



Volume Conversion Device EK205

Operating
Instructions

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In view of extended product liability, the listed data and material properties should only be regarded as reference values and must always be checked for each individual case and corrected if necessary. This is especially the case when safety aspects are affected.

Further support is available from your local branch office or agent. The address is available on the Internet or from Honeywell.

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Mainz-Kastel, December 2022

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1 General

1.1 Information in these instructions

These instructions make it possible to work with the device in a safe and efficient manner.

Compliance with all of the safety and handling instructions specified in this operating manual is a prerequisite to working with the device in a safe manner and to use it properly. In addition, compliance is also necessary with the guidelines, standards, local accident prevention regulations and general safety regulations that apply for the device's area of application.

The instructions are a component of the product and must be kept in the immediate vicinity of the device, so that installation, operational, maintenance, and cleaning personnel may access them at any time. The graphical illustrations in these instructions serve to depict the facts that are being explained and are therefore not necessarily true to scale and may differ from the actual design of the device.



The data and material properties that are presented below are guidelines. They must be reviewed for each individual case and corrected if necessary.



For the commissioning of the various communication and device applications, you can use the application manual of the EK205 (see section 1.1.1).

1.1.1 Downloading manuals from Docuthek

Elster Gas provides user documentations such as manuals, certificates, data sheets and technical information bulletins for various device types in Docuthek. The documents are updated on a regular basis:

<https://docuthek.kromschroeder.com>

Use the device type EK205 as your search term.



Check the PDF after downloading it.

You can use SHA-1 checksum information to check the file integrity of a PDF after downloading it using a suitable tool.

The desired value of the SHA-1 checksum for a PDF can be found in Docuthek in the detailed information in the section entitled "Remarks" or, if you have downloaded the PDF from the Elster-Instromet website, in brackets next to the download link.



Which manuals are relevant for earlier device software versions?

Docuthek only contains the current manual versions. If you are using an older software version, you can find the manuals for every version in the software history on the Elster-Instromet website. The software history is available for product releases since 2020 in PDF format in the download area for the relevant device type.

www.elster-instromet.com/en/volume-converter

1.1.2 Device software available on the Elster-Instromet website

The Elster-Instromet website contains the latest software releases for the Elster Gas device series. The current versions for EK205 and enSuite can be found in the download area:

www.elster-instromet.com/en/software-downloads

The change history provides information about new functions, improvements, bug fixes and security problems which have been rectified. The change history is available for product releases since 2020 in PDF format in the download area for the relevant device type.

Furthermore, the change history lists the relevant manuals for a software release.



Elster Gas newsletter

Our newsletter provides you with regular information about new software releases and relevant manuals for the EK, DL and enCore FC device series. If you are interested, you can register at:

<https://outcomes.gasdatalab.com/techniknewsEN.html>

1.2 enSuite parameterization software

The download area of the Elster-Instromet website also contains the enSuite parameterization for Windows 64-bit (from Windows XP) required for the commissioning process:

www.elster-instromet.com/en/software-downloads



Updating enSuite

We recommend that you download the latest version of enSuite from the Elster-Instromet website before you commission the EK205.

1.3 Warranty provisions

The current warranty provisions can be found in our General Terms of Business, e.g., on our website at:

www.elster-instromet.com/en/general-terms-of-business

1.4 Customer service and Technical Support (TAC)

Our customer service department is available for technical advice as well as repairs. Furthermore, our employees are always interested in new information and experiences that arise through use of the device and that may be valuable for improving our products.

1.4.1 Customer services and repairs

- Phone: +49 (0) 61 34/605-346
- Fax: +49 (0) 61 34 605-390
- E-mail: PMT-Reparatur_Mainz-GE4N@honeywell.com

1.4.2 Technical Assistance Center (TAC)

Our Technical Support (TAC Technical Assistance Center) is at your disposal in case of faults:

- Phone: +49 (0) 6134 / 605-123
- Website: www.elster-instromet.com/en/support
- Knowledge Base: www.honeywellprocess.com/support
- E-Mail: ElsterSupport@honeywell.com

1.5 Explanation of symbols

1.5.1 Safety instructions

Safety instructions are indicated in these instructions by symbols. The safety instructions are introduced by keywords that express the extent of the risk.

Safety instructions must be observed and treated diligently to avoid accidents, personal injury and material damage.



DANGER!

...indicates an immediately hazardous situation that leads to death or severe injury if it is not avoided.



WARNING!

...indicates an immediately hazardous situation that may lead to death or severe injury if it is not avoided.



CAUTION!

...indicates an immediately hazardous situation that may lead to minor or slight injury if it is not avoided.



... indicates hazards from electric current. In the event of non-observance of the safety instructions, there is a risk of severe or fatal injuries.



CAUTION!

...indicates an immediately hazardous situation that may lead to material damage if it is not avoided.

1.5.2 Tips and recommendations



... highlights useful tips and recommendations as well as information for ensuring efficient and smooth operations.

1.6 Limitation of liability

All specifications and instructions in these operating instructions were compiled under consideration of applicable standards and regulations, the current state of the art and the knowledge and experience we gained over the years. The manufacturer assumes no liability for loss due to:

- Non-compliance with these operating instructions
- Use of the device not in accordance with its intended use
- Use of the device by non-instructed personnel
- Unauthorized device modifications
- Technical changes
- Use of non-authorized replacement parts

The actual scope of delivery may differ from the explanations and descriptions included here in case of special device designs, the use of additional order options or because of the latest technical changes.

The obligations arranged in the delivery contract apply, as do the General Terms and Conditions, manufacturer delivery conditions and current legal regulations that apply at the time the contract was concluded.



Read through these operating instructions carefully before beginning any work to and with the device, especially before commissioning the device! The manufacturer assumes no liability for loss and malfunctions that result from non-compliance with these instructions.

We reserve the right to make technical changes within the scope of improving performance characteristics and continuous development of the device.

1.7 Copyright

These instructions are copyright-protected and intended for internal purposes only. Handover to third parties, copies of any form, including extracts, as well as utilization and/or notification of the content without written approval of the manufacturer is not permitted, except for internal purposes. Violations give rise to compensation. Further claims remain reserved.

1.8 Scope of delivery

The scope of delivery of the EK205 includes:

- Electronic Volume Conversion Device EK205
- Dispatch breakdown
- Interpretation data sheet
- Instructions
- Accessories bag

1.9 Replacement and accessory parts



WARNING!

Incorrect replacement parts and accessories are a safety risk!

Incorrect or defective replacement parts and accessories may detract from safety and lead to damage, malfunction, or total device failure.

Therefore:

- Use only original replacement parts and accessories from the manufacturer.
- Always contact the manufacturer if you are in doubt.

The replacement parts and accessories list can be found in the appendix. Replacement parts and accessories can be ordered from a contract dealership or directly from our customer service.

The accessories of the EK205 also include the free enSuite program (see section 1.1.2). With them, you can program the Volume Conversion Device EK205 via its data interfaces in order to carry out further applications.

The EK205 is available in numerous equipment variants.

Details can be found at www.elster-instromet.com as well as in section 6 “Installation, connection and commissioning”.

1.10 Storage



CAUTION!

Reduced performance after exceeding or falling below the valid temperature range of the batteries.

Exceeding or falling below the valid temperature range can reduce the performance of the batteries when storing the device.

Therefore:

- For longer-term storage, ensure that the valid temperature range of the built-in batteries between -25 °C and +55 °C is not exceeded or fallen below.



CAUTION!

Material damage from formation of condensation!

Storing the device can lead to the formation of condensation resulting from variations in temperature. This may result in the device malfunctioning at a later time.

Therefore:

- After the device has been stored or transported in cold weather or if it has been subject to extreme variations in temperature, bring it slowly to room temperature before it is commissioned.
- The device must undergo a waiting period of at least 12 hours before it is put into operation if condensation formed during storage.



If the power supply of the device is interrupted during storage from clamping the batteries, the time and date need to be reset.

The following regulations apply for storage:

- Relative humidity may not exceed 93%.
- Do not store the packaging units outdoors.
- The storage temperature may not fall below -25°C and exceed +55°C.
- Avoid mechanical vibrations during storage.

2 Security considerations for your network

EK series volume converters are used in modern billing infrastructures and network control systems to supply process information such as meter readings, measurements and messages to a billing or control centre. A connection of this type constitutes a significant security risk which must be given careful consideration when designing the network.

2.1 How to report a vulnerability

A vulnerability is defined as an error or weakness in the software which can be exploited to adversely affect or reduce the operation or security of the parameterization or device software.

Honeywell reviews all reports about vulnerabilities relating to Honeywell products and services. You can find further information about the Honeywell Security Policy at:

www.honeywell.com/product-security

If you would like to report a possible vulnerability in a Honeywell product, follow the instructions on the Honeywell website at:

www.honeywell.com/product-security

You can find information about current malware threats at:

www.honeywellprocess.com/en-US/support/Pages/security-updates.aspx

OR

Contact your local Honeywell Process Solutions Customer Contact Center (CCC) or our Elster Gas Technical Support team (see section 1.4.1 “Customer services and repairs”, page 8).

2.2 Implementing stringent password guidelines

Since various types of attacks on passwords take place these days, you should follow best practices for password management. Here are a few time-tested methods:

- Change standard passwords.
- Use secure passwords. A secure password for LIS devices consists of eight characters.
- Change passwords on a regular basis.
- Change passwords immediately in case someone has tried to attack the system.
- LIS200 uses role-based authentication, please follow best practices for shared passwords like secured distribution and secured storage.

**Passwords can be changed via so-called insecure protocols without re-authentication!**

Note that when a password is changed via IEC 62056-21 and DLMS, the initial password is not queried again. This vulnerability enables a potential attacker to assign a new password without specifying the old password!

It is therefore even more important to protect data communication from third-party access.

**Document any changes from time-tested methods.**

If your system does not allow one of these time-tested methods to be used, you should document this. For example, if special symbols such as the equals sign “=” are not allowed in passwords.

2.3 Preventing unauthorized external access using a firewall

To reduce the risk for your network, we recommend that you use a firewall or another mechanism to restrict network traffic between the “external” central billing or control system and the “internal” network of the gas metering systems. Furthermore, EK devices should only be installed in the gas metering system, where access control is guaranteed, i.e., protective action is taken to prevent unauthorized persons gaining access to the device.

We also recommend that you only allow protocols and ports which are actually used for data exchange with the external network and that these are added, for example, to the firewall's whitelist.

Refer to the information in section 2.4 “Data security for data at rest and in transit”.

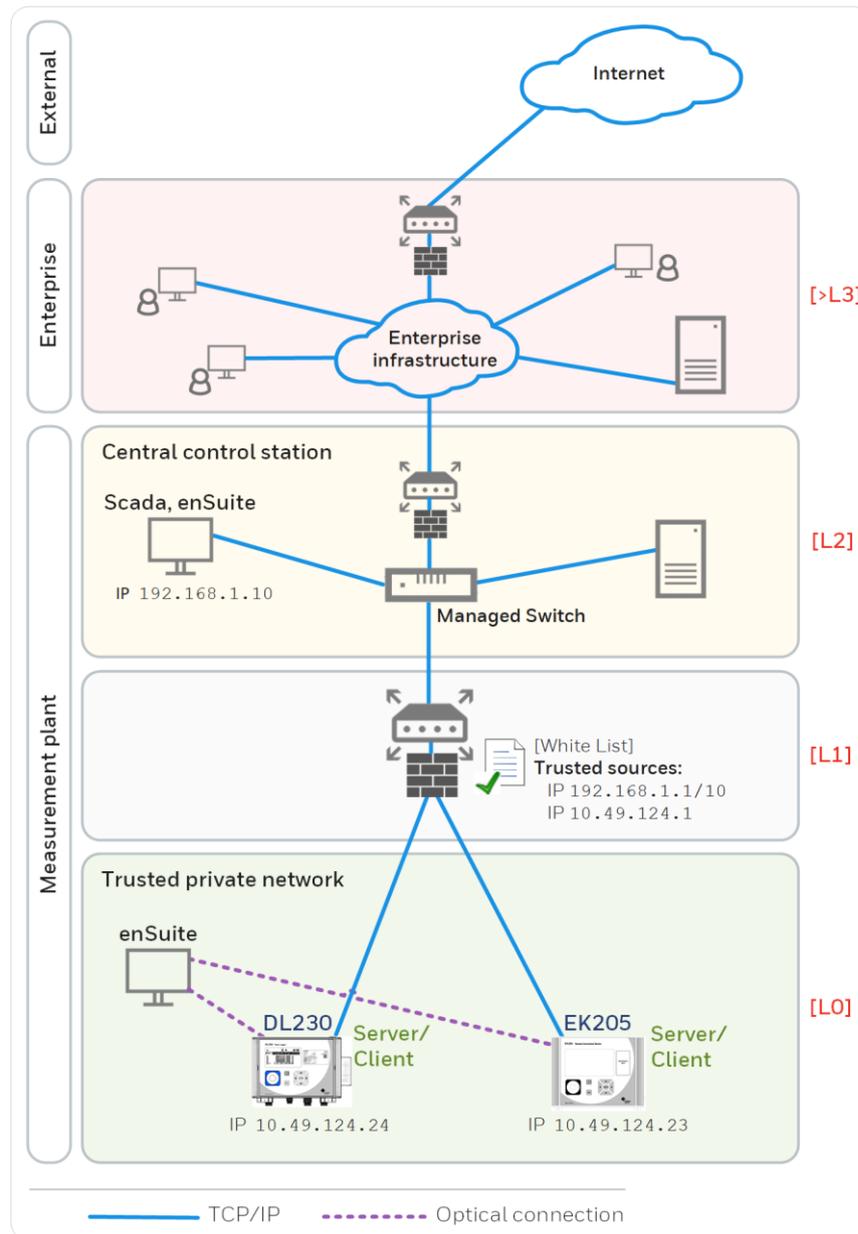


Fig. 1: Router and firewall between the metering systems and control centre – example with indication of security zones L0..L3 and higher according to IEC 62443



We recommend opening safety zone L0 only for zone L1 and not for zones L2, L3 and L4.

2.4 Data security for data at rest and in transit

2.4.1 Data security for data at rest

Data at rest are the data which are temporarily or permanently stored in the EK205. These data are unencrypted in the EK series. This means it is even more important to protect the device from unauthorized access.

See section 2.3 “Preventing unauthorized external access using a firewall”.

2.4.2 Data security for data in transit

Data in transit are data which are currently being transferred between the EK205 and, for example, a control station in a public or trustworthy network.

The protocols used with the EK205 normally transfer the data in plain text form. If possible, you should therefore use the secure version of a protocol (see section 4.9 “Supported protocols”, page 28).

See section 2.3 “Preventing unauthorized external access using a firewall”.



Using an encrypted VPN connection

We recommend that you use a VPN connection whenever you require a secure data connection, but a secure protocol is not supported for the data transfer.

In a VPN, the data are transferred between two or more subscribers in encrypted form. Therefore, a VPN connection is extremely important, for example for mobile access to a volume conversion device, for accessing a private network or for data communication using different systems.

3 Safety

This section provides an overview of all key safety aspects for optimal protection of the staff as well as for safe and fault-free operation.

Non-observance of these operating and safety instructions may result in considerable hazards.

3.1 General

The EK205 is an intrinsically safe device and is suitable for operation within the zones at risk of gas explosion 0, 1 or 2 for gases of temperature class T4.

Check for use in zones 0, 1 or 2 in accordance with the currently applicable rules of the art: see section 11.3: EC type examination certificate no. LCIE 16 ATEX 3007 X and no. IECEx LCIE 16.0003X¹



DANGER!

Risk of explosion by connection to non-intrinsically-safe and associated equipment.

When operating the EK205 in an area at risk of explosion (zones 0, 1 or 2) and connecting devices without certification as an "associated piece of equipment", there is a risk of explosion.

Therefore:

- When used in an area at risk of explosion, connect the EK205 to certified, associated pieces of equipment only in accordance with the valid rules of the art stated in the design test certificates.
- Connect the EK205 only to intrinsically safe pieces of equipment whose electric data correspond to the requirements stated in the design test certificates of the EK205 (see section 11.3).



DANGER!

Risk of explosion from use of wrong batteries.

Use only batteries stated in the design test certificates of the EK205 (see section 11.3). Order number see section 11.1.4.

¹ Not available for all device types.

**DANGER!****Risk of explosion from incorrect use or connection!**

During connection and operation of the EK205 in areas at risk of gas explosion, observe the associated norms:

DIN EN 60079-0

The device may only be used in an area at risk of gas explosion if the installation is carried out in accordance with the general requirements of DIN EN 60079-0 and the operating conditions (see section “Technical data”) and connection conditions (see section “Installation, connection and commissioning”) are observed.

The device can be hazardous if it is used by staff not trained correctly in an improper or unintended manner.

- Anyone appointed to perform work to or with the device must read and understand these operating instructions before beginning work on the device. This also applies if the individuals concerned have already worked with such a device or a similar one, or were instructed by the manufacturer.
- Knowledge of the content is one of the requirements of protecting staff from hazards and avoiding faults and therefore operating the device in a safe and fault-free manner.
- In order to avoid risks and to ensure that the device performs in an optimal manner, no changes or modifications that were not expressly authorized by the manufacturer may be performed to the device.
- Always keep all operating instructions on the device in easily legible condition. Renew damaged or illegible instructions.
- Observe settings values or value ranges stated in the instructions.

3.2 Intended use

The device is designed and constructed exclusively for its intended use as described here.



The Volume Conversion Device EK205 serves to convert a gas volume of a gas line in basic condition measured by a meter in measurement conditions as well as to assign the volumes measured to tariffs. In addition, using the device, further parameters can be measured, recorded and monitored depending on the configuration set by the user.

Compliance with all the specifications in these operating instructions also falls under the device's intended use. Any use of the device that goes beyond or deviates from its intended use is considered a misuse of the device, and may lead to hazardous situations. Claims of any kind due to loss resulting from non-intended use of the device are excluded.

**WARNING!****Hazard from incorrect use!**

Incorrect use of the device may result in hazardous situations.

Therefore:

- Use the device only as intended.
- Do not use the device to control the gas flow or other parameters influencing the gas volume within the framework of the overall system.

3.3 Staff

**WARNING!****Risk of injury in the event of insufficient qualification!**

Improper use may result in considerable personal injury and material damage.

Therefore:

- Have all activities carried out by qualified staff only.

The following qualifications for different areas of activity are listed below in the instructions:

- **Instructed staff**
was instructed by the plant operator in an informational session on the tasks assigned to him or her, and on possible hazards in case of improper behaviour.
- **Specialist staff**
has the ability, because of his or her technical training, knowledge and experience, as well as his or her knowledge of the relevant regulations, to carry out the work to the device assigned to him or her, and to recognize and avoid possible hazards on his or her own.
- **Gas specialist**
has the ability, because of his or her technical training, knowledge and experience, as well as his or her knowledge of the relevant standards and regulations, to carry out work to gas systems, and to recognize possible hazards on his or her own. A gas specialist receives training for the specific location in which he or she works, and is acquainted with the relevant standards and regulations.
- **Calibration officer**
has the ability, because of his or her technical training, knowledge and experience, as well as his or her knowledge of the relevant standards and regulations, to carry out calibration-protected work to gas systems. The calibration officer is trained to work with calibration-protected devices and systems, and is acquainted with the relevant standards and regulations that apply.
- **Electrical expert**
has the ability, because of his or her technical training, knowledge and experience, as well as his or her knowledge of the relevant standards and regulations, to carry out work to electrical systems, and to recognize and avoid possible hazards on his or her own. A qualified electrician receives training for the specific location in which he/she works, and is acquainted with the relevant standards and regulations.

**WARNING!****Risk for unauthorized persons!**

Unauthorized persons who do not fulfil the requirements described do not know the hazards in the work area.

Therefore:

- Keep unauthorized persons away.
- In the event of doubt, speak to people and direct them out of the working area.
- Interrupt the work as long as unauthorized persons are in the working area.

Only persons are permitted as staff from whom it can be expected that they will perform their work reliably. Persons whose reactivity is influenced, e.g., from drugs, alcohol or medication, are not permitted.

- When selecting personnel to operate the device, make sure you comply with the specific regulations of the overall gas system that concern age and occupation.

3.4 Personal protective equipment

When working on the device within a gas system, wearing personal protective equipment is required to minimize health hazards.

- During the activity on the device, always wear the protective equipment required within the relevant system.
- Always observe the notes on the personal protective equipment provided in the working area.

3.5 Special hazards

The risks arising on the basis of the risk assessment are specified below. Observe the safety and warning instructions stated here in the further sections to reduce health hazards and avoid dangerous situations.

**WARNING!****Risk of injury when handling batteries incorrectly!**

Batteries need to be treated with special care.

Therefore:

- Do not throw batteries in the fire or expose them to high temperatures. There is a risk of explosion.
- Do not charge batteries. There is a risk of explosion.
- Liquid being released in the event of incorrect use may result in skin inflammations. Avoid contact with the liquid. Rinse the liquid with lots of water in the event of contact. If the liquid enters the eyes, rinse the eyes for 10 mins with water and see a doctor immediately.

**WARNING!****Fire hazard from easily flammable substances!**

Easily flammable substances, liquids or gases can ignite and cause severe to fatal injuries.

Therefore:

- Do not smoke inside the hazardous area and in the near proximity. Do not handle open flames or sources of ignition.
- Keep a fire extinguisher ready.
- Report suspicious substances, liquids or gases to the person in charge immediately.
- Suspend work immediately in the event of fire. Leave the hazardous area until the all-clear has been given.

3.6 Environmental protection

**CAUTION!****Substances harmful to the environment!**

When handling substances harmful to the environment, in particular in the event of incorrect disposal, severe damage may arise for the environment.

Therefore:

- Observe the below notes at all times.
- Take suitable measures immediately if substances harmful to the environment enter the environment by mistake. In the event of doubt, inform the municipal authorities in charge of the damage.

The following substances harmful to the environment are used:

- Batteries

Batteries contain poisonous heavy metals. They are subject to special waste treatment and need to be disposed of at the municipal collection points or by a specialist company.

3.7 Operator liability

The device is used in industrial applications. The device operator is therefore subject to legal obligations of occupational health and safety.

In addition to the safety instructions in these operating instructions, current regulations of safety, accident prevention and environmental protection must be observed for the device area of application. The following items especially apply:

- The operator must ensure compliance with the current regulations of safety, accident prevention and environmental protection that apply for the overall system in which the device is integrated.
- The operator must keep himself/herself informed of the applicable occupational health and safety regulations, and determine, over the course of a risk assessment, the additional risks that arise from the specific working conditions when the device is being used. The operator must include these items in the form of operating instructions for the device.

- The operator must review, over the entire operational life of the device, whether the operating instructions prepared by him or her correspond to the current status of the bodies of regulations and revise the instructions if necessary.
- The operator must definitively regulate and establish the responsibilities for device assembly, connection, commissioning, operation and maintenance.
- The operator must ensure that all employees who work with the device have read and understood these operating instructions. In addition, the operator must train these personnel at regular intervals and inform them of the risks involved with the device.
- The operator of the overall system in which the device is integrated must provide personnel with the required protective equipment.

In addition, the operator is responsible for ensuring the device is always in technically perfect condition. The following items therefore apply:

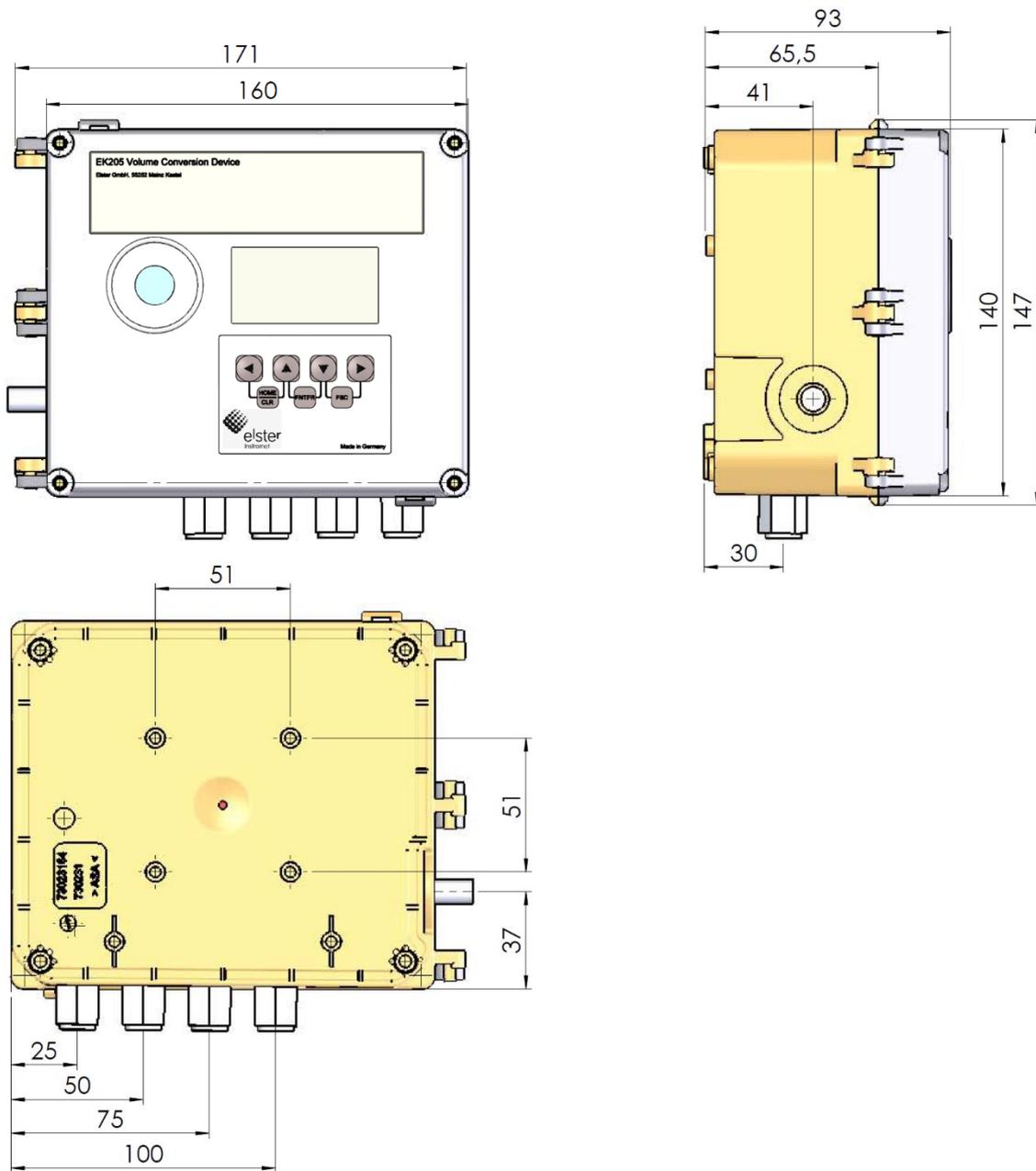
- The operator must ensure that the installation and maintenance work described in these operating instructions are performed properly.
- The operator must have all safety installations checked regularly to ensure they function correctly and are complete.

4 Technical data

4.1 General data

Information	Value	Unit
Width (incl. hinges)	170	mm
Height (incl. cable screw connections)	180	mm
Depth	90	mm
Permissible ambient temperature range	-25 – +55	°C
Permissible gas temperature range	-30 – +60	°C
IP protection class	IP65	

4.1.1 Dimensions



4.2 Power supply for EK205 without integrated mains adapter

4.2.1 Battery supply

Information	Value	Unit
Voltage	3.6	V
General nominal capacity	16.5	Ah
Usable capacity	13.0	Ah
Minimally required number of batteries	1	Unit
Minimal operating duration (in standard operation mode)	5	Years

The **standard operation mode** is defined as follows:

Information	Value
Measurement cycle	30 seconds
Mode input 1	Pulse input
Display active	60 minutes per month
Interface active	30 minutes per month
Ambient temperature	-10 – +50°C

4.2.2 External power supply for the basic device

Data	Value	Unit
Supply voltage	6.0 ...9.0	VDC
Supply current, maximum	60	mA

4.3 Pressure sensor

4.3.1 CT30 Type Pressure Sensor

Information	Value	Unit
External thread	M12 × 1.5	
Usable thread length	About 10	mm

4.3.1.1 Absolute pressure ranges

Measuring range	Overload capacity
0.8 – 5 bar abs.	25 bar abs.
2.0 – 10 bar abs.	40 bar abs.
1.0 – 16 bar abs.	40 bar abs.



The pressure sensor is available as an internally completed variant. You can find details at www.elster-instromet.com or see section 6 “Installation, connection and commissioning”.



Not applicable when used as a Temperature Conversion Device.

4.4 Temperature sensor

Information	Value	Unit
Measuring range	-30 – +60	°C
Measurement uncertainty	max. ± 0.1	%
Installation length	50	mm

4.5 Digital inputs

4.5.1 Pulse and reporting inputs NF

The maximum meter frequency of the digital inputs can be set with the enSuite software. The thresholds stated here for frequency and duration apply only if the so-called software debouncing is deactivated.

Ex works, the software debouncing is activated to suppress fault pulses and so that safe counting is limited to 2 Hz.



If the software debouncing is set to a higher frequency than 2 Hz, miscounting from electromagnetic faults may arise under certain circumstances.

Information		Value	Unit
No-load voltage U_0		2.0	V
Internal resistance R_i	About	500	kΩ
Short-circuit current I_k	About	4	μA
Switchpoint "on":	▪ Resistance R_e	max.	300 kΩ
	▪ Voltage U_e	max.	0.8 V
Switchpoint "off":	▪ Resistance R_a	min.	5 MΩ
	▪ Voltage U_a	min.	1.8 V
Pulse duration t_e	min.	62.5	ms
Break duration t_a	min.	62.5	ms
Meter frequency f	max.	10	Hz
Cable length	max.	10	m

4.6 Digital outputs

The digital outputs DA1 and DA2 can be set exclusively as low-frequency pulse or report outputs.



CAUTION!

It is essential that you observe the polarity of the outputs. Incorrect polarity will probably result in the destruction of the output. You should therefore not use reverse polarity even for test purposes.

Information	Value		Unit
Switching voltage	max.	30	V DC
Switching current	max.	100	mA DC
Voltage drop	max.	1	V
Remaining current	max.	0.001	mA
Pulse duration	min.	125	ms
Break duration	min.	125	ms
Output frequency	max.	4	Hz
Cable length	max.	10	m

4.7 Optical serial interface

Information	Value	Unit
Baud rate	9600	Bd
Format	1 start, 1 parity, 1 stop bit	



The baud rate of the serial optical interface is adjustable to 19200 Bd. However, operation using this baud rate also depends on the connected optical reading cable and can therefore not be guaranteed.

4.8 Electrical serial interface

Information	Value
Adjustable types	RS232 or RS485
Cable length	max. 10 m

4.8.1 RS485 type

Parameter	Value
Operating types	RS485 2-wire (semi-duplex) RS485 4-wire (full-duplex)
Scheduling	No load resistor usable in the connected bus participants
Maximum data transmission rate	19,200 baud
Number of bus participants	Drive performance at the outlet: max. 16 unit loads ² Received power at the input ³ : - 6 unit loads (RS485, not electr. insulated) - 3 unit loads (RS485, electr. separated)
Cable length	max. 10 m



The complete description for bus operation using Modbus is provided in the EK205 application manual.

4.9 Supported protocols

Transmission method	Application protocols
Optical	DLMS, IEC 62056-21
Serial (RS232, RS485)	DLMS, IEC 62056-21, Modbus (ASCII, RTU, TCP)
Via modem	DLMS, IEC 62056-21, Modbus (ASCII, RTU, TCP)



Use secure version of a protocol!

The protocols used with the EK280 normally transfer the data in plain text form. If possible, use the secure version of a protocol.

Please take our recommendations in the following sections into account:

- 2.3 "Preventing unauthorized external access using a firewall"
- 2.4.2 "Data security for data in transit"

²Unit load: Standard RS485 receiver with an input resistance = 12 kOhm

³Details on the connection of the RS485 interface, see application manual

Application protocol	Description	Secure versions
DLMS/COSEM HLS	Device Language Message Specification for reading out the device and software updates (in High Level Security)	DLMS (HLS)
DLMS/COSEM LLS	Device Language Message Specification for reading out the device (in Low Level Security)	–
IEC 62056-21	Standard protocol for parameterizing and reading the device (\cong LIS200 protocol)	–
Modbus ASCII, RTU, TCP	Protocol for data exchange by user-defined registers between AMR and an EK series volume conversion device	–



Modbus TCP and IEC 62056-21: check the national regulations.

Please note that communication via Modbus and IEC 62056-21 is unencrypted. This means that the possibility of an attacker intercepting or modifying the data cannot be excluded. Check the national regulations. These may require the data to be verified manually or other measures.

4.10 Operating conditions

4.10.1 Environment

Information	Value	Unit
Temperature range	-25 – +55	°C
Relative humidity, maximum	93	%
Humidity conditions acc. EN12405-1	condensation	
Point of use acc. EN12405-1	open	
Mechanical ambient conditions acc. EN12405-1	M2	
Electromagnetic ambient conditions acc. EN12405-1	E2	

4.11 Identification

The EK205 is approved as a volume corrector as per the Measuring Instruments Directive (MID). The identification of the EK205 is carried out on the front side (see section “Construction and function”).

4.11.1 Type plate⁴ and EX identification

The type identification of the EK205, which relates to its function as Volume Conversion Device, contains the following information:

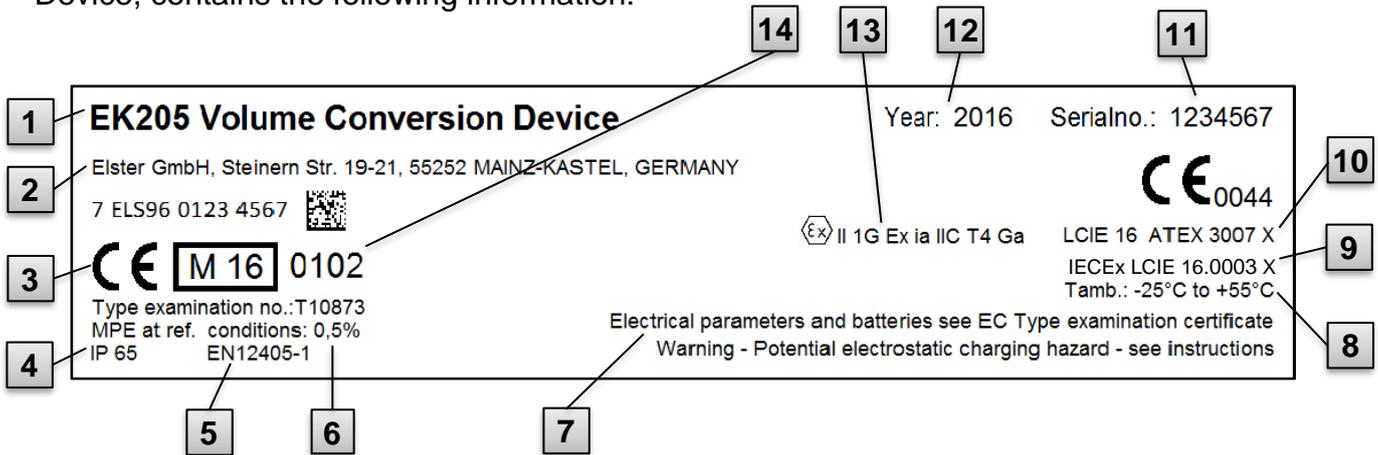


Fig. 2

- | | | | |
|---|---------------------------|----|--|
| 1 | Type designation | 8 | Ambient temperature range |
| 2 | Manufacturer and address | 9 | IECEx - EC type examination certificate no. ⁵ |
| 3 | CE marking | 10 | ATEX - EC type examination certificate no. |
| 4 | IP protection class data | 11 | Serial number |
| 5 | Reference to EN 12405-1 | 12 | Year of construction |
| 6 | Measurement accuracy data | 13 | Ex marking |
| 7 | Notices | 14 | Metrology marking |

4.11.2 Device software identification

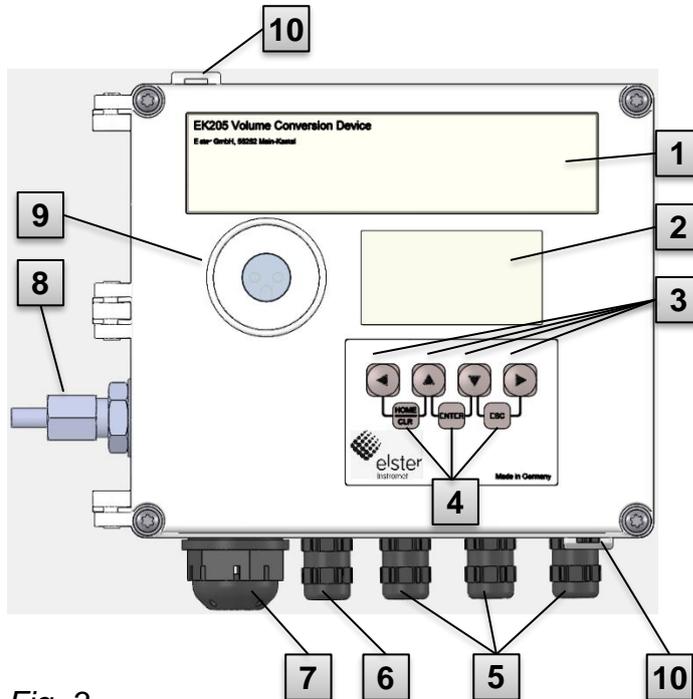
- Move the cursor with the arrow keys to the Serv. tab and via the following path to the values Vers (device software version) or Chk (checksum):
Serv. → Identification → Volume converter → Vers or Chk
- The checksum Chk can be recalculated for verification purposes by pressing the ENTER button.

⁴ Depending on the device design or country of destination, the type plate may contain other information.

⁵ Not available for all device types.

5 Construction and function

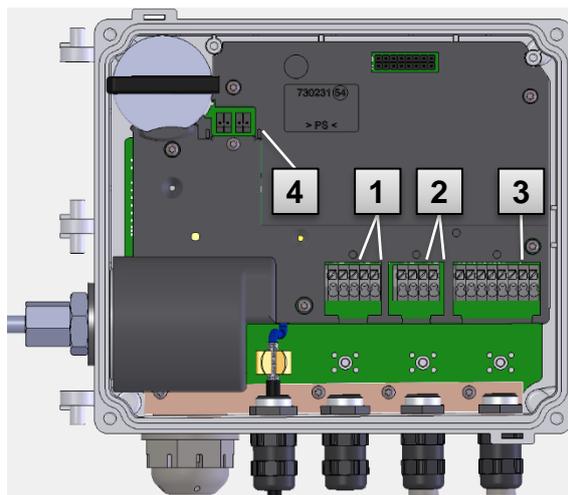
5.1 External view



- 1 Type plate
- 2 Display
- 3 Arrow keys ▲, ▼, ►, ◀
- 4 Description of the key combinations
- 5 Cable bushings for the connection of further components
- 6 Cable bushing Temperature sensor
- 7 Outdoor plug (option)
- 8 Pressure sensor⁶
- 9 Optical interface
- 10 Security bails

Fig. 3

5.2 Internal view



- 1 Connections of the meter and reporting inputs DE1 and DE2
- 2 Connections of the pulse and reporting outputs DA1 and DA2
- 3 Connections of the serial interface
- 4 Connections of the battery

Fig. 4

⁶ Not applicable when used as a Temperature Conversion Device.

5.3 Brief description

The volume converter EK205 is an explosion-protected, electronic device that calculates from a volume of a gas determined by an external meter in operating mode the volume in normal mode and therefore the energy share of the relevant gas volume.

In addition, using the registration function, the reporting inputs / outputs, the serial and optical data interfaces of the device, the gas load of a line can be monitored, registered and passed on.

The recording of the status parameters required for this is carried out via an internally connected pressure sensor and a temperature sensor. When using the EK205 as a Temperature Conversion Device, the momentary values of temperature are measured, and the pressure is set as a constant. As an operating element of the EK205, an alphanumeric display and a keyboard on the front side of the device are available.

5.4 Connections

The Volume Conversion Device EK205 has connection options for:

- Two batteries

To monitor and register the calculated data and to pass on the data and program its functions, the following are available:

- 2 meter and reporting inputs DE1, DE2
- 2 pulse and reporting outputs DA1, DA2
- Serial data interface
- Optical data interface



Details on the connection options of the EK205 and the deliverable equipment variants can be found under section “Technical data” and under section “Installation, connection and commissioning”.

6 Installation, connection and commissioning

6.1 Installation



The EK205 can be installed either on the gas meter, on the pipeline or on a wall.



In the event of issues during installation, e.g., when selecting the suitable installation accessories, please contact our customer service (see section "General").

6.1.1 Installation on a gas meter



Install the EK205 on a gas meter using a mounting bracket (see Appendix) as well as suitable cylinder screws and square nuts.

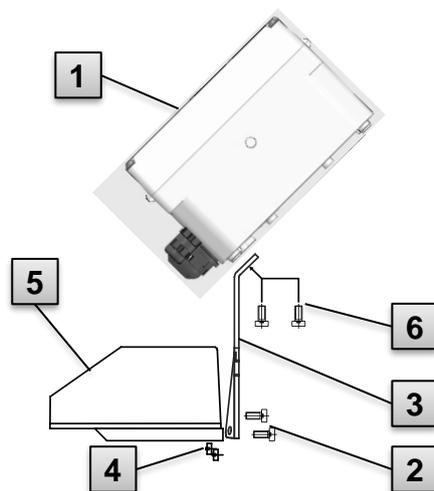


Fig. 5

1. Using two self-cutting screws (6), install the mounting bracket (3) on the EK205 (1)
2. Tighten the self-cutting screws such that the angle is tight.
3. Using two M5 square nuts (4) and two M5 x 10 mm cylinder screws (2), install the mounting bracket on the rear of the meter head (5).
4. Tighten the cylinder screws such that the device sits tight and cannot fall down.

6.1.2 Installation on a pipeline



Using pipe installation aids (see Appendix) with suitable cable ties, install the EK205 on a pipeline.

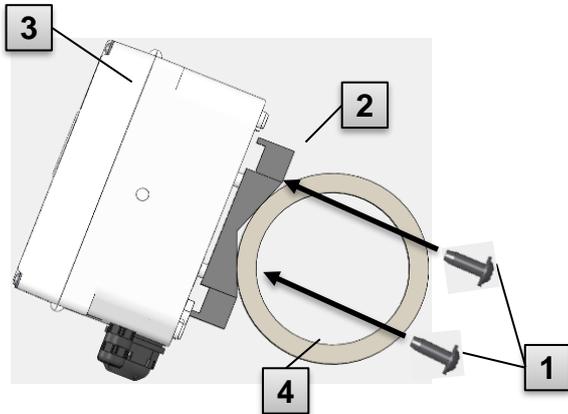


Fig. 6

1. Using the four self-cutting screws provided (1), install the pipeline installation aid (2) on the rear of the EK205 (3).
2. Tighten the cylinder screws such that the installation aid sits tight.
3. Fasten the EK205 with installed pipeline installation aid (2 and 3) with the help of cable ties on the pipeline (4).
4. Install the device such that it sits tight and cannot fall down.

6.1.3 Installation on a wall



Using the wall mounting feet (see Appendix), install the EK205 on the wall.

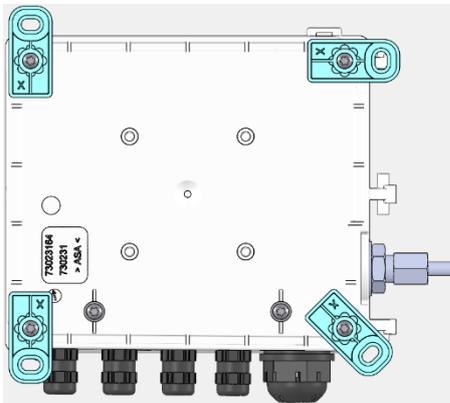


Fig. 7

1. Using the four self-cutting screws provided on the rear of the EK205, install the wall mounting feet. The fastening feet can be fastened in different positions.
2. Drill holes in the wall in accordance with the position of the installed installation feet. Select the wall plugs suitable for the size of the screws and insert them in the borings of the wall.
3. Use four screws for fastening the EK205, e.g., 5 x 35 mm.

6.1.4 Three-way cock⁷

When installing the pressure sensor, a three-way cock is usually installed in order to carry out an inspection of the pressure sensor in built-in condition or for the replacement of deficient sensors without deactivating the overall gas line. The three-way cock available from Elster has the following structure:

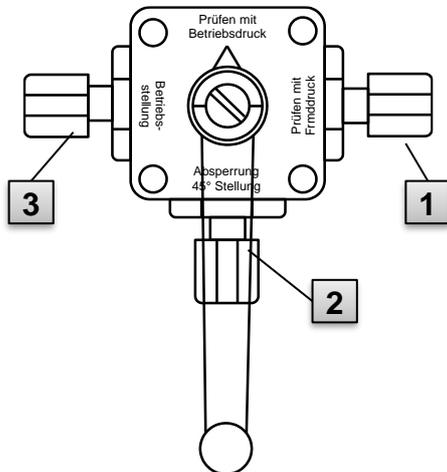


Fig. 8

- 1**: From the meter: From the pressure connection of the gas meter
For bellows-type gas flow meters, this is carried out on the input side of the meter
- 2**: For the MU: To connect the gas sensor of the Volume Conversion Device
- 3**: Test connection: Possibility to take test pressure or to give external pressure on the pressure sensor of the Volume Conversion Device.



When installing the three-way cock, it must be noted that the position of the operating lever is checked with the corresponding throughputs, as the lever can be removed and may be installed in a twisted manner.



The pipeline from the pressure sensor to the meter must be laid in a falling manner so that, where applicable, water cannot damage the pressure sensor or influence the measurement precision.

⁷ Not applicable when using EK205 as a Temperature Conversion Device.

6.2 Connection



The EK205 is available in various equipment variants. Information about this can be found at www.elster-instromet.com.



DANGER!

Risk of explosion by connection to non-intrinsically-safe and associated equipment.

When operating the EK205 in an area at risk of explosion (zones 0, 1 or 2) and connecting devices without certification as an "associated piece of equipment", there is a risk of explosion.

Therefore:

- When used in an area at risk of explosion, connect the EK205 to certified, associated pieces of equipment only in accordance with the valid rules of the art stated in the design test certificates.
- Connect the EK205 only to intrinsically safe pieces of equipment whose electric data correspond to the requirements stated in the design test certificates of the EK205 (see section 11.3).



WARNING!

Risk from faulty connection of the device!

The connection of the device may be carried out by a gas expert only (see section "Safety"). Faults in this process may result in fatal situations or considerable material damage.

Therefore:

- Have the connection of the calibrated device be carried out by a gas expert only.
- Also involve this person for subsequent relocations.
- Do not perform any connection changes or relocations of the device independently.

- During connection and commissioning of the EK205, observe the requirements of the associated norms DIN EN 60079-0 and DIN EN 60079-14.
- Have the wiring of the connections carried out correctly by a gas expert or a calibration officer.
- Do not connect active outputs against each other and ensure that they have the correct polarity in advance.
- Seal unused cable glands as described in DIN EN 60079-14 using a plug or a suitable screw-in cover to maintain the required IP protection class (see section 4.1).
- Insulate any unused wire (e.g., in multicore cables) at the end by appropriate termination means. (see "Technische Regel für Betriebssicherheit (TRBS)")

To program the device and carry out additional applications, you can also connect in addition to the components stated in this section the serial and optical interfaces of the EK205 (see section "Construction and function").

6.2.1 Cable glands

The following cable diameters are possible for the existing cable glands:

Cable gland	Cable diameter	Unit
M12 × 1.5 Ex e II, plastic, black	4.0 – 7.0	mm

The following tightening torques must be used for the existing cable glands:

Tightening torque for	Torque	Unit
Cable gland on the housing	1.2	Nm
Pressure bolt (cap nut)	0.8 – 1.0	Nm

6.2.2 Connecting gas meters

To measure the gas volume, a gas meter with a low-frequency pulse transducer can be connected to the digital input DE1 of the EK205.

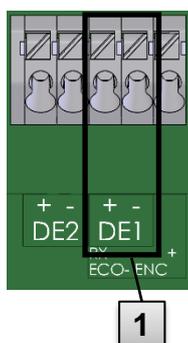


Fig. 9

The pulse transducer of the gas meter is connected to the DE1 (**1**) terminal of the EK205.

Details and characteristics on the use of the pulse transducer are described in the following subsections.



The line diameter for connection of the inputs of the EK205 is 0.8 ... 1.0 mm (AWG 20 – 18).

6.2.2.1 Connection to a low-frequency pulse transducer

1. Connect the pulse output of the gas meter to the DE1 terminal (**1** in Fig. 9) of the EK205.

The priority can be freely selected. (The labels + and - of the terminals are intended for connecting other pulse transducers.)

2. Set the operation parameters such as the cp value (pulse constant) as described in section 6.3.1.2.

6.2.3 Lead-sealing of the input terminals

After connecting to the gas meter in accordance with section 6.2.2, the input terminal DE1 needs to be sealed.

To this end, the accessory bag terminal covers are provided. Where required, screw them via the connected terminals and then glue an adhesive seal to the fastening screw (see section 6.3.2).

6.2.4 Connect temperature sensor



When connecting the temperature sensor, national requirements must be observed.



Lubricate the temperature sensor before connecting with heat transfer paste to increase its functionality.

6.2.4.1 Connection to standard temperature sensor pocket

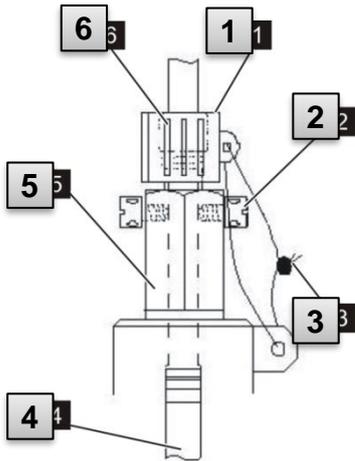


Fig. 10

1. Insert the temperature sensor Pt 500 **4** in the temperature sensor pocket **5** (see Appendix).
2. Fasten the temperature sensor through the capstan screw **2** and the planned screw connection **6**.
3. Have the temperature sensor sealed using a lead-sealing socket **1** and the wire seal **3** in accordance with Fig. 9 by a calibration officer.

6.2.4.2 Connection to an older temperature sensor pocket

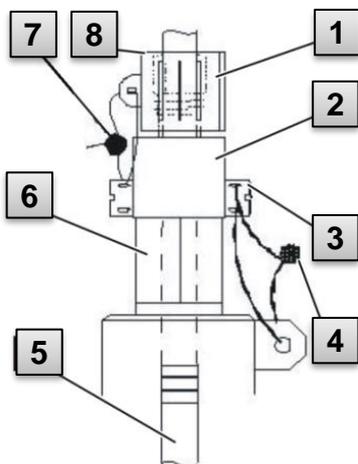


Fig. 11

1. Insert the temperature sensor Pt 500 **5** in the temperature sensor pocket **6** (see Appendix).
2. Use the adapter for lead-sealing the connection **2** (see Appendix).
3. Fasten the temperature sensor through the capstan screw **3** and the planned screw connection **8**.
4. Have the temperature sensor sealed using a lead-sealing socket **1** and the wire seal **4, 7** by a calibration officer.

6.2.5 Connect pressure line⁸



When connecting the pressure lines, national requirements must be observed.
For Germany, the requirements of the PTB inspection rules, volume 20 Electronic Volume Conversion Devices for gas, section 5 apply.



When installing pipelines, ensure that there is a downward gradient from the EK205 to the gas line.

6.2.5.1 Connection to an internal pressure sensor

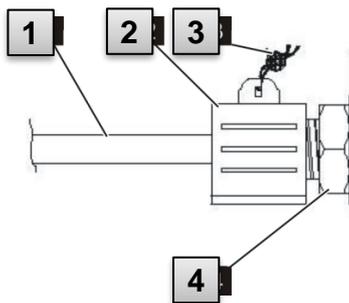


Fig. 12

1. Connect the pressure connection **1** using the union nut and the seal insert to the connection of the internal pressure sensor **4**.
2. Seal the connection with the sealing socket **2** and a wire seal **3**.

6.2.6 Connecting the power supply



DANGER!

The connection of non-associated equipment presents a risk of explosion!

Operating the EK280 in zone 0, 1 and connecting devices which are not certified as "associated equipment" present a risk of explosion.

Therefore:

- When using the EK280 in zone 0, 1, it should only be connected to certified associated equipment as per the ATEX Product Directive 94/9/EC.
- The EK280 should only be connected to the intrinsically-safe circuits of associated equipment whose electrical data correspond to those requirements stipulated in the declaration of conformity for the EK280 (see Appendix).

For the external power supply of the EK205 (model without in-built power supply unit), the electrical data should be adhered to as per sections 11.3 and 4.2.2.

The extended function unit "FE260" from Elster can be used as a power supply unit, for example.

⁸ Not applicable when using EK205 as a Temperature Conversion Device.

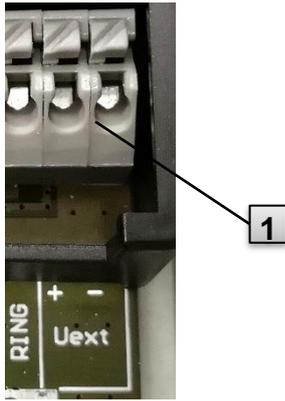


Fig. 13

Connect the power supply to the "Uext" terminal **1** of the EK205.

The polarity should be taken into consideration, i.e., connect the "+" of the power supply unit to the "Uext +" terminal and "-" to "Uext".

6.2.7 Connect outputs of the EK205



The line diameter for connection of the inputs of the EK205 is 0.8 ... 1.0 mm (AWG 20 – 18).



Various instruments can be connected to the digital output of the EK205. To this end, the outputs are preset (see section 6.3.1.10)



CAUTION!

Danger from incorrect device connection!

Ensure that the outputs have the correct polarity to prevent damaging the outputs.

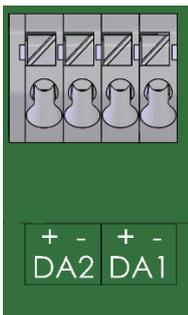


Fig. 14

1. Connect the downstream device to the required digital outputs (terminals DA1 and DA2) on the EK205 (see Fig. 14).
2. A terminal cover is supplied in the accessories bag to seal the output terminals. If necessary, place these over the terminals and screw tight. Then affix a seal to the retaining screw (see section 6.3.2).
3. If necessary, set the cp value (pulse constant) for the pulse outputs as described in section 6.3.1.10.

6.3 Commissioning

6.3.1 Setting the operating parameters

The setting of the operating parameters required can be carried out using the free enSuite software, see chapter 1.1.2).

If the program is not available, the settings can be alternatively made using the device keyboard.



Before setting the operating parameters using the keyboard, read section 7 to familiarize yourself with the operation of the device.

6.3.1.1 Opening the calibration lock

On circuit board in the housing floor, the calibration lock can be found in the form of a key that can be secured with an adhesive label. This needs to be operated to change relevant values and parameters.

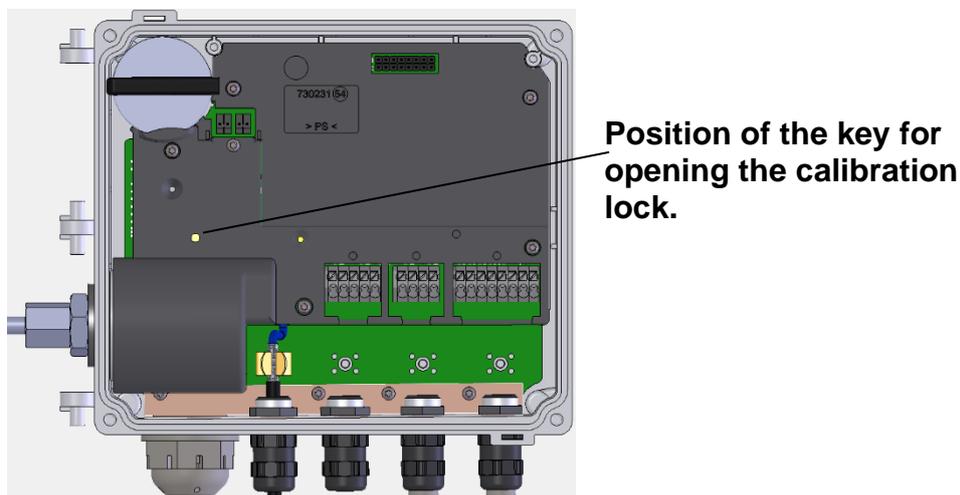


Fig. 15

6.3.1.2 Setting parameters for the NF pulse transducer of the gas meter

If a low-frequency pulse transducer is connected in accordance with 6.2.2.1, you can set the input mode and cp value as follows:

1. Setting the input mode:

- Move the cursor to the "Serv" tab and via the following path to the value "Md.I1" input mode:
Serv. → Inputs → Input 1 → Md.I1
- Press the key combination ENTER ▲ + ▼ ⇒ The value set flashes.
- Repeatedly press one of the ▲ or ▼ arrow buttons until the text "Pulse input" flashes.
- Press the ENTER ▲ + ▼ button to confirm the set value. It is possible to abort the entry by pressing the key combination ESC ▼ + ►.

2. Setting the cp value (pulse constant):

- Move the cursor to cp value "cp.I1" in the same path
- Press the key combination ENTER ▲ + ▼ ⇒ One digit of the value flashes.

- Move the cursor with the arrow buttons ► or ◀ to the digits and change these with the arrow buttons ▲ or ▼.
- Press the ENTER ▲ + ▼ button to confirm the set value. It is possible to abort the entry by pressing the key combination ESC ▼ + ►.

6.3.1.3 Setting the volume at measurement conditions

In order to control the recording of volumes within measurement conditions, the EK205's counter can be set to the same value as the gas counter once when the administrator lock is open. Setting the volume is always possible when the calibration lock is open.

- Open the administrator lock or the calibration lock
- Move the cursor to the "Serv" tab and via the following path to the value "VmA" (adjustable volume at measurement conditions) input mode:
Serv. → Volume → Actual volume → Synchronization Vm → VmA
- Press the key combination ENTER ▲ + ▼ ⇒ one digit of the value flashes.
- Move the cursor with the arrow buttons ► or ◀ to the digits and change these with the arrow buttons ▲ or ▼.
- After all digits have been changed, press the key combination ENTER ▲ + ▼ in order to confirm the input. It is possible to abort the entry by pressing the key combination ESC ▼ + ►.
- To adopt the value set, move the cursor to the *Store* value.
- Press the ENTER key combination ▲ + ▼ ⇒ "0" flashes.
- Change the value using the arrow buttons ▲ or ▼ to "1".
- After the value has been changed, press the key combination ENTER ▲ + ▼ in order to confirm the input. It is possible to abort the entry by pressing the key combination ESC ▼ + ►. ⇒ For *Vm*, *VmA* is adopted.



If the administrator lock is open and the transfer of VmA for Vm is rejected with the –13– message, this process has already been carried out.

Further changes are possible when either the calibration lock or the administration lock is open, after deleting the change information regarding setting Vm at the same value as the gas counter (see section 6.3.1.4).

6.3.1.4 Deleting change information for alignment of Vm with the gas meter

To allow for resetting of the volume within measurement conditions when the administrator lock is open, the change information regarding setting *Vm* at the same value as the gas counter must be deleted:

- Open the calibration lock
- Move the cursor to the "Serv." tab and via the following path to the value "Clear" (adjustable volume at measurement conditions) input mode:
Serv. → Volume → Actual volume → Synchronization Vm → Clear
- Press the key combination ENTER ▲ + ▼ ⇒ "0" flashes.
- Change the value using the arrow buttons ▲ or ▼ to "1".
- After the value has been changed, press the key combination ENTER ▲ + ▼ in order to confirm the input. It is possible to abort the entry by pressing the key combination ESC ▼ + ►. ⇒ "*TimeX*" (time stamp of the alignment), "*Vm_o*" (*Vm* old value), "*Vm_n*" (*Vm* new value) are set to the default values.

6.3.1.5 Setting the volume at base conditions

It is possible to set up the meter when first operating the EK205 provided that the administrator lock is open. Setting the volume is always possible when the calibration lock is open.

- Open the administrator lock or the calibration lock.
- Move the cursor to the "Serv" tab and via the following path to the value "VbA" (adjustable standard volume meter) input mode:
Serv. → Volume → Standard volume → Synchronization Vb → VbA
- Press the key combination ENTER ▲ + ▼ ⇒ One digit of the value flashes.
- Move the cursor with the arrow buttons ► or ◀ to the digits and change these with the arrow buttons ▲ or ▼.
- After all digits have been changed, press the key combination ENTER ▲ + ▼ in order to confirm the input. It is possible to abort the entry by pressing the key combination ESC ▼ + ►.
- To adopt the value set, move the cursor to the Store value.
- Press the key combination ENTER ▲ + ▼ ⇒ "0" flashes.
- Change the value using the arrow buttons ▲ or ▼ to "1".
- After the value has been changed, press the key combination ENTER ▲ + ▼ in order to confirm the input. It is possible to abort the entry by pressing the key combination ESC ▼ + ►. ⇒ For Vb, VbA is adopted.



If the administrator lock is open and the transfer of VbA for Vb is rejected with the –13– message then this process has already been carried out.

Further changes are possible when either the calibration lock or the administration lock is open, after deleting the change information regarding setting Vb (see section 6.3.1.6).

6.3.1.6 Deleting change information for alignment of Vb

To allow for resetting of the standard volume when the administrator lock is open, the change information regarding setting at the same value as "Vb" must be deleted:

- Open the calibration lock
- Move the cursor to the "Serv." tab and via the following path to the value "Clear" (adjustable volume at base conditions) input mode:
Serv. → Volume → Standard volume → Synchronization Vb → Clear
- Press the key combination ENTER ▲ + ▼ ⇒ "0" flashes.
- Change the value using the arrow buttons ▲ or ▼ to "1".
- After the value has been changed, press the key combination ENTER ▲ + ▼ in order to confirm the input. It is possible to abort the entry by pressing the key combination ESC ▼ + ►. ⇒ "TimeX" (time stamp of the alignment), "Vb_o" (Vb old value), "Vb_n" (Vb new value) are set to the default values.

6.3.1.7 Setting compressibility equation and gas analysis

- Move the cursor to the "Serv" tab and via the following path to the value "Md.K" (compressibility equation):
Serv. → Volume conversion → Parameter settings → Md.K
- Press the key combination ENTER ▲ + ▼ ⇒ The value set flashes.

- Change the value using the arrow buttons ▲ or ▼. In doing so, observe the legal provisions applicable at the place of use.

Md.K	Meaning
Fixed value	No calculation of the compressibility. The adjustable K.F value is used.
S-Gerg-88	Calculation of the compressibility in accordance with S-Gerg-88
AGA-NX19	Calculation of the compressibility in accordance with AGA-NX19
AGA-8 GC1	AGA8 gross characterization method 1
AGA-8 GC2	AGA8 gross characterization method 2
AGA-NX19-HW	AGA-NX19 according to Herning and Wolowsky
AGA-8 DC92	AGA8 detailed characterization

- Press the ENTER ▲ + ▼ button to confirm the set value. It is possible to abort the entry by pressing the key combination ESC ▼ + ►.
- Move the cursor with the arrow keys ▲ or ▼ further to the gas analysis values (*Ho,b*, *CO2*, etc.).
- Change the values in accordance with the gas used by enabling with the ENTER ▲ + ▼ key combination the entry, going with the arrow keys ► or ◀ to the figures and changing them with the keys ▲ or ▼.
- Press the ENTER ▲ + ▼ button to confirm the set value. It is possible to abort the entry by pressing the key combination ESC ▼ + ►.



The calorific value $H_{o,b}$ applies to the basic conditions p_{bX} , T_{bX} and reference combustion temperature $+25^{\circ}\text{C}$. p_{bX} and T_{bX} are adjustable under calibration lock.

6.3.1.8 Setting the alarm limits for gas pressure and temperature measurement

Ex works, the alarm thresholds are set to sensible values. If a change is necessary, proceed as follows:

- Move the cursor to the "Serv" tab and via the following paths to the alarm thresholds:
 - Serv. → Measured values → Pressure → pMin and pMax⁹*
 - Serv. → Measured values → Temperature → TMin and TMax*
- Press the key combination ENTER ▲ + ▼ to enable the entry.
- Move the cursor with the arrow buttons ► or ◀ to the digits and change these with the arrow buttons ▲ or ▼.
- Press the ENTER ▲ + ▼ button to confirm the set value. It is possible to abort the entry by pressing the key combination ESC ▼ + ►.

⁹ These values are not required in the performance as Temperature Conversion device.

6.3.1.9 Setting replacement values for gas pressure and temperature

If the gas pressure or the gas temperature cannot be measured due to a fault or if pressure and temperature are outside the alarm limits defined in section 6.3.1.8, an adjustable replacement value (fixed value) is used to calculate the standard volume. The volume thereby calculated is counted in the separate fault volume meter VbD (Base Volume Disturbed).

The total base volume counter VbT is keep on counting although there is a disturbance. The total base volume calculated under these faulty conditions has no measuring relevance. It must not be used for billing purposes.

The replacement values can be found at the following paths:

Serv. → Measured values → Pressure → p.F¹⁰

Serv. → Measured values → Temperature → T.F

The values are changed as a rule in the same way as described in section 6.3.1.8.

6.3.1.10 Parameterization of the outputs



The setting of the cp values (pulse constants) for the outputs can be carried out via the enSuite software as an alternative.

The following functions are preset for the outputs as factory settings:

Output	Function
DA1	Pulse output for the total standard volume "VbT" ¹¹ (CP.O1= 0.1 Imp/m ³)
DA2	Pulse output for the total standard volume "VmT" (CP.O2= 0.1 Imp/m ³)

The cp value of an output states how many pulses were emitted per cubic meter. A cp value of 0.1/m³ (0.1 pulses per m³) means that e.g., a pulse is emitted per 10m³.

To change the cp values for output 1 or output 2, move the cursor to the "Serv." tab and via the following path to "CP.O1" (output 1) or "CP.O2" (output 2):

Serv. → Outputs → Output 1 → CP.O1 or

Serv. → Outputs → Output 2 → CP.O2

- Press the key combination ENTER ▲ + ▼ ⇒ One digit of the cp value flashes.
- Move the cursor with the arrow buttons ► or ◀ to the digits and change these with the arrow buttons ▲ or ▼.
- Press the key combination ENTER ▲ + ▼ to confirm the set value. It is possible to abort the entry by pressing the key combination ESC ▼ + ►.



Except for the settings described here, many additional functions, such as time synchronous pulses, can be set for the outputs.

The complete description can be found in the application manual EK205 (see section 1.1.1).

¹⁰ These values are not required in the performance as Temperature Conversion device.

¹¹ VbT must not be used for billing purposes.

6.3.1.11 Setting summer time switching

- Move the cursor to the "Serv." tab and via the following path to the value "MdTim" (summer time mode):

Serv. → Date and time → MdTim

- Press the key combination ENTER ▲ + ▼ ⇒ The value set flashes.
- Change the value using the arrow buttons ▲ or ▼:

Mod.Z	Meaning
off	No switching to CEST*
auto	Automatic switching to CEST*
manual	Every year, the start and end of CEST* is set by the control room.

*CEST = Central European Summer Time

- Press the ENTER ▲ + ▼ button to confirm the set value. It is possible to abort the entry by pressing the key combination ESC ▼ + ►.

6.3.1.12 Delete measurement archives



It is not mandatory to delete the archives on commissioning.

- Move the cursor to the "Serv." tab and via the following path to the value "Clr.A" (delete measurement archives):
- Serv. → Edit and delete → Clr.A*



All measurement archives (no logbooks) are deleted.

To avoid deleting the archives by mistake, when the calibration lock is open the serial number (on the type plate of the device) of the EK205 must be stated.

- Press the key combination ENTER ▲ + ▼ ⇒ One digit of the value flashes.
- Move the cursor with the arrow buttons ► or ◀ to the digits and enter with the arrow buttons ▲ or ▼ the serial number of the device.
- After stating the serial number of the device, press the key combination ENTER ▲ + ▼ in order to confirm the input. It is possible to abort the entry by pressing the key combination ESC ▼ + ►.

6.3.1.13 Clearing the certification data log



The logbook can only be cleared if the calibration lock is open.

- Move the cursor to the "Serv." tab and use the following path to access the value "CICDL" (Clear certification data log):
- Serv. → Edit and delete → CICDL*
- Press the ENTER key combination ▲ + ▼ ⇒ "0" will flash.
 - Change the value to "1" using the ▲ or ▼ arrow key.

- After you have entered the value, press the ENTER key combination ▲ + ▼ to confirm the input. The input process can be cancelled by pressing the ESC key combination ▼ + ►.

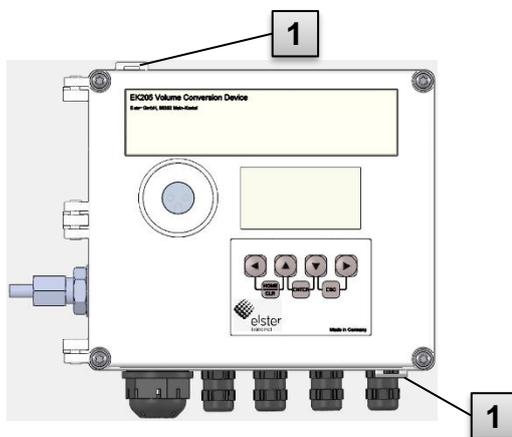
6.3.1.14 Close and secure calibration key

After making all settings subject to calibration requirements, close the calibration lock. Press the key described in section 6.3.1.1 again.

The calibration lock is calibrated with an adhesive label as described in section 6.3.2.2.

6.3.2 Sealing

6.3.2.1 External view



- 1 Optional user protection: Lid sealing using wiring seals through sealing plugs.

Fig. 16

6.3.2.2 Internal view

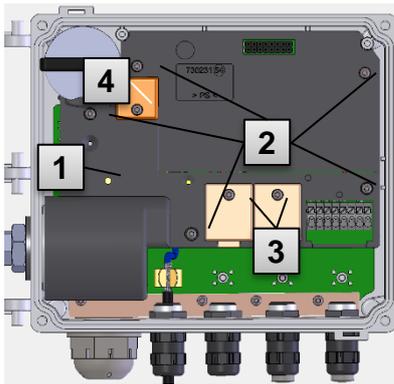


Fig. 17

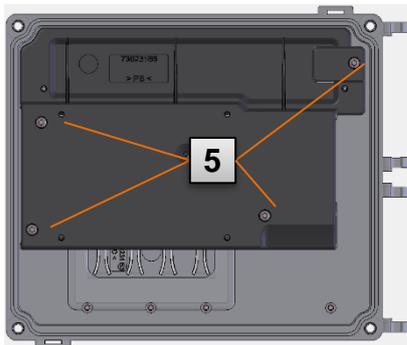


Fig. 18

- 1 Sealing point for securing the calibration switch.
- 2 Sealing points for securing the plate covers.
- 3 Sealing points for securing the terminal covers of the inputs and outputs.
- 4 Sealing points for securing the battery cover (if available).
- 5 Sealing points for securing the LCD plate cover.



The sealing of the sealing points Fig. 17/3 for securing the pulse inputs and pulse outputs is subject to national law (see WELMEC 11.1, section 2.7.1).

Depending on the legal situation in the country of use, seals from a group of people set out in law or from meter operators must be used.

If devices are delivered with connected input and/or output cables then seals with the manufacturer's symbol are applied at the plant. If necessary, these can be substituted on site as described above.

6.3.2.3 Sensors



The sealing of the connected temperature and pressure sensors is illustrated in sections 6.2.4 and 6.2.5 as an example.

6.3.3 Close housing



CAUTION!

Damage to property caused by improper device closure!

If the device is not properly closed cables can get pinched and cause damage.

Therefore:

- Ensure correct positioning of the cable guide when closing.

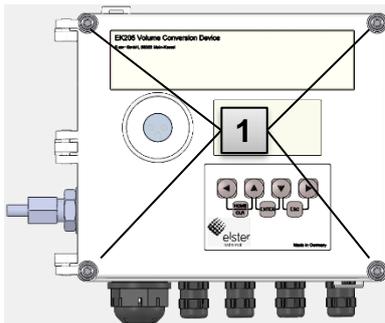


Fig. 19

1. Close the housing using the four pre-installed screws (Fig. 19: 1).
2. Do not close the cable screw connections used with matching sealing plugs.

6.3.4 Check installation and connection



WARNING!

Risk from improper installation and connection!

Improper installation and connection of the EK205 may result in fatal situations.

Therefore:

- Carry out the installation and connection of the EK205 correctly.
- Observe the requirements of the standards and guidelines stated in the design test certificates.

6.3.5 Data transfer

For the various options of remote data transmission to a control room via a device connected to the terminal interface, please observe the corresponding instructions in the application manual EK205, see section 1.1.1).

The settings of the data transfer are possible without opening the calibration lock.

7 Operation



Using the enSuite software and the data interfaces of the EK205, further applications than those described below are possible.

7.1 Safety

7.1.1 Personal protective equipment

When working on the device within a gas system, wearing personal protective equipment is required to minimize health hazards.

- During the activity on the device, always wear the protective equipment required within the relevant system.
- Always observe the notes on the personal protective equipment provided in the working area.

7.2 Operating staff

Below various persons are stated who are authorized to perform various activities when operating the EK205.

7.2.1 Trained individual

The person instructed to operate the EK205

- was instructed by the plant operator in an informational session on the tasks assigned to him or her, and on possible hazards in case of improper behavior.
- is authorized to read and note values and parameters using operating elements of the EK205.

7.2.2 Specialist

The specialist on operating the EK205

- has the ability, because of their technical training, knowledge and experience, as well as their knowledge of the relevant regulations, to carry out the work to the device assigned to them, and to recognize and avoid possible hazards on their own.
- is authorized to read and note values and parameters of the operating elements of the EK205 and to make changes not subject to calibration requirements.

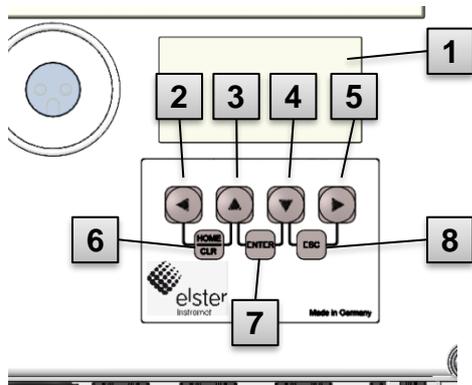
7.2.3 Calibration officer

The calibration officer

- has the ability, because of their technical training, knowledge and experience, as well as their knowledge of the relevant standards and regulations, to carry out calibration-protected work to gas systems. The calibration officer is trained to work with calibration-protected devices and systems, and is acquainted with the relevant standards and regulations that apply.
- is authorized to read and note values and parameters of the operating elements of the EK205 and to make changes subject to calibration requirements.

7.3 Basics

As already explained in the section Construction and function, you can operate and program the EK205 using the operating elements on the front plate of the device:



- 1 Alphanumerical display
- 2 Arrow key ◀
- 3 Arrow key ▲
- 4 Arrow key ▼
- 5 Arrow key ▶
- 6 HOME/CLR key combination
- 7 ENTER key combination
- 8 ESC key combination

Fig. 20: Front plate of the EK205



On plate in the housing floor, the calibration lock can be found in the form of a key that can be sealed with an adhesive label. This needs to be operated to change calibration-protected values and parameters. In the event of a calibration-protected device, this may be carried out by a calibration officer only.

7.3.1 Display

The display is divided ex works into the five tabs of Main, Cust., Admin, Serv. and Ctrl., in which the measurement values, settings and other data are displayed.

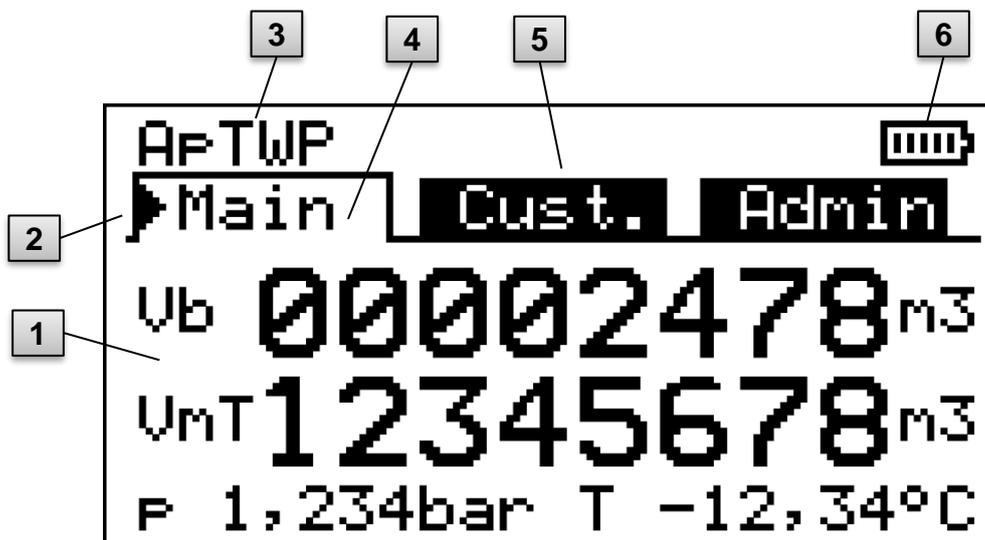


Fig. 21 Structure of the display

- 1 Data field
- 2 Cursor
- 3 Device status
- 4 Active tab
- 5 Inactive tab
- 6 Battery charging status

The display in the data field in Fig. 21 (starting here with Vb) is different in the tabs. All other display parts (in the top part) are the same regardless of the tab displayed.

7.3.2 Functions of the keys

The keys have the following functions:

Key	Function
▶	<ul style="list-style-type: none"> ■ jump to the right to another data list. ■ jump to the second part of a value displayed in two parts. ■ open the relevant submenu.
▼	<ul style="list-style-type: none"> ■ jump down within a data list.
◀	<ul style="list-style-type: none"> ■ jump to the left to another data list. ■ leave a submenu and jump to its start value (one menu level higher).
▲	<ul style="list-style-type: none"> ■ jump up within a data list.
▲ + ▼	<ul style="list-style-type: none"> ■ By pressing the two keys at the same time, you can execute the ENTER function regardless of the relevant data class and thereby <ul style="list-style-type: none"> ● activate the input mode. ● open the relevant submenu. ● update the relevant measurement value.
▼ + ▶	<ul style="list-style-type: none"> ■ By pressing the two keys at the same time, you can execute the ESC function regardless of the relevant data class and thereby <ul style="list-style-type: none"> ● leave a submenu and jump to its start value (one menu level higher). ● cancel an input (the input mode).
◀ + ▲	<ul style="list-style-type: none"> ■ By pressing the two keys at the same time, you can execute the HOME/CLR function and thereby <ul style="list-style-type: none"> ● display the Main tab. ● initiate a value in the input mode (reset to its start value).
▲ + ▶	<ul style="list-style-type: none"> ■ By pressing the two keys at the same time, via the context menu displayed, you can <ul style="list-style-type: none"> ● display the Main tab. ● freeze the current display. ● delete the status tab.
◀ + ▶	<ul style="list-style-type: none"> ■ Address display of the current value.

7.3.3 Calling up the data, navigation in the display

With the ►, ◀, ▲, ▼ arrow keys, you can move the cursor in the display and switch to other values.

By pressing the key combination ESC ▼ + ► several times, you reach one of the Main, Cust., Admin, Serv. or Ctrl. tabs (→ 7.3.1, Fig. 21). The active tab that the cursor is on is displayed with a bright background (Fig. 22/1). At the tab level, you can use the arrow keys ► or ◀ to move the cursor to the other tabs to display their content.

The Customer tab contains more data than can be displayed simultaneously. With the ▼ arrow key, you move the cursor from the tab to the data field (the bottom part of the display). If the cursor is at the lowest visible value, the display is moved by pressing the ▼ key again, which makes the data visible. Accordingly, the cursor can be moved up with the ▲ key and the display will be moved up at the top visible value.

If the cursor hits a value that was saved with an associated time stamp, it is displayed automatically. (Fig. 22/2)

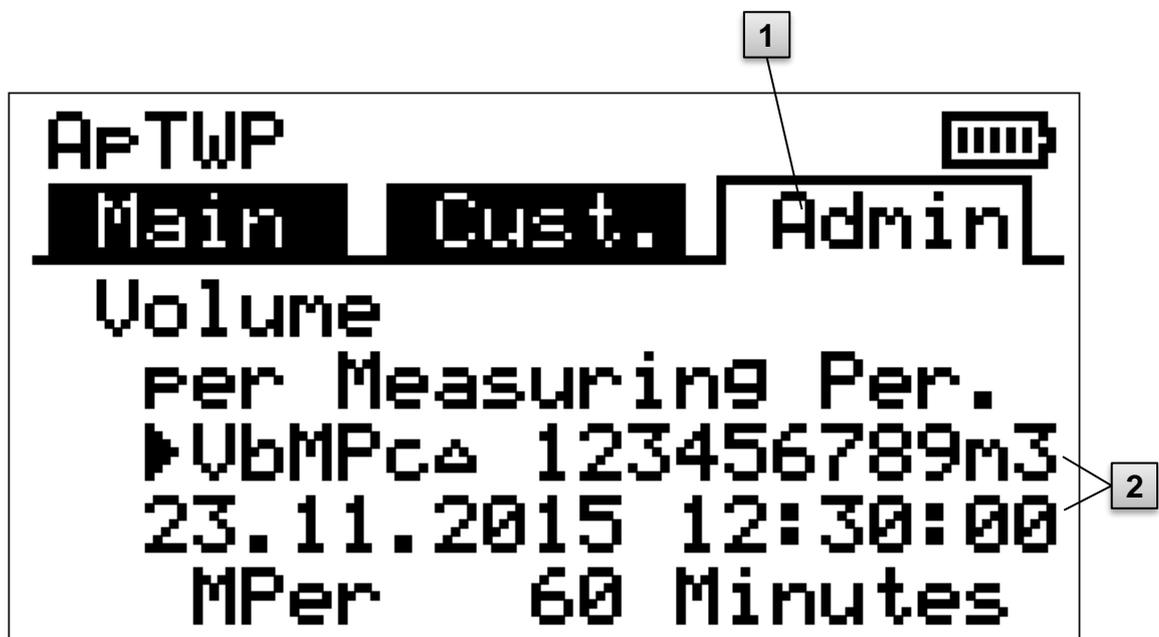


Fig. 22: Admin tab

- 1 Active tab
- 2 Value with associated time stamp

7.3.4 Meaning of the status symbols

The status symbols displayed in the first row have the following meaning:

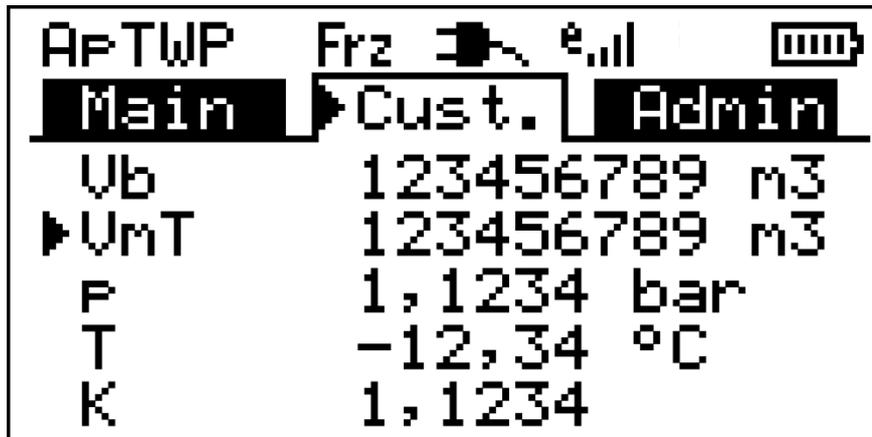


Fig. 23: Status symbols in the display

Symbol	Meaning
APTWP	At the top left edge of the display, individual letters are displayed as symbols for the following messages:
ok.	No special messages
A	Alarm – collective message "any alarm"
p	Pressure alarm – the gas pressure cannot be measured
T	Temperature alarm – the gas temperature cannot be measured
W	Warning – collective message "any warning"
B	Battery warning – the battery is nearly empty
L¹²	Certification data log - the certification data log is full.
P	Calibration lock (programming mode) – the calibration lock is open.
o	online – data transmission is ongoing
<p>If one of these letters flashes, the condition thereby indicated is still in place (active). If a letter is displayed consistently, the indicated status is no longer in place, but needs to be confirmed.</p> <p>Detailed explanations on the meaning and on any necessary procedure: see section 9.1.4 "Conduct in the event of faults"</p>	
Frz.	<p>Display frozen</p> <p>The values displayed are "frozen" (not up to date). After pressing any key, the current values are displayed. Freezing the display can be triggered after pressing the ▲ + ► key combination.</p>
	<p>External power supply</p> <p>If this symbol appears, the EK205 is being supplied power from an external unit connected to the terminals.</p>

¹² If a calibration logbook is available in the device.

Symbol	Meaning
	Signal strength of the radio network for the external modem (connected to the terminals). This display is only shown if an external modem is connected and active.
	Charging status of the device battery

7.3.5 Error messages when entering values

If a value has been entered incorrectly via the keyboard, then input error messages will be displayed.

Figure: --x-- with x = error code according to the following table

Code	Description
1	The archive is empty, no values have been entered.
2	The archive value cannot be read. The archive may currently be opened by the interface for exporting.
4	Parameter cannot be changed (constant)
5	You are not authorized to change this value. A corresponding lock must be opened to change this value.
6	Invalid value The value entered is outside the permissible limits.
7	Wrong key The key entered (number code) is incorrect, lock is not opened.
11	Input not possible due to special settings or configuration, e.g.: - Change heat value only possible in the gas analysis list; not in the energy list
12	The input of this source (address) is not permitted.
13	Input not possible due to special settings or configuration, e.g.: The <i>Clr.X</i> function can only be performed once the time has been set to its start value (initialized) with the button combination ◀ + ▲. - The <i>Store</i> function can only be executed once the change information for the alignment of "Vm" (see section 6.3.1.4) or "Vb" (see section 6.3.1.6) was deleted.
14	Gas analysis parameters do not match.
20	Value not defined for the user-specific display The value to be displayed can be defined by entering the address of the user. As this address has not yet been entered, no value will be displayed.
21	The value can only be changed when the calibration lock is open as the PTB logbook is full.

7.3.6 Access rights

The EK205 has the following access parties.

Access	Meaning
C	Calibration officer
CDL ¹³	Calibration Manual
A	Administrator
Cu	Customer
-	No access

Every access party has a lock and a matching key.

The access rights apply for both inputs by keyboard and for access via the optical, electrical (fixed-wired) or integrated modem interface. If the lock is closed, all attempts to set values prompt a corresponding error message (see section 7.3.5, Error messages when entering values).

Reading values via the interfaces is also only possible within the meaning of data protection if a lock is open.

7.3.6.1 Calibration lock

The calibration lock serves to secure calibration law parameters. These include all values that influence volume counting and volume conversion.

The calibration lock is designed as a key that is placed within the EK205 housing below the circuit board cover. It can be secured with an adhesive label (see section 6.3.1.1, Opening the calibration lock).

The calibration lock is opened by actuating the key (the P symbol flashes in the display) and closed again by actuating it a second time (P symbol extinguishes). Closing is also possible by deleting the St.ES value (see section 7.4.6, Strg. tab (control)) via the keyboard or interface. Using the enSuite software, it is also possible to set a time in minutes after which the calibration lock closes automatically.

In particular for applications outside the German calibration obligation or the MID, the protection degree of all parameters can be changed on request.

As such, parameters that are below the calibration key by default can also be protected with the administrator key or calibration logbook.

¹³ If a calibration logbook is available in the device.

7.3.6.2 Certification data log

The certification data log is activated by default, but can be deactivated as an option. The parameters affected are then below the calibration lock.

Using the certification data log in accordance with PTB-A 50.7, some calibration law-relevant parameters can also be changed when the calibration lock is closed. The requirements for this are:

- The administrator lock must be opened (see below).
- At least three free entries must be available in the certification data log.

The parameters affected according to the factory settings are:

- *CP.11* cp value for input 1,
- *MPer* measurement period
- *Md.KK* number mode
- *Clr.A* delete measurement archive
- *Md.11* mode for input 1
- *QMax* maximum load (plausibility check in encoder mode)

For every change of a parameter under *CDL* with a closed calibration lock, a data row for the value is entered before and after the change.

If the certification data log is full, it can be deleted when the calibration lock is open using the *CICDL* command. (see section 6.3.1.13)



If the calibration lock is opened while the calibration logbook is open, it can only be closed again after deleting the certification data log.

7.3.6.3 Administrator lock and customer lock

Administrator and customer lock are used to secure all calibration law data that are not relevant, but that should not be changed without authorization.

The locks can be opened by entering a code (the "key") under *Cod.A* or *Cod.C* and closed by entering "0" for *St.AL* or *St.CL*.

These values can be found under the path:

[Admin](#) → [Device settings](#) → [Access](#) or

[Serv.](#) → [Device settings](#) → [Access](#)

There, a time can also be set in minutes for each lock after which it closes automatically.

7.4 Content of the data register

7.4.1 Access rights

The "Access" column in the tables of the following sections describes what lock needs to be opened to change a parameter. All changes of parameters are saved in a logbook.

Access	Meaning
C	Calibration officer
CDL ¹⁴	Calibration Manual
A	Administrator
Cu	Customer
-	No access

7.4.2 Main tab (main display)

In the Main tab, the key measurement values are displayed at a glance. The content can differ depending on the settings (see section 7.4.6.5). With this tab, there is no possibility to move the cursor for a value.¹⁵ Via the ENTER key, an update of the values displayed can be initiated.

Display	Meaning	Unit	Access	Address
Vb	Volume at base conditions	m ³	C	2:300
VmT	Total Volume at measurement conditions	m ³	C	4:302
p	Pressure	bar	-	7:310_1
T	Temperature	°C	-	6:310_1

7.4.2.1 Vb – volume in base mode

The measured volume of the gas meter connected is converted in base mode and added up in this counter.

If a fault is given (see section 9 "Faults"), the counter is stopped and the volume is added up in a special fault volume counter.

7.4.2.2 VmT – Total volume in operation mode

The total measured volume of the gas meter connected is added up in this counter.

Even if a fault is given (see section 9 "Faults"), the counter is still counting. Additionally, the disturbed volume is counted in a special fault volume counter VmD.

¹⁴ If a calibration logbook is available in the device.

¹⁵ An exception is if the Main tab was set to List (see section 7.4.6.5).

7.4.2.3 p – gas pressure¹⁶

The gas pressure measured is used to calculate the volume in base conditions. The pressure is displayed as absolute pressure.

If the pressure cannot be measured due to a fault, an adjustable value is displayed and used to calculate the fault volumes. The definition of the replacement value is carried out on commissioning (see section 6.3.1 “Setting the operating parameters”).

7.4.2.4 T – gas temperature

The gas temperature measured is used to calculate the volume in base conditions.

If the temperature cannot be measured due to a fault, an adjustable value is displayed and used to calculate the fault volumes. The definition of the replacement value is carried out on commissioning (see section 6.3.1 “Setting the operating parameters”).

7.4.3 Customer tab

This tab is used to display and check special device settings or statuses. The application is intended for the gas customer.

This tab can be freely programmed by the user via the enSuite parameterization software.

The following parameters are programmed ex works:

Display	Meaning	Unit	Access	Address
Time	Date and time	-	-	1:400
Vb	Volume at base conditions	m ³	E	2:300
VmT	Total Volume at measurement conditions	m ³	E	4:302
p	Pressure	bar	-	7:310_1
T	Temperature	°C	-	6:310_1
K	Compressibility ratio factor	-	-	8:310
C	Conversion factor	-	-	5:310
SReg	Status register (total)	-	-	1:101
VbMP↑	Maximum measurement period counter Vb in the current month	-	-	3:161
VbDy↑	Maximum daily counter Vb in the current month	-	-	4:161
Qb	Flow at base conditions	m ³ /h	-	2:310
Qm	Actual flow rate	m ³ /h	-	4:310

7.4.3.1 Time – date and time

The time displayed is updated in battery mode every 30 and in mains mode every 2 seconds.

7.4.3.2 Values from Main tab

Vb – volume in base mode, see section 7.4.2.1

¹⁶ These values are not required in the performance as Temperature Conversion Device.

VmT – Total volume in operating mode, see section 7.4.2.2

p – gas pressure, see section 7.4.2.3

T – gas temperature, see section 7.4.2.4

7.4.3.3 K – Compressibility ratio factor

The compressibility ratio factor calculated is used to calculate the volume in base conditions.

The EK205 supports several equations to calculate the compressibility ratio factor. The equation to be used is determined by the directives and standards applicable for the usage area of the device. It can also be set when ordering or commissioning (→ section 6.3.1 “Setting the operating parameters”).

7.4.3.4 C – conversion factor

The currently determined factor for converting the volume in operating mode to basic mode.

7.4.3.5 SReg – status register (total)

All messages since the last manual clear are collected in the status register. Here, it can be seen what occurred since the last station inspection, for instance. The reports can be deleted on the device (*Serv.* → *Status* → *Clr*).

In the status tabs, only alarms and warnings (see section 9.2) are displayed.

7.4.3.6 VbMP ↑ – maximum measurement period counter Vb in the current month

The time stamp of the maximum is displayed in the following row when moving the cursor to the VbMP ↑ value.

The maximum of the past 24 months can be queried in the monthly archive 1 (see section 7.4.4 “Admin tab (administrator)”).

7.4.3.7 VbDy ↑ – maximum day counter Vb in the current month

The time stamp of the maximum is displayed in the following row when moving the cursor to the VbDy ↑ value.

The maximum of the past 24 months can be queried in the monthly archive 1 (see section 7.4.4 “Admin tab (administrator)”).

7.4.3.8 Qb – flow at base conditions

Current flow at base conditions (standard flow rate).

$Q_b = Q_m \cdot C$ with Q_m = actual flow rate

C = conversion factor

The maximum imprecision of the value displayed corresponds roughly to the maximum imprecision of Q_m .

For alarm, Q_b is calculated with the replacement values of the disrupted measurement values.

7.4.3.9 Qm – actual flow rate

Current actual flow rate (measurement flow rate).

The measurement insecurity of the operating load displayed depends on whether a pulse transducer is connected:

For connected pulse transducer:

With a pulse distance of a maximum of 15 minutes (at least four pulses per hour) and $cp.l1 \leq 1$, the measurement uncertainty of Qm is a maximum of 1%. For a pulse period of more than 15 minutes, Qm = 0 is displayed. After changing the gas flow, the precise value can only be displayed when the gas meter has sent at least two pulses.

7.4.4 Admin tab (administrator)

This tab is used to display and check special device settings or statuses. The application is intended for the measurement location operator.

Display	Meaning
User values ¹⁷	Submenu for user-specific parameters
Volume	Submenu for volumes and associated parameters
Volume conversion	Submenu for conversion and associated parameters
Measured values	Submenu for measurement values and associated parameters
Archives	Submenu for archives located in the device
Status	Submenu for current status, status tab and logbooks
Date and time	Submenu for date and time and associated parameters
Batteries	Submenu for device batteries and associated parameters
Inputs	Submenu for the inputs and associated parameters
Outputs	Submenu for all outputs and associated parameters
Interfaces	Submenu for the interfaces in the device
Device settings	Submenu for general device settings
Identification	Submenu for the identification of the gas system

¹⁷ In the User values submenu, the user can set via the enSuite parameterization software up to 10 and within this list in another submenu up to 12 freely programmable parameters.

7.4.5 Serv. tab (service)

This tab is used to display, check and parameterize special device settings or statuses. The application is only intended for service technician (specialist staff) or a calibration officer when commissioning or maintaining.

Display	Meaning
Volume	Submenu for volumes and associated parameters
Volume conversion	Submenu for conversion and associated parameters
Measured values	Submenu for analogue measurement values and associated parameters
Archives	Submenu for archives located in the device
Status	Submenu for current status, status tab and logbooks
Date and time	Submenu for date and time and associated parameters
Batteries	Submenu for device batteries and associated parameters
Inputs	Submenu for the inputs and associated parameters
Outputs	Submenu for all outputs and associated parameters
Interfaces	Submenu for the interfaces in the device
Device settings	Submenu for general device settings
Identification	Submenu for the identification of the gas system
Edit and delete	Submenu for triggering various deletion functions
Examination	Submenu for freezing function and test archive
Data book	Submenu with information from the data book of the device

7.4.6 Strg. tab (control)

This tab is used to check special device settings. The application is only intended for service technician (specialist staff) or a calibration officer when commissioning or maintaining.

Display	Value	Unit	Access	Address
St.AL ¹⁸	Administrator lock: Status / close	-	-	3:170
Cod.A ¹⁸	Enter / change administrator key	-	-	3:171
St.PL	Calibration lock: Status / close	-	-	1:170
Menu	Selection of the display menu	-	C	1:1A1
Main	Content of the Main tab	-	A	2:1A1

¹⁸ Operate the device with high communication reliability (high level security, see application manual) so that this menu item is not displayed.

7.4.6.1 St.AL – administrator lock: Status / close

The administrator lock needs to be opened to change certain operating parameters. In normal mode, the administrator lock should be closed.

Display	Meaning
locked	The administrator lock is closed.
open	The administrator lock is open.

7.4.6.2 Cod.A – enter / change administrator lock

Here, by entering the correct key (hexadecimal characters) the administrator lock can be opened. After the administrator lock was opened, the existing key can be changed.

The individual characters of the key can assume the values 0 to 9 and A to F.

7.4.6.3 St.PL – calibration lock: Status / close

The calibration lock needs to be opened to change certain operating parameters. In normal mode, the calibration lock should be closed.

Display	Meaning
locked	The calibration lock is closed.
open	The calibration lock is open. In this case, the "P" at the top left also flashes in the display (see section 7.3.4 "Meaning of the status symbols")

7.4.6.4 Menu – selection of the display menu

In delivery status, the display of the EK205 has the five tabs: Main, Cust., Admin, Serv. and Ctrl. With the Menu value, for certain purposes tabs can be displayed or hidden.

7.4.6.5 Main – content of the Main tab

Here, the content of the Main display tab can be set.

The setting ex works is Volume+Measurement value. This corresponds to the content displayed in section 7.3.1.

Display	Meaning
Volume+meas.	<ul style="list-style-type: none"> - The following is displayed: Volume at base conditions, volume at measurement conditions, pressure, temperature - Format: 8 integers and 3 decimals for the meter - with brief descriptions for all values
List	<ul style="list-style-type: none"> - The following is displayed: Volume at base conditions, volume at measurement conditions, pressure, temperature, status register, compressibility ratio factor, actual flow rate, flow at base conditions, date and time

8 Maintenance

8.1 Safety



DANGER!

Risk of life from electric current!

When coming into contact with live parts, there is a immediate risk of life. Damage to the insulation or individual components can be fatal.

Therefore:

- Cover the electric connections and live parts against possible contact.
- Immediately cut the power supply in the event of damage to the insulation and initiate the repairs.
- Have work on the electric components of the device, such as the connection of the external power supply, carried out by electrical experts only.
- For all work on the electrical plant, de-energize it and check the freedom from voltage.
- Before maintenance work, cut the voltage supply and secure it from reactivation.
- Do not bridge any fuses or deactivate them. When replacing fuses, observe the correct ampere figure.
- Keep life parts away from humidity. This may result in a short-circuit.



DANGER!

Risk of explosion due to electrostatic charging.

Avoid electrostatic charges.

Therefor:

- Clean the device only with a damp cloth.
- Avoid rubbing with non-conductive materials.



WARNING!

Risk of injury when handling batteries incorrectly!

Batteries need to be treated with special care.

Therefore:

- Do not throw the batteries in the fire or expose them to high temperatures. There is a risk of explosion.
- Do not charge the batteries. There is a risk of explosion.
- Liquid being released in the event of incorrect use may result in skin inflammations. Avoid contact with the liquid. Rinse the liquid with lots of water in the event of contact. If the liquid enters the eyes, rinse the eyes for 10 mins with water and see a doctor immediately.

**CAUTION!****Substances harmful to the environment!**

When handling substances harmful to the environment, in particular in the event of incorrect disposal, severe damage may arise for the environment.

Therefore:

- Observe the below notes at all times.
- Take suitable measures immediately if substances harmful to the environment enter the environment by mistake. In the event of doubt, inform the municipal authorities in charge of the damage.

8.1.1 Staff

Maintenance work must be carried out correctly.

- Have the maintenance work described here carried out by electrical experts only (see section “Operation”).

**WARNING!****Risk of injury from improperly performed maintenance work.**

Improper maintenance may result in severe personal injury or material damage.

Therefore:

- Before starting work, ensure sufficient installation freedom.
- Ensure order and cleanliness at the place of installation. Components and tools lying around and placed on top of one another loosely are sources of accidents.
- If components were removed, ensure correct installation, reinstall all fastening elements and observe screw torques.

8.1.2 Personal protective equipment

- During the maintenance work on the device, wear the protective equipment required within the relevant system.
- Always observe the notes on the personal protective equipment provided in the working area.

8.1.3 Environmental protection

Observe the following instruction during maintenance work:



The batteries used contain poisonous heavy metals. They are subject to special waste treatment and need to be disposed of at the municipal collection points or by a specialist company.

8.2 Check and replace device batteries

8.2.1 Replace and connect device batteries



DANGER!

Risk of explosion when using of wrong batteries.

Use only batteries stated in the design test certificates of the EK205 (see section 11.3). Order number see section 11.1.4.



WARNING!

Risk of injury when handling batteries incorrectly!

Batteries need to be treated with special care.

Therefore:

- Do not throw batteries in the fire or expose them to high temperatures. There is a risk of explosion.
- Do not charge batteries. There is a risk of explosion.
- Liquid being released in the event of incorrect use may result in skin inflammations. Avoid contact with the liquid. Rinse the liquid with lots of water in the event of contact. If the liquid enters the eyes, rinse the eyes for 10 mins with water and see a doctor immediately.

The replacement of the batteries can be carried out without damaging lead seals for devices with a standard structure.



Before removing the plug of the old battery from the plate, ensure that the new battery has already been connected. As such, the EK205 continues to work during the battery replacement.

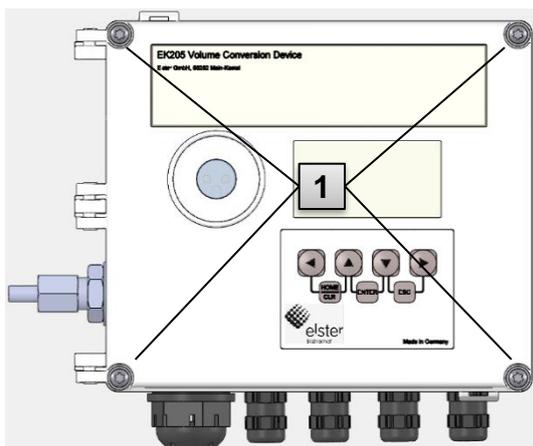


Fig. 24

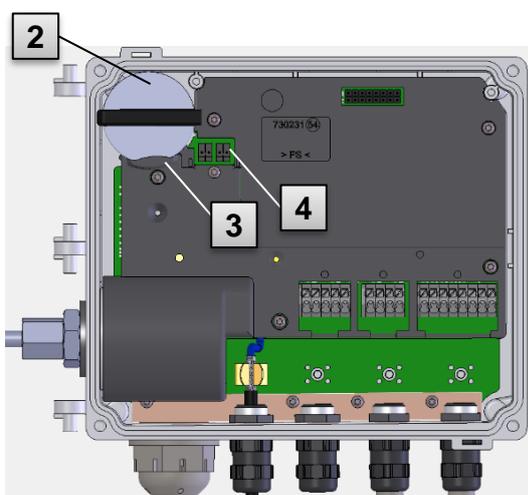


Fig. 25

1. Loosen the four housing screws (Fig. 24: **1**).
2. Open the lid of the EK205.
3. Mark the old battery with a felt pen or label, for instance.
4. Remove the battery (Fig. 25: **2**) from the battery holder (Fig. 25: **3**).
5. Select the free connection on the plate for connecting the new battery (K9 or K10; Fig. 25: **4**).
6. Place the new battery inside (Fig. 25: **2**) and ensure that the battery is correctly anchored in the battery holder.
7. Remove the old battery and dispose of it correctly.
8. Close the housing using the intended screws (Fig. 24: **1**).
9. Reenter the start capacity of the battery as described in section 8.2.2.
10. Check of the operating period calculated as described in section 8.2.3. In standard operation mode (see section 4.2.1), the operation duration must display at least 62 months. Otherwise, compared the settings with the standard operation case and execute step 9 if applicable.



Ensure that the new battery is fastened correctly and sits tight inside the EK205.



CAUTION!

Damage to property caused by improper device closure!

If the device is not properly closed cables can get pinched and cause damage.

Therefore:

- During closing, ensure the correct position of the cable ducts.

8.2.2 Enter battery capacity



The battery capacity needs to be re-entered after a battery replacement.

- To open the administrator lock, move the cursor to the Admin tab and via the following path to the Cod.A value (administrator key entry):
Admin. → Device settings → Access → Cod.A



After delivery, the administrator key for keyboard entry is 00000000.

- Press the key combination ENTER ▲ + ▼ ⇒ One digit of the value flashes.
- Move the cursor with the arrow buttons ► or ◀ to the digits and change these with the arrow buttons ▲ or ▼.
- After the value has been entered, press the key combination ENTER ▲ + ▼ in order to confirm the input. It is possible to abort the entry by pressing the key combination ESC ▼ + ►.
- To enter the battery capacity, move the cursor to the Serv. tab and via the following path to the Bat.C value (battery capacity):
Serv. → Batteries → Bat.C
- Press the key combination ENTER ▲ + ▼ ⇒ One digit of the value flashes.
- Move the cursor with the arrow buttons ► or ◀ to the digits and change these with the arrow buttons ▲ or ▼.



When using a battery of the D value, set the Bat.C value to 13.0 Ah.

- After the value has been entered, press the key combination ENTER ▲ + ▼ in order to confirm the input. It is possible to abort the entry by pressing the key combination ESC ▼ + ►.
- To close the administrator lock, move the cursor to the Admin tab and via the following path to the St.AL value (administrator lock status):
Admin. → Device settings → Access → St.AL
- Press the key combination ENTER ▲ + ▼ ⇒ "open" flashes.
- Move the cursor with the arrow keys ▲ or ▼ to change the value to "closed".
- After the value has been entered, press the key combination ENTER ▲ + ▼ in order to confirm the input. It is possible to abort the entry by pressing the key combination ESC ▼ + ►.

8.2.3 Display remaining operating duration of the battery



The calculation of the remaining operating duration is carried out depending on the consumed capacity (which is measured) and the consumption expected for the future (which results in the theoretical remaining operation duration). For that reason, for applications with strong power consumption may result in the remaining operating duration falling faster than the indication of the remaining operating duration promises.

A fresh calculation of the remaining operating duration is automatically carried out after entering a new battery capacity Bat.C (see above). It is not possible to edit the value.

- Move the cursor to the "Serv." tab and via the following path to the value "Bat.R" (remaining battery operating duration):
Serv. → Batteries → Bat.R



After entering a new battery capacity, in the standard operating case (see section 4.2.1) a value of at least 62 months must be displayed for "Bat.R".

9 Faults

The following section describes causes of faults of the device and possibilities of rectification.



In the event of faults that cannot be rectified with the following instructions, please contact our customer service (see section “General”) or our electronics hotline:

- Tel. +49 (0) 6134 / 605-123
- www.elster-instromet.com/de
- www.honeywellprocess.com/sSupport (Knowledge Base)
- E-Mail: support@elster-instromet.com

9.1 Safety



DANGER!

Risk of life from electric current!

When coming into contact with live parts, there is an immediate risk of life. Damage to the insulation or individual components can be fatal.

Therefore:

- Immediately cut the power supply in the event of damage to the insulation and initiate the repairs.
- Have work on the electric components of the device, such as the connection of the external power supply, carried out by electrical experts only.
- For all work on the electrical plant, de-energize it and check the freedom from voltage.
- Before maintenance work, cut the voltage supply and secure it from reactivation.
- Keep live parts away from humidity. This may result in a short-circuit.

9.1.1 Staff

- The work described here for fault rectification, unless indicated otherwise, can be carried out by the operator.
- Some work may only be carried out by specially trained specialist staff or exclusively by the manufacturer. Special reference to this is made in the description of the individual faults.
- Work on the electrical system may be carried out by electrical specialist staff only as a rule.

9.1.2 Personal protective equipment

- During the rectification of a fault on the device, wear the protective equipment required within the relevant system.
- Always observe the notes on the personal protective equipment provided in the working area.

9.1.3 Improper fault rectification



WARNING!

Risk of injury from improper fault rectification!

Improper fault rectification may result in severe personal injury or material damage.

Therefore:

- Before starting work, ensure sufficient installation freedom.
- Ensure order and cleanliness at the place of installation. Components and tools lying around and placed on top of one another loosely are sources of accidents.
- If components were removed, ensure correct installation, reinstall all fastening elements and observe screw torques.



The following explanations on the faults occurring provide information on who is authorized to rectify the fault.

9.1.4 Conduct in the event of faults

The following applies as a rule:

1. If work is required in the hazardous area, deactivate the overall system and secure it from restarting.
2. Determine the cause of the fault.
3. Inform the persons in charge at the place of use of the fault immediately.
4. Depending on the type of the fault, contact the manufacturer and have it rectified by authorized specialist staff or do so yourself.

9.2 Fault and other status messages

Faults (here equivalent to "alarms") during the operation of the EK205 can be identified on the basis of the status symbols in the first row of the display (see section 7.3.4).

Further information and reports can be obtained in the Stat current status and in the SReg. status tab. They can be found:

- in the *Cust.* tab (SReg only)
- at the paths *Admin* → *Status* and *Serv.* → *Status*

Effects and recommended procedures in the event of fault and other status messages:

Message	Description, process
a) Faults, alarms:	
Restart	If this message appears whilst in operation, the device is faulty. Please contact the Elster customer service (see section 1.4 "Customer service").
C-fact. err.	The conversion factor could not be calculated, as the measured gas temperature is outside -100°C to +100°C or no usable compressibility figure is available.

Message	Description, process
Data error	An error was detected during the cyclic check of the data subject to calibration regulations. Please contact the Elster customer service (see section 1.4 "Customer service").
T Alarm Lim.	The gas temperature measured is outside the permissible limits. The limits can be changed when commissioning in the presence of the calibration officer. (see section 6.3.1.8)
p Alarm Lim.	The gas pressure measured is outside the permissible limits. The limits can be changed when commissioning in the presence of the calibration officer. (see section 6.3.1.8)
K-val. error	The compressibility ratio factor could not be calculated, as no valid real gas factor could be determined yet.
z-fact. err.	The real gas factor could not be calculated. At least one of the gas analysis values of Ho.n, CO ₂ , H ₂ , Rhon is outside the permissible range.
Vm-Alarm	No volume could be entered for the input used for the volume conversion.
Vm-Inp.Alarm	For the encoder connected on input 1, for 40 seconds (with external, current supply) or for the duration of two measurement cycles + 1 second (in the event of battery supply), no operating volume could be entered.
T Inp. error	The gas temperature cannot be measured due to a fault. Please contact the Elster customer service (see section 1.4 "Customer service").
p Inp. error	The gas pressure cannot be measured due to a fault. Please contact the Elster customer service (see section 1.4 "Customer service").
b) Warnings:	
Data restore.	The batteries of the EK205 have failed temporarily. As a result of this, the time has not changed and no measurements have been logged. However, all data remain preserved. This message appears when old batteries are removed before connecting the new ones (see section 8.2). Procedure using the enSuite software: <ul style="list-style-type: none"> ■ Set the time of the EK205. ■ Delete the status register
Outp.1 Error Outp.2 Error	There should be more pulses being emitted from the specified output than are permitted under its configured settings. In order to eliminate the cause of the problem, you can use the enSuite software to either: <ul style="list-style-type: none"> ■ reduce the cp value of the output ■ or increase the output frequency In both cases, the change must be aligned with the device connected.

Message	Description, process
I1-Warning	The encoder could not be read at the end of the measurement period. The flow recording at this point is invalid.
I2 Pulse cmp	During the pulse comparison between, for instance, input 1 and input 2, too large a deviation occurred.
W Warn Lim.	The performance displayed is outside the warning limit set. The warning limit can be changed with the enSuite software.
Vb Warn Lim.	The standard volume consumption value monitored (by default: hourly consumption) is outside the warning limit set. What value is monitored and the warning limits can, among other things, be changed with the enSuite software.
Qm Warn Lim.	The operating load (gas flow) is outside the warning limit set. The warning limit can be changed with the enSuite software.
T Warn Lim.	The gas temperature measured is outside the warning limit set. The warning limit can be changed with the enSuite software.
p Warn Lim.	The gas pressure measured is outside the warning limit set. The warning limit can be changed with the enSuite software.
z Warning	The sum of the gas analysis values with AGA-8 DC92 is larger or smaller than 100%. As such, no correct calculation of the real gas factor and the compressibility figure could be carried out.
Update error	Before the software update, an error was detected in the cached software image.
Softw. error	This message is used for factory diagnosis. Please contact the Elster customer service (see section 1.4 "Customer service").
Sett. error	The programming of the device has generated an unusable combination of settings. Please contact the Elster customer service (see section 1.4 "Customer service").
I2 Warn.sig.	If an input has been configured as a warning input, this message will be displayed if an active signal appears at the corresponding terminal (e.g., terminal DE2). The input configuration can be adjusted using the enSuite software.
Batt. low	The remaining battery power is less than six months. The batteries need to be changed soon.
c) Remarks:	
TA Warn Lim.	The ambient temperature measured is outside the warning limit set. The warning limit can be changed with the enSuite software.
Repair mode	The device is in revision mode

Message	Description, process
Clock n. set	The internal clock of the Volume Conversion Device has not been adjusted at the factory.
CDL full	The certification data logbook is full. Changing the parameters marked with "CDL" without a calibration lock is only possible if the content of the certification data logbook has been deleted.
U.Logb. full	The software update logbook is full. An update is only possible if the content of the software update logbook has been deleted.
online	Data is currently being transmitted via an interface (modem, optical interface or terminal interface). If this message is displayed, the "o" will flash in the "Status" field of the display (see section 7.3.4).
E2-HinwSig.	If an input has been configured as a signal input, this message will be displayed if an active signal appears at the corresponding terminal (e.g., terminal DE2). The input configuration can be adjusted using the enSuite parameter program.
Remote clock	The Volume Conversion Device has started to set its clock via RDT. It is deleted again as soon as this could be carried out successfully. If this report remains entered for more than a couple of minutes, the Automatic setting of the clock via RDT function is activated but could not be executed. In this case, please contact the Elster customer service (see section 1.4 "Customer service").
Cal.lock o.	The calibration lock is open. In normal operating conditions, the calibration lock should be closed so that unauthorized changes cannot be made. To close the calibration lock, please go to <i>Ctrl. → St.ES</i> and enter the value "0".
Admin.lock	The administrator lock is open.
Cust.lock o.	The customer lock is open.
Bat. operat.	The EK205 is in battery mode. This signal is primarily used to inform a remote data transmission system that the batteries run down more quickly during long periods of data transmission.
Dayl.Sav.Tim	The time displayed in volume convertor is daylight saving time. The switchover mode can be changed using the enSuite software.

Message	Description, process
Call Win.1 Call Win.2 Call Win.3 Call Win.4 Call Win.5 Call Win.6	The specified call pickup time window is active, i.e., the Volume Conversion Device will accept data transmission calls.
call time1 call time2	The specified call time is active, i.e., the EK205 shall make a data transmission call to the remote terminal.

10 Decommissioning

10.1 Final decommissioning

Read the data from the device (optional).

Run the function (“Clr.X”) to delete the (basic) parameterization and all sensitive data such as volume counters, archives and logbooks in the device:



CAUTION!

Please note that after the deletion process, it will only be possible to actuate the optical interface. All other data will be irretrievably deleted.

- Open the calibration lock (see **6.3.1.1 “Opening the calibration lock”**).
 - Set the clock to its start value using key combination ◀ + ▲.
 - Move the cursor in the “Serv.” tab to “Edit and delete” > “Clr.X”.
 - Press the ENTER key combination. ⇒ “0” will flash.
 - Change the value to “1” using the ▲ or ▼ arrow key.
 - Press the ENTER key combination to confirm the set value. The input process can be cancelled by pressing the ESC key combination.
- ⇒ All data will be deleted.
- Remove the device battery and, if necessary, disconnect the device from the external voltage supply.
 - Remove all supply cables.
 - You can then remove the device immediately.

10.2 Disposal

EK series volume conversion devices are covered by the WEEE Directive and bear the WEEE symbol . The important thing to note here is that end-of-life devices must be processed by an individual or collective recycling and disposal system. As EU member states have transposed the WEEE Directive differently into national law, the regulations for returning end-of-life devices vary.

Please ask your Honeywell sales partner about the regulations for returning your devices.



Environmentally sound disposal under the WEEE Directive

The WEEE Directive 2012/19/EU was adopted by the European Commission. WEEE stands for “Waste Electrical and Electronic Equipment” (or e-waste). Its aim is to provide a statutory framework to achieve the sustainable production and sustainable use of electrical and electronic equipment by re-use, recycling and other forms of the recovery of end-of-life electrical and electronic equipment. The intention is to reduce the share of this equipment in household waste and to collect raw materials properly for recovery.

**Remove the battery before shipping or disposing of the device.**

Please note that batteries require special waste treatment. They should therefore be removed before shipping an EK series volume conversion device and sent to a collection point or disposed of by a specialist contractor.

See section 8.2.1 “Replace and connect device batteries” (page 66)

11 Appendix

11.1 Replacement and accessory parts list



Figures of the following replacement and accessory parts can be found in the catalogue of the manufacturer, which can be ordered at www.elster-instromet.com.

11.1.1 Fastening parts

Replacement / spare parts	Order no.
Mounting bracket for installation on meter with meter head type MI-2	73 021 952
Mounting kit EK205 to RABO flow direction horizontal	73 023 803
Mounting kit EK205 to RABO flow direction vertical	73 023 804
Mounting kit EK205 to S1, S1V, S1D, Enc. S1	73 023 805
Universal holding angle for pipe installation for various nominal widths	73 021 955
Universal holding angle for fastening with clamp to a pipe	73 018 057
EK205 wall installation help	73 023 360
Pipe installation help, incl. screws	04 300 365



When ordering the universal holding angle with the clamps for pipe installation, state the pipe diameter.

11.1.2 Pressure connection

Replacement / spare parts	Order no.
Two-way ball cock Ermeto T-piece	03 152 266
Three-way ball cock complete	73 022 404
Flexible pressure hose $\varnothing 6 \times 700$ mm	73 017 659
Flexible pressure hose $\varnothing 6 \times 400$ mm	73 017 656
Test supports for Ermeto Minimess	03 008 298

11.1.3 Temperature sensor bags

Replacement / spare parts	Order no.
Temperature sensor bag EBL50 complete incl. welding nozzles M10 × 1	73 012 634
Temperature sensor bag EBL67 complete incl. welding nozzles M10 × 1	73 014 456
Temperature sensor bag EBL160 complete incl. welding nozzles G 3/4" and seal ring	73 012 100
Temperature sensor bag EBL250 complete incl. welding nozzles G 3/4" and seal ring	73 015 695
Adapter for older sensor bags (EBL45, 50 and 67) for fastening and sealing the 6 mm universal sensor.	73 019 951
Adapter for older sensor bags (EBL160 and 250) for fastening and sealing the 6 mm universal sensor.	73 019 950

11.1.4 Small parts and other

Replacement / spare parts	Order no.
Seal sleeve for pressure connection and temperature sensor	73 017 997
Connection cable for 2 NF pulse transducer, approx. 700 mm in length	73 017 093
Device: Battery module (rated voltage = 3.6 V, rated capacity = 16.5 Ah)	73 015 774
Outdoor plug / breather drain plug	73 020 775

11.1.5 Documentation

Replacement / spare parts	Order no.
German manual	73 023 158
English manual	73 023 159
Russian manual	73 023 160

11.2 Conformity declaration¹⁹



EU Declaration of Conformity No. **DEMZE2206**
EU-Konformitätserklärung Nr.

Honeywell

Type, Model **EK205**
Typ, Ausführung

Manufacturer **Elster GmbH, Postfach 1880, D - 55252 Mainz-Kastel; Steinern Straße 19-21**
Hersteller

Product **Volume conversion device**
Produkt **Zustands-Mengennumwerter**

The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:
Der oben beschriebene Gegenstand der Erklärung erfüllt die einschlägigen Harmonisierungsrechtsvorschriften der Union:

2014/32/EU (MID)	2014/30/EU (EMC)	2014/34/EU (ATEX)	2014/34/EU (ATEX)	2011/65/EU (RoHS)
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Relevant harmonised standards used:

Einschlägige harmonisierte Normen, die zugrunde gelegt wurden:

EN 12405-1:2005+A2:2010, OIML D11 Edition 2004 (E)	EN 61326-1:2013	EN IEC 60079-0:2018 EN 60079-11:2012	IEC 60079-0:2011 Ed. 6 IEC 60079-11:2011 Ed. 6	EN 50581:2012
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Certificates and interventions by notified bodies:

Bescheinigungen und Maßnahmen durch notifizierte Stellen:

T10873	Not applicable Entfällt	LCIE 16 ATEX 3007 X	IECEx LCIE 16.0003X	Not applicable Entfällt
EC-type Examination EG-Baumusterprüfung		EU-type examination EU-Baumusterprüfung	Type examination Baumusterprüfung	
Notified Body 0122 NMI Certin B.V. Hugo de Grootplein 1 NL-3314 EG Dordrecht		Notified Body 0081 Bureau Veritas LCIE 33, avenue du Général Leclerc F-92260 Fontenay-aux-Roses		

This declaration of conformity is valid for products labelled accordingly:

Diese Konformitätserklärung gilt für entsprechend gekennzeichnete Produkte:

T10873		 II 1 G Ex ia IIC T4 Ga	 Ex ia IIC T4 Ga	
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The production is subject to the following surveillance procedures:

Die Herstellung unterliegt folgenden Überwachungsverfahren:

Directive Module D Richtlinie Modul D	Directive Module C Richtlinie Modul C	Directive Annex IV+VII Richtlinie Anhang IV+VII	Directive Article 7 Richtlinie Artikel 7
Notified Body 0102 Physikalisch Technische Bundesanstalt (PTB) D-38116 Braunschweig		Notified Body 0044 TÜV NORD CERT GmbH D-30519 Hannover	

This declaration of conformity is issued under the sole responsibility of the manufacturer. If alterations are made to the product or it is modified, this declaration becomes void with immediate effect.

Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller. Bei Umbau des Produkts oder Änderungen am Produkt verliert diese Erklärung mit sofortiger Wirkung ihre Gültigkeit.

Elster GmbH

Mainz-Kastel, 02.11.2022

Signed for and on behalf of
Unterzeichnet für und im
Namen von

Place and date of issue
Ort und Datum der
Ausstellung

Dr. Martin Schröder,
Managing Director

Christian Neugebauer,
R&D Manager Gas
Electronics

¹⁹ IECEx is not available for all device types.

11.3 Design test certifications

11.3.1 ATEX – EC Type Examination Certificate



LCIE

1 ATTESTATION D'EXAMEN CE DE TYPE

Appareil, système de protection ou composant destiné à être utilisé en atmosphères explosibles (Directive 94/9/CE)



EC TYPE EXAMINATION CERTIFICATE

Equipment, protective system or component intended for use in potentially explosive atmospheres (Directive 94/9/EC)

3 Version : 01

LCIE 16 ATEX 3007 X

Issue : 01

4 Appareil :
Convertisseur de volume

Equipment:
Volume conversion device

Type: EK205

5 Demandeur - Fabricant

Applicant - Manufacturer

ELSTER GmbH

6 Adresse :

Address :

Steinem Straße 19-21
55252 Mainz-Kastel
Allemagne

7 Cet appareil, système de protection ou composant et ses variantes éventuelles acceptées sont décrits dans l'annexe de la présente attestation et dans les documents descriptifs cités en référence.

This equipment, protective system or component and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

8 Le LCIE, organisme notifié sous la référence 0081 conformément à l'article 9 de la directive 94/9/CE du Parlement européen et du Conseil du 23 mars 1994, certifie que l'appareil, système de protection ou composant est conforme aux Exigences Essentielles de Sécurité et de Santé pour la conception et la construction d'appareil, système de protection ou composant destinés à être utilisés en atmosphères explosibles, données dans l'annexe II de la directive. Les résultats des vérifications et essais figurent dans le(s) rapport(s) confidentiel(s) :

LCIE, notified body number 0081 in accordance with article 9 of the Directive 94/9/EC of the European Parliament and the Council of 23 March 1994 certifies that this equipment, protective system or component has been found to comply with the essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.

The examination and test results are recorded in confidential report(s):

N° 138685-679422

9 Le respect des Exigences Essentielles de Sécurité et de Santé est assuré par la conformité à :

Compliance with the Essential Health and Safety Requirements has been assured by compliance with :

EN 60079-0:2012 + A11:2013
EN 60079-11:2012

10 Le signe X lorsqu'il est placé à la suite du numéro de l'attestation, indique que cet appareil est soumis aux conditions spéciales pour une utilisation sûre, mentionnées dans l'annexe de cette attestation.

If the sign X is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

11 Cette attestation d'examen CE de type concerne uniquement la conception et la construction de l'appareil, système de protection ou composant spécifié. Des exigences supplémentaires de la directive sont applicables pour la fabrication et la fourniture de l'appareil, système de protection ou composant. Ces dernières ne sont pas couvertes par la présente attestation.

This EC type examination certificate relates only to the design and construction of the specified equipment, protective system or component.

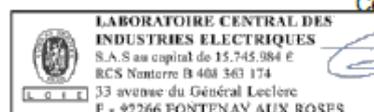
Further requirements of the directive apply to the manufacturing process and supply of this equipment, protective system or component. These are not covered by this certificate.

12 Le marquage de l'appareil, système de protection ou composant est mentionné dans l'annexe de cette attestation.

The marking of the equipment, protective system or component is specified in the schedule to this certificate.

Fontenay-aux-Roses, le 5 février 2019

Responsable de Certification
Certification Officer



Julien Gauthier

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CERT-ATEX-FORM 04 Rev. 01

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au capital de 15 745 984 €
RCS Nanterre B 408 363 174



LCIE

1 ATTESTATION D'EXAMEN CE DE TYPE

Appareil, système de protection ou composant destiné à être utilisé en atmosphères explosibles (Directive 94/9/CE)



EC TYPE EXAMINATION CERTIFICATE

Equipment, protective system or component intended for use in potentially explosive atmospheres (Directive 94/9/EC)

3 Version : 01

LCIE 16 ATEX 3007 X

Issue : 01

13

ANNEXE

SCHEDULE

15 DESCRIPTION DE L'APPAREIL, DU SYSTEME DE PROTECTION OU DU COMPOSANT

Le convertisseur de volume EK205 est un appareil électronique qui convertit et affiche le volume mesuré d'un compteur de gaz.

L'appareil est principalement constitué

- d'une enveloppe plastique,
- d'un afficheur LCD avec un clavier,
- d'une carte mère équipée de deux entrées de sécurité intrinsèque (DE1 DE2), de deux sorties de sécurité intrinsèque (DA1, DA2) et d'une interface série de sécurité intrinsèque (Uext, T+/DTR, T-/TxD, R+/DCD, R-/RxD, GND, RING) pour la transmission des données,
- d'un capteur interne de pression et d'un capteur externe de température.

Paramètres spécifiques du ou des modes de protection concernés :

Les piles utilisées dans l'appareil :

- Elster N°73015774, tension nominale = 3,6 V, capacité nominale = 16,5 Ah.
- Elster N°73020663, tension nominale = 3,6 V, capacité nominale = 19 Ah.
- Elster N°73023226, tension nominale = 3,6 V, capacité nominale = 19 Ah.

DESCRIPTION OF EQUIPMENT, PROTECTIVE SYSTEM OR COMPONENT

The EK205 volume conversion device is an electronic device that converts and displays the volume measured by a gas meter.

The equipment consists mainly of

- plastic housing,
- LCD display with keypads,
- CPU board equipped with two intrinsically safety inputs (DE1, DE2), two intrinsically safety outputs (DA1, DA2) and an intrinsically safety serial interface (Uext, T+/DTR, T-/TxD, R+/DCD, R-/RxD, GND, RING) for data communication,
- an internal pressure sensor and an external temperature sensor.

Specific parameters of the concerned protection mode:

Batteries used within the equipment:

- Elster N°73015774, rated voltage = 3.6 V, rated capacity = 16.5 Ah.
- Elster N°73020663, rated voltage = 3.6 V, rated capacity = 19 Ah.
- Elster N°73023226, rated voltage = 3.6 V, rated capacity = 19 Ah.

Borne / Terminal	Paramètres électriques / Electrical parameters				
Uext, DA1, DA2, DTR/T+, TXD/T-, RXD/R-, DCD/R+, RING	U_i : 25 V	$I_{i\Sigma}$: 144 mA	$P_{i\Sigma}$: 500 mW	C_i : 0	L_i : 0
DE1	U_o : 6.6 V	I_o : 0.66 mA	P_o : 1.1 mW	C_o : 22 μ F	L_o : 81624 mH
DE2	U_o : 6.6 V	I_o : 7.34 mA	P_o : 12.2 mW	C_o : 22 μ F	L_o : 660 mH

MARQUAGE

Le marquage de l'appareil du système de protection ou du composant doit comprendre :

Elster GmbH
Adresse : ...
Type : EK205
N° de fabrication : ...
Année de fabrication : ...

⊕ II 1 G

Ex ia IIC T4 Ga
Tamb : -40°C à +60°C
LCIE 16 ATEX 3007 X

AVERTISSEMENT – DANGER POTENTIEL DE CHARGES ELECTROSTATIQUES – VOIR INSTRUCTIONS

AVERTISSEMENT – UTILISER UNIQUEMENT LA PILE ELSTER N°73015774, N°73020663 ou N°73023226

U_i : ..., I_i : ..., P_i : ..., C_i : ..., L_i : ... (*)

U_o : ..., I_o : ..., P_o : ..., C_o : ..., L_o : ... (*)

(*) : complété par les paramètres de sécurité intrinsèque du paragraphe 15.

MARKING

The marking of the equipment, protective system or component shall include the following :

Elster GmbH
Address: ...
Type: EK205
Serial number: ...
Year of construction: ...

⊕ II 1 G

Ex ia IIC T4 Ga
Tamb: -40°C to +60°C
LCIE 16 ATEX 3007 X

WARNING – POTENTIAL ELECTROSTATIC CHARGING HAZARD – SEE INSTRUCTIONS

WARNING – USE ONLY ELSTER N°73015774, N°73020663 or N°73023226 BATTERY

U_i : ..., I_i : ..., P_i : ..., C_i : ..., L_i : ... (*)

U_o : ..., I_o : ..., P_o : ..., C_o : ..., L_o : ... (*)

(*) : completed by intrinsic safety parameters of the clause 15.



L C I E

1 ATTESTATION D'EXAMEN CE DE TYPE

Appareil, système de protection ou composant destiné à être utilisé en atmosphères explosibles (Directive 94/9/CE)

**EC TYPE EXAMINATION CERTIFICATE**

Equipment, protective system or component intended for use in potentially explosive atmospheres (Directive 94/9/EC)

3 Version : 01

LCIE 16 ATEX 3007 X

Issue : 01

13

ANNEXE**SCHEDULE**

L'appareil doit également comporter le marquage normalement prévu par les normes de construction qui le concernent sous la responsabilité du fabricant.

The equipment shall also bear the usual marking required by the product standards applying to such equipment under the manufacturer responsibility.

16 DOCUMENTS DESCRIPTIFS**DESCRIPTIVE DOCUMENTS**

N°	Rev.	Date	Pages	Rubriques / Items
EE0284	1	2016/01/29	149	25

17 CONDITIONS SPECIALES POUR UNE UTILISATION SURE**SPECIAL CONDITIONS FOR SAFE USE**

- L'appareil ne doit être raccordé qu'à des matériels associés de sécurité intrinsèque certifiés. Cette association doit être compatible vis-à-vis de la sécurité intrinsèque.
- Le connecteur K3 ne doit pas être utilisé en zone explosible.
- Utiliser uniquement le capteur de température ou de pression défini dans le dossier technique du fabricant.

- The equipment shall only be connected to certified associated intrinsically safe equipment. This association must be compatible with regard to the intrinsic safety.
- The connector K3 shall not be used in hazardous area.
- Use only temperature or pressure sensor defined in the manufacturer's technical file.

18 EXIGENCES ESSENTIELLES DE SECURITE ET DE SANTE**ESSENTIAL HEALTH AND SAFETY REQUIREMENTS**

Couvertes par les normes listées au point 9.

Covered by standards listed at 9.

19 INFORMATIONS COMPLEMENTAIRES**ADDITIONAL INFORMATION****Essais individuels****Routine tests**

Néant

None

Conditions de certification**Conditions of certification**

Les détenteurs d'attestations d'examen CE de type doivent également satisfaire les exigences de contrôle de production telles que définies à l'article 8 de la directive 94/9/CE.

Holders of EC type examination certificates are also required to comply with the production control requirements defined in article 8 of directive 94/9/EC.

20 DETAILS DES MODIFICATIONS**DETAILS OF CHANGES**

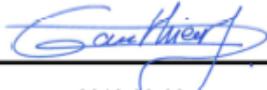
Version 01 : Correction éditoriale dans la partie française §15 (« EK215 » remplacé par « EK205 »). Aucune d'évaluation complémentaire de la conformité aux exigences essentielles de santé et de sécurité.

Issue 01 : Editorial correction §15 in the french text ("EK215" replaced by "EK205"). No complementary assessment of the compliance to the essential health and safety requirements.

Version 00 : Version initiale
2016-03-08

Issue 00 : Initial issue

11.3.2 IECEx Certificate of Conformity²⁰

		<h1>IECEx Certificate of Conformity</h1>	
<p>INTERNATIONAL ELECTROTECHNICAL COMMISSION IEC Certification Scheme for Explosive Atmospheres for rules and details of the IECEx Scheme visit www.iecex.com</p>			
Certificate No.:	IECEx LCIE 16.0003X	issue No.:0	Certificate history:.....
Status:	Current		
Date of Issue:	2016-03-08	Page 1 of 3	
Applicant:	Elster GmbH Steinern Straße 19-21 55252 Mainz-Kastel Germany		
Electrical Apparatus: Optional accessory:	Volume conversion device - Type: EK205		
Type of Protection:	Ex ia		
Marking:	Ex ia IIC T4 Ga (Refer to full marking in attachment)		
Approved for issue on behalf of the IECEx Certification Body:	Julien GAUTHIER		
Position:	Certification Officer		
Signature: (for printed version)			
Date:	2016-03-08		
<ol style="list-style-type: none"> This certificate and schedule may only be reproduced in full. This certificate is not transferable and remains the property of the issuing body. The Status and authenticity of this certificate may be verified by visiting the Official IECEx Website. 			
Certificate issued by: Laboratoire Central des Industries Electriques (LCIE) 33 Avenue du General Leclerc FR-92260 Fontenay-aux-Roses France			
Documents relative to LCIE certification activities (Certificates, QARs, ExTRs) can be registered under the references "LCI" or "LCIE".			

²⁰ Not available for all device types.



IECEX Certificate of Conformity

Certificate No.: IECEx LCIE 16.0003X

Date of Issue: 2016-03-08

Issue No.: 0

Page 2 of 3

Manufacturer: **Elster GmbH**
Steinern Straße 19-21
55252 Mainz-Kastel
Germany

Additional Manufacturing location
(s):

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements. This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended.

STANDARDS:

The electrical apparatus and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards:

IEC 60079-0 : 2011 Explosive atmospheres - Part 0: General requirements
Edition: 6.0

IEC 60079-11 : 2011 Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"
Edition: 6.0

*This Certificate **does not** indicate compliance with electrical safety and performance requirements other than those expressly included in the Standards listed above.*

TEST & ASSESSMENT REPORTS:

A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in

Test Report:

[FR/LCIE/ExTR16.0006/00](#)

Quality Assessment Report:

[DE/TUN/QAR11.0003/02](#)



IECEX Certificate of Conformity

Certificate No.: IECEX LCIE 16.0003X

Date of Issue: **2016-03-08**

Issue No.: 0

Page 3 of 3

Schedule

EQUIPMENT:

Equipment and systems covered by this certificate are as follows:

The EK205 volume conversion device is an electronic device that converts and displays the volume measured by a gas meter.

The equipment consists mainly of

- plastic housing,
- LCD display with keypads,
- CPU board equipped with two Intrinsically safety inputs (DE1, DE2), two Intrinsically safety outputs (DA1, DA2) and an intrinsically safety serial interface (Uext, T+/DTR, T-/TxD, R+/DCD, R-/RxD, GND, RING) for data communication,
- an internal pressure sensor and an external temperature sensor.

CONDITIONS OF CERTIFICATION: YES as shown below:

- The equipment shall only be connected to certified associated intrinsically safe equipment. This association must be compatible with regard to the intrinsic safety.
- The connector K3 shall not be used in hazardous area.
- Only temperature or pressure sensor defined in the manufacturer's technical file can be used.



Annex 00 to Certificate IECEX LCIE 16.0003X issue 00



1. Marking:

Elster GmbH

Address: ...

Type: EK205

Serial number: ...

Year of construction: ...

Ex ia IIC T4 Ga

Tamb: -40°C to +60°C

IECEX LCIE 16.0003X

WARNING – POTENTIAL ELECTROSTATIC CHARGING HAZARD – SEE INSTRUCTIONS

WARNING – USE ONLY ELSTER N°73015774, N°73020663 or N°73023226 BATTERY

Ui: ..., li: ..., Pi: ..., Ci: ..., Li: ... (*)

Uo: ..., lo: ..., Po: ..., Co: ..., Lo: ... (*)

(*): completed by intrinsic safety parameters in ratings.

2. Ratings:

Batteries used within the equipment:

- Elster N°73015774, rated voltage = 3.6 V, rated capacity = 16.5 Ah.

- Elster N°73020663, rated voltage = 3.6 V, rated capacity = 19 Ah.

- Elster N°73023226, rated voltage = 3.6 V, rated capacity = 19 Ah.

Intrinsic safety parameters:

Terminal	Intrinsic safety parameters				
Uext, DA1, DA2, DTR/T+, TXD/T-, RXD/R-, DCD/R+, RING	U_i : 25 V	$I_{i\Sigma}$: 144 mA	$P_{i\Sigma}$: 500 mW	C_i : 0	L_i : 0
DE1	U_o : 6.6 V	I_o : 0.66 mA	P_o : 1.1 mW	C_o : 22 μ F	L_o : 81624 mH
DE2	U_o : 6.6 V	I_o : 7.34 mA	P_o : 12.2 mW	C_o : 22 μ F	L_o : 660 mH