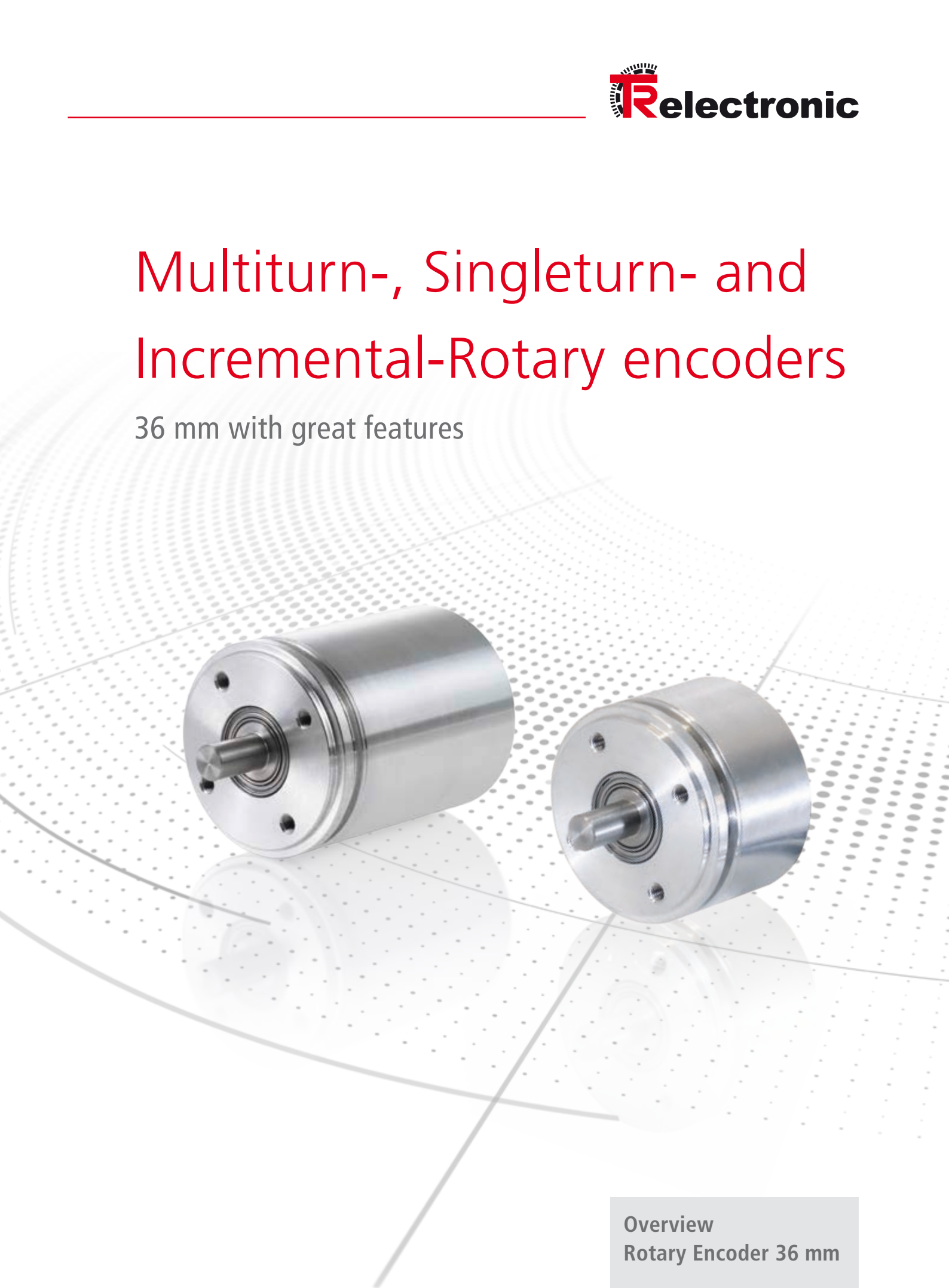
Multiturn-, Singleturn- and Incremental-Rotary encoders

36 mm with great features



Overview
Rotary Encoder 36 mm

Exemption note

We expressly point out that the details, measurement values and tolerances provided in the drawings are not binding. They are subject to technology and design modifications. Their only objective is to illustrate the product.
Please contact our sales and distribution team if you need a concrete offer with a binding drawing.

All information and data can be found at:
www.tr-electronic.com/s/S003322

Get information faster, just scan QR code.

Content

Small multi-turn, single-turn and incremental rotary encoders (36 mm) with great features

A new design size is taking the market by storm: with a diameter of 36 mm, advanced encoder technology is moving in where there is no room for typical industrial design sizes. And there is absolutely no need for the 36-mm series of encoders from TR to hide behind the bigger design sizes.
The series is made up of incremental, single and real multi-turn rotary encoders, some with single-scan, some with double-scan functionality, and implemented according to the redundancy concept from the gears to the scan, power supply and interface. You can rely on the tried and tested multi-turn gear technology, which has proven to be extremely durable; each revolution is accurately registered, even when not under voltage, and is not influenced by electromagnetic interference.
The rotary encoders communicate with the control unit via incremental signals (K1, K2, K0 and negating), SSI, double SSI, SSI + incremental, and soon communication via DRIVE-CLiQ or CAN will be supported.

Bearing free
No rotating mechanical connection. Contact-free scanning, no wear and tear. Encapsulated electronics up to IP 69K rating. Available as singleturn and incremental rotary encoder.

Integrated solid shaft
Tried and tested double bearing. Encoder is driven by shaft. Installed via flange with clamps or front-side screws.

Extremely tight
Up to IP 69K rating with integrated and separate bearing, as singleturn and incremental rotary encoder. Optionally available with housing made completely of stainless steel.

Real multi-turn
Integrated compact gears with up to 4,096 revolutions, optionally up to 16 million! No counters, no battery buffering, robust against electromagnetic interference. Reliably registers every movement even without power supply.

Double rotary encoder
Complete two-channel installation. As singleturn with 2 × SSI, 4,096 steps /revolution. As multi-turn with redundant compact gears and 2 × SSI, 4,096 steps/revolution and 4,096 revolutions.

Interfaces
Incremental rotary encoder: K1, K2, K0 and negating
Absolute single and multi: SSI, 2 × SSI, SSI + incremental, DRIVE-CLiQ and CANopen (also with customer-specific protocols) are being prepared

Features product series 36

Incremental

Supply voltage
11 … 27 V DC optional 5 V DC

Number of pulses / revolution
(factory setting)
8, 10, 16, 20, 25, 32, 40, 50, 64, 80, 100, 125, 128, 200, 250, 256, 400, 500, 512, 1,024, 2,048

Protection class
IP 65, optional IP 69 K

Working temperature
-25 °C … +70 °C

Housing
aluminium cover, optional stainless steel

Interface
K1 / K1, K2 / K1, K2, K0 / + inverse

Connection
Standard: Kabelverschraubung mit 1 m Kabel

Output frequency
< 150 kHz

Singleturn

Supply voltage
11 … 27 V

Number of steps
(factory setting)
32, 40, 64, 80, 100, 128, 160, 200, 256, 320, 400, 500, 512, 1,000, 1,024, 1,600, 2,000, 2,048, 4,096, 8,192

Protection class
IP 65, optional IP 69 K

Working temperature
-25 °C … +70 °C

Housing
aluminium cover, optional stainless steel

Interface
SSI, optional redundant 2 × SSI

Connection
standard: axial cable gland with 1 m cable

Option
V/R input, preset input; programmable with TR WinProg

Multiturn

Supply voltage
11 … 27 V

Number of steps
(factory setting)
32, 40, 64, 80, 100, 128, 160, 200, 256, 320, 400, 500, 512, 1,000, 1,024, 1,600, 2,000, 2,048, 4,096, 8,192

Protection class
IP 54, optional IP 65

Working temperature
-25 °C … +70 °C

Housing
aluminium cover

Interface
SSI, optional redundant 2 × SSI, DRIVE-CLiQ

Connection
standard: axial cable gland with 1 m cable, DRIVE-CLiQ M12 × 8 plug

Option
V/R input, preset input; programmable with TR WinProg (not in combination with DRIVE-CLiQ)

number of turns
< 4,096, optional bis zu 16,777,216

product overview

Incremental-Encoder IMV 36 / IMF 36 / IMS 36

_ Incremental interface
_ integrated solid shaft, blind hollow shaft, bearing free
_ fully encapsulated electronics
_ compact design Ø 36 mm
_ protection class IP 65, optional IP 69 K
_ magnetic sensor technology
_ customer-specific adjustments can be requested

INC

INC

Absolut-Encoder CMV 36 S / CMF 36 S / CMS 36 S

_ SSI interface
_ integrated solid shaft, blind hollow shaft, bearing free
_ fully encapsulated electronics
_ protection class IP 65, optional IP 69 K
_ compact design Ø 36 mm
_ additional interfaces are possible
_ customer-specific adjustments can be requested

SSI

SSI

Absolut-Encoder CDV 36 S / CDF 36 S / CDS 36 S

_ 2 × SSI interface
_ integrated solid shaft, blind hollow shaft, bearing free
_ redundand version
_ fully encapsulated electronics
_ protection class IP 65, optional IP 69 K
_ compact design Ø 36 mm
_ additional interfaces are possible
_ customer-specific adjustments can be requested

SSI
SSI

SSI
SSI

Absolut-Encoder CMV 36 M / CMS 36 M

_SSI interface
_integrated solid shaft, blind hollow shaft
_protection class IP 54, optional IP 65
_compact design Ø 36 mm
_magnetic sensor technology
_customer-specific adjustments can be requested

SSI

Absolut-Encoder CDV 36 M / CDS 36 M

_redundand version
_2 × SSI interface
_integrated solid shaft, blind hollow shaft
_protection class IP 54, optional IP 65
_additional interfaces are possible
_customer-specific adjustments can be requested

SSI
SSI

Absolut-Encoder CMV 36 M / CMS 36 M

_DRIVE-CLiQ / CANopen interface
_integrated solid shaft, blind hollow shaft
_protection class IP 54, optional IP 65
_compact design Ø 36 mm
_additional interfaces are possible
_customer-specific adjustments can be requested

DRIVE-CLiQ

CANopen

Product series 36 mm

Incremental

_bearing free: IM**F**
_integrated solid shaft: IM**V**
_blind hollow shaft: IM**S**
_extremely tight up to IP 69 K
_stainless steel variant
_K1, K2, K0 + negating

Absolute Singleturn

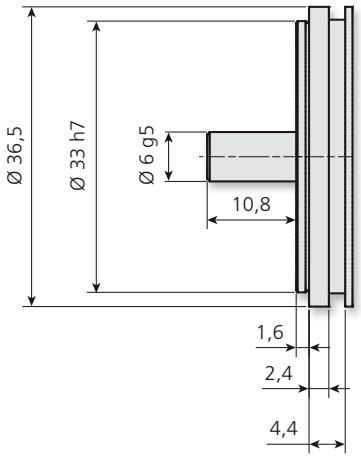
_bearing free: CM**F**
_integrated solid shaft: CM**V**
_blind hollow shaft: CM**S**
_extremely tight up to IP 69 K
redundant version: C**D**
_stainless steel variant
_SSI, 2 × SSI, CANopen

Absolute Multiturn

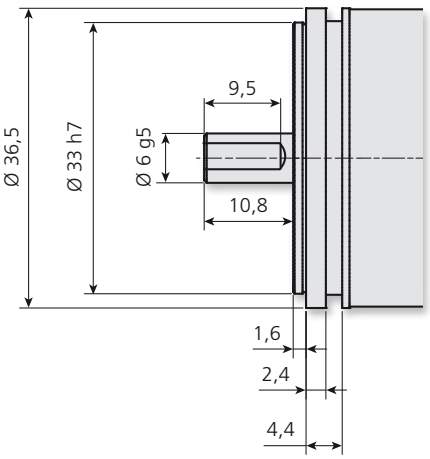
_integrated solid shaft: CM**V**
_blind hollow shaft: CM**S**
_SSI, CANopen, SSI + INC
up to 16 million turns
_DRIVE-CLiQ
_double encoder:
C**D**_ 2 × SSI

Shaft types / flange

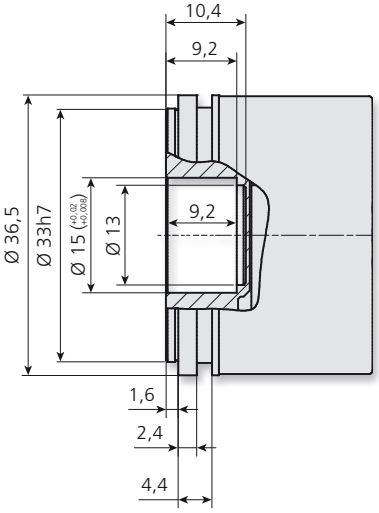
Solid shaft 6GL10,8



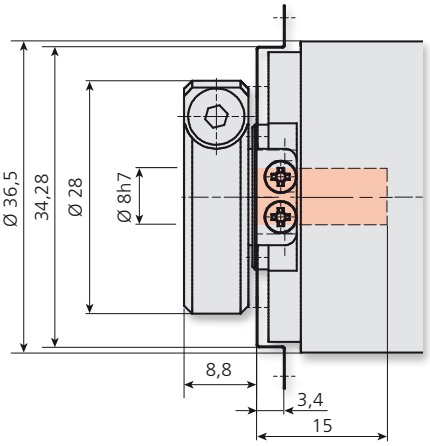
Solid shaft 6FL10,8



Bearing free

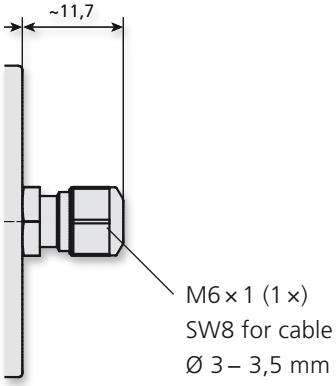


Blind hollow shaft



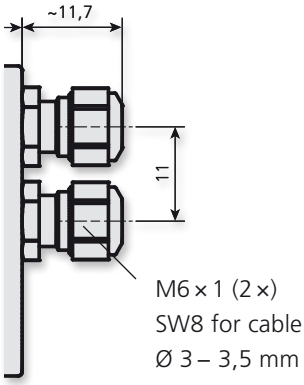
Connection technology / housing

Incremental, 1 × SSI



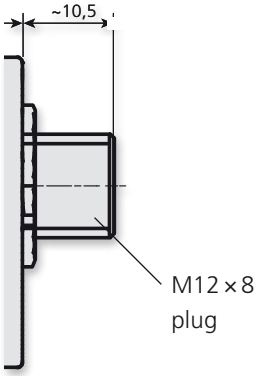
INC SSI

redundant 2 × SSI



SSI
SSI

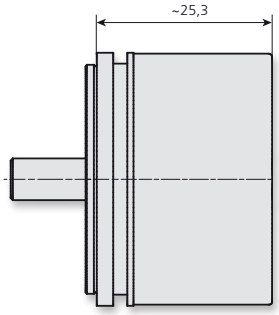
DRIVE-CLiQ



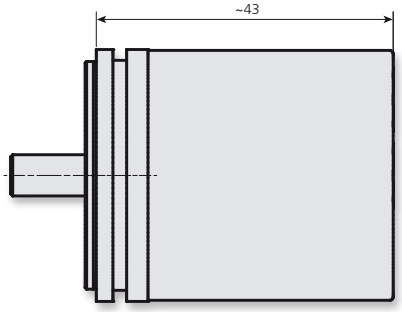
DRIVE-CLiQ

Housing

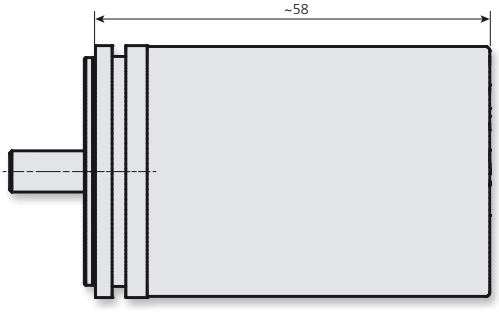
Incremental / Singleturn



Multiturn



Multiturn DRIVE-CliQ



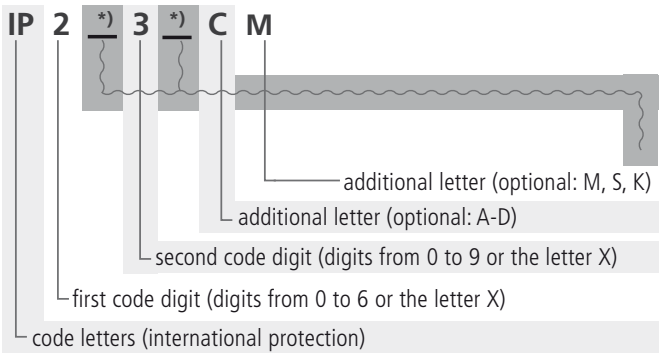
Absolute encoder with completely encapsulated electronics (IM_36, CM_36S, CD_36S)

_completely encapsulated single-turn encoder
_extremely robust and extremely tight (IP 69 k)
_for areas where the temperature fluctuates (thawing)
_compact design, only 36 mm diameter
_professional solution for your outdoor applications
_optional double scanning for redundancy (2 × SSI)
_optionally as incremental rotary encoder
_optional separate bearing (completely free from wear and tear)
_magnetic scanning

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

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

Structure of the IP code



*) In connection with the first code digits 5 and 6 and the second digits 4 , 6 and 9 is the additional letter K. This is positioned right behind the respective code digit.

IP protection classes, DIN 40050-9

1st code digit		2nd code digit / water protection	no protection	protection against vertically falling drip water (condensation)	protection against drip water (if housing is at an inclination of up to 15°)	protection against spray from all directions (also at inclinations of up to 60° from a vertical perspective)	protection against splash water from all directions	protection against high-pressure water from all directions	protection against strong high-pressure water from all directions	protection against the ingress of water when immersed	protection against the ingress of water submerged	protection against water from all directions (high-pressure/steam jet cleaner, 80 – 100 bar)
protection against contact	**protection against foreign bodies**		**IP x0**	**IP x1**	**IP x2**	**IP x3**	**IP x4**	**IP x5**	**IP x6**	**IP x7**	**IP x8**	**IP x9**
no protection against contact	no protection against solid foreign bodies	**IP 0x**	**IP 00**									
protection against contact with large area (back of hand)	protection again solid foreign bodies > Ø 50 mm	**IP 1x**	**IP 10**	**IP 11**	**IP 12**							
protection against finger contact	protection against solid foreign bodies > Ø 12.5 mm	**IP 2x**	**IP 20**	**IP 21**	**IP 22**	**IP 23**						
protection against contact with tools (wires and similar objects > 2.5 mm Ø)	protection against solid foreign bodies > Ø 2.5 mm	**IP 3x**	**IP 30**	**IP 31**	**IP 32**	**IP 33**	**IP 34**					
protection against contact with tools (wires and similar objects > 1 mm Ø)	protection against solid foreign bodies > Ø 1 mm	**IP 4x**	**IP 40**	**IP 41**	**IP 42**	**IP 43**	**IP 44**					
protection against contact with tools (wires and similar objects > 1 mm Ø)	protection against soiling accumulations of dust in the interior	**IP 5x**	**IP 50**				**IP 54**	**IP 55**				
protection against contact with tools (wires and similar objects > 1 mm Ø)	no ingress of dust	**IP 6x**	**IP 60**					**IP 65**	**IP 66**	**IP 67**	**IP 68**	**IP 69 k**

Code letter for 3rd place

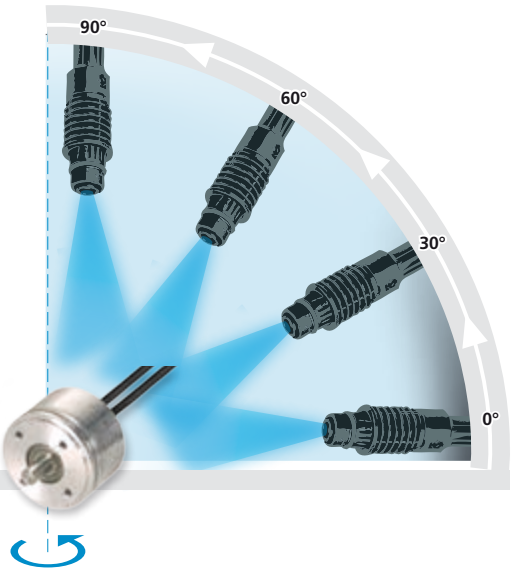
- **A** protection for back of hands of objects with a Ø > 50 mm
- **B** finger guard for fingers with a Ø > 12 mm and up to 80 mm in length
- **C** tool guard for tools with a Ø 2.5 mm and up to 100 mm in length
- **D** wire guard for wires with a Ø > 1 mm and up to 100 mm in length

Code letter for 4th place

- **H** high-voltage electrical equipment
- **M** tested when moving parts are in operation
- **S** tested when moving parts are at rest
- **K** tested to check for ingress of hot water at high pressure
- **W** tested for specific weather conditions

Test Method IP 69 K in Accordance with DIN 40050

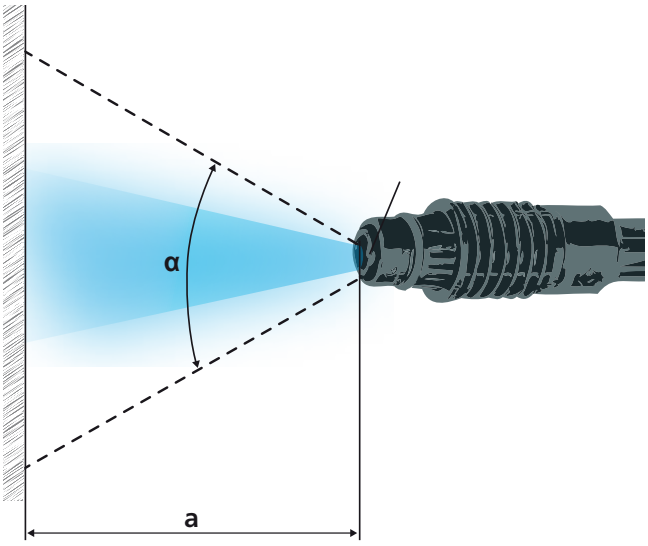
_ 30 second cycle
_ 14 – 16 liters per minute
_ test with flat jet nozzle
_ water pressure at 80 – 100 bar at 80 °C (±5 °C)
_ spray angle below 0°, 30°, 60° and 90°
_ for a duration of 30 seconds in each position
_ distance from nozzle to rotary encoder 100 – 150 mm
_ rotation during test, 5 rotations/minute (±1)
_ tension put on during test



The aim of this test is, to simulate the conditions of a high-pressure cleaning procedure at works level. In the test facility, the CM_36 S was exposed to a jet of water of 80 – 100 bar at a temperature of 80 °C. A function check is run before and after the test. A steam jet test is run first with +80 °C of hot water followed by a function check.

Water jet requirements
Flat jet nozzle and jet distribution for the test facility to prove that protection is in place with regard to high pressure/steam-jet cleaning – water protection degree 9K.

What does IP 69 K mean?
It was developed for high-pressure jet cleaning at high temperatures. The digit "6" stands for protection against the ingress of dust, "9" stands for protection for high-pressure cleaning at short distances and "K" stands for the high temperature of the water that is used (hot water).
It was introduced in 1993 and is based on the DIN 40050-9 standard. It was originally intended for vehicles as protection against the ingress of foreign bodies such as dust or dirt and hot jet water. The test conditions stipulated by the protection class, IP 69 K, require high water pressure and a temperature of 80 °C.



a (mm)	b (mm)	α (°)
100	8 ±2	30 ±5
150	10 ±2	

Inspection for ingress of solid foreign objects
The test requirements to fulfil the specific degree of protection are shown in the table on the left. The inspection takes place in a dust chamber (depending on the type, whether horizontal or vertical).
Normally, a mixture of 50 % weight component of limestone (with clay and sand), i.e. "unfired Portland concrete" and 50 % of fly ash with the following distribution of aggregates (according to DIN V 40 046 part 48):
_33 weight component ≤ 32 µm
_67 weight component > 32 µm, but ≤ 250 µm

About 2 kg of test dust are filled per m³ into the chamber volume (vertical dust chamber). This dust is kept floating throughout the duration of the test. In the event of a horizontal dust chamber, a specific density of the air/dust mix of 5 (±2) g/m³ and a flow rate of 1.5 m/s is prespecified.

Properties of the test atmosphere

Temperature range:	23 (±5) °C
Relative humidity:	25 % – 75 %
Air pressure:	86 kPa – 106 kPa (860 mbar – 1060 mbar)

Answer to water and dust

_for IP 69 K also a completely sealed interior
_protective coating of PCB
_Housing closed at shaft end. The shaft can move in the liquid without the liquid ingressing into the encoder.

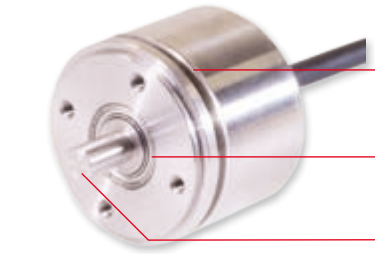
Integral bearing

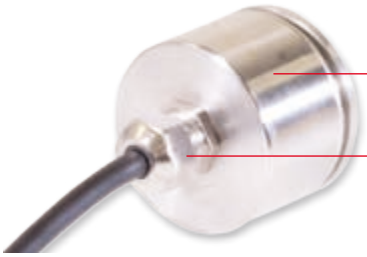
solid shaft with bearing pressed-in

Separate bearing

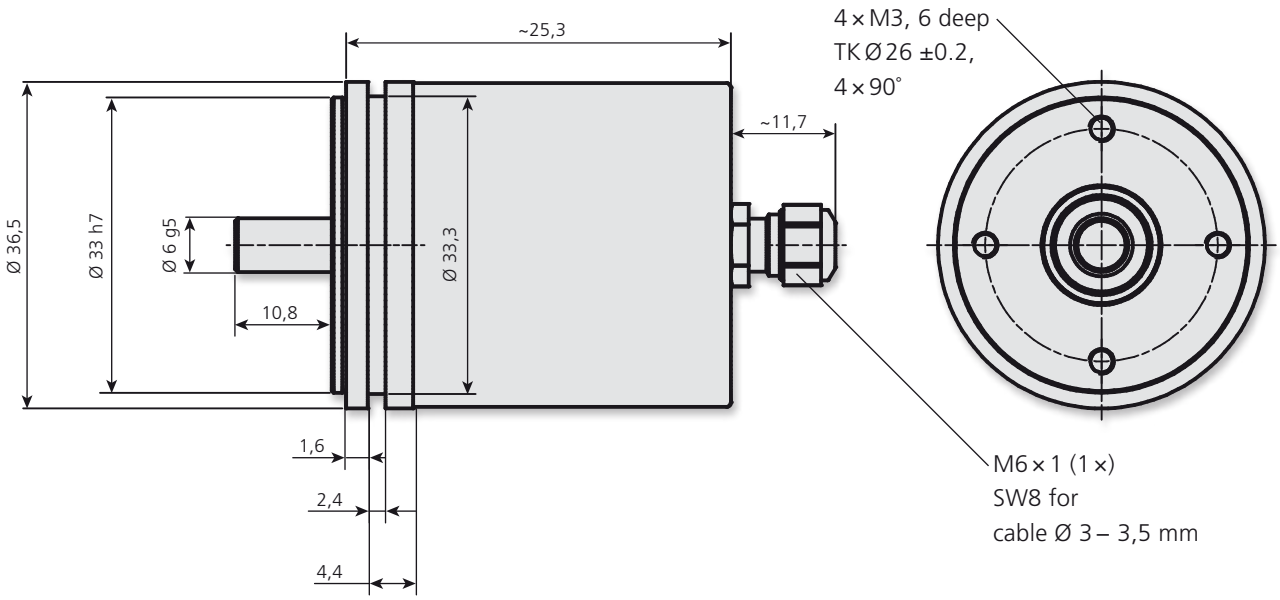
shaft end with magnet is immersed into the rotary encoder

Stainless steel – IP 69 K





Avaiable for incremental and absolute singleturn variants

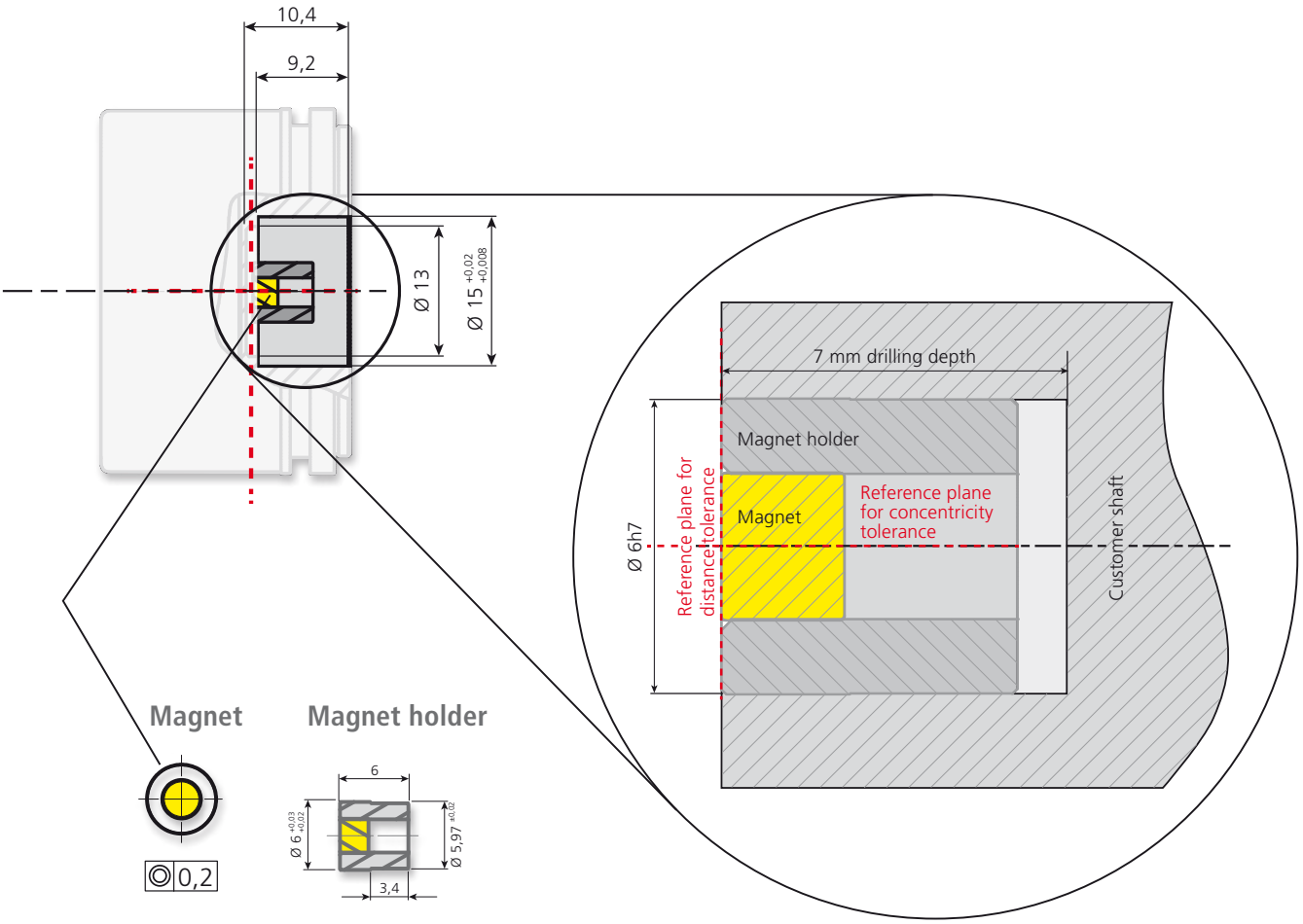


Assembly of a Magnet Holder

For bearing free __F36

TR-Electronic constructs and manufactures the magnet holder custom fit for your application and delivers it with a built-in magnet. The example shows a magnet holder pressed into the face sided drilling 6h7 (7 mm deep) of the shaft (order no. 49150092). The magnet holder is not part of delivery. Please order this item separately. Magnet holders in other sizes will be designed and delivered according to customers specifications.

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



This type:
Order no. 49150092

TR-Electronic – your partner in automation

Rotary encoders

Absolute encoder, incremental rotary encoder, wire-actuated encoder

Rotary encoders with optical and magnetic scanning function register the precise position in a wide variety of applications and industries.
In medical engineering, miniature versions ensure correct positioning while SIL3-approved absolute rotary encoders provide the necessary safety. We offer not only high-quality rotary encoders (from Ø 22 to 160 mm) for almost any application but also comprehensive accessories.

Linear encoders

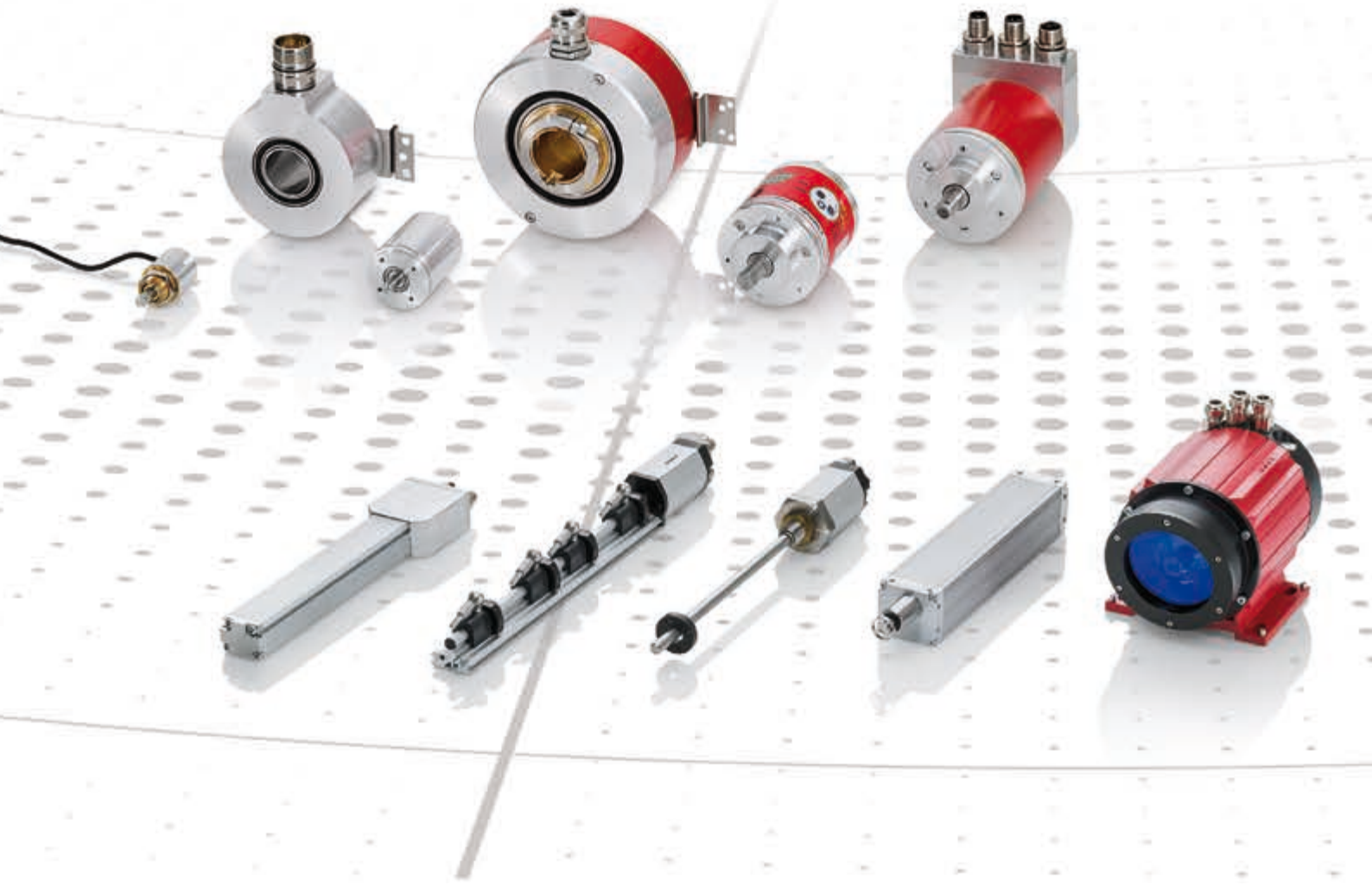
Linear absolute measuring systems, laser displacement measurement

Linear encoders register linear motions in machines, tools and systems according to specific requirements using different technologies.
Linear rotary encoders allow measuring distances of max. 20 m almost without any wear. This value is max. 240 m for laser measuring systems. Machines and systems can be precisely controlled to reach their desired positions.

Motion

Servo drives, compact drives, process drives

Intelligent encoTRive drives are available with the current field bus systems, such as PROFIBUS, PROFINET and CANopen, within a power range of up to 300 watts. The drives are configured to meet customer requirements and can be freely combined with precision gear, holding brake and I/O.
Values of up to 4,350 rpm and powerful 200 Nm are available to cope with demanding applications.



Components

Industrial PC, field bus I/O, PLC, HMI controller

Industrial PCs are available in numerous variants and offer customized calculation power for PC-assisted automation. Programmable logic controllers (PLC) are the traditional means for automation. HMI controllers establish the interface to the user. Field bus nodes, I/O modules and cam controllers complete the range of automation components.

Automation

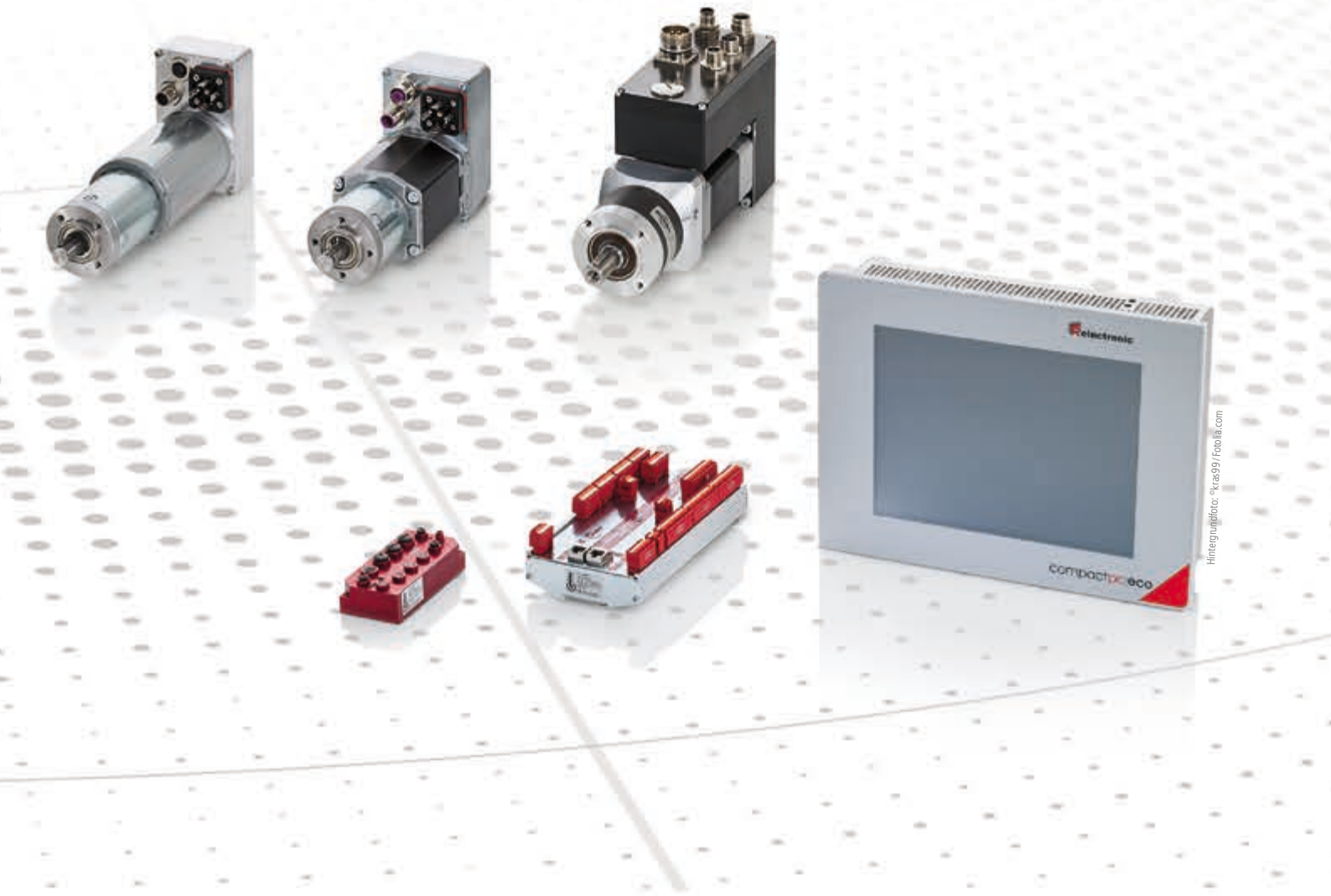
Consulting and implementation for new machines and retrofit

You want to set up a largely automated new machine or retrofit and modernize your existing machine with automation systems? Then you just need our extensive expert knowledge and the more than 20 years of our experience.

Unidor

Blanking and forming, systems, controls and sensors

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



Hintergrundfoto: ©kras99/Fotolia.com

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