

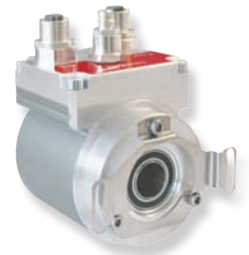
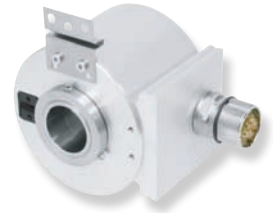
sensors
rotary
linear

motion

systems

controls

TR-Electronic Overview Rotary Encoder



TR-Electronic - Your Partner in Automation

For more than 25 years TR-Electronic has been a very successful company. We have over 300 employees with global reach. Our recipe for success: a lot of innovation and flexibility in everything we do. With our automation and communication capabilities we deliver quality products for the automation industry.

TR-Electronic GmbH is a constant within the sensor industry – more precisely in the development and production of digital angular and distance measurement systems for automation: from absolute and incremental rotary encoder, magnetostrictive transducers and laser distance measurement systems, electrical compact drives and servo controllers.

We offer products that are individually designed to meet your needs. As a response to new technology developments, we created the TRsystems product range, in order to provide you with complete solutions.

To us in Germany, as well as to our representatives abroad, it is very important to be innovative, precise and flexibel. We respond quickly, to meet your requirements.



- _rotary encoder
- _linear encoder
- _laser
- _compact drive



- _development / services
- _industrial PC
- _fieldbus I/O



- _sensors for stamping and metal forming machines
- _control system



How to find the right rotary encoder

Choose according to your requirements:

① Technology

E optical - our standard scanning

The single, as well as multi turn, rotary encoder with 13 bit per revolution (programmable) covers with its optical scanning, here abbreviated with "E", almost every application area of the automation industry.

O high resolution for the industry

Up to 18 bits per revolution (programmable) resolve nearly every measuring task in the industry. With direct fieldbus interfaces and Industrial Ethernet.

M magnetic

For low requirements in resolution, accuracy and interface variety, cost-efficient rotary encoders with magnetic scanning, abbreviated with "M", can be realized.

	E	O	M
Scanning	●●●○	●●●●	●●○○
Time response	●●●○	●●●●	●●○○
Programmability	●●●●	●●○○	●○○○
Number of configurations	●●●●	●●●○	●●○○

LEGEND	
Satisfactory	●●
Good	●●●
Very Good	●●●●
Great	●●●●●
Amazing	●●●●●●

② Options

V solid shaft

Available: round, flat or keyed, in both imperial sizings and metric.

H hollow shaft

Available with: flat shaft as well as a nut/spring, depending on the model up to 80 mm diameter.

S blind shaft

The advantage compared to the hollow shaft is, that there is no second entry to seal. Therefore, it is better suitable for higher revolutions than the hollow shaft and a higher IP rating.

K integrated coupling

Combines without rotating the installation of a rotary encoder with a fixed shaft within a compact model of a blind shaft. Vibrations and shaft will be balanced through a coupling element made of plastics (PU).



③ Model

You can get our absolute rotary encoder in housing diameters of 22 mm up to 115 mm. Our special hollow shaft in cubical form offers you more space – generous dimensioned connection fields, hollow shaft diameter up to 25 mm, and other options.

Content

Our classics for industrial standard applications

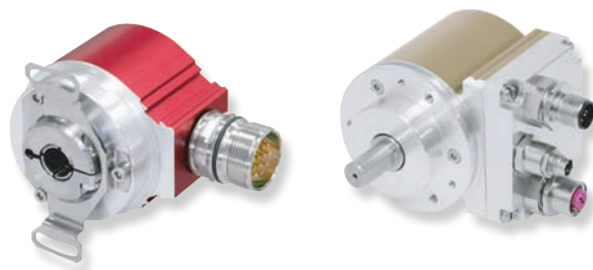
- 58mm diameter - compact and programmable 10
- 65mm diameter - numerous special features 13

Rotary encoder for special applications

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Products by Model

Absolute rotary encoder			
solid shaft	22 / 36 mm housing	22	
	40 / 69 / 70 mm housing	23	
	58 mm housing	20	
	65 mm housing	21	
	70 / 115 / 58 mm housing	24	
	75 mm housing	25	
hollow shaft	58 mm housing	26	
	80 mm housing	27	
	80 / 81 mm housing	28	
	110 / 160 mm housing	29	
blind shaft	58 mm housing	30	
	65 / 36 mm housing	31	
coupling	58 / 65 mm housing	32	
Double rotary encoder			
solid shaft	58 / 70 / 115 mm housing	33	
hollow / blind	75 / 80 / 58 mm housing	34	
String pot	22 / 58 / 65 mm housing	35	
Incremental			
solid shaft	24 / 35 / 40 mm housing	36	
	58 / 92 mm housing	37	
hollow shaft	58 / 20 mm housing	38	
	76 / 92 mm housing	39	
	120 mm housing	40	
blind shaft	24 / 58 mm housing	41	
	76 mm housing	42	
hand wheel	housing option	43	

Products by Shaft Type

Solid shaft	absolute rotary encoder	20 - 25
	double rotary encoder	33
	string pot	35
	incremental rotary encoder	36 - 37
Hollow shaft	absolute rotary encoder	26 - 29
	double rotary encoder	34
	incremental rotary encoder	38 - 40
Blind shaft	absolute rotary encoder	30 - 31
	double rotary encoder	34
	incremental rotary encoder	41 - 42
Coupling	absolute rotary encoder	32
Hand wheel	housing option	43

Interfaces (others on request)

- SSI
- ISI
- Parallel
- SIN/COS
- LWL



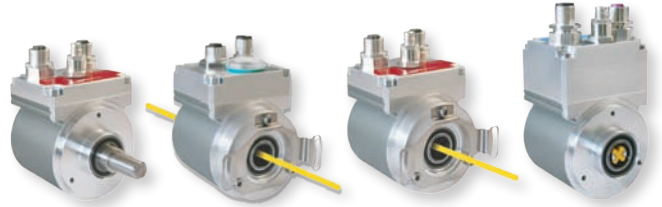
TR-Electronic - Your Partner in Automation

General / Definition



Programmable rotary encoder

The standard of automation technology, available with all current fieldbus systems: PROFIBUS, Interbus, CANopen, DeviceNet and Industrial Ethernet. Including TR-Electronic's variety of mechanics, interfaces and functions.



Absolute Rotary Encoder



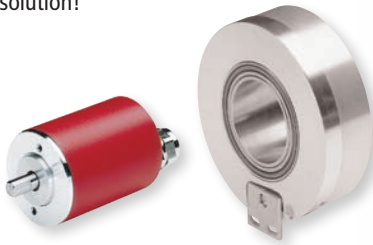
SIL 3, PL e

PROFIsafe

Incremental Rotary Encoder

Incremental rotary encoder

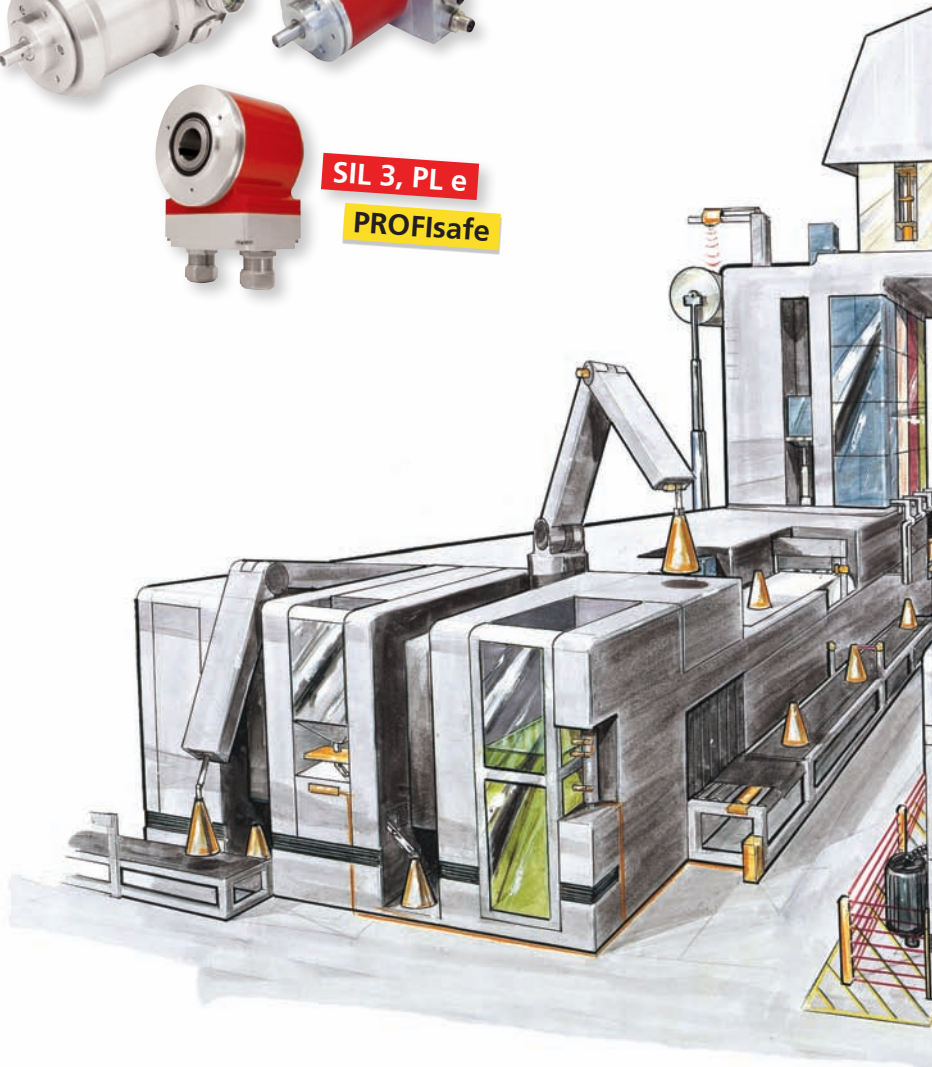
From 35 mm external diameter up to 55 mm hollow shaft - we always have a solution!



Accessories

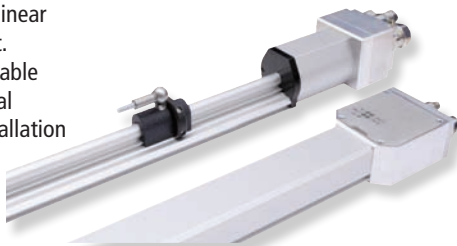
Motor feedback systems

Feedback encoder for modern positioning drives. Optional integrated or directly mounted on the drive shaft via hollow shaft.



Linear absolute displacement sensors

The compact class for linear absolute measurement. Directly bus-ready, suitable for harsh environmental conditions and for installation in hydraulic cylinders.



Absolute high resolution linear measurement systems

Linear measurement with absolute sub-micron resolution without referencing.



Intelligent positioning drive

Absolute positioning directly via fieldbus.
Integrated motor, power amplified position control-loop controller, absolute encoder, PLC functions and fieldbus interface.



Heavy-duty industrial PC

Double shock proof mounted housing isolates the electronics from vibration, while front access (MIPC) simplifies configuration and start up.
Choose from our wide selection of housings.



SPC - the PLC for PC

Turns every PC into an efficient PLC under S5/S7 or IEC 1131 protocols. Combines the comfort of PC control with the safety of a separate processor for PLC tasks.



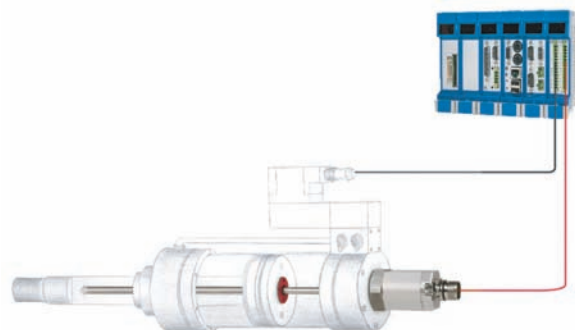
@ctiveIO - more than fieldbus modules

Modular, rugged fieldbus node system I/O-node, small-scale PLC, decentralized axis controller, high performance cam controller, DIN-rail mounted industrial PC, servo controller for the hydraulic ... with commercial fieldbus systems, such as Profibus-DP, CANopen, DeviceNet, LightBus ... and ETHERNET as option!



Laser distance measuring systems

Absolute and wear-free measurement of distances up to 200 m via SSI, fieldbus and Ethernet.



General / Definition

Absolute Rotary Encoder

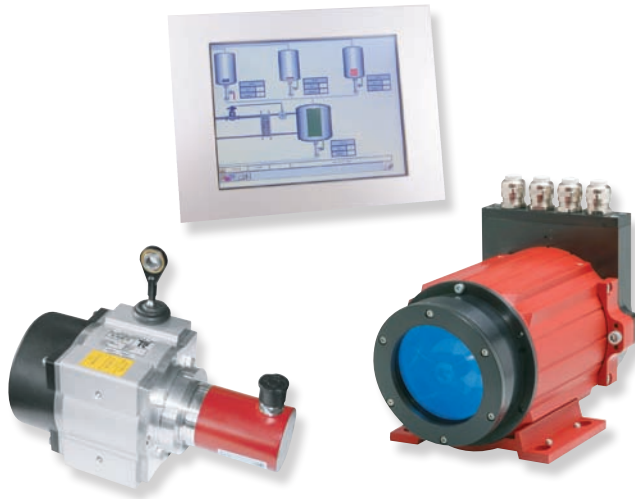
Incremental Rotary Encoder

Accessories

TR-Electronic - For Each Sector the Perfect Solution

Storage and logistics

It is especially important for storage equipment such as rack feeders, transfer units and cranes to have an effective, decentralized measurement and control technology for easy project planning and fast start up.



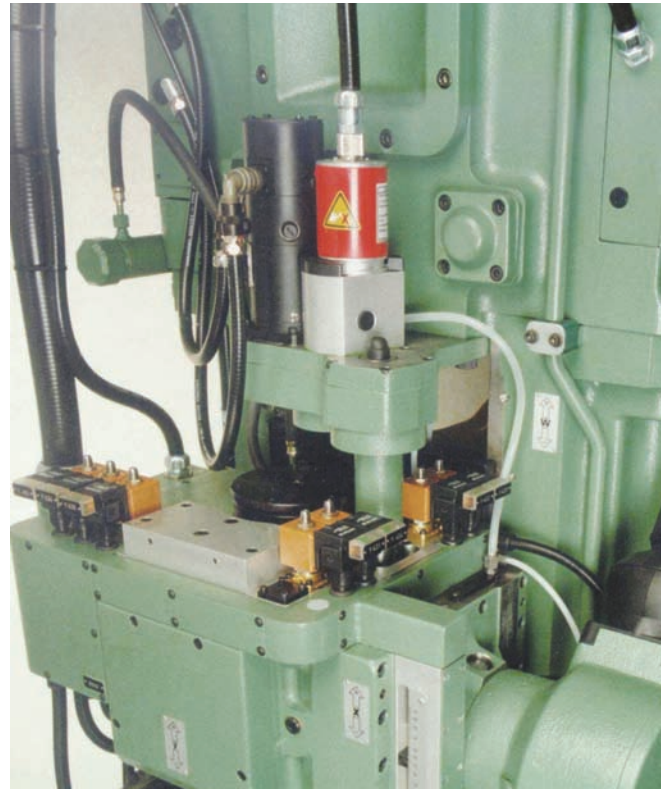
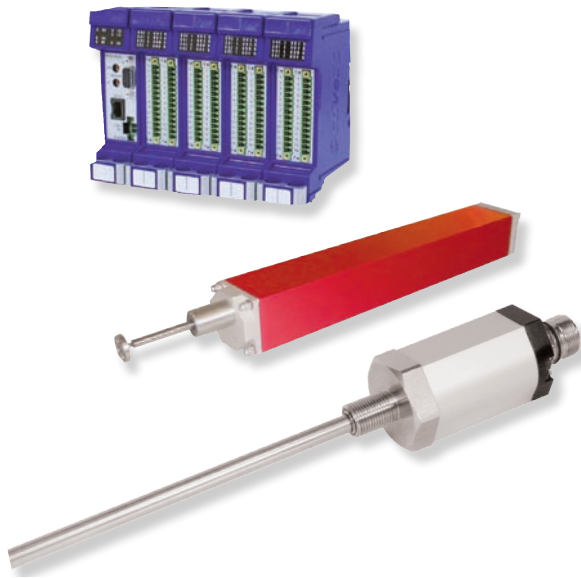
Packaging industry

Flexible automation solutions according to our customers' wishes are the intelligent base for a successful machine concept within the packaging industry. High processing speed, enables fast cycle times and larger lot sizes. Absolute measurement systems save time consuming Homing Sequences. Highly integrated, intelligent sensors also allow for distributed control. When it comes to needing higher precision, we have a perfect solution.



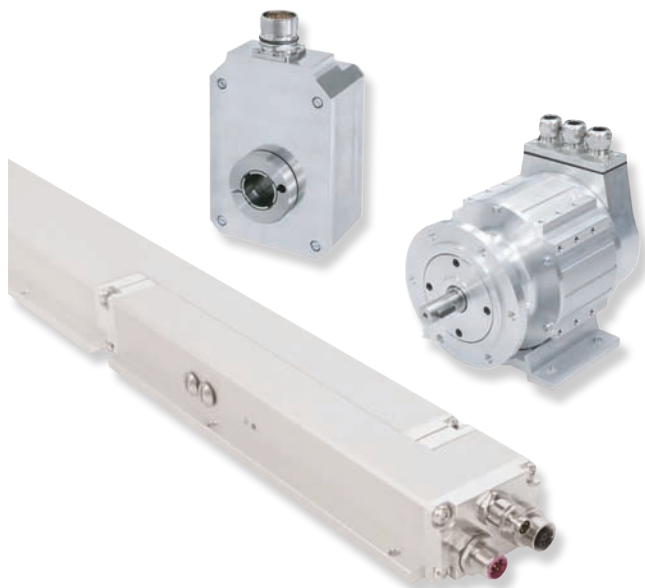
Metal working

For years the world of presses and stamping has been a specialty of TR-Electronic. We design and develop products from the beginning, in such a way that they resist high shock and vibration impacts.



Wood-working

Intelligent, decentralized controlling concepts, efficient sensors with on-site signal processing and components that work reliably despite high temperature fluctuations, are the base for automation solutions within the wood-working industry. Our specialty is to equip and network transfer machines, machine centers and installation fields, especially if you have particular requirements for your machine.



General / Definition

Absolute Rotary Encoder

Incremental Rotary Encoder

Accessories

TR-Electronic - For Each Sector The Perfect Solution

Print technology and paper conversion

Fast signal processing for printing machines enables higher accuracy and decentralized compact drives automate adjusting procedures. With stainless steel housings, rotary encoders even sustain aggressive mediums like groundwood pulp in paper machines. Small absolute rotary encoders measure movements in tight spaces.



Event technology

Our rotary encoders offer safety in all required classes for stage technology and other SAFE applications. From rotary encoders with additional incremental tracks up to SIL 3 certified safety rotary encoders, we offer the right solution for safety.

SAFETY INSIDE

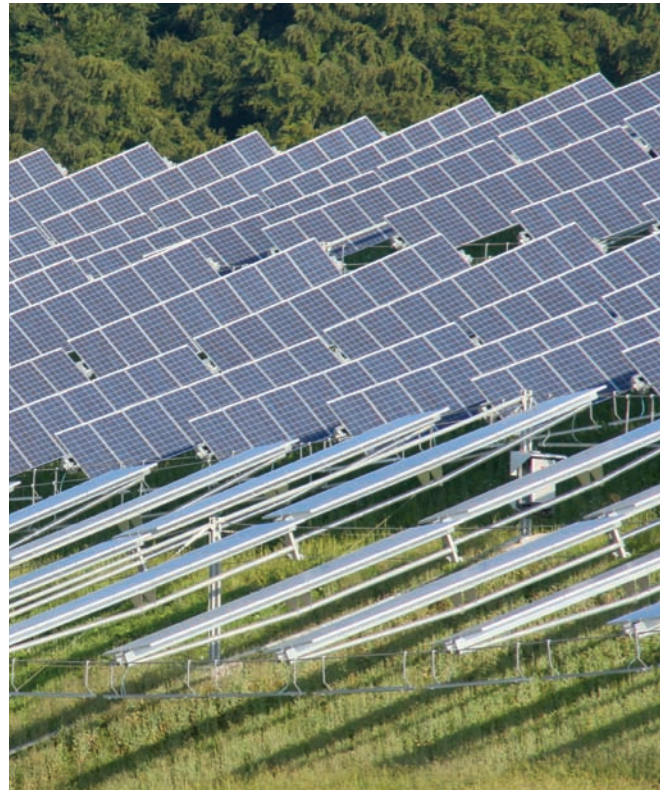
SIL 3, PL e

PROFIsafe



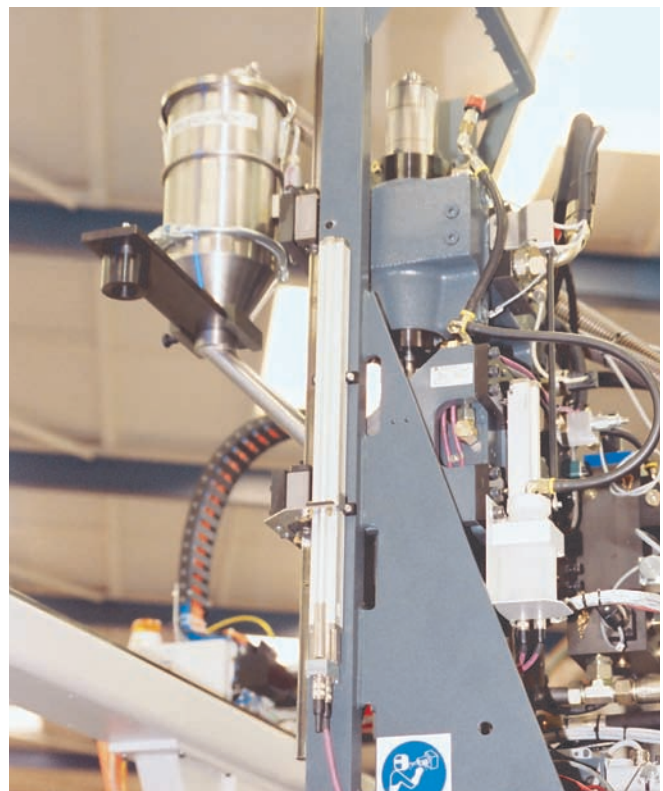
Renewable energy

With intelligent tracking of photovoltaic constructions the efficiency is improved and the automation accelerated. High resolution rotary encoders enable exact positioning. Compact drives reduce the number of connected components and provide years of orientation of your construction towards the sun.



Plastics processing

Various measurement tasks within plastic processing machines require fast signal processing and high precision. Linear measurement systems, for implementing into hydraulic cylinders, blend smoothly into injection molding machines. Industrial PCs are an universal platform for user specific control systems for series production and special machines.



General / Definition

Absolute Rotary Encoder

Incremental Rotary Encoder

Accessories

Rotary Encoder for Industrial Standard Applications in a 58 mm Housing

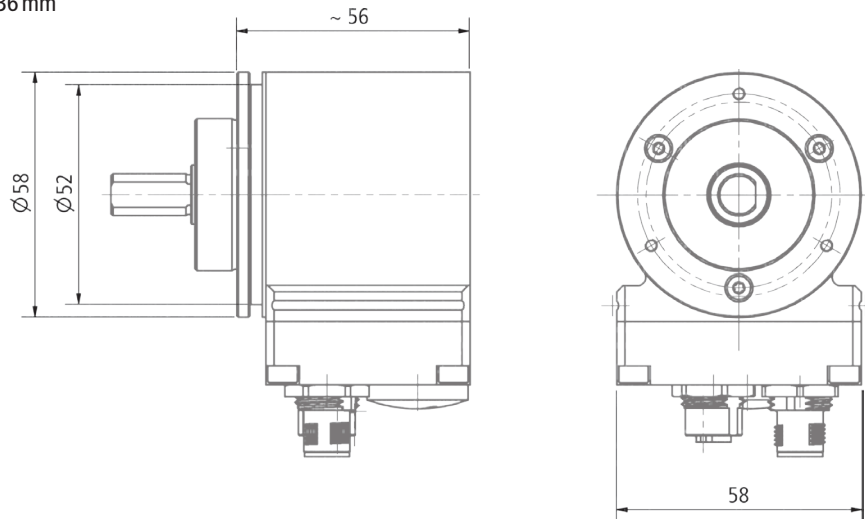
The rotary encoder - lots of variety enclosed

The 58 mm encoder size is a widespread established industrial standard for absolute and incremental rotary encoders. The standard of TR-Electronic is something that other companies consider specialties. The 58 mm absolute rotary encoders are built on a modular concept allowing rapid customization.

- + industrial standard model size 58 mm
- + optimized costs through various resolution ranges
- + multiple interfaces
- + compatible with a multitude of controllers
- + shaft and mounting varieties
- + same mechanics with different interfaces
- + compact connector technology – for serial machines
- + for individual projects - because programmable by the user
- + for customer specific connector technology
- + partly with UL permit

Drawings

example CEV 58 M
CANopen
connected via 2 x M12 connector
8.192 steps/revolution
4.096 revolutions
flange with centering ring 36 mm
shaft 10 mm with flat
protection class IP 65



Interfaces

(others on request)

SSI

ISI

Parallel

SIN/COS



CANopen



EtherCAT



ETHERNET POWERLINK

Three scanning options for optimal cost-benefit ratios

O optical high-resolution scanning

Thanks to modern opto-asic technology you can generate within a single revolution up to 18 bits (262.144 steps). In addition, you can scan absolute 32.768 revolutions. Signal processing is in FPGA speed. This scanning is always used, when positioning values have to be captured really fast. You recognize this type of the scanning by the abbreviation "O".

E optical scanning for industrial standard applications

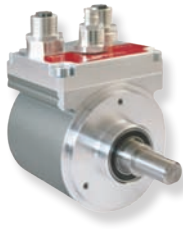
The majority of industrial applications use rotary encoders with a resolution up to 15 bit per revolution and up to 4.096 / 256.000 scanned revolutions.

Signal processing within the processor enables multiple evaluation functions and optimal adjustments to new requirements. Signals like an end switch and speed control can also be generated. You recognize this type of scanning by the abbreviation "E".

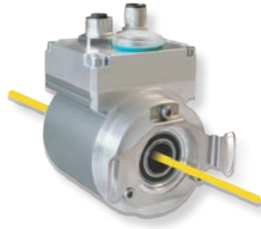
M magnetical scanning for price-sensitive applications

Magnetic rotary encoders offer lower resolutions but provide a price conscious alternative to optical encoders. The resolution of a revolution is 11 bit and is supplemented with 4.096 absolute scanned revolutions. There is no signal processing, though the resolution of this device is programmable. You recognize this type of the scanning by the abbreviation "M".

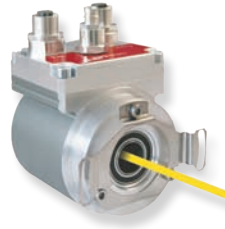
Shaft varieties



solid shaft



hollow shaft



blind shaft



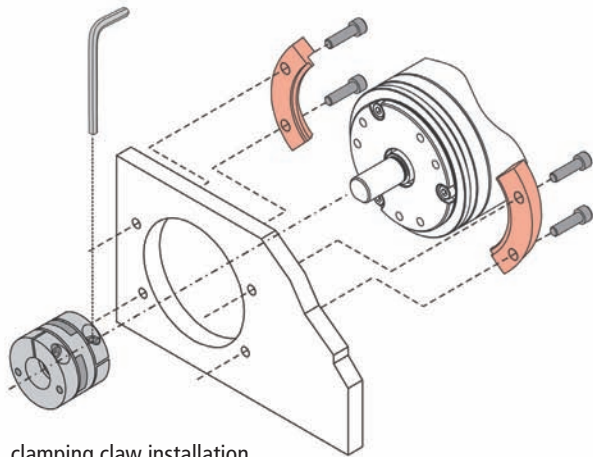
coupling

Persistent machine concept

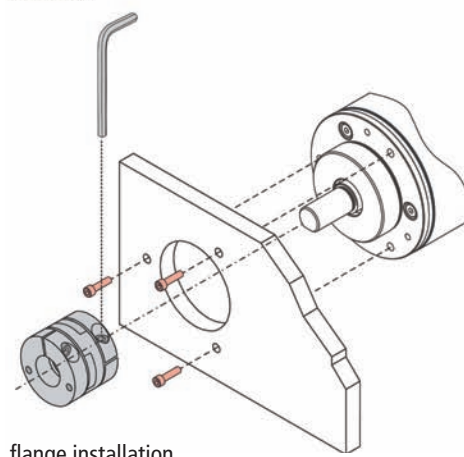
The 58 mm series of the compact rotary encoder was consequently developed for diverse mounting variations. Therefore, there will always be a fitting device for any installation situation available. Functions that you need with a solid shaft, are also available with a hollow shaft. Our rotary encoders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

The variety of the mechanical solutions enhances your room for innovative constructions. You will find an extraction of the numerous mounting possibilities in the following overview. Important: not all possible combinations will be shown.

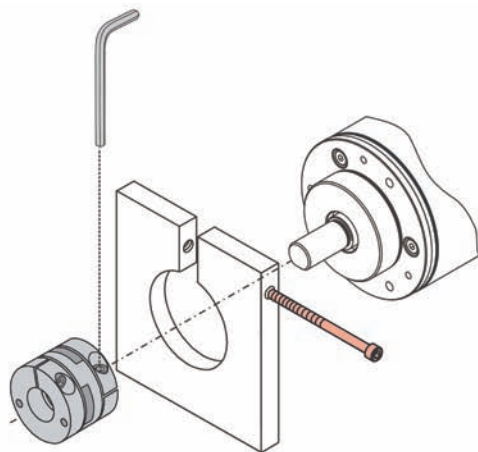
Mounting variations of the solid shaft



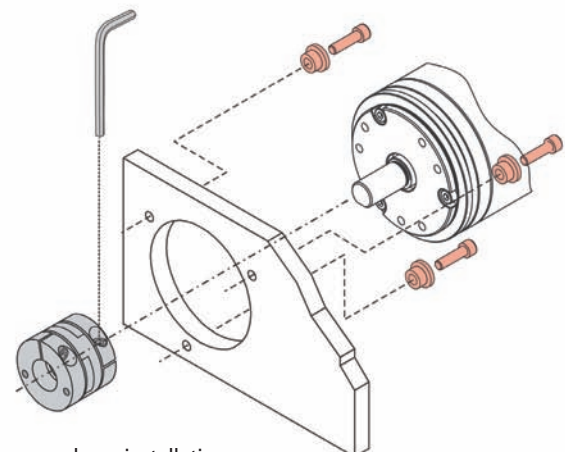
clamping claw installation



flange installation



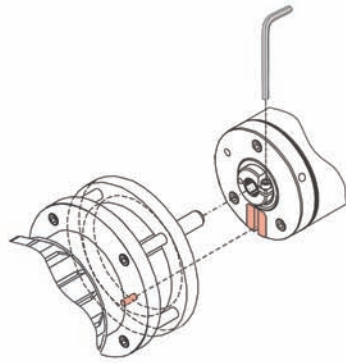
servo flange installation



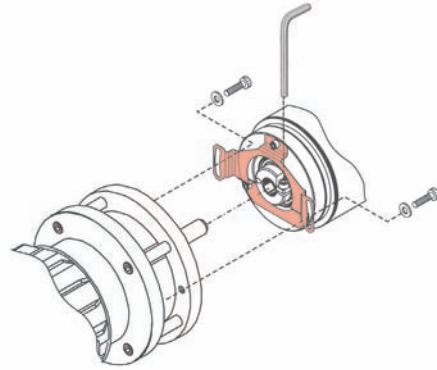
servo clamp installation

Mounting variations for hollow and blind shafts

Distortion lock, mounting position of the pin / torque support spring

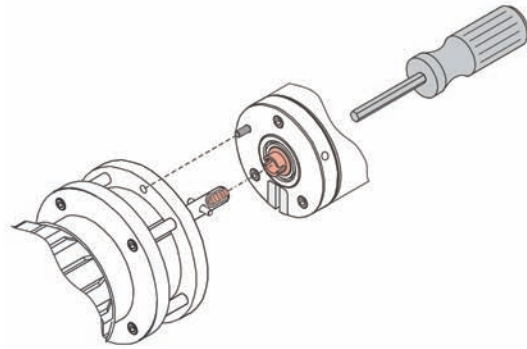


pin/groove axial, pin within the flange of the machine



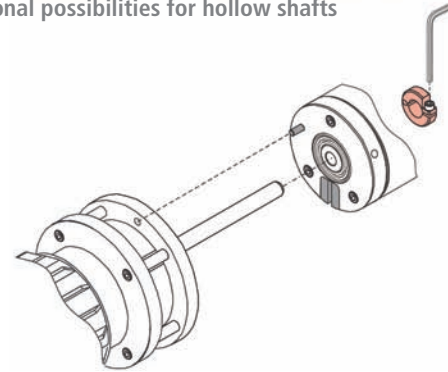
torque support spring with clamping ring

Additional possibilities for blind shafts



pin/groove axial with V-groove and axial screw

Additional possibilities for hollow shafts

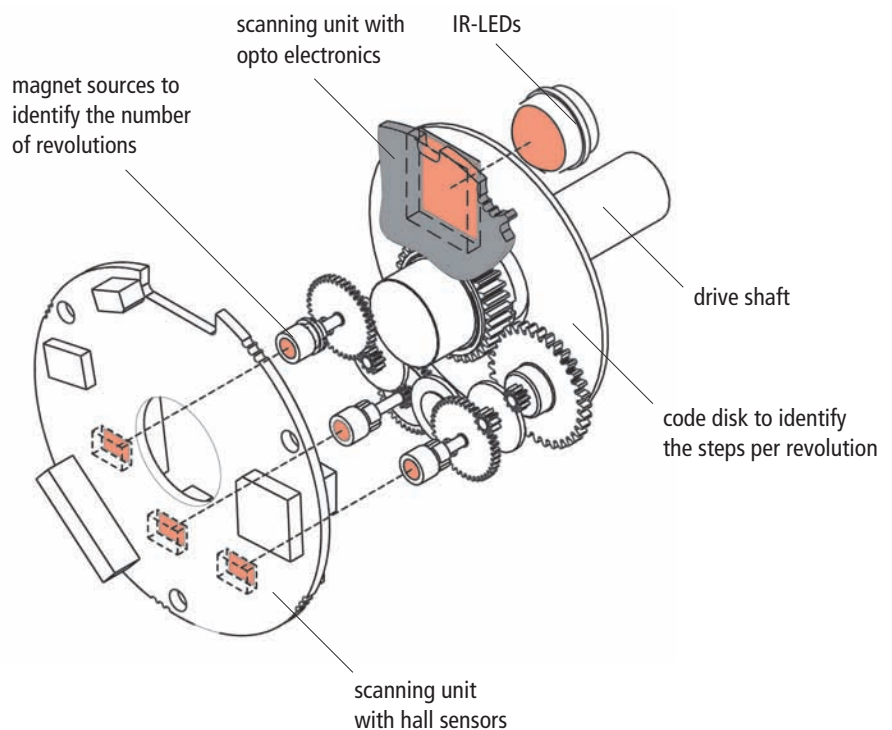


pin/groove axial with clamping ring on the side of the cover

Functional description for the optical scanning

In contrast to incremental measuring systems, the absolute measuring system provides the current position value instantaneously. If this measuring system is moved mechanically while power is off, the current position can be read out directly as soon as the voltage supply is switched on again.

TR-Electronic's absolute measuring systems can be delivered as single turn or multi turn versions depending on the type required.



Space for More Functions Within the 65 mm Housing

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

The specialty of our 65 mm rotary encoder is the output of a cam signal. On up to 32 cam tracks, 4 cams can be shown. Therefore, complex controlling tasks in a machine module can be solved directly from the rotary encoder.

- + comfortable connection of the fieldbus cable
- + higher holding capacity of the cable glands
- + optimal adjustment due to a bigger selection of connectors
- + incremental signal for converter and fieldbuses for the controller are out of one rotary encoder
- + machine parts are controlled via cams in the encoder
- + rare interfaces are possible

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 65mm series offers comfortable connection space. Less bend in the bend cable and a generous clamping area makes it easier to connect on-site. Due to the bigger cable gland, a wider variety of fieldbus cable can be used.



58 mm housing



65 mm housing

More interface possibilities

Rotary encoders size 65 mm of TR-Electronic allow total communication flexibility. 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 65mm 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 (retro-fitting, spares...)
- cam
- special connectors

Combination of fieldbus and point-to-point interfaces:

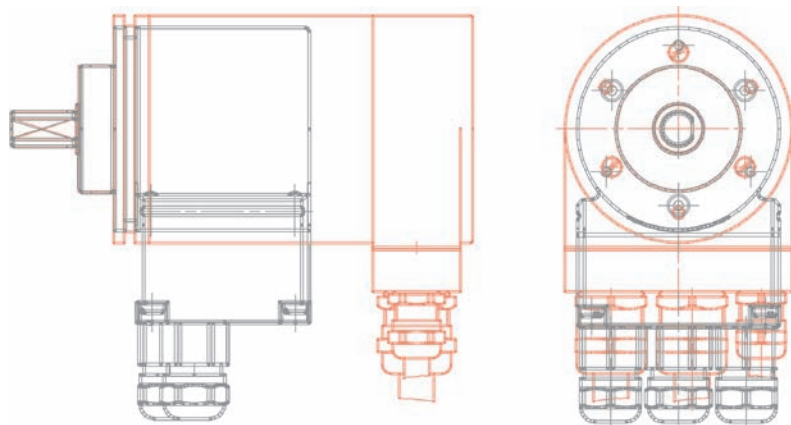
- fieldbus + analog (speed or position)
- fieldbus + SSI
- fieldbus + incremental signal (as feedback to the servo converter)
- fieldbus + SSI + incremental signal

Interfaces for special market niches

- FiberOptic IIO (LWL)
- Interbus on LWL
- FIPIO
- (others on request)

Comparison of the models

- 58 mm housing
- 65 mm housing



Individually Manufactured Rotary Encoder for Your Drive

We are able to design and develop rotary encoder systems according to your requirements that are considerably different from the usual models. The mechanical construction of the rotary encoder will be developed particularly to your needs and wishes. This service is offered when ordering higher quantities. You can integrate your Kit-Encoder within the motor housing of your drive.

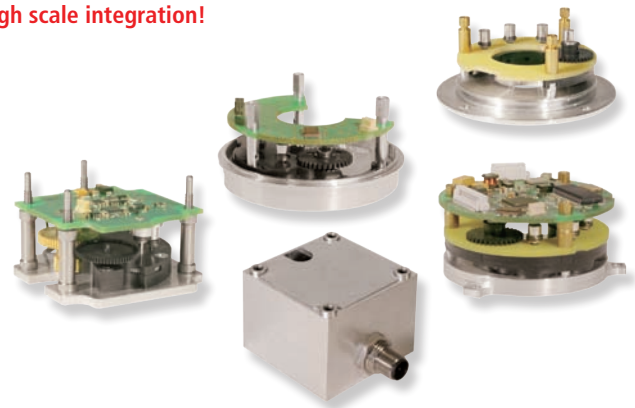
For example, you can use the encoder in a positioning or processing drive, in particular as a motor feedback system. In this case, we construct the rotary encoder without its shaft bearing. The shaft of your drive installs into the encoder and the mechanic of the rotary encoder is driven over a jaw clutch coupling or a pinion gear. Depending on the sampling variation, a resolution up to 2.048 steps/revolution or 8.192 steps/revolution of up to 4.096 revolutions is possible.

Options:

- + additional options like heating or cooling are possible
- + the connection technology is individually chosen
- + an encoder variation in SSI and fieldbus as a double encoder is also possible

Interfaces	SSI, ASI, Parallel, Analog, Cam, CANopen, DeviceNet, PROFIBUS, Fiber Optics, Interbus. Further interfaces on request.
Supply voltage	11 ... 27 VDC or 5 VDC
Temperature range	-20 ... +100 °C
Programmability	TRWinProg, Bus (optional)

Small designed space through high scale integration!



Your advantage:

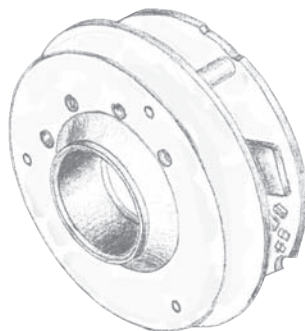
- + the amount of prefabricated parts is low for your device
- + your production process is more cost efficient through our delivery of suitable components for integration to your product
- + also with a lower frequency the rotary encoders are vibration resistant up to 25 g and shock resistant up to 100 g
- + housings up to IP 67 or oil-tight are optional
- + you receive a flange connection and a housing out of aluminum and on request made of other materials such as stainless steel, special synthetic material, and others

Example - unlimited variations are imaginable

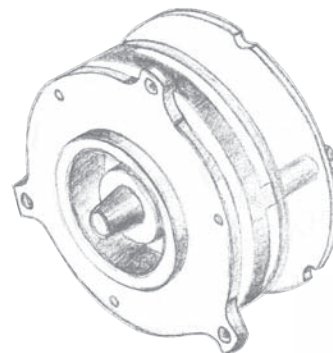
Each Kit-Encoder is individual – it is uniquely customized, developed and built. An overview of each possible variation would generate an enormous catalogue. The sketches should inspire you to challenge us.

For example, you can create the mounting flange according to your needs. The encoder will be attached to the motor.

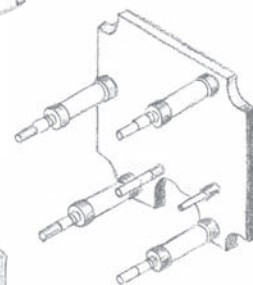
The mounting holes can be put exterior.



Like in the sketch, the mounting can be done from behind, passing through the encoder housing. Even a special flat mounting flange can be realized this way.










The magnet of the central scanning can be attached excentric respectively within the turn of the gear.



In this sketch, the shaft of the motor is external into the bottom edge of the housing. The housing is rectangular and will be custom-fit into your drive.

The Development Process – Cooperative and Suitable for Production

In 10 steps to your individual rotary encoder

<p>① Collaboration of the requirements Together we define the features of your Kit-Encoder and match your individual wishes with a possibility of construction.</p>	<p>② Integration of already existing parts We deliver suitable for production. If necessary and possible we construct the rotary encoder so that already existing components of your drive will be integrated. The advantage is that you will gain space, time and save costs.</p>	<p>③ Housing variation The housing can be created so that the mounting flange of the encoder is simultaneously the end shield of your motor. Of course, you don't have to use the housing at all.</p>	<p>④ Housing form With the form of the housing you can take our standard forms or you can choose your own form, fitting to your application.</p> 
<p>⑤ Construction You can create the mounting flange according to your needs. For example, an extreme flat mounting flange or four instead of three mounting points would be imaginable.</p> 	<p>⑥ Coupling We carry over the rotary movement with an integrated coupling or directly over a gear into the kit.</p> 	<p>⑦ Place of the shaft By default, the shaft is in the middle. If needed, it also can be repositioned.</p> 	<p>⑧ Interfaces Beside the standard interfaces, on request we provide customized interfaces.</p> 
<p>⑨ Other options There are many available options. For example, we offer our encoders with heating, cooling or stainless steel housings.</p>	<p>⑩ Delivery suitable for production We fit our logistics to the batch sizes of your manufacturing. Even the transport packaging we adjust to your manufacturing needs, so it is most convenient for you.</p> <p>Through this customized delivery, you can optimize your production process. Together with you, we gladly implement special wishes and requirements.</p>	<p>CANopen EtherCAT</p>  <p>ETHERNET POWERLINK</p> 	

„Seal Pack“ - an option for high resolution absolute rotary encoders with a 58 mm housing

The "Seal Pack" is an option package for absolute rotary encoders of TR-Electronic. It coordinated combines measures to ensure the following performances: density for occasional dipping (IP67, tested according to DIN EN 60529 / IEC 529); hermetically sealed against sucking water or vapor when having temperature variations (tested according to IEC68 T2-30) and especially tight against creeping oil such as honing oil.

The "Seal Pack" is available for our industrial standard encoder with blind shaft and solid shaft in the 58 mm housing. The bearing of the encoders will be sealed additionally with a gasket. The plug socket is backfilled when assembled. Therefore, liquid cannot get through and damage the encoder when it is insufficiently connected or has badly mounted cable to the connector. The cover of the housing is addi-

tionally sealed. It can be achieved a higher tightness compared to the tested standard (IP67: clean water with 20°C).

The housing of the encoder with "Seal Pack" option is airtight. This means, even when there are high temperature and air pressure differences no vapor or water will be sucked in. Therefore, the systems are absolute tropicalized. The device with "Seal Pack" is just 7 mm longer and has same outer and mounting measures than the standard encoder.



Rotary Encoder for Special Applications

Redundant hollow shaft rotary encoder with SIL3 / PL e certificate

Functional safety. Reliable protection.

The double rotary encoder system with hollow shaft and multi turn scanning fulfils the requirement of EN61508 and is since 2008 certified according to SIL3 and PL e.

The use of certified individual components makes it easier for the system integrator to fulfil safety requirements of the whole application, for example with event technology or general storage and logistic technology.

- + certified according to EN 61508 SIL3, EN ISO 13849 PL e
- + two redundant SSI interfaces or PROFIsafe
- + hollow shaft up to 20 mm with nut
- + resolution SSI: 13 bit x 4.096 revolutions in system 1
13 bit x 4.096 revolutions in system 2
- PROFIsafe: 13 bit x 32.768 revolutions
- + application areas: drive technology, conveying system, mechanical engineering, automation technology, wind energy, event technology and so on.

Resolution	13 bit / revolution, 4.096 revolutions
Protection class	IP54
Interfaces	2 x SSI or PROFIsafe (PROFIBUS)

Further information you will find on page 33

applicable for SIL3 and PL e



Compact single turn rotary encoder in a 40 mm housing

Single turn. Programmable. 40 mm housing.

The compact model and the contact-free, and therefore wear-free, scanning opens up various application possibilities.

In addition, with the attractive price, the use of a digital rotary encoder even makes sense where potentiometers have been used.

The industrial compatible resolution of 12 bit also covers the standard rotary encoder applications. As usual for TR-Electronic, these rotary encoders of the CP series are also applicable in a rough environment. Therefore, they can be used in places that are under strong vibration or heavy shock.

compact single turn



- + compact and robust housing of 40 mm diameter
- + solid shaft or blind shaft up to 12 mm diameter
- + programmable (TRWinProg)
- + shock and vibration resistant

Resolution	12 bit / revolution, 1 revolution
Shaft	solid shaft or blind shaft, max. 12 mm
Interfaces	SSI, ISI

Further information you will find on page 23

16 up to 27 mm hollow shaft in a 80 mm housing

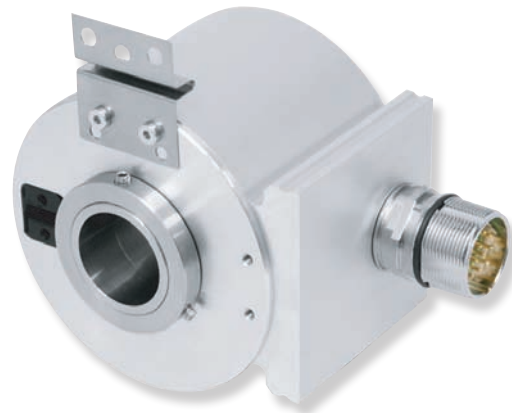
The COH 80 is a compact hollow shaft rotary encoder for mechanical engineering using bigger hollow shafts. As an absolute encoder, an actual position value is provided without any use of battery or counter. The rotary encoder can be carried by the hollow shaft. You have either a compact torque support spring made of steel or a fixing pin for a flange sided nut.

- + compact and robust rotary encoder with a 27 mm hollow shaft
- + with inserts you can realize a smaller shaft diameter
- + programmable
- + measuring range up to 36 bit

Resolution	18 bit / revolution, 4.096 revolutions
Protection class	IP 54
Interfaces	SSI, PROFIBUS, DeviceNet, CANopen

Further information you will find on page 26

robust and compact
up to 27 mm hollow shaft



Absolute multi turn rotary encoder with an 80 mm hollow shaft

For mechanical engineering, torque motors.

If size matters, the CEH 160 with a housing diameter of 160 mm and a shaft diameter of 80 mm is the right choice. With the CEH 160 you will have a real multi turn encoder which gives you an actual position value without any battery or counter.

With inlays you can decrease the diameter of the hollow shaft. A torque support spring with an adjustable ball, joint bar or a spring secures against rotation. For Industrial Ethernet, caps with standardized M12 – connectors will be used.

- + hollow shaft up to 80 mm
- + programmable over TRWinProg or bus
- + Over SSI the absolute data of the position will be conveyed. Industrial Ethernet for PC based control technology with realtime bus systems.

Resolution	15 bit / revolution, 4.096 revolutions
Protection class	IP 54
Interfaces	SSI + Incremental + EtherCAT / PROFINET / Powerlink / EtherNet/IP

Further information you will find on page 28

hollow shaft 80 mm
housing 160 mm



Rotary Encoder for Special Applications

CO_58 - rotary encoder with higher resolution in a 58mm housing

For a compact constructed size.

The successful absolute rotary encoder series in the 58 mm housing, you now get in variations with higher resolution. The mechanical diversity from the solid, hollow and blind shaft as well as the integrated coupling you receive with a resolution up to 262.144 steps per revolution (18 bit) at 4.096 revolutions. Higher revolution ranges are optional possible. Therewith, you have a measuring range which expands from 30 bit to 36 bit depending on the interface.

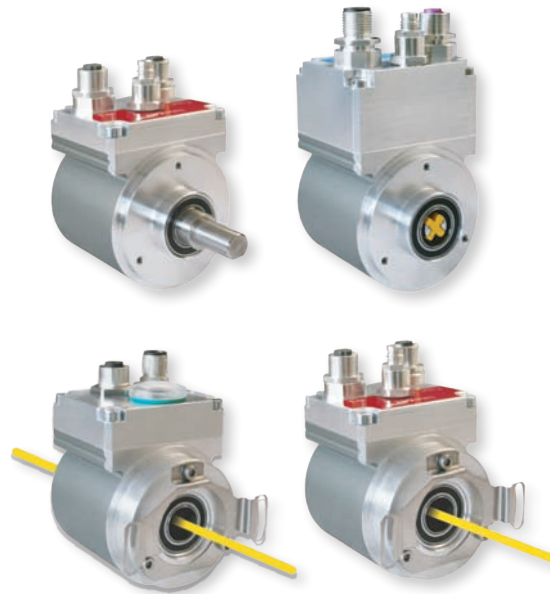
You can adjust the rotary encoder via TRWinProg to the requirements of your application that the output of the measuring value is directly possible in the plant unit.

- + high resolution rotary encoder
- + continuous system from 10 to 18 bit resolution /revolution
- + compact 58 mm housing (industrial standard)
- + solid shaft, hollow shaft, blind shaft or integrated coupling

Resolution	18 bit / revolution, 4.096 revolutions
Protection class	max. IP 65 (hollow shaft IP 54), optional IP 67
Interfaces	SSI, PROFIBUS, CANopen, EtherCAT, DeviceNet (others on request)

Further information you will find on page 20

maximum resolution 36 bit



CMV22M - our smallest absolute multi turn encoder

Small. Robust. Compact.

Within the CMV 22M, we have incorporated the in-depth, accumulated experience that we have gained from over 25 years of innovative rotary encoder technology and ideas. At only 22 mm in diameter, it is our smallest absolute, multi-turn rotary encoder of its kind.

Amazingly compact, it can be easily mounted in the most confined machine spaces, while its low mass and resistance to shock and vibration make the CMV 22 M ideal for use in demanding environments.

- + absolute rotary encoder:
 - in each operating condition the right position
- + no reference pass procedure
- + due to its size it is an ideal replacement for a potentiometer
- + shaft is bedded in ball bearing - therefore higher speed, bears a higher shaft load, long life time
- + programmable
- + shock- und vibration resistant - ideal for demanding conditions
- + 22 mm diameter: small enough for tight spaces
- + improved machine performance and functionality

- Your advantage:
- + higher resolution
 - + standardized interfaces
 - + no dead-stop
 - + wear-free

Resolution	12 bit / revolution, 256 revolutions
Protection class	IP 64
Interfaces	Analog, ASI, SSI

Further information you will find on page 22

22 mm multi turn as poti replacement



Programmable incremental rotary encoder in a 58mm housing

Incremental rotary encoder are simpler constructed and therefore more cost-efficient. They are placed in various machines with different resolutions. It is important when you make your decision that you fast get your requested rotary encoder with the right resolution. We fast implement your wishes.

With the IOV 58 (solid shaft) and the IOH 58 (hollow shaft) you can realize arbitrarily each resolution between 2 and 36.000 steps / revolution. Beside the industrial standard flange and shaft combination, we also offer you an increasing choice of special features like inch-measurement for the US market.

The requested resolution you programm directly over TRWinProg!

- + from 2 up to 36.000 steps
- + programmable over TRWinProg
- + cost-efficient
- + fast deliver times
- + inch-measurement for the US market

Resolution	2 ... 36.000 steps
Protection class	IP 65
Special function	speed control

Further information you will find on page 37

incremental rotary encoder
up to 36.000 steps/ revolution



Power over Ethernet

More flexibility. Fail-safe.

Profibus & Co. are no water under the bridge. The cross linking of industrial facilities is following the example of office networks. By taking out the power supply cable, "Power over Ethernet" (PoE) is using one less cable.

The power supply of the device comes directly over the data cable. Therefore, the network planning is easier and more independent from sockets and control cabinets. You can install our PoE rotary encoder in positions where a lot of cable would disturb. You can save on installation costs in difficult accessible areas. Using an uninterrupted power supply (UPS) lowers the risk of your connected devices when having a power outage.

- + thanks to "Power over Ethernet" you just have to connect on network cable - the power supply cable drops out
- + network planning is independent of sockets and control cabinets
- + speed of Industrial Ethernet
- + fail-safe when using an uninterruptable power supply (UPS)







Resolution	18 bit / revolution, 4.096 revolutions
Protection class	IP 65
Interfaces	EtherCAT

Further information you will find on page 21




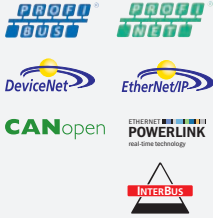


save the
power supply cable



Absolute Rotary Encoder with a Solid Shaft and 58mm Housing

	CEV 58 S/M	COV 58 S/M	CMV 58 S/M
Specifics and specifications	The compact industrial standard, optimized for connector technology	High resolution and fast signal processing within a compact model	Cost-efficient solution when it comes to accuracy and time response
Product picture			
Supply voltage	11 ... 27 VDC	11 ... 27 VDC	11 ... 27 VDC
Capacitance	Multi turn: ≤ 30 bit Single turn: ≤ 13 bit	Multi turn: ≤ 36 bit Single turn: ≤ 18 bit	Multi turn: ≤ 23 bit Single turn: ≤ 11 bit
Steps per revolution	≤ 8.192 / 32.768	≤ 262.144	≤ 2.048 (4.096 optional)
Number of revolutions	Multi turn: ≤ 4.096 / 256.000 Single turn: 1	Multi turn: ≤ 4.096 / 256.000 Single turn: 1	Multi turn: ≤ 4.096 Single turn: 1
Mechanical permissible speed	≤ 12.000 min ⁻¹	≤ 12.000 min ⁻¹	≤ 12.000 min ⁻¹
Available shaft diameter	6 ... 12 mm	6 ... 12 mm	6 ... 12 mm
Life time Speed Operating temperature	≥ 3,9 * 10 ¹⁰ revolutions ≤ 6.000 min ⁻¹ ≤ 60°C	≥ 3,9 * 10 ¹⁰ revolutions ≤ 6.000 min ⁻¹ ≤ 60°C	≥ 3,9 * 10 ¹⁰ revolutions ≤ 6.000 min ⁻¹ ≤ 60°C
Permissible angular acceleration	≤ 10 ⁴ rad/s ²	≤ 10 ⁴ rad/s ²	≤ 10 ⁴ rad/s ²
Moment of inertia (typically)	2,5 * 10 ⁻⁶ kg m ²	2,5 * 10 ⁻⁶ kg m ²	1,3 * 10 ⁻⁶ kg m ²
Mass (typically)	0,3 kg ... 0,5 kg	0,3 kg ... 0,5 kg	0,3 kg
Interfaces	SSI Parallel (Single turn) 	SSI 	SSI 
Vibration, DIN EN 60068-2-6	< 100 m/s ² , Sine 50-2.000 Hz	< 100 m/s ² , Sine 50-2.000 Hz	< 100 m/s ² , Sine 50-2.000 Hz
Shock, DIN EN 60068-2-27	< 1000 m/s ² , half-sine 11ms	< 1000 m/s ² , half-sine 11ms	< 1000 m/s ² , half-sine 11ms
Working temperature	0°C ... +60°C expanded temperature range opt.	0°C ... +60°C expanded temperature range opt.	0°C ... +60°C expanded temperature range opt.
Storage temperature	-30°C ... +85°C, dry	-30°C ... +80°C, dry	-30°C ... +85°C, dry
Protection class (DIN EN 6052: 1991)	IP 65	IP 65 (IP 67 optional)	IP 65
More options and accessories	Stainless steel housing: CEV 70 (S. 23) With sting pot box (S. 34) Explosion proof: AEV 70 "Seal Pack" (S. 20)	Stainless steel housing: CEV 70 (S. 23) Explosion proof: AEV 70 (S. 23) "Seal Pack" (S. 20)	With string pot box (S. 34) Capacitance: Multi turn: ≤ 24 bit Single turn: ≤ 12 bit




Absolute Rotary Encoder with a Solid Shaft and 65 mm Housing

	CEV 65 S/M	COV 65 S/M	CMV 65 S/M
Specifics and specifications	The widest range of available interfaces	High resolution meets Industrial Ethernet	It's so cost efficient - can it be PNO Class 2? (reduced functional range)
Product picture			
Supply voltage	11 ... 27 VDC	11 ... 27 VDC	11 ... 27 VDC
Capacitance	Multi turn: ≤ 25 bit Single turn: ≤ 13 bit	Multi turn: ≤ 36 bit Single turn: ≤ 18 bit	Multi turn: ≤ 24 bit Single turn: ≤ 12 bit
Steps per revolution	≤ 8.192	≤ 262.144	≤ 2.048 (8.192 optional)
Number of revolutions	Multi turn: ≤ 4.096 / 256.000 Single turn: 1	Multi turn: ≤ 4.096 / 256.000 Single turn: 1	Multi turn: ≤ 4.096 Single turn: 1
Mechanical permissible speed	≤ 6.000 min ⁻¹	≤ 6.000 min ⁻¹	≤ 6.000 min ⁻¹
Available shaft diameter	8 ... 14 mm	8 ... 14 mm	8 ... 14 mm
Life time - speed - operating temperature	≥ 3,9 * 10 ¹⁰ revolutions ≤ 3.000 min ⁻¹ ≤ 60°C	≥ 3,9 * 10 ¹⁰ revolutions ≤ 3.000 min ⁻¹ ≤ 60°C	≥ 3,9 * 10 ¹⁰ revolutions ≤ 3.000 min ⁻¹ ≤ 60°C
Permissible angular acceleration	≤ 10 ⁴ rad/s ²	≤ 10 ⁴ rad/s ²	≤ 10 ⁴ rad/s ²
Moment of inertia (typically)	2,5 * 10 ⁻⁶ kg m ²	2,5 * 10 ⁻⁶ kg m ²	2,5 * 10 ⁻⁶ kg m ²
Mass (typically)	0,7 kg	0,7 kg	0,7 kg
Interfaces (others on request)	SSI ISI Parallel SIN/COS LWL Analog Cam 	SSI POWERLINK EtherNet/IP EtherCAT 	
Vibration, DIN EN 60068-2-6	< 100 m/s ² , Sine 50-2.000 Hz	< 100 m/s ² , Sine 50-2.000 Hz	< 100 m/s ² , Sine 50-2.000 Hz
Shock, DIN EN 60068-2-27	< 1000 m/s ² , half-sine 11ms	< 1000 m/s ² , half-sine 11ms	< 1000 m/s ² , half-sine 11ms
Working temperature	0 °C ... +60 °C expanded temperature range opt.	0 °C ... +60 °C expanded temperature range opt.	0 °C ... +60 °C expanded temperature range opt.
Storage temperature	-30 °C ... +85 °C, dry	-30 °C ... +80 °C, dry	-30 °C ... +80 °C, dry
Protection class (DIN EN 6052: 1991)	IP 65	IP 65	IP 65
More options and accessories	Stainless steel housing: CEV 84 (S. 23) String pot (S. 34) Protective housing (S. 24) Increased density	Stainless steel housing: CEV 84 (S. 23) String pot (S. 34) Protective housing (S. 24) Increased density	-

Absolute Rotary Encoder with Solid Shaft 22/36mm Housing

	CMV 22 S/M	COV 36 S/M	CMV 36 S/M
Specifics and specifications	Smallest absolut encoder with a real multi turn gear poti replacement	Motorfeedback solution for high requirements on resolution and time response	Absolute multi turn between mini-ature and industrial standard
Product picture			
Supply voltage	8 ... 30 VDC	11 ... 27 VDC	11 ... 27 VDC
Capacitance	Multi turn: ≤ 20 bit Single turn: ≤ 12 bit	Multi turn: ≤ 36 bit Single turn: ≤ 18 bit	Multi turn: ≤ 28 bit Single turn: ≤ 12 bit
Steps per revolution	≤ 4.096 (8.192 optional)	≤ 262.144	≤ 2.048 (4.096 optional)
Number of revolutions	Multi turn: ≤ 256 Single turn: 1	Multi turn: ≤ 4.096 / 65.536 Single turn: 1	Multi turn: ≤ 65.536 Single turn: 1
Mechanical permissible speed	≤ 10.000 min ⁻¹	≤ 12.000 min ⁻¹	≤ 12.000 min ⁻¹
Available shaft diameter	6 und 6,33 mm	6 ... 8 mm	6 ... 8 mm
Life time Speed Operating temperature	≥ 30 * 10 ⁶ revolutions ≤ 3.000 min ⁻¹ ≤ 25°C	≥ 3,9 * 10 ¹⁰ revolutions ≤ 6.000 min ⁻¹ ≤ 60°C	≥ 3,9 * 10 ¹⁰ revolutions ≤ 6.000 min ⁻¹ ≤ 60°C
Permissible angular acceleration	≤ 10 ⁴ rad/s ²	≤ 10 ⁴ rad/s ²	≤ 10 ⁴ rad/s ²
Moment of inertia (typically)	2,5 * 10 ⁻⁶ kg m ²	1,3 * 10 ⁻⁶ kg m ²	1,3 * 10 ⁻⁶ kg m ²
Mass (typically)	0,05 kg	0,15 kg	0,15 kg
Interfaces	ASI (U _b 8 ... 30 VDC) SSI (U _b 8 ... 30 VDC) Analog (U _b 14 ... 30 VDC)	SSI SIN/COS	SSI
Vibration, DIN EN 60068-2-6	< 100 m/s ² , Sine 50-2.000 Hz	< 100 m/s ² , Sine 50-2.000 Hz	< 100 m/s ² , Sine 50-2.000 Hz
Shock, DIN EN 60068-2-27	< 1000 m/s ² , half-sine 11ms	< 1000 m/s ² , half-sine 11ms	< 1000 m/s ² , half-sine 11ms
Working temperature	0°C ... +60°C	0°C ... +85°C expanded temperature range opt.	0°C ... +60°C
Storage temperature	0°C ... +85°C, dry	-30°C ... +85°C, dry	-30°C ... +85°C, dry
Protection class (DIN EN 6052: 1991)	IP 64	IP 65	IP 65
More options and accessories	Customer specific protocols at the ASI interface	Working temperature: 0°C ... +125°C	-

Absolute Rotary Encoder with a Solid Shaft 40/69/84mm Housing

	CPV 40 S	CMV69	AEV 70 S/M
Specifics and specifications	Compact single turn rotary encoder with a robust 40mm housing	Robust standard solution for agricultural and construction machines, corrosion protected	Absolut qualified for potentially explosive atmospheres Aluminum housing
Product picture			
Supply voltage	11 ... 27 VDC	12 ... 30 VDC	11 ... 27 VDC
Capacitance	Single turn: ≤ 12 bit	Multi turn: ≤ 24 bit Single turn: ≤ 12 bit	Multi turn: ≤ 30 bit Single turn: ≤ 13 bit
Steps per revolution	≤ 4.096	≤ 4.096	$\leq 8.192 / 32.768$
Number of revolutions	Single turn: 1	Multi turn: ≤ 4.096 Single turn: 1	Multi turn: $\leq 4.096 / 256.000$ Single turn: 1
Mechanical permissible speed	$\leq 12.000 \text{ min}^{-1}$	$\leq 12.000 \text{ min}^{-1}$	$\leq 12.000 \text{ min}^{-1}$
Available shaft diameter	6 ... 12 mm	10 mm	6 ... 12 mm
Life time at Speed Operating temperature	$\geq 3,9 * 10^{10}$ revolutions $\leq 6.000 \text{ min}^{-1}$ $\leq 60^{\circ}\text{C}$	$\geq 3,9 * 10^{10}$ revolutions $\leq 6.000 \text{ min}^{-1}$ $\leq 60^{\circ}\text{C}$	$\geq 3,9 * 10^{10}$ revolutions $\leq 6.000 \text{ min}^{-1}$ $\leq 60^{\circ}\text{C}$
Permissible angular acceleration	-	$\leq 10^4 \text{ rad/s}^2$	$\leq 10^4 \text{ rad/s}^2$
Moment of inertia (typically)	-	$1,3 * 10^{-6} \text{ kg m}^2$	$2,5 * 10^{-6} \text{ kg m}^2$
Mass (typically)	0,12 kg	0,5 kg	2,5 kg (at 5 m cable length)
Interfaces	SSI ISI	Analog	SSI  Parallel  Address choosable over bus line
Vibration, DIN EN 60068-2-6	$< 100 \text{ m/s}^2$, Sine 50-2.000 Hz	$< 250 \text{ m/s}^2$, Sine 50-2.000 Hz	$< 100 \text{ m/s}^2$, Sine 50-2.000 Hz
Shock, DIN EN 60068-2-27	$< 1000 \text{ m/s}^2$, half-sine 11ms	$< 1000 \text{ m/s}^2$, half-sine 11ms	$< 1000 \text{ m/s}^2$, half-sine 11ms
Working temperature	$0^{\circ}\text{C} \dots +60^{\circ}\text{C}$	$-20^{\circ}\text{C} \dots +70^{\circ}\text{C}$	$0^{\circ}\text{C} \dots +40^{\circ}\text{C}$
Storage temperature	$-30^{\circ}\text{C} \dots +85^{\circ}\text{C}$, dry	$-30^{\circ}\text{C} \dots +85^{\circ}\text{C}$, dry	$-30^{\circ}\text{C} \dots +85^{\circ}\text{C}$, dry
Protection class (DIN EN 6052: 1991)	IP 65	IP 67	IP 65
More options and accessories	Programmable Incremental rotary encoder and with blind shaft available	-	II 2 G/D EEx de IIC T6  string pot and ATEX-conform coupling possible

Absolute Rotary Encoder with Solid Shaft in a 70/84/115/58mm Housing

	CEV 115 S/M	CEV 115 S/M	CEV 58 H
Specifics and specifications	Protection against outside influences: mechanical and climatical	Protection against outside influences: mechanical and climatical	Magnetical detent for wear-free operation
Product picture			
Supply voltage	11 ... 27 VDC	11 ... 27 VDC	11 ... 27 VDC
Capacitance	Multi turn: ≤ 25 bit Single turn: ≤ 13 bit	Multi turn: ≤ 25 bit Single turn: ≤ 13 bit	Multi turn: ≤ 13 bit
Steps per revolution	≤ 8.192	≤ 8.192	≤ 8.192
Number of revolutions	Multi turn: ≤ 4.096 / 256.000 Single turn: 1	Multi turn: ≤ 4.096 / 256.000 Single turn: 1	Single turn: 1
Mechanical permissible speed	≤ 3.600 min ⁻¹	≤ 3.600 min ⁻¹	-
Available shaft diameter	8 ... 14 mm	8 ... 14 mm	6 mm
Life time Speed Operating temperature	≥ 2,8 * 10 ¹⁰ revolutions ≤ 3.000 min ⁻¹ ≤ 60°C	≥ 2,8 * 10 ¹⁰ revolutions ≤ 3.000 min ⁻¹ ≤ 60°C	-
Permissible angular acceleration	≤ 10 ⁴ rad/s ²	≤ 10 ⁴ rad/s ²	-
Moment of inertia (typically)	2,5 * 10 ⁻⁶ kg m ²	2,5 * 10 ⁻⁶ kg m ²	-
Mass (typically)	6 kg	6 kg	-
Interfaces (others on request)	SSI ISI Parallel Analog 	SSI ISI Parallel Analog 	SSI
Vibration, DIN EN 60068-2-6	< 100 m/s ² , Sine 50-2.000 Hz	< 100 m/s ² , Sine 50-2.000 Hz	< 100 m/s ² , Sine 50-2.000 Hz
Shock, DIN EN 60068-2-27	< 1.000 m/s ² , half-sine 11ms	< 1.000 m/s ² , half-sine 11ms	< 1.000 m/s ² , half-sine 11ms
Working temperature	0°C ... +60°C expanded temperature range opt.	0°C ... +60°C expanded temperature range opt.	0°C ... +60°C expanded temperature range opt.
Storage temperature	-30°C ... +85°C, dry	-30°C ... +85°C, dry	-30°C ... +85°C, dry
Protection class (DIN EN 6052: 1991)	IP 65	IP 65	IP 65
More options and accessories	Heating, cooling, dust explosion-proof: AEV 115 S/M ⊠ II 3D Ex tD A22 IP 65 T95°C	Heating, cooling, dust explosion-proof: AEV 115 S/M ⊠ II 3D Ex tD A22 IP 65 T95°C	Graduation of the scale


General / Definition

Absolute Rotary Encoder

Incremental Rotary Encoder

Accessories

Absolute Rotary Encoder with Solid Shaft in a 75 mm Housing

QEH 75 M	
Specifics and specifications	Absolute encoder with integrated display
Product picture	
Supply voltage	11 ... 27 VDC
Capacitance	Multi turn: ≤ 22 bit
Steps per revolution	≤ 64
Number of revolutions	Multi turn: ≤ 65.536
Mechanical permissible speed	≤ 1000 min ⁻¹
Available shaft diameter	20 mm
Life time Speed Operating temperature	-
Permissible angular acceleration	-
Moment of inertia (typically)	-
Mass (typically)	0,7 kg
Interfaces (others on request)	ASI
Vibration, DIN EN 60068-2-6	< 50 m/s ² , Sine 50-2.000 Hz
Shock, DIN EN 60068-2-27	< 500 m/s ² , 11 half-sine
Working temperature	0 °C ... +60 °C expanded temperature range opt.
Storage temperature	-30 °C ... +85 °C, dry
Protection class (DIN EN 6052: 1991)	IP 50
More options and accessories	Customer specific communications protocol











General / Definition

Absolute Rotary Encoder

Incremental Rotary Encoder

Accessories









Absolute Rotary Encoder with Hollow Shaft in a 58mm housing

	CEH 58 S/M	COH 58 S/M	CMH 58 S/M
Specifics and specifications	Compact industrial standard, optimized for connector technology	High resolution and fast signal processing in a compact design	Cost-efficient solution for less demands on resolution and time response
Product picture			
Supply voltage	11 ... 27 VDC	11 ... 27 VDC	11 ... 27 VDC
Capacitance	Multi turn: ≤ 25 / 28 bit Single turn: ≤ 13 bit	Multi turn: ≤ 36 bit Single turn: ≤ 18 bit	Multi turn: ≤ 23 bit Single turn: ≤ 11 bit
Steps per revolution	≤ 8.192	≤ 262.144	≤ 2.048 (4.096 optional)
Number of revolutions	Multi turn: ≤ 4.096 / 32.768 / 256.000 Single turn: 1	Multi turn: ≤ 4.096 / 256.000 Single turn: 1	Multi turn: ≤ 4.096 Single turn: 1
Mechanical permissible speed	≤ 6.000 min ⁻¹	≤ 6.000 min ⁻¹	≤ 6.000 min ⁻¹
Available shaft diameter	8 ... 12 mm	8 ... 12 mm	8 ... 12 mm
Life time Speed Operating temperature	≥ 3,9 * 10 ¹⁰ revolutions ≤ 6.000 min ⁻¹ ≤ 60°C	≥ 3,9 * 10 ¹⁰ revolutions ≤ 6.000 min ⁻¹ ≤ 60°C	≥ 3,9 * 10 ¹⁰ revolutions ≤ 6.000 min ⁻¹ ≤ 60°C
Permissible angular acceleration	≤ 10 ⁴ rad/s ²	≤ 10 ⁴ rad/s ²	≤ 10 ⁴ rad/s ²
Moment of inertia (typically)	2,5 * 10 ⁻⁶ kg m ²	2,5 * 10 ⁻⁶ kg m ²	2,5 * 10 ⁻⁶ kg m ²
Mass (typically)	0,3 kg ... 0,5 kg	0,3 kg ... 0,5 kg	0,3 kg
Interfaces	SSI  Parallel (Single turn)   	SSI   	SSI
Vibration, DIN EN 60068-2-6	< 100 m/s ² , Sine 50-2.000 Hz	< 100 m/s ² , Sine 50-2.000 Hz	< 100 m/s ² , Sine 50-2.000 Hz
Shock, DIN EN 60068-2-27	< 1.000 m/s ² , half-sine 11ms	< 1.000 m/s ² , half-sine 11ms	< 1.000 m/s ² , half-sine 11ms
Working temperature	0°C ... +60°C expanded temperature range opt.	0°C ... +60°C expanded temperature range opt.	0°C ... +60°C expanded temperature range opt.
Storage temperature	-30°C ... +85°C, dry	-30°C ... +85°C, dry	-30°C ... +85°C, dry
Protection class (DIN EN 6052: 1991)		IP 54	IP 54
More options and accessories	-	-	-













Absolute Rotary Encoder with Hollow Shaft in a 80mm Housing

	CEH 80 S/M	COH 80 S/M	QEH 80 S/M
Specifics and specifications	Variety on interfaces with a hollow shaft over 16 mm	High resolution and precision with a hollow shaft	Flat hollow shaft encoder for mounting directly on to the motor
Product picture			
Supply voltage	11 ... 27 VDC	11 ... 27 VDC	11 ... 27 VDC
Capacitance	Multi turn: ≤ 33 bit Single turn: ≤ 15 bit	Multi turn: ≤ 36 bit Single turn: ≤ 18 bit	Multi turn: ≤ 25 bit Single turn: ≤ 13 bit
Steps per revolution	≤ 32.768	≤ 262.144	≤ 8.192
Number of revolutions	Multi turn: ≤ 4.096 / 256.000 Single turn: 1	Multi turn: ≤ 4.096 / 256.000 Single turn: 1	Multi turn: ≤ 4.096 / 256.000 Single turn: 1
Mechanical permissible speed	≤ 3.000 min ⁻¹	≤ 3.000 min ⁻¹	≤ 3.000 min ⁻¹
Available shaft diameter	16 ... 27 mm	16 ... 27 mm	16 ... 25 mm
Life time bei Speed Operating temperature	≥ 2,8 * 10 ¹⁰ revolutions ≤ 3.000 min ⁻¹ ≤ 60°C	≥ 2,8 * 10 ¹⁰ revolutions ≤ 3.000 min ⁻¹ ≤ 60°C	≥ 3,9 * 10 ¹⁰ revolutions ≤ 3.000 min ⁻¹ ≤ 60°C
Permissible angular acceleration	≤ 10 ⁴ rad/s ²	≤ 10 ⁴ rad/s ²	≤ 10 ⁴ rad/s ²
Moment of inertia (typically)	67 * 10 ⁻⁶ kg m ²	67 * 10 ⁻⁶ kg m ²	57,2 * 10 ⁻⁶ kg m ²
Mass (typically)	0,7 kg	0,7 kg	1,3 kg
Interfaces	SSI   CANopen	SSI 	SSI 
Vibration, DIN EN 60068-2-6	< 100 m/s ² , Sine 50-2.000 Hz	< 100 m/s ² , Sine 50-2.000 Hz	< 100 m/s ² , Sine 50-2.000 Hz
Shock, DIN EN 60068-2-27	< 1.000 m/s ² , half-sine	< 1.000 m/s ² , half-sine	< 1.000 m/s ² , half-sine 11ms
Working temperature	0 °C ... +60 °C expanded temperature range opt.	0 °C ... +60 °C expanded temperature range opt.	0 °C ... +60 °C expanded temperature range opt.
Storage temperature	-30 °C ... +85 °C, dry	-30 °C ... +85 °C, dry	-30 °C ... +85 °C, dry
Protection class (DIN EN 6052: 1991)	IP 54	IP 54	IP 54
More options and accessories	Reducing ring Shaft with or without nut	Reducing ring Shaft with or without nut	-

Absolute Rotary Encoder with Hollow Shaft in 80 / 81 mm Housing

	QOH 80 S/M	QEH 81 S/M	QOH 81 S/M
Specifics and specifications	High resolution with terminal box for individual cable allocation	High resolution with terminal box for individual cable allocation	High resolution with terminal box for individual cable allocation
Product picture			
Supply voltage	11 ... 27 VDC	11 ... 27 VDC	11 ... 27 VDC
Capacitance	Multi turn: ≤ 36 bit Single turn: ≤ 18 bit	Multi turn: ≤ 25 bit Single turn: ≤ 13 bit	Multi turn: ≤ 36 bit Single turn: ≤ 18 bit
Steps per revolution	≤ 262.144	≤ 8.192	≤ 262.144
Number of revolutions	Multi turn: ≤ 4.096 / 256.000 Single turn: 1	Multi turn: ≤ 4.096 / 256.000 Single turn: 1	Multi turn: ≤ 4.096 / 256.000 Single turn: 1
Mechanical permissible speed	≤ 3.000 min ⁻¹	≤ 3.000 min ⁻¹	≤ 3.000 min ⁻¹
Available shaft diameter	16 ... 25 mm	up to max. 16 ... 25 mm	up to max. 16 ... 25 mm
Life time with Speed Operating temperature	≥ 3,9 * 10 ¹⁰ revolutions ≤ 3.000 min ⁻¹ ≤ 60°C	≥ 3,9 * 10 ¹⁰ revolutions ≤ 3.000 min ⁻¹ ≤ 60°C	≥ 3,9 * 10 ¹⁰ revolutions ≤ 3.000 min ⁻¹ ≤ 60°C
Permissible angular acceleration	≤ 10 ⁴ rad/s ²	≤ 10 ⁴ rad/s ²	≤ 10 ⁴ rad/s ²
Moment of inertia (typically)	67 * 10 ⁻⁶ kg m ²	57,2 * 10 ⁻⁶ kg m ²	57,2 * 10 ⁻⁶ kg m ²
Mass (typically)	1,3 kg	1,3 kg	1,3 kg
Interfaces	SSI	SSI ISI Incremental Commutation   	SSI
Vibration, DIN EN 60068-2-6	< 100 m/s ² , Sine 50-2.000 Hz	< 100 m/s ² , Sine 50-2.000 Hz	< 100 m/s ² , Sine 50-2.000 Hz
Shock, DIN EN 60068-2-27	< 1.000 m/s ² , half-sine	< 1.000 m/s ² , half-sine 11ms	< 1.000 m/s ² , half-sine 11ms
Working temperature	0°C ... +60°C expanded temperature range opt.	0°C ... +60°C expanded temperature range opt.	0°C ... +60°C expanded temperature range opt.
Storage temperature	-30°C ... +85°C, dry	-30°C ... +85°C, dry	-30°C ... +85°C, dry
Protection class (DIN EN 6052: 1991)	IP 54	IP 54	IP 54
More options and accessories		Shaft with or without nut	

Absolute Rotary Encoder with Hollow Shaft in a 110/160mm Housing

	CEH 110 S/M	COH 110 S/M	CEH 160 S/M
Specifics and specifications	Real absolut encoder with hollow shaft	High resolution and precision with hollow shaft	Biggest absolut rotary encoder with hollow shaft at TR-Electronic
Product picture			
Supply voltage	11 ... 27 VDC	11 ... 27 VDC	11 ... 27 VDC
Capacitance	Multi turn: ≤ 33 bit Single turn: ≤ 15 bit	Multi turn: ≤ 36 bit Single turn: ≤ 18 bit	Multi turn: ≤ 27 bit Single turn: ≤ 15 bit
Steps per revolution	≤ 32.768	≤ 262.144	≤ 32.768
Number of revolutions	Multi turn: ≤ 4.096 Single turn: 1	Multi turn: ≤ 4.096 Single turn: 1	Multi turn: ≤ 4.096 Single turn: 1
Mechanical permissible speed	≤ 3.000 min ⁻¹	≤ 3.000 min ⁻¹	≤ 3.000 min ⁻¹
Available shaft diameter	27 ... 50 mm	27 ... 50 mm	50 ... max. 80 mm
Life time Speed Operating temperature	≥ 3,9 * 10 ¹⁰ revolutions ≤ 2.000 min ⁻¹ ≤ 60°C	≥ 3,9 * 10 ¹⁰ revolutions ≤ 2.000 min ⁻¹ ≤ 60°C	≥ 3,9 * 10 ¹⁰ revolutions ≤ 1.500 min ⁻¹ ≤ 60°C
Permissible angular acceleration	≤ 10 ⁴ rad/s ²	≤ 10 ⁴ rad/s ²	-
Moment of inertia (typically)	2,5 * 10 ⁻⁶ kg m ²	2,5 * 10 ⁻⁶ kg m ²	-
Mass (typically)	1,75 kg	1,75 kg	4,4 kg
Interfaces	SSI   	SSI   	 + SSI + Incremental  
Vibration, DIN EN 60068-2-6	< 100 m/s ² , Sine 50-2.000 Hz	< 100 m/s ² , Sine 50-2.000 Hz	< 100 m/s ² , Sine 50-2.000 Hz
Shock, DIN EN 60068-2-27	< 1.000 m/s ² , half-sine 11ms	< 1.000 m/s ² , half-sine 11ms	< 1.000 m/s ² , half-sine 11ms
Working temperature	0°C ... +60°C expanded temperature range opt.	0°C ... +60°C expanded temperature range opt.	0°C ... +70°C
Storage temperature	-30°C ... +85°C, dry	-30°C ... +85°C, dry	-30°C ... +85°C, dry
Protection class (DIN EN 6052: 1991)	IP 54	IP 54	IP 54
More options and accessories	Reducing ring Shaft with or without nut	Reducing ring Shaft with or without nut	Reducing ring












General / Definition

Absolute Rotary Encoder

Incremental Rotary Encoder

Accessories

Absolute Rotary Encoder with Blind Shaft in a 58mm Housing

	CES 58 S/M	COS 58 S/M	CMS 58 S/M
Specifics and specifications	Compact industrial standard, optimized for connector technology	High resolution and fast signal processing in a compact design	Cost-efficient solution for less demands on resolution and time response
Product picture			
Supply voltage	11 ... 27 VDC	11 ... 27 VDC	11 ... 27 VDC
Capacitance	Multi turn: ≤ 25 / 28 bit Single turn: ≤ 13 bit	Multi turn: ≤ 36 bit Single turn: ≤ 18 bit	Multi turn: ≤ 23 bit Single turn: ≤ 11 bit
Schrittzahl / Revolution	≤ 8.192	≤ 262.144	≤ 2.048
Number of revolutions	Multi turn: ≤ 4.096 / 32.768 / 256.000 Single turn: 1	Multi turn: ≤ 4.096 / 256.000 Single turn: 1	Multi turn: ≤ 4.096 Single turn: 1
Mechanical permissible speed	≤ 12.000 min ⁻¹	≤ 12.000 min ⁻¹	≤ 12.000 min ⁻¹
Available shaft diameter	8 ... 12 mm	8 ... 12 mm	8 ... 12 mm
Life time - Speed - Operating temperature	≥ 3,9 * 10 ¹⁰ revolutions ≤ 6.000 min ⁻¹ ≤ 60°C	≥ 3,9 * 10 ¹⁰ revolutions ≤ 6.000 min ⁻¹ ≤ 60°C	≥ 3,9 * 10 ¹⁰ revolutions ≤ 6.000 min ⁻¹ ≤ 60°C
Permissible angular acceleration	≤ 10 ⁴ rad/s ²	≤ 10 ⁴ rad/s ²	≤ 10 ⁴ rad/s ²
Moment of inertia (typically)	2,5 * 10 ⁻⁶ kg m ²	2,5 * 10 ⁻⁶ kg m ²	1,3 * 10 ⁻⁶ kg m ²
Mass (typically)	0,3 ... 0,5 kg	0,3 ... 0,5 kg	0,3 kg
Interfaces (others on request)	SSI  Parallel (Single turn)   	SSI   	SSI 
Vibration, DIN EN 60068-2-6	< 100 m/s ² , Sine 50-2.000 Hz	< 100 m/s ² , Sine 50-2.000 Hz	< 100 m/s ² , Sine 50-2.000 Hz
Shock, DIN EN 60068-2-27	< 1.000 m/s ² , half-sine 11ms	< 1.000 m/s ² , half-sine 11ms	< 1.000 m/s ² , half-sine
Working temperature	0°C ... +60°C expanded temperature range opt.	0°C ... +60°C expanded temperature range opt.	0°C ... +60°C
Storage temperature	-30°C ... +85°C, dry	-30°C ... +85°C, dry	-30°C ... +85°C, dry
Protection class (DIN EN 6052: 1991)	IP 65	IP 65	IP 65
More options and accessories	Increased density	Increased density	Increased density













General / Definition

Absolute Rotary Encoder













Incremental Rotary Encoder

Accessories










Absolute Rotary Encoder with Blind Shaft in a 65/36 mm Housing

	CES 65 S/M	CMS 36 S/M
Specifics and specifications	The widest range of available interfaces	Rotary encoder solution for compact drives
Product picture		
Supply voltage	11 ... 27 VDC	11 ... 27 VDC
Capacitance	Multi turn: ≤ 25 / 28 bit Single turn: ≤ 13 bit	Multi turn: ≤ 28 bit Single turn: ≤ 12 bit
Steps per revolution	≤ 8.192	≤ 2.048 (4.096 optional)
Number of revolutions	Multi turn: ≤ 4.096 / 32.768 / 256.000 Single turn: 1	Multi turn: ≤ 65.536 Single turn: 1
Mechanical permissible speed	≤ 6.000 min ⁻¹	≤ 12.000 min ⁻¹
Available shaft diameter	10 ... 14 mm	8 mm
Life time Speed Operating temperature	≥ 3,9 * 10 ¹⁰ revolutions ≤ 6.000 min ⁻¹ ≤ 60°C	≥ 3,9 * 10 ¹⁰ revolutions ≤ 6.000 min ⁻¹ ≤ 60°C
Permissible angular acceleration	≤ 10 ⁴ rad/s ²	≤ 10 ⁴ rad/s ²
Moment of inertia (typically)	2,5 * 10 ⁻⁶ kg m ²	1,3 * 10 ⁻⁶ kg m ²
Mass (typically)	0,7 kg	0,15 kg
Interfaces	SSI ISI Parallel SIN/COS LWL Analog Cam       	SSI   
Vibration, DIN EN 60068-2-6	< 100 m/s ² , Sine 50-2.000 Hz	< 100 m/s ² , Sine 50-2.000 Hz
Shock, DIN EN 60068-2-27	< 1.000 m/s ² , half-sine	< 1.000 m/s ² , half-sine
Working temperature	0 °C ... +60 °C expanded temperature range opt.	0 °C ... +60 °C
Storage temperature	-30 °C ... +80 °C, dry	-30 °C ... +85 °C, dry
Protection class (DIN EN 6052: 1991)	IP 65	IP 65
More options and accessories	-	-

Absolute Rotary Encoder with Coupling in a 58/65 mm Housing

	CEK 58 S/M	COK 58 S/M	CEK 65 S/M
Specifics and specifications	Integrated coupling combines the precision of a solid shaft with the advantages of a space saving hollow shaft	Coupling for high resolution applications	More construction space, more interfaces and more possibilities
Product picture			
Supply voltage	11 ... 27 VDC	11 ... 27 VDC	11 ... 27 VDC
Capacitance	Multi turn: ≤ 25 / 28 bit Single turn: ≤ 13 bit	Multi turn: ≤ 36 bit Single turn: ≤ 18 bit	Multi turn: ≤ 24 bit Single turn: ≤ 12 bit
Schrittzahl / Revolution	≤ 8.192	≤ 262.144	≤ 4.096
Number of revolutions	Multi turn: ≤ 4.096 / 32.768 / 256.000 Single turn: 1	Multi turn: ≤ 4.096 / 256.000 Single turn: 1	Multi turn: ≤ 4.096 Single turn: 1
Mechanical permissible speed	≤ 12.000 min ⁻¹	≤ 12.000 min ⁻¹	≤ 6.000 min ⁻¹
Available shaft diameter	-	-	-
Life time - Speed - Operating temperature	≥ 3,9 * 10 ¹⁰ revolutions ≤ 6.000 min ⁻¹ ≤ 60°C	≥ 3,9 * 10 ¹⁰ revolutions ≤ 6.000 min ⁻¹ ≤ 60°C	≥ 3,9 * 10 ¹⁰ revolutions ≤ 3.000 min ⁻¹ ≤ 60°C
Permissible angular acceleration	≤ 10 ⁴ rad/s ²	≤ 10 ⁴ rad/s ²	≤ 10 ⁴ rad/s ²
Moment of inertia (typically)	2,5 * 10 ⁻⁶ kg m ²	2,5 * 10 ⁻⁶ kg m ²	2,5 * 10 ⁻⁶ kg m ²
Mass (typically)	0,3 ... 0,5 kg	0,3 ... 0,5 kg	0,7 kg
Interfaces (others on request)	SSI Parallel   CANopen	SSI   CANopen	SSI ISI Parallel SIN/COS LWL Analog Cam    CANopen  
Vibration, DIN EN 60068-2-6	< 100 m/s ² , Sine 50-2.000 Hz	< 100 m/s ² , Sine 50-2.000 Hz	< 100 m/s ² , Sine 50-2.000 Hz
Shock, DIN EN 60068-2-27	< 1.000 m/s ² , half-sine	< 1.000 m/s ² , half-sine	< 1.000 m/s ² , half-sine
Working temperature	0°C ... +60°C expanded temperature range opt.	0°C ... +60°C expanded temperature range opt.	0°C ... +60°C expanded temperature range opt.
Storage temperature	-30°C ... +85°C, dry	-30°C ... +85°C, dry	-30°C ... +85°C, dry
Protection class (DIN EN 6052: 1991)	IP 65	IP 65	IP 65
More options and accessories	Construction aid for the shaft end of the customer	Construction aid for the shaft end of the customer	Construction aid for the shaft end of the customer

Double Rotary Encoder with Solid Shaft in a 58/70/115 mm Housing

	CDV 58 S/M		CDV 70 S/M		CDV 115 S/M	
Specifics and specifications	Two independent encoder systems having the same shaft in a compact housing		Double encoder with combination of fieldbuses		The "Heavy-Duty" version of the CDV 58 S/M	
Product picture						
Supply voltage	11 ... 27 VDC		11 ... 27 VDC		11 ... 27 VDC	
Capacitance	Multi turn: ≤ 36 bit Single turn: ≤ 18 bit		Multi turn: ≤ 36 bit Single turn: ≤ 18 bit		Multi turn: ≤ 36 bit Single turn: ≤ 18 bit	
Steps per revolution	≤ 262.144		≤ 262.144		≤ 262.144	
Number of revolutions	Multi turn: ≤ 4.096 / 256.000 Single turn: 1		Multi turn: ≤ 4.096 / 256.000 Single turn: 1		Multi turn: ≤ 4.096 / 256.000 Single turn: 1	
Mechanical permissible speed	≤ 6.000 min ⁻¹		≤ 6.000 min ⁻¹		≤ 3.000 min ⁻¹	
Available shaft diameter	6 ... 12 mm		6 ... 12 mm		8 ... 14 mm	
Life time Speed Operating temperature	≥ 3,9 * 10 ¹⁰ revolutions ≤ 3.000 min ⁻¹ ≤ 60°C		≥ 3,9 * 10 ¹⁰ revolutions ≤ 3.000 min ⁻¹ ≤ 60°C		≥ 3,9 * 10 ¹⁰ revolutions ≤ 1.500 min ⁻¹ ≤ 60°C	
Permissible angular acceleration	≤ 10 ⁴ rad/s ²		≤ 10 ⁴ rad/s ²		≤ 10 ⁴ rad/s ²	
Moment of inertia (typically)	5 * 10 ⁻⁶ kg m ²		5 * 10 ⁻⁶ kg m ²		5 * 10 ⁻⁶ kg m ²	
Mass (typically)	0,6 ... 1 kg		2,3 kg		6 kg	
Interfaces (others on request)	1. encoder:	2. encoder:	1. encoder:	2. encoder:	1. encoder:	2. encoder:
	SSI or 	SSI or Incremental	 or 	 or 	SSI or 	SSI or Incremental
Vibration, DIN EN 60068-2-6	< 100 m/s ² , Sine 50-2.000 Hz		< 100 m/s ² , Sine 50-2.000 Hz		< 100 m/s ² , Sine 50-2.000 Hz	
Shock, DIN EN 60068-2-27	< 1.000 m/s ² , half-sine		< 1.000 m/s ² , half-sine		< 1.000 m/s ² , half-sine	
Working temperature	0 °C ... +60 °C expanded temperature range opt.		0 °C ... +60 °C expanded temperature range opt.		0 °C ... +60 °C expanded temperature range opt.	
Storage temperature	-30 °C ... +80 °C, dry		-30 °C ... +80 °C, dry		-30 °C ... +80 °C, dry	
Protection class (DIN EN 6052: 1991)	IP 65		IP 65		IP 65	
More options and accessories	-		-		Heating Device for cooling	

Doppelrotary Encoder with Hollow Shaft and Blind Shaft in a 75/80/85mm Housing

	CDH 75 S/M	QDH 80 S/M	CDS 58 S/M
Specifics and specifications	"Whisper encoder" for theater applications, absolut multi turn with SIL3 certificate	"Whisper encoder" for theater applications, common disc, separate scanning	Double encoder with blind shaft
Product picture			
Supply voltage	11 ... 27 VDC	11 ... 27 VDC	11 ... 27 VDC
Capacitance	Multi turn: ≤ 25 bit Single turn: ≤ 13 bit	Multi turn: ≤ 25 bit Single turn: ≤ 13 bit	Multi turn: ≤ 25 bit Single turn: ≤ 13 bit
Steps per revolution	≤ 8.192	≤ 8.192	≤ 8.192
Number of revolutions	Multi turn: ≤ 4.096 Single turn: 1	Multi turn: ≤ 4.096 / 256.000 Single turn: 1	Multi turn: ≤ 4.096 / 256.000 Single turn: 1
Mechanical permissible speed	≤ 3.000 min ⁻¹	≤ 3.000 min ⁻¹	≤ 6.000 min ⁻¹
Available shaft diameter	20 mm Nut	16 ... 25 mm	10 ... 12 mm
Life time Speed Operating temperature	≥ 2,8 * 10 ¹⁰ revolutions ≤ 3.000 min ⁻¹ ≤ 60°C	≥ 3,9 * 10 ¹⁰ revolutions ≤ 3.000 min ⁻¹ ≤ 60°C	≥ 3,9 * 10 ¹⁰ revolutions ≤ 3.000 min ⁻¹ ≤ 60°C
Permissible angular acceleration	≤ 10 ⁴ rad/s ²	≤ 10 ⁴ rad/s ²	≤ 10 ⁴ rad/s ²
Moment of inertia (typically)	2,5 * 10 ⁻⁶ kg m ²	57,2 * 10 ⁻⁶ kg m ²	typisch 5 * 10 ⁻⁶ kg m ²
Mass (typically)	0,9 kg	1,3 kg	0,6 ... 1 kg
Interfaces (others on request)	2 x SSI or PROFIsafe	SSI or  multi turn Two scanings: Incremental or SSI single turn	1. encoder: 2. encoder: SSI, or  
Vibration, DIN EN 60068-2-6	< 100 m/s ² , Sine 50-2.000 Hz	< 100 m/s ² , Sine 50-2.000 Hz	< 100 m/s ² , Sine 50-2.000 Hz
Shock, DIN EN 60068-2-27	< 1.000 m/s ² , half-sine	< 1.000 m/s ² , half-sine	< 1.000 m/s ² , half-sine
Working temperature	0°C ... +60°C expanded temperature range opt.	0°C ... +60°C expanded temperature range opt.	0°C ... +60°C expanded temperature range opt.
Storage temperature	-30°C ... +85°C, dry	-30°C ... +85°C, dry	-30°C ... +80°C, dry
Protection class (DIN EN 6052: 1991)	IP 54	IP 54	IP 65
More options and accessories	Additional incremental interfaces-SIN/COS or rectangle (without SIL)	-	-

General / Definition

Absolute Rotary Encoder

Incremental Rotary Encoder

Accessories

String Pot in a 22/58/65mm Housing

	CMW 22 M		CMW 58 M			CEW 65 M		
Specifics and specifications	Miniature string pot with wear-free multi turn rotary encoder		The industrial standard for short distances			"Durable runner" with a long measuring length		
Product picture								
Supply voltage	8 ... 30 VDC		11 ... 27 VDC			11 ... 27 VDC		
Measuring range (max.)	0.75 m		5 m			50 m		
Steps per revolution	4.096		8.192			8.192		
Way per revolution	50 mm	75 mm	163,84 mm	259,02 mm	315,57 mm	200,00 mm	325,73 mm	490,196 mm
Adjustment speed (max.)	-		4 m/s			2 m/s	4 m/s	4 m/s
Available measurement lengths	0,5 m	0,75 m	2 m	3 m	5 m	2 / 3 m	5 / 10 / 15 / 20 / 25 / 30 m	50 m
Housing	Plastics		Aluminum, black anodizes			Aluminum, natural anodized		
Mass in kg (typically)	0,07		1,8	2,2	3,5	1,8 ... 2,4	3,1 ... 10	27 ... 28
Interfaces (others on request)	ASI (U _b 8 ... 30 VDC) SSI (U _b 8 ... 30 VDC) Analog (U _b 0 ... 10 VDC)		SSI  			SSI   ISI  Parallel   SIN/COS LWL   Analog Cam 		
String outlet	-		with gaiter and wiper			with gaiter and wiper		
String material	Stainless steel with PA cover		Stainless steel with PA cover			Stainless steel		
String end	Becket, brass		Becket, brass			Becket, plastic cover with ball joint		
String diameter	0,36 mm		0,8 mm	0,8 mm	1,0 mm	1,35 mm	0,81 mm	0,81 mm
Mounting	Mounting nuts		Sliding block			Every 2 ... 6 thread bore holes each side		
More options and accessories	-		Pulley			Pulley, cold resistant construction		

General / Definition

Absolute Rotary Encoder

Incremental Rotary Encoder

Accessories

Incremental rotary encoder with solid shaft in a 58mm housing

	IE 58	IEV / IOV 58	IE 92 V
Specifics and specifications	Set impulse number Optional SIN/COS ($1 V_{SS} / 11 \mu A$)	Resolution and number of zero impulses programmable	Set impulse number
Product picture			
Supply voltage	11 ... 27 VDC (optional 5 VDC)	11 ... 27 VDC (optional 5 VDC)	10 ... 30 VDC (optional 5 VDC)
Stroke	1 up to 10.000	1 up to 36.000	9.000, 10.000, 18.000
Output	Push-Pull (line driver) Incremental signale Zero impulse Output frequency	K1, K2 and inverse K0, 1 / revolution, inverse 150 kHz (300 kHz)	K1, K2 and inverse K0, 1 / revolution, inverse $\leq 1 \text{ MHz}$ (300 kHz)
Mechanical permissible speed	$\leq 6.000 / 12.000 \text{ min}^{-1}$	12.000 min^{-1}	4.000 min^{-1}
Available shaft diameter	10 ... 14 mm	10 mm	10 mm
Moment of inertia (typically)	$2,5 \times 10^{-6} \text{ kg m}^2$	$2,5 \times 10^{-6} \text{ kg m}^2$	-
Mass (typically)	0,3 kg	0,3 ... 0,5 kg	-
Vibration, DIN EN 60068-2-6	$< 100 \text{ m/s}^2$ (10 g)	$< 100 \text{ m/s}^2$, Sine 50-2.000 Hz	$< 10 \text{ g}$, Sine 10-2.000 Hz
Shock, DIN EN 60068-2-27	$< 1000 \text{ m/s}^2$ (100 g)	$< 1.000 \text{ m/s}^2$, half-sine 11 ms	$< 1000 \text{ m/s}^2$ (100 g)
Working temperature	$0^{\circ}\text{C} \dots +70^{\circ}\text{C}$ optional $-20^{\circ}\text{C} \dots +80^{\circ}\text{C}$	$0^{\circ}\text{C} \dots +60^{\circ}\text{C}$ optional $-20^{\circ}\text{C} \dots +70^{\circ}\text{C}$	$0^{\circ}\text{C} \dots +80^{\circ}\text{C}$
Storage temperature	$-30^{\circ}\text{C} \dots +80^{\circ}\text{C}$, dry	$-30^{\circ}\text{C} \dots +80^{\circ}\text{C}$, dry	-
Protection class (DIN EN 6052: 1991)	IP 65	IP 65	IP 64

Notes

General / Definition




Absolute Rotary Encoder

Incremental Rotary Encoder

Accessories

Incremental Rotary encoder mit Hollow shaft im 58/20mm housing

General / Definition
 Absolute Rotary Encoder
 Incremental Rotary Encoder
 Accessories

	IEH / IOH 58	IH 58 A / U	IH 20
Specifics and specifications	Resolution and number zero impulse are programmable	Set impulse number	Set impulse number
Product picture			
Supply voltage	11 ... 27 VDC (optional 5 VDC)	11 ... 27 VDC (optional 5 VDC)	11 ... 27 V DC
Stroke	1 up to 36.000	1 up to 10.000	1 up to 1024
Output Incrementalsignale Zero impulse Output frequency	Push-Pull (line driver) K1, K2 and inverse K0, 1 / revolution, inverse ≤ 150 kHz (300 kHz)	Push-Pull (Line-driver) K1, K2 and inverse K0, 1 / revolution, inverse ≤ 160 kHz (300 kHz)	K1, K2 and inverse K0, 1 / revolution, inverse ≤ 30 kHz (100kHz)
Mechanical permissible speed	≤ 6.000 min ⁻¹	≤ 10.000 min ⁻¹	≤ 6.000 min ⁻¹
Available shaft diameter	8 ... 12 mm	4 ... 12 mm	4 ... 12 mm
Moment of inertia (typically)	2,5 * 10 ⁻⁶ kg m ²	1,5 * 10 ⁻⁶ kg m ²	2,5 * 10 ⁻⁶ kg m ²
Mass (typically)	0,3 ... 0,5 kg	0,3 kg	0,5 kg
Vibration, DIN EN 60068-2-6	< 100 m/s ² , Sine 50-2.000 Hz	< 100 m/s ² (10 g)	< 100 m/s ² (10 g)
Shock, DIN EN 60068-2-27	< 1.000 m/s ² , half-sine 11 ms	< 1.000 m/s ² (100 g)	< 1.000 m/s ² (100 g)
Working temperature	0 °C ... +60 °C optional -30 °C ... +80 °C	-20 °C ... +85 °C	0 °C ... +60 °C optional -20 °C ... +70 °C
Storage temperature	-30 °C ... +80 °C, dry	-30 °C ... +80 °C, dry	-30 °C ... +80 °C, dry
Protection class (DIN EN 6052: 1991)	IP 54	IP 54	IP 54

Notes

Incremental Rotary Encoder with Hollow Shaft in a 120mm Housing

	IH 120	IH 120V
Specifics and specifications	Programmable	Programmable
Product picture		
Supply voltage	11 ... 27 VDC	10 ... 30 VDC (optional 5 VDC)
Stroke	1 ... 10.000	9.000, 10.000, 18.000
Output Incremental signal Zero impulse Output frequency	K1, K2 and inverse K0, 1 / revolution, inverse ≤ 160 kHz (300 kHz)	K1, K2 and inverse K0, 1 / revolution, inverse ≤ 160 kHz (300 kHz)
Mechanical permissible speed	≤ 4.000 min ⁻¹	≤ 4.000 min ⁻¹
Available shaft diameter	27 ... 55 mm	27 ... 55 mm
Moment of inertia (typically)	≤ 400 * 10 ⁻⁶ kg m ²	-
Mass (typically)	ca. 1,2 kg	-
Vibration, DIN EN 60068-2-6	< 100 m/s ² (10 g)	< 10 g, Sine 10-2.000 Hz
Shock, DIN EN 60068-2-27	< 200 m/s ² (100 g)	< 1000 m/s ² (100 g)
Working temperature	-20 °C ... +70 °C	0 °C ... +80 °C
Storage temperature	-30 °C ... +80 °C, dry	-
Protection class (DIN EN 6052: 1991)	IP 52	IP 64

Notes

General / Definition

Absolute Rotary Encoder

Incremental Rotary Encoder

Accessories


Incremental Rotary Encoder with Blind Shaft in a 76mm Housing

General / Definition

Absolute Rotary Encoder

Incremental Rotary Encoder

Accessories

IH 76 - 500	
Specifics and specifications	Set impulse number
Product picture	
Supply voltage	11- 27 VDC optional 5 VDC
Stroke	1 ... 10.000
Output Incremental signal Zero impulse Output frequency	K1, K2 and inverse K0, 1 / revolution, inverse ≤ 160 kHz (300 kHz)
Mechanical permissible speed	≤ 6.000 min ⁻¹
Available shaft diameter	16 ... 28 mm
Moment of inertia (typically)	≤ 60 * 10 ⁻⁶ kg m ²
Mass (typically)	ca. 0,4 kg
Vibration, DIN EN 60068-2-6	< 100 m/s ² (10 g)
Shock, DIN EN 60068-2-27	< 200 m/s ² (100 g)
Working temperature	0 °C ... +80 °C
Storage temperature	-30 °C ... +80 °C, dry
Protection class (DIN EN 6052: 1991)	IP 54

Notes

Electrical and Mechanical Accessories

Programming adapter

Connects the device to the PC. Changes signals from USB to encoder programming interface and is electrically isolated. We suggest the use in conjunction with one of our switch cabinet modules. USB to encoder conversion on request.



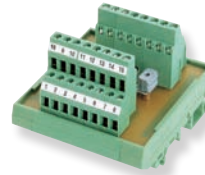
SSI-Parallel converter PU10

Converts absolute position and CAM signals from SSI interface to parallel output bits with max. 32 bit.



Switch cabinet module

The perfect aid for transparent rotary encoder cabling. Correct grounding of signal wires and easy connection to our programming adapter.



Pulse divider for rotary encoder

For rotary encoder signal processing (and incremental tracks of our absolute encoders) we offer a wide range of pulse dividers and signal distributors.



Coupling

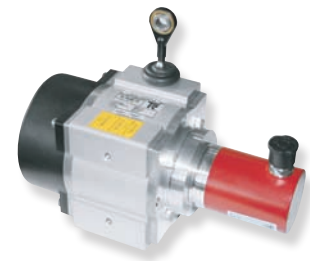
CPS-couplings protect the encoder shaft from other than rotation, vibrations and shaft movement.



Additional options

Besides the already shown possibilities, our encoders have to adjust to other requirements you have, for example:

- _ protection housing
- _ stainless steel housing (also with fieldbuses)
- _ string length at the string outlet
- _ variations from standard connectors (contact, binder, M 12 with a fieldbus hood)
- _ string pot
- _ oil-proof



Universal display TA-Mini

Is displaying actual values of the SSI measuring system (TR-Electronic and other producers).



Existing SSI connections between measuring system and the controller can be monitored and the position can be shown without influencing the connection.

- + comfortable display function
- + scale
- + zero shift
- + decimal, hexadecimal, binary
- + leading zero, prefix...

Is displaying actual values and other parameters of rotary encoder (rotary encoder of TR-Electronic with arbitrary process and programming interfaces). The process interface remains free.

_ Programming module

The display itself can be programmed via USB or PC (TRWinProg).

Over the display the measuring system can be programmed (those that are connected to the programming interface). The TA-Mini takes over the function of the PC adapter.

_ Signal converter

Parameters read in over the programming interface can be displayed as SSI value.

Therefore, you easily can retrofit, for example, a LLB 60 Analog with a SSI interface or via programming interface readout speed, ... that can be send via SSI.

_ Linked displays

Values shown can be transmitted to other TA-Minis (display at a machine, master display). The scale can be taken over or independently adjusted.

_ Displaying differences

For each display can be chosen, when having two linked displays with their own SSI measuring system, if one would like to show its own position or the one of the other measuring system or the difference of it.

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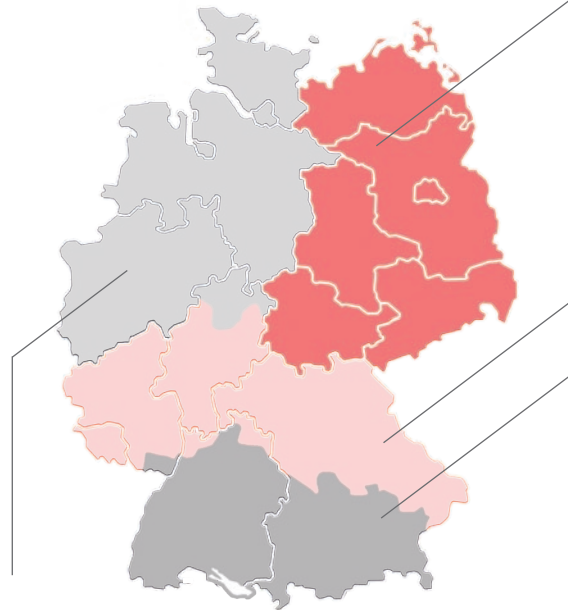
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