



# Volume Conversion Device EK280

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Operating  
Instructions

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Mainz-Kastel, January 2024

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# 1 General

## 1.1 Information about this manual

This manual allows for safe and efficient use of the device.

Compliance with all safety information and instructions for use contained in this operating manual is a prerequisite for safe working processes and proper use of the device. Furthermore, the valid guidelines, standards, local accident prevention regulations, and general safety regulations must be complied with for the respective area of application of the device.

This manual forms a constituent part of the product and must be stored within the immediate vicinity of the device and be accessible to installation, service, maintenance, and cleaning personnel at all times. The graphic illustrations used in this manual serve as a visual representation of the described processes and are therefore not necessarily to scale and may deviate from the actual design of the device.



The data and material properties indicated serve as reference values. These must be verified on a case-by-case basis and adjusted as necessary.



The EK280 Application Manual is available for you at → Docuthek for the commissioning of the various communication and device applications.

In general, you can download the manuals in various languages directly from the Honeywell Docuthek. Enter “EK280” as search term.

### 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:

[www.docuthek.com](http://www.docuthek.com)

Use the device type EK280 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”.



### **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 Honeywell website. The software history is available for product releases since 2020 in PDF format in the download area for the relevant device type.

[process.honeywell.com/us/en/site/elster-instromet/support#software-downloads](https://process.honeywell.com/us/en/site/elster-instromet/support#software-downloads)

## **1.1.2 Device software available on the Honeywell website**

The Honeywell website contains the latest software releases for the Elster Gas device series. The current versions for EK280 and enSuite can be found in the download area:

[process.honeywell.com/us/en/site/elster-instromet/support#software-downloads](https://process.honeywell.com/us/en/site/elster-instromet/support#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.

## **1.2 Warranty provisions**

The current warranty provisions can be found in the general terms and conditions online under:

[process.honeywell.com/us/en/site/elster-instromet/about-us](https://process.honeywell.com/us/en/site/elster-instromet/about-us)

## 1.3 Customer service and technical support (TAC)

Our customer service team is responsible for providing technical information and repairs. Our employees are constantly striving to acquire new information and gain experience, and these are both valuable sources for improving our products.

### 1.3.1 Customer service and repairs

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

### 1.3.2 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: [process.honeywell.com/us/en/site/elster-instromet/support](http://process.honeywell.com/us/en/site/elster-instromet/support)
- E-Mail: [ElsterSupport@honeywell.com](mailto:ElsterSupport@honeywell.com)

## 1.4 Meaning of symbols

### 1.4.1 Safety information

In this manual, safety information is denoted using symbols. The safety information is introduced by signal words which identify the level of risk. Always observe this safety instructions and act with caution to prevent accidents, personal injury, and material damage.



#### **DANGER!**

... indicates an imminently dangerous situation which, if not avoided, could lead to death or serious injury.



#### **WARNING!**

... indicates a potentially dangerous situation which, if not avoided, could lead to death or serious injury.



#### **CAUTION!**

... indicates a potentially dangerous situation which, if not avoided, may lead to minor or slight injuries.



... indicates dangers resulting from electrical current. A non-compliance of the safety information poses a risk of serious or life-threatening injuries.



### **CAUTION!**

... indicates a potentially dangerous situation which, if not avoided, could lead to material damage.

## **1.4.2 Tips and recommendations**



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

## **1.5 Limitation of liability**

All the information contained in this manual has been compiled under consideration of valid standards and regulations, the latest technological developments, and our many years of experience and expertise. The manufacturer shall accept no liability for damages resulting from:

- Non-compliance of the manual
- Improper use
- Deployment of unqualified personnel
- Unauthorized modifications
- Technical changes
- Use of unauthorized spare parts

The actual scope of delivery may deviate from the information and graphics presented herein due to special designs, the selection of additional ordering options, or the latest technological developments.

The obligations stipulated in the delivery contract, the general terms and conditions and delivery conditions of the manufacturer, and the statutory provisions valid at the time of signing the contract, shall apply.



This manual should be read carefully before commencing all works on and with the device, particularly before putting the device into operation! The manufacturer shall accept no liability for damages and losses arising from non-compliance with the manual.

We reserve the right to make technical changes within the scope of improving usability and further development.

## 1.6 Copyright protection

This manual is copyright-protected and is intended for internal use only. A transfer of this manual to third parties, a reproduction of any kind, whether partially or fully, and the use and/or disclosure of its content, are not permitted without written consent from the manufacturer, except for internal purposes. Contraventions to this provision shall result in damage compensation. We reserve the right to assert further claims.

## 1.7 Scope of delivery

The scope of delivery for the EK280 includes:

- Electronic volume conversion device EK280
- Dispatch list
- Design data sheet
- Manual
- Bag of accessories

## 1.8 Spare parts and accessories



### **WARNING!**

**Incorrect use of spare parts and accessories may present a risk to safety!**

False or incorrect use of spare parts and accessories may impair safety and lead to damage, malfunctions, or total failures.

Therefore:

- Only use original spare parts and accessories produced by the manufacturer.
- The manufacturer should always be contacted in the event of uncertainty.

A list of spare parts and accessories can be found in the appendix. Spare parts and accessories can be ordered from an authorized retailer or from our customer service team directly.

The free enSuite program also belongs to the accessories for the EK280 (→ 1.10 “enSuite parameterization software”). This can be used to program the EK280 volume conversion device via its data interfaces to perform advanced applications.

The EK280 can be supplied as a calibrated and non-calibrated device and is also available in a number of different models. Further details in section 6 “Assembly, Connection and Putting into Operation”.

## 1.9 Storage



### CAUTION!

**Exceeding or falling below the valid temperature range for the batteries may impair performance.**

If the valid temperature range of the batteries during storage of the device is exceeded or fallen below, the performance of the batteries may be impaired.

Therefore:

- For long periods of storage, please ensure that the valid temperature range for the fitted batteries does not fall below  $-25\text{ }^{\circ}\text{C}$  or exceed  $+55\text{ }^{\circ}\text{C}$ .



### CAUTION!

**Material damage caused by the formation of condensation.**

Fluctuations in temperature during storage may cause condensation to form. This may lead to subsequent malfunctions of the device.

Therefore:

- After storage or transport in cold weather conditions or after having been exposed to strong temperature fluctuations, the device should slowly be adjusted to the room temperature before being put into operation.
- If condensation has formed, wait at least 12 hours before putting the device into operation.



If the power supply to the device is interrupted during storage due to the batteries being disconnected, the time and date have to be reprogrammed.

The following rules apply for storage:

- The relative humidity should be a maximum of 93%.
- Do not store packages in the open air.
- The storage temperature should not fall below  $-25\text{ }^{\circ}\text{C}$  and should not exceed  $+55\text{ }^{\circ}\text{C}$ .
- Avoid mechanical vibrations during storage of the device.

## 1.10 enSuite parameterization software

enSuite is the parameterization software for current Honeywell Elster volume converters, and supports all activities required for the commissioning and maintenance of these end devices.

[process.honeywell.com/us/en/site/elster-instromet/support#software-downloads](https://process.honeywell.com/us/en/site/elster-instromet/support#software-downloads)



### Updating enSuite

We recommend that you download the latest version of enSuite from the Honeywell website before you commission the EK280.

## 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/us/en/product-security](http://www.honeywell.com/us/en/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/us/en/product-security#vulnerability-reporting](http://www.honeywell.com/us/en/product-security#vulnerability-reporting)

You can find information about current malware threats at:

[www.honeywell.com/us/en/news](http://www.honeywell.com/us/en/news)

OR

Contact your local Honeywell Process Solutions Customer Contact Center (CCC) or our Elster Gas Technical Support team.

→ section 1.3 “Customer service and technical support (TAC)” (p. 9)

### 2.2 Deactivate access parties

Pre-define which access parties need access to the device during runtime and disable all other parties.

→ Section 7.3.6.4.1 “Administrator lock: enable/disable access parties”

### 2.3 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.

## 2.4 Preventing unauthorized external access

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 2.5 “Data security for data at rest and in transit”.

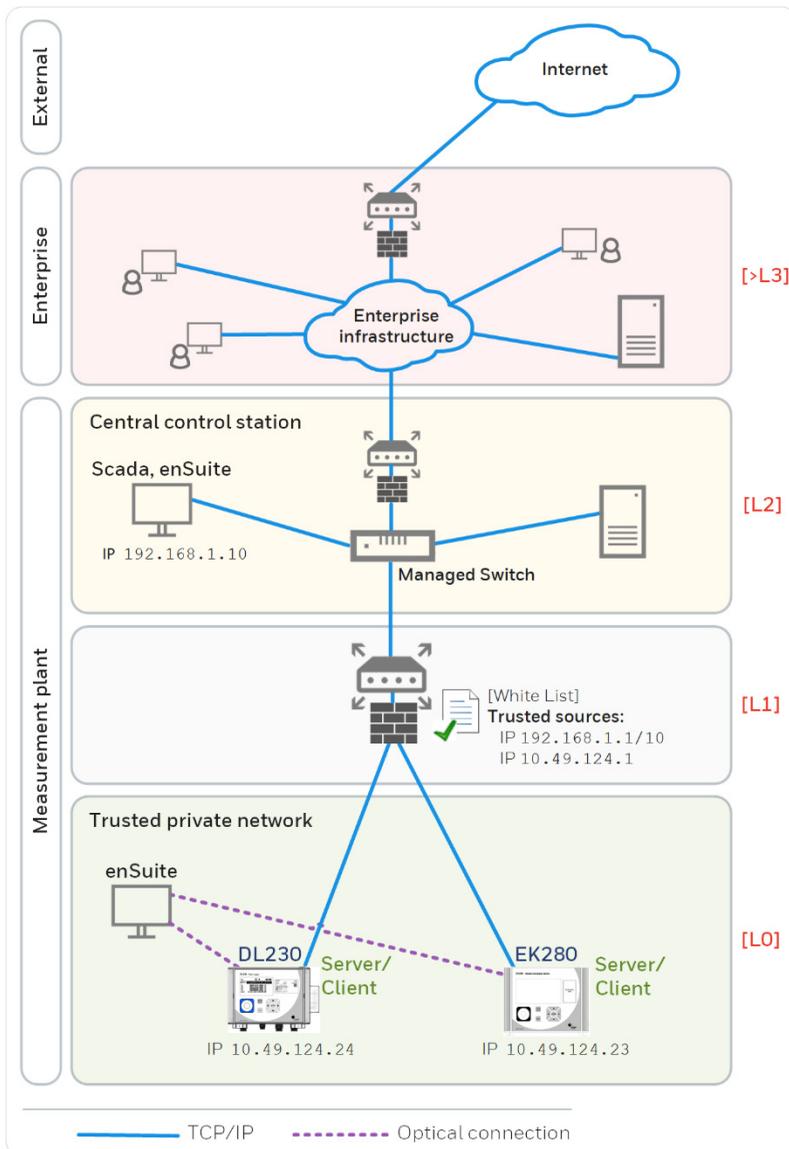


Fig. 1: Router and firewall between the metering systems and control centre – example with indication of security zones L0..L3 and higher according to IEC 62443



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

## 2.5 Data security for data at rest and in transit

### 2.5.1 Data security for data at rest

Data at rest are the data which are temporarily or permanently stored in the EK280. These data are unencrypted in the EK series. This means it is even more important to protect the device from unauthorized access.

→ section 2.4 “Preventing unauthorized external access”

### 2.5.2 Data security for data in transit

Data in transit are data which are currently being transferred between the EK280 and, for example, a control station in a public or trustworthy network.

The protocols used with the EK280 normally transfer the data in plain text form. If possible, you should therefore use the secure version of a protocol (→ section 4.10 “Supported protocols”, p. 40).

→ section 2.4 “Preventing unauthorized external access”



#### 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 gives an overview of all of the most important safety aspects in order to best protect personnel and to ensure a safe and smooth operation of the device. A non-compliance with the safety information and instructions for use specified in this manual could result in serious damage.

### 3.1 General

The EK280 is an “intrinsically safe apparatus” as per the ATEX Product Directive 2014/34/EU and the ATEX Operating Directive 1999/92/EC EN or IECEx System Equipment Scheme 02, and is suitable for operation within the following explosive gas atmospheres:

- EK280 without integrated power supply unit and without data transmission module (modem, Ethernet, RS232):  
Zones 1 and 2 for gases in temperature class T4
- EK280 without integrated power supply unit and with modem:  
Zones 1 and 2 for gases in temperature class T3
- EK280 with integrated power supply unit (with or without data transmission module):  
Zone 2 for gases in temperature class T6

Verification for use in zone 0 or 1 as per the respectively valid technical rules and standards: → section 11.3: EC type examination certificate no. LCIE 11 ATEX 3027 X.



#### **DANGER!**

**Using the wrong model presents a risk of explosion!**

The EK280 is available in a model for use in zone 0 and 1 and in a model for use in zone 2.

The model designed for zone 2 should not be used in zone 0 or 1 as this presents a risk of explosion!

Therefore:

- Before installing the device in zone 0 or 1, please check that the EK280 is suitable for it:  
The EK280 may only be operated in zone 0 or 1 if it is provided with an label according to 4.12.2.1 (for ATEX) or 4.12.3.1 (for IECEx).
- If category “II 3 G” has been marked on the ATEX or IECEx label, the EK280 should not be used in zone 0 or 1, but only in zone 2.
- The ATEX or IECEx label is located on the top panel of the EK280 housing.
- As soon as an EK280 for zone 0 or 1 is installed in zone 2 or outside the Ex zone, it may no longer be used in zone 0 or 1!



**DANGER!**  
**Explosion hazard due to the connection of non-certified devices!**

Operating the EK280 in zone 0 or 1 and connecting devices without suitable certification present a risk of explosion.

Therefore:

- When using the EK280 in zone 0 or 1, it should only be connected to certified intrinsically safe apparatuses or associated apparatuses or simple apparatuses as per the ATEX Product Directive 2014/34/EU or IECEx.
- The EK280 should only be connected to the intrinsically-safe circuits whose electrical data comply with the requirements specified in the Declaration of Conformity of the EK280 (→ “Appendix”).
- The options for retrofitting and replacement of components are limited depending on the device model. Refer to the notes in section 8.3!



**DANGER!**  
**Using incorrect batteries presents a risk of explosion!**  
Connect only the prescribed Elster battery-types to the device (→ section 11.1.4).



When connecting and operating the EK280 in explosive gas atmospheres, the corresponding standards must be observed:

DIN EN 60079-0 or IEC 60079-0

DIN EN 60079-14 or IEC 60079-14

The device may only be used in zone 0, 1 or zone 2, if installation has been carried out according to the separate requirements in the above-mentioned standards and the operating conditions (→ "Technical Data") as well as the connection conditions (→ section 6 "Assembly, Connection and Putting into Operation").

The device may be dangerous if unqualified personnel use it incorrectly or do not use it according to its intended purpose.

- All persons who are charged performing works on or with the device, must have read and understood the manual before commencing such works. This shall also apply if the person in question has already worked with the same or a similar device or has been trained by the manufacturer.
- Being familiar with the content of the manual is a necessary condition for protecting personnel against risks, preventing errors from occurring, and therefore ensuring a safe and smooth operation of the device.
- In order to avoid risks and to ensure optimal performance of the device, neither modifications nor changes should be carried out without express consent from the manufacturer.
- All operating instructions should be kept in a clearly legible condition on the device. Damaged or illegible instructions should be replaced immediately.
- The setting values and value ranges specified in this manual should be complied with.

### 3.2 Intended use

This device is solely designed and constructed for the intended use described below.

The volume conversion device EK280 is used to convert the gas volume read from a gas pipe under measurement conditions, into base conditions, as well as to allocate the measured quantities to tariffs. Furthermore, the device can also be used to measure, record and monitor additional variables depending on the configuration set by the user.

Intended use also refers to compliance with all of the information contained in this manual. Any use beyond the intended use and/or other types of use, shall be considered as misuse and can result in dangerous situations. The manufacturer shall not be held liable for any claims for damages resulting from misuse of this device.



**WARNING!**  
**Danger resulting from misuse.**

Misuse of the device may lead to dangerous situations.

Therefore:

- Only use the device according to its intended use.
- Do not use the device to regulate the gas flow or other variables affecting the gas volume in the entire system.

### 3.3 Personnel

**WARNING!****Risk of injury to unqualified personnel.**

Improper use of the device may lead to significant personal injury or material damage.

Therefore:

- All works should solely be carried out by qualified personnel.

The following qualifications are used in the manual to denote different areas of responsibility:

- **Instructed personnel**  
will be informed of the tasks assigned to them and possible risks resulting from inappropriate behaviour, in a training session provided by the operator.
- **Qualified personnel**  
who, on the basis of their specialist training, knowledge and experience, as well as their awareness of the relevant statutory provisions, are in a position to perform their assigned tasks on the device and are able to independently identify and prevent possible risks.
- **Gas specialists**  
who, on the basis of their specialist training, knowledge and experience, as well as their awareness of the relevant standards and regulations, are in a position to perform works on gas-handling equipment and to independently identify possible risks. The gas specialist will be specially trained in the respective area and will be familiar with the relevant standards and regulations.
- **Calibration officers**  
who, on the basis of their specialist training, knowledge and experience, as well as their awareness of the relevant standards and regulations, are in a position to perform the works subject to calibration regulations on gas-handling equipment. The calibration officer will be trained on works on devices and installations subject to calibration regulations and will be familiar with the relevant standards and regulations.
- **Electricians**  
who, on the basis of their specialist training, knowledge and experience, as well as their awareness of the relevant standards and regulations, are in a position to perform the works on electrical installations and to independently identify and prevent possible risks. The electrician will be specially trained in the respective area and will be familiar with the relevant standards and regulations.

**WARNING!****Risk to unauthorized persons!**

Unauthorized persons, who do not meet the aforementioned criteria, will not be familiar with the risks in the working area.

Therefore:

- Please keep unauthorized persons away from the working area.
- In cases of doubt, approach said person and direct them out of the working area.
- Interrupt the works if unauthorized persons enter the working area.

Only those persons who can be trusted to reliably execute their works shall be authorized to work on or with the device. People whose reactivity is impaired, e.g., by drugs, alcohol or medication, shall not be authorized to perform such works.

- When selecting personnel, please observe the valid age and professional guidelines for all of the gas-handling equipment.

### **3.4 Personal protective equipment**

When working on the device inside a gas-handling plant, personal protective equipment must be worn to minimize risks to health.

- During works on the device, the necessary personal protective equipment must be worn inside the respective plant at all times
- The notices relating to personal protective equipment mounted in the working area must be followed at all times.

### 3.5 Specific risks

The residual risks arising from the risk assessment will be listed below. Please observe the safety and warning information specified in the following sections to reduce risks to health and to prevent dangerous situations from arising.



**WARNING!**

**Misuse of batteries may present a risk of injury.**

Special care must be taken when handling batteries.

Therefore:

- Do not throw batteries into the fire or expose these to high temperatures. There is a risk of explosion.
- Do not charge batteries. There is a risk of explosion.
- Liquids that are produced as a result of misuse may lead to skin irritation. Avoid physical contact with such liquid. In the event of contact, rinse with large quantities of water. If the liquid enters the eyes, immediately rinse with water for 10 minutes and seek medical attention.



**WARNING!**

**Risk of fire from highly flammable substances!**

Highly flammable substances, liquids or gases could catch fire and lead to serious or fatal injuries.

Therefore:

- Do not smoke within the danger zone or within close proximity to this zone. No naked flames or ignition sources are permitted within this zone.
- Have a fire extinguisher close to hand.
- Suspicious substances, liquids or gases should be reported to the responsible member of staff immediately.
- Work should be stopped immediately in the event of a fire. You should leave the danger zone until it is given the all-clear.

### 3.6 Environmental protection



#### **CAUTION!** **Environmentally hazardous substances!**

If environmentally hazardous substances are handled incorrectly this may cause significant damage to the environment, particularly if they are improperly disposed of.

Therefore:

- The instructions below should be observed at all times.
- Appropriate measures should be taken immediately if environmentally hazardous substances are accidentally released into the environment. In cases of doubt, please inform the responsible local authority about the damages.

The following environmentally hazardous substances are used:

- Batteries

Batteries contain toxic heavy metals. They must be treated as special hazardous waste and be disposed of in municipal waste collection points or by a waste specialist.

### 3.7 Operator's responsibility

The device will be used in the commercial sector. The operator of the device will therefore be subject to legal obligations concerning occupational safety. In addition to the safety information contained in these instructions, the valid safety, accident prevention, and environmental protection regulations for the area of application of the device, must be adhered to. In particular:

- The operator must ensure that the valid safety, accident prevention, and environmental protection regulations for the entire plant in which the device is being integrated, are complied with.
- The operator must be familiar with the valid occupational safety regulations and must also be able to conduct a risk assessment to determine risks arising from the specific working conditions in the respective area of application of the device. The operator must then implement this in the form of operating instructions for the operation of the device.
- Throughout the entire life cycle of the device, the operator must determine whether their prepared operating instructions are compatible with current regulations and amend these if and when necessary.
- The operator must clearly regulate and define responsibilities for the assembly, connection, putting into operation, and maintenance of the device.
- The operator must ensure that all employees who use the device have

read and understood this manual. Furthermore, the operator must provide training to personnel at regular intervals and inform them of the potential risks.

- The operator of the entire plant in which the device is to be integrated, must provide personnel with the necessary protective equipment.

Furthermore, the operator is responsible for ensuring that the device remains in a perfect functioning order at all times. The following therefore apply:

- The operator must ensure that the installation and maintenance works described in this manual are carried out correctly.
- The operator must regularly have all safety mechanisms checked for their functionality and completeness.

## 3.8 Intrinsic Safety

### 3.8.1 ATEX Conformity - Zone 0 and 1



#### **DANGER!** **Explosion hazard due to installation errors**

When installing the EK280 in zone 0 or 1 or for connection to a device located in zone 0 or 1, the following special conditions must be met:

- Follow the requirements of IEC 60079-25.
- Do not make any modifications to the device. Parts may only be replaced or added with the written approval of Elster GmbH.
- The intrinsically safe connectors of equipment shall only be connected to certified associated intrinsically safe equipment or simple apparatus. These combinations shall comply with the requirements of the standard EN 60079-25.
- Connectors X9, X23 and X24 on the CPU board cannot be used in hazardous area.
- Connectors X17 and X18 can only be connected to temperature sensors defined by the Elster GmbH.
- Connectors X7, X15, X16, X28, X29 and X30 can only be connected to pressure sensors defined by the Elster GmbH.
- The equipment housing contains more than 10% in total of aluminium. It must be mounted in such a manner as to eliminate the risk of sparks caused by friction or impact.

### Electrical parameters of the intrinsic safe terminals

a) Connecting an associated apparatus:

Terminal	Ui	Ii $\Sigma$ <sup>1</sup>	Pi $\Sigma$ <sup>1</sup>	Ci	Li
DA1, DA2, DA3, DA4, DTR/T+, TxD/T-, RxD/R-, DCD/R+, RI, Uext	30 V	140 mA	0,5 W	0	0

b) Connecting an intrinsically safe apparatus:

Terminal	Uo	Io	Po	Co	Lo
DE1, DE2	9,7 V	19,7 mA	48 mW	24 $\mu$ F	367 mH
DE3, DE4	9,7 V	21 mA	51 mW	24 $\mu$ F	322 mH
DE5, DE6	9,7 V	1,0 mA	2,4 mW	24 $\mu$ F	142 H

### Operation of a 4G Modem in EX Zone 0 and 1



#### **DANGER!** Explosion hazard due to installation errors

When installing the EK280 version with 4G modem 73025409 in EX zone 0 or 1, the following restrictions must be observed:

- Only the internal antenna or a passive antenna with no additional inductance and capacitance with a maximum cable length of 1 m shall be used to operate the modem.
- The modem battery must not be replaced in a hazardous area. Therefore, make sure beforehand that there is no explosive atmosphere around the system.
- The P13 connector on the modem shall only be used in a non-hazardous area for factory settings only.
- The SIM connection shall only be used for SIM cards.

<sup>1</sup>  $\Sigma$  means: for both Ii and Pi, all terminals in total

### 3.8.2 ATEX Conformity - Zone 2



**DANGER!**  
**Explosion hazard due to installation errors**

When installing the EK280 in Zone 2 or for connection to a device located in Zone 2, the following special conditions must be met:

- Follow the requirements of IEC 60079-25.
- Do not open the device in an explosive atmosphere.
- Do not rub the display window to avoid possible electrostatic discharges.
- Follow the measures mentioned in 6.2.9 when connecting cables.
- Do not make any unauthorized modifications to the device. Only original parts from Elster GmbH with approval for the specific purpose and application may be replaced or added.
- The EK280 must not be subjected to shocks or impacts with an energy of more than 2 J.

**Electrical parameters of associated intrinsically safe equipment or sensor:**

Terminals	U <sub>o</sub>	I <sub>o</sub> Σ <sup>2</sup>	P <sub>o</sub> Σ <sup>2</sup>	C <sub>o</sub> - C <sub>c,max</sub> <sup>3</sup>	L <sub>o</sub> - L <sub>c,max</sub> <sup>3</sup>
DA1, DA2, DA3, DA4, DTR/T+, TxD/T-, RxD/R-, DCD/R+, RI, Uext	≤ 30 V	≤ 140 mA	≤ 0,5 W	≥ 0	≥ 0

Terminals	U <sub>i</sub>	I <sub>i</sub>	P <sub>i</sub>	C <sub>i</sub> + C <sub>c,max</sub> <sup>3</sup>	L <sub>i</sub> + L <sub>c,max</sub> <sup>3</sup>
DE1, DE2	≥ 9,7 V	≥ 19,7 mA	≥ 48 mW	≤ 26 μF	≤ 206 mH
DE3, DE4	≥ 9,7 V	≥ 21 mA	≥ 51 mW	≤ 26 μF	≤ 181 mH
DE5, DE6	≥ 9,7 V	≥ 1,0 mA	≥ 2,4 mW	≤ 26 μF	≤ 80 H

<sup>2</sup> Σ means: all terminals in total (for I<sub>o</sub> and P<sub>o</sub> respectively)

<sup>3</sup> C<sub>c,max</sub>, L<sub>c,max</sub>: maximum value of capacitance and inductance of the connected cable between EK280 and an associated intrinsically safe equipment or sensor.

### 3.8.3 IECEx Conformity - Zone 0 and 1



#### **DANGER!**

#### **Explosion hazard due to installation errors**

When installing the EK280 in zone 0 or 1 or for connection to a device located in zone 0 or 1, the following special conditions must be met:

- Follow the requirements of IEC 60079-25.
- Do not make any modifications to the device. Parts may only be replaced or added with the written approval of Elster GmbH.
- The intrinsically safe connectors of equipment shall only be connected to certified associated intrinsically safe equipment or simple apparatus. These combinations shall comply with the requirements of the standard EN 60079-25.
- Connectors X9, X23 and X24 on the CPU board cannot be used in hazardous area.
- Connectors X17 and X18 can only be connected to temperature sensors defined by the Elster GmbH.
- Connectors X7, X15, X16, X28, X29 and X30 can only be connected to pressure sensors defined by the Elster GmbH.
- The equipment housing contains more than 10 % in total of aluminium. It must be mounted in such a manner as to eliminate the risk of sparks caused by friction or impact.

### Electrical parameters of the intrinsic safe terminals

a) Connecting an associated apparatus:

Terminal	Ui	Ii $\Sigma$ <sup>1</sup>	Pi $\Sigma$ <sup>1</sup>	Ci	Li
DA1, DA2, DA3, DA4, DTR/T+, TxD/T-, RxD/R-, DCD/R+, RI, Uext	30 V	140 mA	0,5 W	0	0

b) Connecting an intrinsically safe apparatus:

Terminal	Uo	Io	Po	Co	Lo
DE1, DE2	9,7 V	19,7 mA	48 mW	24 $\mu$ F	367 mH
DE3, DE4	9,7 V	21 mA	51 mW	24 $\mu$ F	322 mH
DE5, DE6	9,7 V	1,0 mA	2,4 mW	24 $\mu$ F	142 H

## Operation of a 4G Modem in EX Zone 0 and 1



### **DANGER!**

#### **Explosion hazard due to installation errors**

When installing the EK280 version with 4G modem 73025409 in EX zone 0 or 1, the following restrictions must be observed:

- Only the internal antenna or a passive antenna with no additional inductance and capacitance with a maximum cable length of 1 m shall be used to operate the modem.
- The modem battery must not be replaced in a hazardous area. Therefore, make sure beforehand that there is no explosive atmosphere around the system.
- The P13 connector on the modem shall only be used in a non-hazardous area for factory settings only.
- The SIM connection shall only be used for SIM cards.

## 3.8.4 IECEx Conformity - Zone 2



### **DANGER!**

#### **Explosion hazard due to installation error**

When installing the EK280 in Zone 2 or for connection to a device located in Zone 2, the following special conditions must be met:

- Follow the requirements of IEC 60079-25.
- Do not open the device in an explosive atmosphere.
- Do not rub the display window to avoid possible electrostatic discharges.
- Follow the measures mentioned in 6.2.9 when connecting cables.
- Do not make any unauthorized modifications to the device. Only original parts from Elster GmbH with approval for the specific purpose and application may be replaced or added.
- The EK280 must not be subjected to shocks or impacts with an energy of more than 2 J.

### Electrical parameters of associated intrinsically safe equipment or sensor

Terminals	U <sub>o</sub>	I <sub>o</sub> Σ <sup>2</sup>	P <sub>o</sub> Σ <sup>2</sup>	C <sub>o</sub> - C <sub>c,max</sub> <sup>3</sup>	L <sub>o</sub> - L <sub>c,max</sub> <sup>3</sup>
DA1, DA2, DA3, DA4, DTR/T+, TxD/T-, RxD/R-, DCD/R+, RI, Uext	≤ 30 V	≤ 140 mA	≤ 0,5 W	≥ 0	≥ 0

Terminals	U <sub>i</sub>	I <sub>i</sub>	P <sub>i</sub>	C <sub>i</sub> + C <sub>c,max</sub> <sup>3</sup>	L <sub>i</sub> + L <sub>c,max</sub> <sup>3</sup>
	≥ 9,7 V	≥ 19,7 mA	≥ 48 mW	≤ 26 μF	≤ 206 mH
DE3, DE4	≥ 9,7 V	≥ 21 mA	≥ 51 mW	≤ 26 μF	≤ 181 mH
DE5, DE6	≥ 9,7 V	≥ 1,0 mA	≥ 2,4 mW	≤ 26 μF	≤ 80 H

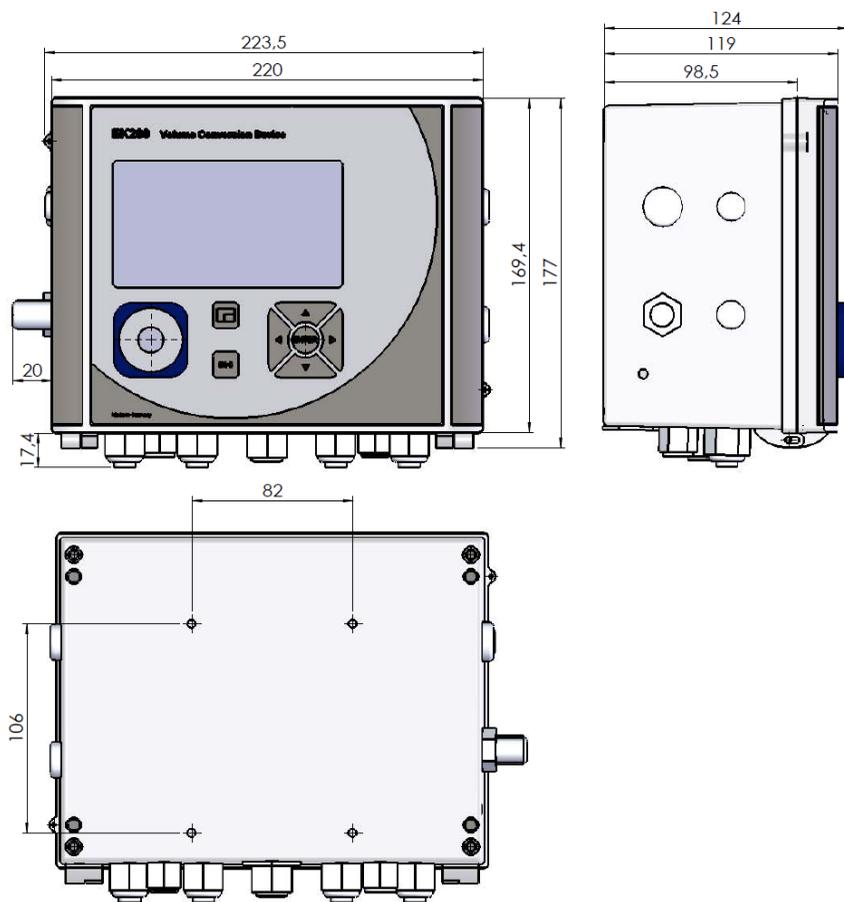
## 4 Technical data

### 4.1 General data

Data	Value	Unit
Width (incl. cable glands)	230	mm
Height (incl. cable glands)	180	mm
Depth	115	mm
Permissible ambient temperature range	-25 ... +55	°C
Permissible gas temperature range	-30 ... +75 *	°C
Mechanical ambient conditions accord. to MID Directive:	Class M2	
Electromagnetic ambient conditions accord. to MID Directive:	Class E2	
Degree of protection provided by enclosure (IP code)	IP 65	

\* The permitted gas temperature range may be less depending on the compressibility equation used (→ 6.3.1.10).

### 4.1.1 Dimensions



## 4.2 Power supply for EK280 without integrated power supply unit

### 4.2.1 Battery power supply for the basic device

Data	Value	Unit
Voltage	3.6	V
General nominal capacity	16.5	Ah
Usable capacity	13.0	Ah
Minimum number of batteries required	2	units
Minimum operating life (at standard measurement conditions)	5	years

The **standard measurement conditions** are defined as follows:

Data	Value
Measurement cycle	30 seconds
Mode input 1	Pulse input
Display active	60 minutes per month
Interface or modem active	30 minutes per month
Ambient temperature	-10 ... +50°C
Electrical insulation of the outputs (⇒ section 6.2.6.1)	deactivated

### 4.2.2 Battery power supply for the integrated modem

Data	Value	Unit
Voltage	3.9	V
General nominal capacity	16.0	Ah

### 4.2.3 External power supply for the basic device

Data	Value	Unit
Supply voltage	7.5 ...8.5	V
Supply current, maximum	40	mA

## 4.3 Power supply for EK280 with integrated power supply unit

### 4.3.1 Battery power supply for the basic device

Batteries for switching to battery mode in the event of a power failure:  
→ section 4.2.1 “Battery power supply for the basic device”

### 4.3.2 External power supply

Data	Value	Unit
Supply voltage	115...230	V ~
Power consumption, maximum	10	W

### 4.3.3 Buffer batteries for the integrated modem

The buffer batteries can optionally be connected to the integrated power supply unit to ensure that data continue to be transmitted, even in the event of a power failure.

Data	Value	Unit
Voltage	3.6	V
General nominal capacity	13.0	Ah
Usable capacity	8.0	Ah
Minimum number of batteries required	2	units

## 4.4 Power supply for the EK280 with Power over Ethernet (PoE)

If the EK280 is equipped with an Ethernet module and if the Ethernet network (or a switch) provides the Power over Ethernet function, the EK280 can be supplied with power from the Ethernet module. An integrated power supply is not required.

Data	Value	Unit
Supply voltage	36 V to 56 V	V DC

## 4.5 Pressure sensor

### 4.5.1 CT30 Type Pressure Sensor

Data	Value	Unit
External thread	M12 × 1.5	
Usable thread length	approx. 10	mm

#### 4.5.1.1 Absolute pressure ranges

Measuring range	Overload capacity
0.7 ...2 bar abs.	18 bar abs.
0.8 ...5 bar abs.	25 bar abs.
1.4 ...7 bar abs.	25 bar abs.
2.0 ... 10 bar abs.	40 bar abs.
2.4 ... 12 bar abs.	40 bar abs.
4 ... 20 bar abs.	40 bar abs.
6 ... 30 bar abs.	60 bar abs.
8 ... 40 bar abs.	60 bar abs.
14 ... 70 bar abs.	105 bar abs.
16 ... 80 bar abs.	105 bar abs.



These pressure sensors are available as both an external and internal model.  
Further details in → section 6 "Assembly, Connection and Putting into Operation".

#### 4.5.1.2 Relative pressure ranges

Measuring range	Overload capacity
1.4 ... 7 bar rel.	40 bar rel.
4 ... 20 bar rel.	40 bar rel.
16 ... 80 bar rel.	105 bar rel.



These pressure sensors are only available as an externally connected model and can only be used as a second pressure sensor for non-metrological measurements.  
Further details in → section 6 "Assembly, Connection and Putting into Operation".

## 4.5.2 Pressure Sensor Type 17002

Data	Value	Unit
External thread (internal model)	M12 × 1.5	
Usable thread length (internal model)	approx. 10	mm
Measuring range	Overload capacity	
0.9 ... 7 bar abs.	10 bar abs.	



The pressure sensor is available as both an external and internal model.  
Further details in → section 6 “Assembly, Connection and Putting into Operation”.

## 4.6 Temperature sensor

Data	Value	Unit
Measuring range	-30 ... +75 *	°C
Measurement uncertainty	max. ± 0.1	%
Installation length	50	mm

\* The permitted gas temperature range may be less depending on the compressibility equation used (→ 6.3.1.10).

## 4.7 Digital inputs

### 4.7.1 LF pulse and signal inputs

The maximum counting frequency of the digital inputs can be adjusted using the enSuite software. The limit values specified for frequency and duration shall only apply if the so-called "software debounce" has been switched off. The software debounce is activated ex-works to suppress interference pulses and therefore restrict safe readings to 2 Hz.



If the software debounce is parameterized to a frequency higher than 2 Hz, then it may lead to counting errors caused by electromagnetic interference under certain circumstances.

Data		Value	Unit
Open-circuit voltage $U_0$		5.0	V
Internal resistance $R_i$		1	MΩ
Short circuit current $I_k$		5	μA
Switch point "ON":	▪ Resistance $R_e$	max. 100	kΩ
	▪ Voltage $U_e$	max. 0.8	V
Switch point "OFF":	▪ Resistance $R_a$	min. 2	MΩ
	▪ Voltage $U_a$	min. 3	V
Pulse duration $t_e$	min.	62.5	ms
Pause duration $t_a$	min.	62.5	ms
Counting frequency $f$	max.	10	Hz
Counting frequency $f$ for input 3	max.	6	Hz

### 4.7.2 HF pulse inputs (high frequency)

High frequency pulse transducers can only be connected to inputs 1 and 2 (terminals DE1 and DE2) (→ section 6.2.1.3).

Data	Value	Unit
Open-circuit voltage	7.5 ... 8.5	V
"High" switching level	max. 1.2	mA
"Low" switching level	min. 2.1	mA
Input frequency	max. 2500	Hz

### 4.7.3 Encoder input



An encoder can only be connected to input 1 (terminal DE1).

Data	Value	Unit
Encoder protocol	Namur, SCR	-

## 4.8 Digital outputs

The digital outputs DA2 and DA3 can be configured as low or high frequency pulse or signal outputs.

The digital outputs DA1 and DA4 can exclusively be configured as low frequency pulse or signal outputs.

### 4.8.1 Nominal data

Data	Value	Unit
Maximum switching voltage	30	V DC
Maximum switching current	100	mA DC
Maximum voltage drop	1	V
Maximum residual current	0.001	mA

### 4.8.2 LF pulse or signal outputs

Data	Value		Unit
Pulse duration	min.	125	ms
Pause duration	min.	125	ms
Output frequency	max.	4	Hz

### 4.8.3 HF pulse outputs

The use of outputs as high frequency output is only possible if an external power supply has been connected (→ section 6.2.5).

Only outputs 2 and 3 (terminals DA2 and DA3) can be used as high frequency output.

Data	Value	Unit
Output frequency	max. 1000	Hz



If the HF output is fed via a FE260, the maximum output frequency is limited to 500 Hz (depending on the configuration of the outputs).

## 4.9 Interfaces

### 4.9.1 Serial optical interface

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



The baud rate of the serial optical interface is adjustable to 19200 Bd. However, the function with this baud rate depends among others also from the optical read out head and therefore cannot be guaranteed.

### 4.9.2 Serial electrical interface

Data	Value
Adjustable types	RS232 or RS485

#### 4.9.2.1 Technical Data of the RS485 Interface

Data	Value
Operating modes	RS485 2-wire (half-duplex) RS485 4-wire (full-duplex)
Termination	Do <u>not</u> use a termination resistor at any device connected
Maximal data transfer rate	19.200 Baud
Number of devices connected to the bus	max. 16 unit loads <sup>4</sup> Power consumption at the input <sup>5</sup> : - 6 unit loads (RS485, not electr. insulated) - 3 unit loads (RS485, electrically insulated)

<sup>4</sup>Unit Load: Standard RS-485 receiver with an input resistance = 12kOhm

<sup>5</sup>For details on connecting the RS485 interface → Application manual.

### 4.9.3 Integrated modem

Data	Value	Unit
Modem type	2G: GSM / GPRS 3G: GSM / GPRS / UMTS 4G: LTE Cat-M1 und Cat-NB1	
Frequency bands	2G: 850 /900 /1800 /1900 3G: 850 /900 /1800 /1900 /2100 4G bands between 700 and 2200	MHz

### 4.9.4 Ethernet adapter

Data	Value	Unit
Type	100	Mbit
Supply	Internal mains-supply or PoE	
Functions	TCP-IP Client/Server, FTP	

### 4.9.5 Additional RS232/RS485 interface board

The additional RS232/RS485 interface can be used if the EK280 is not equipped with an integrated modem or integrated Ethernet adapter and if it is used in a safe area or in ATEX Zone 2.

Data	Value
Adjustable types	RS232 or RS485
Supply voltage at Usio	7,5 ... 9 V

#### 4.9.5.1 Intrinsic safety parameters of the RS232/RS485 Interface

Maximum voltages to be applied to the RS232/RS485 interface board and limitation of the currents on the data lines.

Connection terminals	Voltage	Current
+Usio	$U_{\max} = 12,5 \text{ V}$	
RI, DCD, RXD	$U_i \leq 24 \text{ V}$	$I_i \leq 90 \text{ mA}$

**4.9.5.2 Technical Data of the RS485 Interface**

Data	Value
Operating modes	RS485 2-wire (half-duplex) RS485 4-wire (full-duplex)
Termination	Do <u>not</u> use a termination resistor at any device connected
Maximal data transfer rate	19.200 Baud
Number of devices connected to the bus	max. 16 unit loads <sup>4</sup>
	Power consumption at the input <sup>5</sup> : - 6 unit loads (RS485, not electrically insulated) - 3 unit loads (RS485, electrically insulated)

**4.10 Supported protocols**

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



**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:

- 2.4 “Preventing unauthorized external access” (p. 15)
- 2.5.2 “Data security for data in transit” (p. 17)



**SMS: Check the national regulations!**

SMS is considered as unsecure, messages can be captured, suppressed, or modified with an IMSI catcher. Check the national regulations. These may require the data to be verified manually or other measures.

Application protocol	Description	Secure versions
DLMS/COSEM HLS	Device Language Message Specification for reading out the device and transferring software updates (in High Level Security)	DLMS (HLS)
DLMS/COSEM LLS	Device Language Message Specification for reading out the device (in Low Level Security)	–
DSfG	Digitale Schnittstelle für Gasmessgeräte (engl. Digital interface for gas measuring devices) The DSfG protocol is a digital data protocol that is well-established in Germany; it has been developed for retrieval of DSfG data, signing of DSfG archive telegrams	–
FTP	File Transfer Protocol for transferring device archives	–
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 device	–
SMS	Short Message Service for sending short messages from the device to the control station, for example	–



### **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.

## 4.11 Measurement conditions

### 4.11.1 Environment

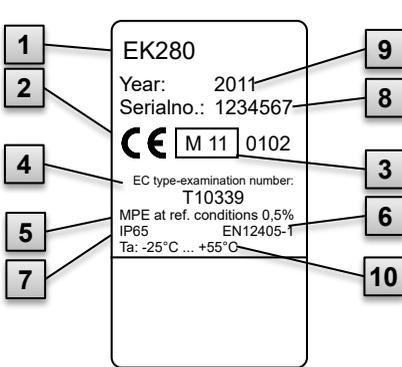
Data	Value	Unit
Temperature range	-25...+55	°C
Relative humidity, max.	93	%

## 4.12 Labelling

The EK280 is approved as a volume conversion device as per the Measuring Instruments Directive (MID). The label is placed on the front panel of the device (→ 5 “Construction and Function”).

### 4.12.1 Type label of the volume conversion device

The type label of the EK280 relating to its function as a volume conversion device, contains the following information<sup>6</sup>:



- 1 Type designation
- 2 CE marking
- 3 Metrology marking
- 4 Number of the EC type examination
- 5 Measurement accuracy data
- 6 Reference to EN 12405-1
- 7 IP protection class data
- 8 Serial number
- 9 Year of construction
- 10 Ambient temperature range

Fig. 2

<sup>6</sup> The identification plate may contain other information depending on the design or the country of destination.

### 4.12.2 ATEX marking

The label for the “Ex” marking of the EK280 is located on the top panel of the device housing.

#### 4.12.2.1 Zone 0 or 1 (without integrated power supply unit)

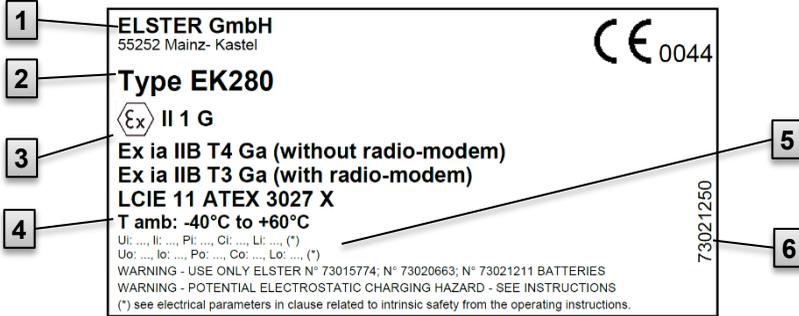


Fig. 3

- 1 Manufacturer and address
- 2 Type designation of the device
- 3 Ex markings with temperature class data
- 4 Permissible ambient temperature range
- 5 Electrical parameters are listed in 3.8.1
- 6 Identification number of the label

#### 4.12.2.2 Zone 2 (with integrated power supply unit)

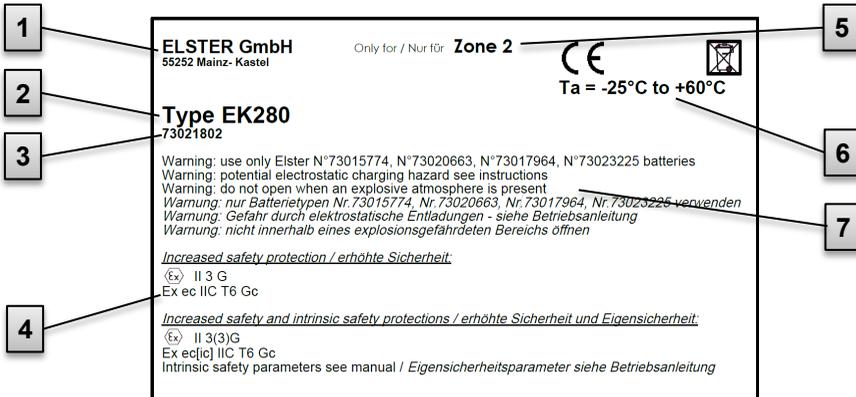


Fig. 4

- 1 Manufacturer and address
- 2 Type designation of the device
- 3 Identification number of the label
- 4 Ex markings
- 5 Ex zone
- 6 Permissible ambient temperature range
- 7 Warning notices

### 4.12.3 IECEx marking

The label for the “Ex” marking of the EK280 is located on the top panel of the device housing.

#### 4.12.3.1 Zone 0 or 1 (without integrated power supply unit)

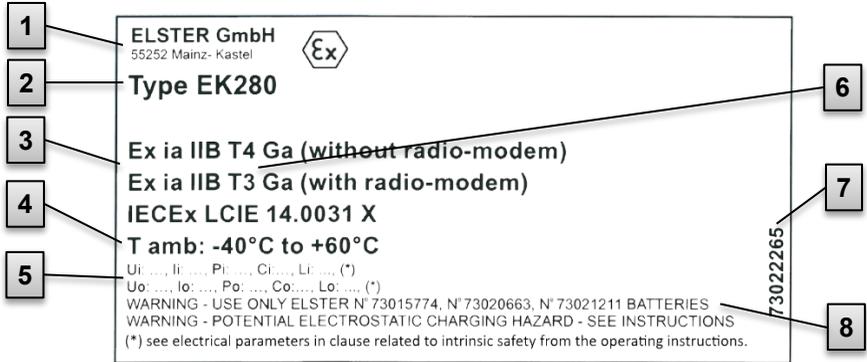


Fig. 5

- 1 Manufacturer and address
- 2 Type designation of the device
- 3 Ex markings
- 4 Permissible ambient temperature range
- 5 The electrical parameters are listed in 3.8.3.
- 6 temperature classes
- 7 Identification number of the label
- 8 Warning notices

### 4.12.3.2 Zone 2 (with integrated power supply unit)



Fig. 6

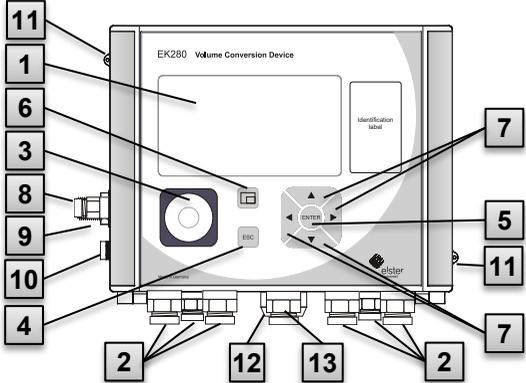
- |                                      |   |
|--------------------------------------|---|
| 1 Manufacturer and address           | 5 Ex markings                             |
| 2 Type designation of the device     | electrical parameters are listed in 3.8.4 |
| 3 Identification number of the label | 6 Ex zone                                 |
| 4 Warning notices                    | 7 Permissible ambient temperature range   |

### 4.12.4 Device software identification

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

# 5 Construction and Function

## 5.1 External view

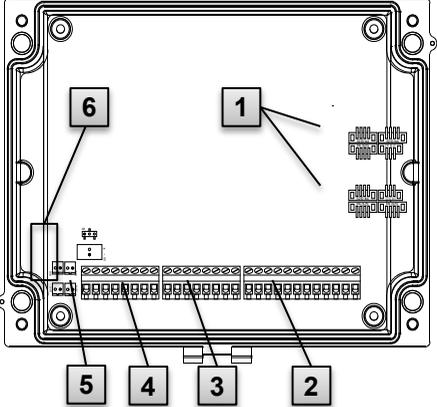


- 1 Display
- 2 Cable glands for the connection of additional components
- 3 Optical interface
- 4 Escape button "ESC"
- 5 Enter button "ENTER"
- 6 Function key 
- 7 Arrow keys 
- 8 Pressure sensor
- 9 Cable gland for temperature sensor
- 10 Ground connection

Fig. 7

- 11 Sealing eyelets
- 12 Outdoor plug (optional)
- 13 Cable gland for antenna

## 5.2 Internal view



- 1 Connections for temperature and pressure sensors
- 2 Connections for counting and signal inputs "DE1" to "DE6"
- 3 Connections for pulse and signal outputs "DA1" to "DA4"
- 4 Connections for serial interfaces
- 5 Connections for external power supply "Uext"
- 6 Connections for batteries

Fig. 8

### 5.3 Short description

The volume conversion device EK280 is an explosion-protected electronic device that takes the volume of gas determined by an external meter at measurement conditions to calculate the volume at base conditions and therefore the energy portion of the respective gas volume.

Furthermore, the gas flow of a pipeline can be monitored, recorded, and transmitted by means of the recording function, the signal inputs and outputs, as well as the serial and optical data interfaces of the device.

Recording the necessary state variables for this purpose takes place via an externally or internally connected pressure sensor as well as a temperature sensor. An alphanumeric display and a keyboard on the front panel of the device serve as the control elements for the EK280.

### 5.4 Connections

The EK280 volume conversion device can be connected to:

- Four batteries
- An external power supply

The following can be used to monitor and record the calculated data and to transmit data and program functions:

- Six counting and signal inputs DE1, DE2, DE3, DE4, DE5, DE6
- Four pulse and signal outputs DA1, DA2, DA3, DA4
- Serial data interface
- Optical data interface



Further details on the connection possibilities for the EK280 and the available equipment versions can be found in sections:

- 4 “Technical data”, and
- 6 “Assembly, Connection and Putting into Operation”

## 6 Assembly, Connection and Putting into Operation



Details of the EK280 equipment variants can be found in the “Gas Electronics – Volume Converters” section on our product page:

[process.honeywell.com/us/en/site/elster-instromet/products](https://process.honeywell.com/us/en/site/elster-instromet/products)

### 6.1 Assembly



#### **DANGER!**

**Using the wrong model presents a risk of explosion!**

The EK280 is available in a model for use in zone 0 and 1 and in a model for use in zone 2.

The model designed for zone 2 should not be used in zone 0 or 1 as this presents a risk of explosion!

Therefore:

- Before installing the device in zone 0 or 1, please check that the EK280 is suitable for it:  
The EK280 may only be operated in zone 0 or 1 if it is provided with an label according to 4.12.2.1 (for ATEX) or 4.12.3.1 (for IECEx).
- If category “II 3 G” has been marked on the ATEX or IECEx label, the EK280 should not be used in zone 0 or 1, but only in zone 2.
- The ATEX or IECEx label is located on the top panel of the EK280 housing.

The following solely applies for the EK280 model with integrated power supply unit (ATEX category “II 3 G” for use in zone 2):



#### **WARNING!**

- Do not open when an explosive atmosphere may be present!
- Electrostatic hazard: Do not rub!



The EK280 can either be mounted on a gas meter, on a pipeline, or on a wall.



Should problems arise during assembly, e.g., with regard to the selection of suitable assembly tools, please contact our customer service team.

→ 1.3 “Customer service and technical support (TAC)” (p. 9)

### 6.1.1 Assembly on a gas meter



Mount the EK280 on a gas meter using a mounting bracket (→ “Appendix”) as well as the corresponding cylinder screws and square nuts.

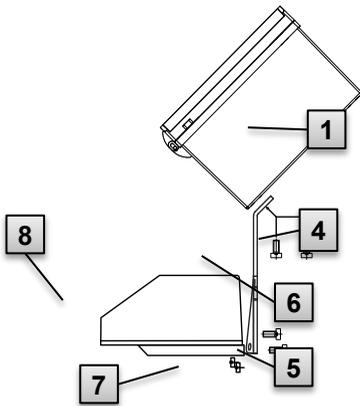
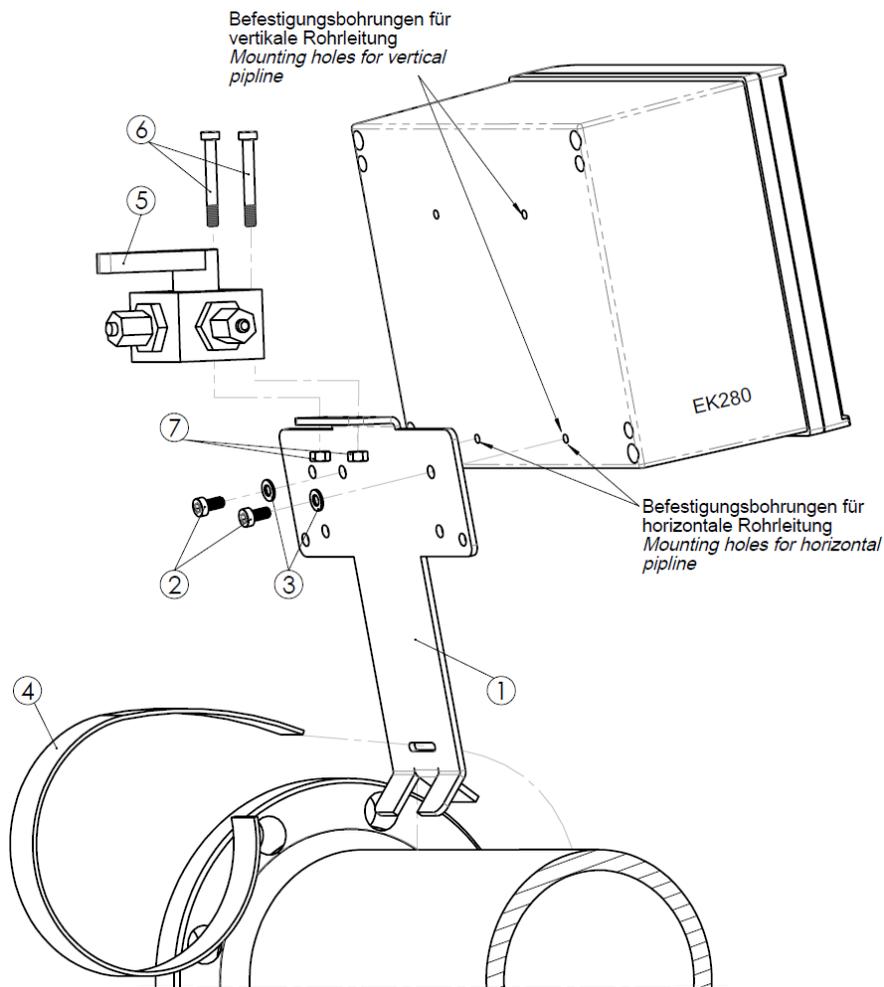


Fig. 9

1. Using two M5 × 10 mm (Fig. 9: **4**) cylinder screws, attach the mounting bracket (Fig. 9: **6**) to the EK280 (Fig. 9: **1**).
2. Tighten the cylinder screws so that the bracket is sitting in a fixed position.
3. Attach the mounting bracket using two square nuts M5 (Fig. 9: **7**) and two M5 × 10 mm (Fig. 9: **5**) cylinder screws at the back of the meter head (Fig. 9: **8**).
4. Tighten the cylinder screws so that the device is in a fixed position and cannot fall down.

### 6.1.2 Installation on a pipeline

The EK280 can be installed on either a horizontal or vertical pipeline using the attachment bracket available as an accessory.



Pipeline attachment bracket kit EK280 (Order No. 73021955):

Item		Quantity
①	Attachment bracket EK280 for pipe mounting	1
②	Cylinder screw DIN 7984, M5 × 10	2
③	Washer ISO 7089 A 5.3	2
④	Pipe clamp	1

Three-way manual valve for pipeline installation (Order No. 73022404):

Item		Quantity
⑤	Three-way manual valve	1
⑥	Cylinder screw ISO 4762, M5 × 40	2
⑦	Hexagon nut ISO 4032 M5	2

For more information on the three-way manual valve → section 6.1.4.

### 6.1.3 Assembly on a wall

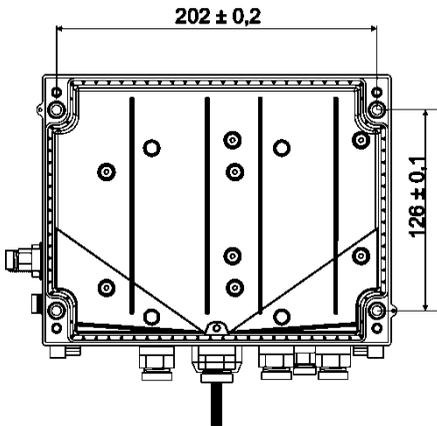


Fig. 10

1. Bore four holes in the positions marked on the wall (→ dimensions in Fig. 10).
2. Select wall plugs which correspond to the size of the screws and insert these in the boreholes in the wall.
3. To fasten the EK280, four M5 × 40 mm wood screws should be used for wall assembly.

### 6.1.4 Three-way manual valve

When mounting the pressure sensor, a three-way manual valve is usually incorporated in order to test the pressure sensor in an installed condition or to exchange a faulty sensor without switching off the entire gas pipeline. The three-way manual valve available from Elster is constructed as follows:

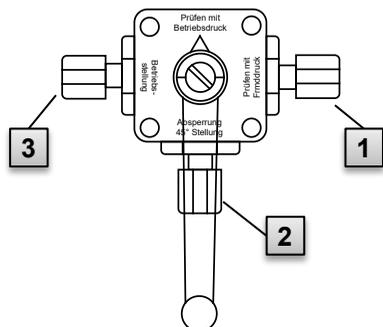


Fig. 11

- 1**: From the meter: from the pressure connection of the gas meter. For diaphragm gas meters, this takes place on the input side of the meter.
- 2**: To the VC: for connection of the pressure sensor to the volume conversion device.
- 3**: Test connection: possible to take the test pressure or to assert external pressure on the pressure sensor of the volume conversion device.



When mounting the three-way manual valve, it must be ensured that the position of the control lever with the corresponding outlets is checked as the lever can be removed and may be mounted the wrong way round.



The pipeline from the pressure sensor to the meter must be laid at an angle in order to ensure that water does not damage the pressure sensor or affect the measurement accuracy.

## 6.2 Connection



The EK280 is available as both a calibrated and non-calibrated device. Information regarding additional equipment versions of the EK280 can be found in → chapter “Assembly, Connection and Putting into Operation”.

**DANGER!****Explosion hazard due to the connection of non-certified devices!**

Operating the EK280 in zone 0 or 1 and connecting devices without suitable certification present a risk of explosion.

Therefore:

- When using the EK280 in zone 0 or 1, it should only be connected to certified intrinsically safe apparatuses or associated apparatuses or simple apparatuses as per the ATEX Product Directive 2014/34/EU or IECEx.
- The EK280 should only be connected to the intrinsically-safe circuits whose electrical data comply with the requirements specified in the Declaration of Conformity of the EK280 (→ “Appendix”).

**WARNING!****Risk caused by incorrect connection of the device!**

The device should solely be connected by a gas specialist (→ section 3 “Safety”). Incorrect connections may lead to life-threatening situations or significant material damage.

Therefore:

- The calibrated device should only be connected by a gas specialist.
  - The same specialist should also be consulted if subsequent changes to location arise.
  - Please refrain from unauthorized connections and relocations of the device.
- 
- When connecting the EK280 and putting it into operation, the guidelines of the corresponding DIN EN 60079-0 and DIN EN 60079-14 or IEC 60079-0 and IEC 60079-14 standards should be observed.
  - The wiring of the connections should be professionally carried out by a gas specialist or a calibration officer.
  - Active outputs cannot be switched.
  - Connect unused cable glands as per DIN EN 60079-14 or IEC 60079-14 with the help of a plug or a suitable screw cap.
  - Insulate any unused wire (e.g., in multicore cables) at the end by appropriate termination means. (→ “Technische Regel für Betriebssicherheit (TRBS)”) )



Pursuant to EN 60079-14 or IEC 60079-14, labelling the cables with intrinsically safe circuits is not required as they are shielded.

If you nevertheless mark the cables, refer to the specifications in these standards.

In order to program the device and perform further applications, and in addition to the components specified in this section, you can also connect an external power supply to the other connections as well as the serial and optical interface of the EK280 (→ 5 “Construction and Function”).



The connections described below should only be sealed by a calibration officer. If the EK280 is used for operations which are not subject to calibration regulations, the seals on the respective connections can be omitted.

### 6.2.1 Connecting the gas meter

In order to measure the gas volume, a gas meter with a low or high frequency pulse transducer or encoder can be connected to the digital input “DE1” of the EK280.

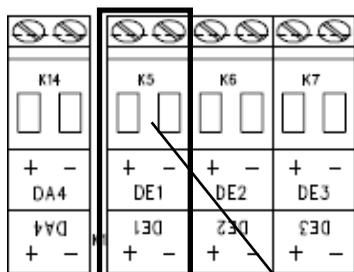


Fig. 12

1

The pulse transducer or encoder of the gas meter will be connected to the “DE1” terminal ( **1** ) of the EK280.

Further details and special features regarding the use of the pulse transducer and encoder are described in the following sub-sections.



Cables with a cross-section of 0.33 to 2.5 mm<sup>2</sup> can be connected.

### 6.2.1.1 Connection to a low frequency pulse transducer

1. Connect the pulse output of the gas meter to the “DE1” terminal (**1** in Fig. 12, p. 55) of the EK280.  
The polarity can be freely selected (the symbols “+” and “-“ on the terminals are used for the connection of other pulse transducers or encoders).
2. Adjust the measurement parameters, e.g., the cp value (pulse constant), as described in → section 6.3.1.2.

### 6.2.1.2 Connection to an encoder

1. Connect the encoder of the gas meter to the “DE1” terminal (**1** in Fig. 12, p. 55) of the EK280.  
The polarity should be taken into consideration, i.e., connect the “+” of the encoder to the “DE1 +” terminal and “-” to the “DE1 -” terminal respectively.
2. Adjust the measurement parameters, e.g., the encoder type, as described in → section 6.3.1.3.

### 6.2.1.3 Connection to a high frequency pulse transducer



The EK280 can only count the pulses of a high frequency pulse transducer if there is an external power supply – not when in battery mode.

In order to ensure an uninterrupted measurement of the gas volume, the EK280 can be configured in such a way that the device automatically switches to a low frequency pulse transducer in the event of a failure of the external power supply; → section 6.2.1.4.



If you would like to use the automatic switching function of the pulse transducer, please proceed as per → section 6.2.1.4 !

1. Connect the high frequency pulse output of the gas meter to the “DE1” terminal (**1** in Fig. 12, p. 55) of the EK280.  
The polarity should be taken into consideration, i.e., connect the “+” of the pulse transducer with the “DE1 +” terminal and “-” with the “DE1 -” terminal respectively.
2. Adjust the measurement parameters, e.g., the cp value (pulse constant), as described in → section 6.3.1.4.

### 6.2.1.4 Automatic switchover of the pulse transducer

The EK280 should be configured as described to ensure an uninterrupted measurement of the gas volume when using a high frequency pulse transducer.

If the power supply is in a functioning order, the volumes, and flows ( $V_b$ ,  $V_m$ ,  $Q_b$ ,  $Q_m$ ) will be measured with the high frequency pulse transducer. In the event of a failure of the external power supply, the EK280 will automatically switch to the low frequency pulse transducer.

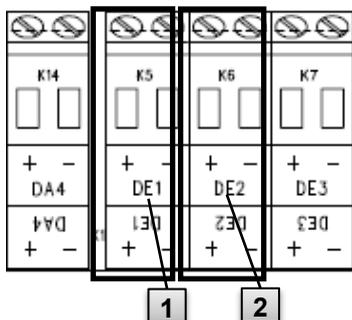


Fig. 13

1. Connect the low frequency pulse transducer of the gas meter to the “DE1” terminal (1) of the EK280.
2. Connect the high frequency pulse transducer of the gas meter to the “DE2” terminal (2) of the EK280.
3. Adjust the measurement parameters, e.g., the cp value (pulse constant), as described in → section 6.3.1.5.

### 6.2.2 Sealing the input terminals

After connecting to the gas meter as per → section 6.2.1, the input terminal “DE1” must be sealed for official calibration measurements.

For this purpose, terminal covers are provided in the bag of accessories. If required, these should be screwed over the connected terminals and an adhesive seal should then be bonded to the fastening screw (→ section 6.3.2).

### 6.2.3 Connecting the temperature sensor



Any national requirements must be observed when connecting the temperature sensor.

The requirements of the PTB Testing Instructions, Volume 20, Electronic volume conversion device for gas, section 5, shall apply to Germany.



Before connecting, the temperature sensor should be lubricated with heat transfer fluid in order to enhance its functionality.

### 6.2.3.1 Connection to a standard thermowell

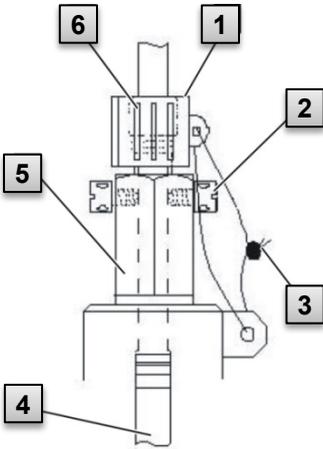


Fig. 14

1. Insert the temperature sensor Pt500 **4** into the thermowell **5** (→ “Appendix”).
2. Fasten the temperature sensor using the capstan screw **2** and screw connections provided **6**.
2. Have a calibration officer seal the temperature sensor using the sealing sleeve **1** and the wire seal **3** as per Fig. 14.

### 6.2.3.2 Connection to an older thermowell

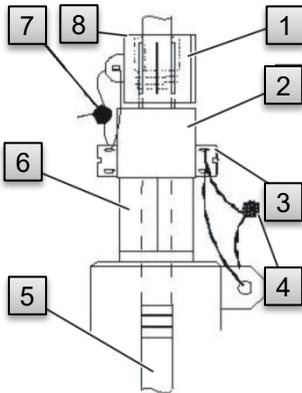


Fig. 15

1. Insert the temperature sensor Pt500 **5** into the thermowell **6** (→ “Appendix”).
2. Use the adapter **2** to seal the connection (→ “Appendix”).
3. Fasten the temperature sensor using the capstan screw **3** and the screw connections **8** provided.
4. Have a calibration officer seal the temperature sensor using the sealing sleeve **1** and the wire seal **4**, **7**.

### 6.2.4 Connecting the pressure pipe



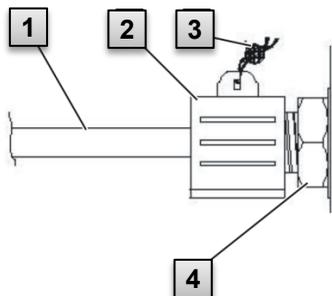
Any national requirements must be observed when connecting the pressure pipes.

The requirements of the PTB Testing Instructions, Volume 20, Electronic volume conversion device for gas, Section 5, shall apply to Germany.



Efforts must be made to ensure the pipes are installed downwards.

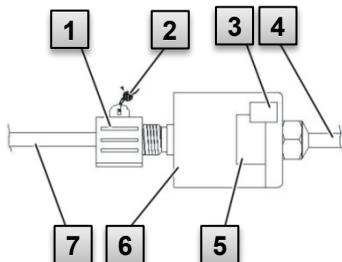
#### 6.2.4.1 Connection to an internal pressure sensor



1. Connect the pressure connection to the internal pressure sensor connection **1** using the union nut and the sealing insert **4**.
2. Have a calibration officer seal the connection with the sealing sleeve **2** and a wire seal **3**.

Fig. 16

#### 6.2.4.2 Connection to an external pressure sensor



1. Connect the pressure connection **7** to the external pressure sensor **6**.
2. Have a calibration officer seal **2** the connection with a sealing sleeve **1**.

Fig. 17

## 6.2.5 Connecting the power supply

### 6.2.5.1 Power supply for EK280 without integrated power supply unit



#### **DANGER!**

**Explosion hazard due to the connection of non-certified devices!**

Operating the EK280 in zone 0 or 1 and connecting devices without suitable certification present a risk of explosion.

Therefore:

- When using the EK280 in zone 0 or 1, it should only be connected to certified intrinsically safe apparatuses or associated apparatuses or simple apparatuses as per the ATEX Product Directive 2014/34/EU or IECEx.
- The EK280 should only be connected to the intrinsically-safe circuits whose electrical data comply with the requirements specified in section 3.8.

For the external power supply of the EK280 (model without in-built power supply unit), the electrical data should be adhered to as per → sections 1.1 and 4.2.3.

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

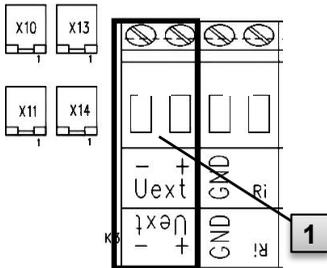


Fig. 18

Connect the power supply to the “Uext” terminal ( **1** ) of the EK280. The polarity should be taken into consideration, i.e., connect the “+” of the power supply unit to the “Uext +” terminal and “-” to “Uext -”.

### 6.2.5.2 Power supply for the EK280 with integrated power supply unit



**DANGER!**  
**Danger to life from electrical current!**

Touching live parts poses an imminent danger to life.

Therefore:

- Works on the electrical components of the device, i.e., the connection of the power supply unit, should solely be carried out by qualified electricians.
- When performing all works to the electrical system, switch off the power, secure it against an accidental restart and check to ensure that the voltage has been cut.
- Keep live parts away from moisture. This could lead to a short-circuit.

The power supply unit to connect the 115...230 V~ power supply, is in-built into the base of the EK280.

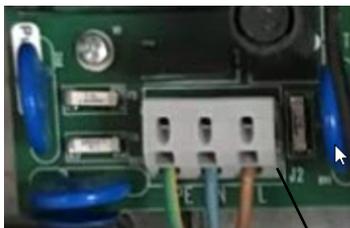


Fig. 19

1

1. Switch off the supply voltage and secure it against an accidental restart!
2. Connect the 115...230 V~ supply voltage to the “J2” terminal block (1) of the EK280. The cables are inserted into the terminal block from the bottom. The upper connections are used to connect a measuring device (to detect the absence of voltage).



Fine-stranded conductors with insulated ferrules with a cross-section of 0.2 to 1.5 mm<sup>2</sup> or solid conductors up to 2.5 mm<sup>2</sup> can be connected.



**DANGER!**  
**Danger to life from electrical current!**

Connect protective ground wire of mains-supply to screw terminal J2, connection PE!

When connecting the mains cable, the cables must be fed through the ferrite sleeve. The sleeve must be fixed close to the cable gland with a cable tie, as shown in the picture on the right. The ferrite sleeve is supplied in the bag of accessories.



### 6.2.6 Connecting the outputs of the EK280



Cables with a cross-section of 0.33 to 2.5 mm<sup>2</sup> can be connected.



Different downstream devices can be connected to the digital outputs of the EK280. The outputs are preconfigured for this purpose (→ section 6.3.1.13).

K11		K12		K13		K14	
+	-	+	-	+	-	+	-
DA1	DA2	DA3	DA4	DA5	DA6	DA7	DA8
+	-	+	-	+	-	+	-

Fig. 20

1. Connect the downstream device to the corresponding digital outputs (terminals “DA1” to “DA4”) of the EK280 (Fig. 20).
2. Terminal covers are provided in the bag of accessories to seal the output terminals. If required, these should be screwed over the connected terminals and a seal should then be bonded to the fastening screw (→ section 6.3.2).

3. If necessary, adjust the cp value (pulse contact) for the pulse outputs as described in → section 6.3.1.13.

### 6.2.6.1 Electrical insulation of the outputs

In standard cases, all negative poles of the outputs are electrically connected to the motherboard.

For special applications, i.e., switching a positive pole, each output can be electrically separated from the motherboard and from the other outputs.

**!** **CAUTION!**  
**Reduced battery life**  
 Activating the electrical insulation of outputs reduces the battery life when in battery mode!  
 It is then impossible to give a reliable prediction of the remaining battery life.

**i** An electrically-insulated output only requires electricity if the output is active (switched-on). You can therefore minimize the negative influence of an electrically-insulated output on the battery life by setting the pulse duration to the lowest possible value when using it as a pulse output.  
 The configuration software enSuite can be used for this purpose.

**i** The electrical insulation of the outputs is not an approved electrical isolation in accordance with ATEX or IECEx. An approved Ex-isolator is required when using the device in Ex zone 0 or 1.

In order to activate the electrical insulation of an output, please move the switch lever behind the corresponding output terminal away from the terminal:

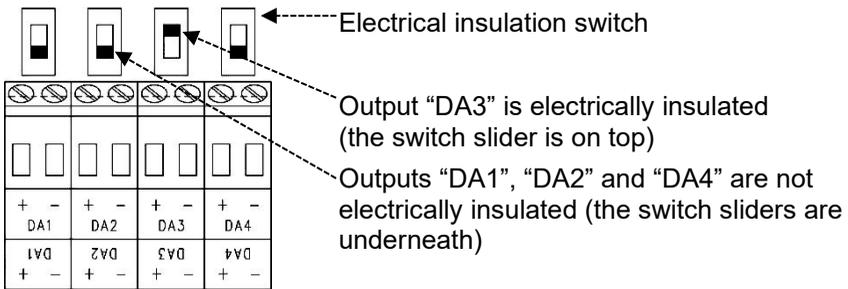


Fig. 21

### 6.2.7 Grounding the EK280 housing



The housing of the EK280 must always be grounded. A M6 screw is provided for this on the left-hand side of the housing.

1. Use a cable with a cross-section of at least 4 mm<sup>2</sup> to ground the EK280.
2. Use this cable to connect the screw on the left-hand side of the housing to the local equipotential bonding strip.



#### CAUTION!

Avoid ground loops. Use a delta-type ground connection.

### 6.2.8 Grounding the cable connections of the EK280



All cables firmly connected to the EK280 have a shield. This is connected to the cable glands of the EK280 in order to prevent electromagnetic interference.



Only shielded cables should be used for new connections.

The cable shield should be completely grounded on both sides. For this purpose, the EK280 is equipped with special cable glands.

On cables with a maximum length of 3 m, the shield may be connected to one side as an exception if it is not possible to connect it on both sides. However, connection on both sides should always be given preference to prevent faults.

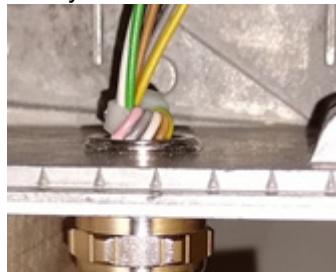
## 6.2.9 Additional measures for installation in zone 2



For the installation of the EK280 model with an integrated power supply unit (ATEX and IEC category “II 3 G”) in zone 2, the following additional measures are necessary:

- A cable tie threaded through a metal cable gland must be fitted in the housing to act as a strain-relief facility. Position the cable tie on the actual cable gland.  
If a plastic cable gland is used to connect the power supply unit, no strain-relief facility is required.

Example of the strain-relief facility:



- All cable glands have to be fastened with a minimum torque of
  - 6 Nm for metal glands
  - 1.5 Nm for plastic glands
- Only use cables with the following diameters depending on the cable gland:
 

- M12 metal gland:	4	to	6.5	mm
- M16 and M20 metal gland:	6.5	to	9.5	mm
- M16 plastic gland:	7	to	10	mm

The ATEX category “II 1 G” models of the EK280 (without in-built power supply unit) can be installed in zones 0 or 1 and in zone 2 without these additional measures.

## 6.3 Putting into operation

### 6.3.1 Configuration of measurement parameters



If the EK280 is subject to calibration regulations, the works described below should only be performed by legally authorized individuals.

The necessary measurement parameters can be adjusted using the free configuration program enSuite (→ 1.10 “enSuite parameterization software”).

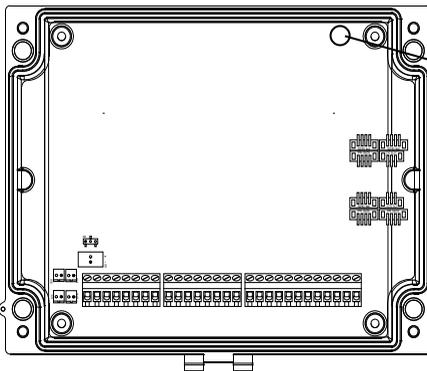
If the program is not available, the configuration can also be carried out using the keyboard as described below.



Before adjusting the measurement parameters via the keyboard, please read → section 7 to learn how the device is operated.

### 6.3.1.1 Opening the calibration lock

The calibration lock is located at the back of the housing cover in the form of a button, and this can be secured by means of an adhesive label. This button must be pressed to adjust the values and parameters protected by configuration regulations.



Position of the button to open the calibration lock.

### 6.3.1.2 Adjusting the parameters for the low frequency pulse transducer of the gas meter

If a low frequency pulse transducer is connected as per 6.2.1.1, adjust the input mode and the cp value as follows:

#### 1. Adjusting the input mode:

- Move the cursor to the “Serv.” tab and to the input mode “Md.11” via the following path:  
     Serv. → Inputs → Input 1 → Md.11
- Press the ENTER button. ⇒ The set value will start to flash.
- Press one of the arrow keys ▲ or ▼ until the text “Pulse input” starts to flash.
- Press the ENTER button to confirm the set value. The input value can be deleted by pressing the ESC button.

## 2. Adjusting the cp value (pulse constant):

- Move the cursor to the cp value “*cp.11*” via the same path.
- Press the ENTER button. ⇒ The value will start to flash.
- Move the cursor using the arrow keys ► or ◀ to the digits and change these using the arrow keys ▲ or ▼.
- Press the ENTER button to confirm the set value. The input value can be deleted by pressing the ESC button.

### 6.3.1.3 Activating encoder mode

If an encoder is connected as per 6.2.1.2, the encoder mode is activated as follows:

Start the “Auto Detect” function using the keyboard of the EK280 as follows:

- Move the cursor to the “*Serv.*” tab and to the value “*Md.11*” (input mode) via the following path:  
     *Serv.* → Inputs → Input 1 → *Md.11*
- Press the ENTER button. ⇒ The set value will start to flash.
- Press one of the arrow keys ▲ or ▼ until the text “*Auto-Encoder*” starts to flash.
- Press the ENTER button to confirm the set value. The input value can be deleted by pressing the ESC button.
- Wait until “*Auto-Encoder*” is replaced by another value. This may take up to one minute as the EK280 consecutively activates and tests all known encoder protocols.
- Once the EK280 has successfully detected the encoder, it will display the meter reading of the gas meter with the description “*Vo*”:  
     *Serv.* → Volume → Inputs → Input 1 → *Vo*

Unlike the “Auto Detect” function, you can also select the connected encoder type directly under “*Md.11*”.

*Serv.* → Volume → Inputs → Input 1 → *Md.11*

The following encoder types can be selected:

<b>Md.11</b>	<b>Meaning</b>
<i>Enc.Namur a</i>	Encoder Namur a protocol
<i>Enc.SCR EDIS</i>	Encoder SCR EDIS95
<i>Enc.SCR OBIS</i>	Encoder SCR OBIS05
<i>Enc.Nam. a-b</i>	Encoder Namur a and b protocol

### 6.3.1.4 Adjusting the parameters for the high frequency pulse transducer of the gas meter

If a high frequency pulse transducer is connected as per 6.2.1.3, the input mode and the cp value should be adjusted as follows:

1. Adjusting the input mode:
  - Move the cursor to the “*Serv.*” tab and to the input mode “*Md.I1*” via the following path:  
     *Serv.* → *Inputs* → *Input 1* → *Md.i1*
  - Press the ENTER button. ⇒ The set value will start to flash.
  - Press one of the arrow keys ▲ or ▼ until the text “*HF pulses*” starts to flash.
  - Press the ENTER button to confirm the set value. The input value can be deleted by pressing the ESC button.
2. Adjusting the cp value (pulse constant):
  - Move the cursor to the cp value “*cp.I1*” via the same path.
  - Press the ENTER button. ⇒ The value will start to flash.
  - Move the cursor using the arrow keys ► or ◀ to the digits and change these using the arrow keys ▲ or ▼.
  - Press the ENTER button to confirm the set value. The input value can be deleted by pressing the ESC button.

### 6.3.1.5 Adjusting the automatic switchover of the pulse transducer

If the automatic switchover of the pulse transducer (→ section 6.2.1.4) is used, adjust the necessary parameters as follows:

1. Adjusting the automatic switchover:
  - Move the cursor to the “*Serv.*” tab and to the value “*Sc.Vm*” (sources for the volume at measurement conditions) via the following path:  
     *Serv.* → *Volume* → *Actual volume* → *Parameter settings* → *Sc.Vm*
  - Press the ENTER button. ⇒ The set value will start to flash.
  - Press one of the arrow keys ▲ or ▼ until the text “*Input 2*” starts to flash.
  - Press the ENTER button to confirm the set value. The input value can be deleted by pressing the ESC button.
2. Adjust the input mode of the high frequency pulse transducer:
  - Press the button ▼ to display “*Md.I2*”.
  - Press the ENTER button. ⇒ The set value will start to flash.
  - Press one of the arrow keys ▲ or ▼ until the text “*HF pulses*” starts to flash.
  - Press the ENTER button to confirm the set value. The input value can be deleted by pressing the ESC button.

3. Adjust the cp value of the high frequency pulse transducer:
  - Press the button ▼ to display “cp.12”.
  - Press the ENTER button. ⇒ The set value will start to flash.
  - Move the cursor using the arrow keys ► or ◀ to the digits and change these using the arrow keys ▲ or ▼ to the cp value of the pulse transducer connected to input 2.
  - Press the ENTER button to confirm the set value. The input value can be deleted by pressing the ESC button.
4. Adjust the parameters for the low frequency pulse transducer:
  - Adjust the parameters for the low frequency pulse transducer on input 1 as described in section 6.3.1.2.

#### 6.3.1.6 Setting the volume at measurement conditions

In order to control the recording of the volume at measurement conditions, the EK280 counter can be set once to the same value as the gas meter if the administrator lock is open. It is always possible to set the volume if the calibration lock is open:

- Open the administrator lock or the calibration lock.
- Move the cursor to the “Serv.” tab and go to the value “VmA” (adjustable volume at measurement conditions) via the following path:  
*Serv. → Volume → Actual volume → Synchronization Vm → VmA*
- Press the ENTER key. ⇒ One of the value digits flashes.
- Move the cursor using the arrow keys ► or ◀ to the digits and change these using the arrow keys ▲ or ▼.
- Once you have changed all of the digits, press the ENTER key in order to confirm your entry. The entry can be cancelled by pressing the ESC key.
- In order to accept the set value, move the cursor to the value “Store”
- Press the ENTER key. ⇒ “0” flashes.
- Change the value using the arrow keys ▲ or ▼ to “1”.
- Once you have changed the value, press the ENTER key in order to confirm your entry. The entry can be cancelled by pressing the ESC key. ⇒ “Vm” is assumed for “VmA”.



If, when the administrator lock is open, the assumption of “VmA” for “Vm” is rejected with the message --13--, then this process has already been carried out once.

Other changes are possible if the calibration lock is open or, if the administrator lock is open, after deleting the change information for comparison of “Vm” with the gas meter (→ section 6.3.1.7).

### 6.3.1.7 Deleting change information for comparison of Vm with the gas meter

In order to allow the volume at measurement conditions to be reset if the administrator lock is open, the change information for comparison of “Vm” with the gas meter must be deleted:

- Open the calibration lock.
- Move the cursor to the “Serv.” tab and go to the value “Clear” (deleting change information) via the following path:
  - Serv. → Volume → Actual volume → Synchronization Vm → Clear
- Press the ENTER key ⇒ “0” flashes.
- Change the value using the arrow keys ▲ or ▼ to “1”.
- Once you have changed the value, press the ENTER key in order to confirm your entry. The entry can be cancelled by pressing the ESC key. ⇒ “TimeX” (time stamp of comparison), „Vm\_o” (Vm old value), “Vm\_n” (Vm new value) are set to default value.

### 6.3.1.8 Setting the volume at base conditions

For the EK280 volume conversion device, there is the option available when commissioning the device to set the volume at base conditions counter once if the administrator lock is open. It is always possible to set the volume if the calibration lock is open:

- Open the administrator lock or the calibration lock.
- Move the cursor to the “Serv.” tab and go to the value “VbA” (adjustable volume at base conditions counter) via the following path:
  - Serv. → Volume → Standard volume → Synchronization Vb → VbA
- Press the ENTER key. ⇒ One of the value digits flashes.
- Move the cursor using the arrow keys ► or ◀ to the digits and change these using the arrow keys ▲ or ▼.
- Once you have changed all of the digits, press the ENTER key in order to confirm your entry. The entry can be cancelled by pressing the ESC key.
- In order to accept the set value, move the cursor to the value “Store”

- Press the ENTER key. ⇒ “0” flashes.
- Change the value using the arrow keys ▲ or ▼ to „1“
- Once you have changed the value, press the ENTER key in order to confirm your entry. The entry can be cancelled by pressing the ESC key. ⇒ “Vb” is assumed for “VbA”.



If, when the administrator lock is open, the assumption of “VbA” for “Vb” is rejected with the message --13--, then this process has already been carried out once.

Other changes are possible if the calibration lock is open or, if the administrator lock is open, after deleting the change information for comparison of “Vb” (→ section 6.3.1.9).

### 6.3.1.9 Deleting change information for comparison of Vb with the gas meter

In order to allow the volume at base conditions to be reset if the administrator lock is open, the change information for comparison of “Vb” must be deleted:

- Open the calibration lock.
- Move the cursor to the “Serv.” tab and go to the value “Clear” (deleting change information) via the following path:  
     Serv. → Volume → Standard volume → Synchronization Vb → Clear
- Press the ENTER key. ⇒ “0” flashes.
- Change the value using the arrow keys ▲ or ▼ to “1”.
- Once you have changed the value, press the ENTER key in order to confirm your entry. The entry can be cancelled by pressing the ESC key. ⇒ “TimeX” (time stamp of comparison), “Vb\_o” (Vb old value), “Vb\_n” (Vb new value) are set to default values.

### 6.3.1.10 Adjusting the compressibility equation and gas analysis

- Move the cursor to the “Serv.” tab and to the value “Md.K”. (compressibility equation) via the following path:  
     Serv. → Volume conversion → Parameter settings → Md.K
- Press the ENTER button. ⇒ The set value will start to flash.
- Change the value using the arrow keys ▲ or ▼. Adhere to the valid legal provisions for the area of application.

Md.K	No	Meaning
<i>fix value</i>	0	No calculation of compressibility. The adjustable value "K.F" will be used.
<i>S-Gerg-88</i>	1	Calculation of compressibility as per S-Gerg-88
<i>AGA-NX19</i>	2	Calculation of compressibility as per AGA-NX19
<i>AGA-8 GC1</i>	3	AGA8 Gross Characterization Method 1
<i>AGA-8 GC2</i>	4	AGA8 Gross Characterization Method 2
<i>AGA-NX19-HW</i>	5	AGA-NX19 according to Herning and Wolowsky
<i>Detail.Char. <sup>7</sup></i>	6	Calculation equivalent to the method AGA8-92DC (Computation with 11 gas components)
<i>GOST-30319</i>	12	Calculation of compressibility as per GOST 30319-3
<i>GERG-mod-H2</i>	13	SGERG-88 for added hydrogen up to 30 mol%

- Press the ENTER button to confirm the set value. The input value can be deleted by pressing the ESC button.
- After selecting the compressibility equation, move the cursor along to the gas analysis values (*Ho.b*, *CO2* etc.) using the arrow keys ▲ or ▼.
- Change the values according to the gas used by confirming the input by pressing the ENTER button or use the arrow keys ► or ◀ to go to the digits and change these with the buttons ▲ or ▼.
- Press the ENTER button to confirm the set value. The input value can be deleted by pressing the ESC button.



The calorific value *Ho.b* applies to the basic conditions *pbX*, *TbX* and reference combustion temperature +25°C. *pbX* and *TbX* are adjustable under calibration lock.

### 6.3.1.11 Adjusting alarm limits for gas pressure and temperature measurement

Alarm limits are set to default values ex-factory. If a change becomes necessary, please proceed as follows:

- Move the cursor to the "Serv." tab and move to the alarm limit values via the following paths:

*Serv.* → *Measured values* → *Pressure* → *Parameter settings* → *pMin and pMax*

<sup>7</sup> For devices with delivery until mid-2023, "AGA-8 DC92" is displayed here.

Serv. → Measured values → Temperature → Parameter settings → TMin and TMax

- Press the ENTER button to confirm the input.
- Use the arrow keys ► or ◀ to go to the digits and change these with the arrow keys ▲ or ▼.
- Press the ENTER button to confirm the set value. The input value can be deleted by pressing the ESC button.

### 6.3.1.12 Adjusting replacement values for gas pressure and gas temperature

If the gas pressure or gas temperature cannot be measured due to a fault, an adjustable replacement value (fixed value) will be used to calculate the volume at base conditions. The volume calculated in this way will be counted in the separate disturbance quantity counter “VbD”.

The replacement values can be found under the following paths:

Serv. → Measured values → Pressure → Parameter settings → p.F

Serv. → Measured values → Temperature → Parameter settings → T.F

Changing the values generally takes place precisely as described in section 6.3.1.12 for the alarm limit values.

### 6.3.1.13 Configuration of the outputs



The cp values (pulse constants) for the outputs can also be configured using enSuite.

The following functions are pre-set ex-factory for the outputs:

Outputs	Function
Output 1	Pulse output for the total volume at base conditions “VbT” (cp.O1 = 0.1)
Output 2	Pulse output for the total volume at measurement conditions “VmT” (cp.O2 = 0.1)
Output 3	Status output for warnings (→ section 9.2)
Output 4	Status output for alarms (→ section 9.2)

The cp value of an output indicates how many pulses are emitted per cubic meter. A cp value of 0.1 / m3 (0.1 pulses per m3) means, for example, that one pulse is emitted per 10 m3.

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

*Serv. → Outputs → Output 1 → cp.O1*

or *Serv. → Outputs → Output 2 → cp.O2*

- Press the ENTER button. ⇒ The cp value will flash.
- Move the cursor using the arrow keys ► or ◀ to the digits and change these using the arrow keys ▲ or ▼.
- Press the ENTER button to confirm the set value. The input value can be deleted by pressing the ESC button.



Aside from the settings described here, a range of other functions can be configured for the outputs, e.g., high frequency or time-synchronous pulses.

A complete description can be found in the EK280 Application Manual (→ 1.1.1 "Downloading manuals from Docuthek").

#### 6.3.1.14 Setting the daylight saving time

- Move the cursor to the "Serv." tab and to the "MdTim" value (daylight saving mode) via the following path:  
*Serv. → Date and Time → MdTim*
- Press the ENTER button. ⇒ The set value will start to flash.
- Change the value using the arrow keys ▲ or ▼:

MdTim	Meaning
<i>CEST off</i>	No switchover to daylight saving time
<i>CEST autom.</i>	Automatic switchover to daylight saving time (CEST = Central European Summer Time)
<i>CEST manual</i>	The start and end of daylight saving time is configured by the control center every year.

- Press the ENTER button to confirm the set value. The input value can be deleted by pressing the ESC button.

#### 6.3.1.15 Deleting the measurement archive

This function can be used, for example, to delete the stored zero consumptions before commissioning or after a measuring point change and to restart the archives.



Deleting the archive is not necessarily required when putting the device into operation.

Deleting the archives is only possible when the Administrator lock is open, and the Certification Data Log is active!

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



All measurement archives will be deleted but no Logbook archives.

In order to ensure that the archives are not accidentally deleted, the serial number of the EK280 must be entered whilst the calibration lock is open (the number is located on EK280 identification plate).

- Press the ENTER button. ⇒ The value will start to flash.
- Move the cursor using the arrow keys ► or ◀ to the digits and enter the serial number of the device using the arrow keys ▲ or ▼.
- After you have entered the serial number of the device, press the ENTER button to confirm the input. The input value can be deleted by pressing the ESC button.

### 6.3.1.16 Deleting the Certification Data Log



The log can only be deleted if the calibration lock is open.

- Move the cursor to the “*Serv.*” tab and to the value “*CICDL*” (delete certification data log) via the following path:  
*Serv.* → *Change and Delete* → *CICDL*
- Press the ENTER button. ⇒ “0” will start to flash.
- Change the value to “1” with the arrow keys ▲ or ▼.
- After you have entered the value, press the ENTER button to confirm the input. The input value can be deleted by pressing the ESC button.

### 6.3.1.17 Closing and securing the calibration lock

After all settings subject to calibration regulations have been adjusted, close the calibration lock in the same way that it was opened:

Press the buttons described in section 6.3.1.1 once again.

The calibration switch is secured with an adhesive label as described in section 6.3.2.2.

### 6.3.1.18 Deactivate access parties

At the start of commissioning, all access parties are activated.



We strongly recommend disabling all access parties that are *not* needed during runtime.

→ Section 7.3.6.4.1 Administrator lock: enable/disable access parties

## 6.3.2 Sealing

### 6.3.2.1 External view

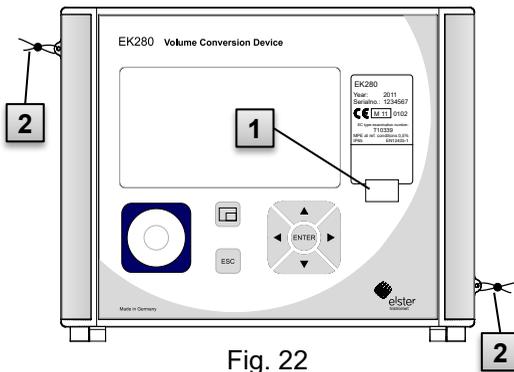


Fig. 22

- 1 Possible sealing point to secure the identification plate via adhesive seal.
- 2 Optional user lock: Seal covers using wire seals through sealing eyelets.

### 6.3.2.2 Internal view

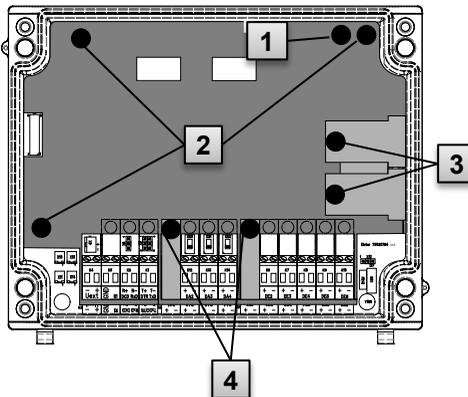


Fig. 23

- 1 Sealing point to secure the calibration switch.
- 2 Sealing points to secure the circuit board cover.
- 3 Sealing points to secure the sensor covers for the pressure and temperature sensors.
- 4 Sealing points to secure the terminal covers of the inputs, outputs, and interfaces if necessary.



These sealing points ( 4 ) to secure the pulse inputs and pulse outputs are subject to national regulations (cf. WELMEC 11.1, section 2.7.1).

Depending on the legal situation in the respective country of use, seals produced by legally authorized manufacturers or the metering point operators, should be used.

If the devices are supplied with connected input and/or output cables, seals will be provided with the manufacturing symbol as standard. If necessary, these can be replaced in the area of application as described above.

### 6.3.2.3 Sensors



Examples of how to seal the connected temperature and pressure sensors are presented in sections 6.2.3 and 6.2.4.

### 6.3.3 Closing the housing



#### CAUTION!

**Material damage may arise through improper closing of the device!**

Improper closing of the device may lead to material damage as a result of cable connections being squashed.

Therefore:

- Please ensure that the cable ducts are positioned correctly when closing the device.
- To close, slightly raise the lid on its hinges.

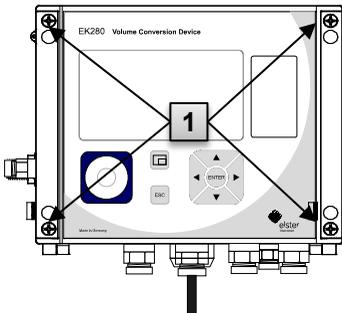


Fig. 24

1. Close the housing using the four screws provided ( 1 ).
2. Close the unused cable glands using the sealing plugs provided within the scope of supply.

### 6.3.4 Verifying assembly and connection

**WARNING!****Risk as a result of incorrect assembly and connection**

Incorrect assembly and connection of the EK280 may lead to life-threatening situations.

Therefore:

- Assemble and connect the EK280 correctly.
- Sealing should solely be carried out by a calibration officer.
- Follow the guidelines of DIN EN 60079-14, DIN EN 60079-0, the ATEX Product Directive 2014/34/EU as well as the ATEX Operating Directive 1999/92/EC EN or IEC 60079-0 and IEC 60079-14.

### 6.3.5 Programming a data transfer

To discover the wide range of possibilities for remote data transfer to a control center via the integrated modem, the Ethernet interface or via a device connected to the terminal interface, please follow the corresponding instructions in the EK280 Application Manual (→ 1.1.1 “Downloading manuals from Docuthek”).

The data transfer settings can be configured without opening the calibration lock.

## 7 Operation



The enSuite software and data interfaces of the EK280 can be used to perform further applications other than those described below.

→ 1.1.1 “Downloading manuals from Docuthek”

### 7.1 Safety

#### 7.1.1 Personal protective equipment

When working on the device inside a gas-handling plant, personal protective equipment must be worn to minimize risks to health.

- During works on the device, the necessary personal protective equipment must be worn inside the respective plant at all times.
- The notices relating to personal protective equipment mounted in the working area must be followed at all times.

### 7.2 Operating personnel

The following groups of people are authorized to perform different functions when operating the EK280.

#### 7.2.1 Instructed personnel

A person instructed on how to operate the EK280, who

- will be informed of the tasks assigned to them and possible risks resulting from inappropriate behaviour, in a training session provided by the operator.
- is authorized to read and take note of values and parameters using the control elements of the EK280.

#### 7.2.2 Qualified personnel

A person qualified to operate the EK280, who,

- on the basis of their specialist training, knowledge and experience, as well as their awareness of the relevant statutory provisions, are in a position to perform their assigned tasks on the device and are able to independently identify and prevent possible risks.
- are authorized to read and take note of values and parameters using the control elements of the EK280, and to perform changes which are not subject to calibration regulations.

### 7.2.3 Calibration officers

A calibration officer, who,

- based on their professional training, knowledge and experience and awareness of applicable standards and regulations, are in a position to perform the works on gas systems. The calibration officer will be trained on works on devices and installations subject to calibration regulations and will be familiar with the relevant standards and regulations.
- is authorized to read and take note of values and parameters using the control elements of the EK280, and to perform changes which are not subject to calibration regulations.

## 7.3 Basic principles

As already explained in the "Construction and Function" section, the EK280 can be operated and programmed using the control elements on the front panel of the device.

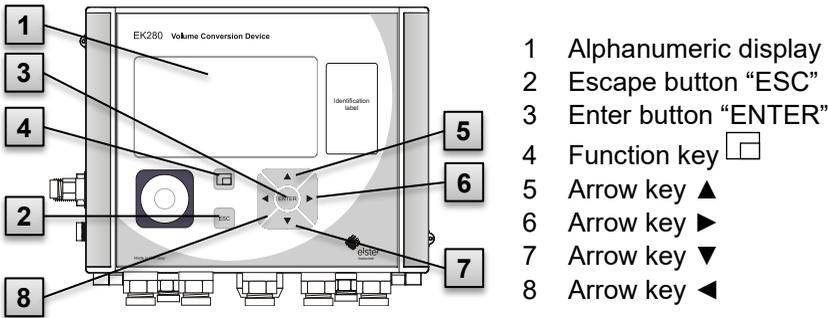


Fig. 25: Front panel of the EK280



The calibration lock is located on the circuit board built into the housing cover in the form of a button and can be sealed by means of an adhesive label. This button must be pressed in order to adjust the values and parameters protected by configuration regulations. For devices protected by calibration regulations, this may solely be carried out by a calibration officer.

### 7.3.1 Display

The display is divided into the five tabs "Main", "Cust.", "Admin", "Serv." and "Ctrl." under which measurements, settings and other data are displayed.

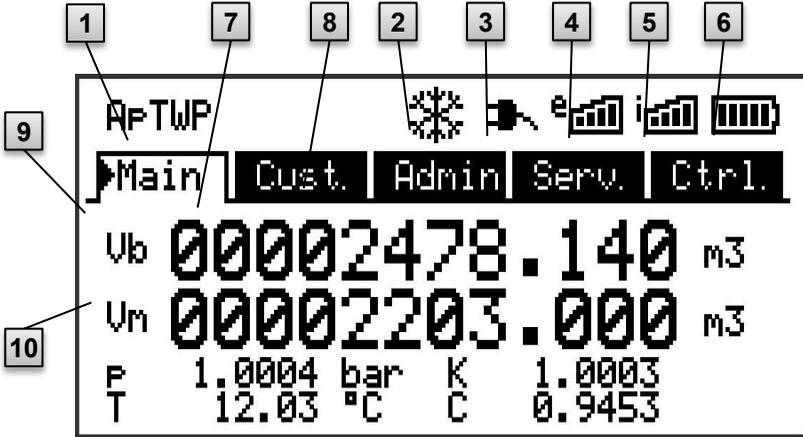


Fig. 26 Display layout

- |  |                         |
|--|-------------------------|
| 1 Device status                            | 6 Battery charge status |
| 2 Frozen display                           | 7 Active tab            |
| 3 External power supply                    | 8 Inactive tab          |
| 4 Reception strength of the external modem | 9 Cursor                |
| 5 Reception strength of the internal modem | 10 Data field           |

The display in the data field in Fig. 26/10 (starting here with "Vb") is different in each of the tabs. All other display sections (in the top part of the screen) remain the same, regardless of the tab displayed.

### 7.3.2 Button functions

The pressure and arrow buttons have the following functions:

Button	Function
▶	Jump right to another data list. Jump to the second part of a two-part value.
▼	Jump down through a data list.
◀	Jump left to another data list.
▲	Jump up through a data list.
ENTER	Depending on the respective data class, you can: <ul style="list-style-type: none"> <li>– Activate the input mode.</li> <li>– Open the respective sub-menu.</li> <li>– Update the corresponding measurement.</li> </ul>
ESC	Depending on the respective data class, you can: <ul style="list-style-type: none"> <li>– Leave a sub-menu and jump to its entry value (one menu level up).</li> <li>– Delete an input (input mode).</li> </ul>
◀ + ▲	By pressing both of the buttons at the same time: <ul style="list-style-type: none"> <li>– You can display the "Main" tab.</li> <li>– You can set a value in input mode (reset to start value)</li> </ul>
◀ + ▶	– Address display of the current value.
	By pressing the function key, you can: <ul style="list-style-type: none"> <li>– Display the "Main" tab.</li> <li>– Freeze the current display.</li> <li>– Delete the status register.</li> </ul>

### 7.3.3 Data recall, display navigation

Using the arrow keys **▶**, **◀**, **▲**, **▼**, you can move the cursor  around the display and switch to the other values.

By pressing the ESC button one or more times, you will be directed to the "Main", "Cust.", "Admin", "Serv." or "Ctrl." tabs (→ 7.3.1, Fig. 26). The active tab over which the cursor is hovering, is presented with a light-coloured background (Fig. 27/1). In the "tab" bar, you can move the cursor to other tabs using the arrow keys **▶** and **◀** to display their content.

The "Cust." tab contains more data than can simultaneously be displayed. The arrow key **▼** is used to move the cursor from the tab to the data field (the bottom part of the display). By moving the cursor to the lowest visible value, the display can be shifted upwards by re-pressing the **▼** button to display further data. The **▲** button can also be used to move the cursor and therefore the display upwards by moving to the highest visible value.

If the cursor hovers over a value which has been saved with a corresponding timestamp, it will automatically display this value. (Fig. 27/2)

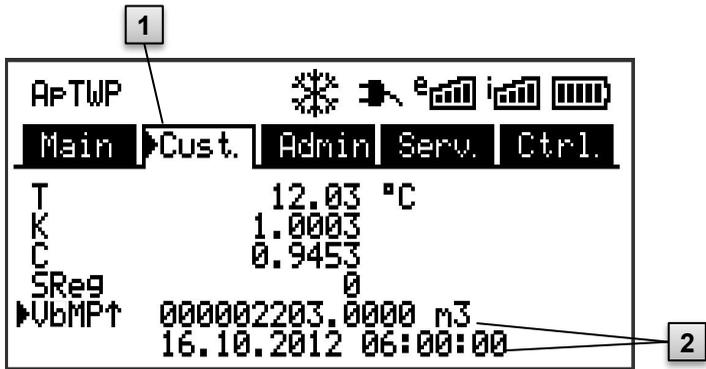


Fig. 27: "Cust." tab

- 1 Active tab
- 2 Value with corresponding timestamp

### 7.3.4 Meaning of status symbols

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

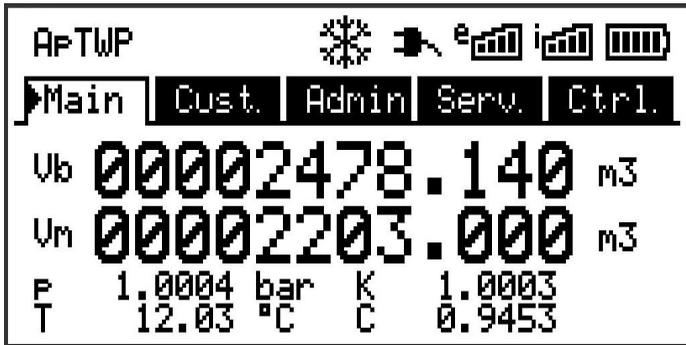


Fig. 28: Status symbols in the display

Symbol	Meaning
<b>AP TWP</b>	In the upper left-hand side of the screen, individual letters are displayed as symbols for the following signals:
<b>ok.</b>	No special message.
<b>A</b>	Alarm – Collective message for “any alarm”
<b>p</b>	Pressure alarm – The gas pressure cannot be measured.
<b>T</b>	Temperature alarm – The gas temperature cannot be measured.
<b>W</b>	Warning – Collective message for “any warning”
<b>B</b>	Battery warning – The battery is almost empty.
<b>L<sup>8</sup></b>	Certification data log – The certification data log is full.
<b>P</b>	Calibration lock (“programming mode”) – The calibration lock is open.
<b>M</b>	Measurement error – The connected gas meter encoder is not giving accurate meter readings.
<b>o</b>	Online – A data transfer is underway.
<b>a</b>	Administrator lock is open.

If one of these letters (above) flashes, the indicated status remains active. If one of the letters is displayed constantly, the indicated status is no longer active but must be acknowledged.

For further details on the meaning and potentially necessary procedures see section 9.1.4 “Behaviour in the event of faults”.

<sup>8</sup> If the Certification Data Log is active in the device.

Symbol	Meaning
	<p>Frozen display</p> <p>The displayed values have “frozen” (are not up-to-date). The current values will be displayed after pressing any button. The display freezing can be caused by pressing the function key .</p>
	<p>External power supply</p> <p>If this symbol appears, the EK280 is being supplied power from an external unit connected to the terminals.</p>
	<p>Signal strength of the radio network for the external modem (connected to the terminals). This symbol will only be shown if an external modem has been connected and is active.</p>
	<p>Signal strength of the radio network for the internal (in-built) modem.</p> <p>This symbol will only be shown if the in-built modem is active.</p>
	<p>Charge status of the battery</p>

### 7.3.5 Error messages when entering values

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

This is shown as follows: --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 already have been opened by the interface for readings.
4	This parameter cannot be changed (constant).
5	You are not authorized to change this value. To change this value, a corresponding lock must be opened.
6	Invalid value The value entered is outside the permissible limits.
7	Incorrect code The code entered (numerical code) is incorrect; the lock will not be opened.
11	Input not possible due to special settings or configuration, e.g.: - The input of “Vm” and “VmD” is not possible in encoder mode. - The calorific value can only be changed in the gas analysis list; not in the energy list.

Code	Description
12	The input of this source (address) is not permitted.
13	Entry based on specific setting or configuration not possible, e.g.: - This function “ <i>Clr.X</i> ” can only be performed once the time has been set to its start value with the key combination ◀ + ▲. - The function “ <i>Store</i> ” can only be performed once the change information for comparison of “ <i>Vm</i> ” (→ section 6.3.1.7) or “ <i>Vb</i> ” (→ section 6.3.1.9) has been deleted.
14	Gas analysis parameters do not correspond.
17	Entering a new key not yet possible.
20	Value has not been defined for the user-specific display. The displayed value can be defined by the user by entering the address. 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 log is full.

### 7.3.6 Access rights

The following parties can access the EK280.

- Calibration officer (→ 7.3.6.1)
- Certification data log (→ 7.3.6.2)
- Manufacturer (→ 7.3.6.3)
- Administrator (→ 7.3.6.4)
- Customer (→ 7.3.6.4)
- Data collector (→ 7.3.6.5)

Each access party has one lock and a corresponding key.

The access rights apply for entries made via the keyboard, and for access via the optical, electrical (hard-wired) or integrated modem interface. If the lock is closed, all attempts to enter values will result in a corresponding error message being displayed (→ section 7.3.5 “Error messages when entering values”).

For data protection reasons, reading values from the interfaces is only possible if one of the locks is open.

### 7.3.6.1 Calibration lock

The calibration lock is used to protect parameters subject to calibration regulations. This includes all values which influence volume readings or the volume conversion.

The calibration lock is designed as a button which is positioned inside the EK280 housing underneath the circuit board cover. It can be protected with an adhesive label (→ section 6.3.1.1).

The calibration lock is opened by pressing the button ("P" symbol flashes in the display) and is closed again by pressing the same button ("P" symbol fades). It can also be closed by deleting the value "*St.PL*" (→ section 7.4.6) via the keyboard or interface. Using the configuration software enSuite, a time can also be set (in minutes) after which the calibration lock will automatically close.

The level of protection can be changed for all parameters upon request, particularly for applications which are not subject to German calibration guidelines or the MID.

For example, parameters which are protected by the calibration lock as standard, can also be protected with an administrator's lock or a certification data log.

### 7.3.6.2 Certification data log

The certification data log is activated as standard but can also be disabled. The corresponding parameters will then be protected by the calibration lock. Using the "certification data log" as per PTBA 50.7, several parameters subject to calibration regulations can also be adjusted when the calibration lock is closed. This is subject to the following conditions:

- The administrator's lock (see below) must be open.
- There are at least three free entries in the certification data log.

The following parameters are set as default:

- "*cp.I1*" cp value for input 1
- "*MPer*" measurement period
- "*Md.K*" K-factor mode
- "*Clr.A*" delete measurement archive
- "*Md.I1*" mode for input 1
- "*qMax*" maximum flow (plausibility check in encoder mode)

For every change of a parameter listed under "*CDL*" when the calibration lock is closed, one row of data will be entered for the value before and after the change.

If the certification data log is full, it can be deleted using the command "*CICDL*" if the calibration lock is open (→ section 6.3.1.16).



If the calibration lock is opened when the certification data log is full, it can only be closed again after the certification data log has been deleted.

### 7.3.6.3 Manufacturer

The access party Manufacturer takes a special role, as Honeywell service technicians only need access to the device in special cases:

- During production, to make central settings on the device, e.g., setting the serial number of the device.
- To enable additional functions, such as the counter curve correction.
- in case of service

Activate the manufacturer's lock only as required.

→ Section 7.3.6.4.1 “Administrator lock: enable/disable access parties” (p. 88)

### 7.3.6.4 Administrator and customer locks

Administrator and customer locks are used to protect data which are not subject to calibration regulations, but which should also not be modified without authorization.

These locks can be opened by entering a code (i.e., the “key”) under “*Cod.A*” or “*Cod.C*” and are closed by entering “0” for “*St.AL*” or “*St.CL*”.

These values can be found under the following path:

*Admin* → *Device settings* → *Access*

or *Serv.* → *Device settings* → *Access*

A time (in minutes) can also be set here for each lock, after which it will automatically close.

#### 7.3.6.4.1 Administrator lock: enable/disable access parties

The administrator lock allows to enable or disable other access parties.



We strongly recommend that you only activate the access parties that are currently required or will be required during runtime!

The affected parameters are located under administrator lock (→ 7.3.6.4).

The values for the individual parameters are:

- ActPL Calibration
- ActML Manufacturer
- ActAL Administrator (*cannot be deactivated*)
- ActCL Customer
- ActDL Data reader

These values can be found under the path:

*Admin* → *Device settings* → *Access*  
 or *Serv.* → *Device settings* → *Access*

#### 7.3.6.4.2 Entering an incorrect key

If an incorrect password is entered, a security function is provided which causes a blocking time until another key is entered. The blocking time doubles with each further incorrect entry. If an attempt is made to enter the key within the blocking time, the key is generally not accepted and the error message "17" (see 7.3.5) is displayed.

#### 7.3.6.5 Data reader

The data reader can read all the data and correct the time. It cannot edit any other data.

The data reader access party is provided exclusively to read consumption data through digital interfaces. Therefore, the access data assigned to it (key and lock) are not shown in the device's display.

## 7.4 Data tabs content

### 7.4.1 Access rights

The "Access" column in the tables in the following section describes which lock must be opened in order to change a parameter. All parameter changes are saved in a log.

Access	Meaning
C	Calibration officer
CDL <sup>8</sup>	Certification data log
M	Manufacturer
A	Administrator
Cu	Customer
D	Data collector
-	No access

### 7.4.2 “Main” tab (main display)

An overview of the most important measurements is presented in the “Main” tab. The contents may vary depending on the parameterization (→ section 7.4.6.5).

It is not possible to move the cursor to a value in this tab<sup>9</sup>. By pressing the “ENTER” button, the displayed values are updated.

Display	Meaning	Unit	Access	Address
$V_b$	Volume at base conditions	m <sup>3</sup>	C	2:300
$V_m$	Volume at measurement conditions	m <sup>3</sup>	C	4:300
$P$	Pressure	bar	-	7:310_1
$K$	Compressibility ratio factor	-	-	8:310
$T$	Temperature	°C	-	6:310_1
$C$	Conversion factor	-	-	5:310

#### 7.4.2.1 $V_b$ – Volume at base conditions

The volume measured by the connected gas meter will be converted into a quantity at base conditions and totalled in this counter.

If there is a fault (→ section 9 “Faults”), the  $V_b$  counter will be stopped and the volume will be totalled in a special disturbance quantity counter.

#### 7.4.2.2 $V_m$ – Volume at measurement conditions

The volume measured by the connected gas meter will be totalled in this counter.

If there is a fault (→ section 9 “Faults”), the  $V_m$  counter will be stopped and the volume will be totalled in a special disturbance quantity counter. To control the measurements, the  $V_m$  can be kept at the same level as the gas meter when putting the device into operation (→ section 6.3.1 “Configuration of measurement parameters”).

#### 7.4.2.3 $p$ – Gas pressure

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

If the pressure cannot be measured due to a fault, an adjustable replacement value is displayed and is used to calculate the disturbance quantity. The replacement value is determined when putting the device into operation (→ section 6.3.1 “Configuration of measurement parameters”).

<sup>9</sup> The exception is if the “Main” tab was set to “List” (→ section 7.4.6.5).

#### **7.4.2.4 T – Gas temperature**

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

If the temperature cannot be measured due to a fault, an adjustable replacement value is displayed and is used to calculate the disturbance quantity. The replacement value is determined when putting the device into operation (→ section 6.3.1 “Configuration of measurement parameters”).

#### **7.4.2.5 K – Compressibility ratio factor**

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

The EK280 supports several equations to calculate the compressibility ratio factor. The corresponding equation is determined by the applicable guidelines and standards for the area of application of the device. This can be adjusted at the ordering or commissioning phase (→ section 6.3.1 “Configuration of measurement parameters”).

#### **7.4.2.6 C – Conversion factor**

The currently valid factor for converting the volume at measurement conditions to base conditions.

### **7.4.3 “Cust.” tab (Customer)**

This tab is used to display and check special device settings and conditions. This application is provided for gas customers.

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

The following parameters are programmed in-house:

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

### 7.4.3.1 Time - Date and time

The displayed time is updated every 30 seconds in battery mode and every 2 seconds in power supply operation.

### 7.4.3.2 Values from the "Main" tab

- Vb* – Volume at base conditions, → section 7.4.2.1
- Vm* – Volume at measurement conditions, → section 7.4.2.2
- p* – Gas pressure, → section 7.4.2.3
- T* – Gas temperature, → section 7.4.2.4
- K* – Compressibility ratio factor, → section 7.4.2.5
- C* – Conversion factor, → section 7.4.2.6

### 7.4.3.3 SReg – Status register (total)

In the status register all messages since the last manual clearing are collected. Here, you can also see what has happened, for example, since the last station inspection. The messages can be cleared at the device (*Serv.* → *Status* → *Clr*).

Only alarms and warnings (→ section 9.2) are displayed in status registers.

#### 7.4.3.4 $VbMP\uparrow$ – Maximum measurement period counter $Vb$ in the current month

The maximum time stamp is displayed in the following line after moving the cursor to the value " $VbMP\uparrow$ ".

The maximum values from the past 15 months can be requested in the monthly archive 1 (→ section 7.4.4 "Admin" tab (Administrator)).

#### 7.4.3.5 $VbDy\uparrow$ – Maximum measurement period counter $Vb$ at the current day

The time stamp for the maximum value is displayed in the following line when moving the cursor  to the value " $VbDy\uparrow$ ".

The maximum values from the past 15 months can be requested in the monthly archive 1 (→ section 7.4.4 "Admin" tab (Administrator)).

#### 7.4.3.6 $Qb$ – Flow at base conditions

Current flow at base conditions (standard flow rate)

$$Qb = Qm \times C \quad \text{with} \quad \begin{array}{l} Qm = \text{actual flow rate} \\ C = \text{Conversion factor} \end{array}$$

The maximum inaccuracy of the displayed value roughly corresponds to the maximum inaccuracy of the  $Qm$ .

For the alarm, the  $Qb$  is calculated with the replacement values of the disturbed measurements.

#### 7.4.3.7 $Qm$ – Actual flow rate

Current actual flow rate (measurement flow rate)

The measurement inaccuracy of the displayed actual flow rate is dependent on whether a pulse transducer or encoder is connected:

If a pulse transducer is connected:

For a maximum pulse interval of 15 minutes (at least four pulses per hour) and  $cp.11 \leq 1$ , the measurement inaccuracy of  $Qm$  is maximum 1%. For a pulse interval of more than 15 minutes,  $Qm = "0"$  will be displayed. After the gas flow rate has changed, the precise value can only be displayed if at least two pulses have been transmitted to the gas meter.

If an encoder is connected:

If the meter reading changes every two seconds or less, the measurement inaccuracy of  $Qm$  will be max. 1%.

If the meter reading changes every 200 seconds or less, the measurement inaccuracy will be max. 10%. This can be reduced by decreasing the

measurement cycle (*Serv.* -> *Device settings* -> *Measurement* -> *MCyc*) by up to 2% for *MCyc* = 4 seconds.

If the meter reading of the encoder does not change after 200 seconds, *Qm* = "0" will be displayed.

#### 7.4.4 “Admin” tab (Administrator)

This tab is used to display and check special device settings and conditions. This application is provided for metering point operator.

Display	Meaning
<i>User values</i> <sup>10</sup>	Sub-menu for user-specific parameters
<i>Volume</i>	Sub-menu for volume and the corresponding parameters
<i>Volume conversion</i>	Sub-menu for volume conversion and the corresponding parameters
<i>Measured values</i>	Sub-menu for measured values and the corresponding parameters
<i>Archives</i>	Sub-menu for existing archives in the device
<i>Status</i>	Sub-menu for current status, status register and logs
<i>Date and time</i>	Sub-menu for date, time and the corresponding parameters
<i>Batteries</i>	Sub-menu for the device battery and the corresponding parameters
<i>Inputs</i>	Sub-menu for inputs and the corresponding parameters
<i>Outputs</i>	Sub-menu for all outputs and the corresponding parameters
<i>Interfaces</i>	Sub-menu for device interfaces
<i>Device settings</i>	Sub-menu for all device settings
<i>Identification</i>	Sub-menu for the identification of the gas system

#### 7.4.5 “Serv.” tab (service)

This tab is used to display, check, and configure special device settings and conditions. This application is only intended for service technicians (specialists) or a calibration officer for putting the device into operation or maintenance.

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<sup>10</sup> In the “User Values” sub-menu, the user can set up to 10 freely programmable parameters and up to 12 freely programmable parameters in a further sub-menu within this list.

<b>Display</b>	<b>Meaning</b>
<i>Volume</i>	Sub-menu for volume and the corresponding parameters
<i>Volume conversion</i>	Sub-menu for volume conversion and the corresponding parameters
<i>Measured values</i>	Sub-menu for analogue measurements and the corresponding parameters
<i>Archives</i>	Sub-menu for existing archives in the device
<i>Status</i>	Sub-menu for current status, status register and logs
<i>Date and time</i>	Sub-menu for date, time and the corresponding parameters
<i>Batteries</i>	Sub-menu for device battery and the corresponding parameters
<i>Inputs</i>	Sub-menu for inputs and the corresponding parameters
<i>Outputs</i>	Sub-menu for all outputs and the corresponding parameters
<i>Interfaces</i>	Sub-menu for device interfaces
<i>Device settings</i>	Sub-menu for all device settings
<i>Identification</i>	Sub-menu for the identification of the gas system
<i>Edit and delete</i>	Sub-menu to activate a range of delete functions
<i>Examination</i>	Sub-menu with freeze function and archive with frozen data
<i>Data book</i>	Sub-menu with information from the device data book

#### 7.4.6 “Ctrl.” tab (Control)

This tab is used to monitor special device settings. This application is only intended for service technicians (specialists) or a calibration officer for putting the device into operation or maintenance.

Display	Value	Unit	Access	Address
<i>St.AL</i> <sup>11</sup>	Administrator lock: State / close	-	-	3:170
<i>Cod.A</i> <sup>11</sup>	Administrator key enter / change	-	-	3:171
<i>St.PL</i>	Calibration lock: State / close	-	-	1:170
<i>Menu</i>	Selection of the display menu	-	C	1:1A1
<i>Main</i>	Content of the “ <i>Main</i> ” tab	-	A	2:1A1

#### 7.4.6.1 *St.AL* – Administrator lock: State / close

The administrator lock must be opened in order to modify certain measurement parameters. The administrator lock should be closed when in normal operating mode.

Display	Meaning
<i>locked</i>	The administrator lock is closed.
<i>open</i>	The administrator lock is open.

#### 7.4.6.2 *Cod.A* – Administrator key enter / change

By entering the right key (hexadecimal notation) the administrator lock can be opened. After the administrator lock is open the key can be changed. The individual characters of the key can take on values from 0 to 9 and from A to F.

#### 7.4.6.3 *St.PL* – Calibration lock: State/close

The calibration lock must be opened to modify certain measurement parameters. The calibration lock should be closed when in normal operating mode.

Display	Meaning
<i>locked</i>	The calibration lock is closed.
<i>open</i>	The calibration lock is open. In this case, the “P” will also flash in the upper left-hand side of the display (→ section 7.3.4 “Meaning of status symbols”)

#### 7.4.6.4 *Menu* - Selection of the display menu

In an as-delivered condition, the display of the EK280 has the following five tabs: “*Main*”, “*Cust.*”, “*Admin*”, “*Serv.*” and “*Ctrl.*”. Tabs can be displayed and hidden for certain purposes using the “*Menu*” value.

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<sup>11</sup> When using the device with high communication security („High Level Security“ → application manual), the parameter will not be displayed.

**7.4.6.5 Main – Content of the “Main” tab**

The content of the “Main” display tab can be adjusted here.

The default setting is “*volume+meas.*”. This corresponds to the content displayed in section 7.3.1.

Display	Meaning
<i>volume+meas.</i>	<ul style="list-style-type: none"> <li>- The following are displayed: Volume at base conditions, volume at measurement conditions, pressure, temperature, compressibility ratio factor and conversion factor</li> <li>- Format: 8 pre-decimal and 3 post-decimal places for counters</li> <li>- With short descriptions for each value</li> </ul>
<i>volume short</i>	<ul style="list-style-type: none"> <li>- The following are displayed: Volume at base conditions and volume at measurement conditions</li> <li>- Format: 8 pre-decimal and 3 post-decimal positions respectively</li> <li>- With short descriptions</li> </ul>
<i>volume long</i>	<ul style="list-style-type: none"> <li>- The following are displayed: Volume at base conditions and volume at measurement conditions</li> <li>- Format: 9 pre-decimal and 4 post-decimal places</li> <li>- Without short descriptions</li> </ul>
<i>volume,p,T,Q</i>	<ul style="list-style-type: none"> <li>- The following are displayed: Volume at base conditions, volume at measurement conditions, pressure, temperature, flow at base conditions and actual flow rate</li> <li>- Format: 8 pre-decimal and 3 post-decimal places for counters</li> <li>- With short descriptions for each value</li> </ul>
<i>List</i>	<ul style="list-style-type: none"> <li>- The following are displayed: Volume at base conditions, volume at measurement conditions, total meter reading the original meter reading of the gas meter at Input DE1, pressure, temperature, Conversion factor, compressibility ratio factor, actual flow rate, flow at base conditions, date and time</li> </ul>
<i>Vb,Vo,meas.</i>	<ul style="list-style-type: none"> <li>- The following are displayed: Volume at base conditions, meter reading of the gas meter (Encoder), pressure, temperature, compressibility ratio factor and conversion factor</li> <li>- Format: 8 pre-decimal and 3 post-decimal places for counters</li> <li>- With short descriptions for each value</li> </ul>

## 8 Maintenance

### 8.1 Safety

**DANGER!****Danger to life from electrical current!**

Touching live parts poses an imminent danger to life. Damage to the insulation or individual components may be life-threatening.

Therefore:

- Safely protect electrical connections and live components against possible human contact.
- In the event of insulation damage, switch off the power supply immediately and arrange for repairs to be carried out.
- Works on the electrical components of the device, i.e., the connection of the external power supply unit, should only be carried out by qualified electricians.
- When performing all works to the electrical system, switch off the power and ensure that the voltage has been cut.
- Before performing maintenance works, switch off the power supply and protect against an accidental restart.
- Do not attempt to bypass or deactivate fuses. When exchanging fuses, ensure that you adhere to the correct ampere rating.
- Keep live parts away from moisture. This could lead to a short-circuit.

**WARNING!****Misuse of batteries may present a risk of injury.**

Special care must be taken when handling batteries.

Therefore:

- Do not throw the batteries into the fire or expose these to high temperatures. There is a risk of explosion.
- Do not charge batteries. There is a risk of explosion.
- Liquids that are produced as a result of misuse may lead to skin irritation. Avoid all contact with liquids. In the event of contact, rinse with large quantities of water. If the liquid enters the eyes, immediately rinse with water for 10 minutes and seek medical attention.

**CAUTION!****Environmentally hazardous substances!**

If environmentally hazardous substances are handled incorrectly this may cause significant damage to the environment, particularly if they are improperly disposed of.

Therefore:

- The instructions below should be observed at all times.
- Appropriate measures should be taken immediately if environmentally hazardous substances are accidentally released into the environment. In cases of doubt, please inform the responsible local authority about the damages.

**8.1.1 Personnel**

Maintenance works must be carried out correctly.

- The maintenance works described in this document should solely be carried out by specialized electricians (→ section 7 "Operation").

**WARNING!****Risk of injury if maintenance works are carried out incorrectly.**

Incorrect maintenance may lead to serious personal injury or material damage.

Therefore:

- Ensure that there is sufficient assembly space before commencing works.
- Ensure that the installation location is clean and tidy. Components that are loosely stacked or lying around can cause accidents.
- If parts have been removed, ensure that they have been installed correctly, re-mount all fastenings, and adhere to tightening torque values for screws.

**8.1.2 Personal protective equipment**

- During maintenance works on the device, the necessary personal protective equipment for the work must be worn inside the respective plant.
- The notices relating to personal protective equipment mounted in the working area must be followed at all times.

### 8.1.3 Environmental protection

Please observe the following notice regarding environmental protection when performing maintenance works:



The batteries used contain toxic heavy metals. These must be treated as special hazardous waste and must be disposed of in municipal waste collection points or by a waste specialist.

## 8.2 Testing and changing device batteries

### 8.2.1 Changing and connecting device batteries



#### **DANGER!**

**Using the incorrect batteries may present a risk of explosion!**

Connect only the prescribed Elster battery types to the device (→ section 11.1.4).



#### **DANGER!**

**Risk of explosion when opening the housing!**

Make sure that there is no explosive atmosphere inside the station before opening the housing.



#### **WARNING!**

**Misuse of batteries may present a risk of injury.**

Special care must be taken when handling batteries.

Therefore:

- Do not throw the batteries into 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.
- Liquids that are produced as a result of misuse may lead to skin irritation. Avoid all contact with liquids. In the event of contact with the skin, rinse with plenty of water. If the liquid enters the eyes, immediately rinse with water for 10 minutes and seek medical attention.



### CAUTION! Reduced battery power!

The simultaneous use of old and new batteries considerably reduces battery power.

Therefore:

- You should always replace all batteries together.

The batteries can be exchanged without a calibration officer as the housing does not need to be sealed.



In an as-delivered condition, two batteries are connected to the base board of the EK280. To double the service life of the batteries, two additional batteries can be connected.



You should always connect at least two batteries (to X10 and X13 or X11 and X14) to the EK280. This way, the EK280 will continue to work whilst the batteries are being changed.

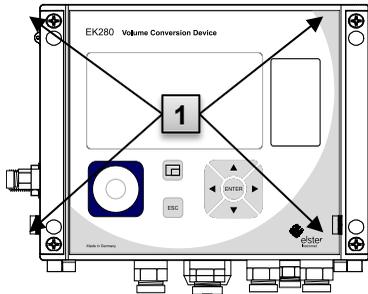


Fig. 29

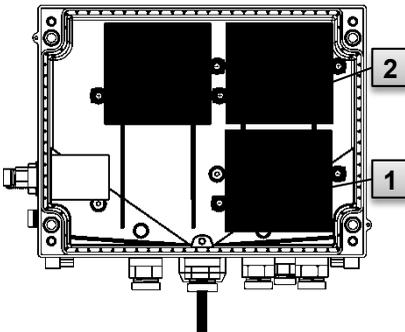


Fig. 30

1. If the external power supply is connected, this should be removed.
2. Loosen the four screws Fig. 29: **1** which are keeping the housing closed
3. Open the cover of the EK280.
4. Loosen the screws on the battery cover Fig. 30: **1** or **2** and remove the battery cover.
5. Mark the old batteries, e.g., using a felt-tipped pen or stickers.
6. Select the two free connections on the board to connect the new batteries (X10 and X13 or X11 and X14, Fig. 31).
7. Place the new batteries inside (Fig. 30: **1** or **2** ).
8. Position the new batteries and secure them using the battery cover.
9. Remove the old batteries from the housing and dispose of these correctly.
10. Close the housing using the screws provided (Fig. 29: **1**).

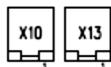


Fig. 31

11. Re-enter the start capacity of the batteries, as described in section 8.2.2
12. Check the calculated service life as described in → section 8.2.3. At standard measurement conditions (→ section 4.2.1), the service life should display at least 60 months. If not, compare the settings with those for standard measurement conditions and repeat step 11 if necessary.



Please ensure that the new batteries are connected correctly and are in a fixed position inside the EK280.



### CAUTION!

**Material damage may arise through improper closing of the device!**

Improper closing of the device may lead to material damage as a result of cable connections being squashed.

Therefore:

- When closing, ensure that the cable ducts are positioned correctly.

## 8.2.2 Entering the battery capacity



The battery capacity must be re-entered after changing a battery.

When using the device with high communication security („High Level Security“ → application manual), the battery capacity can only be entered with the enSuite software!

- For opening the administrator lock move the cursor to the "Admin" tab and to the "Cod.A" value (enter administrator key) via the following path:

Admin. → Device settings → Access → Cod.A



After delivery of the device, the administrator key for input via keypad is "00000000".

- Press the ENTER button. ⇒ The value will start to flash.
- Move the cursor using the arrow keys ► or ◀ to the digits and change these using the arrow keys ▲ or ▼.
- After you have changed all digits, press the ENTER button to confirm the inputs. The input value can be deleted by pressing the ESC button.
- For entering the battery capacity move the cursor to the “*Serv.*” tab and to the “*Bat.C*” value (battery capacity) via the following path:
  - Serv. → Batteries → Bat.C
- Press the ENTER button. ⇒ The value will start to flash.
- Move the cursor using the arrow keys ► or ◀ to the digits and change these using the arrow keys ▲ or ▼.



When using two size D batteries, the value 13.0 Ah should be entered for “*Bat.C*”. When using four batteries, the value 26.0 Ah must be entered.

- After you have changed all digits, press the ENTER button to confirm the inputs. The input value can be deleted by pressing the ESC button.
- For closing the administrator lock move the cursor to the “*Admin*” tab and to the “*St.AL*” value (status administrator lock) via the following path:
  - Admin. → Device settings → Access → St.AL
- Press the ENTER button. ⇒ “*open*” will start to flash.
- Move the cursor using the arrow keys ▲ or ▼ to change the value to “*locked*”.
- After you have changed the value, press the ENTER button to confirm the inputs. The input value can be deleted by pressing the ESC button.

### 8.2.3 Display remaining battery power



The remaining battery power is calculated separately from the consumed power (which is measured) and from the anticipated future consumption (giving the theoretical remaining battery power). Therefore, for applications which are very power consuming, the remaining battery power may drop quicker than is shown on the battery power display.

The remaining battery power will automatically be recalculated after entering a new battery capacity “*Bat.C*” (see above). The value cannot be edited.

- Move the cursor to the “Serv.” tab and to the “Bat.R” value (remaining battery power) via the following path:

Serv. → Batteries → Bat.R



After entering the new battery capacity, a value of at least 60 months will be displayed in standard measurement conditions (→ section 4.2.1) for “Bat.R”.

### 8.3 Connection, Replacement, Retrofit of Components



#### **DANGER!**

#### **Explosion hazard due to the connection of non-certified components!**

The EK280 is available in a model for use in zone 0 and 1 and in a model for use in zone 2.

The model designed for zone 2 should not be used in zone 0 or 1 as this presents a risk of explosion!

Therefore:

- The respective EX label is located on the upper housing wall of the EK280
- For clear identification of the existing model, see chapter 4.12.2 or 4.12.3!
- As soon as an EK280 for zone 0 or 1 is installed in zone 2 or outside the Ex zone, it may no longer be used in zone 0 or 1!
- Before retrofitting or replacing components, check whether the EK280 is suitable for this!

Please refer to the following tables!

Symbol	Meaning
✓	Action is allowed
x	Action is not allowed
–	not relevant

### 8.3.1 All Device Models

Function Block	allowed field action		Carrying out allowed by ...	Additional Activity	Influence on Warranty?
	Replacement	Connection			
Digital Inputs	–	✓	Operator	–	no
Digital Outputs	–	✓	Operator	–	no
Internal Interface	–	✓	Operator	–	no
Device Battery	✓	✓	Operator	–	no
Pressure Sensor	✓	✓	Honeywell Service	(Official) calibration	no
Temperature Sensor	✓	✓	Honeywell Service	(Official) calibration	no

Depending on the organization, the operator is the network operator, the meter operator or the owner.

### 8.3.2 Model ATEX / IECEx Zone 0 or 1

Function Block	allowed field action		Carrying out allowed by ...	Additional Activity	Influence on Warranty?
	Replacement	Retrofit			
2G / 3G Modem CloudLink 5G	✓ <sup>12, 13</sup>	✗	Operator	–	no
	✓ <sup>12, 13</sup>	✓	Honeywell Service	–	no
Battery Module Ex-Zone 1 <sup>14</sup>	✓	✗	Operator	–	no
	✓	✓	Honeywell Service	–	no
Antenna	✓ <sup>12, 13</sup>	✓	Operator	–	no

<sup>12</sup> Also Includes the exchange of internal antenna for external antenna.

<sup>13</sup> The antenna cable length for the CloudLink5G in Zone 0/1 is restricted to a max. of 1m

<sup>14</sup> Ex approved modem battery module (73021211) for the modems iCM280 2G, iCM280 3G and iCM280 4G

Before changing the battery make sure that there is no explosive atmosphere around the system.

**8.3.3 Model ATEX / IECEx Zone 2**

Function Block	allowed field action			Carrying out allowed by ...	Additional Activity	Influence on Warranty?
	Replacement	Retrofit	Connection			
integrated power supply unit	✓	✗	–	Operator	Individual certificate needed	Warranty expires
	–	–	✓		–	no
	✓	✓	✓	Honeywell Service	Individual certificate needed	no
Communication Module	✓	✓	✓	Operator	–	no
Modem Battery Module Ex-Zone 1 <sup>14</sup>	✓	✓	✓	Operator	–	no
Modem Battery 13 Ah	✓	✓	✓	Operator	–	no
Antenna	✓ <sup>12, 13</sup>	✓	✓	Operator	–	no
Second Pressure Sensor	✓	✓	✓	Honeywell Service	–	no
	✓	✓	✓	Operator	–	Warranty expires
Second Temperature Sensor	✓	✓	✓	Honeywell Service	–	no
	✓	✓	✓	Operator	–	Warranty expires

## 9 Faults

Possible causes and solutions for device faults will be described in the following section.



For faults, which cannot be resolved by the instructions below, please contact our customer service team or technical support (→ section 1.3 “Customer service and technical support (TAC)”):

- Phone: +49 (0) 6134 / 605-123
- Website: [process.honeywell.com/us/en/site/elster-instromet/support](https://process.honeywell.com/us/en/site/elster-instromet/support)
- E-mail: [ElsterSupport@honeywell.com](mailto:ElsterSupport@honeywell.com)

### 9.1 Safety



#### **DANGER!** **Danger to life from electrical current!**

Touching live parts poses an imminent danger to life. Damage to the insulation or individual components may be life-threatening.

Therefore:

- In the event of insulation damage, switch off the power supply immediately and arrange for repairs to be carried out.
- Works on the electrical components of the device, i.e., the connection of the external power supply unit, should only be carried out by qualified electricians.
- When performing all works to the electrical system, switch off the power and ensure that the voltage has been cut.
- Before performing maintenance works, switch off the power supply and protect against an accidental restart.
- Keep live parts away from moisture. This could lead to a short-circuit.

### 9.1.1 Personnel

- The works described below for the elimination of a fault can, unless specified otherwise, be performed by the operator.
- Some works may only be carried out by specially trained professionals or exclusively by manufacturers themselves; special reference will be made to this in the descriptions of individual faults.
- Works on the electrical appliance may only be carried out by qualified electricians.

### 9.1.2 Personal protective equipment

- When eliminating faults on the device, the necessary personal protective equipment for the work must be worn inside the respective plant.
- The notices relating to personal protective equipment mounted in the working area must be followed at all times.

### 9.1.3 Improper elimination of faults



#### **WARNING!**

#### **Risk of injury through improper elimination of faults!**

An improper elimination of faults on the device may lead to serious personal injury or material damage.

Therefore:

- Ensure that there is sufficient assembly space before commencing works.
- Ensure that the installation location is clean and tidy. Components that are loosely stacked or lying around can cause accidents.
- If parts have been removed, ensure that they have been installed correctly, re-mount all fastenings, and adhere to tightening torque values for screws.



The following information on possible faults provide indications as to who is authorized to eliminate the fault.

### 9.1.4 Behaviour in the event of faults

The following generally applies:

1. If works in the danger zone are necessary, the entire plant must be switched off and protected against an accidental restart.
2. The cause of the fault must be determined.

3. The person responsible for the area in which the fault occurred should be informed immediately.
4. Depending on the type of fault, the manufacturer may have to be contacted and will then have the fault removed by an authorized specialist or will remove the fault themselves.

## 9.2 Fault and other status messages

Faults (synonymously used here for "alarms") during the operation of the EK280, can be identified by means of status symbols in the first line of the display (→ section 7.3.4).

You can obtain further information and messages under the current status "Stat" and in the status register "SReg". These can be found:

- In the "Cust." tab (only "SReg")
- Under the paths: "Admin" → "Status" and "Serv." → "Status"

Effects and recommended action in the event of fault and status messages:

Message	Meaning, action
<b>a) Faults, alarms:</b>	
<i>Restart</i>	If this message appears whilst in operation, the device is faulty. Please contact the Elster support (→ 1.3 "Customer service and technical support (TAC)").
<i>C-fact. err.</i>	The conversion factor could not be calculated as the measured gas temperature was outside -100°C to +100°C or no usable compressibility ratio factor was available.
<i>Data error</i>	An error was detected during the cyclic check of the data subject to calibration regulations. Please contact the Elster support (→ 1.3 "Customer service and technical support (TAC)").
<i>T Alarm Lim.</i>	The measured gas temperature is outside the permissible limits. The limit values can be changed when putting the device into operation in the presence of a calibration officer (→ section 6.3.1.11, p. 72)
<i>p Alarm Lim.</i>	The measured gas pressure is outside the permissible limits. The limit values can be changed when putting the device into operation in the presence of a calibration officer (→ section 6.3.1.11, p. 72)
<i>K-val. error</i>	The compressibility ratio factor could not be calculated as no valid real gas factor could be determined.

<b>Message</b>	<b>Meaning, action</b>
<i>z-fact. err.</i>	The real gas factor could not be calculated. At least one of the gas analysis values Ho.n, CO <sub>2</sub> , H <sub>2</sub> , rhon, is outside the permissible range.
<i>Vm-Alarm</i>	No volume was recorded at the used input for conversion. (The automatic switchover of the pulse transducer to a second pulse transducer is not configured acc. → section 6.2.1.4.)
<i>Vm-Inp.Alarm</i>	No volume at measurement conditions was recorded at the connected encoder on input 1 for 20 seconds (with ext. power supply) or for two measurement cycle + 1 second (battery powered).
<i>T Inp. error</i>	The gas temperature cannot be measured due to a fault. Please contact the Elster support (→ 1.3 “Customer service and technical support (TAC)”).
<i>p Inp. error</i>	The gas pressure cannot be measured due to a fault. Please contact the Elster support (→ 1.3 “Customer service and technical support (TAC)”).
<b>b) Warnings:</b>	
<i>Data restore</i>	The batteries of the EK280 are intermittently dropping out. As a result of this, the time has not changed, and no measurement and volume conversion have happened. However, all data are available. This message appears when old batteries are removed before connecting the new ones (→ section 8.2). Proceed with enSuite: <ul style="list-style-type: none"> <li>– Set the time of the EK280.</li> <li>– Delete the status register.</li> </ul>
<i>Outp.1 Error</i> <i>Outp.2 Error</i> <i>Outp.3 Error</i> <i>Outp.4 Error</i>	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 enSuite to either: <ul style="list-style-type: none"> <li>– reduce the cp value of the output</li> <li>– or increase the output frequency.</li> </ul> In both cases, the change must be aligned with the connected device.
<i>I1-Warning</i>	The encoder could not be read at the end of the measurement period. The flow recording at this point is invalid.

<b>Message</b>	<b>Meaning, action</b>
<i>I2 Pulse cmp</i>	In the pulse comparison, e.g., between input 1 and input 2, the deviation was too high.
<i>W Warn Lim.</i>	The displayed value is outside the set warning limit values. The warning limits can be adjusted using enSuite.
<i>Vb Warn Lim.</i>	The monitored volume at base conditions consumption value (standard: hourly consumption) is outside the set warning limit values. The monitored values and the warning limits can be adjusted using enSuite.
<i>Vc Warning</i>	The parameters for the corrected volume at measurement conditions are not sorted in ascending order or one of the values is outside the permissible limits.
<i>Qm Warn Lim.</i>	The actual flow rate (gas flow rate) is outside the set warning limit values. The warning limits can be adjusted using enSuite.
<i>T Warn Lim.</i>	The measured gas temp. is outside the warning limit values. The warning limits can be adjusted using enSuite.
<i>p Warn Lim.</i>	The measured gas pressure is outside the warning limit values. The warning limits can be adjusted using enSuite.
<i>z Warning</i>	The sum of gas analysis values for mode DC is more or less than 100%. An accurate calculation of the real gas factor and the compressibility ratio factor can therefore not be carried out.
<i>Vm warning</i>	If a HF-NF switch is configured, then this message is enabled in the event of a fault at the HF input, e.g., loss of external power supply.
<i>Update error</i>	Before the software update, an error was detected in the cached software image.
<i>Softw. error</i>	This message is used for factory diagnosis. Please contact the Elster support (→ 1.3 “Customer service and technical support (TAC)”).
<i>Sett. error</i>	The programming of the device has generated an unusable combination of settings. Please contact the Elster support (→ 1.3 “Customer service and technical support (TAC)”).

<b>Message</b>	<b>Meaning, action</b>
<i>I2 Warn.sig.</i> <i>I3 Warn.sig.</i> <i>I4 Warn.sig.</i> <i>I5 Warn.sig.</i> <i>I6 Warn.sig.</i>	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 enSuite.
<i>T2 Warn Lim.</i>	The measured gas temperature of the second sensor is outside the set warning limit values. The warning limits can be adjusted using enSuite.
<i>p2 Warn Lim.</i>	The measured gas pressure of the second sensor is outside the set warning limit values. The warning limits can be adjusted using enSuite.
<i>Batt. low</i>	The remaining battery power is less than six months. The batteries need to be changed soon.
<b>c) Signals:</b>	
<i>TA Warn Lim.</i>	The measured ambient temperature is outside the set warning limit values. The warning limits can be adjusted using enSuite.
<i>Repair mode</i>	The device is in revision mode.
<i>Clock n. set</i>	The internal clock of the volume conversion device has not been adjusted at the factory.
<i>Encoder err.</i>	No volume at measurement conditions was recorded at the connected encoder on input 1 for 20 seconds (with ext. power supply) or for one measurement cycle + 1 second (battery powered).
<i>CDL full</i>	The certification data log is full. Changing the parameters marked with "CDL" without a calibration lock is only possible if the content of the certification data log has been deleted.
<i>U.Logb. full</i>	The software update log is full. An update is only possible if the content of the software update log has been deleted.
<i>online</i>	Data are currently being transmitted via an interface (modem, optical interface, terminal interface, or Ethernet adapter). If this message is displayed, the "o" will flash in the "Status" field of the display (→ section 7.3.4, p. 84).

Message	Meaning, action
<i>I2-Rep.sig</i> <i>I3-Rep.sig</i> <i>I4-Rep.sig</i> <i>I5-Rep.sig</i> <i>I6-Rep.sig</i>	<p>If an input has been configured as a signal input, this message will be displayed if an active signal has appeared at the corresponding terminal (e.g., terminal DE2).</p> <p>The input configuration can be adjusted using enSuite.</p>
<i>Cal.lock</i>	<p>The calibration lock is open.</p> <p>In normal operating conditions, the calibration lock should be closed to prevent unauthorized changes.</p> <p>To close the calibration lock, please go to  <i>Ctrl. → St.PL</i> and enter the value "0".</p>
<i>Admin.lock</i> <i>Cust.lock o.</i>	<p>The administrator / customer lock is open.</p>
<i>Bat. operat.</i>	<p>The EK280 is in battery mode.</p> <p>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.</p>
<i>Dayl.Sav.Tim</i>	<p>The time displayed in volume conversion device is daylight saving time.</p> <p>The switchover mode can be changed using enSuite.</p>
<i>Call Win.1</i> <i>Call Win.2</i> <i>Call Win.3</i> <i>Call Win.4</i> <i>Call Win.5</i> <i>Call Win.6</i>	<p>The specified call pickup time is active, i.e., the volume conversion device will accept data transmission calls.</p>

## 10 Decommissioning

### 10.1 Final decommissioning

- Read the data from the device (optional).

Run the function (“Clr.X”) to delete the 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 (→ section 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 channel 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.

→ 8.2.1 “Changing and connecting device batteries” (p. 100)

## 11 Appendix

### 11.1 List of spare parts and accessories



Images of the spare parts and accessories described below can be found in the manufacturer's catalogue.

Please contact the Elster support (→ 1.3 "Customer service and technical support (TAC)").

#### 11.1.1 Fastening elements

Spare parts and accessories	Order no.
Set mounting bracket EK220/280 for MI-2	73 021 952
Set mounting bracket EK220/280 for Rabo	73 021 953
Set mounting bracket EK280 for S1/Encoder	73 021 954
Set bracket EK280 for pipe mounting	73 021 955
Mounting bracket for meter head S1D	73 021 050



When ordering the universal bracket with pipe clamps for pipe mounting, please specify the pipe diameter.

#### 11.1.2 Pressure connections

Spare parts and accessories	Order no.
Shut-off valve with t-piece	03 152 266
Three-way manual valve, complete	73 008 403
Pressure pipe C2 Ø6 × 700 mm	73 017 659
Pressure pipe C5 Ø6 × 400 mm	73 017 656
Minimess test connections (adapters)	73 016 167

### 11.1.3 Thermowells

Spare parts and accessories	Order no.
Thermowell EBL 50, with welded sockets M10 × 1	73 012 634
Thermowell EBL 67, with welded sockets M10 × 1	73 014 456
Thermowell EBL 160, with welded sockets G 3/4" and sealing ring	73 012 100
Temp. sensor pocket EBL 250, with welded sockets G 3/4" and sealing ring	73 015 695
Sealing sleeve for the connection of an old temp. sensor pocket EBL 45, 50 and 67	73 019 951
Sealing sleeve for the connection of an old temp. sensor pocket EBL 160 and 250	73 019 950

### 11.1.4 Small parts and miscellaneous

Spare parts and accessories	Order no.
Sealing sleeve for pressure connection and temp. sensor	73 017 997
Connecting cable for two low frequency pulser transducers, approx. 700 mm long	73 017 093
Device battery module 13 Ah	73 015 774
Device battery module 13 Ah <sup>15</sup>	730 23 225
16 Ah battery module for the modem of the EK280 <b>without</b> integrated power supply unit	73 021 211
13 Ah battery module for connection to the integrated power supply unit (modem battery mode in the event of power failure)	73 017 964
Ext. antenna, 1 m connecting cable, SMA connector	04 950 030
Ext. antenna, 3 m connecting cable, SMA connector	04 407 115
Ext. antenna, 5 m connecting cable, SMA connector	04 407 116
Ext. antenna, 10 m connecting cable, SMA connector	04 407 117
10 m antenna extension cable with SMA connector	73 020 149
2G/3G stub antenna, SMA, straight	04 407 113
Breather Drain Plug for outdoor application	73 020 775

<sup>15</sup> After consultation, for special applications.

**11.1.5 Documentation**

<b>Spare parts and accessories</b>	<b>Order no.</b>
German manual	73 021 805
English manual	73 021 209



## 11.2 EC Declaration of Conformity



EU Declaration of Conformity No. **DEMZE2306**  
EU-Konformitätserklärung Nr.

**Honeywell**

Type, Model  
Typ, Ausführung

**EK280**

Manufacturer  
Hersteller

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

Product  
Produkt

Volume conversion device  
Zustands-Mengennummerer

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)	2014/53/EU (RED)	2011/65/EU + 2015/863/EU (RoHS)
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### Relevant harmonised standards used:

Einschlägige harmonisierte Normen, die zugrunde gelegt wurden:

EN 12405-1:2021, OIML D11 Edition 2004 (E)	EN 61326-1:2021	EN IEC 60079-0:2018 EN 60079-11:2012	EN IEC 60079-0:2018, EN 60079-7:2015 + A1:2018, EN 60079-11:2012	EN 301511 V9.0.2, EN 301908-1 V11.1.1, EN 301908-2 V11.1.1	EN 63000:2018
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### Certificates and interventions by notified bodies:

Bescheinigungen und Maßnahmen durch notifizierte Stellen:

T10339 EC-type Examination EG-Baumusterprüfung	-	LCIE 11 ATEX 3027 X EC-type Examination EG-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:

M... 102 T10339		0044 II 1 G Ex ia IIB T4 or T3 Ga	 II 3 G Ex ec IIC T6 Gc II 3(3) G Ex ec [ic] IIC T6 Gc		
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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 Annex II Richtlinie Anhang II	Directive Article 7 Richtlinie Artikel 7
Notified Body 0102 Physikalisch Techni- sche 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, 28.11.2023

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

Place and date of issue  
Ort und Datum der  
Ausstellung

Peter Skirrat,  
Managing Director  
Geschäftsführer

Christian Neugebauer,  
R&D Manager Gas  
Electronics



## 11.3 ATEX Type Examination Certificate for Zone 0 and 1



### ATTESTATION D'EXAMEN UE DE TYPE EU TYPE EXAMINATION CERTIFICATE



1 Version : 07

LCIE 11 ATEX 3027 X

Issue : 07

- |   |   |
|---|---|
| <p>Directive 2014/34/UE</p> <p>2 Appareil ou Système de Protection destiné à être utilisé en Atmosphères Explosibles</p> <p>3 Produit :<br/>Convertisseur de volume</p> <p>4 Fabricant :</p> <p>5 Adresse :</p> <p>6 Ce produit et ses variantes éventuelles acceptées sont décrits dans l'annexe de la présente attestation et dans les documents descriptifs cités en référence.</p> <p>7 Le LCIE, Organisme Notifié sous la référence 0081 conformément à l'article 17 de la directive 2014/34/UE du Parlement européen et du Conseil du 26 février 2014, certifie que ce produit est conforme aux Exigences Essentielles de Sécurité et de Santé pour la conception et la construction de produits destinés à être utilisés en atmosphères explosibles, données dans l'annexe II de la Directive.<br/>Accréditation Cofrac Certification de Produits et Services, n°5-0014. Portée disponible sur <a href="http://www.cofrac.fr">www.cofrac.fr</a>.</p> <p>Les résultats des vérifications et essais figurent dans le(s) rapport(s) confidentiel(s) N° :<br/>101963-602949; 114997-628941; 115333-629915; 121241-642207-01; 137850-677466-01; 144186-692011; 157464-727343; 17472896-785204-M3</p> <p>8 Le respect des Exigences Essentielles de Sécurité et de Santé est assuré par la conformité à :</p> <p>9 Le signe « X » lorsqu'il est placé à la suite du numéro de l'attestation, indique que cet appareil est soumis aux conditions particulières d'utilisation, mentionnées dans l'annexe de cette attestation.</p> <p>10 Cette Attestation d'Examen UE de Type concerne uniquement la conception et la construction du produit spécifié. Des exigences supplémentaires de la directive sont applicables pour la fabrication et la fourniture du produit. Ces dernières ne sont pas couvertes par la présente attestation.</p> <p>11 Le marquage du produit est mentionné dans l'annexe de cette attestation.</p> | <p>Equipment or Protective System Intended for use in Potentially Explosive Atmospheres</p> <p>Product :<br/>Volume conversion device</p> <p>Type: EK280</p> <p>Manufacturer :<br/><b>ELSTER GMBH</b><br/>Address :<br/>Steinern Straße 19-21<br/>55252 Mainz-Kastel<br/>Germany</p> <p>This product and any acceptable variations thereto are specified in the schedule to this certificate and the documents therein referred to.</p> <p>LCIE, Notified Body number 0081 in accordance with article 17 of the Directive 2014/34/EU of the European Parliament and the Council of 26 February 2014 certifies that product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres, given in Annex II to the Directive.<br/>Cofrac Accreditation Product and Services Certification n°5-0014. Scope available on <a href="http://www.cofrac.fr">www.cofrac.fr</a>.</p> <p>The examination and test results are recorded in confidential report(s) N°:<br/>101963-602949; 114997-628941; 115333-629915; 121241-642207-01; 137850-677466-01; 144186-692011; 157464-727343; 17472896-785204-M3</p> <p>Compliance with the Essential Health and Safety Requirements has been assured by compliance with :</p> <p>If the sign "X" is placed after the certificate number, it indicates that the product is subject to the Specific Conditions of Use specified in the schedule to this certificate.</p> <p>This EU Type Examination Certificate relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.</p> <p>The marking of the product is specified in the schedule to this certificate.</p> |
|---|---|

Fontenay-aux-Roses, le 11 août 2023

Responsable de Certification



Certification Officer

Julien Gauthier

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## ATTESTATION D'EXAMEN UE DE TYPE - ANNEXE EU TYPE EXAMINATION CERTIFICATE - SCHEDULE

1 Version : 07

LCIE 11 ATEX 3027 X

Issue : 07

### 12 DESCRIPTION DU PRODUIT

L'appareil est un convertisseur de volume destiné à mesurer, enregistrer and surveiller des paramètres variables fournis par des compteurs de gaz ou des capteurs de température ou de pression.

L'appareil se compose principalement :

- d'une enveloppe en aluminium,
- d'un module LCD,
- d'une carte CPU alimentée par une source externe ou par un ou deux packs de batterie (optionnel: quatre packs de batteries montés 2x2 en série),
- d'une carte modem-adaptateur, alimentée par un pack de batterie, équipée d'un module radio interne (optionnel) et d'une antenne pour la communication sans fil des données,
- des capteurs de température ou de pression, internes ou externes,
- et des bornes pour l'alimentation ou la communication des données.

### DETAIL DE LA GAMME

Un seul modèle avec ou sans Module Radio.

### CARACTERISTIQUES

Paramètres spécifiques du ou des modes de protection concernés :

Les piles utilisées dans l'appareil sont les suivantes :

- carte CPU: Elster N°73015774 ou N°73020663.
- carte modem-adaptateur : Elster N°73021211

### DESCRIPTION OF PRODUCT

The equipment is a volume conversion device intended to measure, record and monitor variable parameters provided from gas meters, pressure or temperature sensors.

The equipment consists mainly of:

- an aluminum housing,
- a LCD module,
- CPU board powered by external supply or by one or two battery packs (optional: four battery packs connected 2x2 in series),
- Modem-adaptor board, powered by battery pack, equipped with internal radio-module (optional) and an antenna for wireless data communication,
- internal or external temperature or pressure sensors,
- and terminals for power supply or data communication.

### RANGE DETAILS

Only one model with or without Radio Module.

### RATINGS

Specific parameters of the concerned protection mode:

Batteries used within the apparatus are as follows:

- CPU board: Elster N°73015774 or N°73020663.
- Modem-adaptor board: Elster N°73021211

Connector	Electrical parameters				
DA1, DA2, DA3, DA4, DTR/T+, TxD/T-, RxD/R-, DCD/R+, RI, Uext ((Carte CPU/CPU-Karte)	$U_i$ : 30 V	$I_i$ : 140 mA	$P_i$ : 0.5 W	$C_i$ : 0	$L_i$ : 0
DE1, DE2	$U_o$ : 9.7 V	$I_o$ : 19.7 mA	$P_o$ : 48 mW	$C_o$ : 24 µF	$L_o$ : 367 mH
DE3, DE4	$U_o$ : 9.7 V	$I_o$ : 21 mA	$P_o$ : 51 mW	$C_o$ : 24 µF	$L_o$ : 322 mH
DE5, DE6	$U_o$ : 9.7 V	$I_o$ : 1.0 mA	$P_o$ : 2.4 mW	$C_o$ : 24 µF	$L_o$ : 142 H

### MARQUAGE

Le marquage du produit doit comprendre :

Elster GmbH  
Adresse : ...  
Type : EK280  
N° de fabrication : ...  
Année de fabrication : ...

Ⓔ II 1 G

Ex ia IIB T4 Ga (sans module-radio)  
Ex ia IIB T3 Ga (avec module-radio)  
LCIE 11 ATEX 3027 X  
Tamb : -40°C à +60°C

$U_i$ : ...,  $I_i$ : ...,  $P_i$ : ...,  $C_i$ : ...,  $L_i$ : ..., (\*)  
 $U_o$ : ...,  $I_o$ : ...,  $P_o$ : ...,  $C_o$ : ...,  $L_o$ : ..., (\*)

### MARKING

The marking of the product shall include the following:

Elster GmbH  
Address: ...  
Type: EK280  
Serial number: ...  
Year of construction: ...

Ⓔ II 1 G

Ex ia IIB T4 Ga (without radio-module)  
Ex ia IIB T3 Ga (with radio-module)  
LCIE 11 ATEX 3027 X  
Tamb : -40°C to +60°C

$U_i$ : ...,  $I_i$ : ...,  $P_i$ : ...,  $C_i$ : ...,  $L_i$ : ..., (\*)  
 $U_o$ : ...,  $I_o$ : ...,  $P_o$ : ...,  $C_o$ : ...,  $L_o$ : ..., (\*)



## ATTESTATION D'EXAMEN UE DE TYPE - ANNEXE EU TYPE EXAMINATION CERTIFICATE - SCHEDULE

1 Version : 07

**LCIE 11 ATEX 3027 X**

Issue : 07

**AVERTISSEMENT :**

- UTILISER UNIQUEMENT DES BATTERIES ELSTER  
N°73015774, N°73020663 et N°73021211  
- DANGER POTENTIEL DE CHARGES  
ELECTROSTATIQUES – VOIR INSTRUCTIONS.  
(\*): complété par des paramètres électriques des  
connecteurs

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

**WARNING:**

– USE ONLY ELSTER N°73015774, N°73020663 and  
N°73021211 BATTERIES  
- POTENTIAL ELECTROSTATIC CHARGING HAZARD – SEE  
INSTRUCTIONS.  
(\*): completed with electrical parameters of connectors.

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

**13 CONDITIONS PARTICULIERES D'UTILISATION**

- a Les connecteurs de sécurité intrinsèque de l'appareil ne  
doivent être raccordés qu'à des appareils certifiés de sécurité  
intrinsèque ou à des appareils simples. Ces associations  
doivent répondre aux exigences de la norme EN 60079-25.
- b Les connecteurs X23 et X24 ne doivent pas être utilisés en  
zone explosive.
- c Les connecteurs Uext sur la carte Modem-adapter et X9 sur la  
carte CPU ne doivent pas être utilisés en zone explosive.
- d Les connecteurs X17 et X18 ne peuvent être connectés qu'aux  
capteurs de température définis par le fabricant dans le  
dossier technique.
- e Les connecteurs X7, X15, X16, X28, X29 et X30 ne peuvent  
être connectés qu'aux capteurs de pression définis par le  
fabricant dans le dossier technique.
- f L'enveloppe de l'appareil contient plus de 10% aluminium. Elle  
doit être montée de manière à éviter le risque d'étincelle par  
frottement ou impact.

**SPECIFIC CONDITIONS OF USE**

The intrinsically safe connectors of equipment shall only be  
connected to certified associated intrinsically safe equipment or  
simple apparatus. These combinations shall comply with the  
requirements of the standard EN 60079-25.

Connectors X23 and X24 cannot be used in hazardous area.

Connectors Uext on Modem-adapter board and X9 in CPU board  
cannot be used in hazardous area.

Connectors X17 and X18 can only be connected to temperature  
sensors defined by the manufacturer in technical file.

Connectors X7, X15, X16, X28, X29 and X30 can only be  
connected to pressure sensors defined by the manufacturer in  
technical file.

The equipment housing contains more than 10% in total of  
aluminum. It must be mounted in such a manner as to eliminate  
the risk of sparks caused by friction or impact.

**14 EXIGENCES ESSENTIELLES DE SANTE ET DE SECURITE**

Couvertes par les normes listées au point 8.

**ESSENTIAL HEALTH AND SAFETY REQUIREMENTS**

Covered by standards listed at 8.

**15 DOCUMENTS DESCRIPTIFS****DESCRIPTIVE DOCUMENTS**

N°	Description	Reference	Rev.	Date	Page(s)
1.	Technical file	EE0308	03	2018-10-30	290
2.	Technical file	EE0313	g	2023-08-03	3
3.	Operating manual	73021209	j	2023-07	-

**16 INFORMATIONS COMPLEMENTAIRES****ADDITIONAL INFORMATION**

Essais individuels

Routine tests

Neant.

None.



## ATTESTATION D'EXAMEN UE DE TYPE - ANNEXE EU TYPE EXAMINATION CERTIFICATE - SCHEDULE

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**Composants intégrés****Integrated components**

Désignation <i>Designation</i>	Fabricant <i>Manufacturer</i>	Type	Document de référence <i>Reference document</i>	Normes de référence <i>Reference standards</i>
Module radio / Radio module	Elster	ECM-2G-UG350	LCIE 16 ATEX 3047U	EN IEC 60079-0:2018 EN 60079-11 :2012
Module radio / Radio module	Honeywell International Inc.	Cloud Link 5G Modem Ref. 51308889-476	CSANe 21 ATEX 2257U	EN IEC 60079-0:2018 EN 60079-11 :2012
Fusible / Fuse	Littelfuse	Safe-T-Plus 0259 series	BASEEFA 02 ATEX 0071U	EN IEC 60079-0:2018 EN 60079-11 :2012

**Conditions de certification**

Les détenteurs d'attestations d'examen UE de type doivent également satisfaire les exigences de contrôle de production telles que définies à l'article 13 de la Directive 2014/34/UE.

**Conditions of certification**

Holders of EU type examination certificates are also required to comply with the production control requirements defined in article 13 of Directive 2014/34/EU.

**17 DETAILS DES MODIFICATIONS DE L'ATTESTATION****DETAILS OF CERTIFICATE CHANGES**

Version 00: Evaluation de la conformité selon les normes (20/04/2011) EN 60079-0:2009 et EN 60079-11:2007.

Issue 00: Conformity assessment according to (2011/04/20) EN 60079-0:2009 and EN 60079-11:2007 standards.

Version 01: (13/07/2012) Modification de composants.

Issue 01: (2012/07/13) Modification of components.

Version 02: (30/08/2012) Carte modem-adaptateur Q24 :  
- Modification de composants.  
- Modification du circuit imprimé.  
Mise à jour des documents.

Issue 02: (2012/08/30) Q24 modem-adaptor board:  
- Modification of components.  
- Modification of the printed board.  
Update of documents.

Version 03: (20/08/2014) - Modification de valeurs de résistances.  
- Mise à jour normative selon les normes EN 60079-0:2009 et EN 60079-11:2012.

Issue 03: (2014/08/20) - Modification of some resistor values.  
- Normative update according to EN 60079-0:2009 and EN 60079-11:2012 standards.

Version 04: (28/01/2016) - Ajout de la batterie Tekcell comme une alternative pour l'alimentation de la carte CPU.  
- Mise à jour normative selon la norme EN 60079-0:2012 + A11:2013.

Issue 04: (2016/01/28) - Addition of Tekcell battery as alternative supply for CPU board.  
Normative update according to EN 60079-0:2012 + A11:2013 standard.

Version 05: (25/11/2016) - Ajout d'une nouvelle carte modem-adaptateur équipée du module radio certifié ECM-2G-UG350 ou ECM-3G-UU270.

Issue 05: (2016/11/25) - Addition of new Modem-adaptor board equipped with Ex certified radio module ECM-2G-UG350 or ECM-3G-UU270.

Version 06: (26/12/2018) - Mise à jour des paramètres de sécurité intrinsèque.

Issue 06: (2018/12/26) - Update of intrinsic safety parameters.

Version 06 Rev. A: (09/09/2022) - Réémission sous accréditation. Pas d'évaluation complémentaire.

Issue 06 Rev. A: (2022/09/09) - New issue under accreditation. No additional assessment.



## ATTESTATION D'EXAMEN UE DE TYPE - ANNEXE EU TYPE EXAMINATION CERTIFICATE - SCHEDULE

1 Version : 07

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Version 07:	<ul style="list-style-type: none"><li>- Mise à jour normative selon la norme EN IEC 60079-0:2018.</li><li>- Ajout d'un nouveau module radio Cloud Link 5G (51308889-476)</li><li>- Retrait des composants : Modules radio ECM-GW120 et ECM-3G-UU270</li></ul>	Issue 07:	<ul style="list-style-type: none"><li>- Normative update of the standard EN IEC 60079-0:2018,</li><li>- Addition of a new radio module Cloud Link 5G (51308889-476)</li><li>- Removing integrated components: Radio modules ECM-GW120 and ECM-3G-UU270</li></ul>
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