSD (Solid-State-Drive); HDD (Hard-Disk-Drive);	CFast (CompactFlash ATA Serial Transfer); SSD (Solid-State-Drive); HDD (Hard-Disk-Drive);	SSD (Solid-State-Drive); HDD (Hard-Disk-Drive);	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	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; USB 2.0; USB 3.0; RS232; Fieldbuses; Realtime-LAN	LAN; USB 2.0; USB 3.0; RS232; Fieldbuses; Realtime-LAN	LAN; USB 2.0; USB 3.0; RS232; Fieldbuses; Realtime-LAN	LAN; USB 2.0; USB 3.0 RS232
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notion.C computer

Product	notion.C computer 	notion.C computer 	notion.C computer 	
Screen diagonal	439.4 mm (17.3")	469.9 mm (18.5")	546.1 mm (21.5")	
Screen resolution	1920*1080	1366*768	1920*1080	
Screen format	16:9 Full HD	16:9 WXGA	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	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	Intel® Atom™ Quad-Core; AMD Quad Core; Intel® Core™ i5; Intel® Core™ i7	
Drive	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);	CFast (CompactFlash ATA Serial Transfer); CF (Compact Flash); SD (Secure Digital Memory Card); SSD (Solid-State-Drive); HDD (Hard-Disk-Drive);	
Operating system	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	Windows® Embedded Standard 7; Windows® 7 Professional; Windows® Embedded 8 Standard; Windows® 8 Professional	
interface	LAN; USB 2.0; USB 3.0; RS232; Fieldbuses; Realtime-LAN	LAN; USB 2.0; USB 3.0; RS232; Fieldbuses; Realtime-LAN	LAN; USB 2.0; USB 3.0; RS232; Fieldbuses; Realtime-LAN	
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.C terminal

notion.C terminal	notion.C terminal	notion.C terminal	notion.C terminal
			
307.0 mm (12.1")	396.0 mm (15.6")	439.4 mm (17.3")	469.9 mm (18.5")
1280*800	1366*768	1920*1080	1366*768
16:10 WXGA	16:9 WXGA	16:9 Full HD	16:9 WXGA
Glass touch (multitouch)	Glass touch (multitouch)	Glass touch (multitouch)	Glass touch (multitouch)
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
VGA; DVI; USB 2.0;	VGA; DVI; USB 2.0;	VGA; DVI; USB;	VGA; DVI; USB;
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
			

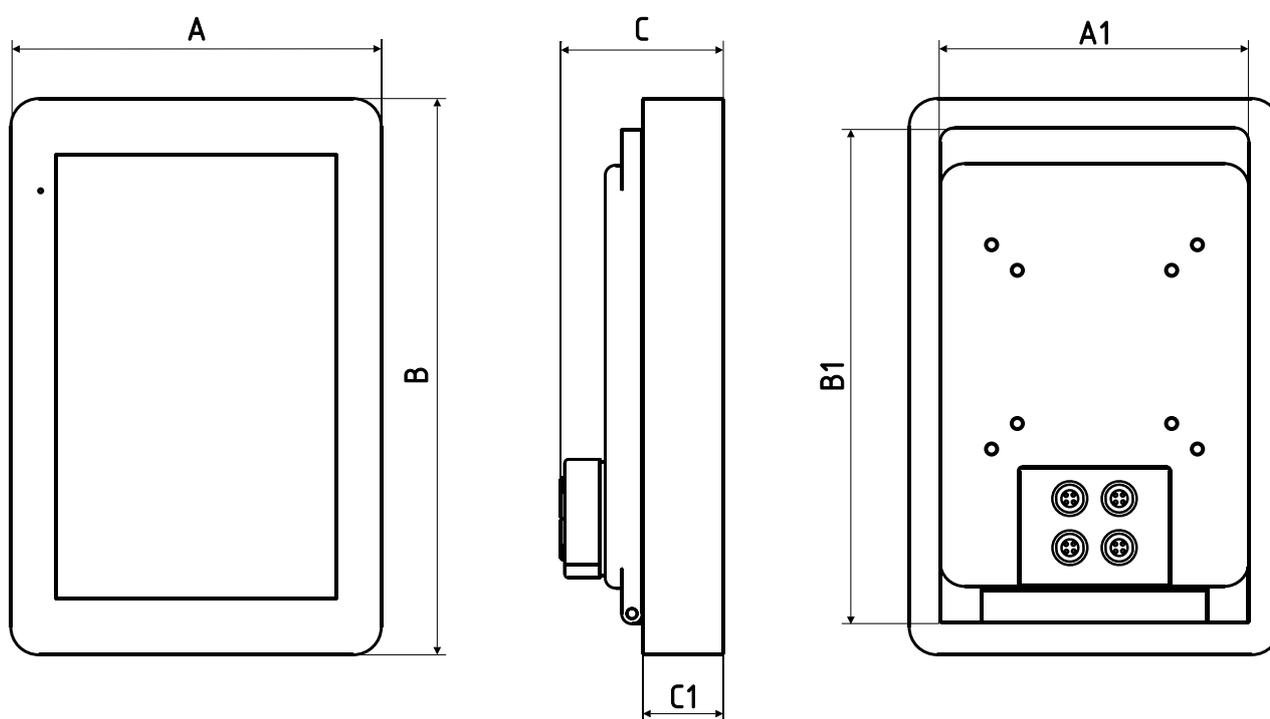
Please ask for your desired configuration about feasibility and availability: info@trsystems.de

notion.C terminal

Product	notion.C terminal 
Screen diagonal	546.1 mm (21.5")
Screen resolution	1920*1080
Screen format	16:9 Full HD
Touch screen	Glass touch (multitouch)
Operating voltage	24 VDC; +/- 20%
Operating temperature	0...50 °C
Type of protection front / backside (IP)	IP65 / IP20
Case mounting	Recessed mounting
CPU	
Drive	
Operating system	
interface	VGA; DVI; USB;
Weblink	www.tr-electronic.de/f/TRS-DOC-000819
QR-Code	

Dimensional Drawings

notion.A tablet
Dimensions see table

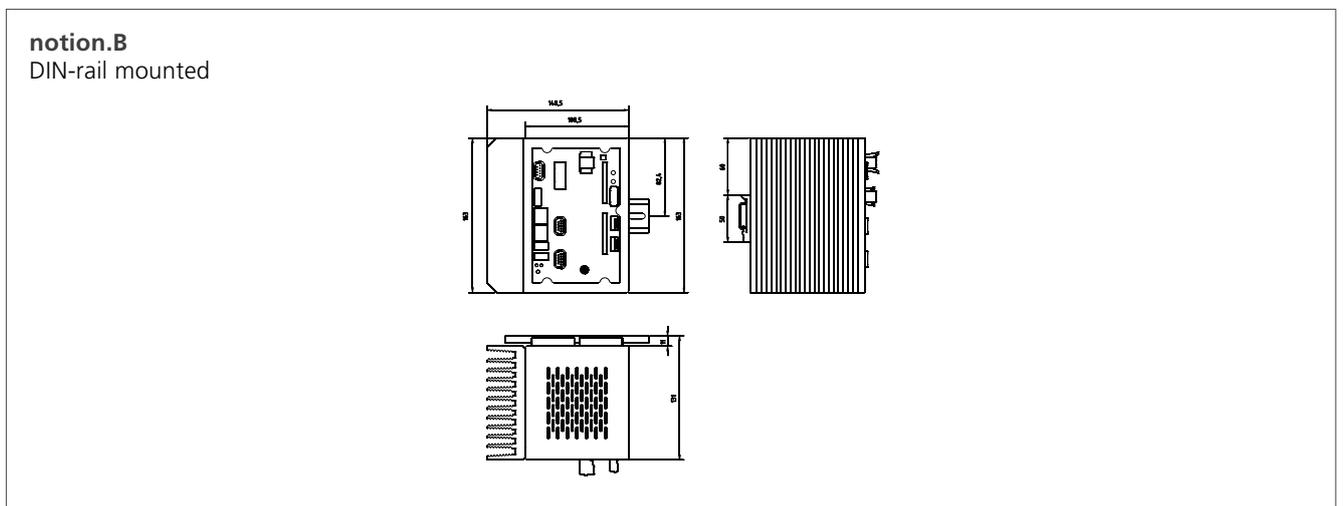
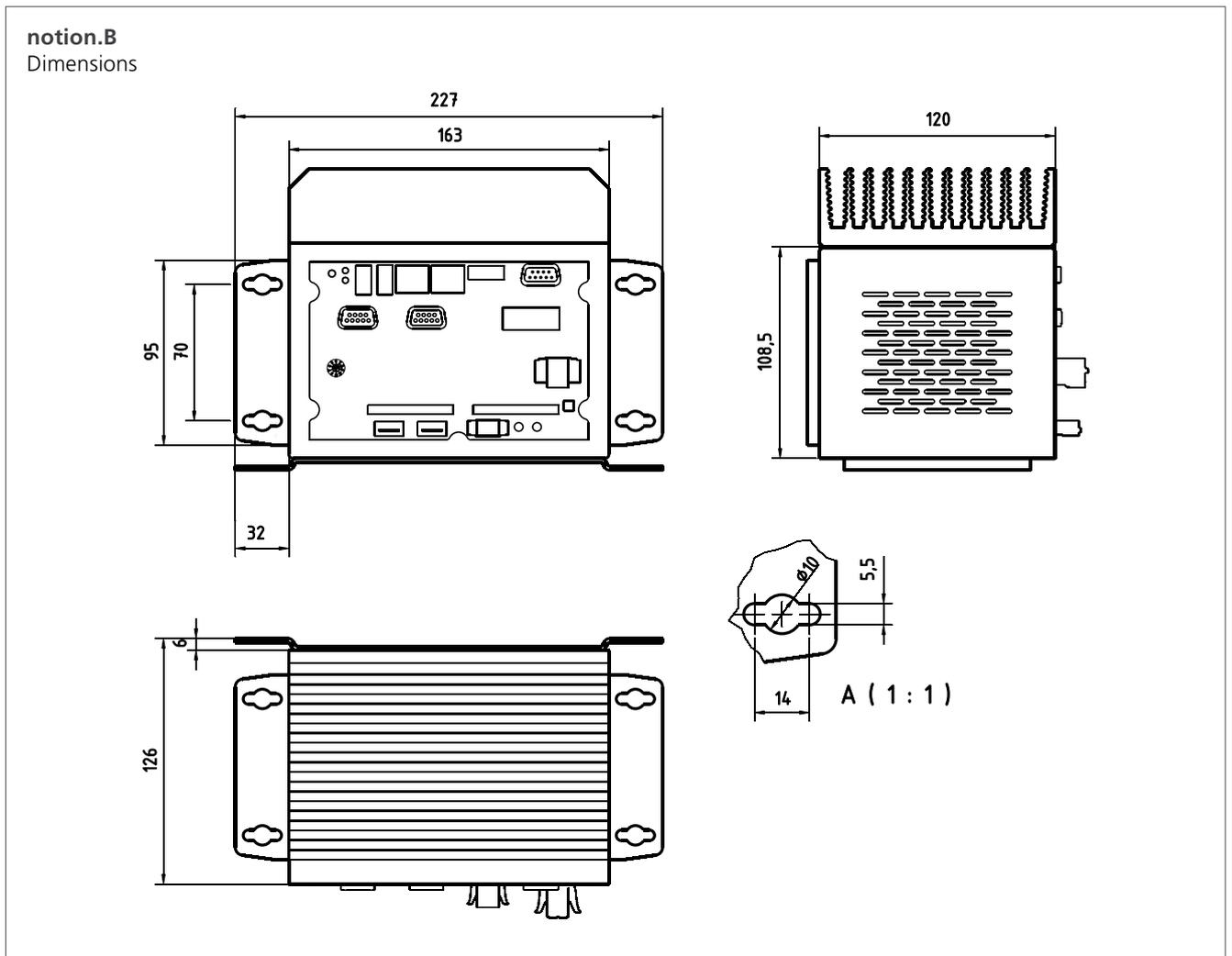


notion.A
Dimensions

notion.A (tablet)

[mm]	A	A1	B	B1	C	C1
Displaydiagonale						
10,1 inch	180,0	150,0	272,3	242,0	78,9	39,0
15,6 inch	247,2	197,2	394,3	334,3	84,8	32,3
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

Dimensional Drawings

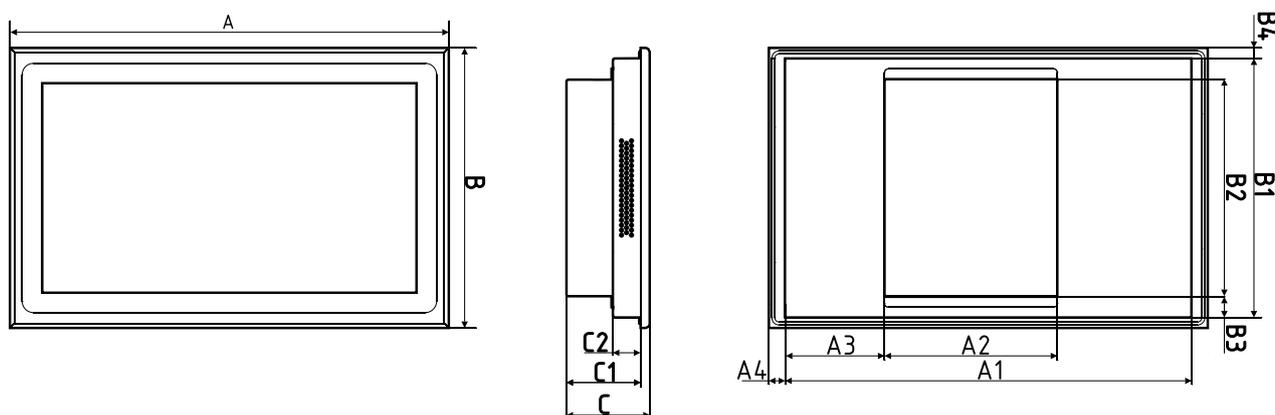


Illustrations are schematic diagrams. Binding dimension drawings and CAD data for specific order numbers at www.tr-electronic.com or on request.

Dimensional Drawings

notion.C

Dimensions see table



notion.C

Dimensions

notion.C (computer)

[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	284,1	266,0			9,1	191,8	172,0			9,1	59,4	53,1	8
15,6 inch	415	383,4			15,8	268	244,6			11,7	98,8	88,5	
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
21,5 inch	548,5	510			19,3	340,8	323			9	78,8		

TR-Automation Retrofit and Setup of New Plants



Our Automation Team - Competent consulting through years of experience

Our TR-Automation team of TR-Electronic GmbH offers competent consulting in press and plant construction from more than 20 years of experience with one of the largest manufacturers in the area of hydraulic machine and plant construction in the world.

We have a lot of know-how in the areas of:

- _ Project management – planning and implementation
- _ Construction:
 - _ Hydraulics and mechanics
 - _ Electrical engineering
- _ Control technology
- _ Controls – concept and implementation
- _ Software development
- _ Visualisation – concept and implementation
- _ Remote maintenance – update and support
- _ After-sales service



We use our experience and the accumulated knowledge to fulfill your requirements in the best projects.
We will support you from planning and development to performance, commissioning and production support.

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Your press plant at the cutting edge of technology



You would like to upgrade or modernize your press plant in a retrofit project: What you need is comprehensive specialist knowledge and many years of experience renovating and optimizing challenging press plants.

As an expert for retrofit projects, the TR Automation Business Unit of the TR Group is your competent partner for modernizing and overhauling press plants. Use our extensive know-how of hydraulic and mechanical presses, blank loaders and automation systems through to cutting systems and internal high-pressure forming plants (IHU). With your retrofit project, you get to benefit from an all-round carefree package that covers electro-construction, hydraulics & pneumatics, mechanics, programming and service.

The TR-Automation team of experts takes you step-by-step through the retrofit or renovation of individual machines and systems in the press plant or of entire press lines. We guarantee maximum transparency and orient ourselves completely to your specific requirements - from project planning and realization through to starting the system on site and subsequent training of your employees. For top-modern machines and systems in a press plant at the cutting edge of technology offering the best performance and efficiency.



Hydraulic and mechanical presses

- _ Tryout presses
- _ Multicurve presses
- _ Transfer presses
- _ Press lines
- _ Single-action and multiple-action draw presses
(ram and ram cushion, die cushion, blank holder)

Blank loaders

The problem-free feeding of blanks is key to the production performance of the forming system. The design of the blank feed is also known as the blank loader. The blank material used, the stack form and range of parts involved influence both the concept design of the blank loader and the production performance of the press. Blank washing systems and blank lubricating systems can be integrated into the plant as required.

TR-Automation takes over overhauling or the complete redesign of the blank loader in your forming system. We modernize the individual components of the blank loader and ensure smooth interaction - the best foundation for optimal functioning presses and efficient production processes.

Cutting systems

Blank production is the basis for the quality of the subsequent production processes, e.g. in car-body assembly in the automotive industry. The exterior skin parts particularly place high demands on the surface quality of the supplied blanks.

TR-Automation takes over the overhaul or modernization of your coil systems or cutting systems. We update the individual components of the coil system and ensure they work together smoothly. This not only increases the precision and throughput of your cutting systems, but also gives you greater availability at the same level of safety - a perfect basis for trouble-free, highly-efficient production in three-shift operations.

Your press plant at the cutting edge of technology



Automation systems

Even automation systems in press plants start to get old at some point in time. With modern transfer systems, feeders, robots, blank loaders, turners and orientation stations, speedbar modules and stacking systems, which are integrated seamlessly into the overall system and tuned to function perfectly together, we ensure that your production processes experience a measurable boost in efficiency. And we can also take over the renovation of individual components or complete automation systems in your presses and press lines.

IHU systems

In Internal-High-Pressure Forming (IHU), metallic tubes or hollow parts are formed in closed forming tools by way of internal pressure. For the production processes to be as efficient as possible and to achieve a high-level of availability and maximum throughput, what you need for these complex techniques is that the individual components of the IHU system are at the state of the art and work together seamlessly. TR-Automation modernizes your existing IHU systems to include cutting edge technology and coordinates each module to work perfectly in tune with the system as a whole.

Range of services of machine & system retrofits



- _ Consulting
 - _ Recording and analysis of the actual condition
 - _ Process optimization

- _ Project management
 - _ Specifications management
 - _ Development of specifications
 - _ Project planning
 - _ Risk and hazard analysis

- _ Construction and development of the different areas
 - _ Electro
 - _ Hydraulics/Pneumatics
 - _ Mechanics
 - _ Programming

- _ On-site assembly and installation
- _ On-site commissioning
 - _ System-specific documentation
 - _ Training of your operating and maintenance personnel during the handover phase
- _ CE marking

- _ Service
 - _ Training
 - _ Production supervision
 - _ Support
 - _ Remote maintenance

Retrofit-services



For presses and press lines, blank loaders, automation systems, coil systems or IHU systems: to ensure smooth production processes, you need optimal-functioning electrics with control systems, sensors and actuators, convenient visualization solutions and comprehensive safety systems. TR-Automation analyzes your electrics system in the press plant to reveal any weaknesses and by modernizing specific areas ensures that the control of all of the systems functions as simply, trouble-free and efficiently as possible.

Programming

- _ Programmable safety control (PPS)
- _ Storage-programmable control (SPS)
- _ Visualization
- _ Operation and preselection panel (BVT), two-hand operating points, panel PC, touch-panel
- _ Controller
 - _ Ram position control
 - _ Ram pressure regulator
 - _ Ram force regulator
 - _ Ram speed control
 - _ Ram parallel control, Ram synchronizer
 - _ Intelligent pre-control of ram
 - _ Limitation control of ram
- _ Ram cushion position control
- _ Ram cushion pressure regulator
- _ Die cushion position control
- _ Die cushion pressure control
- _ Blank holder pressure control, blank holder fine adjustment
- _ Intelligent pump control
- _ Electrical drive control in automation systems
- _ Path control
- _ Individual control and regulation algorithms
- _ Individually adjustable number of axes
- _ Setpoint selection
- _ NC controls
 - _ Continuous path control systems
 - _ Path generators



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Electro

- _ Programmable safety control (PPS)
- _ Storage-programmable control (SPS)
- _ Cabinets and boxes:
Control cabinet, engine cabinet, terminal box, industry PC, control lines, power cable, bus lines: Safetybus p, ProfiSafe, Profinet, EtherCAT, Ethernet, Profibus
- _ Visualization
Operation and pre-selection panel (BVT), two-hand operating points, panel PC, visualization, touch-panel, operating panel, keyboard
- _ Sensors and actuators
Sensor signals: pressure, speed, path, position, force, valve position, rotary encoder, actuator signals: valve, hydraulic valve, proportional valve, servo-valve, motor, electric motor
- _ Controller
- _ Machines and personal protection
Protective casing, doors, gates, lift gates, light barriers, emergency off switches, emergency stop

Hydraulics / Pneumatics

- _ Sealing valves
- _ Sealing cylinders
- _ Checking/ overhauling storage
- _ Replacing valves and units
- _ Redesign of valve blocks and other components

Mechanics

In order to achieve powerful, efficient, highly available and safe production processes in the press area, you need reliable mechanical components in your production systems.

We take over retrofitting your mechanical systems - for example the cams, guides and head pieces. In addition, we help you with the complete relocation or the set-up and dismounting of systems and machines. This minimizes downtimes and we can give you the security that your production systems will be functioning optimally immediately after re-installation.

Range of services



A retrofit serves as a replacement for components that are no longer available. A process optimization can also be carried out, i.e. productivity is increased. In comparison to purchasing a new system a cost optimization also takes place, as the existing system is only upgraded and retrofitted. In many cases the machine can be used more flexibly after a retrofit. The retrofit of a machine has a higher internal acceptance, as the machines and systems are generally well known.

TR-Electronic projects at a glance

- _ Adaptive control, ZIM-project
- _ Continuous path control for feeder automation
- _ Care and maintenance of Müller-Weingarten control systems
- _ Blank holder fine adjustment to mechanical production presses
- _ Brake test stand
- _ Casing jack for offshore installations
- _ Diecasting machines
- _ Hydraulic presses for toolmaking
- _ Hydraulic production presses
- _ IHU systems
- _ Mechanical presses
- _ Multicurve presses
- _ Blank loaders - destacking feeders, conveyor belts, washers, lubrication units, centering station
- _ Press with parallelism control
- _ Press with accumulator supply
- _ Robot automation / coupling and integration into system control
- _ Cutting systems – belt conveyor, press, stacking system
- _ Stretch forming presses
- _ Transfer presses
- _ Die cushion pre-acceleration
- _ Die cushion pressure control

Overview of TR-Automation references



- _ Airbus Deutschland GmbH, Nordenham-Einswarden
- _ Allgaier AEF S.à.r.l, France
- _ Allgaier Werke GmbH, Uhingen
- _ Audi AG, Neckarsulm
- _ BMW AG, Munich Dingolfing
- _ Erdöl-Erdgas Workover GmbH, Salzwedel
- _ G. Siempelkamp GmbH & Co. KG, Krefeld
- _ GEDIA Gebrüder Dingerkus GmbH, Attendorn
- _ Hörnlein Umformtechnik GmbH & Co., Schwäbisch Gmünd
- _ Knorr-Bremse AG, Munich
- _ Läpple Automotive GmbH, Teublitz
- _ Magna Drive Automotive Industries of America Inc., USA
- _ Magna International Stanztech GmbH,
Heilbad Heiligenstadt
- _ Magna Sonora Forming Technology, Mexico
- _ Magnetto Automotive Deutschland GmbH, Treuen
- _ Opel AG, Rüsselsheim
- _ Schuler SMG GmbH & Co. KG, Esslingen
- _ SMF GmbH & Co. KG, Ahlen
- _ Strothmann Machines & Handling GmbH,
Schloß Holte Stukenbrock
- _ ThyssenKrupp System Engineering GmbH,
Wadern-Lockweiler
- _ Tower Automotive, Zwickau
- _ TU Dresden, IFD
- _ University of Stuttgart IFU
- _ VDL Nedcar, The Netherlands
- _ Volkswagen AG, Wolfsburg
- _ Werkzeugbau Leipzig GmbH, Leipzig

TRsystems GmbH, Unidor System Division in Pforzheim



Company history

1948 – Establishment of Kiefer KG, watch and metal goods factory, Pforzheim

Creation of the UNiDOR brand name. Through automation of punching processes. In-house development of the first tool protection systems (UN series) and optical sensors.

1971 – Sale to Thurn and Taxis

Further development of systems, driven by constantly new challenges. Introduction of the first force monitoring systems. Creation of the APS system, development of the first axis automations (stroke adjustments; ram adjustments).

1990 – Acquisition by the Prym Group

Further development of the APS system, first industrial PC systems are used. Customer-specific solutions are increasingly implemented.

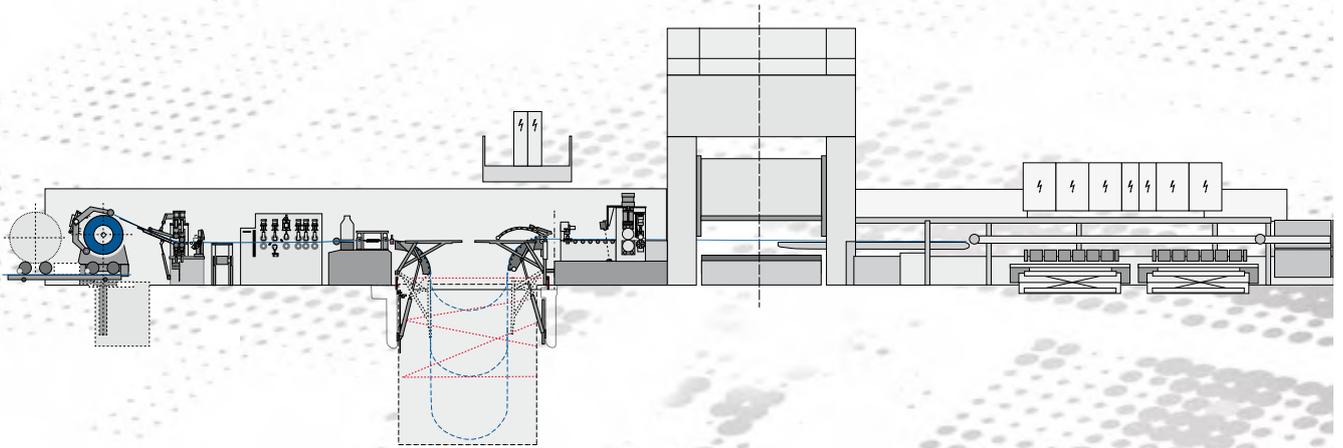
1996 – Acquisition by TR-Electronic GmbH

Creation of the Aplus system. In 2000 creation of the compactPRESS system. 2012 integration into TRsystem GmbH.

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unidor is more than the sum of its products



We provide: Products for perfect punching and forming

Together. Quality products in cutting-edge technology are one thing. Our longstanding experience in process optimization for punching and forming is another. So don't just see us as a supplier of systems, retrofits, components and sensors, but also as a team of experts with extensive practical experience and plenty of optimization ideas.

We want to work with you to establish a status in production, machine and tool. We will then produce an expert's report to show how the complexity of your products, productivity and quality can be increased with existing resources and new concepts.

See us as experts who will work with you in close partnership to create opportunities to get more out of production, and to produce more efficiently and reliably with your machines and tools.

From UNiDOR you can expect an integrated all-round package

From neutral expert advice to prompt delivery and installation of the optimal technology, as well as long-term and consistent after-sales service. Use our forums and presentations to remain constantly up to date. Let us seek optimal solutions in a long-term partnership and inspire each other to constantly push the limits of the possible.



Technology leader and quality from the very start

Forwards. The future of punching and forming is changing rapidly: it is becoming more complex, faster, more precise, with complete documentation, up to the highest number of strokes. Innovative product requirements by your customers and continuous cost pressure force you to take product and tool to the limits of feasibility on a daily basis.

It is therefore becoming increasingly important to visualize the punching and forming process, in order to optimize and precisely control every work step on this basis. Precise understanding of the process is essential to fulfill the customer's requirement for perfect production and quality products and to create the technological lead that will secure orders today and, even more, tomorrow. UNiDOR provides perfect products, an abundance of ideas and a range of services to meet this need. From special sensors to monitoring devices and user-friendly, universal measuring systems, we have exactly the equipment that you need to have punching & forming permanently under control, both in detail and overall. With our products you can be sure of reliably managing

the production process even at the limit of technical capabilities, and of always achieving excellent results with maximum cost-efficiency.

Retrofits

Consult us

In mechanical engineering

Together with our competent mechanical specialists we will ensure a compact mechanical, hydraulic and electrical upgrade of your machine.

- _ Brief interruption in operation
- _ No structural modifications (foundations)
- _ Expenditure can be written off immediately

Anyone who needs cost efficiency, needs us

- _ Current machine status
- _ Expertise in general electrical overhauls
 - Switch cabinet + control panel
- _ Control PLC S7 (as HardPLC or SoftPLC)
- _ compactPRESS starLINE or ecoLINE
- _ Complete electrical equipment + installation
- _ Handover + acceptance with safety check
- _ Training + service + spare parts

Refurbishment, general overhaul, modernization - many names for the same objective

Presses and punches are durable capital goods, whose life cycle goes beyond the control, peripheral equipment, actuators and sensors. Why always think about buying a new machine, when you can still earn a lot of money with the old one, at modest costs!

This solution also has tax advantages, because overhauled machines can be written off more quickly! Modernization costs can be depreciated immediately.

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



Systems

compactPRESS – the process monitoring system for punching and forming technology

A wide variety of controls ensure the broad range of functionality and universality of compactPRESS. Everything that is important for an optimal and continuous production process is displayed, reported and monitored by compactPRESS with the utmost precision. compactPRESS, comprehensive insurance for machines and tools.

compactPRESS

- _ is your all-round assistant for practically everything, a professional for measuring, controlling and rationalizing punching & forming. Ultra-fast up to the highest number of strokes,
- _ protects your machines and dies, ensures regular maintenance and service, manages, logs and archives all production and quality data,
- _ offers simple touch-pad operation that everyone can easily understand. Icons instead of buttons guide and inform the operator in every situation. Knowing what's going on has never been easier,
- _ is based on an extremely reliable IPC. The best solution for continuous machine-level operation in harsh conditions,
- _ displays what is going on in the machine and die directly at the machine or via a central control panel. No matter where your machine is producing, you have everything in view at all times,
- _ understands all analog or digital sensors and combines them as required, functionally, logically or mathematically,
- _ as a standalone system primarily in retrofitting or as PLC subsystem of a control in the initial equipment,
- _ increases the availability of tool and machine and ensures greater transparency, particularly in critical production processes with difficult materials.

However, the immense range of functionality and performance of compactPRESS is determined by the extremely flexible controls. Controls are software-based action and functional units, special „tools“ for all tasks and applications in punching & forming.

The controls determine the numerous features for visualizing, measuring, optimizing, monitoring and logging. With the compactPRESS controls you always know exactly what is going on; production processes, machine and die become so transparent that they take you to the limits of the possible. Whatever the task in hand, with compactPRESS you will find the right control or controls. Each of the many controls is designed for a specific task. Tasks which you can easily solve in many areas by means of parameterization.

In conjunction with specific sensors you now have a set of tools that will provide you with comprehensive support in all customer requirements for greater complexity, precision, productivity and quality, defining entirely new production dimensions in punching and forming.

After an overview of all currently available controls for ecoline+starline, we will provide detailed examples of our own controls and show practical applications.

Two software packages, compactPRESS ecoline and compactPRESS starline, are available. Ecoline is the entry-level class, starline is the high-end performance class. Upward compatibility for data and variables from ecoline to starline is guaranteed.

compactPRESS understands all sensors, regardless of whether digital or analog sensor signals are involved. The same applies for a wide range of absolute rotary encoders, whose inputs are easy to parameterize.

This also applies for digital and analog outputs.

Ample scope for convenient I/O handling.

Software for model series 169



Fig. 1

Side panel

Important displays can be dragged from the main screen onto the side panel using „Drag and Drop“. If more displays are configured than can be shown on the side panel simultaneously, you can scroll the desired display up and down with your finger (Fig. 1, red arrow) (device example: Notion).

Graphic programming of the envelope curve

Beginning, end, maximum and minimum limit of the envelope curve (Fig. 2 & 3) can be programmed with a finger click. To do this, select the tool icon in the individual curve display of an analog channel.

After selecting the respective icon, the desired limits can be changed by dragging with the finger.

Fig. 2



Abb. 3



Controls

Basic Controls

The heart of every compactPRESS is the integrated smartPLC. It links the controls, coordinates the timing and organizes all processes of compactPRESS.

Visualization and parameterization of the controls occur in the control itself, depending on the function and task. The real-time core guarantees correct execution of all time-relevant tasks. All controls included in this group organize and manage compactPRESS.

Digital Controls

This group includes all controls for digital signal processing. All common digital sensors may be used as signal transmitters.

Analog Controls

This group includes all controls for analog signal processing. Special analog sensors are increasingly used in punching and forming technology, and compactPRESS provides the optimal evaluation.

Measuring Controls

This group includes all controls which continuously measure and monitor the supplied material and the production process. Important controls for quality optimization and comprehensive QA certification.

Process Controls

This group includes all controls relating to the production process. Intelligent controls which leave nothing to chance, from material supply through to product selection.

Management Controls

This group includes all controls which manage data, information and actions: Tool log, maintenance organization, import and export, automatic action timing ...

Interface Controls

This group includes all controls which guarantee simple and safe communication between compactPRESS and peripheral systems.

OEM Controls

This group includes all controls which ensure problem-free connection of external equipment (OEM systems).

Tool Controls

This group includes all controls which produce variable products completely automatically with intelligent tools. Ideally suited for automating die controls.

Position Controls

This group includes all controls which can be used as position encoders in compactPRESS.



The right control for every task, a wide selection

Basic Controls	
User administration	System log-on, user identification
Die management	Creation of up to 1000 tools, configuration, saving and backup of tool data
Message management	Internal information, warnings, error display, acknowledgement and deletion
Color management	Free color design of cP screens
Language management	Language file and language selection
System setting	System management, language selection, machine type, machine ID, date/time
Help system	Context-sensitive help for all processes
Digital Controls	
Cam switchgear	Up to 128 cams assignable
Tool protection	Up to 64 digital tool protection devices
Counter	Up to 32 universal counters, counting pulse source is freely selectable
Positioning	Up to 8 positioning axes (multi-turn encoder): ram, strip inlet, feed etc.
Analog Controls	
Force angle	Up to 32 channels for machine and tool force
PSA (Piezo Signal Analysis)	Up to 20-channel individual measurement in the tool for force and deformation
Double blank (slug) monitoring	Up to 32 channels for double blank or slug detection. UT measurement and more
Structure-borne sound	Up to 32 channels for structure-borne sound
Measuring Controls	
Analog feed measurement	Measurement of feed travel, strip position in tool
Strip width measurement	Check strip material for parallelism, curvature, etc.
Strip thickness measurement	Absolute measurement of strip thickness
Part measurement	Measure 100 % parts in the process: height, thickness, diameter, angle etc.
Dimensional check	Check parts in the feed phase
Process Controls	
TDC stop	Controlled stop at TDC (top dead center)
Stroke adjustment	Automatic adjustment of stroke height
Stroke table	Stroke-dependent angle correction
Ram adjustment and display	Automatic adjustment of the ram axis
External die change	Automatic transfer of the tool number from higher-level systems
Sorting	Intelligent separation of bad parts (shift register principle)
External error message	Records all external errors or faults, as binary or 1 from n coded messages

μBDE	Operating and production data for central EDP
Management Controls	
Notebook	Prolog, space for any information on machine and tool
Data import and data export	Import drawings and export cP docs to any host systems
Archiving of process data	Export of information and data in Excel csv or QS-Stat format
Maintenance & service	Interactive management and schedule for functions and actions
Interface Controls	
Lubricating system control	Programming, visualization and measurement of lubricant quantity
Open OPC interface	OPC client for communication with peripheral systems
Feed interfaces	Transfer of feed parameters, display of values and control buttons
Zehnder & Sommer	
Indramat	
Bosch Rexroth	
P.A. Automation	
Esitron	
Interfaces for PLC control	For communication with S7-PLC (hard or soft PLC)
Profibus	
Profinet	
IBH Netlink	
Tool Controls	
Tool-dependent PLC	Customized signal combination
Die control	Order-dependent calculation of die control and feeds
Cylinder monitoring	Cylinder control with limit position monitoring
Servo positioning	Up to 4 axes in the tool
Position Controls	
Rotary	Recording of X axis in 0.1°
Linear	Recording of X axis in 0.01 mm
Temporal	Recording of X axis in 200 μsec
Virtual encoder	Simulation of a rotary encoder via an input signal

powerPRESS with S7-PLC & starLINE

powerPRESS, the complete automation solution

powerPRESS is operation, control (PLC) and compactPRESS in one: An integrated automation concept for all machines for punching & forming.

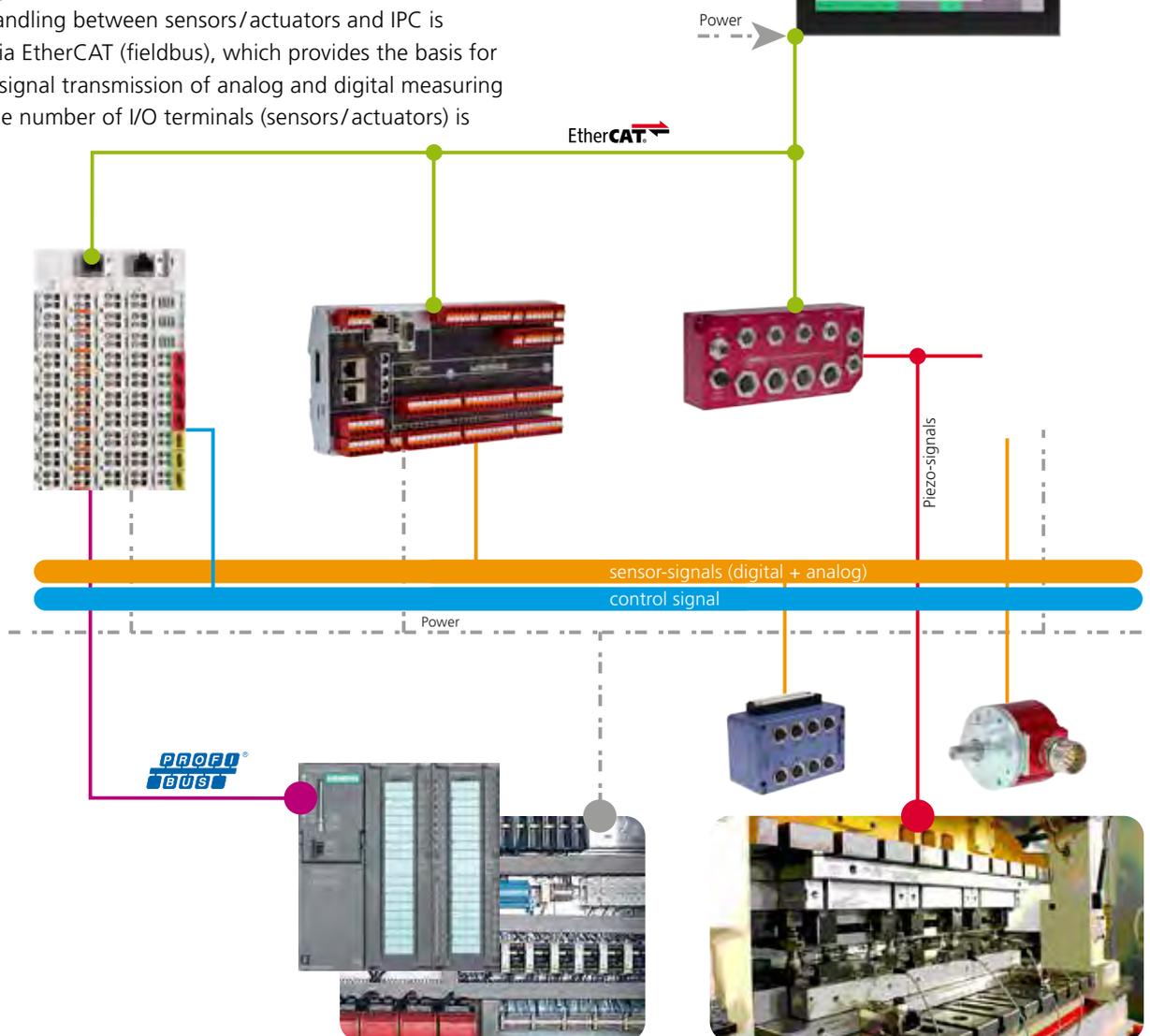
powerPRESS not only boasts excellent technology, but also impresses through its economical use of just a few hardware components: A touch display for the machine operation and compactPRESS visualization, an IPC for the PLC (S7), the drive and compactPRESS: In short, an **“all-in-one” automation solution** par excellence.

The I/O handling between sensors/actuators and IPC is enabled via EtherCAT (fieldbus), which provides the basis for ultra-fast signal transmission of analog and digital measuring values. The number of I/O terminals (sensors/actuators) is scalable.

Model series 169



Panel PC 15,0"



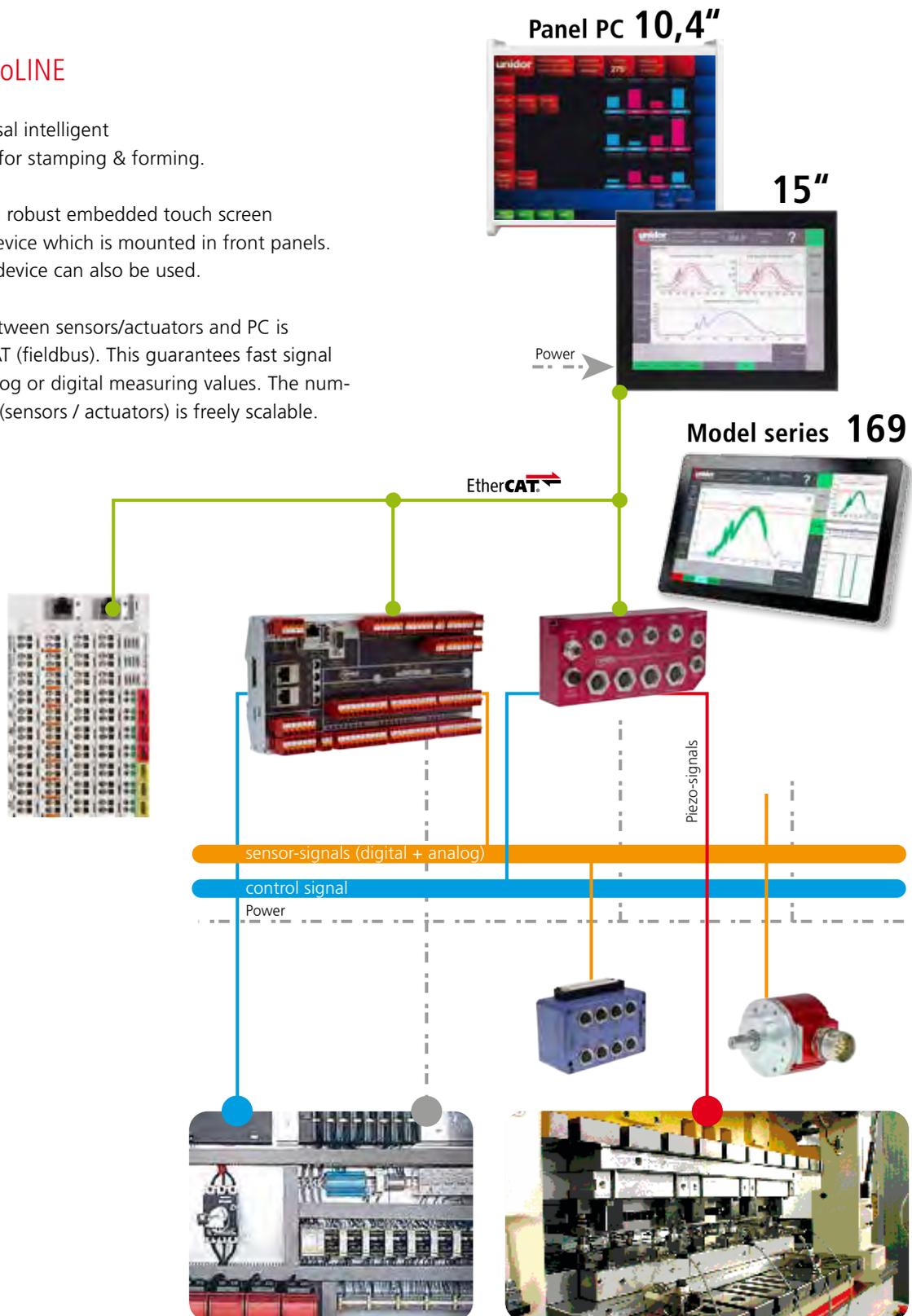
The medium compactPRESS: ecoLINE

The medium ecoLINE

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

ecoLINE based on a robust embedded touch screen PC, a 15" built-in device which is mounted in front panels. The 10.4" desktop device can also be used.

The I/O handling between sensors/actuators and PC is enabled via EtherCAT (fieldbus). This guarantees fast signal transmission of analog or digital measuring values. The number of I/O terminals (sensors / actuators) is freely scalable.



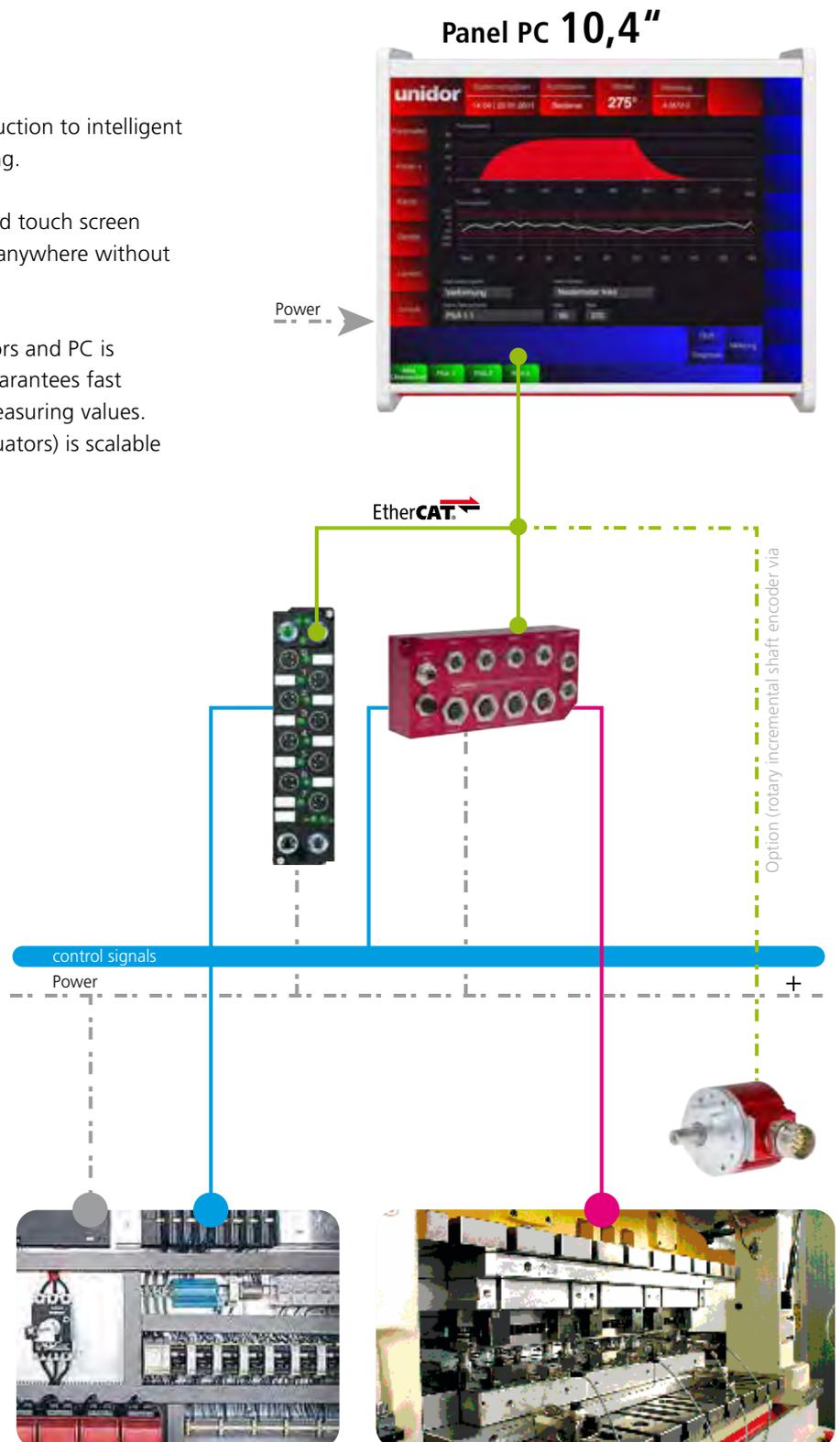
The small compactPRESS: smartLINE

The small smartLINE

smartLINE is the perfect, low-cost introduction to intelligent process monitoring for stamping & forming.

smartLINE is based on a robust embedded touch screen PC, a 10.4" desktop device which will fit anywhere without the need for mounting.

The I/O handling between sensors/actuators and PC is enabled via EtherCAT (fieldbus), which guarantees fast signal transmission of analog or digital measuring values. The number of I/O terminals (sensors/actuators) is scalable within limits.



Components / standalone devices

ioCONTROLLER

This is suitable for all automation tasks which cannot be performed with a PLC or only with significant cost/effort, or which are simply too slow for a PLC.

With its robust hardware and simple system integration the ioCONTROLLER can be seamlessly integrated into any PLC project. It performs all special tasks which a PLC cannot, precisely and ultra-fast.

The ioCONTROLLER begins where the PLC ends and opens up a whole new spectrum of opportunities for many interesting and creative automation ideas.

We give a few examples to show where and how the ioCONTROLLER can support the machine control, enabling entirely new options for greater productivity, quality and transparency in production.



Analog-IN box

To supplement compactPRESS control systems, UNIDOR also offers input modules. The analog box imports up to 16 analog inputs (0 ... 10 V, 0/4 ... 20 mA) and transmits them via EtherNet/IP or PROFINET. The box is supplied with voltage via specially coded M12 plug connectors. This effectively excludes confusion with the bus cables.

The voltage supply is looped through, so that several modules can be interconnected directly in series.

The bus is connected via standard-compliant M12 plug connectors. The sensors are connected via M8 and are also directly supplied via these connections. The analog box can also be used directly in the field with this equipment.



Components / standalone devices

LVCpro 02-S charge amplifier

New - now also suitable for quasi-static measuring processes such as servo / hydraulic presses.

With the newly designed, compact charge amplifier cassette LVCpro 02-S, a multi-channel measurement of the press force can be performed cost-effectively using piezo sensors. An evaluation can be carried out by any higher-level control with an analog input, e.g. Unidor systems (power-PRESS & compactPRESS) or external PC and PLC systems.

Applications

For machines and devices, for measuring dynamic and quasi-static forces, primarily in press manufacture. The necessary piezo sensors are prefabricated in different designs and supplied by Unidor.



PSA 4ec

The PSA ec4 piezo signal amplifier is a perfect 4-channel amplifier specially for piezo sensors, such as pressure, force, acceleration or torsion sensors in all technical applications and areas.

The robust aluminium housing and the high IP67 protection class qualify the use of the PSA in industrial environments in particular and guarantee continuously safe operation.



The EtherCAT®-compatible PSA has 4 analog precision piezo measuring channels (charge amplifiers) including two digital inputs and outputs. The intelligent charge amplifiers are triggered via EtherCAT® with PLC or PC. The extremely low drift of the input stage and the digital processing of the charge signal enable not only very precise, but also quasi-static measurements.

Tool and machine protection

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

Tool protection – smartDIE-PRO 6 6-channel digital tool protection with learning function (Teach-In) and graphic event viewer

Safe hardware, safe software. This dual safety concept ensures maximum system availability and trouble-free operation. Redundant, error-tolerance data storage management and intelligent power control ensure an extremely safe system.

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



Tool and machine protection – PKM 2.000

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



Overview of sensors

Sensors

Right at the heart of the action, sensors convert mechanical quantities such as ...

- _ Force
 - _ Pressure
 - _ Sound
 - _ Vibrations
 - _ Travel
 - _ Positions
 - _ Movement
- ... into digital or analog signals.

These form the basis for exact visualization, optimization, measurement, monitoring and logging of all punching and forming processes.

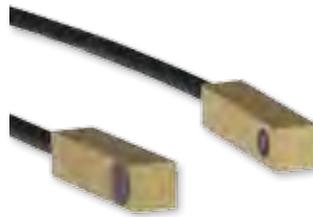
Our sensors have been specially designed for punching and forming.

Unidor provides a wide range of sensors in different designs, complete with the appropriate mounting equipment.

Digital single-beam sensors



GD_L



LS 05



LAS 3

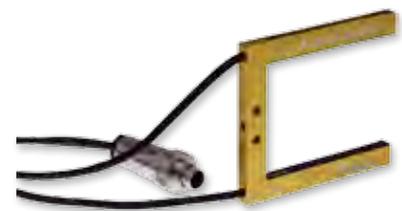
Digital multi-beam sensors



LAV



LAG



LAG-M

Reflex scanners



GM



ORS 250



ORS 400-W

Analog sensors



GD-AH



A-LAS



LAG M40

Digital, inductive sensors



ZT 52



ZT 400



ZT 410

Overview of sensors

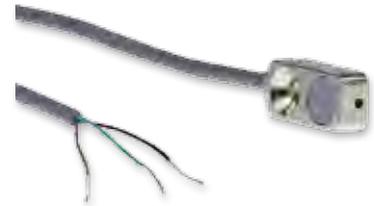
Analog eddy-current sensors



WSD 70



WSD S2/10 S



WSD S2/10 M-F

Piezoelectrical sensors



JZT 127



PSA 20



QMD

Other sensors



Tracer GM 04



OKT 40



Structure-borne sound KSS

Connection boxes

Digital connection boxes



8-channel tool protection box
ZT 2013 (ZT 213/72/8)



4-channel tool protection box
ZT 2013 (ZT 213/7/4)



ND (12/8/4)

Analog connection boxes



D-AE-WSS-24
8-channel for WSD-sensors



Distributor box
8-channel, M12, 5-pole



Actuator / sensor box
ASD 4/0/8, 8-channel

EtherCAT fieldbus connection boxes – EtherCAT box



EP1018-0001
8 digital inputs, M8



EP2008-0001
8 digital outputs, M8



EP3174-0002
4 analog inputs, M12, ± 10 V

Services / project management



© Dmitry Kalinovsky - Fotolia

Sales

Pre-Sales Services

Pre-sales services, in-depth consultation, the development of individual proposals, planning services and the individual requirements of the customer are analyzed and integrated into the project.

After-Sales Services

Our sales representatives aim to continue to support their customers after the sale, to ensure customer satisfaction.

Service

- _ 3 locations in Germany
- _ Highly motivated service technicians
- _ Telephone support/remote maintenance

We implement our "Everything from one source" concept, which includes comprehensive service. Our trained staff will be at your disposal quickly and flexibly in all areas – around the clock, including weekends.



Ready for all requirements

Our range of services also includes the inspection of electrical systems and equipment. We want you to be able to continuously rely on the solutions that we have developed for you in daily practice. You will benefit from the same expertise and reliability that we apply in our numerous projects.

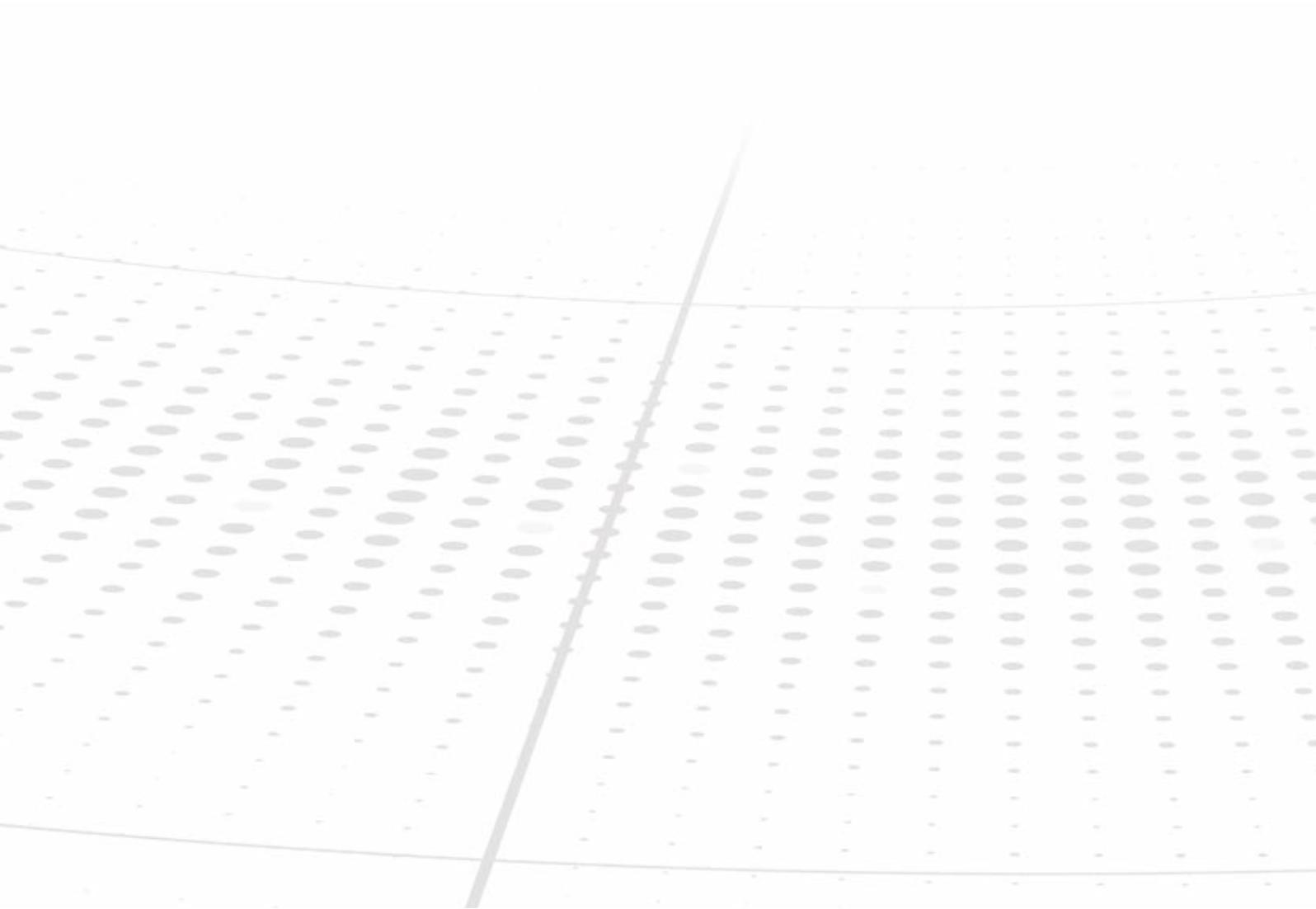
And what's more: You can also rely on our experienced staff to ensure the regular maintenance and service of your systems – to support or replace your own personnel.

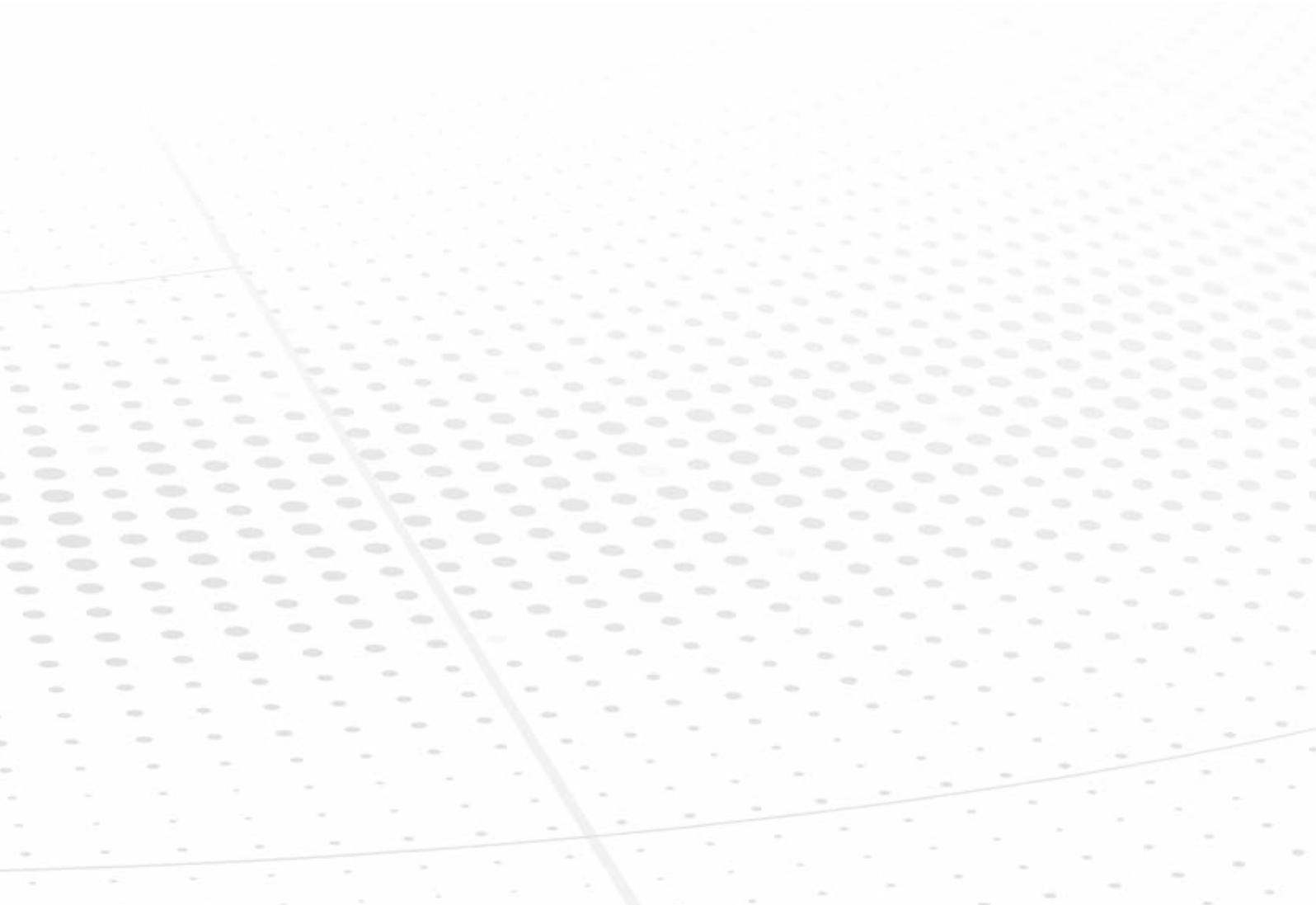
As always – our service offering is entirely based on your requirements.

Training

Your employees are an important factor for your company's success. They must be supported and challenged, so that they can develop their full potential through the acquisition of additional qualifications and in-depth knowledge. Unidor offers: Individual training on site; directly at the machine or in customized workshops at our Pforzheim and Lüdenscheid locations.

TR Information



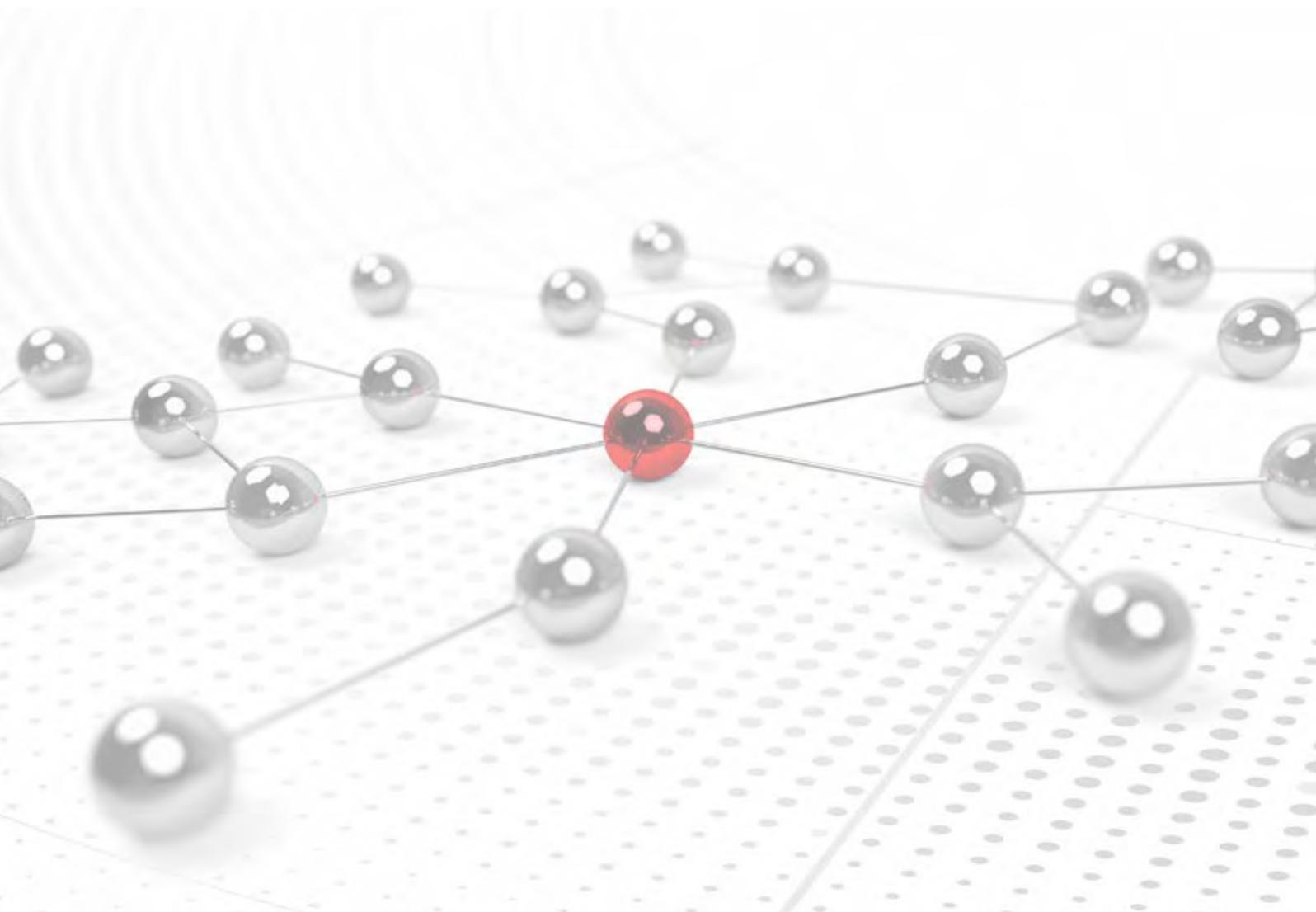


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Interfaces



Different applications require different solutions

The result of almost three decades of development and production is evident. Reliability, ease of installation and a wide variety of interfaces are the result.

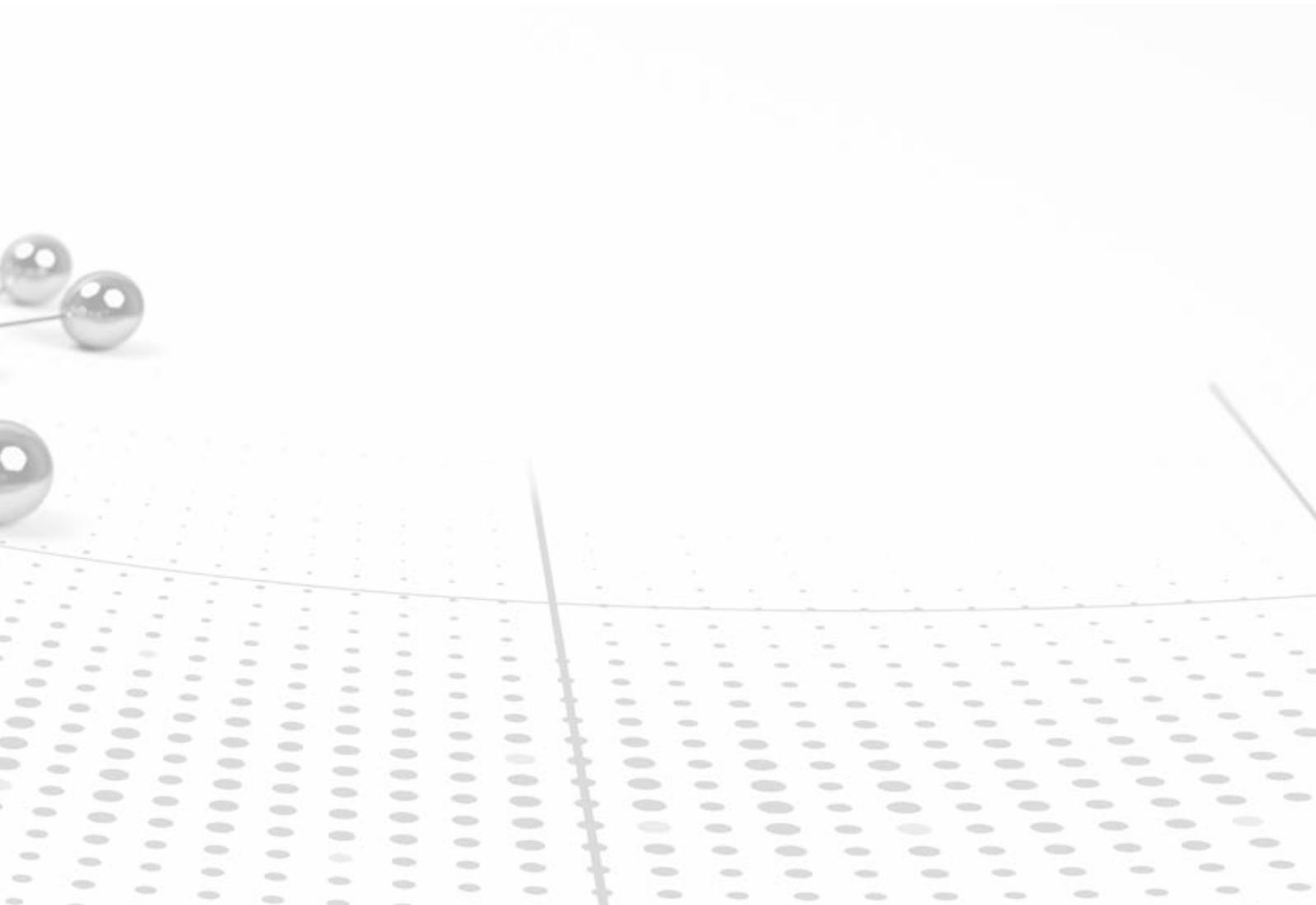
You benefit not only from the highest technical standard in production, but also the highest reliability of our devices. As is the norm with TR-Electronic, the C __ 58 also offers a wide variety of interfaces, some of which can even be combined to enable special applications. These can be specifically matched to the field and frequency of application. Which interface is ultimately used largely depends on the

control technology used.

Efficiency, safety, speed and scope of functions are the important factors. Let our sales team advise you on your own individual solution!

We offer you

- _ modular design concepts
- _ everything from one source
- _ a large number of possible combinations
- _ adaptation of the scope of functions to the interface



Content

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Special bits (SSI, Parallel)

TR-Electronic rotary encoders in the C__58 series are mainly programmable. The following terms are used in connection with different interfaces. To see which function is actually implemented in a rotary encoder, please refer to the product description in the quotation or order confirmation.

Transferable special bits

Max. eight parallel special bits can be defined, the default setting is always 0V. Fewer parallel special bits can also be used to fulfill the requirements of customized device versions. The number of special bits depends on the selected settings and the number of clock pulses sent. These are added in the protocol after the lowest value data bit. The possible functions for the special bits are specified below. The output level for a function event can be defined by selecting active high/ active low.

Overspeed

The Overspeed is set if the set speed (programmable: 30 – 6,000 rpm) is exceeded.

Limit switch

The switch-on and switch-off points for the four possible limit switches are set in the Limit switch. They are set as long as the position is at or above the switch-on point. "Rotating" limit switches can also be implemented, where the switch-on point is greater than the switch-off point.

Move up, Move down

This is a combination of directional display and standstill monitor. These are set when the position moves in the relevant direction and deleted once the position has remained unchanged for 50 ms.

The motion detection has a hysteresis for suppressing vibrations. This is one step in relation to the resolution of the central disk. After a reversal of the running direction a distance corresponding to the hysteresis must be traveled as a minimum, before a movement or direction change is indicated. The hysteresis applies equally for Move up and Movement signals.

Moved up

This is set if Move up is set, and deleted if Move down is set.

Even parity, error parity

The Parity bit serves as control bit for error detection during data transfer. The parity represents the checksum of the bits in the SSI data word. If the SSI data word contains an odd number of ones, the Even parity special bit is = "1" and changes the checksum to even parity. The Parity or Error parity special bit must therefore always be defined last. It is calculated from all preceding bits. Therefore only a single parity special bit is possible. By selecting inverted parity we get odd parity or odd Error parity.

The Error parity corresponds to the normal parity, if no measuring system error is present. If errors are present it is inverted. This saves the additional transfer of an encoder error.

Static/ Dynamic error (watchdog)

As long as the position data can be measured and transmitted error-free, the Static error special bit is deleted and the Dynamic error special bit delivers a rectangular frequency of 250 Hz. If errors are present the Static error is set and the Dynamic error remains at an undefined level.

Movement

This special bit is set as long as Go up or Go down is set.

Control of the following special bits is possible

- _Overspeed
- _Limit switches
- _Move up/down
- _Moved up
- _Static and dynamic error (watchdog)
- _Movement
- _Even parity, error parity

Scaling parameters (SSI, Parallel)

The output resolution of the measuring system can be changed using the scaling parameters. The measuring system supports the gear function for rotary axes. The number of steps per revolution and the ratio of numerator revolutions/denominator revolutions may be a decimal. The position value output is calculated with a zero point correction, the counting direction set and the gear parameter entered.

Closed measuring section

The length in revolutions of the closed measuring section is any whole number in the range from 1 to 256,000. For example, for rotating applications or for decimal codes, a measuring range of the power of 2 can be unfavorable. Powers of 2 such as 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1,024, 4,096 ... cannot be precisely matched to the application, as one is dependent on the value of the powers of two.

Procedure for linear axes (forward and backward traversing movements)

The parameter "denominator revolutions" can be programmed as a fixed value of "1" for linear axes. The parameter "numerator revolutions" is programmed slightly higher than the required number of revolutions. This ensures that the measuring system does not generate an actual value jump (zero transition) if the travel is slightly exceeded. For the sake of simplicity the full revolution range of the measuring system can also be programmed.

Numerator / denominator

These are required if the number of steps per revolution or the ratio of numerator revolutions/denominator revolutions must be a decimal. This is referred to as a gear function. This is used for rotary axes. In contrast to the closed measuring section the transmitter programming can be adapted even more precisely to the application.

More on the topic of scaling parameters
_ Encoder Programming (TR - E - BA - GB - 0011)
www.tr-electronic.com/f/TR-E-BA-GB-0011

Access information even faster:
Simply scan the QR code.



Synchronous serial interface

This interface enables synchronous serial transfer of the measuring system position. Use of the RS422 interface for transfer allows sufficiently high transfer rates to be achieved with a cable length of max. 500 m (with 1 kHz).

The measuring system receives a clock pulse train from the data receiver (control) and responds with the current position value, which is serially transferred synchronously with the sent clock pulse.

The data signals Data+ and Data- are sent with cable transmitters (RS422). To protect against damage due to faults, potential differences or polarity reversal, the clock pulse signals Clock Pulse+ and Clock Pulse- are received with optocouplers. A parity or checksum can be added in order to detect defective transmissions.

The serial data is transferred without ground reference, as the voltage difference between two corresponding cables. The receiver only evaluates the difference between both cables, so that common mode noise on the transmission lines does not cause a distortion of the useful signal. The simplest additional measure is double read-in, where the data bits are repeated after 26 clock pulses of a train.

More on SSI

_ Encoder Programming (TR - ECE - BA - DGB - 0039)
www.tr-electronic.com/f/TR-ECE-BA-DGB-0039

Access information even faster:
 Simply scan the QR code.



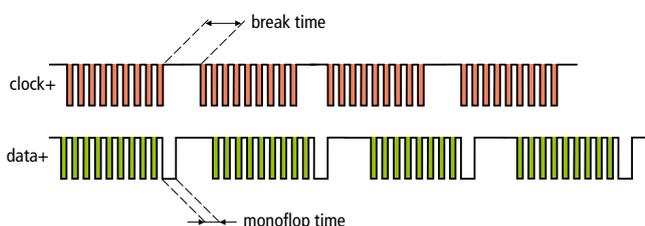
programmable parameters

- _ Total resolution, number of steps/revolution
- _ Output code (Binary, Gray, BCD)
- _ Output format (standard, fir tree, SSI+CRC, 26-bit repetition, variable number of data bits)
- _ Negative values (preceding sign + value, complement on two)
- _ SSI or parallel special bits
- _ V/R (counting direction), preset (electronic adjustment)

Example of transmission of special bits with 24 bit position information



Transfer example for Clock Pulse+ and Data+



Parallel

Parallel interface

In the parallel interface the digital position value is transmitted in parallel, i.e. there is a separate physical line for each signal bit. In addition to the pure signal lines there are also status and control lines, which (optionally, if required) activate individual additional functions in the encoder or contain their output signals.

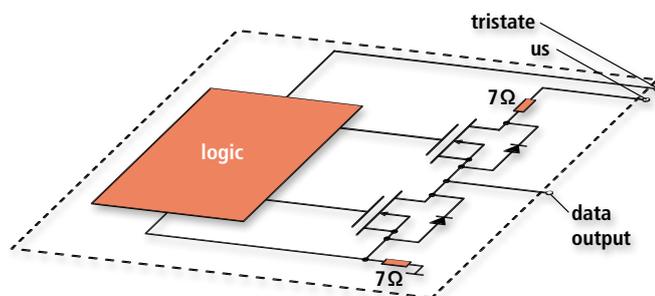
Different codes can be used for converting the digital position value into a signal image.

The functions actually implemented in the encoder are dependent on the encoder family and the selected physical interface, among other things (number of possible lines, volume of the plug connector). Depending on the set-up, some of the functions accessible via the signal line are also programmable.

Not all functions are available with all encoder types. See programming instructions and operating manuals for the respective devices in this regard.

Parallel interfaces are now often replaced by SSI or field bus interfaces. C__58 single-turn rotary encoders with parallel interface are available for retrofits or special automation concepts. If a multi-turn device with parallel interface is required, a simple and compact solution can be achieved with a C__58M SSI and an SSI Parallel PU 10 signal converter.

Output of the following special bits is possible



More on Parallel

_ CE_58 Parallel User Manual

www.tr-electronic.com/f/TR-ECE-BA-DGB-0083

Access information even faster:
Simply scan the QR code.



Parallel – programmable parameters

- _ Total resolution
- _ Number of steps/revolution
- _ Output code (Binary, Gray, BCD)
- _ Output of special bits (overspeed, limit switches and many more)

Output of the following special bits is possible

- _ Overspeed
- _ Limit switches
- _ Move up/down
- _ Moved up
- _ Even parity, error parity
- _ Static and dynamic error (watchdog)
- _ Movement

Analog interface

Even in the early stages of automation, sensors were equipped with an analog interface. This interface is correspondingly widespread. And rotary and linear encoders with an analog interface are still used, even in the age of Industrial Ethernet.

TR-Electronic also offers many options for this inherently simple interface. This enables superb solutions for very specific problems. The various functions of analog interfaces can be integrated depending on the device family and are also available in their full spectrum for customer-specific solutions.

Position

Usually the position value is suitably scaled and output as an analog value.

For normal industrial applications, basic magnetic samples are used in conjunction with a 12-bit D/A conversion for rotary encoders. For higher requirements on accuracy and resolution rotary encoders with optical scanning are used in conjunction with a 16-bit D/A converter.

Speed

Alternatively an analog output can also generate a velocity/speed-proportional output signal (e.g. for velocity feedback in multiple-loop controller concepts). Depending on the required resolution and accuracy, at low speeds in particular very high-resolution basic encoders are used, where e.g. the time base can be set depending on the desired working range.

Voltage

The desired output signal is output proportionally as voltage. Different ranges are normal, such as e.g. 0 ... 10V, -10 ... +10V, as well as 0 ... 5V. The subsequent electronics loads the voltage source in the sensor and must have a minimal internal resistance (usually 1 kOhm), so that the sensor can deliver the voltage. At transfer and line resistors a voltage

More on the subject of analog interfaces
_ User Manual CM_58

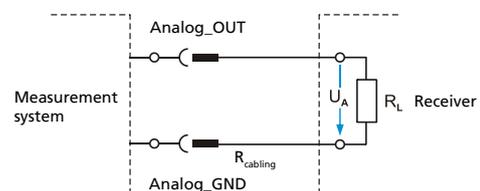
www.tr-electronic.com/f/TR-ECE-BA-DGB-0083

Access information even faster:
Simply scan the QR code.

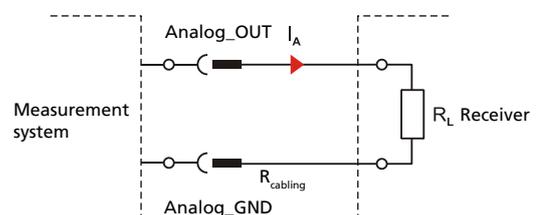


drops off according to the current produced, resulting in a deviation between output signal and the signal measured by the subsequent electronics.

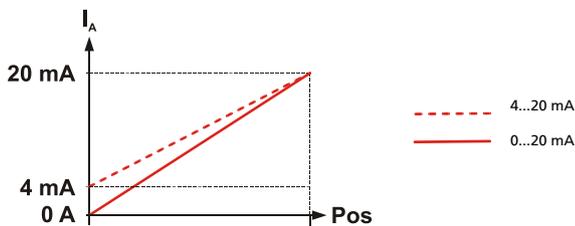
Current



The desired output signal is supplied proportionally as current. The sensor is a signal-proportional current source, which drives a current through the measuring circuit. The subsequent electronics must not exceed a minimal internal resistance ("burden") (usually 500 Ohm), as otherwise the current cannot be driven by the sensor. As the current is the same at all points in the (unbranched) circuit, line losses are not noticeable in the measuring signal. Line losses are equalized by the sensor (up to a maximum total burden). Normal ranges are 0 ... 20 mA and 4 ... 20 mA. "Live zero"



For current output in particular the zero value is often not defined as 0 mA, but as 4 mA. This enables the subsequent electronics to determine a cable break: If no current is flowing, no sensor is connected or the line is interrupted. Normal range: 4 ... 20mA



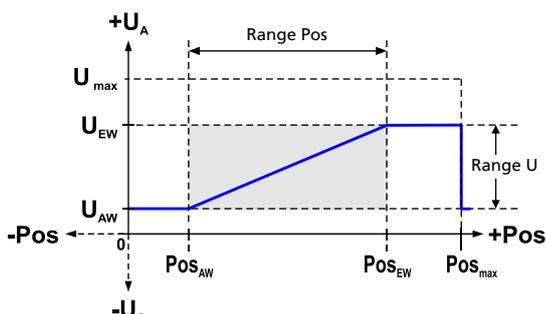
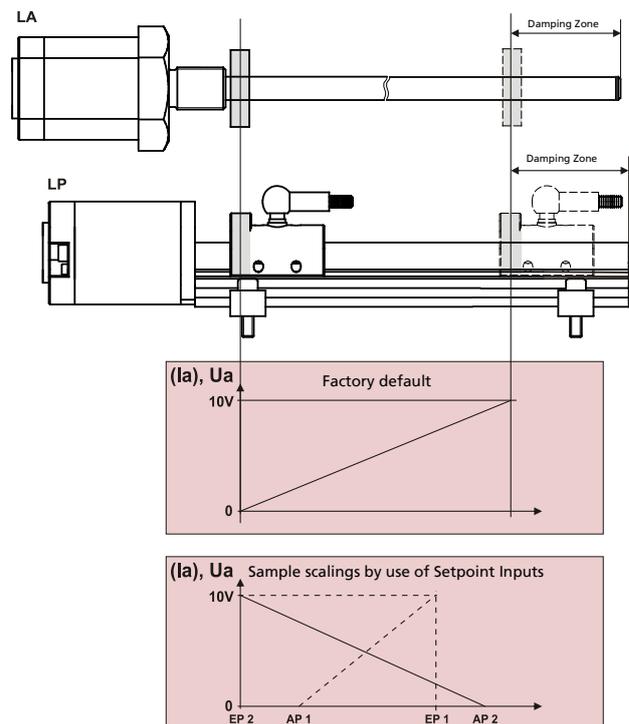
Current sink

This special version of the analog interface uses only a 2-wire connection line. The subsequent electronics supplies the sensor with a fixed voltage (typ. 24 V) via the measuring lines. The sensor now varies the flowing current proportionally to the position or speed signal in a range between 4 and 20 mA. The sensor obtains its own supply from the measuring current, i.e. for the sensor to work, a minimal current of just 4 mA flows.

Scaling

The position or speed measuring range is translated into the display range of the output electronics. Usually the analog signals are produced by a 12-bit converter, but for special applications 16-bit converters are also available. For multi-turn rotary encoders in particular it is useful to limit the output range to suit the planned application and thus to optimally utilize the resolution.

Normally the key points of the scaling are defined in the software. Depending on the application, however, it is also possible to provide potentiometers for setting. For linear encoders a very simple scaling using setpoint inputs has become established: In the respective limit positions the setpoint input for the lower/upper end is activated and the output signal is scaled in this range. The scaling is permanently stored in the sensor and is available immediately on voltage return.

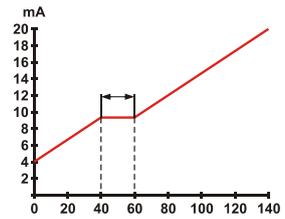
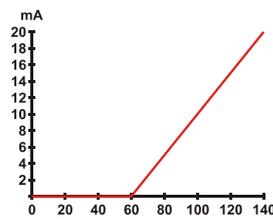
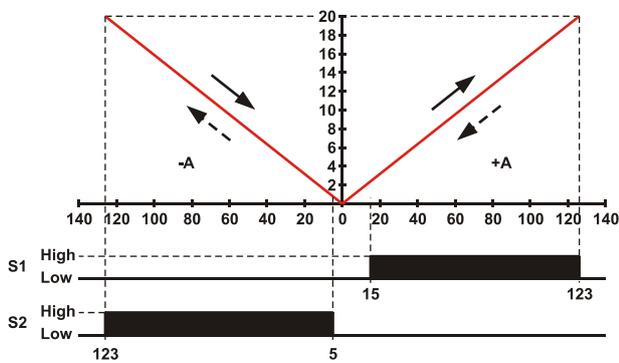


Characteristic curves

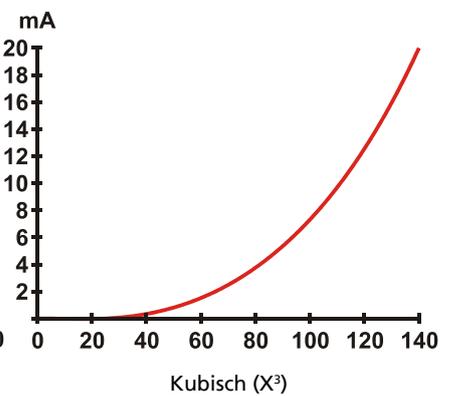
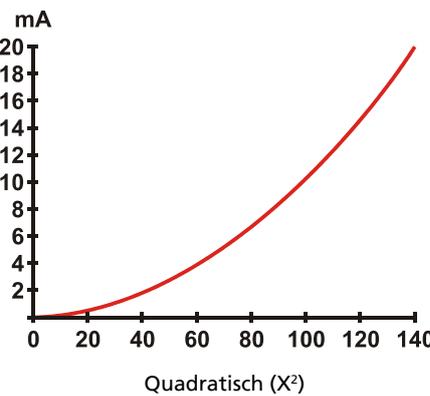
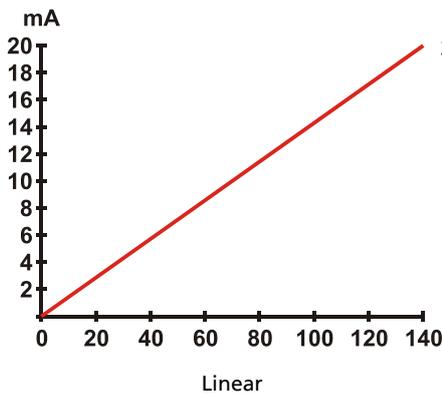
In addition to the linear assignment of position to output signal characteristic curves are also possible:

- Symmetrical characteristic curves, in which the output values increase about a central position in both deflection directions, also in conjunction with additional digital outputs for a direction indication

- Dead zones, also within the deflection range other



- Polynomials of 2nd and 3rd order



These special characteristic curves are used in customized sensors e.g. for joysticks, speed selectors or operating switches

Process Field Bus-Interfaces



PROFIBUS

PROFIBUS is a continuous, open, digital communication system with a broad range of applications, particularly in manufacturing and process automation. PROFIBUS communication is based on the international standards IEC 61158 and IEC 61784. The application and engineering aspects are defined in the PROFIBUS User Organization guidelines. These serve to fulfil the user requirements for a manufacturer independent and open system where the communication between devices from different manufacturers is guaranteed without modification of the devices.

The PROFIBUS User Organisation has implemented a special profile for encoders. The profile describes the connection of rotary, angular and linear encoders with single turn or multi turn resolution to the DP. Two device classes define the basic and additional functions, e.g. scaling, alarm management and diagnosis.

In addition to device classes 1 and 2 defined in the profile, the measuring systems also support additional TR-specific functions.

Safety transmission

For the communication of safety controls with safety-oriented peripheral devices, e.g. rotary encoders with SIL3/PLe certification, transmission with the PROFIsafe protocol extension offers a transmission standard which builds a safe communication on the basis of the unsafe Profibus. Saved actual values of sensors are transmitted directly to the corresponding controls, where they are available for safe evaluation. The PROFIsafe protocol is available on PROFIBUS and PROFINET. The protocol is certified and may be used for safety functions with requirement up to SIL3/PLe.



benefits and advantages

- _ DP communication protocol (cyclical data exchange, station, module and channel specific diagnosis)
- _ Connection variants (cable gland or plug connector)
- _ up to 1,200 m cable length

Programmable parameters

- _ Total resolution
- _ Number of steps/revolution (standard or extended)
- _ PUO encoder profile parameters (counting direction switching, caling function etc.)
- _ Output code (Binary, Gray, capped Gray)
- _ TR-specific functions (gear, speed output)

Drive technology

For drives, the PROFIdrive standard combines the necessary communication procedures and standardizes them. Drives which support the PROFIdrive standard should communicate so similarly across different manufacturers that an adaptation is possible without any problem. The compact drives from TR-Electronic uniformly support the PROFIdrive standard, i.e. the same software can control different series without making changes to the programming. (Except for device-dependent parameters). The PROFIdrive standard is available for PROFIBUS and PROFINET.

CANopen

The CANopen field bus was developed by the CiA and has been standardized as European standard EN 50325 since the end of 2002. CANopen uses layer 1 and 2 of the CAN standard originally developed for use in cars (ISO 11898-2) as a transmission technology. These are extended in automation technology by the recommendations of the CiA Industrial Association in respect of plug assignment, transmission rates and applications.

CiA has developed the CAL standard (CAN Application Layer) for the application layer. The CANopen communication profile was developed first of all together with "building instructions" for device profiles, in which the common denominator of all device profiles is defined with the structure of the object directory and the general coding conventions. The CANopen communication profile (documented in

CiA DS 301) regulates how devices exchange data with each other. A distinction is made between real time data (e.g. position value) and parameter data (e.g. counting direction). CANopen assigns appropriate communication elements to these data types, which are completely different in character.

programmable parameters

- _ Counting direction, scaling function, preset adjustment
- _ Total measuring length in steps
- _ Revolutions, numerator/denominator
- _ Speed resolution
- _ Layer Setting Services (LSS) = Node ID and baud rate
- _ Maximum 8 cams

Drive technology

For drives, the CiA standard CAN DS 402 combines the communication parameters between drive and control. The compact drives from TR-Electronic support CiA DS 402 in all series.

DeviceNet

DeviceNet was developed by Rockwell Automation and the ODVA as an open field bus standard, based on the CAN protocol and is standardized in the European standard EN 50325-4. Specification and maintenance of the DeviceNet standard is regulated by the ODVA. DeviceNet, along with ControlNet and EtherNet/IP, belongs to the family of CIP-based networks.

The CIP (Common Industrial Protocol) forms a common application layer for these 3 industrial networks. DeviceNet, ControlNet and Ethernet/IP are therefore well matched to one another and present the user with a graduated communication system for the physical layer (Ethernet/IP), cell layer (ControlNet) and field layer (DeviceNet).

DeviceNet is an object-oriented bus system and operates according to the resource-saving producer - consumer (publish-subscribe) principle. Simple I/O messages have virtually no overheads and often do not need a send request.

The terminals can send data event or time controlled,

without additional interim storage. The periphery indicates its requirement for data receipt as a "consumer" and sends its data as a "producer". Each device can be both a data consumer and a data producer, and a producer can operate any number of consumers.

programmable parameters

- _ Direction of rotation
- _ Output code (Binary/Gray)
- _ Measurement length in steps
- _ Measurement length in revolutions, only multi-turn measuring system
- _ Preset adjustment via the bus
- _ Preset value 1/2
- _ 7 Special outputs

Industrial Ethernet interfaces



PROFINET

PROFINET is the innovative open standard for Industrial Ethernet and satisfies all requirements of automation technology. A publicly accessible specification was also introduced, which was published by the IEC (IEC/PAS 62411) in 2005 and has been part of the IEC 61158 and IEC 61784 standards since 2003. PROFINET is supported by "PROFIBUS International" and the "INTERBUS Club".

Profinet has a modular concept, so that the user can select the functionality himself. Profinet CBA and Profinet IO are available. These essentially differ because of the type of data exchange, in order to fulfil the speed requirements.

Different performance levels are defined. In PROFINET data which is not time-critical, such as e.g. parameter data, configuration data and connection information, is transferred via the standard data channels based on TCP/UDP and IP. This means that the automation level can also be connected to other networks.

For the transmission of time-critical process data PROFINET distinguishes between three real-time classes (RT Class 1 to 3), which differ in their performance.

benefits and advantages

- _ IO communication protocol (cyclic / acyclic data)
- _ exchange of record data = read / write services)
- Exact synchronization of all nodes
- _ Up to 100 m cable length (between two nodes)
- _ Real-time classes (RT Class) 1 to 3

Safety transmission

For the communication of safety controls with safety-oriented peripheral devices, e.g. rotary encoders with SIL3/PLe certification, transmission with the PROFI-safe protocol extension offers a transmission standard which builds a safe communication on the basis of the unsafe Profibus. Saved actual values of sensors are transmitted directly to the corresponding controls, where they are available for safe evaluation. The PROFI-safe protocol is available on PROFIBUS and PROFINET. The protocol is certified and may be used for safety functions with requirement up to SIL3/PLe.



POWERLINK

Unlike other real time capable Industrial Ethernet systems POWERLINK is a completely software-based solution, which complies 100 % with Ethernet standard IEEE 802.3. Through this conformity and the renunciation of manufacturer-specific hardware, POWERLINK can guarantee that all advantages and the flexibility of Ethernet technology can also be utilized in this real time protocol. Users can therefore use the same standardized hardware components and diagnostic tools as before. In order to achieve these real-time capabilities POWERLINK uses a mixed polling and time slot process, in which only a single node may send at any given time.

benefits and advantages

- _ IO communication protocol (cyclic / acyclic data exchange of record data = read / write services)
- Exact synchronization of all nodes
- _ Up to 100 m cable length (between two nodes)
- _ Real-time classes (RT Class) 1 to 3

Safety transmission

For the communication of safety controls with safety-oriented peripheral devices, e.g. rotary encoders with SIL3/PLe certification, transmission with the openSAFETY protocol extension offers safe transmission over any bus systems. TR-Electronic uses the OPENSafety protocol in conjunction with the lower level POWERLINK transmission for safety-oriented rotary encoders with SIL3/PLe.

open 
SAFETY

EtherNet/IP

EtherNet/IP was developed by Rockwell Automation and the ODVA as an open field bus standard, based on the Ethernet Industrial Protocol and is standardized in the international standards IEC 61158: Type 2 and IEC 61784-1: CP 2/2 Type 2. The ODVA is responsible for the specification and maintenance of the EtherNet/IP standard. Like ControlNet and DeviceNet, it belongs to the family of CIP (Common Industrial Protocol)-based networks. DeviceNet, ControlNet and EtherNet/IP are therefore well coordinated and provide the user with a graduated communication system for the control level (EtherNet/IP), cell level (ControlNet) and field level (DeviceNet).

programmable parameters

- _ Total resolution (≤ 25 bits, ≤ 36 bits)
- _ Number of steps/ revolution (standard, extended)
- _ Number of revolutions (standard, extended)
- _ EtherNet/IP parameters = scaling, counting direction, reset value

Ethernet for Control and Automation Technology

EtherCAT is a real-time Ethernet technology and is particularly suitable for communication between control systems and peripheral devices such as e.g. I/O systems, drives, sensors and actuators.

EtherCAT was developed in 2003 and is available as an open standard. The "EtherCAT Technology Group" (ETG) user association was established for the further development of this technology.

EtherCAT is a publicly accessible specification, which was published by the IEC (IEC/Pas 62407) in 2005.

It is part of ISO 15745-4. This part was integrated into the forthcoming new editions of the international field bus

standards IEC 61158 (Protocols and Services), IEC 61784-2 (Communication Profiles) and IEC 61800-7 (Drive Profiles and Communication).

programmable parameters

- _ Counting direction, scaling function, preset adjustment
- _ Total measuring length in steps
- _ Numerator/denominator revolutions
- _ Speed resolution
- _ Layer Setting Services (LSS) = Node ID and baud rate

Safety transmission

The "Functional Safety over EtherCAT" protocol (FSoE) enables the communication of safety controls with safety-oriented peripheral devices, e.g. rotary encoders with SIL3/PLe certification. The actual values of safety-oriented sensors are thus directly available in certified safety controls with EtherCAT.



Sercos III

Sercos3 is the third generation of the sercos interface series according to IEC/EN 61491 and based upon Ethernet standard IEEE 802.3 and has been submitted to the IEC (International Electric/Electrotechnical Commission) for global standardization, thus becoming part of the international standards IEC 61800-7, IEC 61784 and IEC 61158.

The vision of a real-time, non-proprietary communication solution permeates the world of industrial automation. Different types of automation devices have to be network-enabled in an easy and consistent way: sercos III is an open and IEC-compliant universal bus for Ethernet-based real-time communication.



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 CAN-open, 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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