EK230

Electronic volume corrector with integrated data logger

This product is discontinued!

Applications

Universal use in almost all applications thanks to flexible data logging function and support of different data transfer protocols

Brief information

The EK230 is a battery-operated volume corrector. It can be used with all gas meters such as diaphragm, turbine or rotary gas meters. The volume corrector records the low frequency operating volume pulses of a gas meter, measures the operating pressure and temperature of the gas, and calculates the compressibility K as well as the conversion factor C. The standard volumes, standard flow rates and operating flow rates can be calculated using this initial data.

The EK230 consists of a central unit with either an integrated or external pressure sensor and a temperature sensor which is permanently connected to the unit. The compressibility K can be programmed as a constant for all gases or calculated according to various methods of calculation (S-GERG 88, AGA NX-19, AGA 8 GC1 and GC2).

The volume corrector can be used in many applications in the field of natural gas measurement thanks to four digital outputs, a flexible data logging function in conjunction with a serial interface and different communication protocols.

Additional components for explosion-proof isolation of the interfaces and the intrinsically safe external voltage supply, and for data communication, extend the range of use of the volume corrector.

Display and operation

The current values and parameters can be shown on the two-line, alpha-numerical display and changed if required. The use of four arrow keys guarantees simple navigation of data arranged in lists. Each value is displayed with a clear description and the relevant unit.

For everyday operation, the most important values are combined in a configurable user list. The display range can be limited to this list, which will guarantee simple operation of the volume corrector at the metering point. At the touch of a few buttons, the current meter readings and the main operating parameters can be checked.

Main features

- System volume corrector
- Conform to European standard EN 12405
- MID approval
- Compressibility calculated in accordance with S-GERG 88, AGA 8 (GC1 and GC2), AGA NX-19 or programmable as a fixed value
- Flexible, integrated data logging function
- High accuracy
- Mains-free operation
- Suitable for use in Zone 1 hazardous areas
- Three digital inputs
- Four freely programmable, sealable digital outputs
- Various communication protocols
  - IEC 62056-21
  - Modbus
- Optical interface for parameterisation and readout (IEC 62056-21)
- Serial interface RS232 or RS485 (optional)

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Data logging function

The integrated, event-triggered data logger supports four independent archive functions.

The actual and standard volume meter readings as well as the average values of pressure and temperature, of the super compressibility factor and the conversion factor are recorded in the daily and interval archives. Each entry made in the archives will receive a time stamp with the date and time.

The measuring period for the interval archive can thereby be set between one minute and one month. The EK230 has a memory capacity of 5000 entries for the interval archive and 600 entries for the daily archive. More than six months of data can be stored when applying 60 minute storage intervals.

Logbooks

The EK230 has two logbooks to ensure traceability of operating status, status changes and settings.

The event logbook is used to record the last 250 status changes.

The last 200 changes to values and parameters are entered in the change logbook (audit trail). The old and new parameters are recorded in addition to the time of the change. In addition, the access rights under which the change was carried out are also recorded (calibration, supplier or customer lock).

Communication interface

Local programming or readout of the unit is performed via the optical interface (IEC 62056-21) on the front panel.

In addition a serial interface modul (RS232 or RS485) allows a modem and other communication components to be connected. The volume corrector can thus be integrated into various applications and remote data transfer systems.

Communication protocols

The EK230 supports various communication protocols.
Invoice-relevant data or process and operating data for network management can therefore be used simultaneously in many established central call-up systems and EDM systems.

Using the communication protocol in accordance with IEC 62056-21, all parameters can be read and changed and the archives can be read out. All protocol information is disclosed and is available on request for the development of own applications and call-up systems.

As an alternative to the protocol in accordance with IEC 62056-21, the Modbus protocol can also be used for data communication via the internal interface, which allows connection to SCADA systems. Modbus/RTU and Modbus/ASCII operating modes are supported.
In order to guarantee the greatest flexibility as regards different requirements, the data elements, associated indicators and data formats can thus be freely configured.

All protocol information is disclosed and is available on request for the development of own applications.

Additional functions

Two additional digital inputs can be used either as pulse inputs or status inputs for various applications, such as station monitoring and pulse comparisons, for example.

Four freely programmable digital outputs enable a range of information to be transmitted. When programmed as pulse outputs, they allow forwarding of the volume pulses determined for a measuring cycle in the form of pulse packets. When used as status outputs, messages and warnings can be signalled on the basis of different results (e.g. exceeding the minimum or maximum consumption values or measured values, sensor errors, time synchronisation signals, etc.). The outputs can either be secured against unauthorised changes by supplier lock or calibration lock.

Power supply

The power supply for the unit is provided by a lithium battery. In standard operation, the service life of the battery is 5 years. An optional additional battery can be used to double the battery life. The current operating status of the volume corrector is taken into account when calculating the remaining battery capacity. If the battery life is 3 months or less, the corresponding indication appears in the display. In addition, this information can also be called up via the volume corrector status register. The battery can be replaced without damaging the seals. All parameters are saved in a non-volatile memory.

In addition, it is also possible to use an external voltage supply, in conjunction with a serial interface. In this case, the battery remains in the unit and guarantees the unit functions, including if there is a failure of the external power source.
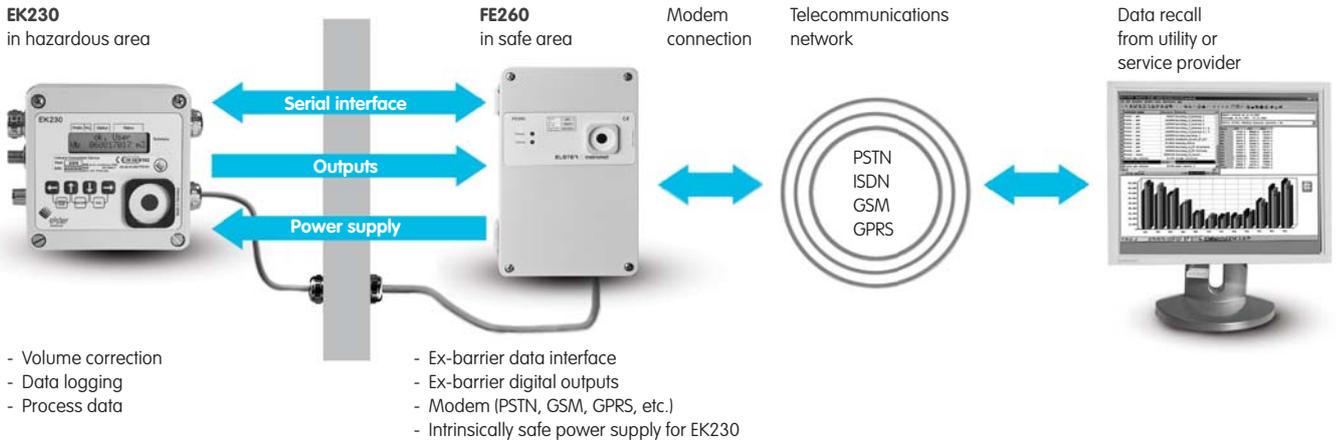
Version

For wall mounting, the housing of the EK230 is equipped with boreholes. It can also be fitted directly to the meter or gas pipe using an attachment bracket.

Accessories (modems)

An EK230 installed in an explosion-hazard area can be integrated in remote data transfer systems using the function extension unit FE260. The industrial modem EM260 is particularly suited for remote data transfer in non-explosive areas under difficult ambient conditions in energy supply companies and in industry. The modular concept of these units allows various interfaces to be used to connect other devices as an alternative to the modem. Function extension unit FE230 is a battery-operated GSM modem which allows data communication without an external voltage supply.

FE260 function extension unit – a flexible interface between volume corrector and energy data management

EK230
in hazardous area

FE260
in safe area

Modem
connection

Telecommunications
network

Data recall
from utility or
service provider

Serial interface

Outputs

Power supply

PSTN
ISDN
GSM
GPRS

- Volume correction
- Data logging
- Process data

- Ex-barrier data interface
- Ex-barrier digital outputs
- Modem (PSTN, GSM, GPRS, etc.)
- Intrinsically safe power supply for EK230

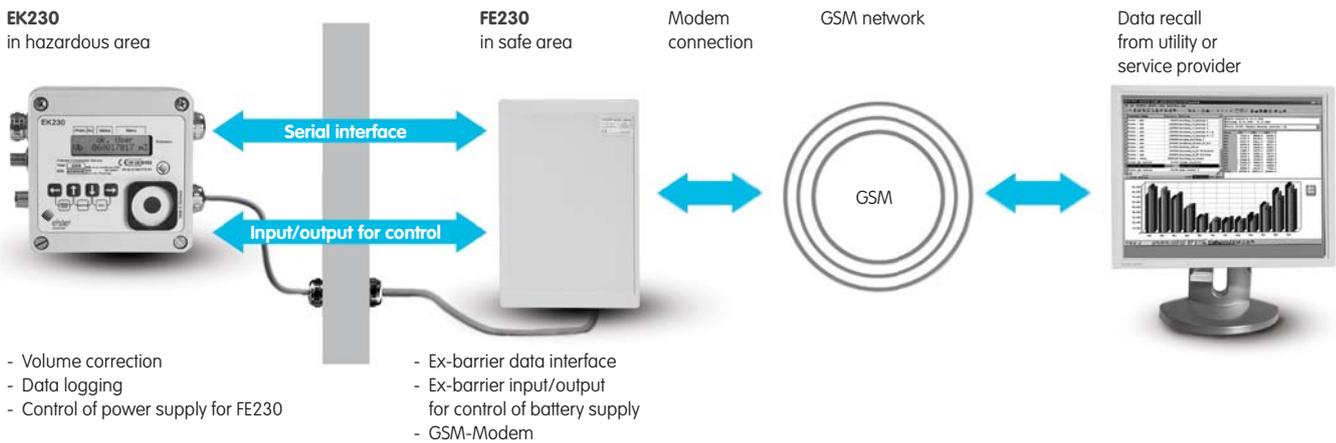The Ex-barrier of the serial interface and the pulse outputs of the volume corrector are provided by the FE260 function extension unit. In addition, the intrinsically safe power supply of the volume corrector is guaranteed. The unit's modular concept allows the use of a modem for data communication or an interface for connection to other devices.

FE230 function extension unit – battery-operated GSM modem for data communication

EK230
in hazardous area

FE230
in safe area

Modem
connection

GSM network

Data recall
from utility or
service provider

Serial interface

Input/output for control

GSM

- Volume correction
- Data logging
- Control of power supply for FE230

- Ex-barrier data interface
- Ex-barrier input/output
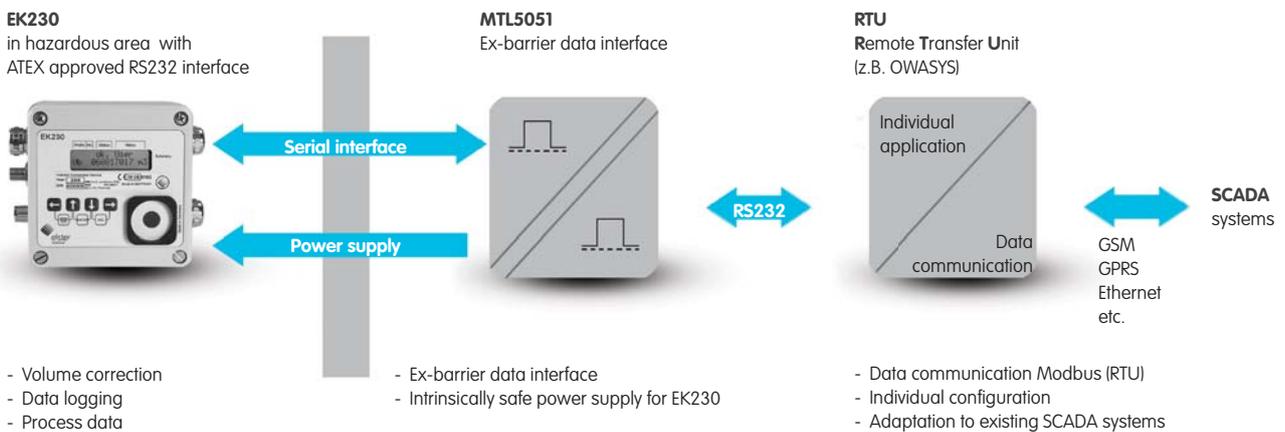 for control of battery supply
- GSM-Modem

The FE230 function extension unit is a battery-operated GSM modem which allows data communication without external power supply. To optimise the service life of the battery, the volume corrector activates the modem within a programmable, cyclical time window for calling up the data.

EK230 in conjunction with MTL5051 for connection to a SCADA system (Modbus/RTU protocol)

EK230
in hazardous area with
ATEX approved RS232 interface

MTL5051
Ex-barrier data interface

RTU
Remote **T**ransfer **U**nit
(z.B. OWASYS)

Serial interface

Power supply

RS232

Individual
application

Data
communication

SCADA
systems

GSM
GPRS
Ethernet
etc.

- Volume correction
- Data logging
- Process data

- Ex-barrier data interface
- Intrinsically safe power supply for EK230

- Data communication Modbus (RTU)
- Individual configuration
- Adaptation to existing SCADA systems

EK230: Electronic volume corrector with integrated data logger

Technical data	
Order number	83462350
Housing	Cast aluminium, wall or meter mounting
Dimensions	H 126 mm x W 126 mm x D 90 mm (not including connections)
Weight	Approx. 1.5 kg (including batteries)
Metrological approval	Conforms to the European standard EN 12405-1: 2005 +A1: 2006 MID DE-08-MI002-PTB001 volume conversion device
ATEX approval	Zone 1, EEx ia IIC T4
Protection class	IP 66 (suitable for outdoor installation)
Ambient conditions	Temperature: -25 to +55 °C
Battery power supply	1 lithium battery module (service life > 5 years under standard operating conditions) Optional additional battery to double the service life
External power supply	5 – 10 V DC, I < 30 mA mains power supply unit (in conjunction with a serial interface)
Control panel	Keypad with 4 buttons
Display	2-line dot-matrix display with plain-text description of the values displayed. All parameters, settings and archived values can be displayed.
Inputs	3 digital inputs for connecting LF pulse generators and message signals (e.g. manipulation contact)
Pressure sensor	Absolute sensor, Type ENVEC CT30, integrated in housing or, as an option, provided as an external sensor, connection for precision steel pipe (Ermeto 6L) or flexible pressure tube, M12 x 1.5 thread Pressure ratings 0.7 – 2 bar / 0.8 - 5 bar / 1.4 - 7 bar / 2 – 10 bar / 2.4 - 12 bar / 4 – 20 bar / 6 - 30 bar / 8 - 40 bar / 14 – 70 bar / 16 – 80 bar
Temperature sensor	Pt-500 resistance thermometer to DIN 60751 with protective tube, for use with thermowell. - Fitting length 50 mm Ø 6 mm, length of supply cable 2.5 m
Compressibility	Calculation in accordance with S-GERG 88, AGA 8 (GC1 or GC2), AGA NX-19 or programmable as a constant
Archives	Daily archive - Event-triggered recording of meter readings and measured values with time stamp and status - Recording at the respective day limit (e.g. 06:00) - Storage capacity 18 months (600 records) Measuring period archive - Event-triggered recording of meter readings and measured values with time stamp and status - Recording interval (measuring period) settable as required (1 minute – 1 month) - Storage capacity 6 months at a recording interval of 60 minutes (5000 records)
Logbooks	Event logbook - Recording of non-periodic events (e.g. time changes with time stamp) - Storage capacity 250 records Change logbook (audit trail) - Recording of all parameter changes with time stamp (old and new values) - Storage capacity 200 records
Signal outputs	4 digital transistor outputs, freely programmable and protectable via calibration lock as - Pulse output for all operating or standard volume meters - Signal output for alarm and/or warning status information
Data interface	Optical interface in accordance with IEC 62056-21 (IEC1107) Option: Internal serial interface RS232 (standard), RS232 (ATEX) or RS485 (ATEX)
Communication protocols	- IEC 62056-21 (IEC1107) - Modbus ASCII - Modbus RTU - IDOM-Protocol Other communication protocols on request

Your contacts

Germany
Elster GmbH
Steinerr Str. 19 - 21
55252 Mainz-Kastel
T +49 6134 605 0
F +49 6134 605 223
www.elster-instromet.com
info@elster-instromet.com

Belgium
Elster-Instromet N.V.
Rijkmakerlaan 9
2910 Essen
T +32 3 670 0700
F +32 3 667 6940
www.elster-instromet.com
info@elster-instromet.com

Singapore
Elster-Instromet
Singapore Representative Office
80 Marine Parade Road
09-04 Parkway Parade
Singapore 449269
T +65 6247 7728
F +65 6247 7729

EK230 EN04

A04.06.2008