

## NEW COST EFFECTIVE ENCODERS FOR SMALLER CONSUMERS

*Everything is absolute!*

Fig. 1: Whether rotary, diaphragm or turbine meter, they are all now available with an Absolute-ENCODER

In contrast to Albert Einstein's famous statement, with ELSTER's new optical Absolute ENCODERS everything in meter reading is absolute. But to date, the Absolute ENCODER was a high-end solution mainly designed for transmission applications. This has changed. Due to our recent developments and investments, the ENCODER technology is now available for widespread use at affordable prices down to even residential meter sizes.

For some time now, the optical Absolute-ENCODER has been successfully in operation in large metering stations. It has several advantages for the user; the digital availability of the original meter reading, maintenance-free operation, touchless operation – no friction, standardised interfaces and the 'plug & play' feature. Customers using the ENCODER have long since been convinced by the effectiveness of the device and by the absolute security it provides in their data chain. The devices are in fact so convincing that a number of copies have appeared on the gas metering market, all of which might bear the name ENCODER but – after a close look – still do no more than count pulses. Details on the function of the 'real' Absolute-ENCODER, the interface options and how it can stand out from the copies can be found in the article 'The Absolute-ENCODER' on page 7.

With the new ENCODER generation ELSTER all this is now put on a broader base. We have invested in new production technology and tools in order to produce the Absolute-ENCODER cost-effectively and to be able to offer it in our diaphragm meters, rotary meters and turbine meters and not only in high-end applications. But why is an Absolute-ENCODER worth every cent? Just by saying it is ingenious and by stressing the improved technical features is not always enough to justify asking for a premium on the price. Therefore, we would now like to attempt to put a monetary value on these technical advantages.

### The digital availability of the original meter reading

In Germany, and in many other countries, it is stipulated by law that when invoicing is carried out with the use of a reconstructed meter reading, the pulse transmission must be inspected once a year. With the Absolute-ENCODER, this is no longer necessary. Absolute-ENCODER readings are recognised by authorities like the German PTB to be equivalent to a visual read – as if you were there! Estimated cost savings: 50 Euros a year.

### Maintenance-free operation

Where there is no battery, there is no need to change it and there is no chance of battery failure. Estimated cost savings: 100 Euros over the technical life of the Absolute-ENCODER.

### No friction – touchless operation

A gas meter with an Absolute-ENCODER is still a gas meter and the addition of an Absolute-ENCODER has no effect on performance or the validity of the initial calibration period. However, since transferring pulses via a Reed switch is touchless as well, we have no cost savings here.

### Standardised interfaces

A standardised interface with a disclosed protocol enables users to integrate peripheral devices from any manufacturer which uses these interfaces. This means you have a wider choice of devices from a number of competitors, resulting in the end in lower prices. You are probably in a better position to estimate the cost savings than we are.

### The 'plug & play' feature

'Plug it in and it works'. It is not necessary to set any complicated parameters, no pulses are lost when there is a power failure, there are no serious parameter errors – take the old device out, put the new one in, and it works! Estimated cost savings: 50 Euros over the technical life of the Absolute-ENCODER.

### Absolute security in the process chain

When invoicing special-contract customers in 'real-time', a safe and accurate transfer of meter readings is of the utmost importance if the invoice is to be correct. If errors occur, the customers get annoyed, or angry, and in a liberalised energy market can very quickly change supplier. Any form of security in this respect is priceless.

The reasons for using an Absolute-ENCODER are as manifold as they are sound. In the near future, there will be, alongside the EK260 volume corrector, a number of devices which will be able to register and process original meter readings via a standardised interface. We will continue to keep you informed on the new possibilities and applications resulting from these developments. For example,



Fig. 2: ELSTER-double-index for RVGs



Fig. 3: BK G4 Diaphragm meter with an Absolute-ENCODER

in the next issue of Profiles, we will show you how it is possible to automatically read out domestic diaphragm meters fitted with an ENCODER with an M-Bus interface.

Our new optical Absolute-ENCODER is indeed an ENCODER for everybody. We can prove it and we stand by our claim. Why not try it out?

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## ELSTER ABSOLUTE-ENCODER

# Unique technology with extended range of functions and a new design

The starting point of any data chain is always the actual volume registered by the gas meter. This volume is displayed on the mechanical index and is transferred via pulses to downstream devices like volume correctors. Transfer of pulses means that the actual meter reading has to be reconstructed.

Faulty pulses caused by any form of straying or vibration, missing pulses as a result of a power failure, compensation processes in the pipe network and back-flowing gas can lead to discrepancies between the original meter reading and the reconstructed reading in the supplementary device.

These discrepancies can then cause arguments between contract partners, which in turn means that the original meter reading often has to be read out manually. The unique technology of the Absolute-ENCODER solves this problem.

### ENCODER principle

The Absolute-ENCODER index is an ideal combination of the advantages to be found in both mechanical and electronic indices. In this new system, the individual drums of the mechanical index are scanned opto-electronically. For this purpose, the individual drums have three slots, which are of different lengths and are ordered asymmetrically. Five beams of light then scan the slots to determine their position. In the example shown here (Fig. 1), three beams are in the area of the slots, two of them are blocked.

The slots are ordered in such a way that every position of the drum and thus the number on each drum is clearly identifiable. The system indicates the position of the drum as a 5 bit code – each of the light beams is either open or closed. This gives 32 different possibilities and, from these, two bit patterns are used to check the internal function (all of the light barriers closed – and all of them open). The remaining 30 bit patterns can be used to clearly identify any other positions, even intermediate positions.

The light barriers consist of phototransistors, LEDs and photoconductors which are all scanned and evaluated one after the other. The light barriers are controlled and evaluated by a controller. This controller exactly defines the position of each individual number on the roller and transfers this as part of a pre-defined protocol to the supplementary device via the electrical interface.

One of the main features of the Absolute-ENCODER index is that it does not require its own power supply, simply because it is a normal mechanical index. The electrical energy necessary during the readout process is provided by the supplementary device (e.g. volume corrector) or the electrical interface. No power supply is required to continue the counting process in between the readouts. When the volume corrector calls up the data a second time, it automatically receives the actual reading on the mechanical index showing the

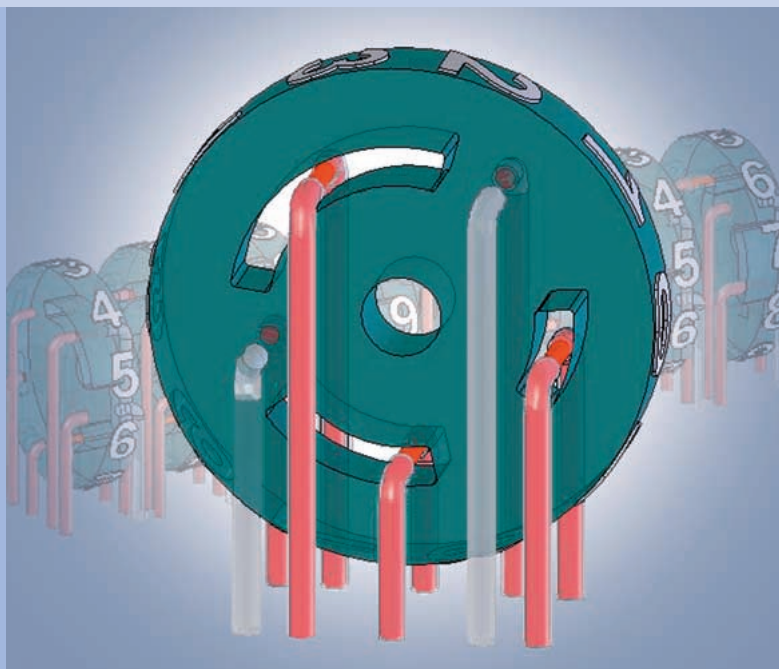


Fig. 1: The principle of the optical sensor system on an index drum

actual volume. This means that the original meter reading is always available in the volume corrector, which helps to avoid any errors in the data chain between the meter and the follow-up devices.

There are a number of 'pseudo' Encoders on the market which do in fact help to improve the consistency of the reconstructed and the original meter readings (e.g. by determining the direction of the rotation). However, these systems are based on the reconstruction of the meter reading by counting the pulses, which has a number of disadvantages.

## Encoder for all meters

The Absolute-ENCODER is available for all diaphragm meters, turbine meters, steel quantometers and rotary meters (RVG series starting from G40). For the rotary meter the Absolute-ENCODER technology is also available in the double index version.

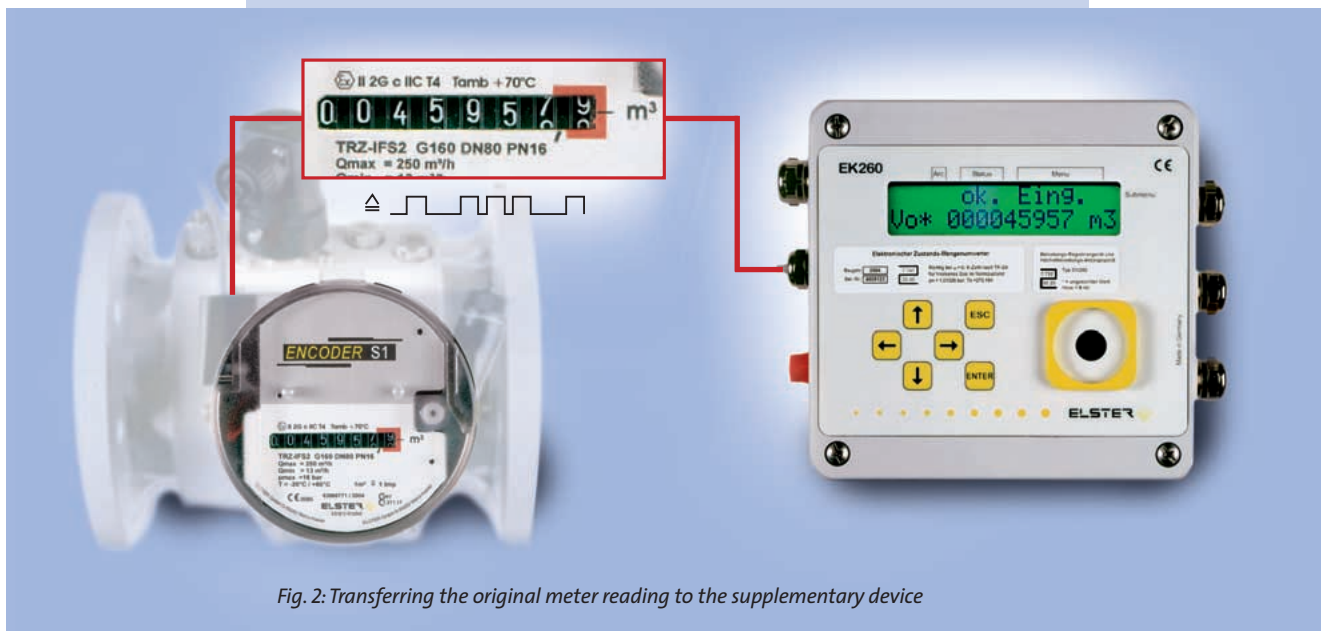


Fig. 2: Transferring the original meter reading to the supplementary device

## Interfaces

In order to guarantee the highest degree of flexibility as far as the interface is concerned, the hardware is arranged on a separate circuit board thus enabling individual applications.

In line with the different index versions for diaphragm meters (Z6) and turbine meters, steel quantometers and rotary meters (S1), the Absolute-ENCODERS have also been named Z6 and S1.

At the moment, there are three different interface variations available:

### NAMUR

The NAMUR interface is already used in the first generation of the C1 Encoder.

### M-Bus

The M-Bus interface is particularly suitable for connecting several meters to an electronic evaluation device, e.g. in domestic metering.

### SCR (System for Communication and Readout of meters)

This low-power interface works with a protocol in accordance with IEC 62056-21 (formerly IEC 1107) and is already quite common in water meters. With the help of a small, separate, external wiring system the SCR interface can be made compatible with the CL interface known from electricity meters.

With new devices it is possible to install the ENCODER as the main index. Retrofitting the S1 Absolute-ENCODER in a turbine meter or rotary meter is also no problem. Absolute-ENCODERS can also be attached to metering devices with a mechanical instrument drive. The retrofitting can be carried out on site.

## Approvals

On top of the metrological approval issued by the PTB for all versions, the ENCODER has also received the ATEX approval for use with the 'NAMUR' and 'SCR' interfaces. For functional and application reasons the M-Bus is not suitable for use in hazardous areas.

The ENCODER technology was once typically associated only with larger systems. Now, it can be used for all applications in the field of gas metering and helps to provide individual and flexible solutions.

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