

Solutions for Drives

- Incremental Encoders
- Absolute Encoders
- Encoders for Functional Safety
- Special Encoders
- Fixing Solutions



Reliable and economical complete encoder solutions for drive motors, torque motors, servo motors and many others.

Kübler has been highly successful in drives engineering for many years and counts internationally important businesses amongst its clientele. Along with outstanding product quality, this industrial sector demands a high degree of flexibility, a fast response and global service. Kübler lives up to these expectations.

Product diversity and quality: We offer absolute and incremental encoders with high mechanical loading, guaranteed – amongst others – as a result of the sturdy bearing construction with Safety Lock™, of the optical technologies that are 100 % resistant to magnetic fields and of a remarkably compact product design.

The mechanical interface is often the deciding path to success: Kübler possesses the expertise and experience when it comes to essential details such as torque arms and mounting solutions for the optimal integration of the encoders into the drives. We have been particularly successful with geared motors in developing a method of mounting the encoder under the fan cowl, which is both safe and cost-effective.

At the forefront of technology: Our innovations in the year 2009 included encoders for functional safety with SIL3 approval, absolute multiturn encoders with total magnetic insensitivity, as well as purely optical encoders with a mechanical gear or – completely new – with an electronic gear.

Kübler Design System: Kübler “KDS” is our structured method for converting – step-by-step – your requirements, with respect to quality and to a reduction in costs and number of models, into a product solution.





Kübler encoders

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Functional Safety

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Special encoders and optimal fixing solutions

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The core business of the Kübler Group is the development, manufacture and marketing of leading-edge position and motion sensors, innovative display and counting technology as well as connection and transmission technology.

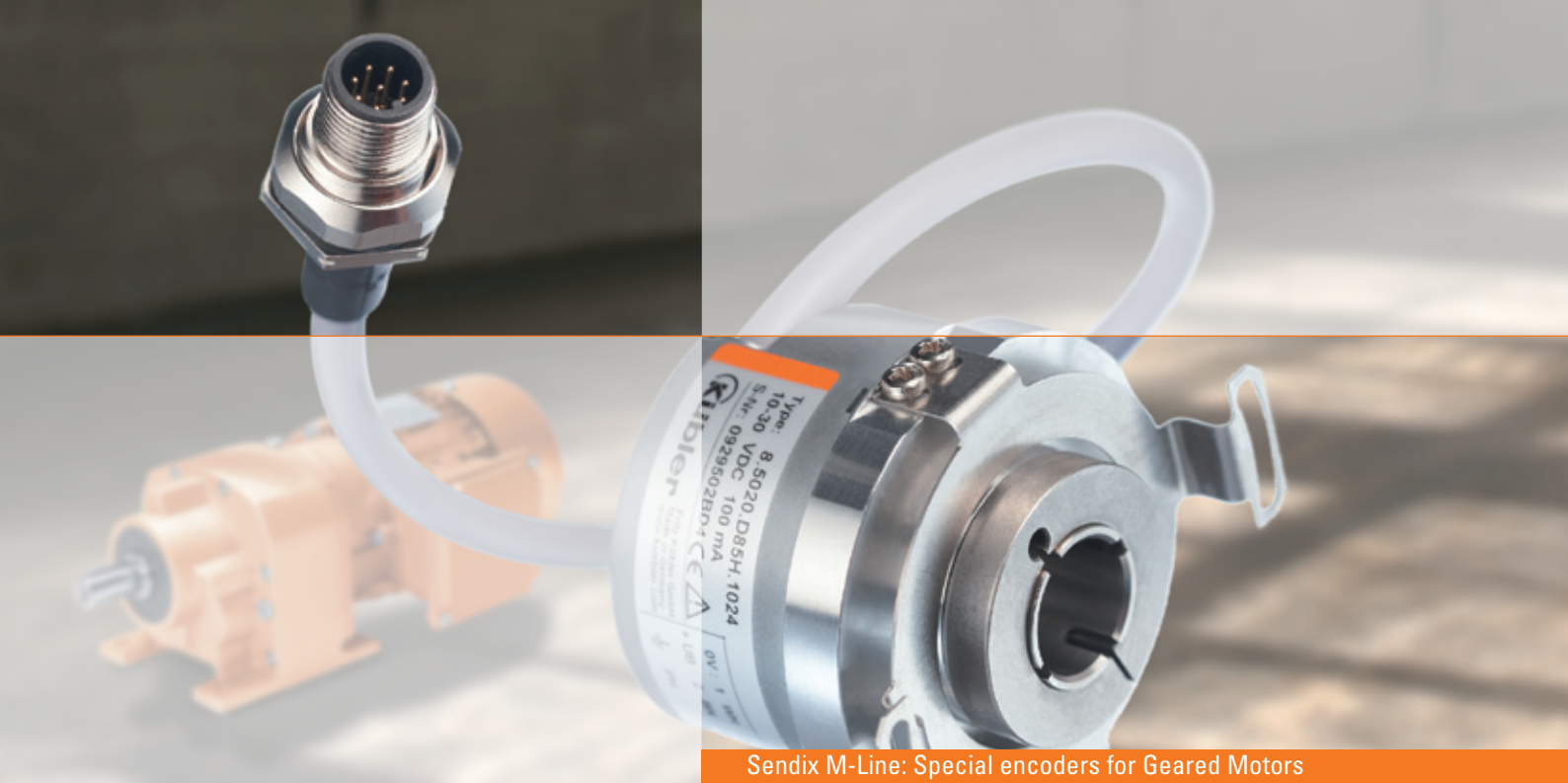
Founded in the year 1960, the family business is now led by the next generation of the family, Gebhard and Lothar Kübler.

It is active worldwide with an export share of its turnover of about 70 percent. 8 group members and 50 strong sales partners offer product know-how, service and advice globally on-site.

We see the opportunities for our business in the field of application oriented innovations and in the provision of outstanding all-round service – always with the success of our customers in mind.

With over 350 employees and 3 production sites, we reliably ensure the high level of flexibility of our products, superior quality management as well as exceptional delivery dependability.





Sendix M-Line: Special encoders for Geared Motors

Incremental Encoders for Drive Engineering

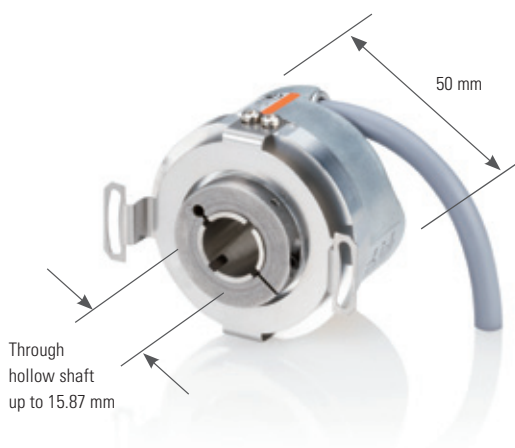
Drive engineering places special demands on encoders – especially when it comes to mechanical and electrical robustness. As a result of their rugged technologies Sendix incremental encoders prove their worth, particularly in harsh environmental conditions.

Sturdy bearings, rugged housings

Sendix incremental impress with their very sturdy bearing construction with its Safety Lock™ Design. Very large interlocked bearings and a large bearing span ensure critical stability with vibration and tolerance of installation errors.

Furthermore, a solid die-cast housing and radial shaft seal make the Sendix incremental ideal for use in harsh outdoor applications.

All Sendix incremental benefit from the high IP 67 protection rating and are well-suited for use with a temperature range of -40°C up to +90°C.



Sendix M-Line – Encoders for geared motors

Powerful and versatile:

- Wide choice of interface options
- Speeds up to 5000 rpm
- Short-circuit proof outputs
- High scanning rate
- High rotary speed

Optimal integration under the fan cowl

Sendix incremental are available with a large hollow shaft up to 15.87 mm, as well as with housing dimensions of only 50 mm and a minimal installation depth of just 37.5 mm.

- Many fixing solutions
- Technically advanced options: insulating shaft sleeve, slotted shaft, stator coupling, tangential cable outlet and many more.
- Especially compact connector solution for fitting to fan cowls
- Only 50 mm diameter – ideal where installation space is very tight
- Through hollow shaft up to 15.87 mm
- Installation and operation with few restrictions





« With the optical incremental encoders from Kübler GmbH, we have acquired a truly rugged and reliable product. All technical adaptations were carried out and our wishes met in the shortest time, and the delivery dependability allows us fast alterations in our production. »

Manager Technology
Austrian Customer



Encoders with large hollow shaft

Cost-optimised standard encoders from 58 mm up to 100 mm diameter.

- Through hollow shaft up to 42 mm with only 49 mm clearance and 100 mm in size
- Through hollow shaft up to 28 mm for 58 mm size
- Simple to install, simple to replace
- Long service life – unaffected by rough installation
- Plug & Play: cable with connector and corresponding pin layout for all common controllers
- Incremental up to 5,000 rpm
- RS422 (TTL), push-pull (HTL) and SIN/COS
- Many fixing options
- Short-circuit proof outputs, reverse polarity protection for supply voltage
- Both incremental and absolute versions available

Magnetic Measuring Systems with index signal

The compact, bearing-free Limes systems open up possibilities, where encoders have reached their limits.

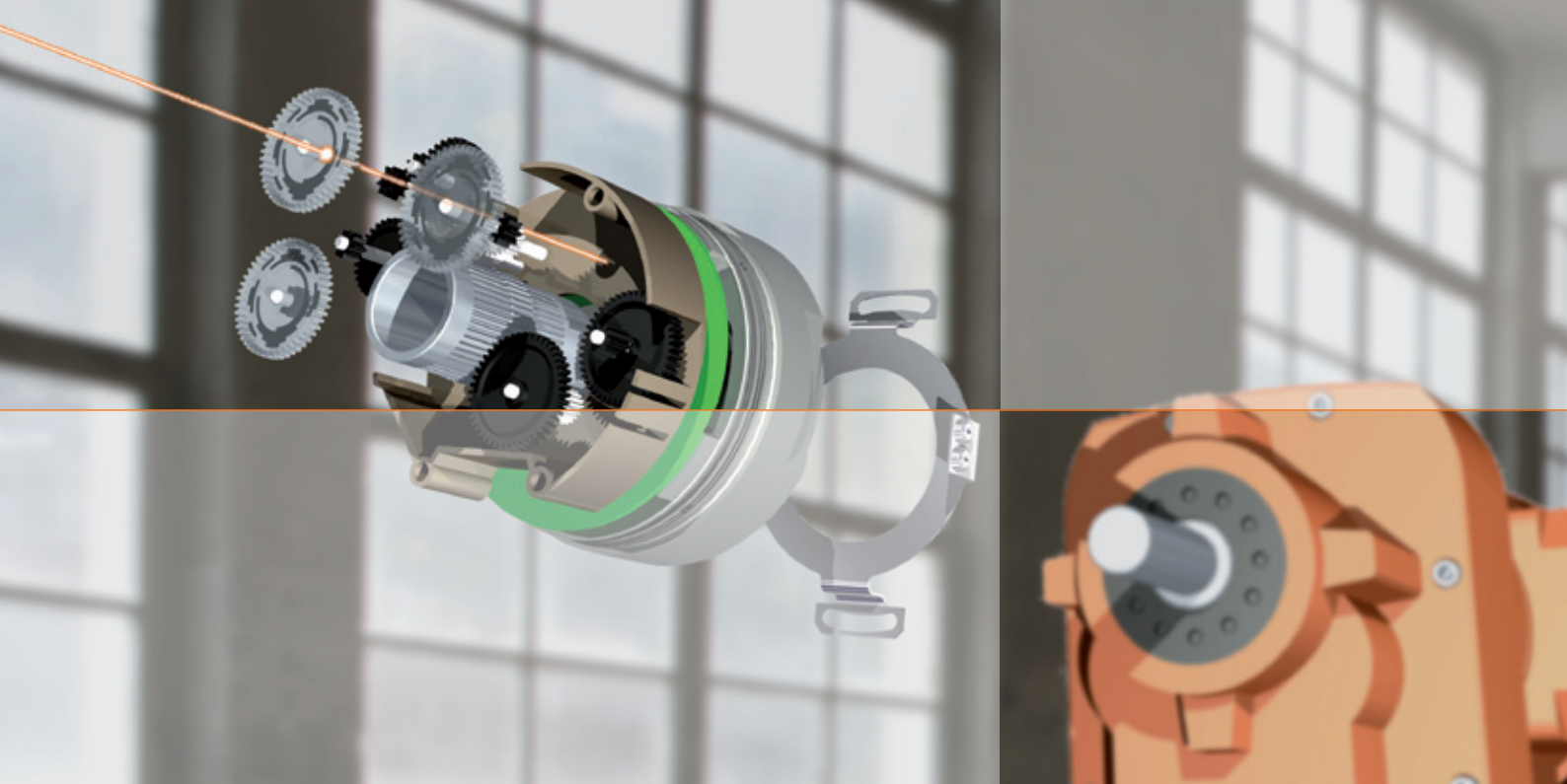
- For extreme shock or vibration loadings
 - shock up to 500 g / 1 ms
 - vibration up to 30 g / 10 ... 2000 Hz
- With magnetic rings: shaft diameter up to 30 mm, index signal.
- With magnetic bands: for measuring large diameters, ideal for rotary speed measurement on the rotor shaft of wind turbines.

Safety Lock™ Design

- Interlocked bearings
- Large bearing span
- Extra strong outer bearings

The advantages:

- Machine downtimes and repairs are eliminated
- Avoids disc crashes and loss of pulses
- Extends service life
- Tolerates installation errors



Sendix Absolute – Singleturn, Multiturn and Fieldbus

Interference-free positioning and manufacturing with the new Kübler Sendix absolute encoders.

A sophisticated safety concept and extremely reliable technology eliminate expensive downtimes resulting from encoder failure.

Kübler Sendix absolute are the first multiturn encoders in 58 mm standard format on the market, which boast a mechanical gear and allow for a through hollow shaft of up to 14 mm or a blind hollow shaft of 15 mm.

Flexible

Kübler Sendix absolute offer a broad spectrum of high-quality solutions:

- Wide choice of supply voltages
- Great variety of mounting and fixing solutions
- High quality features and accessories
- Insulating shaft sleeves to protect the bearings

2 in 1: Cost effective with incremental track

With their extra incremental track, these compact encoders are "2 devices in one". This saves on costs and on installation space.

Cost-effectiveness is further increased as a result of the long service life and their lack of susceptibility to damage during installation.

Fast availability

Fast technology: Kübler Sendix absolute are ideal for applications that require a high-resolution feedback system in real time, such as for example gearless drives.

- High clock rate up to 2 MHz (SSI), up to 10 MHz (BiSS)
- Very short control cycles
- Update rate of the total position value greater than 100 kHz (with a max. jitter of 1 µs)

100 percent magnetic field resistant

For applications with strong electromagnetic interference, as occurs for example with magnetic brakes on drive motors.

- No components susceptible to magnetic fields
- Sophisticated safety concept
- Extremely reliable technology
- First multiturn encoder with 58 mm housing with a mechanical gear and hollow shaft up to 15 mm

High Tech Multiturn Gear Module

The multiturn gear module – developed from special materials – continually counteracts wear thanks to the first stage's double bearing layer and the specially developed gear teeth.

- High speeds up to 9000 rpm
- Wide temperature range
-40°C ... +85°C
- IP67





Sendix F36

The Sendix F36 is a highly accurate, optical encoder without gears, which at the same time is 100% resistant to magnetic fields. Even when installation space is very limited, it is ideal for integration into drive components.

- 36 mm size
- Highly integrated singleturn / multiturn scanning in a single ASIC
- 17 bits singleturn + 24 bits multiturn = 41 bits total resolution
- Interfaces: SSI, CANopen, BiSS, additional incremental outputs RS422 and SinCos
- -40°C up to +90°C with IP 67 protection level
- Sturdy bearing construction in Safety Lock™ Design



Fieldbus and Ethernet encoders

- Up-to-the-minute Fieldbus and Ethernet profiles
- Time-synchronous position detection of several axes
- Position, speed, acceleration and working area in real-time
- LEDs, SET button and connector for fast, error-free start-up
- User-friendly version with bus terminal cover for easy integration into complex Fieldbus networks, or economy version with fixed connection.

... with CAN interface and incremental track

Sendix Absolut CANopen Fieldbus encoder – now also with an additional incremental track.

- For simultaneous positioning via the CAN network and direct speed feedback by means of the incremental track
- 2048 pulse per revolution
- RS422 interface (TTL compatible) with signals A, A, B, B
- Many additional functions

Kübler OptoASIC Technology

- Low susceptibility to interference and temperature
- Extremely robust
- Fewer connection points
- Fewer discrete components
- Resolution singleturn up to 17 bits, multiturn up to 24 bits, total resolution up to 41 bits
- Sin/Cos signals, integrated monitoring of transmitting current and temperature, purely digital real-time interface

Compliance with Safety Standards

According to DIN EN 13849-1 and DIN EN 61800-5-2 up to SIL3/PLe/Kat.4 the following safety functions can be implemented with the encoder:

SS1:	Safe Stop 1 – controlled braking, STO after time or standstill
SS2:	Safe Stop 2 – controlled braking until SOS
SOS:	Safe Operating Stop – safe operating stop in position control
SLS:	Safe Limited Speed
SLI:	Safe Limited Increment of Position
SLP:	Safe Limited Position
SSR:	Safe Speed Range
SDI:	Safe Direction
SSM:	Safe Speed Monitoring

Encoders for Functional Safety

Safety is – not least since the EU Machinery Directive 2006/42/EG – an “integral part of the construction of drives”. When choosing the right encoder for functional safety the principle applies that safety is achieved through the intelligent combination of encoder, controller and actuator.

Sendix SSI absolute encoders, with an additional Sin/Cos incremental output, and Sin/Cos versions of incremental encoders are available with certification. But safety goes further than this: safe components are characterised by a robust reliable interface and by the ability to cope with high mechanical and electronic loads.



Safe Incremental Encoder Function

In order to achieve safe incremental information with the encoder, the controller must monitor the validity of the analogue, 90° phase-shifted sine/cosine signals with the help of the function: $\sin^2 + \cos^2 = 1$

Safe Absolute Encoder Function

In order to obtain safe information with the encoder regarding the absolute position, the controller counts the incremental pulses and compares the result with the absolute positions also provided by the encoder.

Safe mechanical connection

A 100% reliable mechanical connection is required for a safe function in the applications. Suitably sturdy fixing elements can help eliminate the risk of faults.

Multitalented device:

Absolute encoder with incremental sine/cosine signals, multiturn stage and integrated functional safety

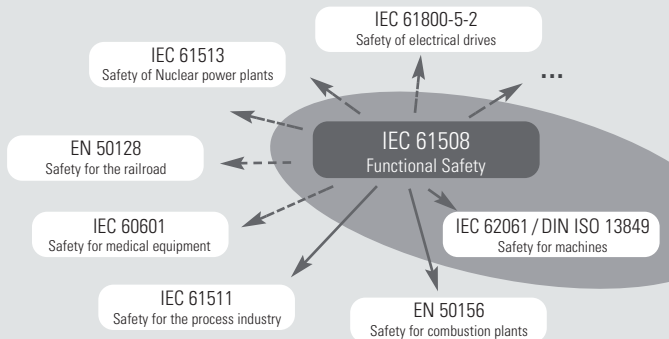
Drive control using incremental sine and cosine signals is a tried-and-tested technology with a number of advantages. The high interpolatability of the analogue sine and cosine signals, with more than 1 million steps per revolution, allows for precise control of both slow turning as well as highly dynamic drives.

Combined with the high resolution and very accurate position information provided by the absolute encoder, all the data necessary for a precisely controlled motor start-up with an encoder is available. Furthermore, the multiturn sensor technology permits position control over a wide range. And finally, the high information content of the signals – all independent of one another – forms the basis for a sensor with high functional safety.



«The test devices have successfully passed the tests and can thus be installed without any modification. I think that is a real success, which shows just how well-engineered and high-quality your devices are.»

Manager Product Marketing
US Corporation



Source: TÜV Rheinland



Sendix 5814SIL / 5834SIL

Incremental encoders with Sin/Cos outputs

The incremental position of the encoder family 58x4SIL is provided in the form of an analogue sine/cosine signal; here the resolution per revolution is 1024 or 2048 sine/cosine periods.

Additional features:

- With protected Safety Lock™ Technology: interlocked bearings for a high degree of ruggedness, accuracy and long service life.
- Protection rating IP65 or IP67
- Magnetically insensitive due to optical scanning.



Sendix 5853SIL / 5873SIL, Sendix 5863SIL / 5883SIL

Absolute encoders single and multiturn with SSI and Sin/Cos outputs

The absolute position of the encoder family 58x3SIL is transmitted in the form of a digital SSI or BiSS data word. With the singleturn variants 5853SIL and 5873SIL the resolution is between 10 bits and 17 bits, depending on the variant.

In contrast to the singleturn variants 5853SIL / 5873SIL, the multiturn variants 5863SIL / 5883SIL have in addition a gear for detecting positions greater than 360°. The number for detecting the revolutions amounts to 12 bits. This thus gives a total resolution for the multiturn of up to 29 bits.

The incremental position is provided in the form of an analogue sine/cosine signal. The resolution per revolution is 1024 or 2048 sine/cosine periods.

Additional features:

- Interlocked bearings for a high degree of ruggedness, accuracy and long service life.
- Protection rating IP65 or IP67
- Magnetically insensitive due to optical scanning.

MTTFd Values

With regard to the requirements of the Machinery Directive 2006/42/EC the MTTFd values for the most important standard encoders from Kübler are also provided.

This thus enables the user to carry out his own calculations according to DIN EN 61800-5-2 and DIN EN ISO 13849.



« I should like to thank you for your commitment over the duration of the whole project. In the future Kübler will be our N°.1 supplier when it comes to sensors. »

*Manager Electric Design
German Customer*



Special encoders



ATEX encoders 7030 and Sendix 7053/7063

If drive engineering is being utilised in hazardous areas, then special hazardous area regulations have to be complied with.

For these applications Kübler offers ATEX shaft and hollow shaft encoders. For the low protection zones 2 and 22, economical compact standard encoders are available.

New: Sendix absolut singleturn and multiturn with ATEX approval.

- "Flameproof-enclosure" construction:
Approved for Zone 1, 2 and 21, 22
- Zone 1, 2 and 21, 22:
⊕ Ex II 2G Ex d IIC T6 and ⊕ Ex II 2D Ex tD A21 IP6X T85°C
- Can be operated in marine environments – housing and flange out of seawater-resistant aluminium
- Stays sealed even when subjected to harsh everyday use. Offers high security against failures in the field. IP 67 protection.
- Can be installed where space is tight
- Installation depth only 145 mm, diameter 70 mm
- Compact cable outlet

A02H Heavy Duty

- An alternative to classic Heavy Duty encoders, which are often over-engineered and expensive
- Special solution for wind turbine generators with isolating inserts and axial screw connection for tapered and cylinder shafts
- Plastic isolating inserts protect against shaft currents and prevent damage to the bearings
- RS 422, push-pull or SinCos outputs
- Balanced stainless steel clamping ring
- -40°C up to +80°C, IP65

Seawater resistant versions

Many versions of the already extremely rugged Sendix family have now been tested and certified to IEC 68-2-11 for resistance to the effects of salt-spray over a period of up to 672 hours – the highest test level.

The high certification level for the Sendix encoders attests a high level of corrosion resistance.

Tested
acc. to the
saltspray test
IEC 68-2-11
=> 672 h



Optimal fixing solutions



Fixing and Connection options

The modular construction system from Kübler offers you a wide choice of fixing and connection options.

- Suitable for every application
- For fast, easy installation and a long service life



Isolating inserts against shaft currents

So-called shaft currents can arise, particularly with large drives. These pass through the shaft and ball-bearings and can lead to the destruction of the bearings.

By using the isolating inserts the motor and encoder shafts are galvanically isolated. This prolongs the service life and considerably reduces maintenance.



Tapered Shaft Mounting Kit

The new mounting kit equips large A02H incremental hollow shaft encoders for simple tapered shaft mounting.

- For high-precision direct coupling
- The mounting kit includes: isolating insert that reliably protects the encoders from shaft currents.

M12 Cordsets with integrated control LEDs

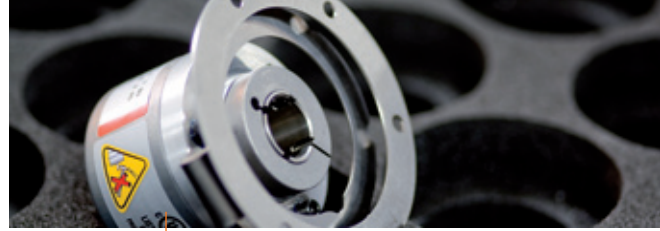
The 8-pin M12 cordset for incremental encoders ensures fast, simple connections under difficult outdoor conditions.

- LEDs, which display the channels A, B and Z
- Simplified start-up thanks to flashing Z-pulse

ez Fan-clip – Mounting solution on fan grill

- For instant easy fixing of the encoder directly onto the fan grill of the gear housing.
- Motor housing does not need to be removed.





Presales

Kübler – the service specialists for every industrial sector and application – supplying complete integrated solutions – globally on your doorstep

Sample Service – Fast delivery of customised versions

Selection tool
Kübler website: Product Finder

Delivery Service: 10 by 10,
48 h Express and Repair Service



Kübler Service for planning dependability

Fast, reliable service and professional advice have top priority at Kübler. We are globally on your doorstep in 6 service and application centres and offer our customers planning dependability.

We deliver from stock within one day. We can manufacture your special orders within 48 hours. Moreover, 10 by 10 is our delivery offensive, which ensures that – for quantities of up to 10 pieces – you will receive all catalogue products so marked within 10 days. Our processes and services are certified and are constantly being improved.

10 by 10

With our 10 by 10 Service we will manufacture 10 encoders within 10 working days.
The benefits to you: easier to order, the delivery can be calculated, flexibility for small production batches.



Technical Hotline

Our Hotline will answer your technical questions Mon-Fri within normal working hours:



Kübler GmbH, Germany	+49 7720 3903-35
Kübler France	+33 3 89 53 45 45
Kübler Italy	+39 0 26 42 33 45
Kübler China	+86 10 5134 8680
Kübler India	+91 9819 457 872
Kübler Poland	+48 6 18 49 99 02

Sample and Repair Service

The Kübler Service Centre can quickly manufacture special, customised versions within a short space of time. We are happy to help you with the practicalities of using our products – at your location if desired. We can carry out repairs within a maximum of 5 working days.



48 h Express Service

Short delivery times, a high level of on-time delivery, guaranteed quality and enthusiastic, service-oriented employees – these are what our customers can depend on.

We can process your order within 48 hours; we can ship stock items the same day.



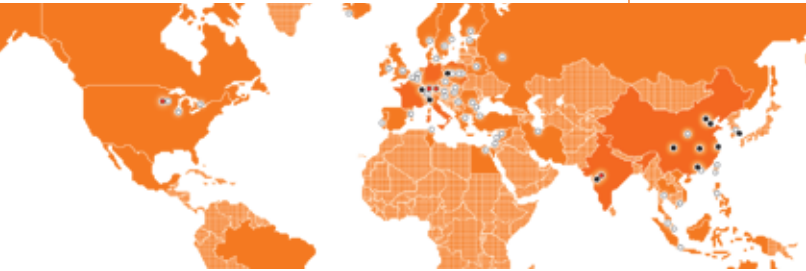


Service Excellence provided by Kübler application specialists for target sectors

Product security – replacement models at the end of the product life-cycle

Aftersales

Service Centres, globally on your doorstep:
Advice, analysis, support during installation in over 50 countries



« We were able to considerably reduce our average delivery time and I can confirm that delivery schedules were always adhered to. Technical support is very professional, efficient and not at all bureaucratic. »

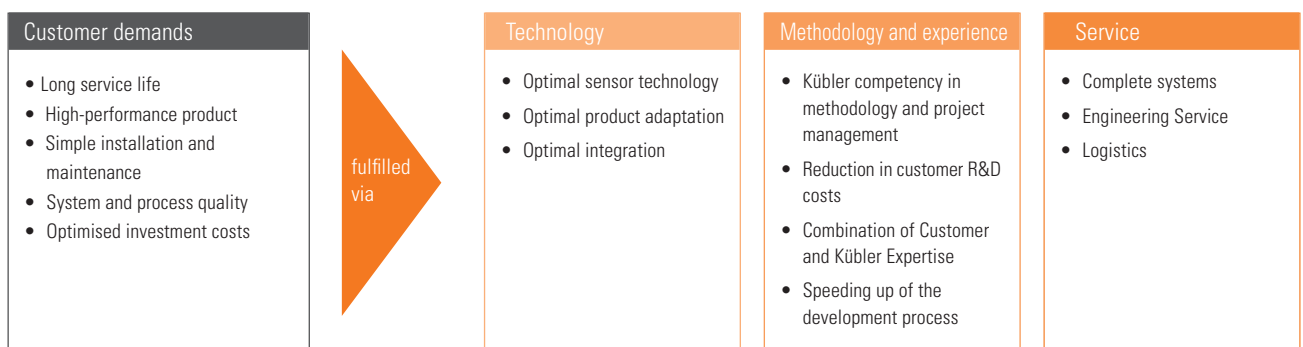
Purchasing Manager, German Producer of Geared Motors

Tailor-made solutions – Kübler Design System

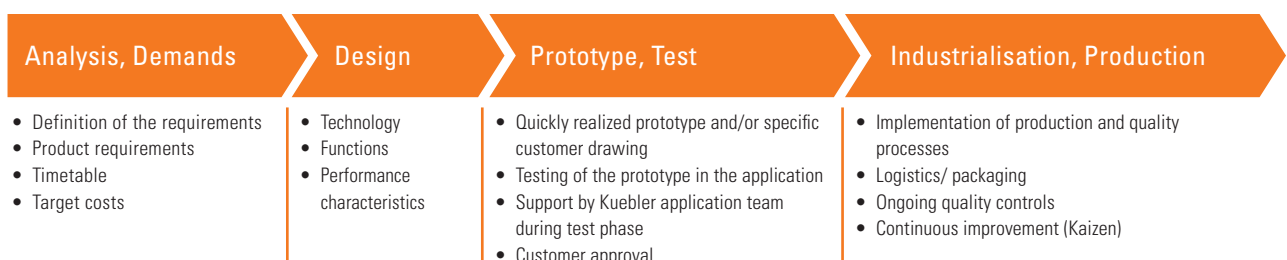
« With the KDS method our customers receive a lasting solution to lowering costs, reducing the number of models available or eliminating quality deficiencies. With KDS we develop product and engineering solutions together. The method stands out because of its structured process; this delivers innovation through experience and cooperation with the customer. »

Gebhard and Lothar Kübler, Managing Directors Kübler GmbH

The Kübler Design System – satisfying customer demands



The 4 phases of the Kübler Design System



Product information

We offer additional information on our products and system solutions in the following main catalogues:

Position and Motion Sensors

- Encoders
- Draw wire encoders
- Magnetic measurement systems
- Inclinometers
- Connection technology
- Accessories



Order-No. German **R.100.568**

Order-No. English **R.100.569**

Counting and Process Technology

- Pulse Counters
- Preset Counters
- Timers / Hour Meters
- Tachometers / Frequency Meters
- Position Displays
- Multifunction Counters
- Energy Counters
- Process and Temperature Displays
- Accessories



Order-No. German **R.100.156**

Order-No. English **R.100.157**

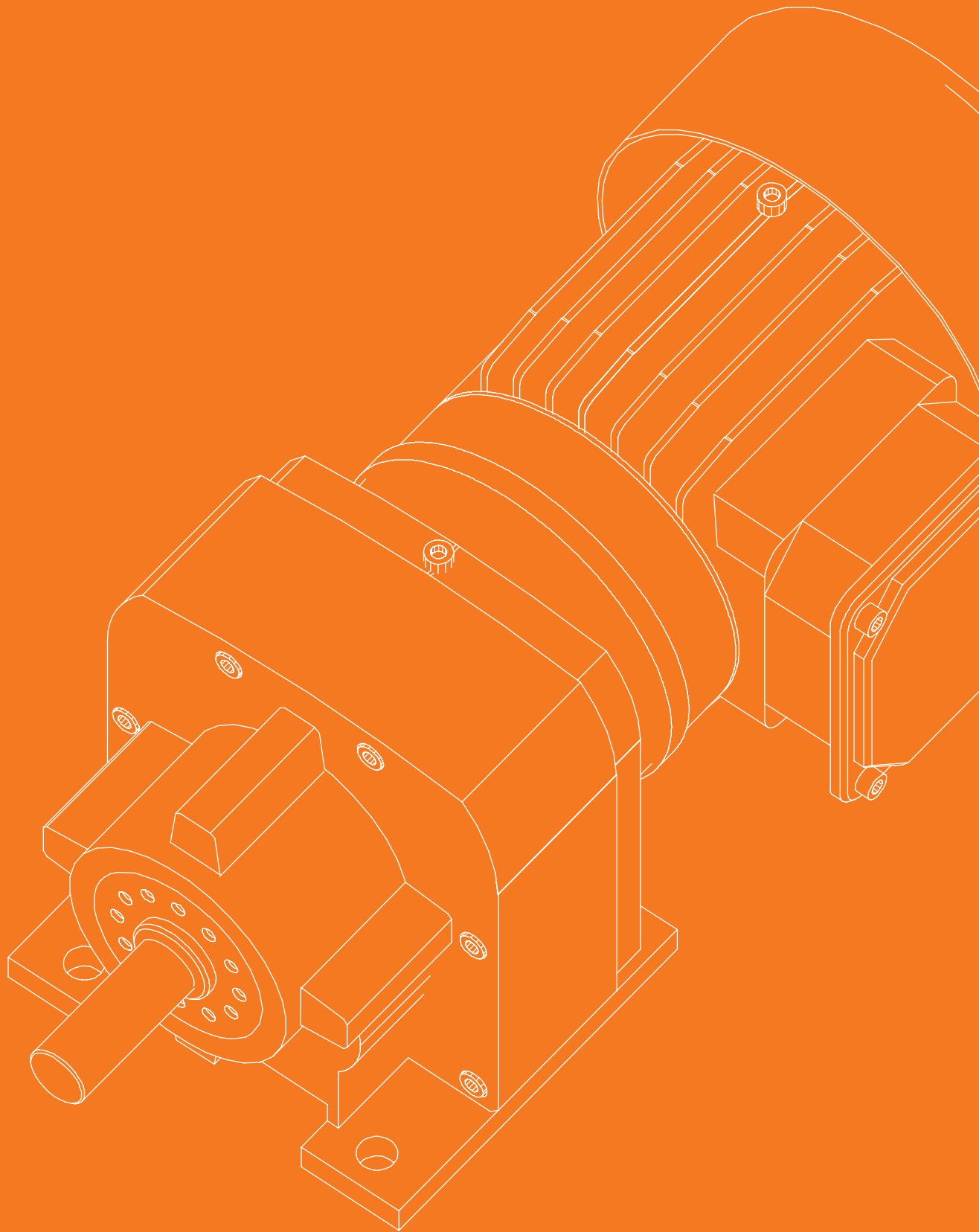
Transmission Technology

- Slip rings
- Fibre Optic Modules



Order-No. German **R.600.948**

Order-No. English **R.600.948.001**



Solutions for Drives

www.kuebler.com/drives