

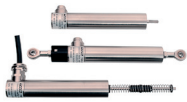
Product overview



1962

1962
Foundation of
the company

1965
Inductive linear
transducers



1970
First opto-
electronic
rotary encoders



1987
Serial interface



1990
Programmable absolute
optical rotary encoders



1992
Bus interface



1997
Bus interface



1995
Bus interface



2001
Parameterisable
inductive linear
transducers IWE/IWP



Our company

TWK-ELEKTRONIK GmbH was founded in 1962 by Theo W. Kessler in Düsseldorf and therefore offers over 50 years of experience. Since this time, the company has stood for the continuous further development and manufacturing of sensor systems for registering travel, angles, inclination and vibrations.

The complex TWK-ELEKTRONIK sensors are used mainly in mechanical and plant engineering but also in device technology.

High technical standards in combination with competent advice and support ensure that the company's customers are satisfied. Its market position, which has been established over a number of years, is reflected in the annual growth of the company's success.



2003

Absolute electro-magnetic rotary encoders in dual-chamber design



2008

Bus interface



EtherCAT

2008

TüV-certificates



2005

Rotary encoders with safety interfaces



CANopen safety



2009

Bus interface



2009

Inclinometers



2010

Electronic switching cam encoders



2014

High-resolution rotary encoders



2014

Plastic rotary encoders



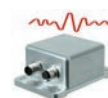
2015

Electronic switching cam encoders, TÜV-certified



2012

Vibration sensors



Content

Absolute rotary encoders

- Standards Pages 04-05
- Safety Page 06
- Special features Page 07

Absolute linear transducers

- Inductive Pages 08-09
- Magnetostrictive Page 10
- Potentiometric Page 11

Inclinometers & vibration sensors

- MEMS technology Pages 12-13

Accessories Page 14

Installation examples Page 15

Absolute rotary encoders

Standards



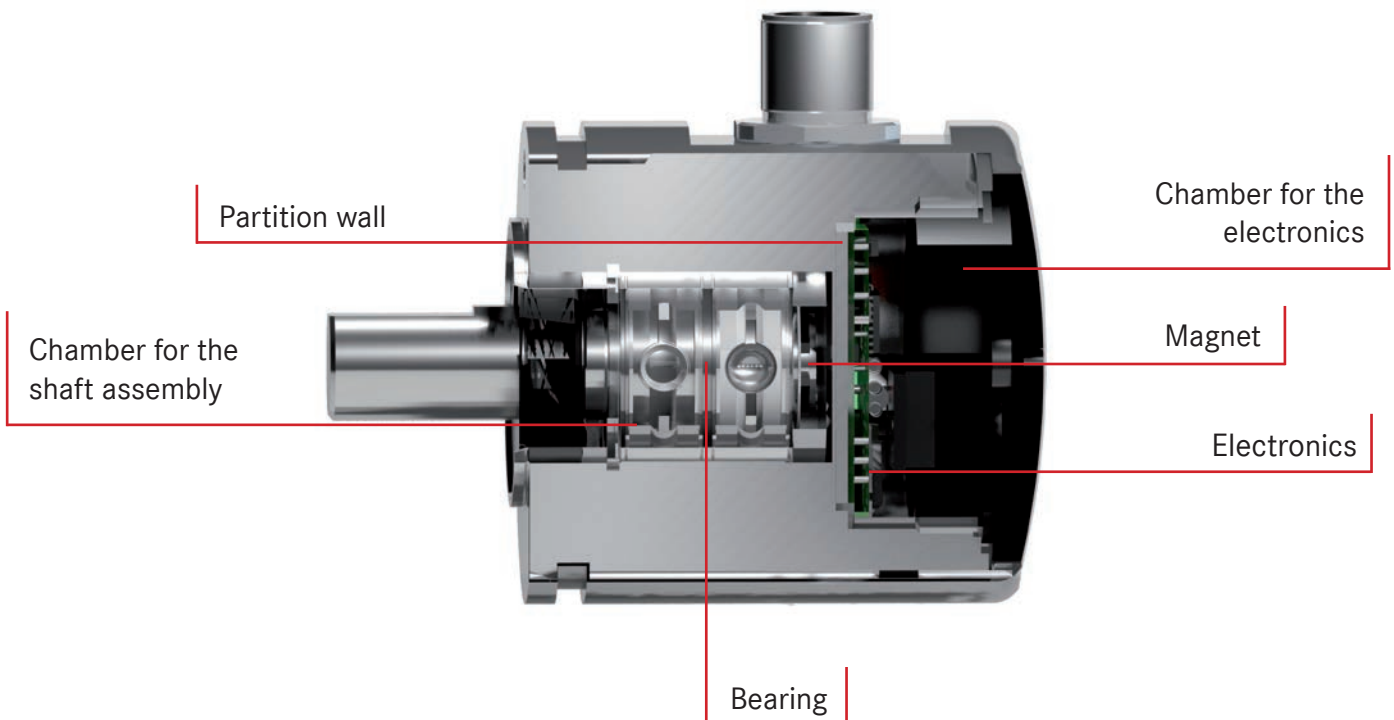
Robust T-series

The T series rotary encoders offer solid designs for mechanical and heavy mechanical engineering. The system, which operates using a Hall sensor, enables the so-called dual-chamber design and thus casting of the electronics. The encoder shaft's good bearings enables axial and radial loads of up to 500 N.



High-resolution H-series

These rotary encoders enable the absolute registration of up to 22 bits/360°. They are therefore suitable for precise positioning. The high resolutions are achieved through special magnetic sampling. These high-resolution rotary encoders thus combine the advantages of optical and magnetic systems in just one product: the robustness of the magnetic and the resolution capacity of the optical system.



Absolute rotary encoders

Standards



| Product | TRX58 | TBX58 | TRX50 | TBX50 | TBX36 |
|-------------------------------|-----------------------------------|-------|---------------------|-------|----------------|
| Electrical data | | | | | |
| Interface | 1 - 11 | | 1 2 9 10 11 | | 1 2 9 10 |
| Resolution | 13 bits/360° | | 13 bits/360° | | |
| Measuring range (revolutions) | 4096 | 1 | 4096 | 1 | |
| Mechanical data | | | | | |
| Housing diameter | ∅ 58 mm | | ∅ 50 mm | | ∅ 36 mm |
| Shaft diameter | ∅ 6, 10, 12 mm | | | | ∅ 6 mm |
| Clamped shaft | ∅ 6, 8, 10, 12 mm | | | | - |
| Environmental data | | | | | |
| Protection class | IP67/IP69K* | | | | |
| Operating temperature | -40 ... +85 °C (-60 ... +125 °C)* | | | | |

*Optional

Interfaces

- | | | | |
|-------------|------------------|------------|---------------|
| 1 Analog | 2 SSI | 3 PROFIBUS | 4 PROFINET |
| 5 PROFIsafe | 6 CANopen safety | 7 EtherCAT | 8 EtherNet/IP |
| 9 CANopen | 10 Inkremental | 11 BiSS | 12 DeviceNet |



Absolute rotary encoders

Safety



SIL2/PLd



REDUNDANZ



ATEX



Safe

T-series/NOCN

Rotary encoders with SIL2 or PLd certification according to IEC61508 or EN ISO13849 are available for safety-relevant applications.

The TÜV-certified rotary encoders are available in multiturn and singleturn designs. The PROFIsafe over PROFIBUS, PROFIsafe over PROFINET and CANopen Safety interfaces ensure secure communication. Redundant rotary encoders round off the range.

Various linear transducers and rotary encoders are available for use in zone 2 and 22 (gas and dust) EX-protection areas. Zones 1 and 21 are optionally available.



Absolute rotary encoders

Special features



Inexpensive

T-series/PMR potentiometer

Rotary encoder technology for large-scale production applications necessitates a compromise between inexpensive and complex, robust technology. The following rotary encoder models are plastic and printed circuit board versions or customer-specific designs:

TKA30 - TBX56 - TBA42 - TBI42 - PMR.

Interfaces **1|2|9** and **10** are available.



Versatile

Switching cam encoders

The electronic switching cam encoder NOC is a special version of our rotary encoders. In addition to the absolute position signal, it offers switching outputs that can be programmed by the user and which can be used to simulate up to four cams with relay outputs. Rotary encoder interfaces **1|2|6** and **9** are available in a housing with \varnothing 64 mm. A SIL2-certified variant is also available.



Small

R-series/VP potentiometer

In device and apparatus engineering, small rotary encoders are required due to cramped installation conditions. The R series encoders are available with 12-bit resolution and a housing diameter of 22 mm or 36 mm. The sensor system operates magnetically - i.e. without contact.

Interfaces **1|2|9** and **10** are available.



Bearing-free

T-series/R-series

Bearing-free rotary encoders have no shaft, enabling space-saving installation. The necessary external magnet is fastened on or in the application-side machine shaft. Alignment errors do not have to be compensated with an additional coupling. The majority of the T series and R series rotary encoders are available in this design.

Interfaces **1|2|9|10** and **11** are available.

Interfaces

1 Analog **2** SSI **6** CANopen safety **9** CANopen **10** Inkremental **11** BiSS

Absolute linear transducers

Inductive

Tried - and - tested

IW250/260

In addition to the registration of rotational angles, travel and length also have to be registered in industrial machines. The IW model series inductive linear transducers offer robust technology for these applications. Thanks to their cast design and stainless steel housing, they are extremely robust and resistant to diverse environmental influences. The inductive sensor principle operates without contact and is therefore wear-free. Inductive linear transducers have been used in systems and mechanical engineering for over 50 years.

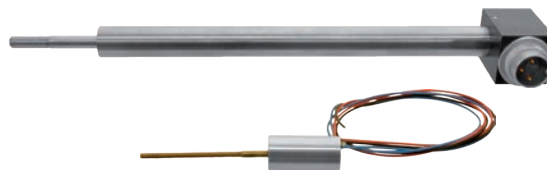


Slim

IW10/IW101

There are also measurement points which only offer little installation space in the case of heavy machines. The slim linear transducers (as of \varnothing 10 mm) are suitable for this.

The slim design is made possible through external electronics of types OE, OV or IE with interfaces 1|2 and 9.

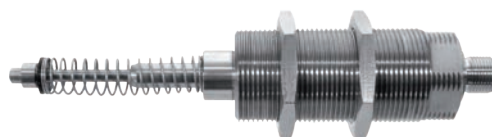


Special

IWM/IE

Some of these linear transducers have been used e.g. at great depths in oceans or in radioactive areas. Pressure-resistant variants for use in hydraulic systems have also already been installed.

Special versions designed specifically for your application are also available on request.



Absolute linear transducers

Inductive



| Product | IW250/260 | IWE/N | IW150 | IW120 | IW10/101 |
|---------------------------|----------------|----------------|----------------|-----------------|-----------------|
| Electrical data | | | | | |
| Interface | 1 | 2⑨ | 1 | 1 2 ⑨** | 1 2 ⑨** |
| Resolution | ∞ | 12 bits | ∞ | ∞ | ∞ |
| Measuring range | Up to 360 mm* | Up to 360 mm | Up to 15 mm | Up to 200 mm | Up to 15 mm |
| Calibrated | Yes | Yes | Yes | No | No |
| External electronics | - | - | - | Yes | Yes |
| Mechanical data | | | | | |
| Housing diameter | ∅ 25 mm | ∅ 25 mm | □ 15x15 mm | ∅ 12 mm | ∅ 10 mm |
| Environmental data | | | | | |
| Protection class | IP66 | IP66 | IP66 | IP66 | IP66 |
| Operating temperature | -10 ... +80 °C | -10 ... +80 °C | -10 ... +80 °C | -55 ... +100 °C | -55 ... +120 °C |

* The IW 25P and IW 26P family devices with teach-in function can be electronically adjusted by the user.

** Only in combination with external electronics.

Interfaces

1 Analog 2 **SSI** ⑨ CANopen



Absolute linear transducers

Magnetostrictive



Precise Magnosens

These linear transducers use the physical principle of magnetostriction. They are characterised by highly precise measurements with simultaneous robustness and a compact design.

Except for the MPL model, all of the listed models are available in both a profile version (MP) and a rod version (MS).



| Product | MPL | MSX | MPX |
|---------------------------|----------------------|-----------------|-----------------|
| Electrical data | | | |
| Interface | 1 | 1-4 7 9 | 1-4 7 9 |
| Resolution | ∞ | Up to 1 µm | Up to 1 µm |
| Measuring range | Up to 2500 mm | Up to 7600 mm | Up to 7600 mm |
| Mechanical data | | | |
| Housing diameter | Approx. □ 50 x 50 mm | Approx. ∅ 51 mm | Approx. ∅ 51 mm |
| Environmental data | | | |
| Protection class | IP65 | IP67/IP68 | IP65 |
| Operating temperature | -40...+75 °C | -40...+75 °C | -40...+75 °C |

Interfaces



Absolute linear transducers

Potentiometric



Classic Potentiometers

Conductive plastic potentiometers are manufactured using a synthetic resin mixture with carbon and a precious metal sliding contact. The simple and reliable technical principle achieves high measurement accuracies with low costs. A complete measuring system is obtained with an interface module based on constant voltage supply or constant current supply. The RH28, RH33, RP12 and RP13 models are the most common standard potentiometers.



| Product | RH28 | RH33 | RP12 | RP13 | RH.20 |
|---------------------------|-----------------|-----------------|-----------------|-----------------|----------------|
| Electrical data | | | | | |
| Linearity | 0.1 % | 0.05 % | 0.1 % | 0.05 % | 0.5 % |
| Resolution | ∞ | ∞ | ∞ | ∞ | ∞ |
| Measuring range | 100 - 1000 mm | 100 - 1000 mm | 25 - 300 mm | 25 - 300 mm | 10 mm |
| External electronics | Yes | Yes | Yes | Yes | Yes |
| Mechanical data | | | | | |
| Housing diameter | □ 35 x 25 mm | □ 33 mm | ∅ 12.7 mm | ∅ 12.7 mm | □ 20 x 24 mm |
| Environmental data | | | | | |
| Protection class | IP50/IP65 | IP60/IP65 | IP40/IP64 | IP65 | - |
| Operating temperature | -40 ... +105 °C | -30 ... +100 °C | -40 ... +105 °C | -30 ... +100 °C | -20 ... +85 °C |

Inclinometers & vibration sensors

MEMS technology



Inclined

NBN/NBA

Our inclinometers cover a wide range of possible applications. Typical applications include crane jibs, undercarriages, solar movers and folding bridges. The necessity of registering the position in comparison with the horizon is common to these applications. This means that the inclination is measured using the earth's gravitational field. The inclinometers' MEMS technology (Micro-Electro-Mechanical-System) makes use of these physical circumstances.

Disturbing vibration influences can be filtered out using adaptable vibration filters. Our devices are characterised by high measurement accuracy, robustness and the high quality of the hardware and software. SIL2-certified variants are available for safety-relevant applications.



| Product | NBN | NBA |
|---------------------------|-------------------|-------------------|
| Electrical data | | |
| Interface | ⑥⑨ | ① |
| Number of axes | 1 or 2 of x, y, z | 1 or 2 of x, y, z |
| Resolution | 0.01° | 0.01° |
| Measuring range | Up to ±90° | Up to ±90° |
| Can be reset to zero | Yes | Yes |
| Mechanical data | | |
| Housing | 100x65x42 mm | 100x65x42 mm |
| Environmental data | | |
| Protection class | IP67/IP69K | IP67/IP69K |
| Operating temperature | - 40 ... +85 °C | - 40 ... +85 °C |

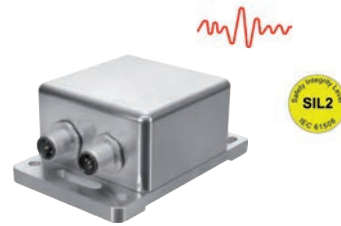


Interfaces

① Analog ⑥ CANopen safety ⑨ CANopen

Inclinometers & vibration sensors

MEMS technology



Shocked

NVA

The NVA model series is a range of vibration sensors based on our NBA/NBN inclinometers. MEMS sensors register the acceleration acting as a result of dynamic processes (vibrations/oscillations) and output it as an analogue signal and as CANopen data after digitisation by the integrated 32-bit controller. Additional relay switching outputs react on exceeding the acceleration limit values. The NVA can be parameterised in various ways: limit values for the relays plus their assignment to the individual filters, amplification for the analogue outputs, further processing of the acceleration value (direct or averaged).

Monitoring of wind power plant mast vibrations is a typical application example. SIL2 versions are also available.

| Product | NVA |
|---------------------------|-----------------------|
| Electrical data | |
| Interface | 1 6 9 |
| Number of axes | 2/3 |
| Resolution | 4096 digit/g |
| Measuring range | ± 2 g |
| Frequency range | 0.1 Hz - 100 Hz |
| Mechanical data | |
| Housing | 100(150)x65x42(30) mm |
| Environmental data | |
| Protection class | IP67/IP69K |
| Operating temperature | - 40 ... +85 °C |



Interfaces



Accessories

ZRS



Measurement gear for rotary encoder, play-compensating

Data sheet: ZRS11877

PMA, PMU



Hand programming devices for parameterisable linear transducers and rotary encoders

Data sheet: PMA11443, PMU12005

SWX



Cable converters for registering travel with rotary encoders

Data sheet: SWF10652, SWH10783

ZMS



Torque support for rotary encoders

Data sheet: ZMS12939

ZWA



Toothed belt linear transducer for registering travel with rotary encoders. With toothed belt, tensioning element and clamping head

Data sheet: ZWA10255, ZWA11788

MW



Mounting brackets for rotary encoders

Data sheet: MZ10111

LB



Bearing bracket for rotary encoders for withstanding high radial forces

Data sheet: LB10103

PAS



Electronic displays for analogue and digital interfaces

Data sheet: PAS11621, PAS11524

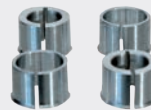
BKK, BKM, KK14



Shaft couplings for rotary encoders for compensating parallel and angular offset

Data sheet: BKK11840, BKM11995
KK12301

ZRH



Reducing bushes for clamped and hollow shafts

Data sheet: MZ10111

SGWC



Heavy protective housing for rotary encoders in extreme environments

Data sheet: SG13405

PR, PS



Positioning magnets for Magnosens linear transducers

Data sheet: MXX11469

OE40



Electronics for inductive linear transducers

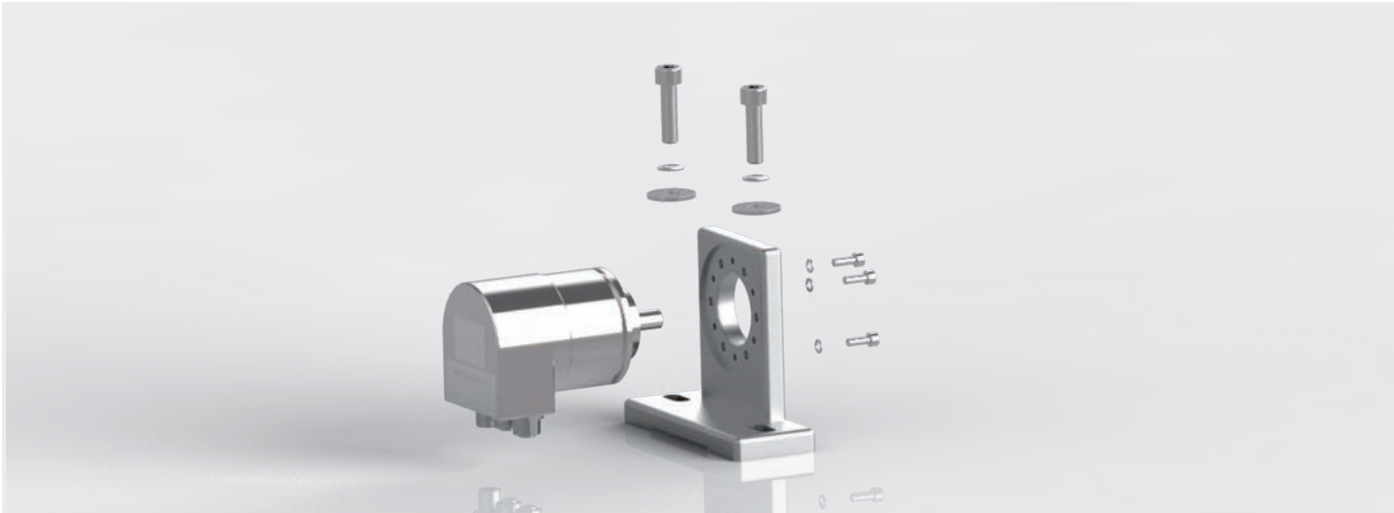
Data sheet: OE11012

KL

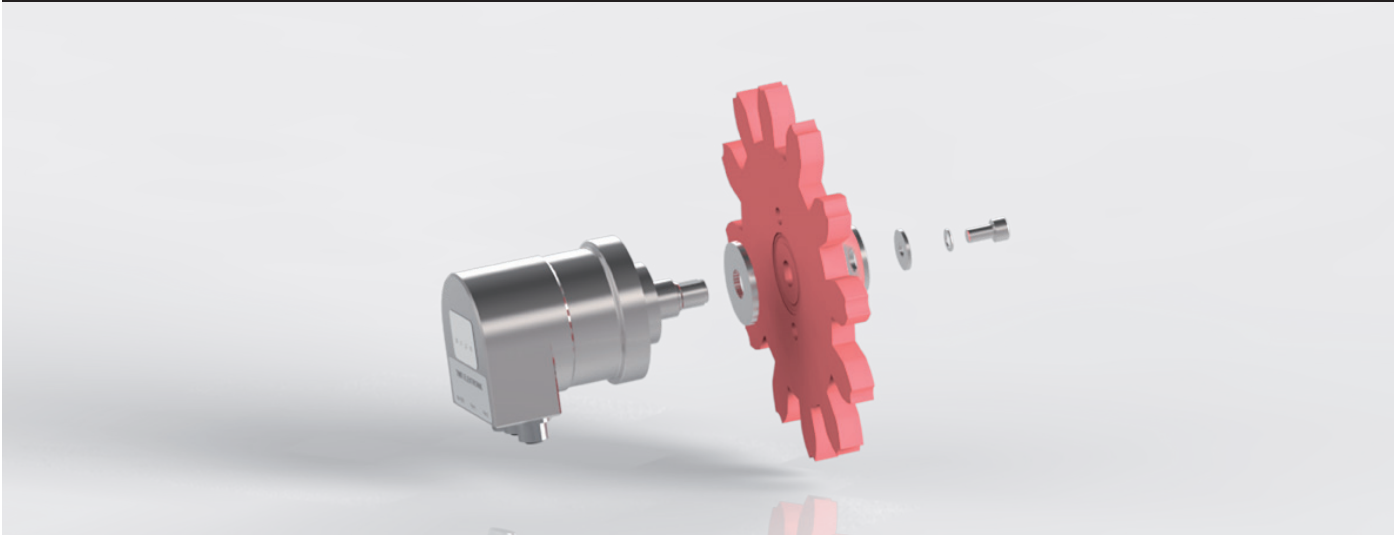


Fastening clamps for rotary encoders

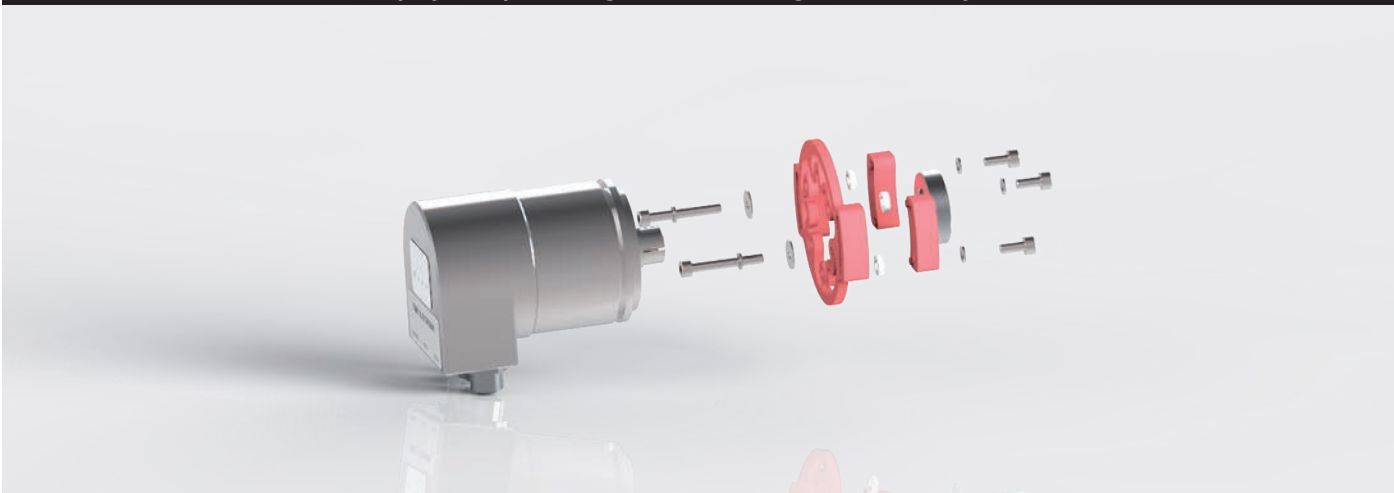
Data sheet: MZ10111



Installation of a rotary encoder on a MW-S-02 mounting bracket



Installation of a ZRS-12-12-A01 play-compensating measurement gear on a rotary encoder



Installation of a ZMS58 torque support on a rotary encoder with clamped shaft

TWK-ELEKTRONIK GmbH

Heinrichstraße 85
40239 Düsseldorf

P.O. Box 105063
D-40041 Düsseldorf

Telephone: 0211-96 117 0
Telefax: 0211-63 77 05

Further information and data
sheets with detailed
product descriptions incl.
application examples can be
found at:

www.twk.de
info@twk.de

