

# Trend towards absolute, optical, safe

by Harald Klieber



1 | The optical F36 encoders are equipped with OptoASICs, which combine all the singleturn and multiturn functions on one chip.

*The counting and sensor technology experts from Kübler GmbH have been showing at the Hanover Fair in which direction the technology journey is heading. The spotlight was focused on the singleturn and multiturn absolute encoders with safe SIL3 certification, as well as on the first optical encoder F36 and on the very easy-to-install Heavy Duty encoder H100.*

The two joint owners and Managing Directors Gebhard F. and Lothar Kübler are particularly proud of the development of the Sendix SIL3 encoder. “Especially in the singleturn version the encoder is unique,” explains the technologist Gebhard F. Kübler. However the financial expert Lothar Kübler sees great potential in the Sendix F36: “We are now manufacturing the F36 in high volumes and are expanding its production.” The F36 was launched in November 2009 and in Gebhard Kübler’s estimation is the first optical multiturn encoder that does without gears and is 100% magnetically insensitive. Technologically the integrated OptoASICs in the F36 offer many advantages: they are fast, extremely reliable and exhibit a very high integration density.

**Gebhard F. Kübler:**

**“Especially in the singleturn version the encoder is unique.”**

Kübler uses the latest OptoASIC technology as the basis for the most recent patented generation of fast and above all wear-free F36 absolute encoders. The single and multiturn encoders impress with their optical Intelligent Scan Technology, which allows for highly accurate determination of position with feedback in real-time, as is required for example in medical technology, where installation space is restricted. Here the optical sensor technology in the multiturn version achieves a high resolution of up to 41 bits. Additional plus points of the F36 include the considerably reduced number of components and the large and sturdy Safety Lock bearings, which guarantee a long service life even in highly demanding industrial environments. The Intelligent-Scan-Technology ensures 100% magnetic insensitivity, as is required for instance on engine brakes.



2 | Arnold Hettich: “Our Sendix Absolute family is now also available with the Profinet interface that provides not just visual warning or alarm signals, if for example the voltage is too low or the temperature too high.”

The IRT mode also offers a real-time solution for all high-performance applications such as synchronous applications.

Gebhard Kübler outlines the compact outer dimensions of the F36 encoder as one area that no competitor can match. Here, for example, with a flange diameter of 36 mm hollow shafts of up to 10 mm are possible. Yet even where installation space is extremely tight the cable connection does not get in the way. Meanwhile with its absolute encoders Kübler has added another important interface to the existing EtherCAT interface. “With the new Profinet certification we are amongst the first to offer these singleturn and multiturn encoders with this interface,” says Product Manager Arnold Hettich, emphasizing the technological step-forward. The complete encoder profile according to Profile Encoder Version 4.1 as well as the Identification & Maintenance functionality Version 1.16 has been implemented in these new Profinet encoders in the rugged Sendix design. The encoders support the Isochronous Real-Time Mode (IRT mode) and in Arnold Hettich’s experience are ideally equipped for real-time applications. Through the decoupling of the real-time communication from the standard communication (TCP/IP), the IRT mode also offers a real-time solution for all high-performance applications such as synchronous applications. The short cycle time of less than 1msec facilitates flexible and versatile use.

With the help of the “Ezturn for Profinet” software supplied as standard, the device is really easy to use, due to the simple plug and play start-up. It also allows the encoder software to be updated quickly and easily. With this firmware update the features of the encoder can be enhanced, without having to dismantle the encoder. The visualized monitoring of the most important parameters is also included in the Ezturn software list of specifications. The standard Ethernet physics ensure direct connection, for example from laptop to encoder. The solid die-cast housing with a protection level of up to IP67 and the wide temperature range from -40°C up to +80°C also allow for use outdoors. Visual warning and alarm signals indicate sensor errors, too low a voltage or too high a temperature. Troubleshooting thus becomes substantially easier; the necessary remedial actions can be implemented without delay and lengthy downtimes avoided.



5 | A compact and robust plastic housing that has an IP68 protection rating surrounds the IS60 with its CANopen interface. It can withstand temperatures from -40°C up to +80°C and offers an exceptional level of shock and vibration resistance.

## The largest and most rugged for steel works and cranes

The largest encoder from the Kübler stable is also the most rugged:

“Here we are pushing forwards into new application territories,” says Arnold Hettich. For the Sendix Heavy Duty encoder is an extremely rugged incremental encoder. As an option, a mechanical speed switch can be integrated as safe protection against overspeed. Thanks to the special HD-Safety-Lock™ construction, an extremely high bearing load capacity of up to 300N axial and 400N radial is achieved. “The H100 can be plugged quite easily into a spring terminal connector. We developed this Heavy Duty model specially for steelworks, as we have been receiving more and more enquiries, above all from China and India,” explains Arnold Hettich. Kübler has configured a two-switch version especially for applications in cranes.



4 | The H100 comes well armed: seawater-resistant materials, dual seals on the shaft side – a friction seal against humidity and an additional labyrinth seal against ingress of dust and protection against water ingress – guarantee usage from -40°C up to +100°C, as well as IP66.

### H100 tolerates overloads

To a large extent the H100 can tolerate the typical temporary encoder overloads, caused for example by axial overload during installation or as a result of high vibration levels. This helps prevent premature damage to the encoder, as well as avoiding failure of the encoder in the field. The wide bearing clearance as well as the extra large robust flange bearings increase the load capacity and extend the service life. The floating bearing on the cover-side, in turn, eliminates internal stress. The revolving scanning unit ensures constant signal quality with extended temperatures; here the sensor unit is mechanically decoupled from the housing. And where uninterrupted availability is of prime importance, the H100 is available as a double encoder.

**“With our IS60 NS and its CANopen interface we make integration considerably easier for design engineers in mobile automation.”**

Wherever there are slopes and other inclined positions, Kübler can measure these with the new inclinometers from their “IS” series.

“Of course, with our IS60 NS and its CANopen interface we make integration considerably easier for design engineers in mobile automation. In this area CANopen is standard and can thus now be used also for the sensor technology,” comments Arnold Hettich, explaining the constructional advantages in particular for vehicle, lifting and crane technology, solar energy plants and commercial vehicles. The sensor measures 2-dimensional inclinations.

Measuring ranges from  $\pm 10^\circ$ ,  $\pm 45^\circ$  or  $\pm 60^\circ$  are possible, depending on the model. The sensor has a standardised CANopen interface, which ensures easy configuration and start-up. Moreover, all the parameters are stored in the internal parameter memory.



3 | Simply fold out: Kübler now provides quick-start comprehensive operating instructions with its Codix Process Displays – ready to offer immediate help.

## About the technology

*Six Highlights – also with fold-out operating instructions*

*Taking centre stage on the Kübler stand at the Hanover Fair were of course the encoders from the various Sendix series: the incremental and absolute singleturn and multiturn Sendix SIL encoders for functional safety with SIL3 certification, the absolute singleturn and multiturn Sendix real-time encoders with Profinet interface, the Sendix F36 – the first 100% magnetically insensitive optical multiturn encoder without gears and finally the extremely robust incremental Sendix Heavy-Duty H100 incremental encoder with optional mechanical speed switch – fast and very easy to install.*

*Further practical highlights included two displays: the Codix Preset Counters, a new generation of preset counters that set standards for simple decentralised control and the Codix Process Displays, which – according to experts at Kübler –offer the fastest start-up without the need for an operating manual. This is because the instructions are affixed to the device! These easy-to-operate process meters boast a clearly legible 14-segment LED display with easy-to-understand running help texts. Programming is simple via four keys on the front. The new Process Controllers for analogue signals, temperature and strain-gauge inputs come with the practical Quick-start Guide for parameterisation.*