ABSOLUTE ENCODER AE2/AE3

Electronically readable mechanical roller index for diaphragm meters for smart metering

BRIEF INFORMATION

Absolute ENCODER AE2/AE3 combines the positive features of a mechanical and electronic index. The technology is based on opto-electronic scanning which identifies the position of the individual rollers on the mechanical index in a contact-free process. The absolute meter reading is determined via the exact position of the individual digit rollers and is provided as a data log by the ENCODER.

A communication module is used for data transmission to a downstream receiving unit that functions as M-Bus master. The communication module is simply plugged onto the ENCODER (see data sheets ACM M-BUS WIRE, ACM SCR+ WIRE and ACM WAVE SYSTEM RF).

The power supply of the Absolute ENCODER AE2/AE3 is provided by the receiving unit or the connected communication module. A battery is therefore not required for operation of the Absolute ENCODER AE2/AE3.

Thanks to the modularity of the communication modules diverse practical requirements can be covered. Depending on the local installation situation, either a cable-based or wireless communication module can be selected for data transmission on the same Absolute ENCODER AE2/AE3. This means that the efforts and expenditure of installation, commissioning and data provision are minimized. This ensures investment security for future uses.

In conjunction with the communications module ACM..V-Drive, the Absolute ENCODER AE2/AE3 with DSMR protocol offers the optional function of remotely switching a valve integrated in the diaphragm gas meter (see Smart valve data sheet).

FUNCTION

The Absolute ENCODER AE2/AE3 has eight leading digit rollers. Seven digit rollers are individually scanned by opto-electronic means. The lowest-order digit roller is not scanned. Each roller has three asymmetrically arranged slots of different lengths which are then scanned by five beams of light to determine their position. The respective position of the roller and thus the digits on the roller can be clearly identified thanks to the specific arrangement of the slots.

The light barriers consist of phototransistors, LEDs and optical waveguides which are all scanned and evaluated one after the other using time-series analysis. Control and evaluation of the light barriers is carried out by a controller. This exactly defines the position of each individual digit roller and transmits the data to the connected communication module according to a defined protocol.

MAIN FEATURES

- Recording and forwarding absolute meter readings.
- Cable-based or wireless data communication available as options.
- Opto-electronic scanning of the digit rollers.
- Re-calibration periods are not reduced and can continue to be increased using random sampling procedures.
- The metrology-relevant part operates independently of electrical power.
- Battery-free cable-based communication.
- Simple plug-in installation of communication modules with immediate availability.

APPLICATIONS

- Media: natural gas, propane and butane (Gases in acc. with EN 437)
- Industries: gas industry
- Tasks: remote data readout

OPTIONS

- Communication modules for Absolute ENCODER AE2/AE3 can be retrofitted in the field.
- Remotely switchable valve in gas meter (see Smart valve data sheet).

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TRANSMISSION PROTOCOLS

Standard M-Bus

The M-Bus standard protocol in accordance with DIN EN 13757-2:2004 (link layer) and DIN EN 13757-3:2004 for meters and remote meter reading is implemented. The protocol does not support activation of the smart shut-off valve in the gas meter.

M-Bus in accordance with DSMR

Specific additions are taken into account for this protocol (based on DSMR (Dutch Smart Meter Requirements), Version 2.2). The protocol supports activation of the optional smart shut-off valve in the gas meter and encrypted data transmission.

M-Bus in accordance with OMS (Open Metering System), Volume 2

The M-Bus data transmission protocol in accordance with OMS is implemented. The protocol does not support activation of the smart shut-off valve in the gas meter. When using a wireless communication module, data is transferred encrypted. Cable-based communication is carried out without encryption.

SCR+

This Elster-specific protocol does not support activation of the smart shut-off valve in the gas meter. Data transmission is not encrypted.

Protocol interpretation is available on request.

Multi-protocol

The multi-protocol combines the OMS M-Bus and SCR+ protocols.

The required protocol is activated by the selected communication module.

AES 128 encryption

The transmission protocol DSMR M-Bus supports encrypted data transmission.

The Advanced Encryption Standard (AES) is used for encryption with a block size of 128 bit.

AES 128 offers a very high level of security and is state-of-the-art encryption technology. Transmission of the required key (size 16 bytes) is implemented in accordance with DSMR.

SEALING

The Absolute ENCODER AE2/AE3 system is secured with two seals.

The first seal is on the ENCODER index on the right-hand side of the housing. It secures access to the metrology-relevant part of the gas meter and the parameterization of the ENCODER.

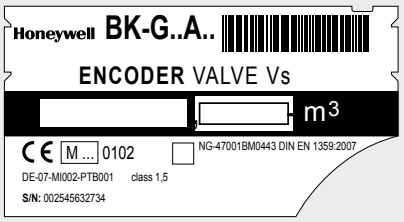
The second seal is included in the delivery of the communication module and is affixed once the communication module has been connected to the ENCODER index. Thanks to this separate seal, which does not affect the metrology-relevant part of the gas meter, the connection cable of the cable-based communication module can be installed on site and simply replaced at any time.

TAMPER PROTECTION

The digit rollers are individually scanned by opto-electronic means. The Absolute ENCODER AE2/AE3 is thereby not prone to faults caused by static magnetic fields. The mechanical recording system in the metrology-relevant part of the gas meter is resistant to electromagnetic interference.

Tampering via the viewing window in the index can be verified by checking for pressure marks. Three small bars behind the index disc leave clearly visible marks on the index plate when pressure is applied to the index.

INDEX PLATE



The individual technical data and the type of transmission protocol can be read off the index plate of the Absolute ENCODER AE2/AE3.

The note “ENCODER VALVE” on the index plate indicates that a remotely switchable valve is integrated in the gas meter.

TECHNICAL DATA

Absolute ENCODER AE2/AE3 for diaphragm gas meters BK-G2.5 to BK-G100.

Out of eight digit rollers, seven are individually scanned by opto-electronic means. The lowest-order digit roller is not scanned.

Ambient temperature: -25 to +55°C.

Enclosure: IP 54.

Absolute ENCODER AE2/AE3 for diaphragm gas meters BK-G2.5 to BK-G100 is MID tested.

The plug-in communication module outside the metrology-relevant part is EMC tested in accordance with EN 61000.

THE HONEYWELL SMART METER SOLUTION

Absolute ENCODER – The electronically readable mechanical roller index for diaphragm meters for residential, commercial and industrial diaphragm gas meters – is part of the Honeywell smart meter solutions package. From mechanical meters and smart index technologies to complete meter data collection and meter data management systems, Honeywell can supply everything required for an efficient, coordinated all-in-one smart metering solution.

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