



Volume Converter

EK280

Manual

Application

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1 General

1.1 Meaning of symbols

This safety information must be complied with and care should be taken 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.

**CAUTION!**

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

**CAUTION!**

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



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

1.2 Safety instructions

This Application Manual is intended for use as a supplement to the ⇒ Operating Instructions [1]. It must not be used without the Operating Instructions.

**DANGER!**

Do not use this Application Manual without the relevant Operating Instructions. Pay specific attention to the safety instructions given therein.

The following cases in particular carry risks, which are further discussed in the ⇒ Operating Instructions [1]:

- Avoid improper use of the EK280 in a potentially explosive atmosphere.
- Avoid improper battery use.
- Avoid contact with live parts in the EK280 version with internal power supply.

**CAUTION!**

Should any instructions in the Application Manual conflict with those given in the Operating Instructions, follow the instructions in the Operating Instructions.

1.3 Additional information

For more information concerning usage ⇒ refer to the following documents:

No.	Documents	Order No.
[1]	EK280 Operating Instructions	73021805
[2]	LIS-200 Device Readings – General Description	–
[3]	LIS-200 Device Readings – Appendix EK280	–
[4]	Modem Application ComFTP – Operating Instructions	73022681
[5]	EK280 DLMS Interface – Application Manual	–
[6]	Modbus Communication with EK2x0_V2.0_*.pdf	–
[7]	Start-up Instructions FE260/GPRS-ComTCPserv	73021405
[8]	Start-up Instructions FE260/GPRS-ComTSC	–
[9]	FE260_INSYS-Ethernet-Install_en_d.pdf	–
[10]	24343_LIS200_FTP-Applikationshandbuch_2017_1_EN.pdf	73024343

You will receive the documents on request from Honeywell.

You can reach our Technical Assistance Center at:

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You can download the Operating Instructions in different languages directly from the Honeywell Docuthek at <http://docuthek.kromschroeder.com>. Enter "EK280" as search term.

2 EK280 Operation and Display

2.1 Display configuration

2.1.1 "Main" main display

With the calibration lock open, *"Main"* on the *"Ctrl."* display tab allows you to select different views and contents for the *"Main"* tab:

<i>"Main"</i>	Description
<i>volume + meas.</i>	Displayed: Volume at base conditions, volume at measurement conditions, pressure, temperature, compressibility and conversion factor with short descriptions Meter reading format: 8 digits before and 3 digits after decimal point
<i>volume short</i>	Displayed: Volume at base conditions and volume at measurement conditions with short descriptions and header Meter reading format: 8 digits before and 3 digits after decimal point
<i>volume long</i>	Displayed: Volume at base conditions and volume at measurement conditions with header but without short descriptions Meter reading format: 9 digits before and 4 digits after decimal point
<i>Volume, p, T, Q</i>	Displayed: Volume at base conditions, volume at measurement conditions, pressure, temperature, standard load and operational load with short descriptions Meter reading format: 8 digits before and 3 digits after decimal point
<i>List</i>	Displayed: Volume at base conditions, volume at measurement conditions, total number of DE1 inputs (initial number for connected Encoder), pressure, temperature, conversion factor, compressibility, operational load, standard load, date and time
<i>Vb, Vo, meas.</i>	The following are displayed: Volume at base conditions, meter reading of the gas meter (Encoder), pressure, temperature, compressibility ratio factor and conversion factor with short descriptions. Meter reading format: 8 digits before and 3 digits after decimal point
<i>Vb, Vo, p, T, Q</i>	The following are displayed: Volume at base conditions, meter reading of the gas meter (Encoder), pressure, temperature, standard load and operational load with short descriptions Meter reading format: 8 digits before and 3 digits after decimal point

2.1.2 Setting the number of tabs

With the calibration lock open, on the "*Ctrl.*" display tab the "*Menu*" value allows you to select the number of tabs displayed.

" <i>Menu</i> "	Description
<i>2 registers</i>	The <i>Main</i> and <i>Ctrl.</i> tabs will be displayed.
<i>3 registers</i>	The <i>Main</i> , <i>Cust.</i> and <i>Ctrl.</i> tabs will be displayed.
<i>4 registers</i>	The <i>Main</i> , <i>Cust.</i> , <i>Admin</i> and <i>Ctrl. tabs</i> will be displayed.
<i>5 registers</i>	All <i>Main</i> , <i>Cust.</i> , <i>Admin</i> , <i>Serv.</i> and <i>Ctrl.</i> tabs will be displayed.
-	This option is system-generated and is not intended for use. It works in the same way as " <i>2 registers</i> " (⇒ above).

2.1.3 User values for the customer



For parameterization of the EK280 you need a connection cable for the optical interface as well as the enSuite program. enSuite can be downloaded free of charge from the Honeywell website in the "Software Downloads" section:

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

All values displayed on the "*Cust.*" tab, can be set using enSuite:

- Connect a PC or laptop with enSuite installed to the EK280 optical interface using the connection cable.
- Start enSuite and set up the communication link to the EK280.
(⇒ section 3.1 [Setting up the communication link to the EK280 via optical interface](#), p. 26)
- Select "*Navigation*" on the left-hand side and then "*Parameterize online*" at the bottom of the navigation window.
- In the top of the device window open the path "*Parameters*" > "*Device settings*" > "*Display*" by clicking on the relevant plus signs, and then select "*User column 'Customer'*".
- By using the "*All Parameters*" tab in the right-hand part of the window, you can now select which values are to be displayed. To do this, press an entry in the "Value" column, and then the button with the three dots. You can now select a new value to be displayed for this position in the display in the window that opens up.
- Once you have set all values, click on the "*Transfer changes to device*" icon at the top of the enSuite window.

2.1.4 User values for the administrator



For parameterization of the EK280 you need a connection cable for the optical interface as well as the enSuite program. enSuite can be downloaded free of charge from the Honeywell website in the "Software Downloads" section:

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

All values displayed on the "*Admin.*" tab under "*User values*" can be set using enSuite:

- Connect a PC or laptop with enSuite installed to the EK280 optical interface using the connection cable.
- Start enSuite and set up the communication link to the EK280.
(⇒ section 3.1 [Setting up the communication link to the EK280 via optical interface](#), p. 26)

- Select "[Navigation](#)" on the left-hand side and then "[Parameterize online](#)" at the bottom of the navigation window.
- In the top of the device window open the path "[Parameters](#)" > "[Device settings](#)" > "[Display](#)" by clicking on the relevant plus signs, and then select "[User column 'Administrator'](#)".
- By using the "All Parameters" tab in the right-hand part of the window, you can now select which values are to be displayed. To do this, press an entry in the "Value" column, and then the button with the three dots. You can now select a new value to be displayed for this position in the display in the window that opens up.
- With the first 10 values you select what will be displayed in the display of the unit under the tab "[Admin.](#)" under "[User values](#)". With the next 12 values you select what will be displayed as the content of display via the path "[User values](#)" > "[further...](#)".
- Once you have set all values, click on the "Transfer changes to device" icon at the top of the enSuite window.

2.2 Displaying archives on the EK280



A comprehensive description of the archives can be found in ⇒ section 9.

To display the contents of an archive, move the cursor to the archive header and press the ENTER or ► key. The Archive Headers are located on the [Admin.](#) and [Serv.](#) tabs under [Archives](#), the log books also are under [Status](#).

The archive data is displayed in table format, i.e., in columns with headings. Individual columns are separated by one or more spaces. The column header contains the name of the value displayed in the column and where applicable the unit. Space permitting, multiple columns are displayed simultaneously.

The ► and ◀ keys move the cursor through the neighboring columns, the cursor remains at the left column edge and the columns are moved along in the display. The ▼ and ▲ keys move the cursor to older or newer entries (rows).

Archive view function keys in detail:

- Move right one column. (The columns will be moved to the left by one column.)
After the last column the cursor returns to the first column.
- ◀ Move left one column. (The columns will be moved to the right by one column.)
After the first column the cursor moves to the last column.
- ▼ Move down one row. The first row then appears again after the last one.
- ▲ Move up one row. The last row appears after the first one.
- ENTER Input for the search function in the archive.
(⇒ section [2.2.2 Search function for checking archive entries](#), p. 14)
The function is executed on the left-hand column.
- ESC Exits the archive and returns to the archive header.
- ◀ + ▲ Go to the archive entry point, i.e., the value at the top left of the table.
- ◀ + ► The LIS-address and the OBIS-Code of the value will be displayed.
The function is executed on the left-hand column.

2.2.1 Progress index

The progress index in comparison to each preceding archive entry is labeled with a "Δ" after its name in the table header (Example: ⇒ "VbΔ" in Fig. 1). They are shown in the display only, and not read out via the interface.

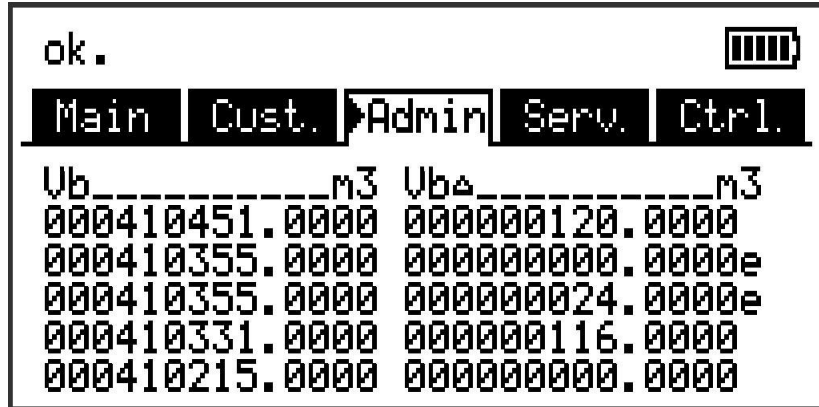


Fig. 1: Progress index display in the archive

Normally the counter advance corresponds to the flow (consumption) over one measurement period. This is however not the case, where an archive row is added as a result of a specific event (i.e., resetting of the clock or meter, displaying of an important status message) or if a data error is detected. Such an event is indicated as follows:

Display	Description
All values within an archive row flash.	It is not possible to calculate a valid progress index due to a data error in the <i>current</i> archive row. The data error is detected via checksum (CRC).
The progress index with a "c" appended to it flashes.	It is not possible to calculate a valid progress index due to a data error in the <i>preceding</i> archive row. The data error is detected via checksum (CRC).
The progress index with an "e" appended to it flashes.	The displayed progress index does not refer to a full measurement period, as the current or previous archive row was not entered as a result of measurement period completion, but instead due to i.e., resetting of the clock. Example of this: ⇒ Fig. 1: "000000000.0000e" and "000000024.0000e". These values would flash in the actual display.

2.2.2 Search function for checking archive entries

The measurement period archive and the daily archive contain several thousand and several hundred entries respectively. Individual values from these datasets can be displayed for verification purposes, as the device includes an archive entry search function. Values can be searched on in the following rows:

- Identification number
- Date and time
- Meter reading

To search, first move the cursor to the desired column in the relevant archive row. Pressing the "ENTER" key allows entry of the value to be searched for in this column. Pressing "ENTER" after entering the search value will cause the cursor to jump to the archive row containing the required value. If the entry is not found, it jumps to the next closest entry.

2.3 Context menu

The context menu allows you to quickly access specific commands in the various displays.

The context menu is accessed using the  key.



Fig. 2: displayed context menu

2.3.1 Jump to main display ("Goto Main")

The main display ("*Main*" tab) is displayed.

2.3.2 Freeze display ("Freeze Display")

This function can be used for example to record multiple measurement values, for which the time stamp is significant.

All currently displayed values are "frozen", i.e., cached for subsequent display in place of the real time values, until the display is unfrozen.

Measurement is unaffected and continues in the background.

The state is indicated by a blinking ❄ symbol ("frozen") in the status bar. Pressing any key unfreezes the display and re-displays the real time values.

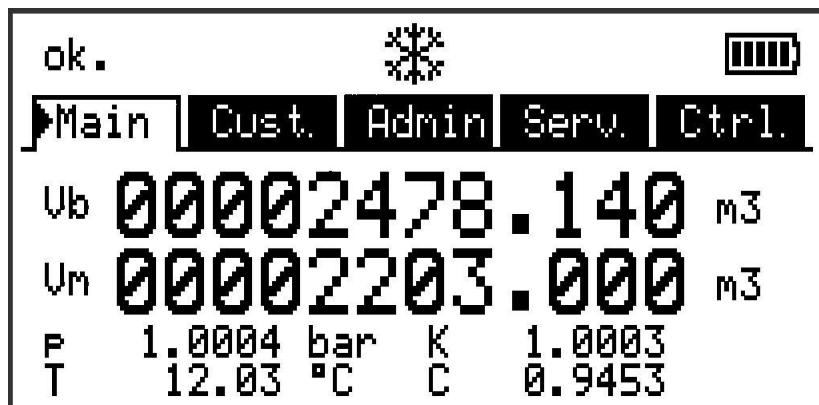


Fig. 3: "frozen" display

2.3.3 Clear status register ("Clear Status R.")

The status register is cleared (⇒ section 10 Status messages, p. 202).



Deleting statuses can only be carried out if the administrator or calibration lock is open. If both locks are closed, then the context menu is left without deleting the status register.

2.4 Special commissioning function

2.4.1 Device software and checksum

- Move the cursor under tab "Serv." to "Identification" > "Volume Converter" > "Vers" or "Chk".
- The checksum "Chk" can be recalculated for verification purposes by pressing the ENTER key.

2.4.2 Clear volumes and archives ("Clr.V")



The "Clr.V" functions described here delete all volume counters and all archives and logbooks.

- So that all volume counters and all archives and logbooks are deleted from the device, open the calibration lock as described in the EK280 Operating Instructions.
- Move the cursor in tab "Serv." to "Edit and delete" > "Clr.V".
- Press the ENTER key. ⇒ "0" flashes.
- Change the value using the arrow keys ▲ or ▼ to "1".
- Press the ENTER key to confirm the set value. It is possible to abort the entry by pressing the ESC key.

2.4.3 Clear archives ("Clr.A")



With the "Clr.A" functions described here, only the measurement period archive, the daily archive, monthly archives 1 and 2 and the four user archives can be deleted.

- So that the measuring period archive, the daily archive, monthly archives 1 and 2 and the four user archives are deleted from the device, go to and open the administrator or calibration lock as described in the ⇒ EK280 Operating Instructions [1].
- Move the cursor in tab "Serv." to "Edit and delete" > "Clr.A".
- Press the ENTER key. ⇒ One digit of the value flashes.
- To prevent accidental deletion of meter counts readings and archives, a security function is provided. To execute the delete function, the serial number of the device must be entered. For input, move the cursor with the arrow keys ► or ◀ to the digits and change these with the arrow keys ▲ or ▼.



The serial number of the device is printed on the identification label or it can be fined in the "Serv." register under "Identification" > "Volume Converter" > "SNo".

- Press the ENTER key to confirm the value setting. Input can be canceled using the ESC key.

2.4.4 Parameterize the volume at measurement conditions "Vm"



A one-time setting up of the volume counter while the administrator lock is open is possible from software version 2.20 and higher.

The counter of the EK280 can be set once in a similar way to that of the gas counter while the administrator lock is open for recording the volume in practice. When the calibration lock is open it is always possible to set the volume and this can also be done directly via the operational volume (tab *"Serv."* to *"Volume"* > *"Actual volume"* > *"Vm"*).

Method (without opening the calibration lock):

- Open the administrator lock.
- Move the cursor to *"Serv."* > *"Volume"* > *"Actual volume"* > *"Synchronization Vm"* > *"VmA"* (the value to be taken over, is first interim saved by the "resettable interim counter" VmP and then taken over as "Vm" when the counter reading is reached).
- Press the ENTER key. ⇒ One digit of the value flashes.
- Move the cursor with the arrow keys ► or ◀ to the digits and change these with the arrow keys ▲ or ▼.
- Press the ENTER key to confirm the value setting. Input can be canceled using the ESC key.
- To accept the set value move the cursor to the value *"Store"*.
- Press the ENTER key. ⇒ *"0"* flashes.
- Change the value to *"1"* by pressing the ▲ or ▼ arrow keys.
- Press the ENTER key to confirm the value setting. Input can be canceled using the ESC key.
⇒ For *"Vm"* *"VmP"* is taken.



If the administrator lock is open and the transfer of "VmP" for "Vm" is rejected with the message --13--, this process has previously been carried out. Further changes are possible when either the calibration lock or the administration lock is open, after deleting the change information regarding setting "Vm" at the same value as the gas meter (⇒ section 2.4.4.1).

The following values are shown on the same menu:

Display	Description
TimeX	Time when counter synchronization was carried out
Vm_o	"Old" operating volume counter value Vm
Vm_n	"New" operating volume counter value Vm

2.4.4.1 Delete change information for synchronization Vm with the gas meter

Change information for adapting *"Vm"* to the gas counter must be deleted while the calibration lock is open in order to re-set the volume under metering period conditions when the administrator lock is open:

- Open the calibration lock
- Move the cursor to *"Serv."* > *"Volume"* > *"Actual volume"* > *"Synchronization Vm"* > *"Clear"*.
- Press the ENTER key. ⇒ *"0"* flashes.
- Change the value to *"1"* by pressing the ▲ or ▼ arrow keys.
- Press the ENTER key to confirm the value setting. Input can be canceled using the ESC key.
⇒ *"TimeX"* (time stamp of synchronization), *"Vm_o"* (Vm old value), *"Vm_n"* (Vm new value) are set to default values.

2.4.5 Parameterizing the volume at base conditions



A one-time setting up of the volume counter while the administrator lock is open is possible from software version 2.20 and higher.

The quantity converter EK280 offers the possibility of adjusting the standard volume counter once during commissioning of the unit while the administrator lock is open. Setting the volume is always possible while the calibration lock is open and can also be carried out directly via Standard Volume (tab "*Serv.*" to "*Volume*" > "*Standard Volume*" > "*Vb*").

Method (without opening the calibration lock):

- Open the administrator lock.
- Move the cursor to "*Serv.*" > "*Volume*" > "*Standard volume*" > "*Synchronization. Vb*" > "*VbP*".
- Press the ENTER key. ⇒ One digit of the value flashes.
- Move the cursor with the arrow keys ► or ◀ to the digits and change these with the arrow key ▲ or ▼.
- Press the ENTER key to confirm the value setting. Input can be canceled using the ESC key.
- To accept the set value move the cursor to the value "*Store*".
- Press the ENTER key. ⇒ "*0*" flashes.
- Change the value to "*1*" by pressing the ▲ or ▼ arrow keys.
- Press the ENTER key to confirm the value setting. Input can be canceled using the ESC key.
⇒ For "*Vb*" is taken "*VbP*".



*If, with the administrator lock, the take of "*VbP*" for "*Vb*" is declined with the message --13-- the procedure has already been once before. Further changes are possible when either the calibration lock or the administration lock is open, after deleting the change information regarding settings for setting at the same value as "*Vb*" (⇒ section 2.4.5.1).*

The following values are shown on the same menu:

Display	Description
<i>TimeX</i>	Time when counter synchronization was carried out
<i>Vb_o</i>	"Old" operating volume counter value Vb
<i>Vb_n</i>	"New" operating volume counter value Vb

2.4.5.1 Deleting change information for synchronization Vb

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

- Open the calibration lock.
- Move the cursor to tab "*Serv.*" to "*Volume*" > "*Standard volume*" > "*Synchronization Vb*" > "*Clear*".
- Press the ENTER key. ⇒ "*0*" flashes.
- Change the value to "*1*" by pressing the ▲ or ▼ arrow keys.
- Press the ENTER key to confirm the value setting. Input can be canceled using the ESC key.
⇒ "*TimeX*" (time stamp of synchronization), "*Vb_o*" (Vb old value), "*Vb_n*" (Vb new value) will be set to default values.

2.4.6 Setting the gas analysis method



The EK280 supports various methods to identify the gas composition. They must be adjusted during the commissioning procedure to suit the statutory requirements.

Using the volume converter EK280, it is possible, with the calibration data log active, to set the gas analysis method and to set the gas analysis itself even when the administrator lock is open. This is done in the *"Serv."* > *"Volume conversion"* > *"Parameter settings"* > *"Md.K"* tab:

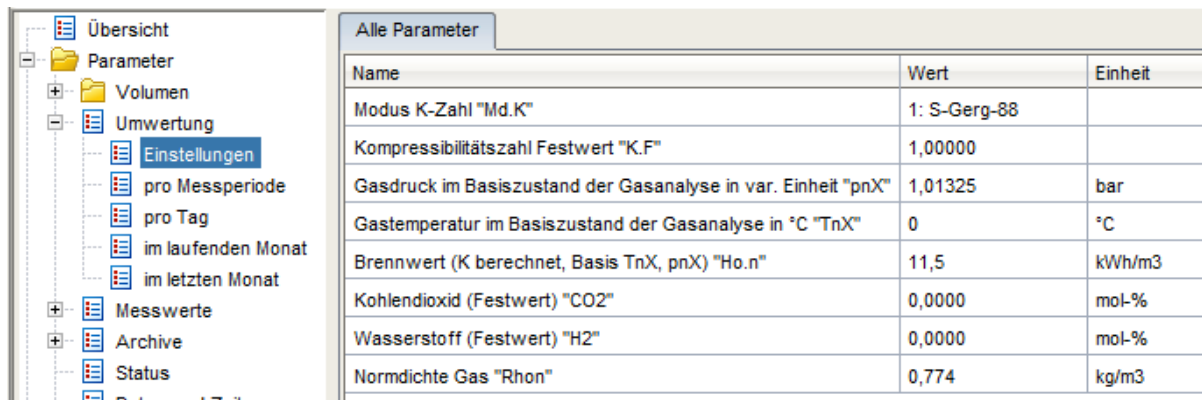
Value	Meaning
0: Fix value	No gas analysis considered; conversion using a fixed value (see "K.F")
1: S-Gerg-88	Standard method with superior calorific value "Ho.b"/carbon dioxide content "CO2"/hydrogen content "H2" and gas density at base conditions "Rhob"
2: AGA-NX19	Use of "Ho.b"/"CO2"/nitrogen content "N2" and density ratio "dr"
3: AGA8 GC1	"Gross characterization method 1": use of "Ho.b"/"CO2"/"dr"
4: AGA8 GC2	"Gross characterization method 2": use of "CO2"/"N2"/"dr"
5: AGA-NX19-HW	Herning & Wolowsky method using "CO2"/"N2"/"dr"
6: AGA-8 DC92	"Detailed characterization" with up to 21 parameters

Procedure (without opening the calibration lock):

- Open the administrator lock.
- Move the cursor to *"Serv."* > *"Volume conversion"* > *"Parameter settings"* > *"Md.K"*.
- Press ENTER. ⇒ A digit in the value will flash.
- Move the cursor using ▲ and ▼ to the required gas analysis method and press ENTER to confirm your input. The input process can be cancelled by pressing ESC.

To set the values for the gas analysis itself, we recommend using the enSuite parameterization software (see section 0).

- Establish an optical connection between enSuite and the EK280 as an administrator so that the *"Admin"* lock is opened.
- Check the method and the gas analysis itself in *"Parameters"* > *"Volume conversion"* > *"Parameter settings"*:



Name	Wert	Einheit
Modus K-Zahl "Md.K"	1: S-Gerg-88	
Kompressibilitätszahl Festwert "K.F"	1,00000	
Gasdruck im Basiszustand der Gasanalyse in var. Einheit "pnX"	1,01325	bar
Gastemperatur im Basiszustand der Gasanalyse in °C "TnX"	0	°C
Brennwert (K berechnet, Basis TnX, pnX) "Ho.n"	11,5	kWh/m3
Kohlendioxid (Festwert) "CO2"	0,0000	mol-%
Wasserstoff (Festwert) "H2"	0,0000	mol-%
Normdichte Gas "Rhon"	0,774	kg/m3

- The possible inputs displayed will automatically adjust to the selected gas analysis method.



The entries "pbX" and "TbX" relate to the reference values of the gas analyzer. This makes it possible to use gas analysis values identified on the basis of different operating conditions. The EK280 will recalculate these internally using its own reference conditions.

2.4.6.1 Validity ranges for the values

2.4.6.1.1 Calculations using S-Gerg-88 (Md.K = 1)

Ho.b	6.0	...	13.0	kWh/m ³
CO ₂	0.0	...	30.0	mol%
H ₂	0.0	...	10.0	mol%
Rhob	0.71	...	1.16	kg/m ³

In addition, the gas supplier must ensure the following limits:

Methane	CH ₄	70 – 100%	Propane	C ₃ H ₈	0 – 3.5%
Nitrogen	N ₂	0 – 50%	Butane	C ₄ H ₁₀	0 – 1.5%
Ethane	C ₂ H ₆	0 – 10%	Pentane	C ₅ H ₁₂	0 – 0.5%

2.4.6.1.2 Calculations using AGA-NX19 (Md.K = 2)

Ho.b	6.0	...	13.0	kWh/m ³
CO ₂	0.0	...	30.0	mol%
Rhob	0.71	...	1.16	kg/m ³
N ₂	0.0	...	30.0	mol%
dr	0.554	...	0.900	for "L gas" (Ho.b ≤ 11.055)
	0.554	...	0.691	for "H gas" (Ho.b > 11.055)

In addition, the gas supplier must ensure the following limits:

Methane	CH ₄	50 – 100%	Propane	C ₃ H ₈	0 – 5%
Nitrogen	N ₂	0 – 50%	Butane	C ₄ H ₁₀	0 – 1%
Ethane	C ₂ H ₆	0 – 20%	Pentane	C ₅ H ₁₂	0 – 0.5%

2.4.6.1.3 Calculations using AGA8-DC92 (Md.K = 6)

CH ₄	45.0 ... 100.0	mol%
N ₂	0.0 ... 30.0	mol%
CO ₂	0.0 ... 30.0	mol%
C ₂ H ₆	0.0 ... 10.0	mol%
C ₃ H ₈	0.0 ... 4.0	mol%
H ₂ O	0.0 ... 0.05	mol%
H ₂ S	0.0 ... 0.02	mol%
H ₂	0.0 ... 10.0	mol%
CO	0.0 ... 1.0	mol%
O ₂	0.0 ... 21.0	mol%
iC ₄ H _x	0.0 ... 1.0	mol%
nC ₄ H _x	0.0 ... 1.0	mol%
iC ₅ H _x	0.0 ... 0.3	mol%
nC ₅ H _x	0.0 ... 0.3	mol%
C ₆ H ₁₄	0.0 ... 0.2	mol%
C ₇ H ₁₆	0.0 ... 0.2	mol%
C ₈ H ₁₈	0.0 ... 0.2	mol%
C ₉ H ₂₀	0.0 ... 0.2	mol%
C ₁₀ H _x	0.0 ... 0.2	mol%
He	0.0 ... 0.2	mol%
Ar	0.0 ... 1.0	mol%



With AGA8-DC92, the total of all the entered gas analysis values must be noted (see above). The total must be 100%. Otherwise, a warning message will be generated.

2.4.6.2 Nominal operating conditions of the conversion method

In addition to the technical capacities of the connected sensors, the conversion method must also be taken into account when defining the allowable measuring range for the pressure and temperature of the gas. The alarm limits T_{min} , T_{max} , p_{min} and p_{max} may be outside the measuring range and differ from the measuring range limits by up to 5% (for the pressure) or 1°C (for the temperature). This makes testing the device at the measuring range limits for temperature and pressure easier.

If the alarm limits are reached or exceeded, an alarm is triggered and counted in the disturbance quantity counters.

The following conversion methods are available for certain applications:

1. Fixed value "K = 1" (Md.K = "0")

This fixed value can be used if the gas only deviates slightly (up to 0.25%) from the ideal gas properties. For natural gas types and their mixtures, in other words gas mixtures which have a high methane content, this applies at temperatures above -10°C up to an absolute pressure of 1.5 bar or a gauge pressure of 0.5 bar.

The pressure range can be extended to 2.0 bar absolute pressure or 1.0 bar gauge pressure if the temperature is always greater than

- +5°C for gases with $H_{o,b} < 11.5 \text{ kWh/m}^3$
- +12°C for gases with $H_{o,b} \geq 11.5 \text{ kWh/m}^3$

Greater pressure and temperature ranges can be set for a gas composition at a metering point if compliance with the error limit has been verified by calculations. This also applies to other combustible gaseous fuels (e.g., town gas). The definitions in the following section apply to the calculations.

2. Fixed value "K ≠ 1" (Md.K = "0")

Fixed values for K which are not equal to 1 may be suitable for metering points whose absolute pressure is always below 11 bar and for which the gas pressure and gas temperature only fluctuate within known limits. The fixed value must be calculated using one of the following methods:

- S-Gerg-88 after checking the admissibility of the method (see below)
- AGA8-DC92 to ISO 12213 Part 2 /1/

A calculation using the same method must be used to verify that the K-values only deviate from this fixed value by a maximum of 0.25% within the permitted measuring range (in other words in compliance with the pressure and temperature limits). The principles of the calculation and the calculation results at the limits of the measuring range must be entered in the operating and design logbook, page entitled "Records of completed work". The alarm limits p_{min} , p_{max} , T_{min} and T_{max} must be set to suit the measuring range (see above).

3. S-Gerg-88 (Md.K = "1")

This method is suitable for natural gas types and their mixtures

- 1.) at temperatures between -10°C and +60°C and for absolute pressures up to 26 bar
- 2.) at temperatures between -10°C and +60°C also for absolute pressures above 26 bar if the following conditions are satisfied:

- The molar fraction of propane x_{C3} [in mol%] must be within the limits from the following equation depending on the molar fraction of ethane x_{C2} [in mol%]:

$$0.3 \cdot x_{C2} - 1.0 < x_{C3} < 0.3 \cdot x_{C2} + 1.0 \quad (1)$$

- The total molar fractions of n-butane, isobutane, and higher hydrocarbons x_{C4+} [in mol%] must be within the limits which result from the following equation depending on the molar fraction of ethane x_{C2} [in mol%]:

$$0.1 \cdot x_{C2} - 0.3 < x_{C4+} < 0.1 \cdot x_{C2} + 0.3 \quad (2)$$

- 3.) For other gas compositions (e.g., biogas), temperature ranges and pressure ranges if it has been verified on the basis of comparison calculations using the AGA8-DC92 method for the expected pressure and temperature range that is secured by alarms and for the present gas composition that no deviations of more than 0.1% occur.

The principles of the calculation and the calculation results at the limits of the measuring range must be entered in the operating and design logbook, page entitled "Records of completed work", unless the S-Gerg-88 calculation method has been generally approved for this application on the basis of a national regulation.

4. AGA8 – Gross characterization methods 1 and 2 (Md.K = "3" and "4")

These methods are suitable for temperatures between 0°C and 55°C for gas mixtures whose relative density is between 0.554 and 0.87, whose superior calorific value is between 5.2 kWh/m³ and 12.5 kWh/m³ and whose components have the following molar fractions [in mol%]:

CH ₄	N ₂	CO ₂	C ₂ H ₆	C ₃ H ₈	C ₄ H ₁₀	C ₅ H ₁₂	C ₆ +	He	H ₂	CO	H ₂ O	H ₂ S
≥ 45	≤ 50	≤ 30	≤ 10	≤ 4	≤ 1	≤ 0.3	≤ 0.2	≤ 0.2	≤ 10	≤ 3	≤ 0.05	≤ 0.02

C₄H₁₀: total of n-butane and i-butane;

C₅H₁₂: total of n-pentane and i-pentane;

C₆+: total of all hydrocarbons with at least 6 carbon atoms

5. AGA-NX19 and AGA-NX19 according to Herning and Wolowsky (Md.K = "2" and "5")

These methods are compatible and are suitable for applications for which verification has been provided by a comparison calculation with the reference method AGA8-DC92 or S-Gerg-88 (in its range of applications) that no deviations of more than 0.1% occur.

6. Detailed characterization (Md.K = "6")

This method is equivalent to AGA8-DC92 and is suitable for natural gas types and their mixtures

- 1.) at temperatures between -25°C and +60°C and for absolute pressures up to 12 bar
- 2.) at temperatures between -20°C and +60°C and for absolute pressures up to 16 bar
- 3.) at temperatures between -10°C and +60°C and for absolute pressures up to 26 bar
- 4.) at temperatures between -10°C and +60°C and for absolute pressures up to 40 bar if the following conditions are satisfied:

- The molar fraction of propane x_{C3} [in mol%] must be within the limits from the following equation depending on the molar fraction of ethane x_{C2} [in mol%]:

$$0.3 \cdot x_{C2} - 1.0 < x_{C3} < 0.3 \cdot x_{C2} + 1.0$$

- The total molar fractions of n-butane, isobutane and higher hydrocarbons x_{C4+} [in mol%] must be within the limits which result from the following equation depending on the molar fraction of ethane x_{C2} [in mol%]:

$$0.1 \cdot x_{C2} - 0.3 < x_{C4+} < 0.1 \cdot x_{C2} + 0.3$$

- 5.) For other gas compositions (e.g., biogas), temperature ranges and pressure ranges if it has been verified on the basis of comparison calculations using the AGA8-DC92 method for the expected pressure and temperature range that is secured by alarms and for the present gas composition that no deviations of more than 0.1% occur.

2.4.7 Activating the energy display



The energy display cannot be used in legal metrology and is based on an entered fixed value of the calorific value. Therefore, the energy displayed in the EK280 may differ from the calculated energy of the gas supplier.

The EK280 can convert the standard volume to the corresponding energy. The display can only be activated via the enSuite parameterization software (see section 0).

Procedure (without opening the calibration lock):

- Establish an optical connection between enSuite and the EK280 as administrator so that the "Admin" lock is opened.
- Check under "Parameters" > "Device settings" > "Display" under "Menu options "VSubm"":

Name	Value	Unit
Time to changeover to standard display "Aut.V"	1	minutes
Time before display switches off "Disp"	2	minutes
Time until display calibration mode is switched off "C..."	0	minutes
Menu selection (no. of registers) "Menu"	4: 5 registers	
View of register 'Main' (e.g. large or small characters) ...	1: volume+meas.	
Display contrast "Contr"	164	
Menu options "VSubm"	3: Without energy	

- The following values are available for selection:

Display	Description
1: With energy	With display of energy
2: Vb Vc Vm W	With gas meter error curve correction (see section 4.9) and with energy
3: Without energy	Without display of energy (default setting)
4: Vb Vc Vm	With gas meter error curve correction (see section 4.9) and without energy

- When the "With energy" setting is activated, a new "Energy" menu tree is displayed under the "Volume" branch:

Name	Value	Unit
Energy, undisturbed quantity "W"	0.0000	kWh
Energy, disturbance quantity "WD"	0.0000	kWh
Energy, total quantity "W.T"	0.0000	kWh
W, adjustable counter "W.A"	0.0000	kWh
Power "P"	0.00	kW
Calorific value (K computed, base: pb, Tb) "Ho.b"	10.3	kWh/m3

- Here you can enter the "Calorific value (K computed, base: pb, Tb)" for the conversion to energy:
- Press the ENTER key. ⇒ The least significant digit of the previous value flashes.

- Move the cursor with the arrow keys ► or ◀ to the digits and change them with the arrow keys ▲ or ▼.
- After you have changed all digits, press the ENTER key to confirm the entry. You can cancel the entry by pressing the ESC key.



The calorific value entered here is not the calorific value that may be used for calculating the K-value (enSuite: see under "Parameters" > "Volume conversion" > "Settings")!

2.5 Setting of the display contrast

The display contrast of the EK280 can be adjusted to suit the surrounding conditions.

- Open the administrator lock as described in the ⇒ EK280 Operating Instructions [1].
- Move the cursor in tab "Serv." to "Device settings" > "Display" > "Contr."
- Press the ENTER key. ⇒ One digit of the value flashes.
- To enter the display contrast value move the cursor to the digits using the arrow keys ► or ◀ and update them using the arrow keys ▲ or ▼.



*The factory settings for the display contrast is "164". Input values greater than "164" darken the contrast settings, whereas lower values render the display brighter.
Do not enter any values below "100", otherwise it is not possible to read values.*

- Press the ENTER key to confirm the value setting. It is possible to abort the entry by pressing the ESC key.

2.6 Error messages when entering values

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

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

Code	Description
1	The archive is empty. No values have been entered.
2	The archive value cannot be read. The archive may currently be open for read-out via the interface.
4	This parameter cannot be changed (constant).
5	You are not authorized to change this value. A corresponding lock must be opened to change this value.
6	Invalid value The value entered is outside the permissible limits.
7	Incorrect code The code entered (numerical code) is incorrect; the lock will not be opened.
11	Entry based on specific setting or configuration not possible, e.g.: <ul style="list-style-type: none"> – The inputs "<i>Vm</i>" and "<i>VmD</i>" are not possible in the Encoder mode, – Changing the net calorific value is only possible in the gas analysis list; not in the energy list.
12	The input of this source (address) is not permitted.
13	Entry based on specific setting or configuration not possible, e.g.: <ul style="list-style-type: none"> – The function "<i>Clr.X</i>" can be carried out only once the clock has been set to its starting value (initialized) with the key combination. ◀ + ▲. – The function "<i>Store</i>" can be carried out only once the change information for adapting "<i>Vm</i>" (⇒ section 2.4.4.1) or "<i>Vb</i>" (⇒ section 2.4.5.1) has been deleted.
14	Gas analysis parameters do not correspond.
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.

3 Working with enSuite

enSuite is the parameter configuration and analysis program for current Honeywell products in the field of flow computers, data storage, gas property measuring instruments and ultrasound gas meters, and it supports all activities that are necessary for the commissioning and maintenance of these terminal devices. enSuite replaces the WinPADS series. The main functions only are briefly explained here. For a more detailed description please refer to the enSuite documentation.

3.1 Setting up the communication link to the EK280 via optical interface



To set the EK280 parameters via the optical interface, you need an optical read head cable, available from Honeywell.

The parameterization program enSuite can be downloaded for free at www.elster.com.

- Insert the optical read head into the ring on the front panel of the EK280 and connect the other end to a COM or USB port on your PC or laptop.
- Connect a PC or laptop to the EK280's optical interface using the cable.
- Start the enSuite program (i.e., *Start > Programs > Elster > enSuite*).
- Press symbol "*Search device...*" (magnifying glass symbol).
- In the "*Search device and connect*" window select the "*LIS200*" tab.
- Select "*Access*" → "*LIS200*", "*User*" → "*Administrator*", "*Connection*" → "*Optical*" and "*use default settings*".
- In the field "*Key*" enter the administrator key.
- Press "*OK*".
- After a few seconds "*connected*" is displayed at the bottom of the "*Output*" window.

3.2 Setting up the communication link to EK280 via a modem

Prerequisite: A communication link between enSuite and the EK280 (⇒ section 7).

- Ensure your PC or laptop is configured for remote data transmission, i.e., is connected to a modem.
- Start the enSuite program (i.e., *Start > Programs > Elster > enSuite*).
- Press symbol "*Search device...*" (magnifying glass symbol).
- In the "*Search device and connect*" window select the "*LIS200*" tab.
- Select "*Access*" → "*LIS200*", "*User*" → "*Administrator*", "*Connection*" → "*Modem*" and "*use default settings*".
- In the field "*Key*" enter the administrator key.
- Enter the EK280's SIM card telephone number under "*Modem*".
- Press "*OK*".
- After a few seconds "*connected*" is displayed at the bottom of the "*Output*" window. Via a GSM modem communication link to an EK280 this may take up to a minute.

3.3 Setting up the communication link to EK280 via a network (TCP/IP)

Prerequisite: A communication link between enSuite and the EK280 (⇒ section 7).

- Ensure your PC or laptop is connected to the LAN. The EK280 must be connected to the same network.
- Start the enSuite program (i.e., *Start > Programs > Elster > enSuite*).
- Press symbol "*Search device...*" (magnifying glass symbol).
- In the "*Search device and connect*" window select the "*LIS200*" tab.
- Select "*Access*" → "*LIS200*", "*User*" → "*Administrator*", "*Connection*" → "*TCP/IP*" and "*use default settings*".
- In the field "*Key*" enter the administrator key.
- Enter the EK280's IP address under "*Address*" and port number under "*Port*".
- Press "*OK*".
- After a few seconds "*connected*" is displayed at the bottom of the "*Output*" window.

3.4 Setting up a direct communication link to EK280

Prerequisite: A communication link between enSuite and the EK280 (⇒ section 7 Data transfer).

- Ensure your PC or laptop has a COM port.
- Start the enSuite program (i.e., *Start > Programs > Elster > enSuite*).
- Select the "*Search device...*" icon (magnifying glass icon).
- In the "*Search device and connect*" window select the "*LIS200*" tab
- Select "*Access*" → "*LIS200*", "*User*" → "*Administrator*", "*Connection*" → "*Serial RS232*" and "*use default settings*".
- Enter the serial communication link speed under "*Baud rate*".
- Press "*OK*".
- After a few seconds "*connected*" is displayed at the bottom of the "*Output*" window.

3.5 Updating customized parameters

Prerequisite: A communication link between enSuite and the EK280 via optical interface, modem or network (TCP/IP) has been set up (⇒ sections 3.1 to 3.3).

- Select "*Navigation*" on the left-hand side.
- Click on the plus sign beside "*My Devices*" in the newly-opened navigation window, to see a list of your devices.
- Click on the entry beginning with the serial number of the connected device.
- The device identifier is now displayed at the bottom of the navigation window. If no command list is displayed underneath, click on the arrow next to the device identifier.
- In the lower part of the navigation window, press "*Parameterize online*".
- Click on the plus sign next to "*Parameter*" at the top of the navigation window, to expand the parameter tree.
- In this parameter tree you can open parameter pages, to update parameters or drill down to open more parameter pages.

3.6 Send parameter file

Prerequisite:

A communication link between enSuite and the EK280 via optical interface, modem or network (TCP/IP) has been set up (⇒ sections 3.1 to 3.3).

- Select "[Navigation](#)" on the left-hand side.
- Click on the plus sign next to "[Connections](#)" in the newly-opened navigation window.
- Click on the entry beginning with the serial number of the connected device.
- The device identifier is now displayed at the bottom of the navigation window. If no command list is displayed underneath, click on the arrow next to the device identifier.
- Select "[Send parameter file](#)".
- Click "[Open...](#)" in the top right.
- In the dialog box "[Select WPP file](#)" select the corresponding directory and the parameter file and then press "[OK](#)".



In enSuite from version 2.7 onwards, the name and issue (in brackets) of the parameter file are both displayed. The file extension ".wpp" is not displayed.



If needed, any arbitrary wpp file can be selected with the "[File system...](#)" button. Make sure that this manually selected wpp file is suitable for the EK280 software version.

- Click on "[Start](#)" in the bottom right and wait until the file has been successfully sent.



*In the center of the window, you will see the number of rows that have been sent along with the number of rows containing errors (if applicable)
You must check in such cases whether the necessary locks are open and/or whether the file used is suitable for the device version. Contact the Honeywell hotline (⇒ EK280 manual) is necessary.*

- To begin another task, click again on "[Navigation](#)" on the left-hand side.

4 Volume measurement

Input 1 (terminal "DE1") is used as counter input for the volume conversion device, for applications with automatic conversion input 2 (terminal "DE2") is also used.

Counter inputs for detection of gas volumes for conversion are generally under calibration lock, i.e., the connector terminals are sealed and parameters affecting the counter can only be updated with the calibration lock open.

The following pulse generators or encoders may be connected to input 1:

Volume encoder	Specifications
LF pulse generator	Reed contact or open collector transistor
HF pulse generator	NAMUR max. 2500 Hz, for use only with external power supply (not battery)
NAMUR encoder a	NAMUR protocol encoder a
NAMUR encoder a-b	NAMUR protocol encoder a and b
SCR EDIS encoder	SCR EDIS encoder with EDIS95 protocol
SCR OBIS encoder	SCR encoder with OBIS05 protocol

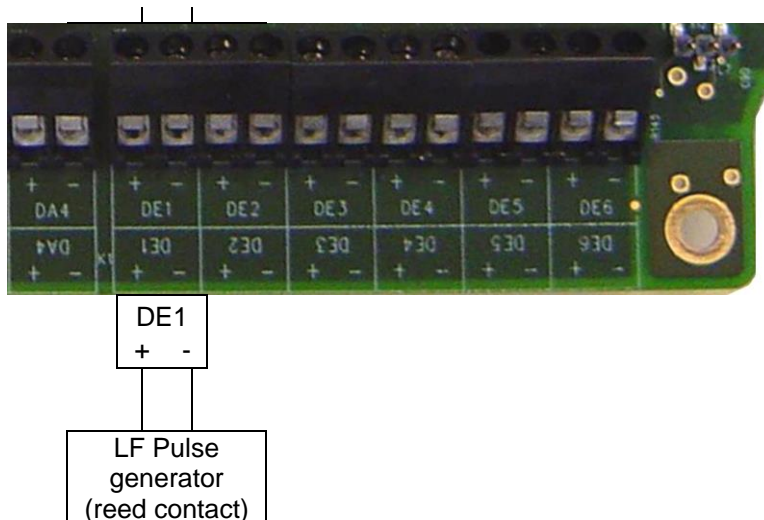
4.1 LF pulse generator (reed contact)

4.1.1 Connection



DANGER!

For EK280 with internal power supply, the mains voltage must be switched off before opening the housing, ensure it is not turned back on and verify that there is no voltage.



- Connect the gas meter's low frequency pulse generator (reed contact) to terminal "DE1" of the EK280.

Have the input 1 (terminal "DE1") sealed by the calibration officer.

4.1.2 Parameterization

Parameterization is carried out via the keyboard on the EK280.

Alternatively, parametrization can be carried out using the *enSuite* program. The paths which are subsequently described can be found in *enSuite* under "[Parameterize online](#)" > "[Parameters](#)".

a) Setting the input mode

- Open the administration lock as described in the EK280 Operating Instructions.
- Move the cursor to the "[Serv.](#)" tab and via the path below go to the input mode "[Md.11](#)":
[Serv.](#) → [Inputs](#) → [Input 1](#) → [Md.11](#).
- Press the ENTER key. ⇒ The set value flashes.
- Repeatedly press one of the ▲ or ▼ arrow keys until the text "[pulse input](#)" flashes.
- Press the ENTER key to confirm the value setting. Input can be canceled using the ESC key.

b) Setting the cp (pulse constant) value

- Move the cursor to cp value "[cp.11](#)" in the same path.
- Press the ENTER key. ⇒ One of the value's digits flashes.
- Move the cursor to the digits using the ► or ◀ arrow keys and update them using the ▲ or ▼ arrow keys.
- Press the ENTER key to confirm the value setting. Input can be canceled using the ESC key.
- Close the administration lock of the EK280.

c) Setting the counter value

- If necessary, the meter reading of the gas meter can be set as the starting value for the volume at measurement conditions V_m . The procedure is described in ⇒ section [2.4.4](#).

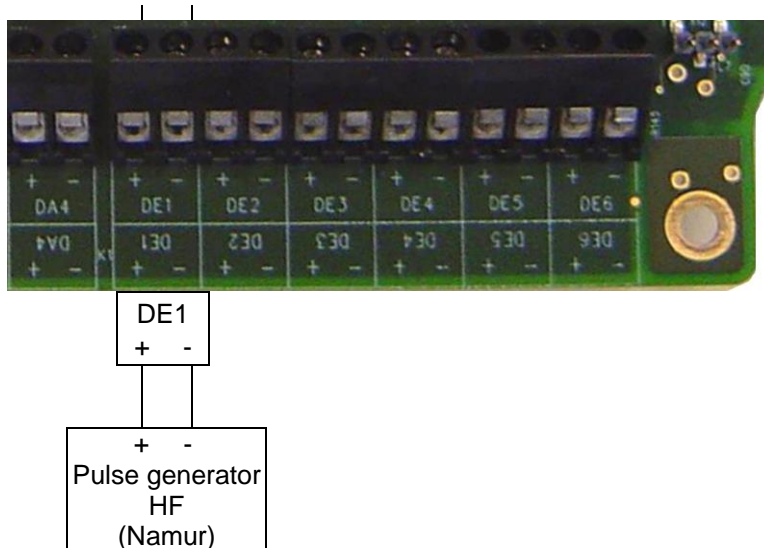
4.2 HF pulse generator (Namur)

4.2.1 Connection



DANGER!

For EK280 with internal power supply, the mains voltage must be switched off before opening the housing, ensure it is not turned back on and verify that there is no voltage.



- Connect the gas meter's high frequency pulse generator (Namur) to terminal "DE1" of the EK280.
- Have the input 1 (terminal "DE1") sealed by the calibration officer.

4.2.2 Parameterization

Parameterization is carried out via the keyboard on the EK280.

Alternatively, parametrization can be carried out using the *enSuite* program. The paths which are subsequently described can be found in *enSuite* under "[Parameterize online](#)" > "[Parameters](#)".

a) Setting the input mode

- Open the administration lock as described in the EK280 Operating Instructions.
- Move the cursor to the "[Serv.](#)" tab and via the path below go to the input mode "[Md.11](#)":
[Serv.](#) → [Inputs](#) → [Input 1](#) → [Md.11](#).
- Press the ENTER key. ⇒ The actual parameterized value flashes.
- Repeatedly press one of the ▲ or ▼ arrow keys until the text "[HF pulses](#)" flashes.
- Press the ENTER key to confirm the value setting. Input can be canceled using the ESC key.

b) Setting the cp (pulse constant) value

- Move the cursor to cp value "[cp.11](#)" in the same path
- Press the ENTER key. ⇒ One of the value's digits flashes.
- Enter the pulse generator's cp value, by moving the cursor to the digits using the ► or ◀ arrow keys and update it using the ▲ or ▼ arrow keys.
- Press the ENTER key to confirm the set value. It is possible to abort the entry by pressing the ESC key.
- Close the administration lock of the EK280.

c) Setting the counter value

- If necessary, the meter reading of the gas meter can be set as the starting value for the volume at measurement conditions V_m . The procedure is described in ⇒ section 2.4.4.

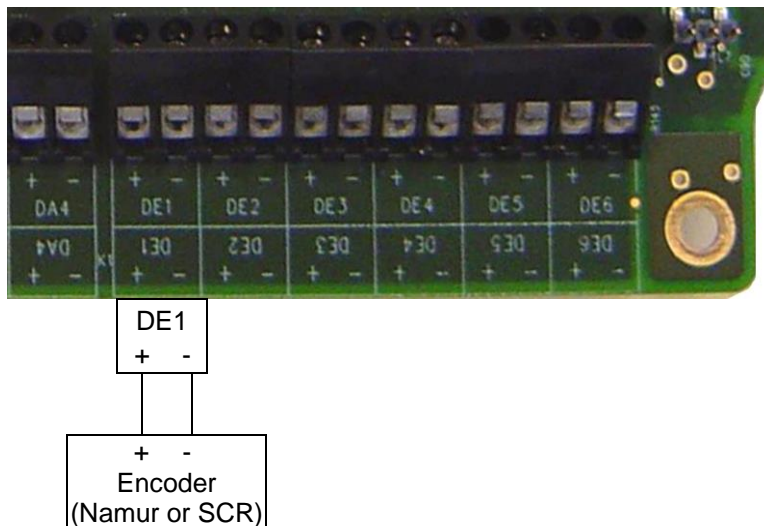
4.3 Encoder

4.3.1 Connection



DANGER!

For EK280 with internal power supply, the mains voltage must be switched off before opening the housing, ensure it is not turned back on and verify that there is no voltage.



- Connect the gas meter encoder to terminal "DE1" of the EK280.
- Have the input 1 (terminal "DE1") sealed by the calibration officer.

4.3.2 Parameterization



When using other parameter settings for the encoder (e.g., timings) in the EK280 then the battery life may become shorter.

Parameterization can be carried out here using the EK280 keypad.

Alternatively, parameterization can be carried out using the *enSuite* program. The paths which are described below can be found in *enSuite* under "[Parameterize online](#)" > "[Parameters](#)".

a) Start the "Auto-Encoder" function using the EK280 keypad as follows:

- Open the calibration lock as described in the EK280 Operating Instructions.
- Move the cursor to the "[Serv.](#)" tab and via the path below to the value "[Md.I1](#)":
[Serv.](#) → [Inputs](#) → [Input 1](#) → [Md.I1](#)
- Press the ENTER key. ⇒ The set value flashes.
- Repeatedly press one of the ▲ or ▼ arrow keys until the value "[Auto-Encoder](#)" flashes.
- Press the ENTER key to confirm the value setting. Input can be canceled using the ESC key.
- Wait until the "[Auto-Encoder](#)" display is updated with a new value. This can take up to a minute as the EK280 activates and test all known encoder protocols consecutively.

- On successful detection the EK280 displays the label "**Vo**" on the meter reading of the gas meter: [Serv. → Inputs → input 1 → Vo](#).
- Close the EK280 calibration lock.

b) Archiving of original counter value of the gas counter "Vo**":**

So that "**Vo**" (meter reading of the gas meter) is stored in the measurement period archive, daily archive and monthly archive 1 instead of "**VmG**" (total operating volume), then use the parameterization program enSuite to send the following parameter file to the EK280 (⇒ section [3.6 Send parameter file](#), p.28):



After loading the WPP file, the measurement period archive, the daily archive and monthly archives 1 and 2 are deleted!

- [EK280 - Archive1,3,7 Vo in Archive \(ATTENTION Archives will be deleted!\) \(*\)](#)¹

c) Archiving the operating volume, total ("VmG**") (factory preset):**

So that "**VmG**" (total operating volume) is stored in the measurement period archive, daily archive and monthly archive 1 again (default setting) instead of "**Vo**" (meter reading of the gas meter), then use the parameterization program enSuite to send the following parameter file to the EK280 (⇒ section [3.6 Send parameter file](#), p. 28):



After adding the WPP file, the measurement period archive, the daily archive and monthly archives 1 and 2 are deleted!

- [EK280 - Archive1,3,7 VbG in Archive \(ATTENTION Archives will be deleted!\) \(*\)](#)¹

4.4 HF pulse input with automatic switching

Pulses from a high-frequency pulse generator can be counted by the EK280 only when an external power supply exists, i.e., not during battery operation. To ensure uninterrupted gas volume measurement, the EK280 can be configured so that it switches to a low frequency pulse generator in the event of failure of the external power supply.

When the power supply is functioning, volumes and loads (Vb, Vm, Qb, Qm) will be measured with the high frequency pulse generator (priority input). In the event of failure of the high frequency pulse generator (e.g., due to failure of the external power supply), the EK280 automatically continues to measure with the low frequency transmitted (fail safe input).

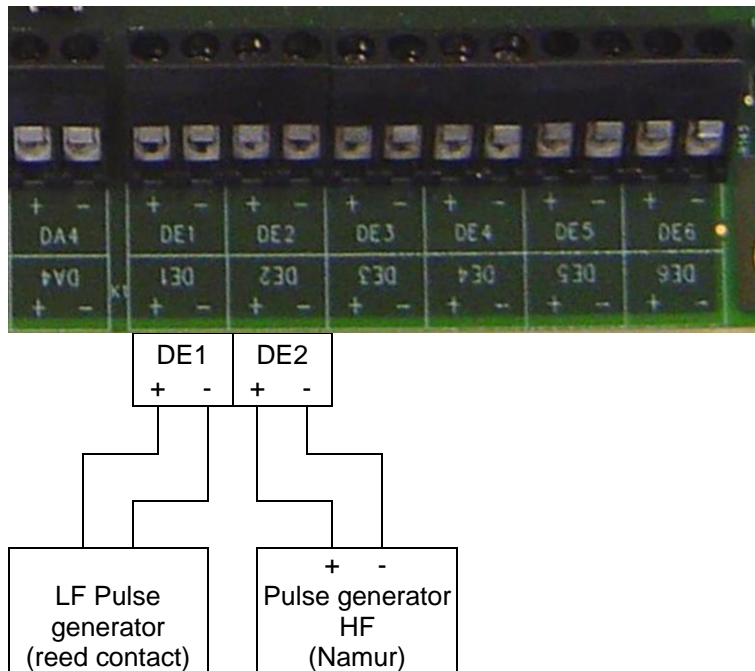
¹ The asterisk * designates the file version, e.g., "a"

4.4.1 Pulse generator connection



DANGER!

For EK280 with internal power supply, the mains voltage must be switched off before opening the housing, ensure it is not turned back on and verify that there is no voltage.



- Connect the gas meter's low frequency pulse generator (LF reed contact) to terminal "DE1" of the EK280.
- Connect the gas meter's high frequency pulse generator (HF Namur) to terminal "DE2" of the EK280. Respect polarity, i.e., connect the impulse generator's "+" to the "DE2 +" terminal and "-" with "DE2 -".
- Have the inputs 1 and 2 (terminal "DE1" and "DE2") sealed by the calibration officer.

4.4.2 Parameterization

Parameterization is here described with reference to the EK280 keyboard and the above-mentioned example.

Alternatively, parametrization can be carried out using the *enSuite* program. The paths which are subsequently described can be found in *enSuite* under "[Parameterize online](#)" > "[Parameters](#)".

a) Set input mode of high-frequency pulse generator (input 2):

- Press the key ▼ until "*Md.l2*" is displayed.
- Press the ENTER key. ⇒ The set value flashes.
- Repeatedly press one of the ▲ or ▼ arrow keys until the text "*HF pulses*" flashes.
- Press the ENTER key to confirm the value setting. Input can be canceled using the ESC key.

b) Set pc value of high-frequency pulse generator (input 2):

- Press the key ▼ until "*cp.l2*" is displayed.
- Press the ENTER key. ⇒ The set value flashes.
- Move the cursor with the ► or ◀ arrow keys to the digits and update them with the ▲ or ▼ arrow keys to the cp value of the pulse generator connected to input 2.
- Press the ENTER key to confirm the value setting. Input can be canceled using the ESC key.

c) Set parameter for low-frequency pulse generator (input 1):

- Set the parameters for the low-frequency pulse generator on input 1 as described in ⇒ section 4.1.

d) Setting automatic conversion:

- Move the cursor to tab "*Serv.*" and to the comparison function mode "*MdCmp*" via the following path:
Serv. → Volume → Actual volume → Volume comparison → MdCmp
- Press the ENTER key. ⇒ The actual parameterized value flashes.
- Repeatedly press one of the ▲ or ▼ arrow keys until the text "*HF-LF sw.ovr*" flashes.
- Press the ENTER key to confirm the set value. It is possible to abort the entry by pressing the ESC key.
- Furthermore, set the source for the fail-safe input (NF input) to "*Sc1Vm*" to "*I1=Count. inp*".
- And the priority source (HF transmitter) "*Sc2Vm*" to "*I2=comp.inp*".

4.5 Volume comparison

In contrast to a pulse comparison, different technology pulse encoders (e.g., LF vs. HF) can also be compared during a volume comparison. As a result, the pulse generators can monitor one another and establish damage to a pulse generator and/or for example, the impeller of a turbine wheel counter.

This procedure was implemented according to the ⇒ specification "prEN 12405-3: 2013, section 6.8.1".

Here, the method is described using a low-frequency pulse generator at input 1 and a high-frequency pulse generator at input 2.

Starting with device version V2.30, there is volume comparison as well as the "HF-LF switchover" function. This can be set under the "*MdCmp*" menu in the "*Actual volume*" area:

- 0 = no comparison.
- 1 = HF-LF switching.
- 2 = Vol. comparison

If the function is active, the volumes are recorded in internal intermediate counters (*Cmp.1* and *Cmp.2*) before they are added to the measured volume counter "*Vm*".

```

CMP.1      0000000000.0000 M3
CMP.2      0000000000.0000 M3

```

The currently leading counter drives the counter reading "*Vm*". Thus, there is the possibility that the *Vm* counter reading is generated either by the LF or the RF transmitter (alternately).

In addition to pulse counting, the two counters are compared and evaluated as a function of the parameterized limit values. The limit values are divided into 3 different limits:

- 1) Deviation limit "*Dev.L*" If the counter reading difference of the internal counters exceeds the parameterized limit value, a warning is emitted "3" (counter deviation at input x) based on the low counter reading.
If the limit value is set to "0", the monitoring is deactivated.
(Limit value recommendation from the standard = $3min \times Qmax$)
- 2) Failure limit "*FailL*" If the counter reading difference of the internal counters exceeds the parameterized limit value, warning "2" (error at input x), is emitted based on the low counter reading.
If the limit value is set to "0", the monitoring is deactivated.
(Limit value recommendation from the standard = $60min \times Qmax$)

- 3) Overflow limit "*Ovfil*" If the counted volume of internal counters exceeds the parameterized limit value, the warnings and alarms of the previous limits are deactivated and the comparison starts in a new interval.
 If the limit value is set to "0", the monitoring is deactivated.
(Limit value recommendation from the standard = $100h \times Q_{max}$)

4.5.1 Requirements

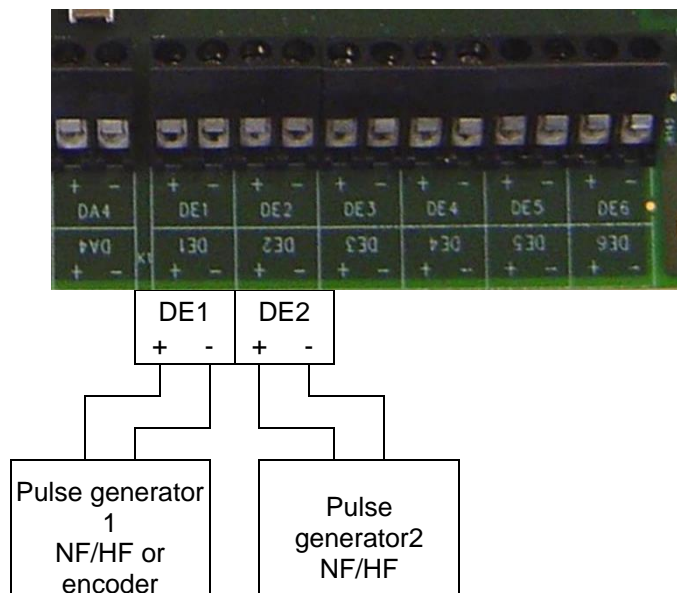
- EK280 from FW V2.30 and higher
- Parameterization program enSuite from V3.0.1 and higher
- The mechanical gas meter must have 2 pulse generators (LF, HF) or an encoder and a pulse generator
- If HF pulses are to be registered in the EK, the external voltage supply for the EK280 must be available
- To configure this function, the administrator lock must be open.
- Before the parameterization is carried out, the pulse generators must already be connected to the inputs of the EK280.

4.5.2 Pulse generator connection



DANGER!

For EK280 with internal power supply, the mains voltage must be switched off before opening the housing, ensure it is not turned back on and verify that there is no voltage.



- Connect the first pulse generator (e.g., LF/reed contact) of the gas counter to terminal "DE 1" of the EK280.
- Connect the second pulse generator (HF/NAMUR sensor) to terminal "DE2".

4.5.3 Parameterization

In order parameterize this function, you can use the parameterization program enSuite to connect to the EK280.

Using enSuite select "*Parameterize online*" > "*Parameter*":

Volume > Operational volume > Volume comparison:

<i>Comparison mode "MdCmp"</i>	2 = Volume comparison
<i>Source 1 for operational volume "Sc1Vm"</i>	Input 1
<i>Source 1 for operational volume "Sc1Vm"</i>	Input 2
<i>Deviation limit "Dev.L"</i>	e.g., 3 min × Qmax
<i>Failure limit "FailL"</i>	e.g., 60 min × Qmax
<i>Overflow limit "OvfilL"</i>	e.g., 100 h × Qmax

4.6 Pulse comparison

Pulse generator errors can be detected early using pulse comparison.

In principle, any two pulses may be compared. The process for securing the custody transfer measurement using a pulse generator on input 2 to monitor the pulse generator on input 1, is described here.



The pulse generator used for pulse comparison must have the same pulse value (cp value)!

With regard to the "HF pulse input with automatic switching" described in ⇒ section 4.4 the calibration lock does not need to be open and the input 2 terminal does not need to be sealed, as they are not used in custody transfer measurement. This also means that, should the pulse generator on input 1 fail, the volume will not be incremented further, but instead a warning will be given.

If the "maximum number of disturbance pulses" set in the "pulse window per disturbance pulses"

- the message "*I2 Pulse cmp*" momentary status "*Stat*" and status register "*SReg*" is entered,
- "W" flashes in the display.

An impulse window is also calculated, to allow a certain number of error pulses, below which the message is removed from the momentary status. Until the status register is cleared by the user the message and the "W" in the display will remain permanently (unless another warning is generated).

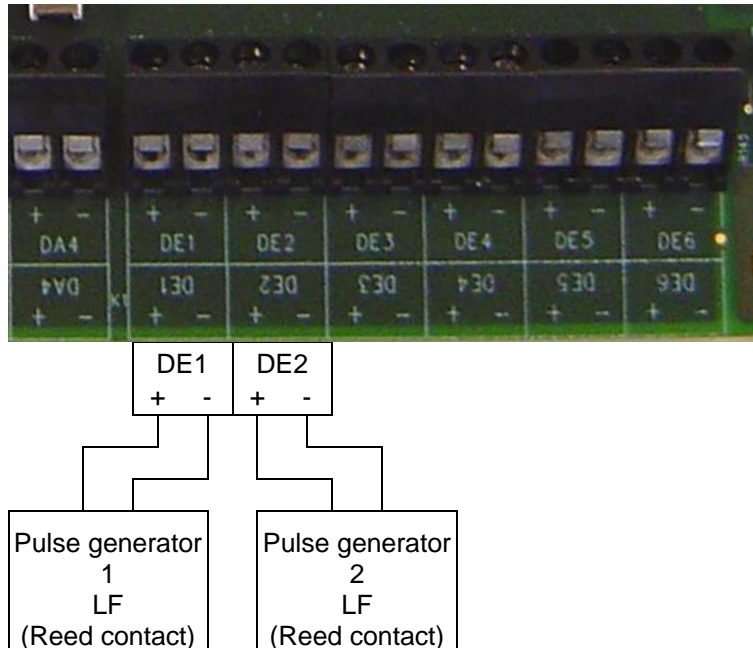
The status message can then be used, for example to create an archive entry or to switch an output.

4.6.1 Pulse generator connection



DANGER!

For EK280 with internal power supply, the mains voltage must be switched off before opening the housing, ensure it is not turned back on and verify that there is no voltage.



- Connect the low frequency pulse generator (LF reed contact) of the gas meter used for the custody transfer measurement to terminal "DE1" of the EK280.
- Connect the second low frequency pulse generator (LF reed contact) to terminal "DE2".

4.6.2 Parameterization

To program input 2 for the pulse comparison with input 1, send the following parameter file to the EK280 using the parameterization program enSuite (⇒ section 3.6 [Send parameter file](#), p.28):

- *EK280 - Input 2 = Pulse Comparison with input 1 (*)*

The deviation amount between the two pulse generators, above which a warning is triggered, is editable. The default is 4 ("maximum number of disturbance pulses") within a 4000 pulse ("pulse window per disturbance pulses").

This setting can be updated using the EK280 keypad or with enSuite:

a) On the "Serv." display tab of the EK280 keypad:

- | | | | | | |
|------------------|---|---------------|---|--------------|--|
| <i>Data book</i> | > | <i>Inputs</i> | > | <i>L1.I2</i> | Maximum number of disturbance pulses (i.e., 4) |
| <i>Data book</i> | > | <i>Inputs</i> | > | <i>L2.I2</i> | Pulse window per disturbance pulses (i.e., 1000) |

a) With enSuite under "[Parameterize online](#)" > "[Parameter](#)":

- | | | | | | |
|------------------|---|---------------|---|--|---|
| <i>Data book</i> | > | <i>Inputs</i> | > | <i>Limit 1 for monitoring status input 2 "L1.I2"</i> | Maximum number of disturbance pulses (i.e., 4) |
| <i>Data book</i> | > | <i>Inputs</i> | > | <i>Limit 2 for monitoring input 2 "L2.I2"</i> | Factor for pulse window per disturbance pulses (i.e., 1000) |

- The maximum number of error pulses is *L1.I2* (i.e., here 4).
- The pulse window is *L1.I2* × *L2.I2* (i.e., here 4 × 1000 = 4000).

4.7 Monitoring the load at measurement conditions Qm in the archive

The EK280 offers the possibility of monitoring the loads of connected counters. In this way it can be ascertained whether pressure should be increased slowly or a valve/flap be opened suddenly during commissioning of the plant. In this case there is a risk that the connected counter (this is particularly critical with a turbine) will be subjected to a pressure shock and may be damaged (bearing damage).

Monitoring will not be constant but is started only when a threshold value is exceeded. When this is exceeded, recording will commence at the most rapid interval of 2 seconds. The last 5000 rows of the measured load of input 2 (Q2) will be archived in flexible archive 12. The maximum record size is 5000 rows.



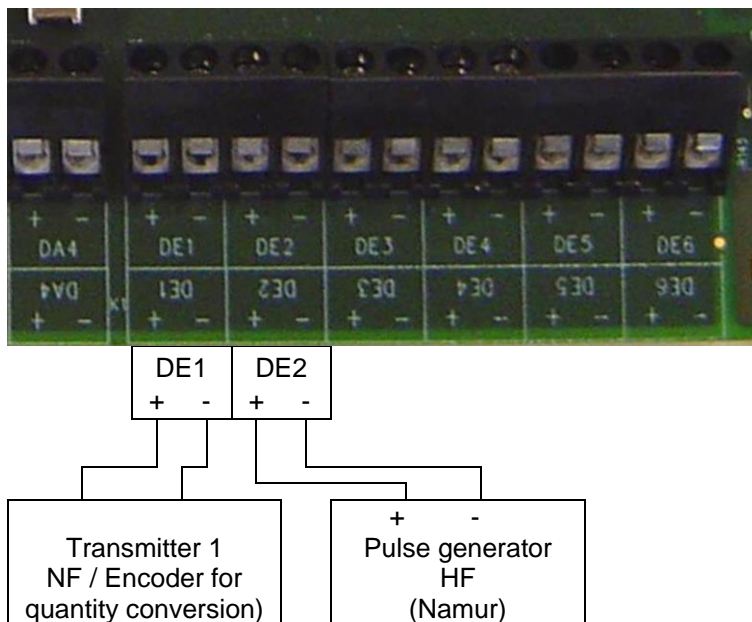
*The HF probe of the gas meter (A1S / A1R) must be connected to input 2!
The EK280 must be mains supplied in order to be able to record the pulses from the HF probe!*

4.7.1 Pulse generator connection



DANGER!

For EK280 with internal power supply, the mains voltage must be switched off before opening the housing, ensure it is not turned back on and verify that there is no voltage.



- Connect the LF pulse generator (LF reed contact) or the encoder of the gas meter for the calibrating metering period to terminal "DE1" of the EK280.
- Connect the HF pulse generator (HF Namur) to terminal "DE2".

4.7.2 Parameterization

For programming Input 2 as the measuring input for HF acquisition, use the parameterization program enSuite to send the following parameters to EK280 (⇒ section 3.6, p. 28):

- *EK280_xvx. - Application: Qm monitoring (Q2-HF) and storage in Archive 12 (*)*

After loading of the file, it is also still necessary to set the pc value for input 2 (HF) and the limit, above which any load excess is to be recorded. This limited is set at the factory to 20.0 m3/h. You can change this using the EK280keyboard or enSuite (opening of the calibration lock is not required)

a) On the "Serv." display tab of the EK280 keypad:

- | | |
|---|--|
| <i>Volume > Actual Volume > Parameter Settings > QbOW</i> | Limit value, above which recording must take place (e.g., 20 m3/h) |
| <i>Volume > Actual Volume > Parameter Settings > cp.I2</i> | Pc-value for the HF input (e.g., 21982.3 l/m3) |

b) With enSuite under "Parameterize online" > "Parameter":

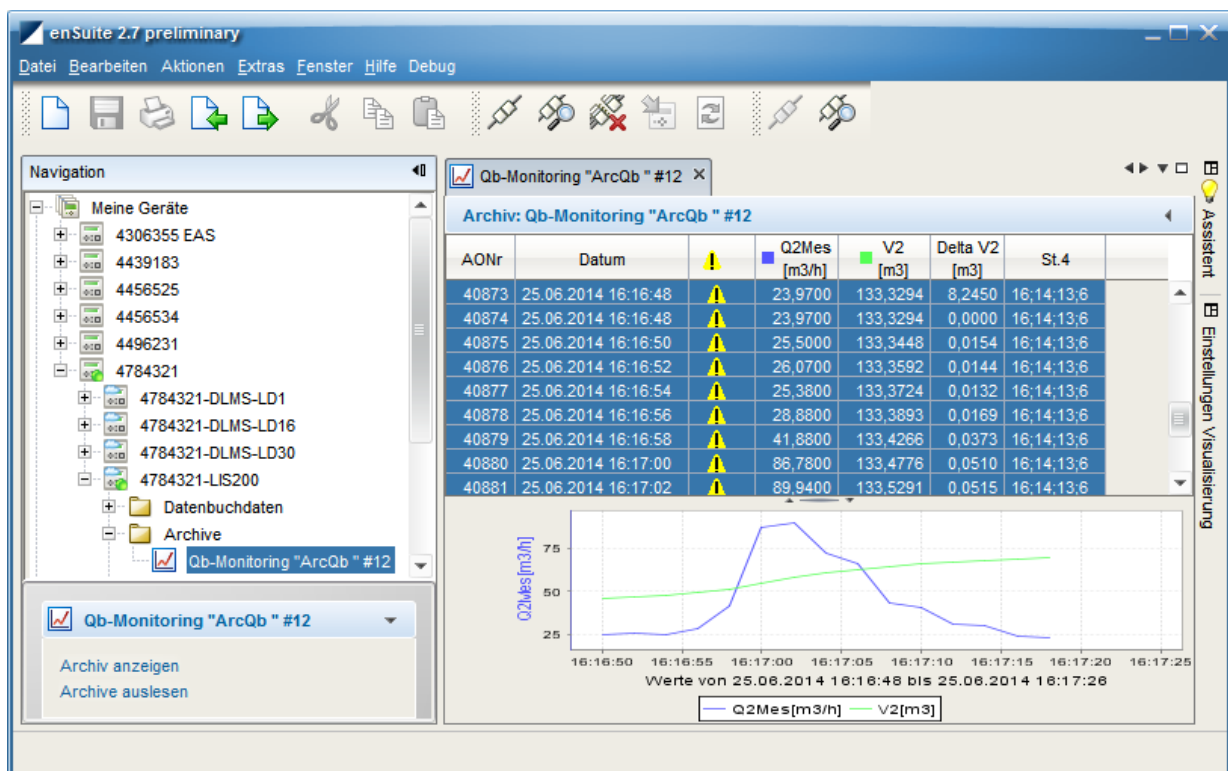
- | | |
|---|---|
| <i>Volume > Actual Volume > Settings > QbOW</i> | Limit, above which recording should take place (e.g.20 m3/h)
(but this is shown as "lower warning threshold" in enSuite) |
| <i>Volume > Actual Volume > Settings > cp.I2</i> | Pc-value for the HF input (e.g., 21982.3 l/m3) |

4.7.3 Evaluation with enSuite

If "overrunning" of a gas meter is suspected, enSuite may be used to read out Archive 12 and display it.

It is first necessary to read it out via enSuite.

- Set up a connection to EK280.
- In the left task area, select the option "*Readout archives*".
- Mark the *Archive 12* (Qb-Monitoring "ArcQb") and select the desired period of time.
- Use "*Start readout*" to read out the archive and allow the enSuite database to take it over.
- Displaying the archive contents:
- In "*navigation area*" of enSuite you select the requisite device in order to display the archive:



4.8 Parameterizing the Qm/Qb load display



Setting of the source for the load display (Qm/Qb) is only possible from software version 2.20 of the EK280.

The operational and standard loading is normally obtained from the input information (encoder or LF pulses) from input 1. Consequently, it cannot follow rapid load changes in time.

The output of the loading in the form of an HF signal via output 2 / 3 (for conversion into a proportional current signal) is therefore supplied after a delay. To ensure that the indicated load can follow such changes in a timely manner, another input may be chosen as a source for the load indication. A suitable input would be input 2 which should be connected to the HF signal of the gas meter (A1S or A1R).

It is particularly suitable for use in the combination with an encoder on input 1, whereas the display of the operational and standard loading takes place via the HF transmitter on input 2. As a result, the HF output of the EK280 can respond more quickly to input fluctuations.



An external power supply for the EK280 is essential for this purpose, as is the provision of HF pulses by the gas meter (A1S/A1R).

Since no calibration values are involved, the settings for the required values can be implemented without opening the calibration lock.

a) Setting the load source

- Move the cursor in tab *"Serv."* to *"Volume" > "Actual volume" > "Parameter settings" > "Sc.Qm"*
- Press the ENTER key. ⇒ The actual parameterized value flashes.
- Repeatedly press one of the arrow keys ▲ or ▼ until the text *"Input 2"* flashes.
- Press the ENTER key to confirm the set value. It is possible to abort the entry by pressing the ESC key.

b) Setting the high frequency pulse generator's input mode:

- Press the key ▼ until *"Md.I2"* is displayed.
- Press the ENTER key. ⇒ The set value flashes.
- Repeatedly press one of the ▲ or ▼ arrow keys until the text *"HF pulses"* flashes.
- Press the ENTER key to confirm the value setting. Input can be canceled using the ESC key.

c) Setting the high frequency pulse generator's cp value:

- Press the key ▼ until *"cp.I2"* is displayed.
- Press the ENTER key. ⇒ The set value flashes.
- Move the cursor with the ► or ◀ arrow keys to the digits and update them with the ▲ or ▼ arrow keys to the cp value of the pulse generator connected to input 2.
- Press the ENTER key to confirm the value setting. Input can be canceled using the ESC key.

4.9 Error curve correction

The error curve correction of the measured flow rate and measured volume is supported by firmware version V2.51 and higher.

This functionality was implemented according to the ⇒ specifications prEN 12405-3:2013, section 4.2.1 – 4.2.3) and fulfils the requirements of ⇒ EN 12405-1, section 4.4.



This functionality is available only when ordered with the EK280.

4.9.1 Functionality

This error curve correction offers the possibility to correct the measuring failure of the measured flow rate and measured volume of a mechanical meter (e.g., turbine meter) on the basis of its calibration data.

The correction depends on the measured flow rate (not on the Reynolds number).

The calculation of the actual, percentage failure can be done in 2 different ways:

- On the basis of at least 6 sampling points of the calibration curve, by means of linear interpolation according to EN12405-1 (common use). With the EK280 up to 10 sampling points are possible.
- On the basis of parameterized 5th order polynomial coefficients by means of the calibration curve according to EN12405-1.

The sampling points are recorded during the calibration process at a specified test pressure of the gas meter and, if necessary, the polynomial coefficients are calculated from this. This test pressure must be entered in the device parameterization.

The actual percentage failure is calculated through the measured points or the polynomial coefficients, based on the actual measured flow rate value. With this percentage failure, the actual correction factor will be generated.

4.9.2 Working method

Since the correction is not possible over the entire measured range and therefore limited by two conditions:

4.9.3 Limited by actual pressure

In order to be able to use the correction, the actual measured pressure must be within the two limits for pressure measurements:

$$p_{MinC} \leq p_{meas} \leq p_{MaxC}$$

Outside these ranges, the correction factor is "1". The limits for the pressure measurements are preset by the EK280 after entering a new test pressure value p_{test} , which was used during meter calibration.

The limit values are preset according to the following principle:

$$p_{MaxC} = 0,9 \times p_{test}$$

$$p_{MinC} = 1,1 \times p_{test}$$

After presetting, the limit values can be changed manually if required.

4.9.4 Limited by actual flow rate

Based on the calibration data of the mechanical meter, the measured flow rate sampling points of the calibration curve must be entered into the EK280. The lowest flow rate value is defined as Q_1 and the highest value with Q_n (e.g. Q_6 with 6 sampling points).

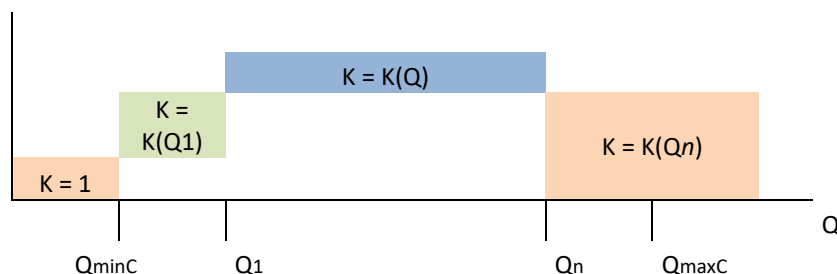
By entering the lowest and highest flow rate value, a range of Q_{MinC} and Q_{MaxC} will be preset in the following principle:

$$Q_{MinC} = 0,95 \times Q_1$$

$$Q_{MaxC} = 1,05 \times Q_n$$

After presetting, the limit values can be changed manually if required.

The following diagram will show the behavior of the correction factor:



With regard to the requirements of \Rightarrow EN 12405-1, section 4.4, the minimum pulse input frequency should be higher than 10 Hz. So there is a lower limit Q_{limit} defined which depends on the cp value:

$$Q_{limit} = 10 \times 3600 / \text{cp value [m}^3/\text{h]}$$

The correction only takes place if the flow rate Q_m exceeds the limit Q_{limit} . Below this limit, warning "6" is active in instance "3".

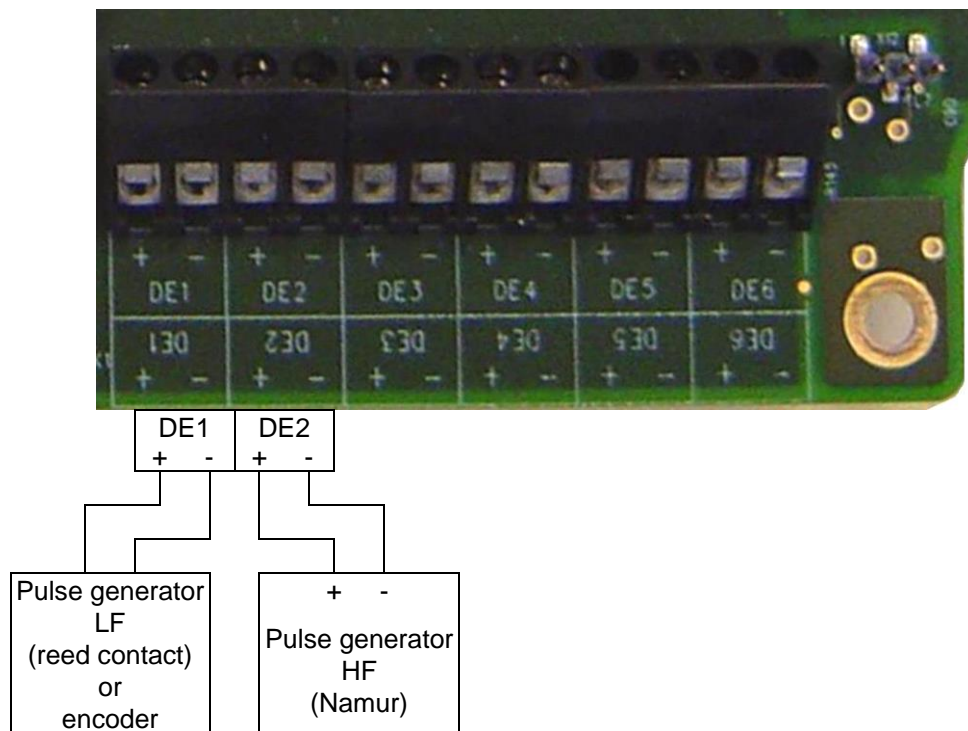
4.9.5 Premises

- EK280 V2.51 or higher
- enSuite V3.01 or higher is installed on the PC or laptop, incl. optical head.
- The gas meter supports HF pulses (via A1S or A1R HF transmitter)
- The data sheet for Error curve correction corresponding to ⇒ section 4.9.1
- For HF pulses the EK280 requires an external power supply.
- To change parameters the calibration lock must be opened.

4.9.6 Hardware wiring

**DANGER!**

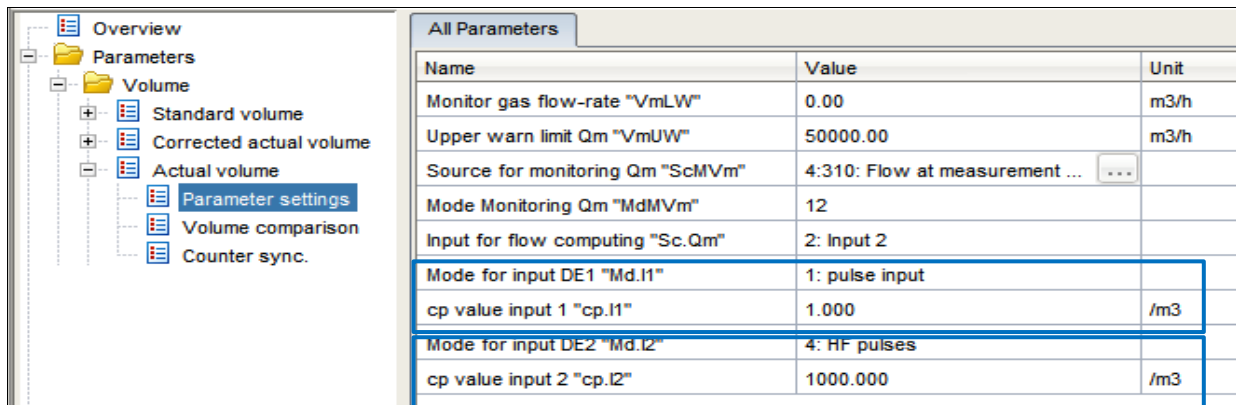
For EK280 with internal power supply, the mains voltage must be switched off before opening the housing, ensure it is not turned back on and verify that there is no voltage.



- Connect the absolute encoder of the gas meter to terminal "DE1" of the EK280. If no encoder is available, use an LF encoder (reed contact; E1).
- Connect the HF pulse generator (HF Namur) to terminal "DE2" of the EK280. Observe the polarity, i.e., connect the "+" of the impulse generator to the "DE2 +" and "-" with "DE2 -".

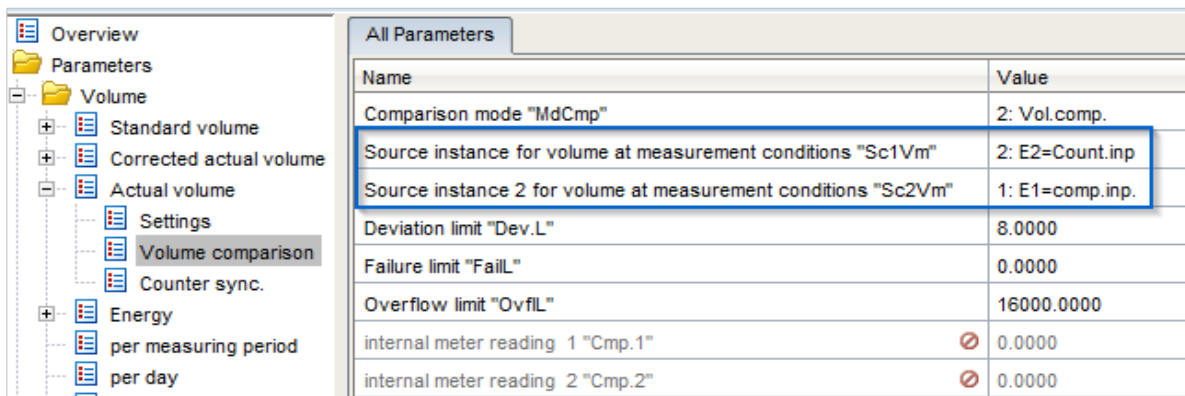
4.9.7 Parameterization

- Establish an optical connection to the EK280.
Note: The power supply of the EK280 is permanently switched on.
- Check under "*Parameters*" > "*Volume*" > "*Actual volume*" > "*Parameter settings*" the "*Mode for input 1 'Md.I1'*", the individual "*cp value for input 1 'cp.I1'*" (if a LF pulse transmitter is used).
The same applies for input 2: "*Mode for input 2 'Md.I2'*" and the "*cp value 'cp.I2'*" (HF pulse), depending on the meter index used and the HF probe:



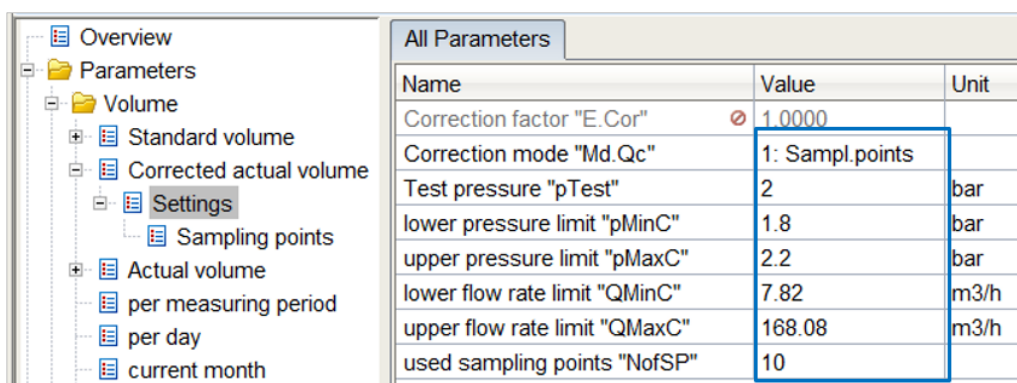
Name	Value	Unit
Monitor gas flow-rate "VmLW"	0.00	m3/h
Upper warn limit Qm "VmUW"	50000.00	m3/h
Source for monitoring Qm "ScMVm"	4:310: Flow at measurement ...	
Mode Monitoring Qm "MdMVm"	12	
Input for flow computing "Sc.Qm"	2: Input 2	
Mode for input DE1 "Md.I1"	1: pulse input	
cp value input 1 "cp.I1"	1.000	/m3
Mode for input DE2 "Md.I2"	4: HF pulses	
cp value input 2 "cp.I2"	1000.000	/m3

- Select as **source instance** (not source instance 2) for the measured volume the input with the connected high frequency (HF) sensor:



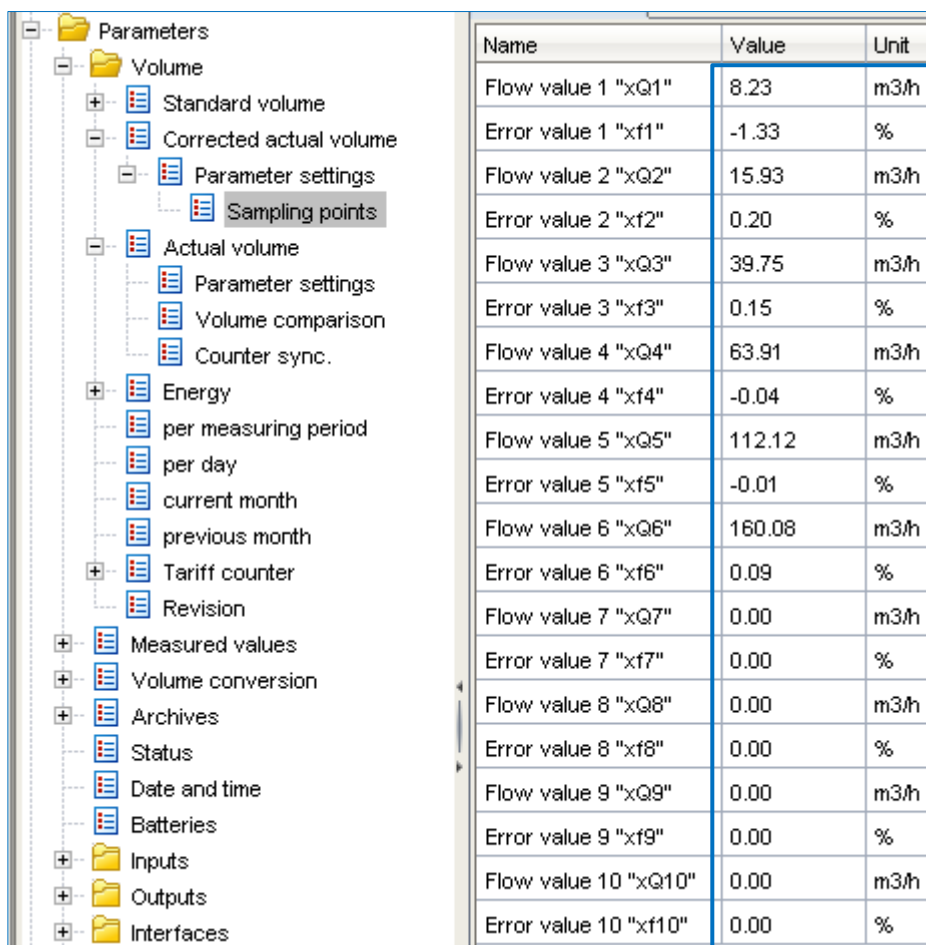
Name	Value
Comparison mode "MdCmp"	2: Vol.comp.
Source instance for volume at measurement conditions "Sc1Vm"	2: E2=Count.inp
Source instance 2 for volume at measurement conditions "Sc2Vm"	1: E1=comp.inp.
Deviation limit "Dev.L"	8.0000
Failure limit "FailL"	0.0000
Overflow limit "OvflL"	16000.0000
internal meter reading 1 "Cmp.1"	0.0000
internal meter reading 2 "Cmp.2"	0.0000

- Select the required "*Correction mode 'Md.Qc'*" under "*Parameters*" > "*Volume*" > "*Corrected actual volume*" > "*Parameter settings*" (calibration lock must be opened), the test pressure "*pTest*" and the number of "*used sampling points 'NofSP'*", depending on the calibration data sheet:



Name	Value	Unit
Correction factor "E.Cor"	1.0000	
Correction mode "Md.Qc"	1: Sampl.points	
Test pressure "pTest"	2	bar
lower pressure limit "pMinC"	1.8	bar
upper pressure limit "pMaxC"	2.2	bar
lower flow rate limit "QMinC"	7.82	m3/h
upper flow rate limit "QMaxC"	168.08	m3/h
used sampling points "NofSP"	10	

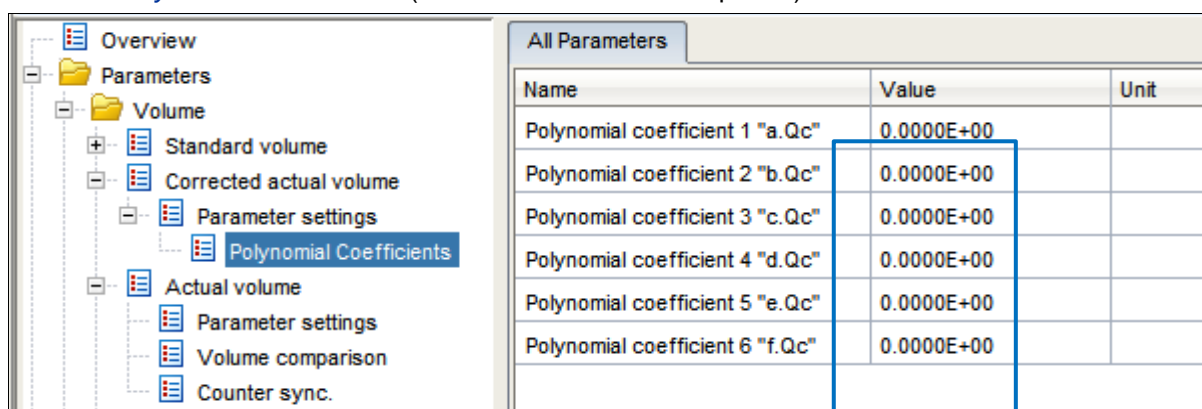
5. If the method “*Sampling points*” (*supp. points*) is used (see above), enter the Sampling points “*xQ1...10*” and “*xf1...10*” of the Error curve correction under “*Parameters*” > “*Volume*” > “*Corrected actual volume*” > “*Parameter settings*” > “*Sampling points*” (calibration lock must be opened):



Name	Value	Unit
Flow value 1 "xQ1"	8.23	m3/h
Error value 1 "xf1"	-1.33	%
Flow value 2 "xQ2"	15.93	m3/h
Error value 2 "xf2"	0.20	%
Flow value 3 "xQ3"	39.75	m3/h
Error value 3 "xf3"	0.15	%
Flow value 4 "xQ4"	63.91	m3/h
Error value 4 "xf4"	-0.04	%
Flow value 5 "xQ5"	112.12	m3/h
Error value 5 "xf5"	-0.01	%
Flow value 6 "xQ6"	160.08	m3/h
Error value 6 "xf6"	0.09	%
Flow value 7 "xQ7"	0.00	m3/h
Error value 7 "xf7"	0.00	%
Flow value 8 "xQ8"	0.00	m3/h
Error value 8 "xf8"	0.00	%
Flow value 9 "xQ9"	0.00	m3/h
Error value 9 "xf9"	0.00	%
Flow value 10 "xQ10"	0.00	m3/h
Error value 10 "xf10"	0.00	%

(example values)

If you are using the error curve method “*polynomial*”, enter the coefficients “*a-f.Qc*” under “*Parameters*” > “*Volume*” > “*Corrected actual volume*” > “*Parameter settings*” > “*Polynomial Coefficients*” (calibration lock must be opened):



Name	Value	Unit
Polynomial coefficient 1 "a.Qc"	0.0000E+00	
Polynomial coefficient 2 "b.Qc"	0.0000E+00	
Polynomial coefficient 3 "c.Qc"	0.0000E+00	
Polynomial coefficient 4 "d.Qc"	0.0000E+00	
Polynomial coefficient 5 "e.Qc"	0.0000E+00	
Polynomial coefficient 6 "f.Qc"	0.0000E+00	

6. As result, in practical operation the error curve correction takes place when the pressure is within the pressure limits (\Rightarrow section 4.9.3) and also within the permissible flow rates (\Rightarrow section 4.9.4).

Depending on the correction mode used and within the permissible limits, the Correction factor "*E.Cor*" is calculated and displayed by the EK280 (\Rightarrow item 4).

This factor is used to calculate the flow rates Q_c and the corrected volume V_m :

$$Q_c = Q_m \times f(Q_m) = Q_m \times E.Cor$$

$$\Delta V_c = \Delta V_m \times f(Q_m) = \Delta V_m \times E.Cor$$

7. The corrected actual volume of the meter readings is counted in the counters "*Vc*", "*VcD*", "*VcA*" and "*VcT*" (\Rightarrow under: "*Parameters*" > "*Volume*" > "*Corrected actual volume*" > "*Corrected actual volume*"):

Parameters

Volume

Standard volume

Corrected actual volume

Actual volume

Energy

per measuring period

per day

Name	Value	Unit
Corrected volume, undisturbed quantity (index) "Vc"	0.0000	m3
Corrected volume, disturbance quantity "VcD"	0.0000	m3
Corrected volume, total quantity "VcT"	<div><div></div>0.0000</div>	m3
Corrected volume, adjustable counter "VcA"	0.0000	m3
Corrected flow "Qc"	<div><div></div>0.00</div>	---

5 Other number and status inputs

Inputs 2 to 6 (terminals DE2 to DE6) can be programmed with status or pulse inputs.

If input 2 is being used as a hedge for input 1 volume detection (⇒ section 4), it is no longer available here.

Each input can be programmed as described in the following ⇒ sub-sections with the following functions:

- Warning input active
- Warning input inactive
- Information input active
- Information input inactive
- Time-synchronous input
- Pulse comparison
- Metering pulse (not suitable for calibration)

Whereby:

- | | |
|--------------------|--|
| – active | The signal is valid, if the terminal poles are conductively connected. |
| – inactive | The signal is valid, if the terminal poles are not conductively connected (open). |
| – Notice input | A valid signal input generates an information message in the momentary status for the relevant input. |
| – Warning input | A valid signal input generates a warning message in the momentary status and status register for the relevant input. |
| – Time-synchronous | With a valid input signal the EK280 clock can be synchronized (set) to the full hour. |
| – Pulse comparison | A user-defined variation between two pulse generators generates a warning message in the momentary status and status register.
(⇒ section 4.5). |
| – Meter input | Usage as an additional meter input for a non-calibrated metering period. However, the values can be recorded in a flexible archive.
(⇒ section 5.6) |

5.1 Warning input active

Each of inputs 2 to 6 (terminals DE2 to DE6) can be programmed as active warning inputs. This means:

If the "+" and "-" poles of the electrical inputs are connected electrically,

- the message "8" is entered in the momentary status for the relevant input,
- the message "8" is entered in the status register for the relevant input.
- "W" flashes in the display.

When the input is reopened (pole no longer connected) the message disappears from the momentary status. Until the status register is cleared by the user the message and the "W" in the display will remain permanently (unless another warning is generated).

The status message can then be used, for example to create an archive entry or to switch an output.

To program an input as an active warning input, send the relevant parameter files from the following to the EK280 using the parameterization program enSuite (⇒ section [3.6 Send parameter file](#), p. 28):

- *EK280 - Input 2 = Warning signal active (*)*
- *EK280 - Input 3 = Warning signal active (*)*
- *EK280 - Input 4 = Warning signal active (*)*
- *EK280 - Input 5 = Warning signal active (*)*
- *EK280 - Input 6 = Warning signal active (*)*

5.2 Warning input inactive

Each of inputs 2 to 6 (terminals DE2 to DE6) can be programmed as inactive warning inputs. This means:

If the "+" and "-" poles of the electrical inputs are open (not connected electrically),

- the message "8" is entered in the momentary status for the relevant input.
- the message "8" is entered in the status register for the relevant input,
- "W" flashes in the display.

When the pole of the input terminal is connected, the message will disappear from the momentary status. Until the status register is cleared by the user the message and the "W" in the display will remain permanently (unless another warning is generated).

The status message can then be used, for example to create an archive entry or to switch an output.

A special "Warning input inactive" application is the tamper detector for a reed contact pulse generator.

To program an input as an inactive warning input, send the relevant parameter files from the following to the EK280 using the parameterization program enSuite (⇒ section [3.6 Send parameter file](#), p. 28):

- *EK280 - Input 2 = Warning signal not active (*)*
- *EK280 - Input 3 = Warning signal not active (*)*
- *EK280 - Input 4 = Warning signal not active (*)*
- *EK280 - Input 5 = Warning signal not active (*)*
- *EK280 - Input 6 = Warning signal not active (*)*

5.3 Information input active

Each of inputs 2 to 6 (terminals DE2 to DE6) can be programmed as active information inputs. This means: When the input "+" and "-" are electrically connected, the message "13" is entered in the momentary status of the relevant input.

The status message can then be used, for example to create an archive entry or to switch an output.

To program an input as an active information input, send the relevant parameter files from the following to the EK280 using the parameterization program enSuite (⇒ section 3.6 [Send parameter file](#), p. 28):

- *EK280 - Input 2 = Message signal active (*)*
- *EK280 - Input 3 = Message signal active (*)*
- *EK280 - Input 4 = Message signal active (*)*
- *EK280 - Input 5 = Message signal active (*)*
- *EK280 - Input 6 = Message signal active (*)*

5.4 Information input inactive

Each of inputs 2 to 6 (terminals DE2 to DE6) can be programmed as inactive information inputs. This means: When the input "+" and "-" are open (not electrically connected), the message "13" is entered in the momentary status of the relevant input.

The status message can then be used, for example to create an archive entry or to switch an output.

To program an input as an active information input, send the relevant parameter files from the following to the EK280 using the parameterization program enSuite (⇒ section 3.6 [Send parameter file](#), p. 28):

- *EK280 - Input 2 = Message signal not active (*)*
- *EK280 - Input 3 = Message signal not active (*)*
- *EK280 - Input 4 = Message signal not active (*)*
- *EK280 - Input 5 = Message signal not active (*)*
- *EK280 - Input 6 = Message signal not active (*)*

5.5 Time-synchronous input

Any of the inputs 2 to 6 (terminals DE2 to DE6) can be used as a time-synchronous input. This means: When the input poles are electrically connected, the clock is set to the full hour. However, the following conditions must be met:

- The input pulse must occur within one minute to or past a full hour. Whichever is the time on the EK280.
- There can be only one synchronization per hour.

To program an input as a time synchronous input, send the relevant parameter files from the following to the EK280 using the parameterization program enSuite (⇒ section 3.6 [Send parameter file](#), p. 28):

- *EK280 - Input 2 = Time sync. (*)*
- *EK280 - Input 3 = Time sync. (*)*
- *EK280 - Input 4 = Time sync. (*)*
- *EK280 - Input 5 = Time sync. (*)*
- *EK280 - Input 6 = Time sync. (*)*

It is recommended, to seal one input for time synchronization, to prevent misuse.

5.6 Additional metering input (Input 3)

Each of inputs 2 to 6 (terminals DE2 to DE6) can be programmed as inactive information input.



For the connection to inputs 2-6 as additional metering input, only low frequency reed contacts or transistor outputs with technical data in accordance with ⇒ section 3.6 [Send parameter file](#) (p. 28) (digital inputs) acc. to the Operating Instructions for EK280 are suitable.

In this way, it is possible, for example, to connect and use further gas meters (or any other kind of meter) with low frequency pulse output for recording. This means: If the "+" and "-" poles of the input x are of sufficient duration (i.e., are electrically connected accordance with the preset pulse and period duration, the input pulse is recognized and converted into a corresponding meter reading using the preset pc value (in the specified units). This may also, for example, be the number of persons who cross a light barrier, or the frequency with which a door is opened.



The use of the archived values for calibration purposes is only possible, if the input works as a "repeating meter", so that it is possible to access the "calibrated values of the transmitting device, where required!"

The first step only produces a display of the meter reading determined at input 3 (abbreviation "V3"). In a further application (⇒ section 5.6.1) an additional archive is set up which records the values accordingly.

The inputs are already programmed as pulse inputs at the factory so that a conversion is usually superfluous. To program input 3 back to metering, send the following parameter file to the EK280 using the parameterization program enSuite (⇒ section 3.6 [Send parameter file](#), p. 28):

- [EK280 - Input 3 = Counting input \(*\)](#)
- It is recommended to secure input 3 with a cover to prevent any misuse.

5.6.1 Archive for the additional metering input (Input 3)

For most applications, not only the current meter reading pursuant to ⇒ section 5.6 is needed, but recording in an archive is specified. The example below therefore details the hourly recording in accordance with the measuring period of the EK280 in a flexible archive.

For reliable activation of input 3 as a metering input and for recording in the flexible archive, you transmit the following parameter file to EK280 by means of the parameterizing program enSuite in the sub folder "[EK280](#)" / "[V2xx](#)" applications (⇒ section 3.6 [Send parameter file](#), p. 28):

- [EK280_2V2x - Application: Input 3=Counting input \(m3\) and hourly storage in flexible archive 13 \(*\)](#)

The input is set with the parameter file to the factory default setting. Hence it is then necessary to check and adjust the input parameters in accordance with ⇒ section 5.6.

The counter value appears both via input 3 and also in the Main Menu. The Main Menu is also set up with a display in the form of a "List" pursuant to ⇒ section 2.1.1. Accordingly, the counter value "V3" appears directly in the Main Menu.

In principle, the make-up of the archive is flexible. In this example, the following values are recorded hourly according to the parameter file.

Column	Specifications	Example
1	Global block number (line number of the entire assembly)	288535
2	Archive block number (line number of the current archive)	9413
3	Date and time	2014-01-29,16:00:00
4	V3 meter reading	2273986.0

Column	Specifications	Example
5	Messages in status register 3	0
6	Messages in the system status	13:15
7	Event causing data line to be archived	0x8104
8	Check sum result	CRC Ok

Here the archive is designed as a ring buffer and, in this example, has a buffer capacity of 1000 entries. This allows the most recent hourly readings for a period of more than one month to be recorded. However, special entries which may reduce the storage capacity are not allowed for.

Both hourly end values and changes in relevant values for this archive (e.g., counter status changes, date and time changes, etc.) and all alarms and warning messages are recorded.

In addition, a user list is available (⇒ sections [2.1.3](#) or [2.1.4](#)) which allows to display the following values:

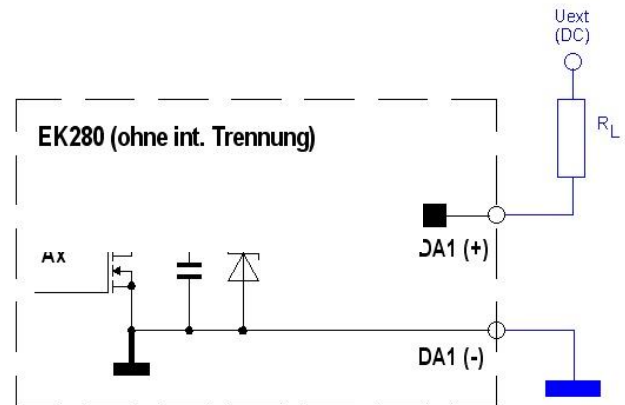
- 31:161 Meter reading at the most recent start of day
- 32:161 Meter reading at the most recent start of month

6 Outputs

The outputs of the EK280 are designed as "open collector transistor-outputs".

So that the internal battery is not placed under undue load, it is standard for the isolation of the outputs (galvanic separation) to be deactivated (\Rightarrow section 6.10).

The outputs are generally not suited to switching larger external loads (limit values: see section "Technical data" in the Operating Instructions)!



Various instruments can be connected to the digital output of the EK280. The outputs are preprogrammed for this purpose.

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

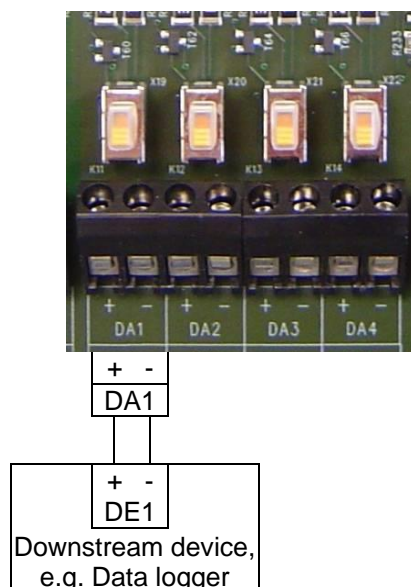
Output	Function
DA1	Pulse output for the total volume at base conditions "VbT" (cp.O1=0.1)
DA2	Pulse output for the total volume at measurement conditions "VmT" (cp.O2=0.1)
DA3	Status output for warnings (\Rightarrow section 10.2)
DA4	Status output for alarms (\Rightarrow section 10.2)

6.1 Connection of outputs



DANGER!

For EK280 with internal power supply, the mains voltage must be switched off before opening the housing, ensure it is not turned back on and verify that there is no voltage.



- Connect the device to one of the desired digital outputs (terminals "DA1" to "DA4") on the EK280.

6.2 LF pulse output (low frequency)

Each of the outputs 1 to 4 (terminals DA1 to DA4) can be programmed as a low-frequency pulse output.

6.2.1 Parameterization

Parameterization is carried out via the keyboard on the EK280.

Alternatively, parametrization can be carried out using the *enSuite* program. The paths which are subsequently described can be found in *enSuite* under "[Parameterize online](#)" > "[Parameters](#)".

a) Setting up the output mode:

- Move the cursor to register "[Serv.](#)" and along the following path to the mode for the corresponding output "[Md.O1](#)" to "[Md.O4](#)":
[Serv.](#) → [Outputs](#) → [Output 1](#) → [Md.O1](#)
[Serv.](#) → [Outputs](#) → [Output 2](#) → [Md.O2](#)
[Serv.](#) → [Outputs](#) → [Output 3](#) → [Md.O3](#)
[Serv.](#) → [Outputs](#) → [Output 4](#) → [Md.O4](#)



The low-frequency pulse output of the EK280 can be operated with active or inactive logic. The output mode must be programmed accordingly for this purpose (see below).

- Press the ENTER key. ⇒ The actual parameterized value flashes.
- Press one of the arrow keys ▲ or ▼ until the "[pulse+](#)" (Logic active) or "[pulse -](#)" (Logic inactive) text flashes.
- Press the ENTER key to confirm the value setting. Input can be canceled using the ESC key.

b) Setting up the source for the output:

- When in the corresponding menu press the ▼ key until "[Sc.O1](#)", "[Sc.O2](#)", "[Sc.O3](#)", or "[Sc.O4](#)" is displayed.
- Press the ENTER key. ⇒ The actual parameterized value flashes.
- Move the cursor to the digits using the ► or ◀ arrow keys and update them using the ▲ or ▼ arrow keys to a value specified in the table.

Sc.O...	Description
02:300_0	Vb Volume at base conditions (undisturbed)
02:301_0	VbD Volume at base conditions (disturbed)
02:302_0	VbT Volume at base conditions total (undisturbed + disturbed)
04:300_0	Vm Volume at measurement conditions (undisturbed)
04:301_0	VmD Volume at measurement conditions (disturbed)
04:302_0	VmT Volume at measurement conditions total (undisturbed + disturbed)

- Press the ENTER key to confirm the value setting. Input can be canceled using the ESC key.

c) Setting up the cp value for the output:



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

- When in the corresponding menu press the ▼ key until "[cp.O1](#)", "[cp.O2](#)", "[cp.O3](#)" or "[cp.O4](#)" is displayed.

- Press the ENTER key. ⇒ The actual parameterized value flashes.
- Move the cursor to the digits using the ► or ◀ arrow keys and update them using the ▲ or ▼ arrow keys to the desired cp value for the corresponding output.
- Press the ENTER key to confirm the set value. It is possible to abort the entry by pressing the ESC key.

d) Setting up period length and pulse duration.



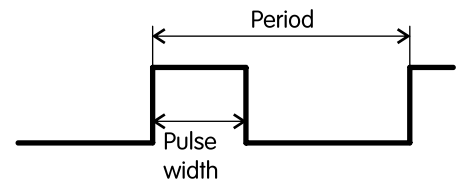
Parametrization of the period length and the pulse duration via the EK280 keyboard is only possible with software version 2.20 or later. Older software versions may be programmed using enSuite via ["Parameterize online"](#) > ["Parameters"](#) and the paths described (⇒ section 6.2.1).



The cycle duration and the pulse duration can be set as a multiple of 125 ms for each output. The cycle duration must always be longer than the pulse duration. The maximum output frequency is 4 Hz

a) Examples

Period		Pulse width		Output frequency
Per.O	in ms	PW.O	in ms	in Hz
2	250	1	125	4
4	500	2	250	2
8	1000	4	500	1
80	10000	40	5000	0.1



- When in the corresponding output menu press the key ▼ until ["Per01"](#), ["Per02"](#), ["Per03"](#) or ["Per04"](#) is displayed.
- Press the ENTER key. ⇒ The actual parameterized value flashes.
- Move the cursor to the digits using the ► or ◀ arrow keys and update them using the ▲ or ▼ arrow keys to set the desired period.
- Press the ENTER key to confirm the value setting. Input can be canceled using the ESC key.
- When in the corresponding menu press the key ▼ repeatedly until ["PW.01"](#), ["PW.02"](#), ["PW.03"](#) or ["PW.04"](#) is displayed.
- Press the ENTER key. ⇒ The actual parameterized value flashes.
- Move the cursor to the digits using the ► or ◀ arrow keys and update them using the ▲ or ▼ arrow keys to set the desired period.
- Press the ENTER key to confirm the value setting. Input can be canceled using the ESC key.

e) Setting up access permissions for the output parameters:



Parameterization of access authorizations for the output parameters via the EK280 keyboard is not possible! Parameterization may be done with enSuite in ["Parameterize online"](#) > ["Parameters"](#) > ["Outputs"](#) > ["Output 1"](#) to ["Output 4"](#).

6.3 Status output (signal output)

Each of the outputs 1 to 4 (terminals DA1 to DA4) can be programmed as a status output (signal output).

6.3.1 Parameterizing by keyboard



The use of enSuite parameterizing software is strongly recommended for parameterizing a status output (see below).

Parameterization with the keyboard on the EK280 is described below.

a) Setting up the output mode:

- Move the cursor to the tab "*Serv.*" and subsequently via the following path to the mode for the corresponding output "*Md.O1*" to "*Md.O4*":
Serv. → *Outputs* → *Output 1* → *Md.O1*
Serv. → *Outputs* → *Output 2* → *Md.O2*
Serv. → *Outputs* → *Output 3* → *Md.O3*
Serv. → *Outputs* → *Output 4* → *Md.O4*



The status outputs of the EK280 can be operated with active or inactive logic. The output mode must be programmed accordingly for this purpose (see below).

- Press the ENTER key. ⇒ The actual parameterized value flashes.
- Press one of the arrow keys ▲ or ▼ until the "*status+*" (Logic active: message is active, when the output is switched on.) or "*status-*" (Logic inactive: message is active, when the output is switched off) flashes.
- Press the ENTER key to confirm the value setting. Input can be canceled using the ESC key.

b) Setting up the status display for the output:

- When in the corresponding menu press the ▼ key repeatedly until "*SpO1*", "*SpO2*", "*SpO3*", or "*SpO4*" is displayed.
- Press the ENTER key. ⇒ The actual parameterized value flashes.
- Move the cursor to the digits using the ► or ◀ arrow keys and update them using the ▲ or ▼ arrow keys to a value specified in the table.

Key for the status pointer SpO:

a.mm_0s:b.c

- c = 0: Message comes, c = 1: Message comes or goes
- b = 1: Instance status, b = 2: System or overall status
- s = status number (1...9 for St.1 ... St.9)
- * mm = message number (1...16),
- a = 0: a message mm, a = 1: Message group from message 1 to mm

b) Examples

Sc.O...	Description
0.mm_0s:1.1 *	A report in a Status <i>St.1</i> to <i>St.9</i>
0.mm_02:2.1 *	A report in system status <i>StSy</i>
0.mm_01:2.1 *	A report in overall status <i>Stat</i>
1.mm_0s:1.1 *	Message group in system status <i>StSy</i>
1.mm_02:2.1 *	VmD: Actual volume disturbance quantity
1.mm_01:2.1 *	Message group in overall status <i>Stat</i>

- * mm = report-number (1...16), s = status number (1...9 for St.1 ... St.9)

6.3.2 Parameterizing with enSuite

The setting of the required report (or range) in particular can be conveniently set with enSuite.


The paths which are described below can be found in *enSuite* under:

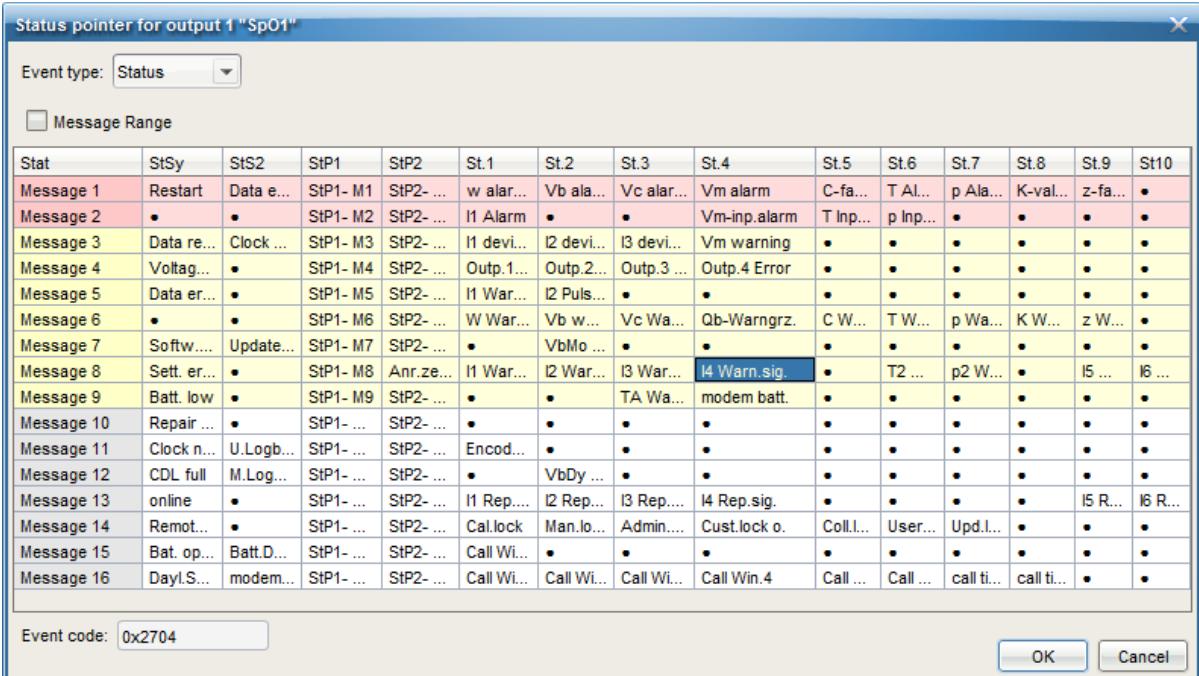
"[Parameterize online](#)" > "[Parameters](#)" > "[Outputs](#)"

a) Setting up the output mode:

- First of all, the mode must be set to the required value:
"[status+](#)" (Logic active: message is active, when the output is switched on.) or
- "[status-](#)" (Logic inactive: Report is active, when the output is switched off.)

b) Setting up the status pointer for the output:

- Under the menu heading "Status pointer for output x" operate the button with the 3 dots :
- If a specific single report is to be used as the reason for switching the output, make sure that the marking "*Message range*" (see below) in enSuite is switched off.
- Now the desired report can be clicked directly. The input is confirmed with "OK": in the example the input 4 is used as incoming report, and this is then to be passed on via output 4 (for easier understanding, the non-relevant reports have been masked):



Status pointer for output 1 "Sp01"

Event type:

☐ Message Range

Stat	StSy	StS2	StP1	StP2	St.1	St.2	St.3	St.4	St.5	St.6	St.7	St.8	St.9	St10
Message 1	Restart	Data e...	StP1- M1	StP2- ...	w alar...	Vb ala...	Vc alar...	Vm alarm	C-fa...	T Al...	p Ala...	K-val...	z-fa...	•
Message 2	•	•	StP1- M2	StP2- ...	I1 Alarm	•	•	Vm-inp.alarm	T Inp...	p Inp...	•	•	•	•
Message 3	Data re...	Clock ...	StP1- M3	StP2- ...	I1 devi...	I2 devi...	I3 devi...	Vm warning	•	•	•	•	•	•
Message 4	Voltag...	•	StP1- M4	StP2- ...	Outp.1...	Outp.2...	Outp.3 ...	Outp.4 Error	•	•	•	•	•	•
Message 5	Data er...	•	StP1- M5	StP2- ...	I1 War...	I2 Puls...	•	•	•	•	•	•	•	•
Message 6	•	•	StP1- M6	StP2- ...	W War...	Vb w...	Vc Wa...	Qb-Warngrz.	C W...	T W...	p Wa...	K W...	z W...	•
Message 7	Softw....	Update...	StP1- M7	StP2- ...	•	VbMo ...	•	•	•	•	•	•	•	•
Message 8	Sett. er...	•	StP1- M8	Anr.ze...	I1 War...	I2 War...	I3 War...	I4 Warn.sig.	•	T2 ...	p2 W...	•	I5 ...	I6 ...
Message 9	Batt. low	•	StP1- M9	StP2- ...	•	•	TA Wa...	modem batt.	•	•	•	•	•	•
Message 10	Repair ...	•	StP1- ...	StP2- ...	•	•	•	•	•	•	•	•	•	•
Message 11	Clock n...	U.Logb...	StP1- ...	StP2- ...	Encod...	•	•	•	•	•	•	•	•	•
Message 12	CDL full	M.Log...	StP1- ...	StP2- ...	•	VbDy ...	•	•	•	•	•	•	•	•
Message 13	online	•	StP1- ...	StP2- ...	I1 Rep...	I2 Rep...	I3 Rep...	I4 Rep.sig.	•	•	•	•	I5 R...	I6 R...
Message 14	Remot...	•	StP1- ...	StP2- ...	Cal.lock	Man.lo...	Admin...	Cust.lock o.	Coll.I...	User...	Upd.I...	•	•	•
Message 15	Bat. op...	Batt.D...	StP1- ...	StP2- ...	Call Wi...	•	•	•	•	•	•	•	•	•
Message 16	Dayl.S...	modem...	StP1- ...	StP2- ...	Call Wi...	Call Wi...	Call Wi...	Call Win.4	Call ...	Call ...	call ti...	call ti...	•	•

Event code:

- Click "OK" to accept the setting.

- For a message range (e.g., all alarms"), the switch "Message range" must be activated.
- Then the first two lines for example (report 1 and 2) may be marked. These are color marked: red = Alarm ; yellow = Warning ; gray = Information
- Consequently every alarm would lead to output switching.

Status pointer for output 1 "Sp01"

Event type:

☒ Message Range

Stat	StSy	StS2	StP1	StP2	St.1	St.2	St.3	St.4	St.5	St.6	St.7	St.8	St.9	St10
Message 1	Restart	Data e...	StP1- M1	StP2- ...	w alar...	Vb ala...	Vc alar...	Vm alarm	C-fa...	T Al...	p Ala...	K-val...	z-fa...	•
Message 2	•	•	StP1- M2	StP2- ...	I1 Alarm	•	•	Vm-inp.alarm	T Inp...	p Inp...	•	•	•	•
Message 3	Data re...	Clock ...	StP1- M3	StP2- ...	I1 devi...	I2 devi...	I3 devi...	Vm warning	•	•	•	•	•	•
Message 4	Voltag...	•	StP1- M4	StP2- ...	Outp.1...	Outp.2...	Outp.3 ...	Outp.4 Error	•	•	•	•	•	•
Message 5	Data er...	•	StP1- M5	StP2- ...	I1 War...	I2 Puls...	•	•	•	•	•	•	•	•
Message 6	•	•	StP1- M6	StP2- ...	W War...	Vb w...	Vc Wa...	Qb-Warngrz.	C W...	T W...	p Wa...	K W...	z W...	•
Message 7	Softw....	Update...	StP1- M7	StP2- ...	•	VbMo ...	•	•	•	•	•	•	•	•
Message 8	Sett. er...	•	StP1- M8	Anr.ze...	I1 War...	I2 War...	I3 War...	I4 Warn.sig.	•	T2 ...	p2 W...	•	I5 ...	I6 ...
Message 9	Batt. low	•	StP1- M9	StP2- ...	•	•	TA Wa...	modem batt.	•	•	•	•	•	•
Message 10	Repair ...	•	StP1- ...	StP2- ...	•	•	•	•	•	•	•	•	•	•
Message 11	Clock n...	U.Logb...	StP1- ...	StP2- ...	Encod...	•	•	•	•	•	•	•	•	•
Message 12	CDL full	M.Log...	StP1- ...	StP2- ...	•	VbDy ...	•	•	•	•	•	•	•	•
Message 13	online	•	StP1- ...	StP2- ...	I1 Rep....	I2 Rep....	I3 Rep....	I4 Rep.sig.	•	•	•	•	I5 R...	I6 R...
Message 14	Remot...	•	StP1- ...	StP2- ...	Cal.lock	Man.lo...	Admin....	Cust.lock o.	Coll.I...	User...	Upd.I...	•	•	•
Message 15	Bat. op...	Batt.D...	StP1- ...	StP2- ...	Call Wi...	•	•	•	•	•	•	•	•	•
Message 16	Dayl.S...	modem...	StP1- ...	StP2- ...	Call Wi...	Call Wi...	Call Wi...	Call Win.4	Call ...	Call ...	call ti...	call ti...	•	•

Event code:

- Press "OK" to accept the setting.
- After confirmation, the speed button "[Transfer changes to device](#)" in enSuite must be used to transmit the values finally to the EK280.

6.4 Time-synchronous output

Each of the outputs 1 to 4 (terminals DA1 to DA4) can be programmed as a time-synchronized output.

6.4.1 Parameterization

Parameterization is carried out via the keyboard on the EK280.

Alternatively, parametrization can be carried out using the *enSuite* program. The paths which are subsequently described can be found in *enSuite* under "[Parameterize online](#)" > "[Parameters](#)".

a) Setting up the output mode:

- Move the cursor to the tab "[Serv.](#)" and subsequently via the following path to the mode for the corresponding output "[Md.O1](#)" to "[Md.O4](#)":
[Serv.](#) → [Outputs](#) → [Output 1](#) → [Md.O1](#)
[Serv.](#) → [Outputs](#) → [Output 2](#) → [Md.O2](#)
[Serv.](#) → [Outputs](#) → [Output 3](#) → [Md.O3](#)
[Serv.](#) → [Outputs](#) → [Output 4](#) → [Md.O4](#)



The time-synchronized outputs of the EK280 can be operated with active or inactive logic. The output mode must be programmed accordingly for this purpose (see below).

- Press the ENTER key. ⇒ The actual parameterized value flashes.
- Press one of the arrow keys ▲ or ▼ until the text "*time sync+*" (Logic active) or "*time sync-*" (Logic inactive) flashes.
- Press the ENTER key to confirm the set value. It is possible to abort the entry by pressing the ESC key.

b) Setting up the source for the output:



*Parametrization of the source for the output via the EK280 keyboard is only possible with software version 2.20 or later.
Older software versions may be programmed using enSuite via "[Parameterize online](#)" > "[Parameters](#)" and the paths described (⇒ section 6.4.1)*

- When in the corresponding menu press the ▼ key until "*Sc.O1*", "*Sc.O2*", "*Sc.O3*", or "*Sc.O4*" is displayed.
- Press the ENTER key. ⇒ The actual parameterized value flashes.
- Move the cursor to the digits using the ► or ◀ arrow keys and update them using the ▲ or ▼ arrow keys to a value specified in the table.

Sc.O...	Description
01:143_0	for the beginning of each month at midnight
02:143_0	for the beginning of each month at 6am The day boundary "6am" (month boundary) can be changed via Serv. → Date and time → DayB.
01:142_0	for the beginning of each day at midnight
02:142_0	for the beginning of each day at 6am The day boundary 6am (month boundary) can be changed via Serv. → Date and time → DayB.
01:403_0	at the beginning of every hour

- Press the ENTER key to confirm the set value. It is possible to abort the entry by pressing the ESC key.

c) Setting up pulse duration:



*Parametrization of the pulse duration via the EK280 keyboard is only possible with software version 2.20 or later.
Older software versions may be programmed using enSuite via "[Parameterize online](#)" > "[Parameters](#)" and the paths described (⇒ sections 6.2.1, 6.4.1)*



The pulse duration can be set as a multiple of 125 ms for each output.

- When in the corresponding menu press the key ▼ until "*PW.O1*", "*PW.O2*", "*PW.O3*" or "*PW.O4*" is displayed.
- Press the ENTER key. ⇒ The actual parameterized value flashes.
- Move the cursor to the digits using the ► or ◀ arrow keys and update them using the ▲ or ▼ arrow keys to set the desired period.
- Press the ENTER key to confirm the value setting. Input can be canceled using the ESC key.

6.5 Event-output

Each of the outputs 1 to 4 (terminals DA1 to DA4) can be programmed as an event-synchronized output.

An event output basically functions as a status output (⇒ section 6.3), however the pulse duration can also be set. In the case of a status output, however, the pulse lasts as long as the corresponding status message.

6.5.1 Parameterizing by keyboard



The use of enSuite parameterizing software is strongly recommended for parameterizing a status output (see below).

Parameterization with the keyboard on the EK280 is described below.

a) Setting up the output mode:

- Move the cursor to the tab "*Serv.*" and subsequently via the following path to the mode for the corresponding output "*Md.O1*" to "*Md.O4*":
Serv. → *Outputs* → *Output 1* → *Md.O1*
Serv. → *Outputs* → *Output 2* → *Md.O2*
Serv. → *Outputs* → *Output 3* → *Md.O3*
Serv. → *Outputs* → *Output 4* → *Md.O4*



The low-frequency event outputs of the EK280 can be operated with active or inactive logic.(as a make contact or break contact). The output mode must be programmed accordingly for this purpose (⇒ below).

- Press the ENTER key. ⇒ The set value flashes.
- Press down one of the arrow keys ▲ and/or ▼ press repeatedly until the text „*Event(C)*“² or „*Event(O)*“³ flashes.

Whereby:

"(C)" = closer: When the message is activated, the output is switched on (closed).
 "(O)" = opener: When the message is activated, the output is switched off (opened).

- Press the ENTER key to confirm the set value. It is possible to abort the entry by pressing the ESC key.

b) Setting the status display for the output:

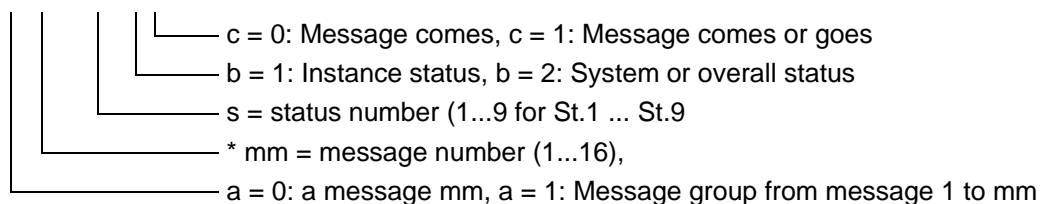
- In the corresponding output menu press the ▼ key repeatedly until "*SpO1*", "*SpO2*", "*SpO3*", or "*SpO4*" is displayed.
- Press the ENTER key. ⇒ The set value flashes.
- Move the cursor with the arrow keys ► or ◀ to the digits and change these with the arrow keys ▲ or ▼ to a value that is specified in the table.

² For software versions prior to V2.50, "*Event+*" (event +) is displayed.

³ For software versions prior to V2.50, "*Event-*" (event -) is displayed.

Key for the status pointer "*Sp.O...*":

a.mm_0s:b.c



c) Examples

Sz.A...	Description
0.mm_0s:1.1	A report in a Status <i>St.1</i> to <i>St.9</i>
0.mm_02:2.1	A message in system status <i>StSy</i>
0.mm_01:2.1	A report in overall status <i>StSy</i>
1.mm_0s:1.1	Message group in system status <i>StSy</i>
1.mm_02:2.1	VbSt Operating volume disturbance quantity
1.mm_01:2.1	Message group in overall status <i>Stat</i>

c) Set up pulse duration:



The pulse duration can be set individually in seconds for each output.

- In the corresponding output menu press the key ▼ until "*PerO1*", "*PerO2*", "*PerO3*" or "*PerO4*" is displayed.
- Press the ENTER key. ⇒ The set value flashes.
- Move the cursor with the arrow keys ► or ◀ to the digits and change these with the arrow keys ▲ or ▼ to the desired cycle duration.
- Press the ENTER key to confirm the set value. It is possible to abort the entry by pressing the ESC key.

6.6 HF Pulse outputs (high frequency)

6.6.1 Scope

The connection of a frequency-current converter, e.g., from the "Turck" company to one of the two HF outputs (DA2, DA3) of the EK280 allows output of a proportional current signal (0-20 mA or 4-20 mA) for display of the instantaneous load (Qb, Qm) or the metering period values (T, p). An output for volume Vb or Vm is not possible.

6.6.2 System preconditions

a) EK280

The EK280 from software version V2.10 upwards may output pulses proportional to the load (e.g., Qb or Qm) or measurements (T, p), through its HF output. These may be transformed into a current signal through a frequency/current converter (FSU), e.g., 0 or 4..20 mA.

The maximum output frequency is approx. 1000 Hz. If an FE260 is used for Ex isolation, the maximally usable output frequency is reduced to approx. 500Hz max.



An external power supply is needed for the EK280.

The current output the load determined with the EK280 directly. This loading should be made up in conjunction with an HF signal on the input side so as to facilitate a plausible calculation. However, in principle this load can also be determined from LF or encoder input signals. However, software filters cause significant damping here, so that control by means of this current signal is not recommended.

b) FE260 / FSU

Connection of an FSU to the FE260 via output 2 is possible from version V15 upwards. If the EK280 is installed in explosion-protected zone 1, an FE260 must be used for isolation of the outputs and the power supply in the event of explosion.

If output 3 of the EK280 is also to be routed through the FE260 as an F output, this is only possible with an FE260 built later than April 2014.

The maximum usable output frequency depends on the length of the cable between EK and FE.
(⇒ FE260 Operating Instructions, section 3.3.1)

6.6.3 Parameterization

Parameterization of the EK280 must be effected with the enSuite program, as this is the only way of setting all necessary parameters.

The parameters to be set will be found under the following menu headings.

Using the EK280 keypad: [Serv. → Outputs → Output 2](#)
 [Serv. → Outputs → Output 3](#)

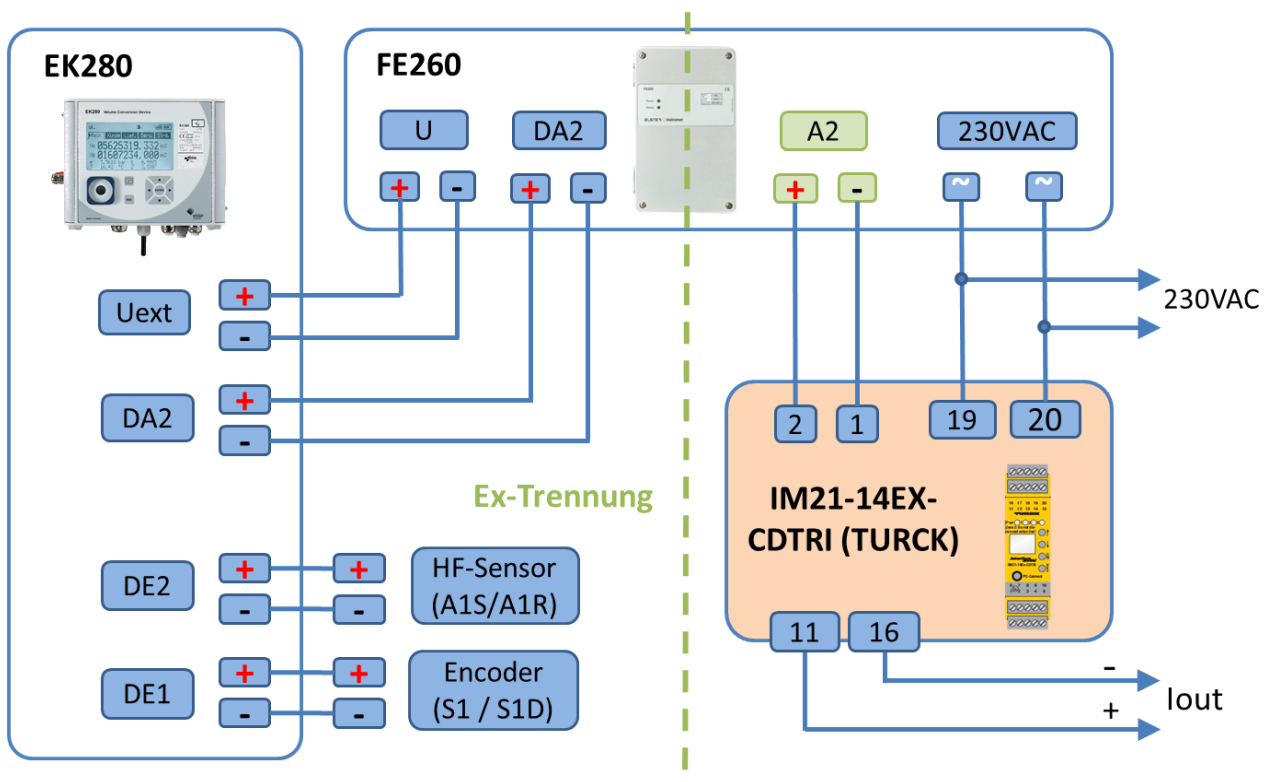
Using the enSuite software: ["Parameterize online" → "Parameters" → Outputs → Output 2](#)
 ["Parameterize online" → "Parameters" → Outputs → Output 3](#)

a) Important parameters:

Parameter	Abbreviation	LIS address	Value (examples)	Notes / meaning
Mode output 2	Md.O2	02:605	8	HF-pulses
Value to be output	Sc.O2	02:606	02:310_0	Qb
			04:310_0	Qm
Lower adjustment value	Aj1.O2	02:622	0	"0" m3/h
Upper adjustment value	Aj2.O2	02:623	1800	"1800" m3/h
Lower output frequency	f1.O2	02:624	0	"0" Hz
Upper output frequency	f2.O2	02:625	500	"500" Hz
Output access	Seal.	02:60E	No	Without access restriction

6.6.4 Connection example

Example: EK280 in Ex-Zone1; Ex isolation of outputs through the FE260; Use of a frequency/current converter type "TURCK – IM21-14EX-CDTRI" (Honeywell Order No.: 04015163)



Always comply with the information in the Operating Instructions for the equipment listed and with the relevant safety regulations.

6.7 Continuous pulse output

Each of the outputs 1 to 4 (terminals DA1 to DA4) can emit continuous pulses for testing purposes.

6.7.1 Parameterization

Parameterization is carried out via the keyboard on the EK280.

Alternatively, parametrization can be carried out using the *enSuite* program. The paths which are subsequently described can be found in *enSuite* under "[Parameterize online](#)" > "[Parameters](#)".

a) Setting up the output mode:

- Move the cursor to the tab "[Serv.](#)" and subsequently via the following path to the mode for the corresponding output "[Md.O1](#)" to "[Md.O4](#)":
[Serv.](#) → [Outputs](#) → [Output 1](#) → [Md.O1](#)
[Serv.](#) → [Outputs](#) → [Output 2](#) → [Md.O2](#)
[Serv.](#) → [Outputs](#) → [Output 3](#) → [Md.O3](#)
[Serv.](#) → [Outputs](#) → [Output 4](#) → [Md.O4](#)
- Press the ENTER key. ⇒ The set value flashes.
- Press one of the arrow keys ▲ or ▼ until the "[cont.pulse](#)" text flashes.
- Press the ENTER key to confirm the set value. You can abort the entry by pressing the ESC key.

6.8 Switching pulse inputs on or off

Each of the outputs 1 to 4 (terminals DA1 to DA4) can be permanently switched off (transistor closed, "switch open") or switched on (transistor conducts, "switch closed").

6.8.1 Parameterization

Parameterization is carried out via the keyboard on the EK280.

Alternatively, parametrization can be carried out using the *enSuite* program. The paths which are subsequently described can be found in *enSuite* under "[Parameterize online](#)" > "[Parameters](#)".

a) Setting up the output mode:

- Move the cursor to the tab "[Serv.](#)" and subsequently via the following path to the mode for the corresponding output "[Md.O1](#)" to "[Md.O4](#)":
[Serv.](#) → [Outputs](#) → [Output 1](#) → [Md.O1](#)
[Serv.](#) → [Outputs](#) → [Output 2](#) → [Md.O2](#)
[Serv.](#) → [Outputs](#) → [Output 3](#) → [Md.O3](#)
[Serv.](#) → [Outputs](#) → [Output 4](#) → [Md.O4](#)
- Press the ENTER key. ⇒ The actual parameterized value flashes.
- Press down one of the arrow keys ▲ or ▼ press repeatedly until the text "[off](#)" or "[on](#)" flashes.
- Press the ENTER key to confirm the set value. You can abort the entry by pressing the ESC key.

6.9 Connecting outputs to a PLC or an isolation amplifier



When connecting the outputs to a customer system (e.g., PLC) galvanic separation of both systems is strongly recommended. Especially when using or connecting the EK280 to a hazardous area (hazardous area 1), an external isolation amplifier (permitted for use in hazardous areas) or usage of the FE260 is required.



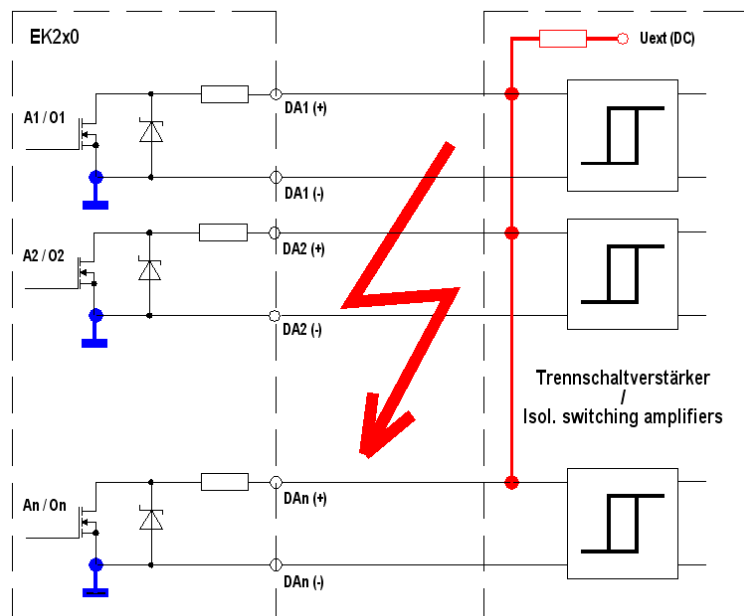
A galvanic separation is also recommended outside the hazardous area to exclude disturbances of the systems with each other. This can be carried out separately for each output via the internal slide switch. Alternatively, an external cut-off relay.



In particular, when connecting more than one output to a PLC, it must be taken into consideration that under normal operating conditions all 4 outputs have a common earth. Inputs on a PLC often have a common "plus" contact so that all outputs can be switched in parallel.

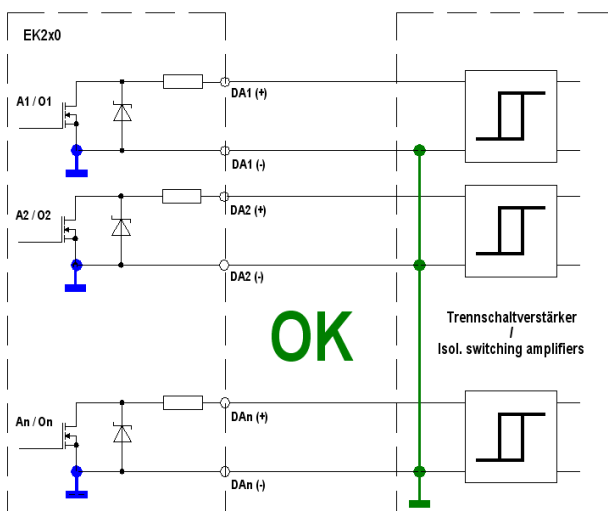
Impossible interconnections

of outputs to a PLC or an isolation amplifier with more than one input and a common plus potential in the device connected downstream:

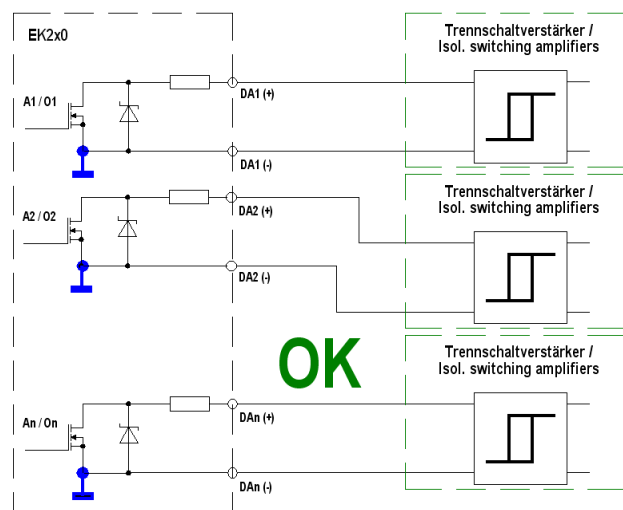


Possible correct interconnections:

Isolation amplifiers with common earth:



Separate isolation amplifiers for each output (recommended):



6.10 Isolating outputs (galvanic isolation)

Usually, all negative poles of the outputs are electrically connected to the motherboard.

For special applications, such as e.g., switching a positive terminal, each output can be electrically kept separate from the motherboard and from the other outputs.

In addition, interconnecting devices means that unwanted disturbance via ground loops can take place, which can be prevented by "isolating" outputs which are correspondingly used in such a manner.



CAUTION!

Reduced battery life

Activation of electrical isolation of outputs reduces battery life when operating the battery.

More information on the influences on battery life can be found in ⇒ section [11.1.4 Output isolation \(galvanic separation\)](#).



Galvanic separation of the outputs is not relevant with regard to hazardous areas. If using the EK280 in hazardous area 1 then a permitted, external separator is required which is suitable for use in hazardous areas.



An electrically isolated output only requires electricity provided that the output is active (switched on). It is possible to minimize the negative influence of an electrically isolated output on battery life by setting the pulse duration to as low a value as possible when using as a pulse output.

The parameterization software enSuite is suitable for this purpose.

To activate the electrical isolation of an output, please push the switch lever behind the relevant output terminal away from the terminal:

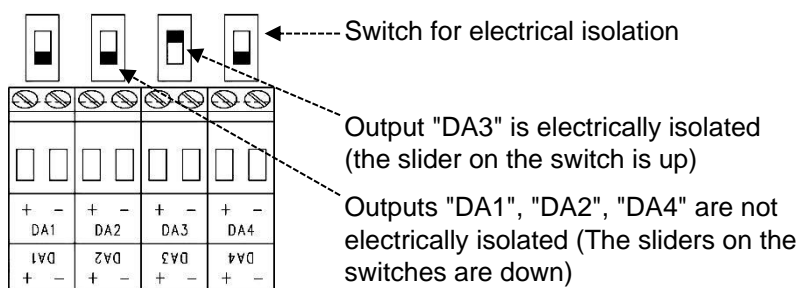
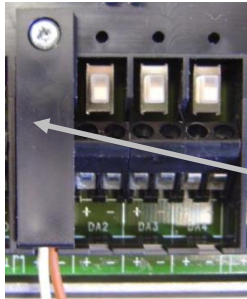


Fig. 4

6.11 Securing the outputs

Each output can be individually secured against manipulation by means of a terminal cover and also be sealed with an adhesive seal if required. Terminal covers are delivered in the bag of accessories. If necessary, screw into position via the terminals connected and then stick a seal onto the fixing screw (see below).



Output "DA1" is protected with a terminal cover.

An adhesive label can now be adhered over the screw for sealing.

Fig. 5



Sealing for securing pulse inputs and outputs is subject to national law (⇒ WELMEC 11.1, section 2.7.1).

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

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

7 Data transfer

7.1 Internal 2G- (GSM/GPRS), 3G (UMTS) and 4G modem (LTE cat.M1/NB1)

7.1.1 Distinguishing the internal modem types

Starting with software version 2.60, the EK280 also supports the 4G modem "CloudLink 5G" as well as the 2G types "ECM-GW120", "ECM-2G-UG350" (both GSM/GPRS) and "ECM-3G-UU270" (GSM/GPRS/UMTS).



Why is the 4G modem called "CloudLink 5G"?

The CloudLink 5G (=CL5G) is based on an nRF9160 modem from the manufacturer Nordic Semiconductor. It supports the 4G radio technologies LTE cat.M1 (=LTE-M) and LTE cat.NB1 (=NB-IoT). Both are also part of the 5G standards, which means that the 5G radio network is backward compatible with these technologies. Therefore, the new modem is considered "5G ready".

The actions described in the following sections of this Application manual differ in certain places depending on the built-in modem type. The following diagrams show the built-in modem type:

Module with one
ECM-GW120:



Module with one ECM-2G-UG350 or ECM-3G-UU270:



The ECM-2G-UG350 and ECM-3G-UU270 modem types are distinguished by their rating plate:

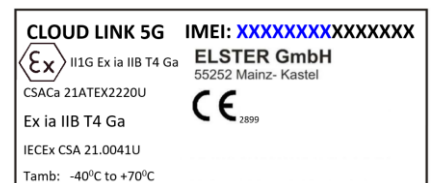
ECM-2G-UG350



ECM-3G-UU270



CloudLink 5G



If the module has already been installed in the EK280 at Elster (no retrofitting on site), the modem types can also be configured in the EK280 using the "MdxS3" setting in the following menu **"Serv. - Interfaces – internal modem – Hardware Configur."**:

2: Sierra GSM or
3: Sierra GPRS

7: Ublox GPRS

7: Ublox GPRS or
8: Ublox UMTS

11: Nordic nRF9160_NB1 or
12: Nordic nRF9160_M1

7.1.2 Inserting the SIM card

7.1.2.1 Inserting the SIM card with the 2G modem "ECM-GW120"

If an ECM-GW120 modem module is installed in the EK280 (⇒ photo), the SIM is inserted as follows:

- For EK280 with internal power supply, the mains voltage must be switched off before opening the housing



DANGER!

For EK280 with internal power supply, the mains voltage must be switched off before opening the housing, ensure it is not turned back on and verify that there is no voltage.

- Remove the four screws from the top of the EK280 and open it.
- For version with power supply unit: Disconnect the modem backup batteries if applicable from the internal power supply! (see Fig. 7)

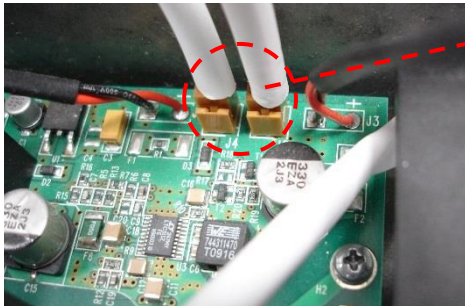


Fig. 6:

Disconnect the modem backup batteries from the power supply

Note:

The connection between the internal power supply and the modem remains! (siehe Fig. 7)

- For version without power supply unit: Disconnect the modem battery from the modem (siehe Fig. 7).

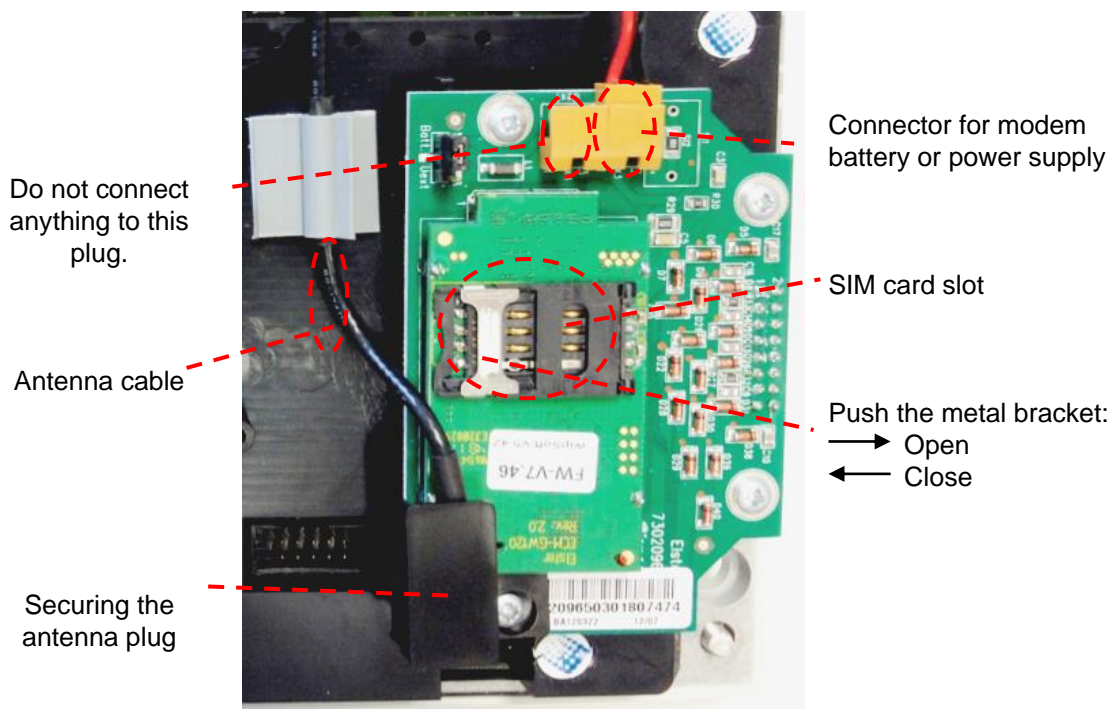


Fig. 7: Modem and SIM card slot

- Push the metal bracket in the SIM card slot back halfway, and flip open the cover.

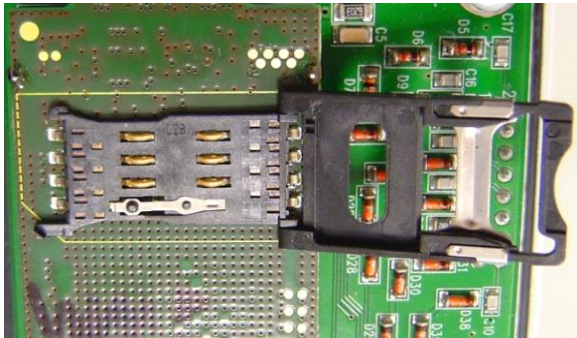


Fig. 8: open SIM card slot

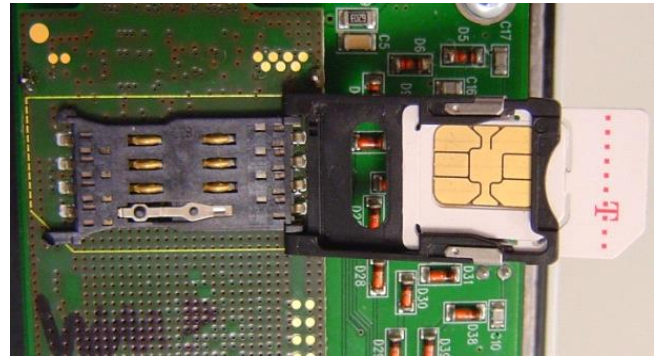


Fig. 9: SIM card inserted

- Insert the SIM card from the rear into the card slot (in the lid), so that the gold contacts face downwards in the closed end and the beveled side is at the open end of the lid.
 - Click the lid shut again and gently slide the metal bracket outwards.
- a) For version with power supply unit:

**Caution!**

The following order must be followed!
Failure to do so may destroy the internal power supply!

- The mains voltage remains switched off. It will only be switched on again after closing the EK280 housing!
 - Make sure the internal power supply is connected to the modem. (see Fig. 7)
 - If applicable, connect the modem buffer batteries in the EK280 to the internal power supply unit. If the modem batteries are used as buffer batteries on the power supply, two batteries must (Order No. 73017964) must always be connected!
- b) For version without power supply unit:
- Reconnect the modem battery to the modem.

Screw the EK280 housing back on.

7.1.2.2 Inserting the SIM card into the other Radio Modems

If one of the ECM-2G-UG350 (GSM/GPRS), "ECM-3G-UU270" (UMTS) or "CloudLink 5G" modems is installed in the EK280 (⇒ photo), the SIM is inserted as follows:

- For the EK280 with internal power supply, the mains voltage must be switched off before opening the housing.

**DANGER!**

For EK280 with internal power supply, the mains voltage must be switched off before opening the housing, ensure it is not turned back on and verify that there is no voltage.

- Remove the four screws from the top of the EK280 and open it.
- For version with power supply: if applicable, disconnect the modem backup batteries from the power supply (see Fig. 6: above).
Note: the connection between the internal power supply and the modem remains!
- For version without power supply unit: disconnect the modem battery from the modem.
- Unplug the modem from the power supply to avoid damage to the modem and SIM card. This applies also to an EK280 with power supply which is disconnected from the mains, in case a back-up battery supply is connected!



When the EK280 is used for the first time, the plug for the power supply is not yet connected to the modem. It has not been connected at the factory in order to avoid an unnecessary load on the battery!

- SIM card with the canted corner on the front left (→ (SIM contacts point downwards) into the SIM card holder (A) (left photo) until it clicks into place (right photo).

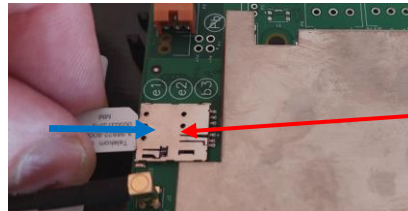


Connector for modem battery or internal power supply.

SIM card holder (B) (can be used as an alternative, operate as described in ⇒ section 7.1.2.1).

SIM card holder (A)

CloudLink 5G



SIM card holder in format 4FF (Nano)

- a) For version with power supply unit:



Caution!

The following order must be followed!

Failure to do so may destroy the internal power supply!

- The mains voltage remains remains switched off. It will only be switched on again after closing the EK280 housing!
- Make sure the internal power supply is connected to the modem. (see Fig. 7)
- If applicable, connect the modem buffer batteries in the EK280 to the internal power supply unit. If the modem batteries are used as buffer batteries on the power supply, two batteries must (Order No. 73017964) must always be connected!

- b) For version without power supply unit:

- Reconnect the modem battery to the modem.

Screw the EK280 housing back on.



Attention!

If the "ECM-2G-UG350" (GSM / GPRS) or "ECM-3G-UU270" (UMTS) modem is supplied with a battery (*), after connecting the modem to the battery, the modem must be quickly commissioned as described in ⇒ section 7.1.4 or 7.1.6 in order to avoid an unnecessary load on the modem battery! (Up until the first opening of a time window approx. 1 ... 5 mA, flow after the closing the first time window. After all the other time windows only 0.03 ... 0.09 mA flows!)

(*) In the case of switched off power supply, the modem battery is connected directly to modem or the power failure buffer battery on the internal power supply.

Caution!

If modem "ECM-2G-UG350" (GSM/GPRS) or "ECM-3G-UU270" (UMTS) is supplied by a battery (*), the modem must be commissioned in accordance with section 7.1.4 or 7.1.5 shortly after the battery has been connected to the modem to prevent any unnecessary load on the modem battery.

(Until a time window is opened for the first time, a current of around 1 – 5 mA will flow. After closing the first time window and after all other time windows, the current will be just 0.03 – 0.09 mA!)

(*) Modem battery connected directly to the modem or mains failure buffer battery on the internal power supply when the mains supply is switched off.

7.1.3 Unlocking the SIM card

a) If necessary, the SIM card must be unlocked, the PIN must be entered.

If the inserted SIM card's PIN ("Personal Identification Number") is activated, carry out the following instructions to unlock it:

- Move the cursor to the "*Serv.*" tab in the EK280's display, then to *Interfaces > internal modem > GSM and GPRS > PIN.*
- Press the *ENTER* key and enter the first PIN digit using the ▲ and ▼ arrow keys.



The PIN must be entered right aligned in the EK280!

- Move the cursor through the next digits using the ► key and enter them.
- After entering the last digit press the *ENTER* key, to save the input.
- Under "*P.Sta*" the "*Pin New*" is now ready for confirmation.
If "*P.Sta*" is not displayed, move the cursor down using the ▼ arrow keys.
- As soon as a communications time window is opened via the modem, the new PIN is used.
After a few seconds, under "*P.Sta*" the message "*PIN OK*" is displayed if the correct PIN was entered, or the message "*PIN Error*" if the PIN was incorrectly entered.



Further commissioning steps are necessary, before the mains power is switched on again on an EK280 with mains power unit.

7.1.4 GSM Operation



The 2G modem is already prepared for transmission via GPRS when delivered. If GSM operation (CSD) is explicitly desired, the modem must first be set to CSD mode according to the following section. Please note that CSD mode is no longer guaranteed by the provider.

The CloudLink 5G modem and the LTE network do not support CSD!

7.1.4.1 Parameterization



For parameterization of the EK280 you need a connection cable for the optical interface as well as the enSuite program. enSuite can be downloaded free of charge from the Honeywell website in the "Software Downloads" section:

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

a) Close time window / pre-allocate connections

To ensure that parameterization functions correctly, the time windows 1 to 4 need to be closed, and parameterization of the connections must be pre-allocated. To do this:

- Connect a PC or laptop with enSuite installed to the EK280 optical interface using the connection cable.
- Start enSuite and set up the communication link to the EK280 using the optical interface. (⇒ section 3.1 [Setting up the communication link to the EK280 via optical interface](#), p. 26)
- Send the following files to the EK280 (⇒ section 3.6 [Send parameter file](#), p. 28): [EK280 - Reset all types of connections and time windows to factory setting \(*\)](#)⁴
- Then wait a minute, for any communications activity in progress on the EK280 to be safely stopped.

b) Sending parameter file

- Depending on the type of the built-in modem (⇒ section 8.1.1) send one the following files to the EK280 (⇒ section 3.6 [Send parameter file](#), p. 28):

[ECM-GW120: EK280_xvx.. - int. ECM-GW120 - WipSoft \(GSM\) \(*\)](#)⁴

[ECM-2G-UG350: EK280_xvx.. - int. ECM-2G-UG350 CSD mode only \(*\)](#)⁴

[ECM-3G-UU270: EK280_xvx.. - int. ECM-3G-UU270 CSD mode only \(*\)](#)⁴



Attention: Even if a GPRS modem is only to be put into operation for CSD data transmission in the GSM network, there is a risk that unconscious costs will be incurred if no APN is entered in the EK280 AND if an APN is stored on the SIM. In this case, the modem uses the APN from the SIM and, as a result, every time a GPRS session is set up (at each time window start), a minimum data volume (e.g., 10 or 100 kB) will be available depending on the provider and the tariff invoice! You can avoid this by using one of the parameter files listed here.

- For the following customized settings and tests required, press "[Navigation](#)" on the left-hand side and then "[Parameterize online](#)" at the bottom of the navigation window.



All the values listed in enSuite under "[Parameters](#)" can be found on the "[Serv.](#)" display tab of the EK280 under the same path.

c) Setting time window for potential data retrievals

In the base configuration now displayed you can define cyclic time windows, during which data can be retrieved from the EK280 via the modem. There are two available time windows, which operate on EK280 battery power only and for versions of the EK280 with power supply there are two more, which operate only on mains voltage.



Make the battery power time windows only as long and frequent as absolutely necessary. Each time window reduces the EK280's battery life. The editable time windows are not directly accounted for in calculation of expected battery life of the "[Bat.R](#)" EK280 batteries. Therefore, the expected battery life is not updated when the time windows are changed. Past time windows and data transfers are however used in remaining battery and service life calculation for the "[BatRC](#)".

- The two battery-power time windows are set in the enSuite device window under:
 - [Parameters](#) > [Interfaces](#) > [Connections](#) > [Connection 1](#) and
 - [Parameters](#) > [Interfaces](#) > [Connections](#) > [Connection 2](#)

⁴ The "x" stands for the version of software on the device, e.g., "2v2".
The asterisk * stands for a small letter which indicates the version of the file, e.g., "a".

- The two mains voltage time windows are set under:
 - [Parameters > Interfaces > Connections > Connection 3](#) and
 - [Parameters > Interfaces > Connections > Connection 4](#)

If you do not need a time window, you can deactivate it by setting the time window start and end to the same value.

- Press the "[Transfer changes to device](#)" icon at the top of the enSuite window.

7.1.4.2 Checking radio network signal strength

Before starting a data transfer via the modem, you must ensure that there is adequate reception field strength.



Danger of death!

Ensure that before you switch the mains voltage on again, the housing on the EK280 is securely closed.



Caution!

Check whether the connection cable between the power supply and the internal modem is connected before you switch on the mains voltage. (See section 7.1.2.1 and 7.1.2.2)
The internal power supply may be destroyed if you fail to do this.

- For an EK280 with mains power supply, reconnect the mains voltage now.

a) Opening the test time window on the device



The test time window only needs to be open if none of the time windows 1 to 4 are open.



The use of a test time window is only possible if an appropriate power supply for the modem (mains supply or modem batteries) is available.

- Move the cursor to the "[Serv.](#)" tab in the EK280's display, then to [Interfaces > internal modem > CWTst](#)
- Press the ENTER key in order to enter the length of the test time window in minutes ⇒ "[0](#)" flashes.
- Move the cursor with the arrow keys ► or ◀ to the digits and change these with the arrow keys ▲ or ▼ to 10, for example.
- After the desired digits have been changed, press the ENTER key in order to confirm the input. It is possible to abort the entry by pressing the ESC key.



Only enable the test time window for battery operation for as long as is required. Each time the test time window is open, this reduces the life of the EK280 battery.

The editable time window is not directly reflected in the forecast of the remaining battery life of the batteries "[BatR](#)" of the EK280. Therefore, the forecast battery life is not changed if the time window is changed. Past time windows and data transfers are however used in the remaining battery capacity "[BatRK](#)" and remaining service life forecast calculation.

b) Display radio network signal strength

- Check whether corresponding bars indicating the reception level for the internal modem ("i") appear on the main EK280 display.
- Move the cursor to the "[Serv.](#)" tab in the EK280's display, then to [Interfaces > internal modem > Mobile Communicat. > Sign.](#)
- The percentage field strength is now displayed under [Sign.](#)
- In order to update the level display, move the cursor to [Sign.](#), please press the [ENTER](#) key of the EK280 and then wait approx. 30 seconds. This makes it possible to determine the best installation position for an external GSM antenna.



With a signal strength below 50% data transfer issues may be encountered. You can remedy this in the majority of cases with an external antenna, mounted somewhere suitable.

In case of LTE Cat.M1/NB1, a signal strength of about 20% can be sufficient.

7.1.4.3 Retrieving data with enSuite

a) Opening the test time window for the following test retrievals with enSuite



The test time window only needs to be open if none of the time windows 1 to 4 are open.

- If the communication link to the EK280 via the optical interface is not set up, it must be created. (⇒ section [3.1 Setting up the communication link to the EK280 via optical interface](#), p. 26)
- Select "[Navigation](#)" on the left-hand side of the enSuite window and then "[Parameterize online](#)" at the bottom of the navigation window.
- In the top of the device window open the path "[Parameters](#)" > "[Interfaces](#)" by clicking on the relevant plus signs, and then select "[internal modem](#)" (not the plus sign before).
- Click on the "[0](#)" value next to "[Test call acceptance window](#)" in the right-hand side of the window and enter a duration in minutes (i.e., 10), for the test time window for the test retrieval to remain open. For a battery-operated EK280 please do not enter an excessively long duration, as this will adversely affect the battery life.
- Press the "[Transfer changes to device](#)" icon at the top of the enSuite window. The EK280 is now available via the modem for the duration set.
- In enSuite press the "[Disconnect](#)" icon or "[Disconnect from all devices](#)" to terminate the optical interface communication link between enSuite and the EK280.

b) Test retrieval via the modem

- Set up the modem communication link (=CSD⁵ connection) between enSuite and EK280. (⇒ section [3.2 Setting up the communication link to EK280 via a modem](#), p. 26)
- Once the communication link is set up, you can carry out checks, for instance view certain parameters. To do this press "[Navigation](#)" on the left-hand side of the enSuite window and then "[Parameterize online](#)" in the bottom of the navigation window, then click on the plus sign next to "[Parameters](#)" and then its subsections.
- In enSuite press the "[Disconnect](#)" symbol or "[Disconnect from all devices](#)" to end the test retrieval.

⁵ CSD=Circuit Switched Data, line switched data service in the case of mobile telephony

7.1.5 National Roaming – Preferred Network Operator

If the SIM card used supports "National Roaming", the modem usually first tries to connect to its own mobile network. If there is no coverage (i.e., sufficient reception field strength) at the measuring point, the modem books itself into a "foreign" mobile network, which is permitted by the "National Roaming" option of the SIM card.



For information on which "foreign" mobile networks are supported for National Roaming, please contact your mobile network operator / provider. Only he can tell you bindingly which foreign networks he allows via "National Roaming".

If "National Roaming" is not to be used automatically, but a specific network operator is preferred, the preferred network operator must first be entered and then the "Network provider selection" mode must be specified.

7.1.5.1 Input „Preferred Network Operator“

To enter or change the information for the preferred network operator, navigate in the enSuite under "[Parameterize online](#)" > "[Parameters](#)" > "[Interfaces](#)" > „[Internal Modem](#)“ > „[Mobile Communicat.](#)“ to the entry "[Name of the preferred operator](#)" "[Oper.](#)".

The entry itself can be made either by the plain text name of the network (e.g., "t-online.de") or by its "Mobile Country & Network Code" (e.g., "26201"). If this parameter is deleted, the network provider selection mode is selected automatically, regardless of whether another mode is selected.



The entry in plain text must exactly match the provider's name specified on the SIM card. For example, "T-Mobile" is not identical to "telekom" or "T-D1". We therefore recommend that you enter the unique Mobile Country & Network code.



Lists of the possible "Mobile Country & Network Code" can be found on the Internet at <https://www.mcc-mnc.com/>, for example. However, the specifications of your mobile phone provider whose SIM cards you are using are binding.

7.1.5.2 Mode „Network Provider Selection“

To change the parameter for the "Network provider selection" mode, navigate in the enSuite via "[Parameterize online](#)" > "[Parameters](#)" > "[Interfaces](#)" > „[Internal Modem](#)“ > „[Mobile Communicat.](#)“ to the entry "[Mode for logging in with an operator](#)" „[MdLog](#)“.

Now select one of the three possible modes. The meaning and function are described in the following table.

MdLog	Function
0: auto	Default setting, i.e., the selection of the network is left to the modem. Which network is selected depends on the local reception conditions and the tariff properties of the SIM card inserted by the respective provider. A value parameterized under "Preferred network provider" is not taken into account during selection.
1: manually	The network parameterized under "Preferred network provider" is specified here. If it is not possible to log on to this network with the SIM card inserted, the modem is switched off and an error message is displayed in the connection status.
4: man. first	The modem tries to log in to the network specified under "Preferred network provider". If this is not possible, however, the modem is not switched off, but a new logon attempt is started, in which the network selection is left to the modem (analogous to mode 0: auto). If this logon attempt is also unsuccessful, the modem is switched off and a corresponding error message is displayed in the connection status.



The mode "1: manual" should only be selected if it is certain that

1. *the 'preferred network operator' is also authorized by the mobile operator which provided the SIM cards with the 'national roaming' option*
and
2. *there is also sufficient coverage (i.e., receiving field strength) at the measuring point for the preferred network.*

For these reasons, this mode can only be selected via the optical interface and keyboard and should only be selected after the volume corrector has been installed on site. After selecting this mode, it is strongly recommended to open a (test) time window to check whether the modem was able to log into the parameterized network.

7.1.6 TCPserv operation (GPRS, UMTS or LTE cat.M1/NB1)

In this modem operating mode, you can access the EK280 via the network (Ethernet, TCP/IP), to which your retrieval system is connected, i.e., you do not require an additional retrieval system modem. Data transfer is normally faster than with GSM operation, as explained in ⇒ section 7.1.4.

Here the radio modem in the EK280 functions as a TCP-Server and may be addressed by a TCP client that is listed in its readout software through a static IP address. To allocate a static IP to the radio modem during the setup of the data transmission session, they must (together with their network provider) maintain a virtual private network (VPN) which must be enabled on the SIM used in the modem.

7.1.6.1 Parameterization



A modem parameterized for TCP / IP operation can still be called up via a CSD⁶ link (GSM operating mode ⇒ section 7.1.4). However, a CSD connection cannot consist of a TCP connection at the same time: only one after the other!

The CloudLink 5G modem and also the LTE network do not provide CSD!



For parameterization of the EK280 you need a connection cable for the optical interface as well as the enSuite program. enSuite can be downloaded free of charge from the Honeywell website in the "Software Downloads" section:

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

a) Closing the time windows

In order that the parameterization works correctly the time windows 1 to 4 must be closed. To do this:

- Connect a PC or laptop with enSuite installed to the EK280 optical interface using the connection cable.
- Start enSuite and set up the communication link to the EK280 over the optical interface. (⇒ section 3.1 [Setting up the communication link to the EK280 via optical interface](#), p. 26)
- Select "[Navigation](#)" on the left-hand side and then "[Parameterize online](#)" at the bottom of the navigation window.
- In the top of the device window open the path "[Parameters](#)" > "[Interfaces](#)" by clicking on the relevant plus signs, and then select "[Call time windows](#)".
- In call windows 1 to 4 set start and end to the same value for each one and then select the "Transfer changes to device" icon at the top of the enSuite window.
- Then wait a minute, for any communications activity in progress on the EK280 to be safely stopped.

⁶ CSD=Circuit Switched Data, circuit-switched data service in the case of mobile telephony.

b) Sending parameter file

- Depending on the built-in modem type (⇒ section 8.1.1), send the following parameter file to the EK280 (⇒ section 3.6 Send parameter file, p. 28):
 ECM-GW120: *EK280_xvx.. - int. ECM-GW120 - TCPserv (CSD/TCPserv/FTP/NTP (*)*⁷
 ECM-2G-UG350: *EK280_xvx.. - int. ECM-2G-UG350 CSD/TCPserv/FTP/NTP (*)*⁷
 ECM-3G-UU270: *EK280_xvx.. - int. ECM-3G-UU270 CSD/TCPserv/FTP/NTP (2G) (*)*^{7, 8}
 or *EK280_xvx.. - int. ECM-3G-UU270 TCPserv/FTP/NTP (2G+3G) (*)*^{7, 8}
 CloudLink 5G: *EK280_xvx.. - int. CloudLink TCPserv/FTP/NTP (4G+5G LTE-M1) (*)*⁷
 or *EK280_xvx.. - int. CloudLink TCPserv/FTP/NTP (4G+5G LTE-NB1) (*)*^{7, 8}



When using the parameter file "...ECM-3G-UU270 CSD/TCPserv/FTP/NTP (2G) (*)" the modem generally logs into the 2G network (GPRS). As such, the higher data rates which are possible in the 3G network (UMTS) cannot be used.

When using the parameter file "...ECM-3G-UU270 TCPserv/FTP/NTP (2G+3G) (*)" the modem preferably logs into the 3G network (UMTS) if it is locally available. The modem only uses the 2G network (GPRS) if no 3G network is available locally. However beware: In the German 3G networks (Telekom, Vodafone, O2), the CSD service (Circuit Switched Data) is not supported!!!!

Summary

If you want to use the CSD data transmission in Germany, you must also operate the modem in the 2G network! In other countries, you may need to clarify the circumstances with your network provider!



When using the parameter file "... int. CloudLink TCPserv/FTP/NTP (4G+5G LTE-NB1) (*)", the modem logs into the Narrowband IoT network (NB-IoT, LTE cat.NB1). In this both the data volume as well as the transmission speed are limited. The exact conditions depend on the network provider and the selected tariff. For details please contact your mobile network provider.

- For the following customized settings and tests required, press "[Navigation](#)" on the left-hand side and then "[Parameterize online](#)" at the bottom of the navigation window.



All the values listed in enSuite under "[Parameters](#)" can be found on the "Serv." display tab of the EK280 under the same path. However, it is not possible to enter the following APN data via keyboard but must be entered via the enSuite parameterization software.

c) Configure individual parameters

- In the top of the device window open the path "[Parameters](#)" > "[Interfaces](#)" > "[internal modem](#)" by clicking on the relevant plus signs, and then select "[Mobile Communicat.](#)".
- On the right-hand side of the window you will now see several values, in which the following must be entered:

⁷ The "x" stands for the software version on the device, e.g., "2v5".

The asterisk * stands for a small letter which indicates the version of the file, e.g., "a".

⁸ ⇒ see also next info block

Value	Input	
GPRS access point name " <i>APN</i> "	These values vary according to the SIM card and VPN (Virtual Private Network) in use. The values to be entered can normally be obtained from your IT department or SIM card provider. The user name for ECM-2G and ECM-3G is limited to max. 30 characters.	
APN user name " <i>UName</i> "		
APN password " <i>PwAPN</i> "		
IP port " <i>Port</i> "	"Port" means the TCP port no. of the retrieval system in use.	
GPRS authentication protocol " <i>AutPr</i> "	0 = <i>None</i> 1 = <i>CHAP</i> (default) 2 = <i>PAP</i>	Depending on the provider, the protocols specified on the left can be used to log on to the GPRS network. Consultation with the provider may be required.



If you fail to input an Access Point Name (APN), the APN that is saved on the SIM is used. Since this is usually a public APN (no access to a VPN) and since a dynamic IP address is allocated when a GPRS session with a public APN is set up, the TCP server function cannot be used! This is because a static IP address would be needed for this purpose. In such a case, the modem could only be used as TCP client.

Attention

Without the input of an APN there is the risk that unspecified costs may be incurred, as with every set up through a GPRS provider and based on a corresponding tariff a minimum data volume (e.g., 10 or 100 kB) will be billed!

- Press the "*Transfer changes to device*" icon at the top of the enSuite window.
- If required (i.e., with the aid of the enSuite user list) two further addresses for a "Domain Name System" can be entered in addresses 3:0794.0 and 3:0795.0. This is however not essential.

d) Setting time window for potential data retrievals

In the base configuration now displayed you can define time windows, during which data can be retrieved cyclically from the EK280 via the modem. There are two available time windows, which operate on EK280 battery power only and for versions of the EK280 with power supply there are two more, which operate only on mains voltage.



Make the battery power time windows only as long and frequent as absolutely necessary. Each time window reduces the EK280's battery life.

*The editable time windows are not directly accounted for in calculation of expected battery life of the "*Bat.R*" EK280 batteries. Therefore, the expected battery life is not updated, when the time windows are changed. Past time windows and data transfers are however used in remaining battery and service life calculation for the "*BatRC*".*

- The two battery-power time windows are set in the enSuite device window under:
 - *Parameters > Interfaces > Connections > Connection 1* and
 - *Parameters > Interfaces > Connections > Connection 2*
- The two mains voltage time windows are set under:
 - *Parameters > Interfaces > Connections > Connection 3* and
 - *Parameters > Interfaces > Connections > Connection 4*

If you do not need a time window, you can deactivate it by setting the time window start and end to the same value.

- Press the "*Transfer changes to device*" icon at the top of the enSuite window.

7.1.6.2 Checking Radio Network Signal strength

⇒ section 7.1.4.2 Checking radio network signal strength (S. 74)

7.1.6.3 Display of the Radio Network Operator

- In the top of the device window open the path "*Parameters*" > "*Interfaces*" > "*Internal modem*" > "*Cellular*".
- The network operator is now displayed under "*Prov.*"



In the case of a CloudLink 5G modem, the Mobile Network Code (MNC) is displayed instead of the operator's name. The list of European network operators can be found, for example, at https://en.wikipedia.org/wiki/List_of_mobile_network_operators_of_Europe.

7.1.6.4 Retrieving data with enSuite

a) Opening the test time window for the following test retrievals with enSuite



The test time window only needs to be open if none of the time windows 1 to 4 are open.



The use of a test time window is only possible if an appropriate power supply for the modem (mains supply or modem batteries) is available.

- If the communication link to the EK280 via the optical interface is not set up, it must be created. (⇒ section 3.1 [Setting up the communication link to the EK280 via optical interface](#), p. 26)
- Select "*Navigation*" on the left-hand side of the enSuite window and then "*Parameterize online*" at the bottom of the navigation window.
- In the top of the device window open the path "*Parameters*" > "*Interfaces*" by clicking on the relevant plus signs, and then select "*internal modem*" (not the plus sign before).
- Click on the "*0*" value next to "*Test call acceptance window*" in the right-hand side of the window and enter a duration in minutes (i.e., 10), for the test time window for the test retrieval to remain open. For a battery-operated EK280 please do not enter an excessively long duration, as this will adversely affect the battery life.
- Press the "*Transfer changes to device*" icon at the top of the enSuite window. The EK280 is now available via the modem for the duration set.
- In enSuite press the "*Disconnect*" or "*Disconnect from all devices*" icon to terminate the optical interface communication link between enSuite and the EK280.

b) Test call up through a GSM modem connection

- Set up the modem communication link between enSuite and EK280. (⇒ section 3.2 [Setting up the communication link to EK280 via a modem](#), p. 26)
- Once the communication link is set up, you can carry out checks, for instance view certain parameters. To do this press "*Navigation*" on the left-hand side of the enSuite window and then "*Parameterize online*" in the bottom of the navigation window, then click on the plus sign next to "*Parameters*" and then its subsections.
- In enSuite press the "*Disconnect*" symbol or "*Disconnect from all devices*" to end the test retrieval.

c) Test call up through the TCP/IP network (incl. radio network)

- Set up the network communication link between enSuite and the EK280. (⇒ section 3.3 [Setting up the communication link to EK280 via a network \(TCP/IP\)](#), p. 27)
- Once the communication link is set up, you can carry out checks, for instance view certain parameters. To do this press "*Navigation*" on the left-hand side of the enSuite window and then "*Parameterize online*" in the bottom of the navigation window, then click on the plus sign next to "*Parameters*" and then its subsections.

- In enSuite press the "[Disconnect](#)" symbol or "[Disconnect from all devices](#)" to end the test retrieval.

7.1.7 Hiding APN access data between two "market partners"

The EK280 has two independent interfaces that can be used for remote reading. If both interfaces are used with GPRS modems by two different market partners (e.g., network operator and supplier), it is often desired that the users cannot view the APN access data. This prevents misuse of SIM cards if they are stolen.

To use this function, the following parameter files are available, which can be individually transferred to the EK280 using the enSuite software. The settings refer to the access rights for the "Administrator" and the "Data reader".

1. [Lock APN data - administrator modem at terminals, data reader internal modem](#)
→ Administrator access uses the terminal interface (e.g., external FE260)
→ The "data reader" party uses the internal interface (radio modem/ethernet card).
2. [Lock APN data - administrator internal modem, data reader modem at terminals](#)
→ Administrator access uses the internal interface (radio modem/ethernet card)
→ The "data reader" party uses the terminal interface (e.g., FE260).



If the read and write rights for one party are removed, the return to the factory settings is only possible with the calibration switch open!

To reset the setting, i.e., the parameters can be seen under both access rights, there is an additional file
→ [Reset locking of APN data](#).

7.1.8 FTP operation (GPRS, UMTS, LTE cat.M1/NB1)

7.1.8.1 FTP operation, depending on the version of EK280

From the EK280-version 2.50, the FTP data transfer is controlled by the EK280 itself. This differs from previous versions, where for handling the "FTP Pushes", the modem application "ComFTP" is needed.



*From V2.50 onwards, no special "ComFTP" modem is required for the FTP data transmission with EK280. Rather, it can be done with the GPRS and UMTS modems listed in ⇒ section 7.1.1
As of version V2.50 of the EK280 firmware, the ComFTP modems are no longer supported!*



*The modem application "ComFTP" is required for FTP data transmission with an EK280 up to and including V2.40. "ComFTP" is software in a modem that reads data cyclically from the EK280, processes it and transfers it via "FTP Push" to a pre-specified FTP server.
As of version V2.50 of the EK280 firmware, ComFTP modems will be no longer supported!*



The commissioning procedure for the "ComFTP" application is not described in these instructions. Please refer to the application manual for version V2.40.

7.1.8.2 FTP data transfer via GPRS, UMTS or LTE cat.M1/NB1

For commissioning the FTP data transmission, the EK280 must first be configured for GPRS, UMTS or LTE operation. Here, a distinction must be made between whether the FTP data transmission is to take place within a VPN⁹ or via the Internet:

- If the FTP data transfer is to be carried out within a VPN, the parameterization is the same as for TCPserv operation (⇒ section 7.1.6). Among other things, the access data to the VPN are entered in the menu "*Parameter – Interfaces – Internal modem – Mobile Communicat.*" In detail, these are:

Parameter
2:780 – GPRS Access Point Name "APN"
2:781 – APN user Name
2:782 – APN password

and optionally (only if the FTP server is not defined by an IP address, but by a URL address):

2:794 – Domain Name Server 1
2:795 – Domain Name Server 2

- If the FTP data transmission takes place over the Internet, the provider-dependent access to the public Internet must be entered in the menu "*Parameter – Interfaces – Internal modem – Mobile Communicat.*" instead of the access to a VPN. E.g., for the German 2G providers this is:

Parameter	Telekom	Vodafone-D2:	O2
3:780 – GPRS Access Point Name "APN"	internet.telekom or ¹⁰ internet.t-mobile	web.vodafone.de or ¹⁰ m2m.vodafone.de	internet
3:781 – APN user Name	tmobile	- (empty)	- (empty)
3:782 – APN password	tm	- (empty)	- (empty)

and optionally (only if the FTP server is not defined by an IP address, but by a URL address):

3:794 – Domain Name Server 1	193.254.160.1	139,007,030,125	62.134.11.4
3:795 – Domain Name Server 2	193.254.160.2	139,007,030,126	195,182,110,132



The access data stated in the table are examples. They may differ depending on the SIM or SIM tariff and the used radio technology. Please keep in touch with your provider!

After configuring the GPRS, UMTS or LTE cat.M1/NB1 operation, the following FTP-specific steps still have to be carried out:

1. Create the FTP servers on which the data can be stored ("phone book").
2. Parameterize the data stored on the server ("FTP transmission").
3. Parameterize the time at which this FTP task is to be executed, as well as the server on which these data are to be stored ("Connection").

These steps are described in separate instructions ⇒ FTP Application manual [10]. For information on Modbus commissioning, contact ElsterSupport@Honeywell.com.

⁹ VPN = Virtual Private Network

¹⁰ The choice of the APN may influence the cost of data transmission!



From the EK280-V2.50, a modem used for FTP data transmission can be used for FTP and CSD connections (⇒ section 7.1.4) as well as for TCP connections (⇒ section 7.1.6). However, there should only be one connection at a time.



The active FTP application will incur costs due to continuous data volume transmission via a mobile network. Estimate adequate reserve for this. Talk to your provider to obtain an economical tariff. Switching off roaming can also help to reduce costs. Optimization of these factors is your responsibility.



Wireless networks can be disrupted; therefore, one hundred percent data transfer cannot be guaranteed in any case.

7.1.8.3 Configuration of the FTP application (PUSH transfer)



Separate instructions ("LIS200 device series - FTP in LIS terminal devices (EK/DL)" [10]) are available for configuring the FTP transfer and can be downloaded from www.elster-instromet.com.

We can also supply you with support for commissioning these FTP systems as part of a minor project.

For further information, please contact our Elster technical support team – see section 1.3).

7.1.9 GPRS with ComTSC (Tainy Switching Center)



Data transmission to a Tainy Switching Center (TSC) is supported by the EK280 up to and including V2.40!

→ Operation with a TSC is not supported as from version V2.50 of the EK280.

7.1.10 Replacing the antenna



DANGER!

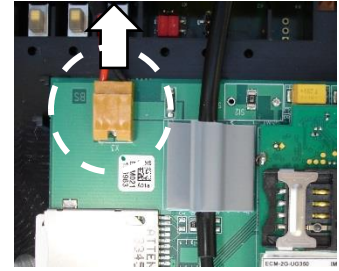
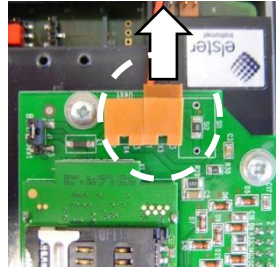
For EK280 with internal power supply, the mains voltage must be switched off before opening the housing, ensure it is not turned back on and verify that there is no voltage.

If reception via the internal modem is too poor, it is possible to replace the mounted short antenna with an external "station" antenna (= rod antenna). To do this, Elster GmbH offers various antennas of varying lengths.

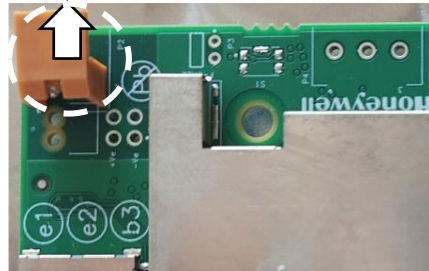
7.1.10.1 Steps

- For the EK280 with an internal power supply, the mains voltage must be switched off.
- Remove the cover strip from the housing.
- Loosen the housing screws and open the housing cover.

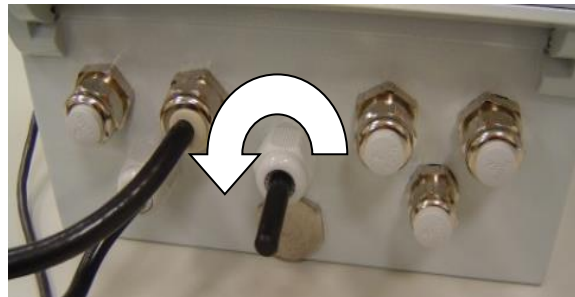
- Disconnect the modem battery or the connection of the modem supply of the internal power supply from X3, "Battery", of the modem board:
- Left Photo: Module with ECM-GW120
- Right Photo: Module with ECM-2G UG350 or ECM-3G-UU270



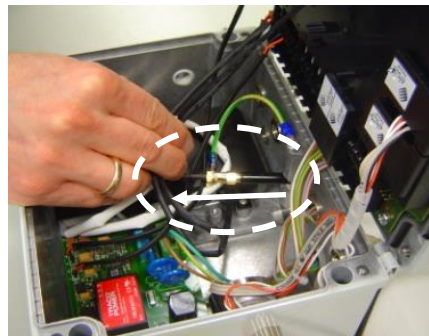
power supply connector of CloudLink 5G



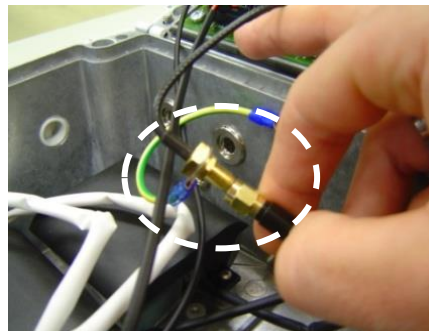
- Open the cable gland of the short antenna.



- Remove the short antenna from the housing. Be careful not to stretch the antenna adapter cable when opening the housing cover.



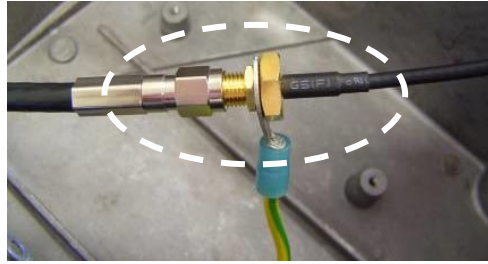
- Unscrew the short antenna from the antenna adapter cable.



- Slide the cable gland nut over the external antenna cable. Then feed the cable into the housing via the cable gland.



- Screw the external antenna onto the antenna adapter cable.



- Pull the external antenna cable back outwards as far as possible, until the antenna adapter cable is lying against the inside of the cable gland.



- Now tighten the cable gland nut.
- Reconnect the modem battery or the connection of the modem supply of the internal power supply on X3, "Battery", of the modem board.

Caution!



Check whether the connection cable between the power supply and the internal modem is connected before you switch on the mains voltage (see section 7.2). The internal power supply may be destroyed if you fail to do this.

Caution!

Damage to property caused by improper device closure!



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

Therefore:

Ensure correct positioning of the cable guides when closing.

- Close the housing cover and retighten the screws.
- Finally, replace the cover strips on the housing.



Danger of death!

Ensure that before you switch the mains voltage on again, the housing of the EK280 is securely closed.

- When using the internal power pack, switch on the external power supply again.

To check the function, you may now open a time window for testing and check the GSM signal quality on the EK280 display (⇒ section 7.1.4.2 [Checking radio network signal strength](#), p. 74) and for a test call off with enSuite (⇒ section 7.1.4.3. [Retrieving data with enSuite](#), p. 75).

If using an external address, the position of the antenna should be chosen in such a way that the best possible reception is achieved.

7.1.11 Position of the antenna for gas meter mounting with Encoder



DANGER!

For EK280 with internal power supply, the mains voltage must be switched off before opening the housing, ensure it is not turned back on and verify that there is no voltage.

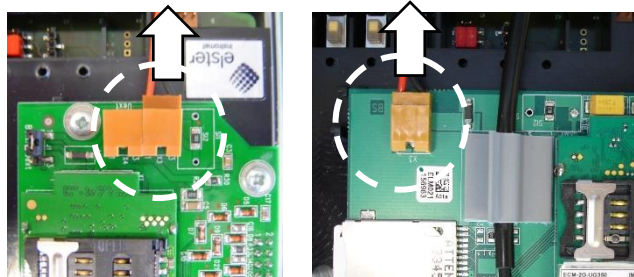
If the EK280 is mounted on a gas meter with encoder, the antenna must be displaced from the bottom to the right side of the housing. If not, then the encoder function could be disturbed during modem operation because the antenna on the bottom of the housing is too close to the encoder.

7.1.11.1 Steps

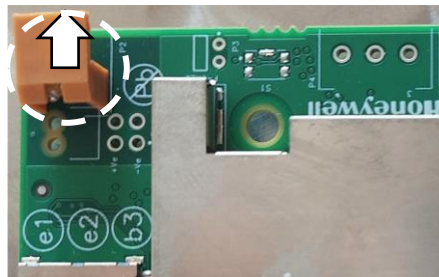
- For the EK280 with an internal power supply, the mains voltage must be switched off.
- Remove the cover strip from the housing.
- Loosen the housing screws and open the housing cover.

- Disconnect the modem battery or the connection of the modem supply of the internal power supply from X3, "Battery", of the modem board:

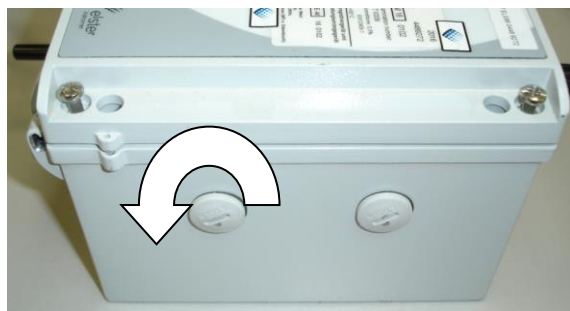
- Left photo: module with ECM-GW120
Right photo: module with ECM-2G-UG350 or ECM-3G-UU270



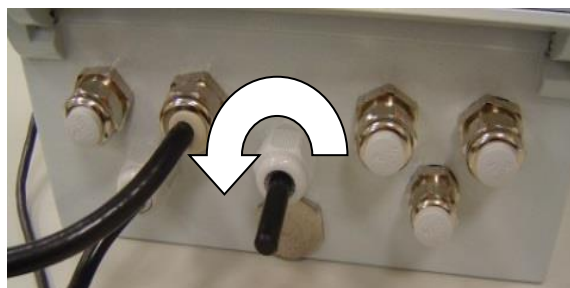
Power supply connector of CloudLink 5G



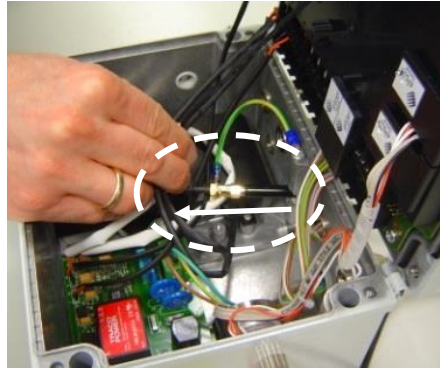
- Remove the dummy plug on the lower right side



- Open the cable gland of the antenna



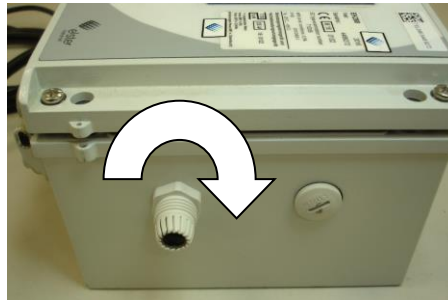
- Remove the short antenna from the housing. Be careful not to stretch the antenna adapter cable when opening the housing cover.



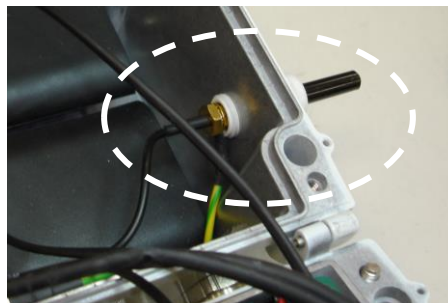
- Remove the cable gland on the bottom side of the housing



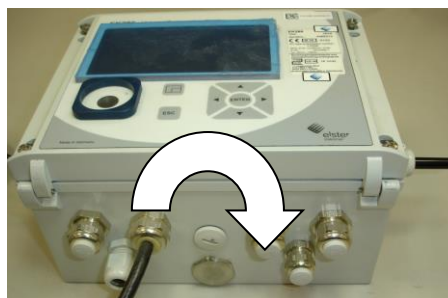
- Screw in the cable gland on the lower right side of the housing



- Insert the antenna into the cable gland and screw in the nut from outside to tighten the antenna



- Screw the dummy plug into the former position of the antenna on the bottom side of the housing.



- Reconnect the modem battery or the connection of the modem supply of the internal power supply on X3, "Battery", of the modem board.

**Caution!**

Check whether the connection cable between the power supply and the internal modem is connected before you switch on the mains voltage (see section 7.2). The internal power supply may be destroyed if you fail to do this.

- Close the housing cover and retighten the screws.
- Finally, replace the cover strips on the housing.

**CAUTION!****Damage to property caused by improper device closure!**

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

Therefore:

- Ensure correct positioning of the cable guides when closing.

- When using the internal power pack, switch on the external power supply again.

To check the function, you may now open a time window for testing and check the GSM signal quality on the EK280 display (⇒ section [7.1.4.2 Checking radio network signal strength](#), p. 74) and for a test call off with enSuite (⇒ section [7.1.4.3. Retrieving data with enSuite](#), p. 75).

7.1.12 Upgrading an internal modem



An EK280 with built-in modem and corresponding ATEX or IECEx approval may be installed in Ex zone 0 or 1.

However, retrofitting of modems is not permitted for use in Ex zone 0 or 1!

Modem assembly 73022788 (GPRS)
or 73023789 (UMTS)
or 73025411 (LTE cat.M1\NB1)

**DANGER OF DEATH!**

The internal modem may only be retrofitted in the non-hazardous area or Ex zone 2, but not in Ex zone 0 or 1! Please also refer to the following table!

Device variant	Functional range	Permissible action in the field			Execution permitted by	Additional activity	Influence on warranty?
		Exchange ¹⁾	Retrofitting ¹⁾	Connection			
All	digital inputs	-	-	x	Operator	-	no
	digital outputs	-	-	x	Operator	-	no
	internal interface	-	-	x	Operator	-	no
	device battery	x	-	-	Operator	-	no
	modem battery	x	-	-	Operator	-	no
	antenna	x ²⁾	-	-	Operator	-	no
	pressure sensor	x	-	-	Honeywell customer service	calibration & adjustment	-
	temperature sensor	x	-	-	Honeywell customer service	calibration & adjustment	-
ATEX zone 0/1	no further action is permitted						
ATEX zone 0/1	internal power supply	x	-	-	Operator	separate verification required	warranty claim expires
		-	x	-	Honeywell customer service (with ATEX training)	Tests in accordance with the Low Voltage Directive; separate verification required	-
		-	-	x	Operator	-	no
	Internal communication module	x	x	x	Operator	-	no
	2. pressure sensor	x	x	-	Honeywell customer service	Calibration	-
	2. temperature sensor	x	x	-	Honeywell customer service	Calibration	-

If the EK280 is not installed in an Ex zone 0/1, please proceed as follows:

- If the EK280 is connected to an external power supply, please switch this off.



DANGER OF DEATH!

For EK280 with internal power supply, the mains voltage must be switched off before opening the housing, ensure it is not turned back on and verify that there is no voltage.

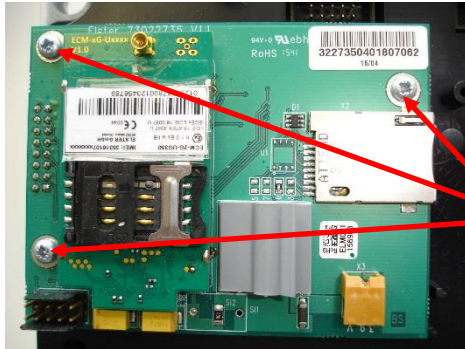
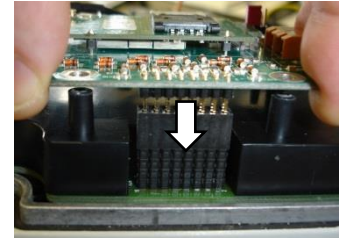


CAUTION!

To protect the modem from electrostatic discharge, please proceed as follows:

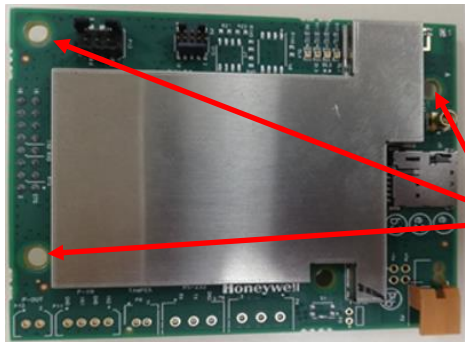
- Before touching the modem, discharge the static electricity of your body by touching an unpainted, grounded metal surface. This may be located on a heater, for example.
- Only touch the sides of the modem, not the surface. Avoid touching pins and components.
- Do not remove the modem from its packaging until you are ready to install it, e.g., after the housing of the EK280 has been opened.

- Open the housing cover of the EK280.
- Push the 2x8-pin terminal strip of the modem assembly onto the modem interface (X26) of the EK280 (⇒ illustration). Pay special attention to correct engagement of all 16 pins into the socket strip.



ECM-2G-UG350 / ECM-3G-UU270

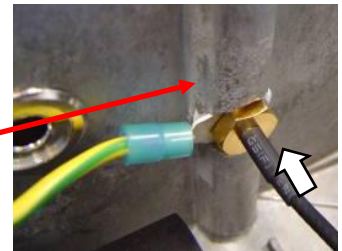
Attach the modem assembly at the three points marked. Only use the Plastide 3x6 pan headed screws supplied.



CloudLink 5G

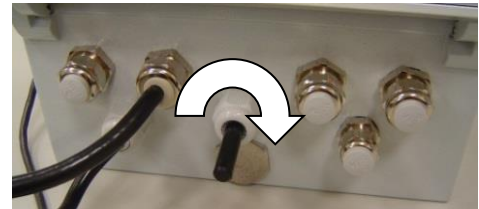
Attach the modem assembly at the three points marked. Only use the Plastide 3x6 pan headed screws supplied.

- Pass the GSM antenna supplied from the inside into the central plastic cable gland. One eyelet of the green-yellow protective earth wire is placed between the cable gland and the antenna base; the protective earth wire is positioned laterally (⇒ illustration).



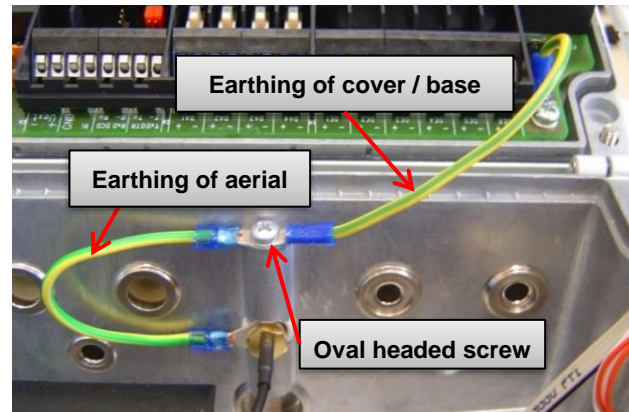
Lead the protective earth wire laterally out of the bore (⇒ illustration)! If this is not done, the antenna cannot be pushed into the correct position.

- Fasten the antenna by tightening the cable gland (⇒ illustration).



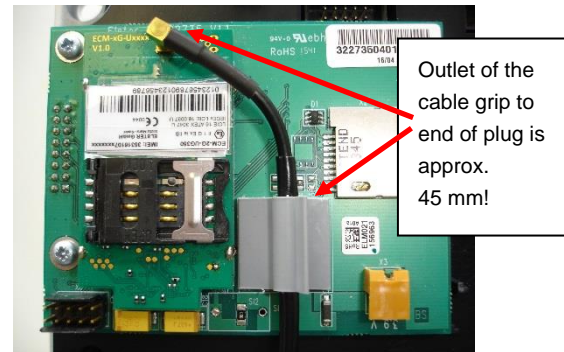
While tightening, hold the antenna from the inside against the cable gland. Otherwise the antenna will be pushed into the housing during tightening.

- Loosen the M4×6 pan headed screw with which the earthing lead is retained between housing cover and housing base.
- Reattach the earth lead of the antenna together with the earth between housing cover and base at the illustrated screw post (⇒ picture).



Always fit the earth lead between cover and base exactly as illustrated, as the eye on the circuit board side will otherwise interfere with housing closure.

- Attach the antenna cable with the aid of the light gray plastic cable grip installed at the factory. For this reason the length of cable between the outlet of the cable grip and the end of the antenna plug should be approx. 45 mm (⇒ picture on the right hand side), and the shrunk-on tubing should be moved along the antenna cable in such a way that after clamping it is placed approximately at the center of the grip.



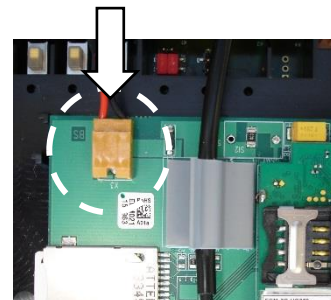
The cable grip should be carefully pushed upwards during the installation of the antenna cable. There is always the risk of permanent damage to the cable grip!

- Connect the GSM antenna cable with the modem.



Carefully press the antenna plug into the antenna socket until it clicks into place. In particular, make sure that the antenna plug does not lie skew in the bushing and that it is not stretched any longer by rotary and pull-off forces respectively.

- Insert the SIM into the SIM holder (⇒ section 7.1.1).
- Connect the power supply (modem battery or internal power pack) with **the pin connector strip X3, "3.9V"** on the modem assembly (⇒ illustration).



Caution!

Check whether the connection cable between the power supply and the internal modem is connected before you switch on the mains voltage (see section 7.1.1). The internal power supply may be destroyed if you fail to do this.

- Close the housing cover and retighten the screws.

- Finally, replace the cover strips on the housing.

**Caution!****Damage to property caused by improper device closure!**

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

Therefore:

- Ensure correct positioning of the cable guides when closing.

- Where appropriate, switch on the external power supply of the EK280 again.

To check the function, you can now use the radio modem for data transmission in accordance with the other sections of chapter 7.1.

**Caution!**

If modem “ECM-2G-UG350” (GSM/GPRS) or “ECM-3G-UU270” (UMTS) is supplied by a battery (*), the modem must be commissioned in accordance with section 7.1.4 or 7.1.5 shortly after the battery has been connected to the modem to prevent any unnecessary load on the modem battery.

(Until a time window is opened for the first time, a current of around 1 – 5 mA will flow. After closing the first time window and after all other time windows, the current will be just 0.03 – 0.09 mA!)

(*) Modem battery connected directly to the modem or mains failure buffer battery on the internal power supply when the mains supply is switched off.

7.2 Internal Ethernet Interface iCE280

From software version 2.51 and higher, the EK280 supports an internal Ethernet interface (iCE280) for directly connecting an EK280 to a network.

**DANGER!**

The internal modem may only be retrofitted in the non-hazardous area or in Ex zone 2, but not in Ex zones 0 and 1!

7.2.1 Information about PoE operation (Power over Ethernet)

The Ethernet interface can be powered via PoE (Power over Ethernet according to IEEE 802.3af). In this case, the Ethernet interface outputs a "class 0 classification signature".

The PoE supply for the Ethernet interface can take place either via the data lines (phantom power or mode A) or via the unused pairs (power on spare pairs or mode B). The PSE (power sourcing equipment) can be active or passive PoE injectors (endspan) or PoE switches (midspan).

IEEE 802.3af PSE devices have a test mechanism to protect incompatible devices from damage when connected. Only devices that have an authenticating feature based on the IEEE 802.3af standard receive power over the data line. Once the PSE has detected a PD (Powered Device), it begins to classify, i.e., determine the power requirement of the connected device. The EK280 outputs a "Class 0 classification signature".

The IEEE 802.3af classifies the power supply on the PSE side and the current consumption of the PD on the PSE side into five different classes:

Class	Min. output power of the PSE	Input power of the PDs
0	15.4W	0.44W – 12.95W
1	4.0W	0.44W – 3.84W
2	7.0W	3.84W – 6.49W
3	15.4W	6.49W – 12.95W
4	Reserved for future applications	Treatment like class 0

The Ethernet interface iCE280 is intended for the range of 36 V to 56 V DC voltage. The voltage provided by the PoE Switch or Injector must be within this range. A voltage of 48 V is recommended.

7.2.2 Information on the network cable

Only the cable types tested and approved by Honeywell should be used for connection to the Ethernet module. These have successfully passed the EMC test. These cables ensure interference-free operation. Interference-free operation cannot be guaranteed for other cable types.

You can obtain the appropriate cables from Honeywell (L = 5 m in length) (Honeywell Order No.: 73024367). Other lengths are available from specialist distributors.

The following types of cable have been tested and approved by Honeywell and are thus recommended for use with the Ethernet module (the part numbers below apply to the 5 m cable). Other lengths of cable from the same type series may also be used.

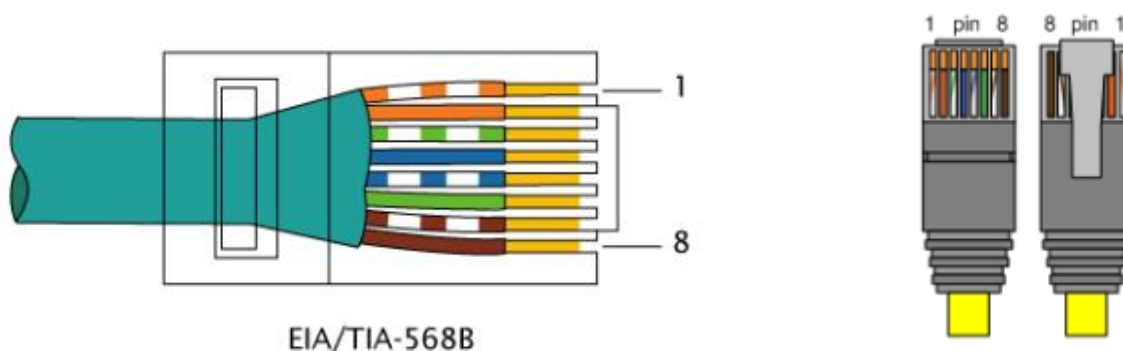
Weidmüller							
Type:	IE-C5ES8UG0050M40M40-G						
Part number:	1166000050						
Telegärtner							
Type:	Patch cord	SF/UTP	Cat.5	4x2xAWG	26/7	(PUR),	
	IP20-IP20,	5.0	m,	green	RAL	6018	
Part number:	L00003A0091						

The cables have the following specification:

Specification	
Operating temperature	-40°C to +75°C
PoE/PoE+	in accordance with IEEE 802.3at
Category	Cat 5 (ISO/IEC 11801)
Cable design:	
Conductor material	multi-wire tin-plated copper conductor
Strands (per core)	7
Cross-section	4 x 2 x AWG 26/7 (4 x 2 x 0.128 mm ²)
Number of cores	8
Core layout	twisted pair
Core pair screen	aluminum foil
Colour sequence of cores – core pairs	in accordance with EIA/TIA 568B
Screen	SF/UTP

Specification	
Total screen	braid made from copper wires
Degree of screen coverage	min. 60%
Sheath material	PUR
Sheath diameter	5.8 mm ± 0.2 mm
Plugs	left: RJ45 IP20, right: RJ45 IP20

The pin assignment of the network cable complies with **EIA/TIA 568B**.



7.2.3 Connecting the network cable



DANGER OF DEATH!

The mains voltage must be switched off before opening the housing of the EK280. Ensure it is not turned back on and verify that there is no voltage.



CAUTION!

Always switch off the PoE power supply before connecting the network cable and secure it against being switched on again!
The safest way is to remove the network cable from the switch or the network socket.

The following section describes the preparation of the network cable and the connection of the cable to the Ethernet board.

7.2.3.1 Cutting the cable to the required length

Shorten the Ethernet cable to the required length. Please note that you need around **25 cm** of additional length for connecting the cable in the EK280.

If the cable is already of the required length, only cut the RJ45 plug off one end of the cable.

7.2.3.2 Dismantling the cable gland

Dismantle the cable gland and pull the individual parts (except the threaded insert) over the cable (⇒ Fig. below).

The yellow foam masking of the cable gland is not used and can be appropriately disposed of.



7.2.3.3 Removing the cable sheath

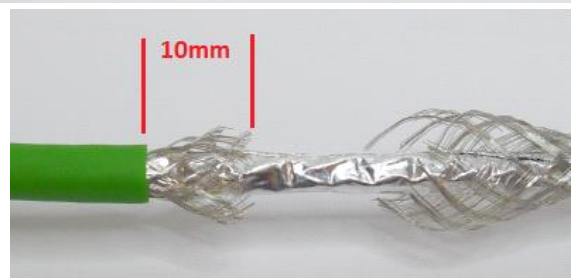
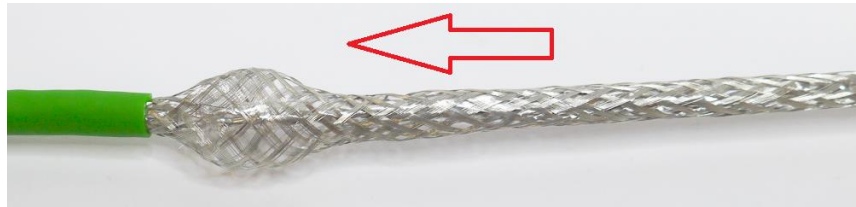
Remove the cable sheath for a length of approx. **22 cm**.



The cable screen must not be damaged in order to ensure flawless screening of the cable.

7.2.3.4 Bulging and shortening the cable screen

- To create a bulge in the screen, hold it near the sheath and push it towards the sheath. (⇒ Fig. right)
- Cut the screen at the bulge with diagonal pliers so that around **10 mm** of the screen remains. (⇒ Fig. right)
- Also remove the drain wire which is inside the screen.



7.2.3.5 Pushing the cable screen over the cone

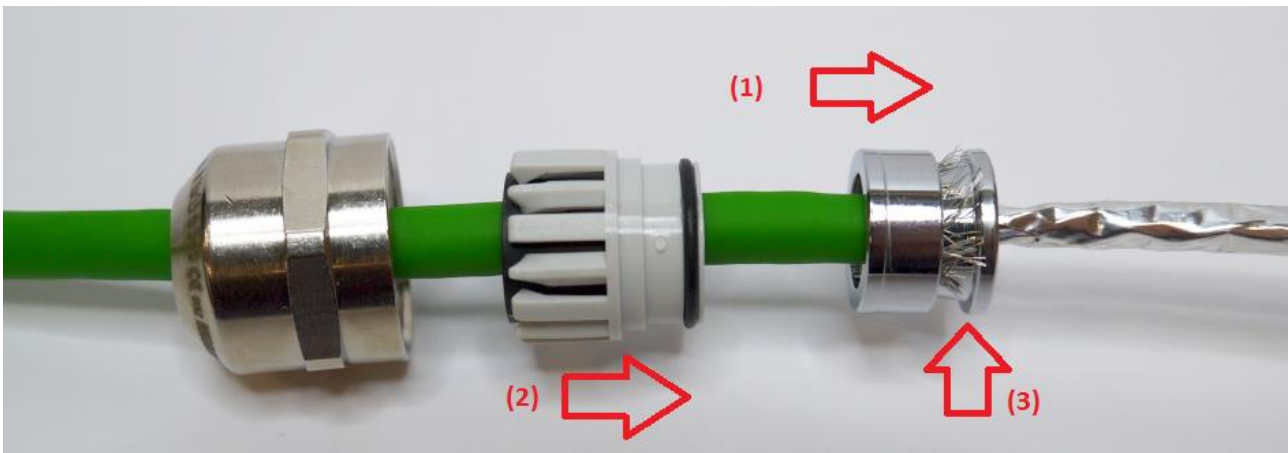
Spread out the braid some more and push the cone under the screen. Then slide the cone from the sheath onto the part of the cable with the sheath removed and carefully push it under the screen (⇒ Figure below).



Make sure that the screen is evenly spread over the entire circumference of the cone.

7.2.3.6 Placing the retaining ring and assembling the cable gland

- Push the retaining ring over the cone.
Make sure that the screen is pushed up to the collar on the cone (⇒ Fig.).



- (1) Slide on the retaining ring.
(2) Push the sealing insert afterwards.
(3) The screen should end here.

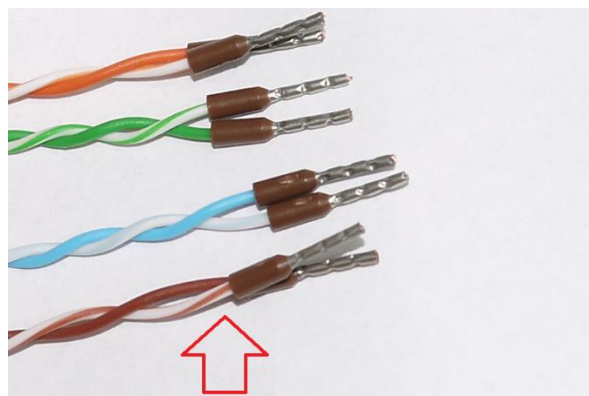
- Slide the cone with the retaining ring into the threaded insert of the cable gland.
- Then carefully insert the sealing insert.
- Screw on and tighten the union nut.

7.2.3.7 Removing the foil screen

- The foil screen can be splayed by slightly twisting it.
Cut off the foil screen near the gland with diagonal pliers.

7.2.3.8 Stripping cores and fitting with ferrules

- The cores are now stripped over a length of **7 mm** and fitted with ferrules.
For this, use 0.14 mm x 6 ferrules and ferrule crimping pliers (ideally self-adjusting crimping pliers for ferrules). The ferrules can be in any colour.
The core ends should now look something like this:



The cores must remain twisted as far as possible.



Before inserting the cores into the plug, make sure that the core pairs are twisted as much as possible. If they have “untwisted”, twist them in pairs as much as possible before inserting into the plug.

7.2.3.9 Inserting the cable into the EK280

- For this, the central plastic gland or the blind plugs have to be removed.



An A/F 20 wrench is required for the cable gland.

- Now push the prepared cable into the EK280 and tighten the cable gland.

7.2.3.10 Connecting the cable to the Ethernet module



CAUTION!

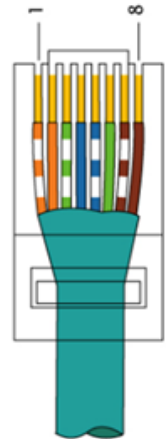
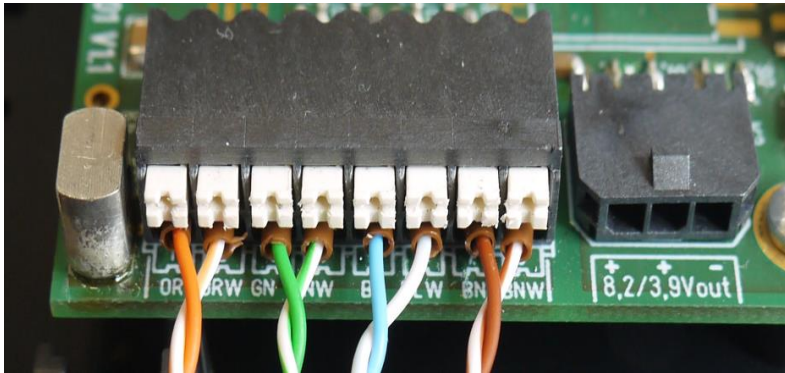
Always switch off the PoE power supply before connecting the network cable and secure it against being switched on again!
The safest way is to remove the network cable from the switch or the network socket.

- Now guide the cable ends into the connector of the Ethernet module.
The core assignment is printed in front of the connector. The cores with the ferrules only need to be inserted. For this, it is **NOT** necessary to activate the white actuator on the terminal block. This is only required if the cable has to be removed again.



If you cannot insert the cable with your fingers, a small screwdriver can be used to press onto the collar of the ferrule (⇒ Fig. below).

This is what the connected cable looks like:



The cable length was dimensioned such that the twisted core pairs bend slightly when the cover is open, without being tensioned.

7.2.4 Connecting the power supply

7.2.4.1 Power supply via the internal power supply unit

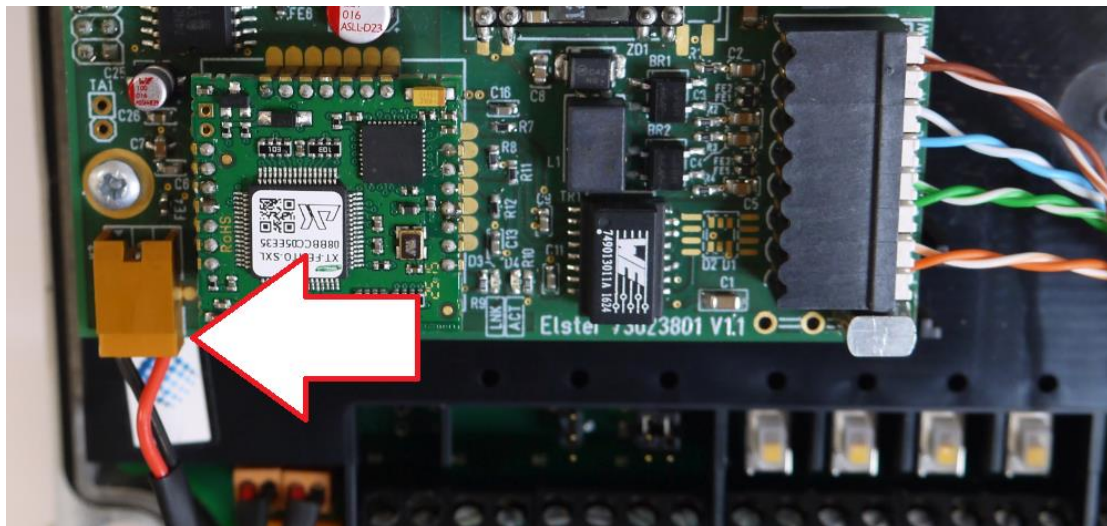


Caution!

The following order must be followed!

Failure to do so may destroy the internal power supply!

- Ensure that the mains voltage is switched off.
- Now connect the Ethernet module to the internal power supply



- Close the housing cover and retighten the screws.
- Replace the cover strips on the housing.



Caution!

Damage to property caused by improper device closure!

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

- Ensure correct positioning of the cable guides when closing.



Danger of death!

Ensure that before you switch the mains voltage on again, the housing of the EK280 is securely closed.

- Switch on the power supply again.

7.2.4.2 Power supply in PoE mode (Power over Ethernet)



Caution!

If a power supply unit is installed in the EK280 and connected to the EK280 CPU board via the terminals Uext + and Uext-, the connection of the PoE adapter cable described in this section must not be made!

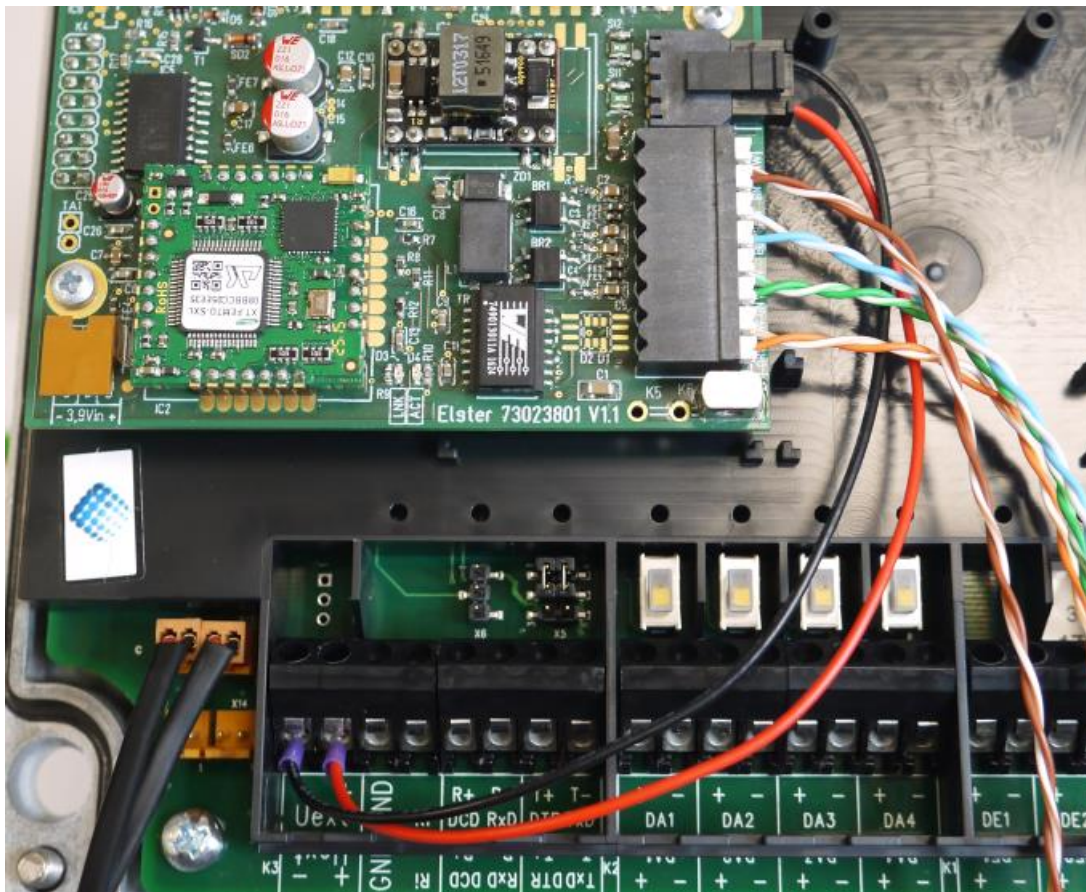
If the EK280 is nevertheless to be supplied with PoE, the internal power supply must first be taken out of operation, i.e. de-energized and disconnected from the EK280 CPU board! Only then may the PoE adapter cable be connected as described below.

In the PoE mode, the Ethernet provides power to the EK280 via the Ethernet module.

- Install the appropriate adapter cable in this case.



- For this, attach the open ends to the Uext input on the EK280:
- The red cable is connected to Uext+ and the black cable to Uext-.
- We recommend laying the cable beneath the Ethernet cable (⇒ Photo):



7.2.5 Setting the network parameters



For parameterization of the EK280 you need a connection cable for the optical interface as well as the enSuite program. enSuite can be downloaded free of charge from the Honeywell website in the "Software Downloads" section:

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

a) Closing the time windows

Time windows 1 to 4 must be closed for parameterization to function securely. To do this:

- Connect a PC or laptop with enSuite installed to the EK280 optical interface using the connection cable.
- Start enSuite and establish the communication link to the EK280.
(⇒ section 3.1 [Setting up the communication link to the EK280 via optical interface](#), p. 26)
- Select "[Navigation](#)" on the left-hand side and then "[Parameterize online](#)" at the bottom of the navigation window.
- In the top part of the device window, open the path "[Parameters](#)" > "[Interfaces](#)" by clicking on the relevant plus signs, and then select "[Call time windows](#)".
- In call windows 1 to 4, set start and end to the same value for each one and then select the "[Transfer changes to device](#)" icon at the top of the enSuite window.
- Then wait a minute for any communications activity in progress on the EK280 to be safely stopped.

b) Sending the parameter file

- Send the following parameter file to the EK280 (⇒ section 3.6 [Send parameter file](#), p.28).
[EK280_xvx.. - int. ICE280 \(*\)](#)¹¹
- For any further customized settings and tests, press "[Navigation](#)" on the left-hand side of the enSuite window and then "[Parameterize online](#)" at the bottom of the navigation window.

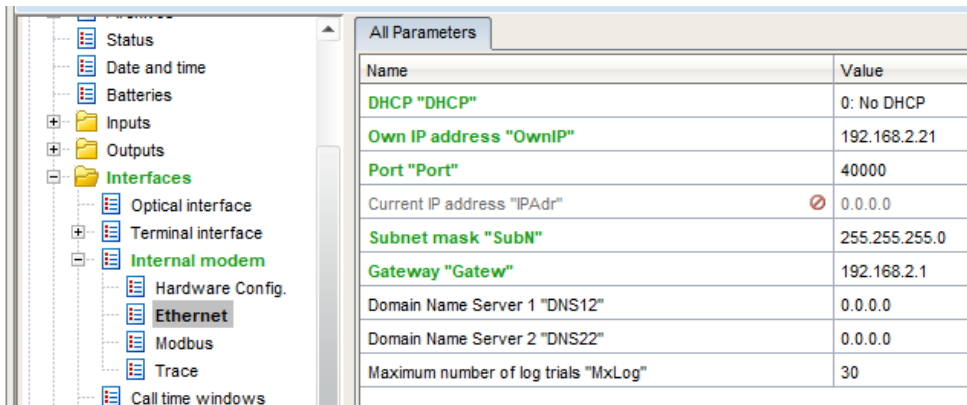


All the values listed in enSuite under "Parameters" can be found in the "[Serv.](#)" display tab of the EK280 under the same path.

¹¹ The "x" stands for the device software version, e.g., "2v2".
The asterisk * stands for a small letter which indicates the version of the file, e.g., "a".

c) Setting the network parameters

You can find the network parameters in enSuite in the parameter tree under “*Parameters*” > “*Interfaces*” > “*internal modem*” > “*Ethernet*” or on the device in the menu “*Service*”-“*Interfaces*”-“*internal modem*”-“*Ethernet*”).



Name	Value
DHCP "DHCP"	0: No DHCP
Own IP address "OwnIP"	192.168.2.21
Port "Port"	40000
Current IP address "IPAdr"	0.0.0.0
Subnet mask "SubN"	255.255.255.0
Gateway "Gatew"	192.168.2.1
Domain Name Server 1 "DNS12"	0.0.0.0
Domain Name Server 2 "DNS22"	0.0.0.0
Maximum number of log trials "MxLog"	30

Usage with DHCP =	
on	off
x	(x)
	x
x	x
x	
	x
	(x)
	(x)
x	

– Automatic allocation of network address (DHCP):

If the network address is automatically allocated by a DHCP server, the parameter “*DHCP*” must be set to “*1*” (“*Use DHCP*”).

Set the parameter “*Port*” to the port number under which this device is to be accessible.



You can find the MAC address of the Ethernet interface needed for the DHCP with a dedicated IP address on the label on the board:



The obtained IP address can be checked in the above Screen of the enSuite.

Under "Maximum number of log trials", attempts to connect to the DHCP server may be restricted

– Dedicated network address:

Set the parameter “*DHCP*” to the value “*No DHCP*”.

Then parametrize the following values (see enSuite screenshot above):

- Device address (“*Own IP*”)
- Port (“*Port*”)
- Subnet mask (“*SubN*”)
- Gateway (“*Gatew*”)

If the device is to connect with servers which are addressed via their network names, then also enter the addresses for the domain name server (“*DNS12*”, “*DNS22*”).

These access details can be obtained from IT officer responsible for the system.

You can define time windows within which you can access the EK280 in the basic configuration which is now set up. You can deactivate time windows which are not needed by setting the start and end of the time window to the same value.

- In the top part of the device window, open the path “[Parameters](#)” > “[Interfaces](#)” by clicking on the relevant plus signs, and then select “[Call time windows](#)”.
- In call window 3, set the start to “00:00” and the end to “23:59” and then select the “Transfer changes to device” icon at the top of the enSuite window.



Danger of death!

Ensure that before you switch the mains voltage on again, the housing of the EK280 is securely closed.

- Switch on the mains power supply of the EK280 again. The plug symbol in the Main Menu of the EK280 shows the external supply.
- Wait for around a minute for the EK280 to detect the iCE280.



When the Ethernet module is active two LEDs flash on the module (ACT and LINK).



- If the LEDs do not flash, either the module is not active (possible cause: the time window is not open) or there is a fault in the wiring.

7.2.6 Retrieving data with enSuite

a) Opening the test time window for the following test retrievals with enSuite



The test time window only needs to be open if time windows 3 and 4 are closed.

- If there is no communication link to the EK280 via the optical interface, it must be established. (⇒ section 3.1 [Setting up the communication link to the EK280 via optical interface](#), p. 26)
- In the top part of the device window, open the path “[Parameters](#)” > “[Interfaces](#)” by clicking on the relevant plus signs, and then select “[internal modem](#)” (not the plus sign in front).
- Click on the value “0” next to “[Test call acceptance window](#)” in the right-hand part of the window and enter a duration in minutes (e.g., 10) for which the test call acceptance window should remain open for the test retrieval. For a battery-operated EK280, do not enter an excessively long duration, as this will adversely affect the battery life.
- Press the “[Transfer changes to device](#)” icon at the top of the enSuite window. The EK280 can now be accessed via the modem for the duration set.
- In enSuite, press the “[Disconnect](#)” or “[Disconnect from all devices](#)” icon to terminate the optical interface communication link between enSuite and the EK280.

b) Test retrieval via the TCP/IP network

Establish the communication link between enSuite and the EK280 via the network.

(⇒ section 3.3 [Setting up the communication link to EK280 via a network \(TCP/IP\)](#), p. 27)

- Once the communication link has been established, you can carry out checks, for instance view certain parameters. To do this, press “[Navigation](#)” on the left-hand side of the enSuite window and then “[Parameterize online](#)” at the bottom of the navigation window, then click on the plus sign next to “[Parameters](#)” and then its subsections.
- In enSuite, press the “[Disconnect](#)” or “[Disconnect from all devices](#)” icon in order to end the test retrieval.

7.2.7 Retrofitting the internal Ethernet interface**DANGER OF DEATH!**

The mains voltage must be switched off before opening the housing of the EK280. Ensure it is not turned back on and verify that there is no voltage.

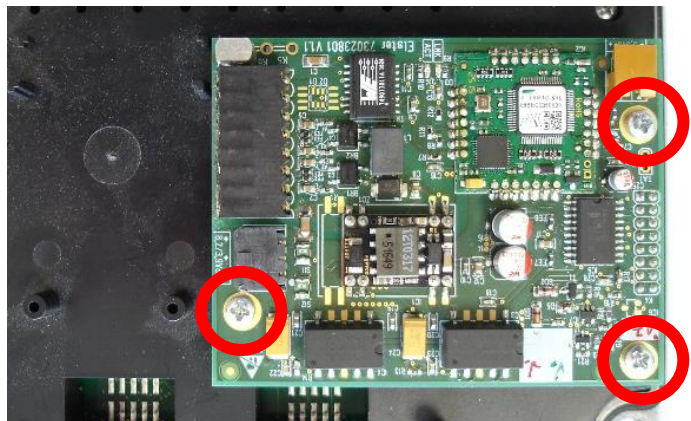
**CAUTION!**

The internal modem may only be retrofitted in the non-hazardous area or in Ex zone 2, but not in Ex zone 0 or 1!

**CAUTION!**

To protect the module from electrostatic discharge, please proceed as follows:

- Before touching the module, discharge the static electricity of your body by touching an unpainted, grounded metal surface. This may be located on a heater, for example.
 - Only touch the sides of the module, not the surface. Avoid touching pins and components.
 - Do not remove the modem from its packaging until you are ready to install it, e.g., after the housing of the EK280 has been opened.
- Attach the Ethernet module to the right socket connector and secure it to the PCB housing with the screws provided.



Once you have installed the Ethernet module in the EK280

- attach the network cable (⇒ section 7.2.1) and
- for internal power supply version: connect the Ethernet module to the internal power supply (⇒ section 7.2.4.1)
OR
for power over Ethernet (PoE): connect the Ethernet module to the EK280 CPU board using the "PoE adapter cable" (⇒ section 7.2.4.2)
- parameterize the Ethernet module (⇒ section 7.2.5).

7.3 EM260 to serial interface



Attention

As of V2.50 of the EK280, function with an EM260 is no longer guaranteed!

The EK280 as of V2.50 has a wide range of communication options. These are either via an internal communication module ⇒ section [7.1 Internal 2G- \(GSM/GPRS\), 3G \(UMTS\)](#) (p. 68) or via a connected FE260 ⇒ section [7.4 FE260 to serial interface](#) (p. 104).

7.4 FE260 to serial interface

- FE260 connection and EK280 configuration via jumper is described in ⇒ section [7.4.1](#)
- [EK280 jumpers](#) (p. 105).
- For FE260 GSM/GPRS (with wireless modem) models only, the SIM card must be inserted as described in ⇒ section [7.4.2](#).
- You then proceed according to FE260 version as described in the ⇒ following section.

7.4.1 FE260 connection

- For the connection of the FE260 to the EK280, the screened 8-core cable must be used which is optionally included as part of the supply of the FE260. The required cable length must be indicated when the FE260 is ordered (2m, 5m or special length)
- The individual cores must be taken to the inside of the EK280 through one of the metal unions; the housing of the EK280 needs to be opened up for this purpose.



DANGER OF DEATH!

Ensure the mains voltage is disconnected before opening the FE260 housing, ensure it is not turned back on and verify that there is no voltage.



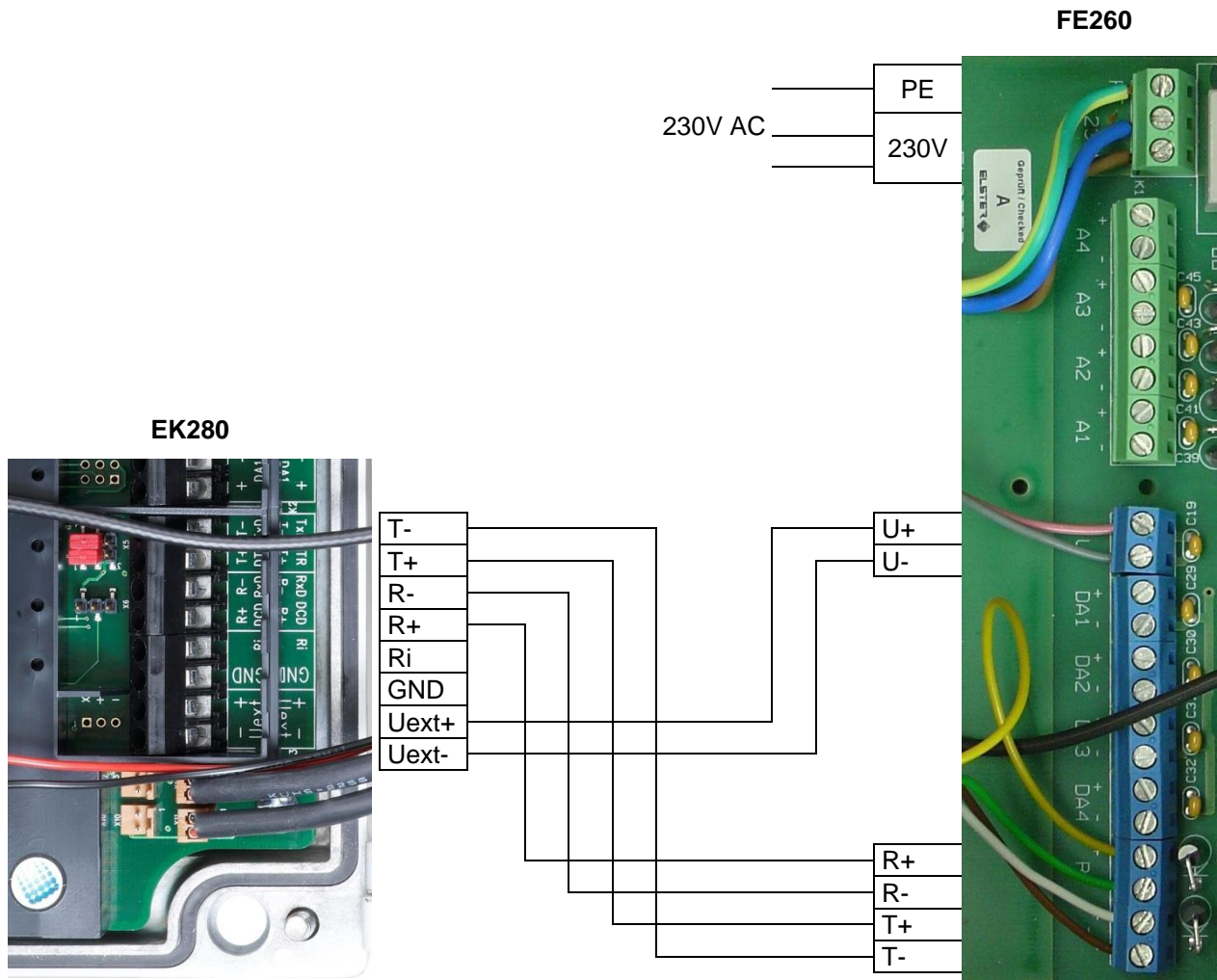
DANGER OF DEATH!

Explosion hazard!

If EK280 operation takes place in a potentially explosive atmosphere, ensure that all safety instructions in the EK280 Operating Instructions are followed.

- The cable screen must be expertly connected to the EK280 bulkhead fitting so as to prevent electromagnetic interference.
- The terminal interface of the EK280 needs to be parameterized **before** connection of an FE260 for **RS485 operation**. This is ensured by loading the application-specific parameter file. The name of the parameter file to be used is given further down in the appropriate section.

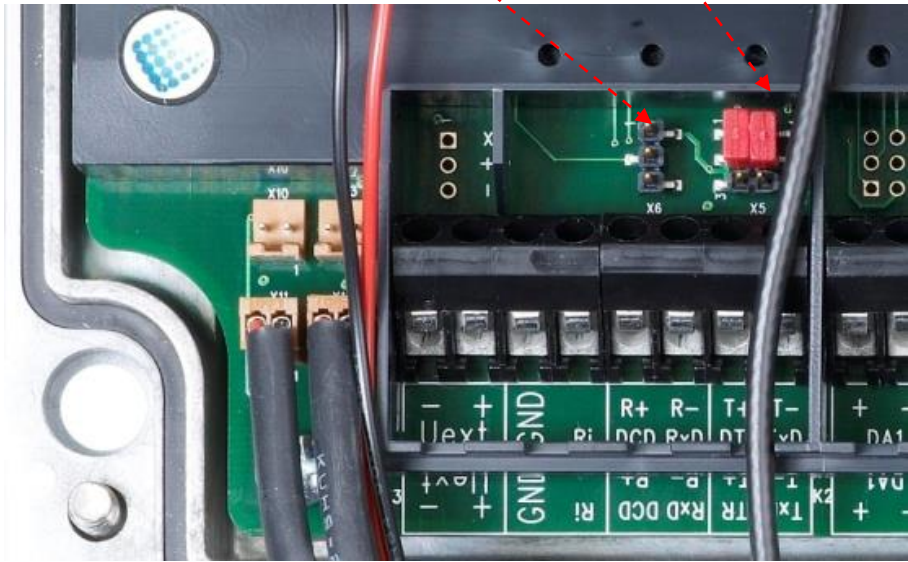
7.4.1.1 Wiring




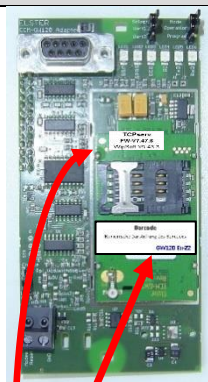


7.4.1.2 EK280 jumpers

X6: No jumper
or a jumper on a pin located closer to the
terminals.

X5: two jumpers
on the pins located
furthest from the terminals.



7.4.2 Differentiation of the radio-controlled modems and their application in the FE260

Modem type	M2106B	M2106+	ECM-GW120	ECM-2G-UG350	ECM-3G-UU270	CloudLink 5G
Year of construction	up to 5/2008	6/2008–3/2014	4/2014 - 9/2017	from 10/2017		from 12/2021
Appearance of the module						
Sticker	WM15410 WM17270	WM19551	GW120 Ex-Z2 TCPserv FW-V7.47.6 WipSoft V5.43.3	ECM-2G-UG350	ECM-3G-UU270	CLOUD LINK 5G
Network	GSM/GPRS				GSM/GPRS/ UMTS	LTE cat.M1/NB1

Suitable for the following applications depending on the software version of the EK280:

Application	EK280 from Version 2.60					
GSM-CSD	Yes ¹²	Yes ¹²	Yes ¹³	Yes	Yes ¹⁴	No
SMS	Yes ¹²	Yes ¹²	Yes ¹³	Yes	Yes	Yes
TCPserv	Yes ¹²	Yes ¹²	Yes ¹³	Yes	Yes	Yes
FTP	No	No	Yes ¹⁵	Yes	Yes	Yes
TSC	No	No	No	No	No	No
Application	EK280 from Version 2.50					
GSM-CSD	Yes ¹²	Yes ¹²	Yes ¹³	Yes	Yes	No
SMS	Yes ¹²	Yes ¹²	Yes ¹³	Yes	Yes	No
TCPserv	Yes ¹²	Yes ¹²	Yes ¹³	Yes	Yes	No
FTP	No	No	Yes ¹⁵	Yes	Yes	No
TSC	No	No	No	No	No	No

¹² Only with modem application ComTCPserv V1.10

¹³ Only with modem application ComTCPserv V2.04 or WipSoft V5.43.3

¹⁴ **Attention:** In some UMTS networks (e.g., German networks Telekom, Vodafone, O2), the CSD service (Circuit Switched Data) is not supported! Please get in touch with your network operator.

¹⁵ With the modem application WipSoft V5.43.3

	M2106B	M2106+	ECM-GW120	ECM-2G-UG350	ECM-3G-UU270	CloudLink 5G
	EK280 up to and including version 2.40					
GSM-CSD	Yes	Yes	Yes	No	No	No
SMS	Yes	Yes	Yes	No	No	No
TCPserv	Yes ¹⁶	Yes ¹⁶	Yes ¹⁶	No	No	No
FTP	Yes ¹⁷	Yes ¹⁷	Yes ¹⁷	No	No	No
TSC	Yes ¹⁸	Yes ¹⁸	Yes ¹⁸	No	No	No

7.4.3 Inserting the SIM card into the FE260

The SIM card must only be inserted and if applicable unlocked in FE260 with a radio modem. For other versions (Analog modem, Ethernet, ISDN) this section can be skipped.

SIM card installation varies according to the radio modem used in the FE260:

- ECM-GW120, ECM-2G-UG350, ECM-3G-UU270
(⇒ section 7.4.3.1 Inserting the SIM card into the ECM modems, p. 107)
- CloudLink 5G:
(⇒ section 7.4.3.2 Inserting the SIM card into the CloudLink 5G)
- Older versions: Integra "M2106+" or "M2106B"
(⇒ section 7.4.3.3 Inserting the SIM card into the modem "Integra-M2106+" and "Integra-M2106B", p. 108)

How to recognize the individual radio modems can be found in ⇒ section 7.4.2.

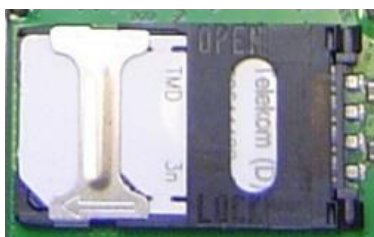
7.4.3.1 Inserting the SIM card into the ECM modems



DANGER OF DEATH!

Ensure the mains voltage is disconnected before opening the FE260 housing, ensure it is not turned back on and verify that there is no voltage.

- Remove the four screws from the top of the FE260 and open it.
- To unlock the SIM card holder slide the metal strap to the right and open flap.
- Slide SIM into the flap of the SIM card holder.



→ Metal strap to the right:
← Metal strap to the left:



Fig. 10: SIM card slot on the ECM-GW120

After installation, the chamfered edge of the SIM is located at bottom left.

SIM unlocked (open)
SIM locked (closed)

¹⁶ With the modem application ComTCPserv

¹⁷ With the modem application ComFTP

¹⁸ With the modem application ComTSC

- Close flap again and lock (slide metal strap under slight pressure to the left). The chamfered edge of the SIM must now be located at bottom left as shown.
- Screw the FE260 housing back on.

7.4.3.2 Inserting the SIM card into the CloudLink 5G



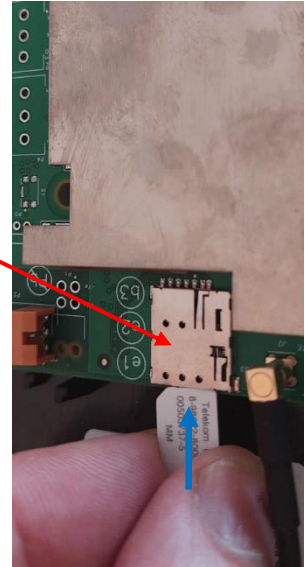
DANGER OF DEATH!

Ensure the mains voltage is disconnected before opening the FE260 housing, ensure it is not turned back on and verify that there is no voltage.

- Remove the four screws from the top of the FE260 and open it.
- Insert the SIM card with the canted corner on the front left (SIM contacts point downwards) into the SIM card holder (see photo on the right) until it clicks into place.
- Screw the FE260 housing back on.



Unlike the ECM modems, which are equipped with a SIM card holder for "mini" SIM cards (=2FF format), the CloudLink 5G modem has a SIM card holder for "nano" SIM cards (=4FF format).



7.4.3.3 Inserting the SIM card into the modem "Integra-M2106+" and "Integra-M2106B"



DANGER OF DEATH!

Ensure the mains voltage is disconnected before opening the FE260 housing, ensure it is not turned back on and verify that there is no voltage.

- Remove the four screws from the top of the FE260 and open it.
- Ensure that the "JP2" (mode) jumper is in the "operation" position.
- Press the eject button with for example a ballpoint pen or similar, to remove the SIM card slider.
- Insert the SIM card into the card slot (i.e., the SIM carriage) so that the gold-plated contact face upwards. The chamfered corner of the SIM card is at the bottom left (as illustrated on the print)

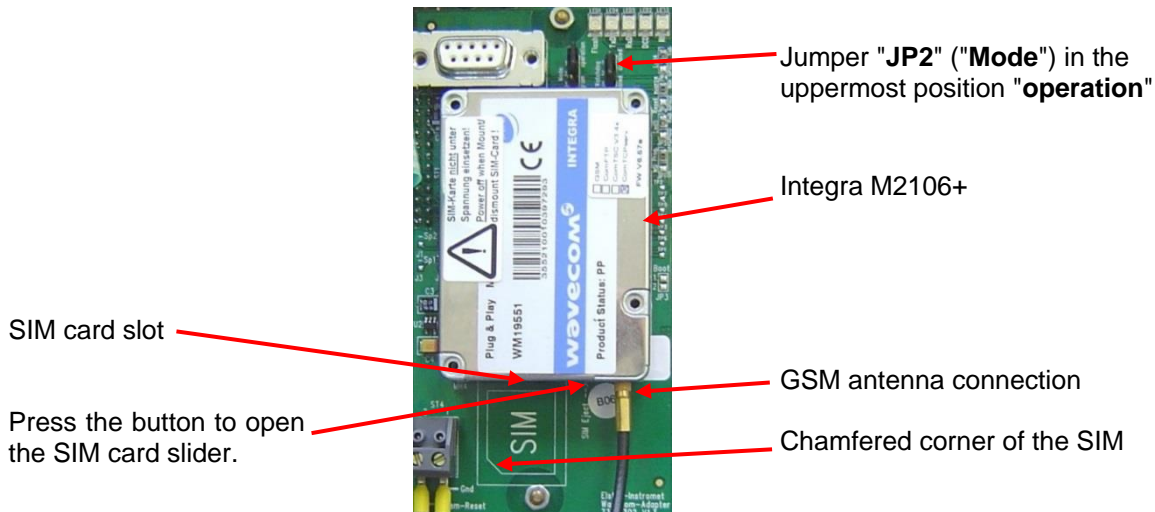


Fig. 11: Integra modem with SIM card slot

- Push the SIM card and slider back into the modem until the slider clicks into place.
- Screw the FE260 housing back on.

7.4.4 Unlocking the SIM card in the FE260 (entering the PIN)

If the inserted SIM card's PIN ("Personal Identification Number") is activated, carry out the following instructions to unlock it:

- Move the cursor to the ["Serv."](#) tab in the EK280's display, then to [Interfaces > Terminal interface > Mobile Communicat. > PIN](#).
- Press the [ENTER](#) key and enter the first PIN digit using the ▲ and ▼ arrow keys.



The PIN must be entered right aligned in the EK280!

- Move the cursor through the next digits using the ► key and enter them.
- After entering the last digit press the [ENTER](#) key, to save the input.
- Under ["P.Sta"](#) the ["Pin New"](#) is now ready for confirmation.
If ["P.Sta"](#) is not displayed, move the cursor down using the ▼ arrow keys.
- As soon as a communications time window is opened via the modem, the new PIN is used.
After a few seconds, under ["P.Sta"](#) the message ["Pin OK"](#) is displayed if the correct PIN was entered, or the message ["Pin Error"](#) if the PIN was incorrectly entered.

7.4.5 FE260 with GSM/GPRS or UMTS modem, GSM operating mode



The 2G modem is already prepared for transmission via GPRS when delivered. If GSM operation (CSD) is explicitly desired, the modem must first be set to CSD mode according to the following section. Please note that CSD mode is no longer guaranteed by the provider.

The CloudLink 5G modem as well as the LTE network do not provide CSD.

Prerequisites for process described below:

- The FE260 is connected and configured as described in ⇒ section [7.4.1](#).
- The modem installed in the FE260 is suitable for GSM operation and is supported by the software version installed in the connected EK280 (see table in ⇒ section [7.4.2](#)).

- The SIM card is inserted as described in ⇒ section 7.4.3.
- The SIM card may be unlocked by entering the correct PIN as described in section 7.4.4.

7.4.5.1 EK280 Parameterization



For parameterization of the EK280 you need a connection cable for the optical interface as well as the **enSuite** program. enSuite can be downloaded free of charge from the Honeywell website in the "Software Downloads" section:

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

a) Closing the time windows

In order that the parameterization works correctly the time windows 5 and 6 must be closed. To do this:

- Connect a PC or laptop with enSuite installed to the EK280 optical interface using the connection cable.
- Start enSuite and set up the communication link to the EK280.
(⇒ section 3.1 [Setting up the communication link to the EK280 via optical interface](#), p. 26)
- Select "[Navigation](#)" on the left-hand side and then "[Parameterize online](#)" at the bottom of the navigation window.
- In the top of the device window open the path "[Parameters](#)" > "[Interfaces](#)" by clicking on the relevant plus signs, and then select "[Call time windows](#)".
- In call windows 5 and 6 set start and end to the same value for each one and then select the "Transfer changes to device" icon at the top of the enSuite window.
- Then wait a minute, for any communications activity in progress on the EK280 to be safely stopped.

b) Sending parameter file

- Depending on the GSM modem fitted to the FE260 (ECM-GW120 or Wavecom Integra M2106) send one of the following parameter files to the EK280 (⇒ section 3.6 [Send parameter file](#), p. 28):

Integra M2106+: [EK280_xvx.. - FE260 & M2106 – GSM \(*\)](#)¹⁹

ECM-GW120: [EK280_xvx.. - FE260 & int. ECM-GW120 - GSM \(*\)](#)¹⁹

ECM-2G-UG350: [EK280_xvx.. - FE260 & int. ECM-2G-UG350 - CSD mode only \(*\)](#)¹⁹

ECM-3G-UU270: [EK280_xvx.. - FE260 & int. ECM-3G-UU270 - CSD mode only \(*\)](#)^{19, 20}

For the following customized settings and tests required, press "[Navigation](#)" on the left-hand side and then "[Parameterize online](#)" at the bottom of the navigation window.



Attention: In some UMTS networks (e.g., German networks Telekom, Vodafone, O2), the CSD service (Circuit Switched Data) is not supported! Please get in touch with your network operator.



All the values listed in enSuite under "[Parameters](#)" can be found on the "[Serv.](#)" display tab of the EK280 under the same path.

¹⁹ The "x" stands for the device software version, e.g., "2v5". The asterisk * stands for a small letter which indicates the version of the file, e.g., "a".

²⁰ ⇒ see also next info block

c) Setting time window for potential data retrievals

In the base configuration now displayed you can define time windows, during which data can be cyclically retrieved from the EK280 via the modem. Time windows 5 and 6 are reserved for EK280 operation with an FE260, and generally only time window 5 is used. Redundant time windows can be deactivated by setting the time window start and end to the same value.

- In the top of the device window open the path "[Parameters](#)" > "[Interfaces](#)" by clicking on the relevant plus signs, and then select "[Call time windows](#)".
- For call window 5, set the start to "00:00" and the end to "23:59" and then select the "Transfer changes to device" icon at the top of the enSuite window.

7.4.5.2 Checking radio network signal strength

Before starting a data transfer via the modem, you must ensure that there is adequate reception field strength.

- Finally, turn the FE260 power supply back on.
- Wait for around a minute for the EK280 to detect the FE260.
- Check whether appropriate bars indicating the signal level for the external modem ("e") appear on the main display of the EK280.
- Move the cursor to the "[Serv.](#)" tab in the EK280's display, then to [Interfaces > Terminal interface. > Mobile Communicat. > Sign.](#)
- The percentage field strength is now displayed under [Sign.](#)
- In order to update the level display, move the cursor to [Sign.](#), please press the [ENTER](#) key of the EK280 and then wait approx. 30 seconds. This makes it possible to determine the best installation position for an external GSM antenna.



With a signal strength below 50% data transfer issues may be encountered. Adjusting the antenna position can improve signal strength in most cases.

7.4.5.3 Retrieving data with enSuite

a) Opening the test time window for the following test retrievals with enSuite



The test time window only needs to be open if none of the time windows 5 to 6 is currently open.

- If the communication link to the EK280 via the optical interface is not set up, it must be created. (⇒ section [3.1 Setting up the communication link to the EK280 via optical interface](#), p. 26)
- Select "[Navigation](#)" on the left-hand side of the enSuite window and then "[Parameterize online](#)" at the bottom of the navigation window.
- In the top of the navigation window click first on the plus sign next to "[Parameters](#)", then on the plus sign next to "[Interfaces](#)" and then on "[Terminal interface](#)".
- Click on the "0" value next to "[Test call acceptance window](#)" in the right-hand side of the window and enter a duration in minutes (i.e., 10), for the test time window for the test retrieval to remain open.
- Press the "[Transfer changes to device](#)" icon at the top of the enSuite window. The EK280 is now available via the modem for the duration set.
- In enSuite press the "[Disconnect](#)" icon or "[Disconnect from all devices](#)" to terminate the communication link between enSuite and the EK280.

b) Test retrieval via the modem

- Set up the modem communication link from enSuite to the EK280.
(⇒ section [3.2 Setting up the communication link to EK280 via a modem](#), p. 26)
- Once the communication link is set up, you can carry out checks, for instance view certain parameters. To do this press "[Navigation](#)" on the left-hand side of the enSuite window and then "[Parameterize online](#)" in the bottom of the navigation window, then click on the plus sign next to "[Parameters](#)" and then its subsections.
- In enSuite press the "[Disconnect](#)" symbol or "[Disconnect from all devices](#)" to end the test retrieval.

7.4.6 FE260 with GSM/GPRS, UMTS or LTE modem, TCPserv operating mode

In this modem operating mode you can access the EK280 via the network (Ethernet, TCP/IP), to which your retrieval system is connected, i.e., you do not require an additional retrieval system modem. Data transfer is normally faster than with GSM operation, as explained in ⇒ section [7.4.5 FE260 with GSM/GPRS or UMTS modem, GSM operating mode](#) (p. 109).

Here the GPRS resp. UMTS modem in the EK280 functions as a TCP-Server and may be addressed by a TCP client that is listed in its retrieval software through a static IP address. To allocate a static IP to the modem during the setup of the GPRS resp. UMTS session, they must (together with their network provider) maintain a virtual private network (VPN) which must be enabled on the SIM used in the modem.

Prerequisites for process described below:

- The FE260 is connected and configured as described in ⇒ section [7.4.1](#).
- The modem installed in the FE260 is suitable for TCPserv operation and is supported by the software version installed in the connected EK280 (refer to table on ⇒ section [7.4.2](#)).
- The SIM card is inserted and unlocked as described in ⇒ section [7.4.3](#).
- The SIM card may be unlocked by entering the correct PIN in accordance with ⇒ section [7.4.4](#).

7.4.6.1 EK280 Parametrization



A modem parameterized for TCPserv operation can still be called via the CSD²¹ connection (GSM operation ⇒ section [7.4.5](#)). However, a CSD connection cannot consist of a TCP connection at the same time: only one after the other!

The CloudLink 5G modem as well as the LTE network do not provide CSD.



For parameterization of the EK280 you need a connection cable for the optical interface as well as the enSuite program. enSuite can be downloaded free of charge from the Honeywell website in the "Software Downloads" section:

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

a) Closing the time windows

In order that the parameterization works correctly the time windows 5 and 6 must be closed. To do this:

- Connect a PC with enSuite installed to the EK280 optical interface using the connection cable.
- Start enSuite and set up the communication link to the EK280.
(⇒ section [3.1 Setting up the communication link to the EK280 via optical interface](#), p. 26)
- Select "[Navigation](#)" on the left-hand side and then "[Parameterize online](#)" at the bottom of the navigation window.

²¹ CSD=Circuit Switched Data, circuit-switched data service in the case of mobile telephony.

- In the top of the device window open the path "[Parameters](#)" > "[Interfaces](#)" by clicking on the relevant plus signs, and then select "[Call time windows](#)".
- In call windows 5 and 6 set start and end to the same value for each one and then select the "Transfer changes to device" icon at the top of the enSuite window.
- Then wait a minute, for any communications activity in progress on the EK280 to be safely stopped.

b) Sending parameter file

- Depending on the modem module fitted to the FE260 and the loaded modem application (this can be determined from the modem sticker, ⇒ section [7.4.6.2 Parameterization of TCPserv modems in the FE260](#) (only modems with "ComTCPserv"), p. 115) send one of the following parameter files to K280 (⇒ section [3.6 Send parameter file](#), p. 28):
- modem type "ECM-2G-UG350":
[EK280_xvx.. - FE260 & ECM-2G-UG350 – CSD/TCPserv/FTP/NTP \(*\)](#) ²²
- modem type "ECM-3G-UU270":
[EK280_xvx.. - FE260 & ECM-3G-UU270 – CSD/TCPserv/FTP/NTP \(2G mode\) \(*\)](#) ^{22, 23}
or
[EK280_xvx.. - FE260 & ECM-3G-UU270 – TCPserv/FTP/NTP \(2G+3G\) \(*\)](#) ^{22, 23}
- modem type "CloudLink 5G":
[EK280_xvx.. - FE260 & CloudLink TCPserv/FTP/NTP \(4G+5G LTE-M1\) \(*\)](#) ²²
or
[EK280_xvx.. - FE260 & CloudLink TCPserv/FTP/NTP \(4G+5G LTE-NB1\) \(*\)](#) ^{22, 23}
- modem type "ECM-GW120" with the modem application "WipSoft":
[EK280_xvx.. - FE260 & ECM-GW120 – WipSoft \(GPRS\) \(*\)](#) ²²
- modem type "ECM-GW120" with the modem application "ComTCPserv":
[EK280_xvx.. - FE260 & ECM-GW-120 - ComTCPserv \(*\)](#) ²²
- modem type "Integra M2106" with the modem application "ComTCPserv":
[EK280_xvx.. - FE260 & M2106+ \(FW657e\) – ComTCPserv \(*\)](#) ²²



When using the parameter file "[...ECM-3G-UU270 – CSD/TCPserv/FTP/NTP \(2G mode\) \(*\)](#)" the modem generally logs into the 2G network (GPRS). As such, the higher data rates which are possible in the 3G network (UMTS) cannot be used.
When using the parameter file "[...ECM-3G-UU270 – TCPserv/FTP/NTP \(2G+3G\) \(*\)](#)" the modem preferably logs into the 3G network (UMTS), if it is locally available. The modem only uses the 2G network (GPRS) if no 3G network is available locally. However, beware: In the German 3G networks (Telekom, Vodafone, O2), the CSD service (Circuit Switched Data) is not supported!

Summary

If you want to use the CSD data transmission in Germany, you must also operate the modem in the 2G network! In other countries, you may need to clarify the circumstances with your network provider!



When using the parameter file "[... int. CloudLink TCPserv/FTP/NTP \(4G+5G LTE-NB1\) \(*\)](#)", the modem logs into the Narrowband IoT network (NB-IoT, LTE cat.NB1). In this both the data volume as well as the transmission speed are limited. The exact conditions depend on the network provider and the selected tariff. For details, please contact your mobile network provider.

²² The "x" stands for the software version on the device, e.g., "2v5".

The asterisk * stands for a small letter which indicates the version of the file, e.g., "a".

²³ ⇒ see also next info block

- For the following customized settings and tests required, press "[Navigation](#)" on the left-hand side and then "[Parameterize online](#)" at the bottom of the navigation window.



All the values listed in enSuite under "[Parameters](#)" can be found on the "[Serv.](#)" display tab of the EK280 under the same path.

c) Set individual parameters in the case of ECM-GW120 with WipSoft, ECM-2G-UG350, ECM-3G-UU270 and CloudLink 5G

- In the top of the device window open the path "[Parameters](#)" > "[Terminal interface](#)" and then select "[Mobile Communicat.](#)"
- On the right-hand side of the window you will now see several values, in which the following must be entered:

Value	Input
GPRS Access Point Name "APN"	These values vary according to the SIM card and VPN (Virtual Private Network) in use. The values to be entered can normally be obtained from your IT department or SIM card provider.
APN Username "UName"	
APN Password "PwAPN"	
GPRS Port Address "Port"	"Port" means the TCP port no. of the retrieval system in use.



If you fail to input an Access Point Name (APN), the APN that is saved on the SIM is used. Since this is usually a public APN (no access to a VPN) and since a dynamic IP address is allocated when a GPRS session with a public APN is set up, the TCP server function cannot be used! This is because a static IP address would be needed for this purpose. In such a case, the modem could only be used as TCP client.

Attention: Without the input of an APN there is the risk that unspecified costs may be incurred, as with every set up through a GPRS provider and based on a corresponding tariff a minimum data volume (e.g., 10 or 100 kB) will be billed!

- Press the "[Transfer changes to device](#)" icon at the top of the enSuite window.
- If required (i.e., with the aid of the enSuite user list) two further addresses for a "Domain Name System" can be entered in addresses 3:0794.0 and 3:0795.0. This is however not essential.

d) Set individual parameters (Integra M2106 only or ECM-GW120 with "ComTCPserv")

- On this GPRS modem the VPN access data are not parameterized in the EK280, but in the GPRS modem refer to ⇒ section [7.4.6.2 Parameterization of TCPserv modems in the FE260](#) (only modems with "ComTCPserv") (p. 115).

e) Setting time window for potential data retrievals

In the base configuration now displayed you can define time windows, during which data can be cyclically retrieved from the EK280 via the modem. Time windows 5 and 6 are reserved for EK280 operation with an FE260, and generally only time window 5 is used. Redundant time windows can be deactivated by setting the time window start and end to the same value.

- In the top of the device window open the path "[Parameters](#)" > "[Interfaces](#)" by clicking on the relevant plus signs, and then select "[Call time windows](#)".
- For call window 5, set the start to "00:00" and the end to "23:59" and then select the "Transfer changes to device" icon at the top of the enSuite window.
- Finally, turn the FE260 power supply back on.
- Wait for around a minute for the EK280 to detect the FE260.
- Check whether appropriate bars indicating the signal level for the external modem ("e") appear on the main display of the EK280.

7.4.6.2 Parameterization of TCPserv modems in the FE260 (only modems with "ComTCPserv")



Parameterization as described for the GSM/GPRS modem in the FE260 is only required, if the FE260 is fitted with a modem into which the modem application "ComTCPserv" has been loaded with:

- Either the **Integra M2106** with the sticker illustrated on the right:
If another sticker has been affixed to the M2106, or another modem application is marked, the modem **cannot** be used for the "GPRS-TCPserv" application!

<input type="checkbox"/>	GSM
<input type="checkbox"/>	ComFTP
<input type="checkbox"/>	ComTSC
<input checked="" type="checkbox"/>	ComTCPserv
FW-V6.57e	

- Or **ECM-GW120** with the sticker illustrated on the right.

Note:

For the application "TCPserv" used with the EK280 plus the FE260 and the integrated **ECM-GW120**, the normal modem application used is "**WipSoft**", because there is no need for a separate modem parameterization. Inputting the VPN access data into the EK280 with enSuite is sufficient for proper function of the "TCPserv" feature. The EK280 sets these data at the beginning of each time window with ECM-GW120 (⇒ section 7.4.6.1).

However, in practice there is the possibility that the modem application "ComTCPserv" is loaded into ECM-GW120 instead of "WipSoft". This can happen, for example, if the FE260 has been previously used with an EK260 which is now being swapped for an EK280. Since it was not possible to store the VPN access data in the EK260, it could only be used for TCPserv applications with the modem application "ComTCPserv"!

<input type="checkbox"/>	GSM
<input type="checkbox"/>	ComFTP
<input type="checkbox"/>	ComTSC
<input checked="" type="checkbox"/>	ComTCPserv
FW-V7.47.6	



If the FE260 includes an ECM-GW120 with the sticker shown on the right or an ECM-xG-Uxxxx, it does need not to be parameterized separately. In this case, the function is set by entering the parameters in the EK280 in accordance with ⇒ section 7.4.6.1 EK280 Parametrization (p. 112).

TCPserv	
FW-V7.47.6	
WipSoft V5.43.3	

Parameterization of the modem application "ComTCPserv" in the GSM/GPRS modem may be effected either through a GSM-CSD modem connection or on location, with the FE260 housing open and a switched 230 VAC on supply. However, the latter operation must only be performed by suitably qualified persons.



DANGER OF DEATH!

CAUTION! 230 V alternating voltage!



For the parameterization of the GPRS-ComTCPserv modems in the FE260 for operation with an EK280 you need a commercially available DSUB9-RS232 cable (1.1 through contacted, not a null modem cable) or a GSM/CSD connection as well as the software enSuite from V3.9 and higher, which is available for downloading free of charge from www.elster-instromet.com.



For parameterization of the modem application "ComTCPserv" in an FE260 there is also a separate ⇒ commissioning instruction [7], which is included with every FE260 with a ComTCPserv modem.

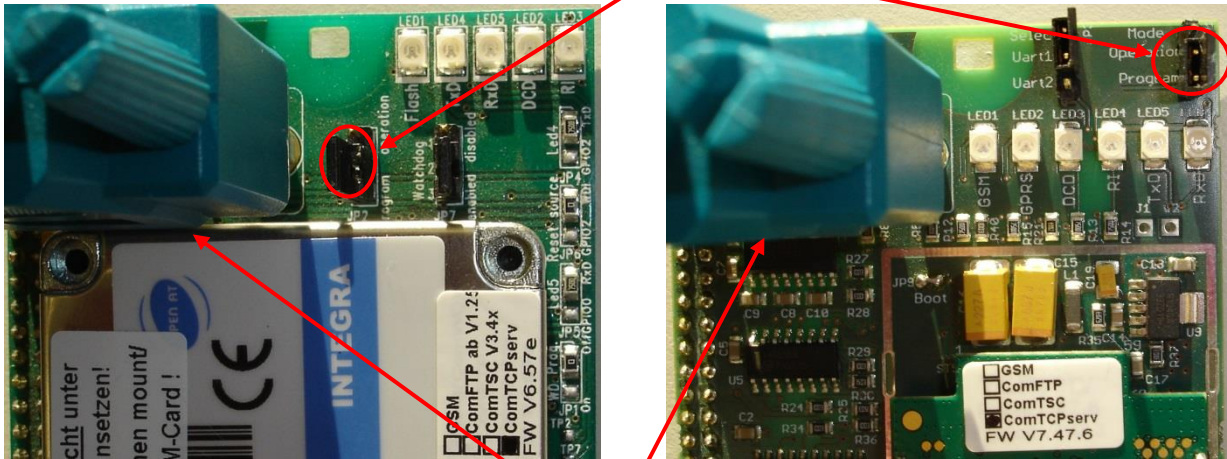
For parameterization of the GPRS-ComTCPserv modem in the FE260 please proceed as follows.

When parameterizing on location:

- Make sure that time windows 5 and 6 of the EK280 are closed.
- Make sure that the FE260 is not under power.

- On the modem adapter board, fit the jumper "Mode" in position "program" (lower position, ⇒ photos).

Jumper "Mode" in Position "program" (lower position)



Modem parameterization interface

- Connect a COM interface of your computer with the modem parameterization interface on the modem adapter board (⇒ photograph) with the aid of a DSUB9-RS232 cable.
- Turn on the FE260 power supply.

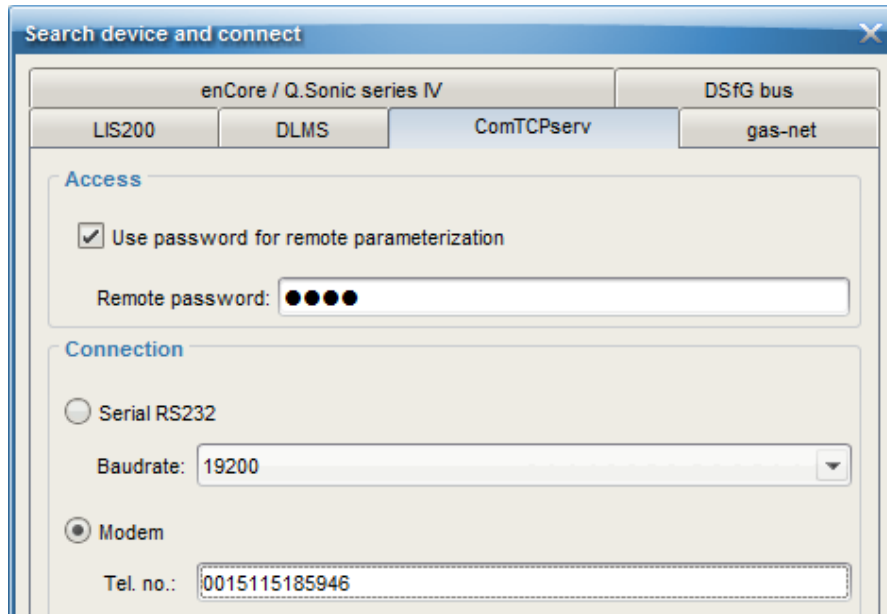


Danger of death!

Ensure that before you switch the mains voltage on again, the housing of the FE260 is securely closed.

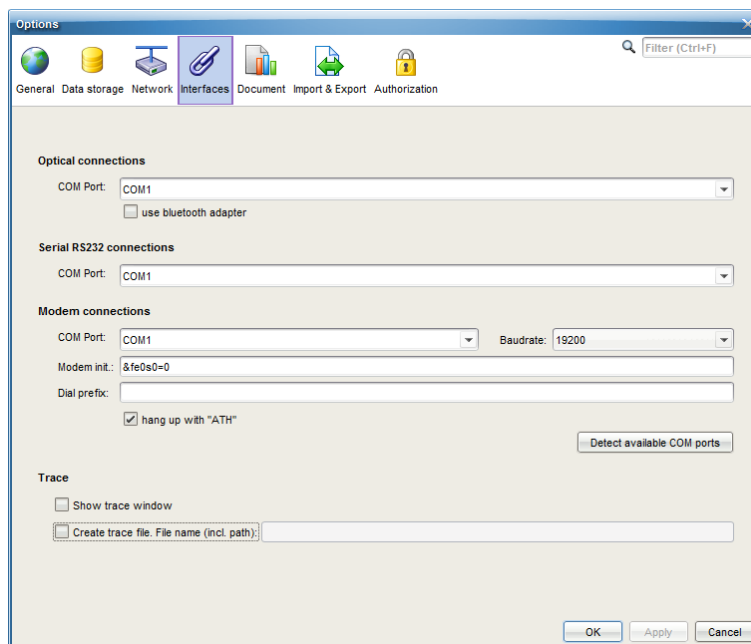
The following steps are performed either when parameterizing on site or remotely via a GSM-CSD modem connection:

- On your computer, start the software enSuite (version V3.9 or higher).
- In enSuite, depending on the connection, open menu **"Actions"** > **"Search device (F3)"**.
- Select the **"ComTCPserv"** tab.
- Enter the password for the remote parameterization in the **"Access"** section (factory setting = "0000").
- In the **"Connection"** section, specify whether you want to parameterize the modem locally via a serial RS232 interface with 19200 Baud or via a modem connection. In the latter case, you must also enter the telephone number under which the modem to be parameterized can be reached:

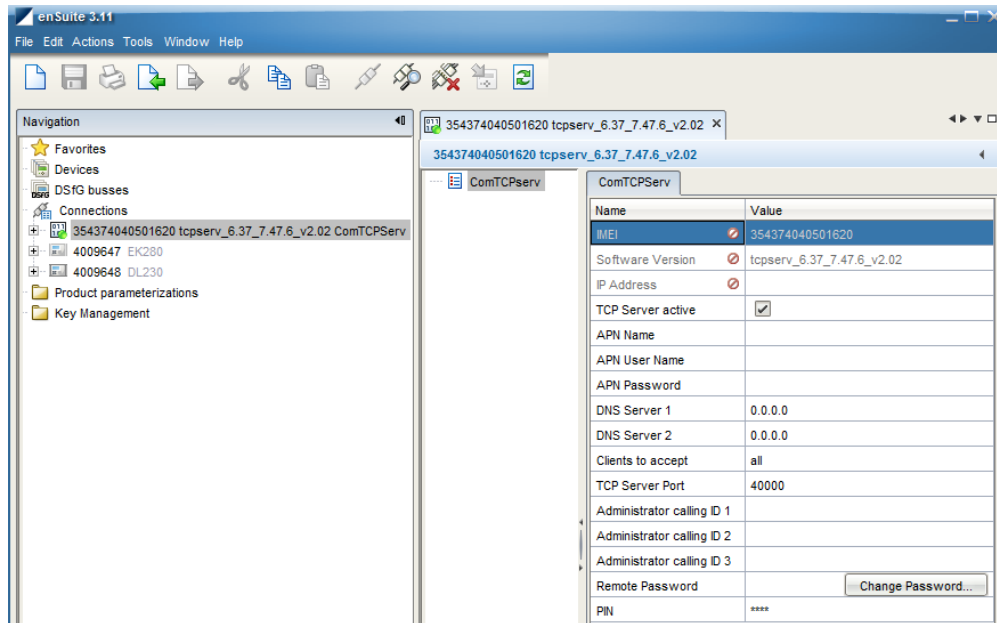


Note:

After pressing the "*Configure Interfaces*" button, you can specify which COM port of your PC is to be used for a local or a modem connection:

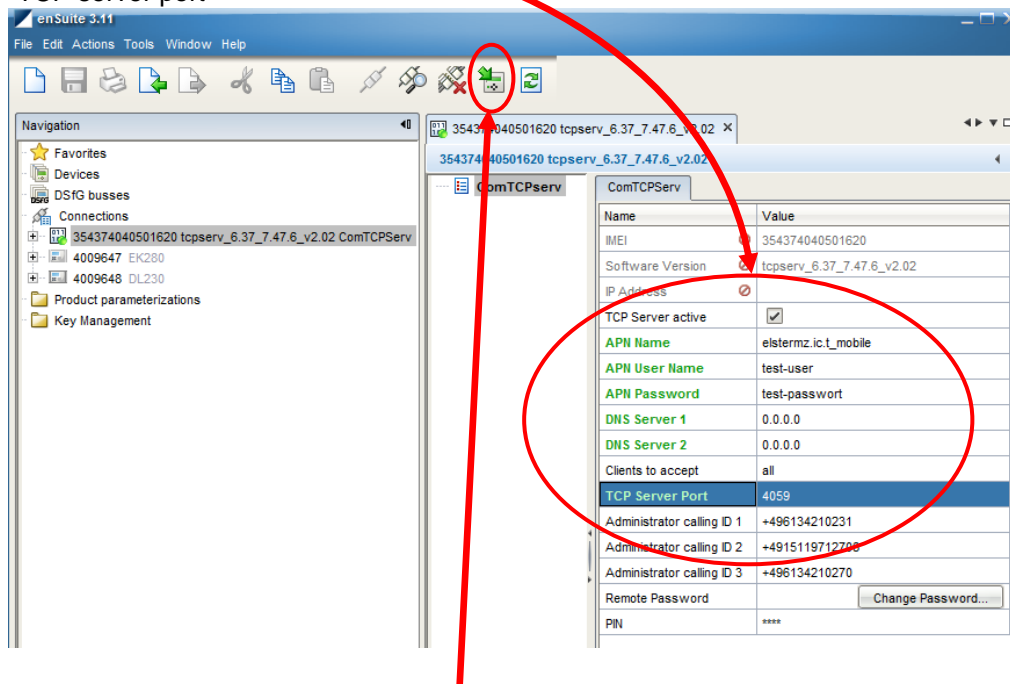


- After pressing the "OK" button in the "*Search device and connect*" dialog, the connection to the ComTCPserv modem is established, the currently set parameters are read out and displayed, including the IMEI number of the modem and the ComTCPserv software version:



– Enter at least enter the following parameters:

- APN name
- APN password
- APN username
- TCP server port



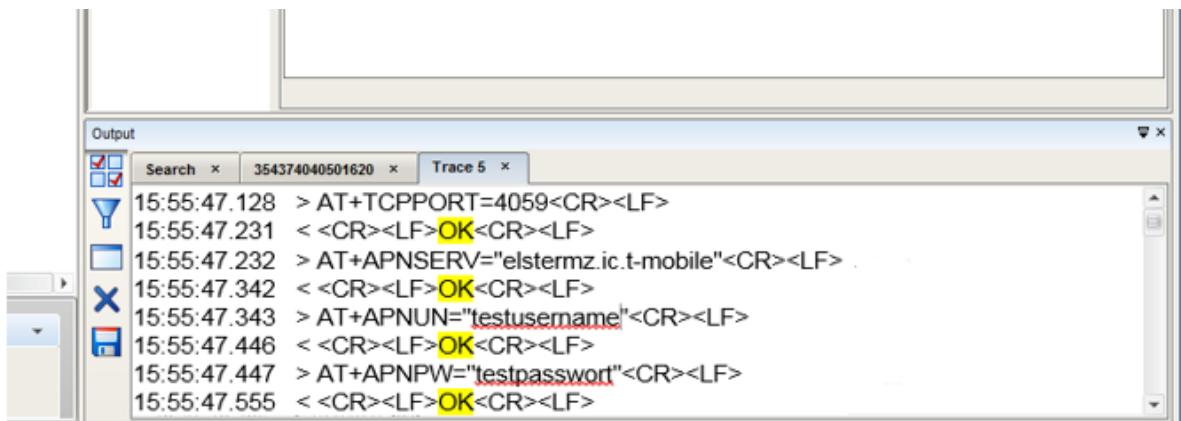
– After pressing the "Transfer changes to the device" button, the entered values are sent to the modem.

Note:

The remaining parameters are optional and are only needed in special cases:

- *DNS Server 1 and 2 (currently not required)*
- *Accepted clients:*
 - *All*
 - The ComTCPserv modem does not check the IP address of the TCP client
 - Any computer within the VPN can access the ComTCPserv modem, if the firewall in the VPN allows it!

- **One IP address**
→ Only the computer within the VPN with the specified IP address can access the ComTCPserv modem, if the firewall in the VPN allows it!
 - **Administrator caller ID 1, 2 and 3:**
Telephone connections from which a remote parameterization of a ComTCPserv modem is permitted (only ComTCPserv up to V1.10)
 - **Remote password:**
Password for a remote parameterization of the ComTCPserv modem. In the factory, the setting is set to "0000".
Attention: If you forget the password, no remote parameterization is possible!
 - **PIN:**
If parameterization is effected via the local interface, and if on the SIM card a PIN is active, this PIN must be entered. For remote parameterization, a PIN need not be entered, as the modem requires logging on to the GSM network in any case.
- The transfer of the values to the ComTCPserv modem is logged in the trace window of enSuite. The parameterization has been completed successfully if all parameters have been sent without an error message and have been acknowledged with "OK" by the modem:



- In the event of parameterization through the **local** parameter interface, the following points must also be dealt with:
- Switch off the power supply to the FE260 and disconnect the parameterization cable from the FE260.
 - Set the jumper "Mode" to the "Operation" position (upper position).
 - Make sure that a GSM antenna is connected and that a SIM card has been inserted into the SIM slot (⇒ section 7.4.3) and is unlocked (⇒ section 7.4.4).



Danger of death!

Ensure that before you switch the mains voltage on again, the housing of the FE260 is securely closed.

- Reconnect the supply voltage to the FE260.

7.4.6.3 Checking Radio Network Signal strength

Before starting a data transfer via the modem, you must ensure that there is adequate reception field strength.

- On the display of the EK280, move the cursor in the tab "Serv." to *Interfaces > Terminal interface. > Mobile Communicat. > Sign..*
- With the cursor over *Sign.* please press the EK280 **ENTER** key and wait for approximately 30 to 60 seconds until the field strength percentage is displayed.



With a field strength below 50% data transfer issues may be encountered. Adjusting the antenna position can improve field strength in most cases.

In case of LTE Cat.M1/NB1, a signal strength of about 20% can be sufficient.

7.4.6.4 Display of the Radio Network Operator

- In the top of the device window open the path "[Parameters](#)" > "[Interfaces](#)" > "[Terminal interface](#)" > "[Cellular](#)".
- The network operator is now displayed under "[Prov.](#)"



In the case of a CloudLink 5G modem, the Mobile Network Code (MNC) is displayed instead of the operator's name. The list of European network operators can be found, for example, at https://en.wikipedia.org/wiki/List_of_mobile_network_operators_of_Europe.

7.4.6.5 Retrieving data with enSuite

- If the call window is not open (⇒ section [7.4.6.1 EK280 Parametrization](#) (p. 112), section c), a unique "Test" time window can be set up for verification purposes:

a) Opening the test time window for the following test retrievals with enSuite



The test time window only needs to be open if none of the time windows 5 to 6 is currently open.

- If the communication link to the EK280 via the optical interface is not set up, it must be created. (⇒ section [3.1 Setting up the communication link to the EK280 via optical interface](#), p. 26)
- Select "[Navigation](#)" on the left-hand side of the enSuite window and then "[Parameterize online](#)" at the bottom of the navigation window.
- In the top of the navigation window click first on the plus sign next to "[Parameters](#)", then on the plus sign next to "[Interfaces](#)" and then on "[Terminal interface](#)".
- Click on the "0" value next to "[Test call acceptance window](#)" in the right-hand side of the window and enter a duration in minutes (i.e., 10), for the test time window for the test retrieval to remain open.
- Press the "[Transfer changes to device](#)" icon at the top of the enSuite window. The EK280 is now available via the modem for the duration set.
- In enSuite press the "[Disconnect](#)" symbol or "[Disconnect from all devices](#)" to end the test retrieval.

b) GSM-CSD Test retrieval via the modem

- Set up the modem communication link from enSuite to the EK280. (⇒ section [3.2 Setting up the communication link to EK280 via a modem](#), p. 26)
- Once the communication link is set up, you can carry out checks, for instance view certain parameters. To do this press "[Navigation](#)" on the left-hand side of the enSuite window and then "[Parameterize online](#)" in the bottom of the navigation window, then click on the plus sign next to "[Parameters](#)" and then its subsections.
- In enSuite press the "[Disconnect](#)" symbol or "[Disconnect from all devices](#)" to end the test retrieval.

c) GPRS-TCPserv Test retrieval via the modem

- Set up the modem communication link from enSuite to the EK280. (⇒ section [3.3 Setting up the communication link to EK280 via a network \(TCP/IP\)](#), p. 27)
- Once the communication link is set up, you can carry out checks, for instance view certain parameters. To do this press "[Navigation](#)" on the left-hand side of the enSuite window and then

"[Parameterize online](#)" in the bottom of the navigation window, then click on the plus sign next to "[Parameters](#)" and then its subsections.

- In enSuite press the "[Disconnect](#)" symbol or "[Disconnect from all devices](#)" to end the test retrieval.

7.4.7 FE260 with GSM/GPRS, UMTS or LTE modem, FTP operating mode

7.4.7.1 FTP operation, depending on the version of EK280

From the EK280-version 2.50, the FTP data transfer is controlled by the EK280 itself. This differs from previous versions, where for handling the "FTP Pushes", the modem application "ComFTP" is needed.



From V2.50 and higher, no special "ComFTP" modem is required for the FTP data transmission with EK280. Rather, it can be used with the GPRS, UMTS and LTE modems, which are usable according to the table in ⇒ section 7.4.2 for FTP data transmission. As of version V2.50 of the EK280 firmware, ComFTP modems will be no longer supported!



The commissioning procedure for the "ComFTP" application is not described in these instructions. A separate description is available from ElsterSupport@Honeywell.com.

7.4.7.2 FTP data transfer via GPRS, UMTS or LTE without ComFTP (EK280 from V2.50)

For commissioning the FTP data transfer via the FE260, the EK280 must first be configured for GPRS and/or UMTS operation. Here, a distinction must be made between whether the FTP data transmission is to take place within a VPN²⁴ or via the Internet:

- If the FTP data transfer is to be carried out within a VPN, the parameterization is the same as for TCPserv operation (⇒ section 7.1.6). In so doing, among other things, the access data to the VPN is entered in the menu "[Parameter – Interfaces – Terminal interface – Mobile Communicat](#)". In detail, these are:

Parameter
2:780 – GPRS Access Point Name "APN"
2:781 – APN user Name
2:782 – APN password

and optionally (only if the FTP server is not defined by an IP address, but by a URL address):

2:794 – Domain Name Server 1
2:795 – Domain Name Server 2

- If the FTP data transfer is to be done over the Internet, the provider-dependent access data to the public Internet are entered in the menu "[Parameter – Interfaces – Terminal interface – Mobile Communicat](#)." instead of the access data to a VPN. Request access data from your own provider. Some examples of access can be found in section 7.1.8.2.

After configuring the GPRS, UMTS or LTE operation, the following FTP-specific steps still have to be carried out:

1. Create the FTP servers on which the data can be stored ("phone book").
2. Parameterize the data stored on the server ("FTP transmission").
3. Parameterize the time at which this FTP task is to be executed, as well as the server on which these data are to be stored ("Connection").

²⁴ VPN = Virtual Private Network

These steps are described in separate FTP manual ⇒ [10].



From the EK280-V2.50, a modem used for FTP data transmission can be used for FTP and CSD connections ⇒ section 7.4.5) as well as for TCP connections ⇒ section 7.4.6). However, there should only be one connection at a time.



The function of the active FTP application causes costs due to a running data transfer volume in the mobile network. Calculate this with a sufficient reserve. Talk to your provider to use a favorable tariff. Switching off roaming can also help to save costs. It is your own responsibility to optimize these factors.



Radio connections can be disturbed. Therefore, a hundred percent data transmission can never be guaranteed.

7.4.7.3 Configuration of the FTP application (PUSH transfer)



Separate instructions ("LIS200 device series - FTP in LIS terminal devices (EK/DL)" [10]) are available for configuring the FTP transfer and can be downloaded from www.elster-instromet.com.

We can also supply you with support for commissioning these FTP systems as part of a minor project.

For further information, please contact our Elster technical support team:

Tel.: +49 (0)6134 605-123

E-mail: ElsterSupport@honeywell.com

7.4.8 FE260 with GSM/GPRS modem, TSC operating mode



Data transfer to a TAINY SwitchingCenter (TSC) is supported from EK280 up to and including V2.40.

→ Operation with a TSC is not supported as from version V2.50 of the EK280.

7.4.9 FE260 with internal analog modem (PSTN Modem)

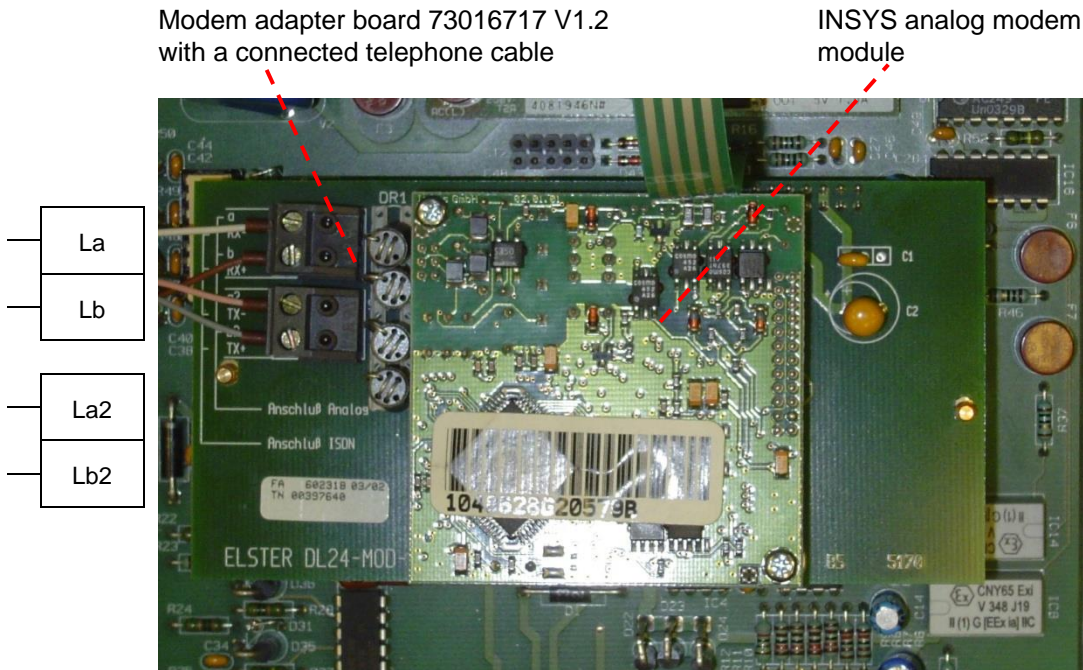


Fig. 12: INSYS Analog modem module in the FE260

This interface card is used as an interface for an analog telephone line.

Prerequisites for process described below:

- The FE260 is connected and configured as described in ⇒ section 7.4.1.

7.4.9.1 Parametrization of the EK280



For parameterization of the EK280 you need a connection cable for the optical interface as well as the enSuite program. enSuite can be downloaded free of charge from the Honeywell website in the "Software Downloads" section:

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

a) Closing the time windows

In order that the parameterization works correctly the time windows 5 and 6 must be closed. To do this:

- Connect a PC with enSuite installed to the EK280 optical interface using the connection cable.
- Start enSuite and set up the communication link to the EK280.
(⇒ section 3.1 [Setting up the communication link to the EK280 via optical interface](#), p. 26)
- Select "[Navigation](#)" on the left-hand side and then "[Parameterize online](#)" at the bottom of the navigation window.
- In the top of the device window open the path "[Parameters](#)" > "[Interfaces](#)" by clicking on the relevant plus signs, and then select "[Call time windows](#)".
- In call windows 5 and 6 set start and end to the same value for each one and then select the "Transfer changes to device" icon at the top of the enSuite window.
- Then wait a minute, for any communications activity in progress on the EK280 to be safely stopped.

b) Send parameter file

- Send the following parameter file to the EK280. (⇒ section 3.6, p. 28)
EK280_xvx. - FE260 & int. PSTN modem ()*²⁵
- For the following customized settings and tests required, press "[Navigation](#)" on the left-hand side and then "[Parameterize online](#)" at the bottom of the navigation window.



All the values listed in enSuite under "Parameters" can be found on the "Serv." display tab of the EK280 under the same path.

c) Setting time window for potential data retrievals

In the base configuration now displayed you can define time windows, during which data can be cyclically retrieved from the EK280 via the modem. Time windows 5 and 6 are reserved for EK280 operation with an FE260, and generally only time window 5 is used. Redundant time windows can be deactivated by setting the time window start and end to the same value.

- In the top of the device window open the path "[Parameters](#)" > "[Interfaces](#)" by clicking on the relevant plus signs, and then select "[Call time windows](#)".
- For call window 5, set the start to "00:00" and the end to "23:59" and then select the "Transfer changes to device" icon at the top of the enSuite window.
- Finally, turn the FE260 power supply back on.
- Wait for around a minute for the EK280 to detect the FE260.

7.4.9.2 Retrieving data with enSuite

- If the communication link to the EK280 is via the optical interface, press the "[Disconnect](#)" or the "[Disconnect from all devices](#)" icon to terminate the communication link between enSuite and the EK280 and then wait for the "o" on the EK280 display to stop flashing.
- Set up the modem communication link from enSuite to the EK280.
(⇒ section 3.2 [Setting up the communication link to EK280 via a modem](#), p. 26)
- Once the communication link is set up, you can carry out checks, for instance view certain parameters. To do this press "[Navigation](#)" on the left-hand side of the enSuite window and then "[Parameterize online](#)" in the bottom of the navigation window, then click on the plus sign next to "[Parameters](#)" and then its subsections.
- In enSuite press the "[Disconnect](#)" symbol or "[Disconnect from all devices](#)" to end the test retrieval.

²⁵ The "x" stands for the version of software on the device, e.g., "2v2".
The asterisk * stands for a small letter which indicates the version of the file, e.g., "a".

7.4.10 FE260 with “Insys” Ethernet adapter (up to manufacturing year 2018)



The Ethernet adapter (Insys) was supplied up to and including manufacturing year 2018 as from manufacturing year 2019, the FE260 will instead feature the iCE260 Ethernet module (see section 7.4.11).



ATTENTION!

This description is only valid for EC280 as of V2.40.

For versions smaller than V2.40, please use the Application Manual 2015-1.

Modem adapter board 73016717 V1.2
with attached LAN cable 04115524

INSYS Ethernet module
04407090

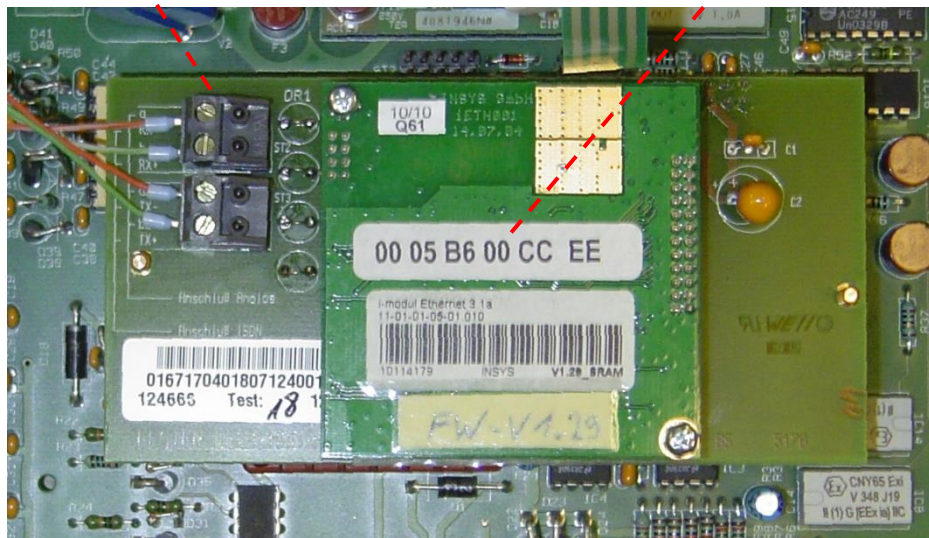


Fig. 13: INSYS Ethernet adapter in the FE260

This interface card is used as an interface with your Ethernet LAN.

Prerequisites for process described below:

- The FE260 is connected as described in ⇒ section 7.4.1 FE260 connection (p. 104). It is connected but it must not be live.

7.4.10.1 Parameterization of the EK280 for operation with an FE260/Ethernet



For parameterization of the EK280 you need a connection cable for the optical interface as well as the enSuite program. enSuite can be downloaded free of charge from the Honeywell website in the "Software Downloads" section:

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

a) Closing the time windows

In order that the parameterization works correctly the time windows 5 and 6 must be closed. Proceed as described in ⇒ section 7.4.5.

b) Send parameter file

- Send the following parameter file to the EK280 (⇒ section 3.6):
EK280_xvx. - FE260 & int. Ethernet adapter ()*²⁶
- For any further individual settings and tests required, press "[Navigation](#)" on the left-hand side and then "[Parameterize online](#)" at the bottom of the navigation window.



All the values listed in enSuite under "[Parameters](#)" can be found on the "[Serv.](#)" display tab of the EK280 under the same path.



ATTENTION! *Should your Ethernet card already have been parameterized with corresponding network data, the default settings (e.g., port, IP address, sub net mask) must be deleted from the initialization string in order to prevent them being accidentally overwritten. You will find the modem initialization string under "[Parameters](#)" > "[Interfaces](#)" > "[Terminal interface](#)".*

7.4.10.2 Parameterization of the FE260-integrated Ethernet adapter with enSuite



For parameterization of the Ethernet adapter in the FE260 for operation with a quantity converter EK280, a connection cable is required for the optical interface as well as the enSuite program, which can be downloaded free of charge from www.elster-instromet.com.

The Ethernet adapter in FE260 is basically parameterized at the Honeywell factory, so that at the time of commissioning on site only the following, application-specific parameters need to be set.

- IP address
- Gateway address
- Subnet mask
- TCP-Port


These parameters may be set as follows in the Ethernet adapter:

- Make sure that the FE260 is switched off.
- Start enSuite and establish the communication link to the EK280 via the optical interface. (⇒ section 3.1 [Setting up the communication link to the EK280 via optical interface](#), p. 26)
- Select "[Navigation](#)" on the left-hand side of the enSuite window and then "[Parameterize online](#)" at the bottom of the navigation window.
- In the top of the device window open the path "[Parameters](#)" > "[Interfaces](#)" by clicking on the relevant plus signs, and then select "[Call time windows](#)".
- Make sure that time windows 5 and 6 are closed.
- In the path "[Parameters](#)" > "[Interfaces](#)" choose the option "[Terminal interface](#)".
- Select the menu item "[Ethernet](#)".
- Now enter your individual address parameters (IP, Subnet Mask, Gateway, Port) in the appropriate parameter fields. Where necessary, you may require permission from your network administrator at this time.

²⁶ The "x" stands for the version of software on the device, e.g., "2v2".
The asterisk * stands for a small letter which indicates the version of the file, e.g., "a".

Example parameters:

Eth IP Adresse	OwnIP	192.168.27.11
Eth Subnet mask	SubN	255.255.255.0
Eth Gateway	Gatew	192.168.27.1
Eth Port	Port	40000
DHCP (1=ein/0=aus)	DHCP	0: No DHCP
Max. Anz. Versuche eine IP zu beziehen (nur bei DHCP=1)	MxLog	60

- Activate the button  "*Transfer values to device*", so that the modified values are transferred into the EK280.
- Make sure that the FE260 is connected to the EK280 in accordance to ⇒ section 7.4.1.

**Danger of death!**

Ensure that before you switch the mains voltage on again, the housing of the FE260 is securely closed.

- Turn on the FE260 power supply.
- Now under "*Parameters*" > "*Interfaces*" > "*Call time windows*" open one of the time windows 5 or 6. After opening the time window, the Ethernet adapter is automatically parameterized by the EK280 (V2.40).
- After approximately 30s, the Ethernet adapter is configured. Check the connection status of the appropriate connection profile (time window 5 = connection) to verify that parameterization was successful (Setpoint = "4: The interface is ready...").

7.4.10.3 Checking accessibility

- Make sure that the Ethernet connecting cable of the FE260 is connected to the network (LAN).
- In order to be able to verify the Ethernet card configuration, have your network administrator execute a ping command to the corresponding IP address (e.g., ping 192.168.0.5.). This will ensure that the IP address is registered within the network and valid.

7.4.10.4 Retrieving data with enSuite**a) Opening the test time window for the following test retrievals with enSuite**

The test time window only needs to be open if none of the time windows 5 to 6 is currently open.

⇒ section 7.1.4.3 *Retrieving data with enSuite* (p. 75)

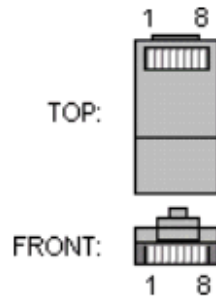
b) Test retrieval via the network.

- If the communication link to the EK280 is via the optical interface, press the "*Interrupt connection*" or the "*Break all connections*" icon to terminate the communication link between enSuite and the EK280 and then wait for the "o" top left of on the EK280 display to stop flashing.
- Now set up the communication link from enSuite to EK280 via the Ethernet adapter. (⇒ section 3.3 *Setting up the communication link to EK280 via a network (TCP/IP)*, p. 27)
- Once the communication link is set up, you can carry out checks, for instance view certain parameters. If not already displayed automatically, click on the left-lower part of the navigation window on "Parameterize online", then click on the plus sign next to the menu "Parameter" and on the sub-item

- In enSuite press the “*Disconnect*” symbol or “*Disconnect from all devices*” to end the test retrieval.

7.4.10.5 Additional information: cable assignment on the RJ45 network plug

Pinbelegung	
RJ45	FE260 / EM260
1	→ a / RX- / RA
3	→ b / RX+ / RB
2	→ a2 / TX- / TA
6	→ b2 / TX+ / TB



7.4.11 FE260 with iCE260 Ethernet module (from manufacturing year 2019)



For this function, the EK280 requires software version V2.53 or higher.

As from software version 2.53, the EK280 also supports an FE260 with an integrated iCE260 Ethernet interface for connecting to a network. With this application, the EK280 can also be installed in a Zone 0 or 1 potentially explosive atmosphere (in contrast to an EK280 with an internal iCE280 Ethernet interface as described in section 7.2).

7.4.11.1 Information about PoE mode (Power over Ethernet)

Since the FE260 always has a mains supply and the Ethernet interface is supplied by the FE260 (⇒ see Fig. 19), power supply via the network (PoE (Power over Ethernet) mode) is not necessary in this case.

If the network nevertheless provides PoE, this will be identified automatically by the Ethernet interface. The PoE supply in this case will take priority to prevent the PoE block installed on the Ethernet module operating in idle mode.

7.4.11.2 Information on the network cable

⇒ see section 7.2.2

7.4.11.3 Connecting the network cable



Danger of death!

The mains voltage must be switched off before opening the housing of the FE260. Ensure it is not turned back on and verify that there is no voltage.

The following section describes the preparation of the network cable and the connection of the cable to the Ethernet board.

7.4.11.3.1 Cutting the cable to the required length

Shorten the Ethernet cable to the required length. Please note that you need around 20 cm of additional length for connecting the cable in the FE260.

If the cable is already of the required length, only cut the RJ45 plug off one end of the cable.

7.4.11.3.2 Dismantling the cable gland

A special EMC cable gland must be used for feeding the Ethernet cable through the housing wall of the FE260. If the FE260 has already been supplied with an integrated Ethernet interface, the cable gland has been installed at the factory in the following position (⇒ see Fig. 14):

If the Ethernet interface was supplied separately in a retrofit kit, the EMC cable gland, including an M20/M16 reducing adapter is supplied with the retrofit kit. It replaces the gland previously installed in the position marked in Fig. 14.

In both cases, the cable gland must first be dismantled, and the individual components pulled over the Ethernet cable as described in section 7.2.3.2.



Fig. 14: Special EMC cable gland for installing the Ethernet cable

7.4.11.3.3 Removing the cable sheath

Remove the cable sheath for a length of approx. 17 cm.



The cable screen must not be damaged in order to ensure flawless screening of the cable.

7.4.11.3.4 Bulging and shortening the cable screen

⇒ see section 7.2.3.4

7.4.11.3.5 Pushing the cable screen over the cone

⇒ see section 7.2.3.5

7.4.11.3.6 Placing the retaining ring and assembling the cable gland

⇒ see section 7.2.3.6

7.4.11.3.7 Removing the foil screen

⇒ see section 7.2.3.7

7.4.11.3.8 Stripping cores and fitting with ferrules

Only the four cores colored *orange*, *orange and white*, *green* and *green and white* are required for connecting the FE260 to the network. Stripping the cores and fitting the ferrules is described in section 7.2.3.8.

7.4.11.3.9 Inserting the cable into the FE260

- If the iCE260 Ethernet interface was supplied separately in a retrofit kit, the M20/M16 reducing adapter included in the retrofit kit must be installed first. (⇒ see Fig. 15)
- The threaded insert of the cable gland must then be screwed into the reducing adapter. (⇒ see Fig. 16)



An A/F 20 wrench is required for the cable gland.

- The cable prepared as described in sections 7.4.11.3.1 to 7.4.11.3.8 can now be inserted into the FE260 housing and the cable gland installed. (see Fig. 17)



Fig. 15:
M20/M16 reducing adapter



Fig. 16: Threaded insert of the
EMC cable gland



Fig. 17: Fitted EMC cable gland

7.4.11.3.10 Connecting the cable to the Ethernet module



Caution! Before connecting the network cable to the Ethernet module, it is essential to ensure that the other end of the network cable has been disconnected from the switch or the network socket.

- Now feed the cable ends into the terminal block of the Ethernet module (⇒ Fig. 18).
- The core assignment is printed in front of the terminal block. The cores with the ferrules only need to be inserted. The white actuator on the terminal block does not have to be activated for this. This is only required if the cable has to be removed again.



If you cannot insert the cable with your fingers, a small screwdriver can be used to press onto the collar of the ferrule (⇒ Fig. 18).



Ensure that the core pairs remain twisted as far as possible (⇒ Fig. 18).

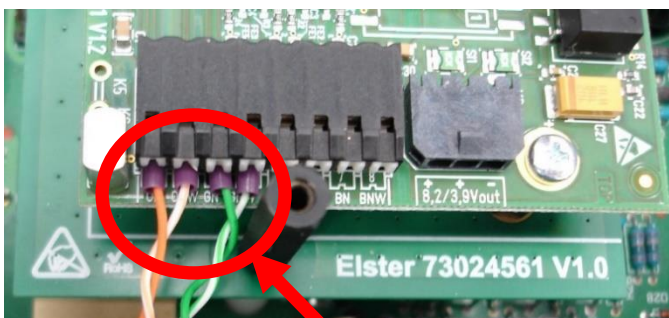
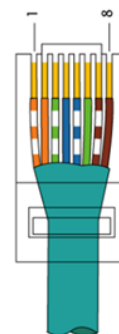


Fig. 18: Connected Ethernet cable



7.4.11.4 Power supply to the Ethernet interface

- The Ethernet interface is supplied with power by the FE260. A two-core cable was installed on the Ethernet module at the factory for this purpose (⇒ see Fig. 19).
- Close the FE260 housing.
- Do **not** switch on the power supply to the FE260 yet.

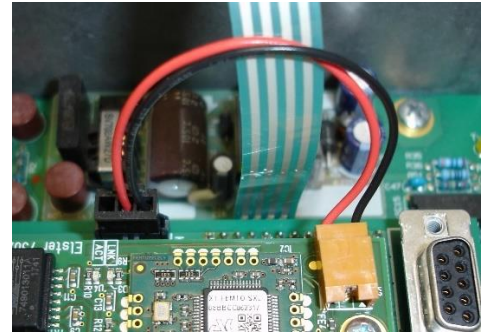


Fig. 19: Power supply to the Ethernet interface

7.4.11.5 Programming the network parameters



To parameterize the EK280 for operation with an iCE280, you will require a connection cable for the optical interface as well as the enSuite program, which can be downloaded free of charge from www.elster-instromet.com.

a) Closing the time windows

Time windows 5 and 6 must be closed for parameterization to function securely. To do this:

- Connect a PC or laptop with enSuite installed to the EK280 optical interface using the connection cable.
- Start enSuite and establish the communication link to the EK280.
(⇒ Section 3.1 [Setting up the communication link to the EK280 via optical interface](#), p. 26)
- Select “[Navigation](#)” on the left-hand side and then “[Parameterize online](#)” at the bottom of the navigation window.
- In the top part of the device window, open the path “[Parameters](#)” > “[Interfaces](#)” by clicking on the relevant plus signs and then select “[Call time windows](#)”.
- In call acceptance windows 5 and 6, set start and end to the same value for each one and then select the “[Transfer changes to device](#)” icon at the top of the enSuite window.
- Then wait a minute for any communications activity in progress on the EK280 to be safely stopped.

b) Sending the parameter file

- Send the following parameter file to the EK280 (⇒ section 3.6 [Send parameter file](#), p. 28):
[EK280_xvx.. - FE260 & ICE280 \(*\)](#)²⁷
- For any further customized settings and tests, click on “[Navigation](#)” on the left-hand side of the enSuite window and then on “[Parameterize online](#)” at the bottom of the navigation window.

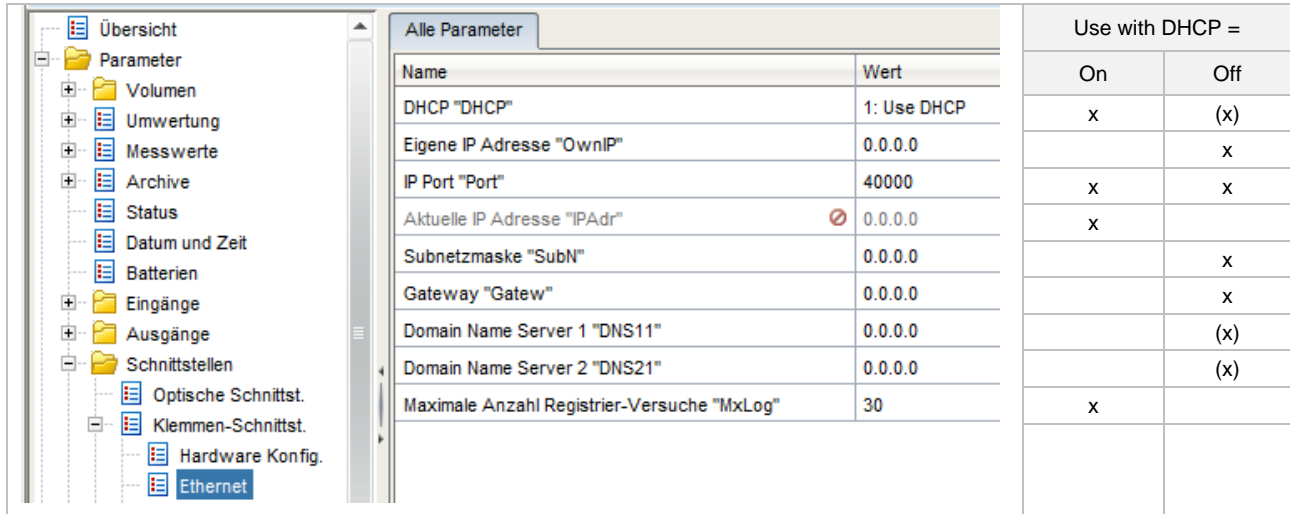


All the values listed in enSuite under “[Parameters](#)” can be found in the “[Serv.](#)” display tab of the EK280 using the same path.

²⁷ The “x” stands for the device software version, e.g., “2v5”.
The asterisk (*) stands for a lower-case letter which marks the version of the file, e.g., “a”.

c) Setting the network parameters

You can find the network parameters in enSuite in the parameter tree under *“Parameters” > “Interfaces” > “Terminal interface” > “Ethernet”* or on the device display in the menu *“Service” > “Interfaces” > “Terminal interface” > “Ethernet”*:



Alle Parameter		Use with DHCP =	
Name	Wert	On	Off
DHCP "DHCP"	1: Use DHCP	x	(x)
Eigene IP Adresse "OwnIP"	0.0.0.0		x
IP Port "Port"	40000	x	x
Aktuelle IP Adresse "IPAdr"	0.0.0.0	x	
Subnetzmaske "SubN"	0.0.0.0		x
Gateway "Gatew"	0.0.0.0		x
Domain Name Server 1 "DNS11"	0.0.0.0		(x)
Domain Name Server 2 "DNS21"	0.0.0.0		(x)
Maximale Anzahl Registrier-Versuche "MxLog"	30	x	

- **Automatic allocation of network address (DHCP):**
If the network address is automatically allocated by a DHCP server, the parameter *“DHCP”* must be set to “1” (*“Use DHCP”*).
- Set the parameter “IP Port” to the port number under which this device is to be accessible.



You can find the MAC address of the Ethernet interface needed for the DHCP with a dedicated IP address on the label on the board (⇒ Fig. 20):

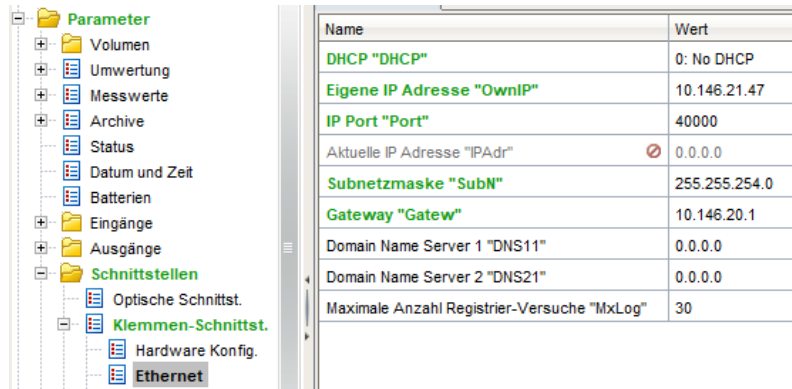


Fig. 20: MAC address of the iCE260-Ethernet

- The IP address you have received can be checked in the screen mask in enSuite shown above. The number of attempts to establish a connection to the DHCP server can be restricted in *“Maximum number of log trials”*.
- **Dedicated network address:**
Set the parameter *“DHCP”* to “0” (*“No DHCP”*).

- Then parameterize at least the following values:
 - Own IP address (*“Own IP”*)
 - IP port (*“Port”*)
 - Subnet mask (*“SubN”*)
 - Gateway (*“Gatew”*)

Attention! The values shown on the right of the illustration are examples only.



Name	Wert
DHCP "DHCP"	0: No DHCP
Eigene IP Adresse "OwnIP"	10.146.21.47
IP Port "Port"	40000
Aktuelle IP Adresse "IPAdr"	0.0.0.0
Subnetzmaske "SubN"	255.255.254.0
Gateway "Gatew"	10.146.20.1
Domain Name Server 1 "DNS11"	0.0.0.0
Domain Name Server 2 "DNS21"	0.0.0.0
Maximale Anzahl Registrier-Versuche "MxLog"	30

If the device is to connect with servers which are addressed via their network names, then also enter the addresses for the domain name server (*“DNS1”*, *“DNS2”*).

These access details can be obtained from the IT officer responsible for the system.

You can define time windows within which you can access the EK280 in the basic configuration which is now set up. You can deactivate time windows which are not needed by setting the start and end of the time window to the same value.

- Connect the network cable to the network socket.



Danger of death!

Ensure that before you switch the mains voltage on again, the housing of the FE260 is securely closed.

- **+Now switch on the power supply to the FE260.**
→ The plug symbol in the Main menu of the EK280 shows the external supply.
- In the top part of the device window, open the path *“Parameters”* > *“Interfaces”* by clicking on the relevant plus signs and then select *“Call time windows”*.
- In call acceptance window 5, set the start to “00:00” and the end to “23:59” and then select the *“Transfer changes to device”* icon at the top of the enSuite window.
- Wait for around a minute for the EK280 to detect the iCE280.



If the Ethernet module is active, the ACT and LINK LEDs (⇒ Fig. 21) will flash.

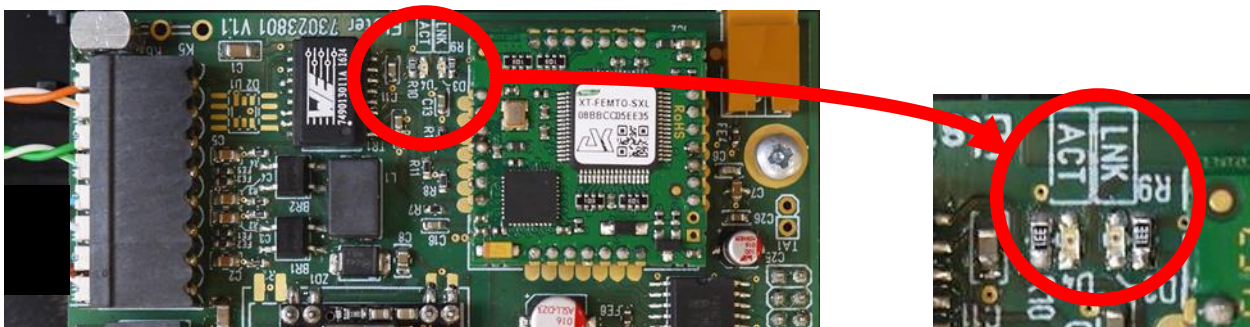


Fig. 21: “ACT” and “LILNK” LEDs on the iCE260 Ethernet interface

- If the LEDs do not flash, either the module is not active (possible cause: no voltage supply) or there is a fault in the wiring.

7.4.11.6 Retrieving data with enSuite

a) Opening the test time window for the following test retrieval with enSuite



The test time window only needs to be open if time windows 5 and 6 are closed.

- If there is no communication link to the EK280 via the optical interface, it must be established. (⇒ Section 3.1 [Setting up the communication link to the EK280 via optical interface](#), p. 26)
- In the top part of the device window, open the path “[Parameters](#)” > “[Interfaces](#)” by clicking on the relevant plus signs and then select “[Terminal interface](#)” (not the plus sign in front).
- Click on the value “0” next to “[Test call acceptance window](#)” in the right-hand part of the window and enter a duration in minutes (e.g., 10) for which the test time window should remain open for the test retrieval. For a battery-operated EK280, do not enter an excessively long duration, as this will adversely affect the battery life.
- Click on the “[Transfer changes to device](#)” icon at the top of the enSuite window. The EK280 can now be accessed via the modem for the duration set.
- Click on the “[Disconnect](#)” or “[Disconnect from all devices](#)” icon at the top of the enSuite screen to terminate the communication link between enSuite and the EK280 via the optical interface.

b) Test retrieval via the TCP/IP network

- Establish the communication link between enSuite and the EK280 via the network. (⇒ Section 3.3 [Setting up the communication link to EK280 via a network \(TCP/IP\)](#), p. 27)
- Once the communication link has been established, you can view certain parameters, for example, to check it. To do this, click on “[Navigation](#)” on the left-hand side of the enSuite window and then on “[Parameterize online](#)” at the bottom of the navigation window, then click on the plus sign next to “[Parameters](#)” and then its sub-items.
- Click on the “[Disconnect](#)” or “[Disconnect from all devices](#)” icon in enSuite to end the test retrieval.

7.4.11.7 Retrofitting the Ethernet interface in the FE260



Danger of death!

The mains voltage must be switched off before opening the housing of the FE260. Ensure it is not turned back on and verify that there is no voltage.



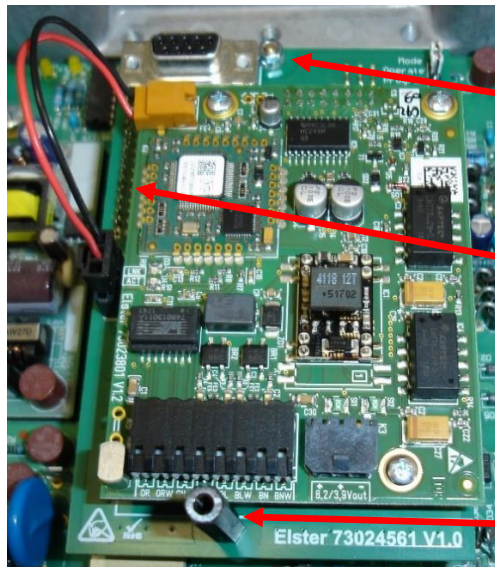
CAUTION!

To protect the Ethernet module from electrostatic discharge, please proceed as follows:

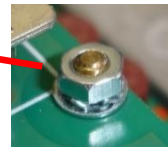
- Before touching the module, discharge the static electricity of your body by touching an unpainted, grounded metal surface. This may be located on a heater, for example.
- Only touch the sides of the module, not the surface. Avoid touching pins and components.
- Do not remove the modem from its packaging until you are ready to install it, e.g., after the housing of the EK280 has been opened.

The Ethernet interface can be retrofitted in the FE260 using the following procedure:

- Connect pin strip ST1 on the iCE260 Ethernet module to socket strip ST1 on the SVB board (⇒ Fig. 22).
- Secure the iCE260 Ethernet module to the two insulation supports (⇒ Fig. 22).



Screw connection to the upper insulation support:



Hex nut
Serrated washer
Flat washer

Pin strip ST1

Attention! Pay special attention to ensuring that the pin strip is connected precisely to the socket strip. The two insulation supports can be used as guides for this purpose.

Screw connection on the lower insulation support with black M3 x 30 plastic long nut

Fig. 22: Securing the iCE260-Ethernet module

- Connect the network cable to the Ethernet interface (⇒ section 7.4.11.3).
- Close the FE260 housing.
Do not switch on the power supply to the FE260 yet.
- Set the network parameters (⇒ section 7.4.11.5). The power supply to the FE260 must be switched on during the setting process as described in section 7.4.11.5.
- Complete a test data retrieval with enSuite (⇒ section 7.4.11.6).

7.4.12 FE260 with RS232 interface card

RS232 interface,
e.g., the COM port of a PC

RS232-Modul 73016593 V1.1

Jumper in position "RS232"

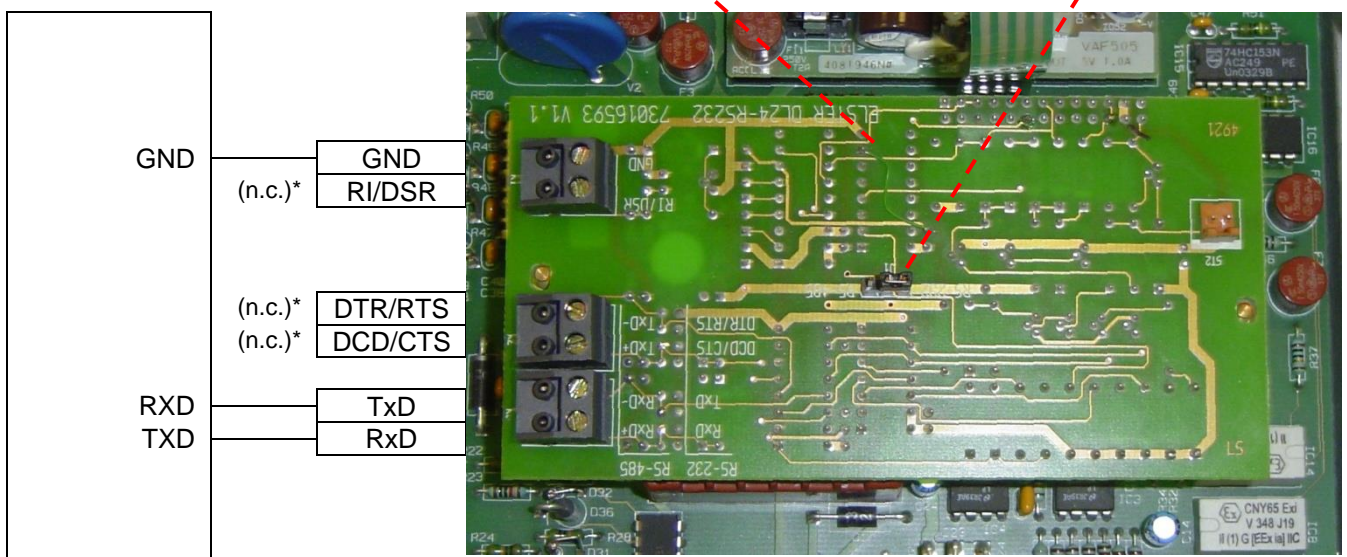


Fig. 23: RS232-Adapter in the FE260

* (n.c.) = not connected

This interface card is used to communicate with PCs and other serial interface devices.

7.4.12.1 Preparation

Prerequisites for process described below:

- Place jumper J1 into the "RS232" position. (⇒ Fig. 23)
- The FE260 is connected and configured as described in ⇒ section 7.4.1.
- The serial communication link to the PC or other device is set up.

7.4.12.2 EK280 Parameterization



For parameterization of the EK280 you need a connection cable for the optical interface as well as the enSuite program. enSuite can be downloaded free of charge from the Honeywell website in the "Software Downloads" section:

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

a) Closing the time windows

In order that the parameterization works correctly the time windows 5 and 6 must be closed. To do this:

- Connect a PC or laptop with enSuite installed to the EK280 optical interface using the connection cable.
- Start enSuite and set up the communication link to the EK280.
(⇒ section 3.1 [Setting up the communication link to the EK280 via optical interface](#), p. 26)
- Select "[Navigation](#)" on the left-hand side and then "[Parameterize online](#)" at the bottom of the navigation window.
- In the top of the device window open the path "[Parameter](#)" > "[Interfaces](#)" by clicking on the relevant plus signs, and then select "[Call time windows](#)".
- In call windows 5 and 6 set start and end to the same value for each one and then select the "Transfer changes to device" icon at the top of the enSuite window.
- Then wait a minute, for any communications activity in progress on the EK280 to be safely stopped.

b) Send parameter file

- Send the parameter file to the EK280 (⇒ section 3.6 [Send parameter file](#), p. 28):
- [EK280_xvx. - FE260 & int. RS232 interface card \(*\)](#)²⁸
- For the following customized settings and tests required, press "[Navigation](#)" on the left-hand side and then "[Parameterize online](#)" at the bottom of the navigation window.



All the values listed in enSuite under "[Parameters](#)" can be found on the "[Serv.](#)" display tab of the EK280 under the same path.

c) Setting time window for potential data retrievals

In the base configuration now displayed you can define time windows, during which data can be cyclically retrieved from the EK280 via this interface. Time windows 5 and 6 are reserved for EK280 operation with an FE260, and generally only time window 5 is used. Redundant time windows can be deactivated by setting the time window start and end to the same value.

- In the top of the device window open the path "[Parameter](#)" > "[Interfaces](#)" by clicking on the relevant plus signs, and then select "[Call time windows](#)".
- For call window 5, set the start to "00:00" and the end to "23:59" and then select the "Transfer changes to device" icon at the top of the enSuite window.

²⁸ The "x" stands for the version of software on the device, e.g., "2v2".
The asterisk * stands for a small letter which indicates the version of the file, e.g., "a".

- Wait for around a minute for the EK280 to detect the FE260.
- Press the "[Transfer changes to device](#)" icon at the top of the enSuite window.

7.4.12.3 Retrieving data with enSuite

- Connect your laptop or PC in accordance with ⇒ section [7.5.2.1](#) as a "device with RS232" to the RS232 interface card.
- If the communication link to the EK280 is via the optical interface, press the "[Disconnect](#)" or the "[Disconnect from all devices](#)" icon to terminate the communication link between enSuite and the EK280 and then wait for the "o" on the EK280 display to stop flashing.
- Set up the communication link from enSuite to the EK280 via "direct connection". (⇒ section [3.4 Setting up a direct communication link to EK280](#), p. 27)
- Once the communication link is set up, you can carry out checks, for instance view certain parameters. To do this press "[Navigation](#)" on the left-hand side of the enSuite window and then "[Parameterize online](#)" in the bottom of the navigation window, then click on the plus sign next to "[Parameters](#)" and then its subsections.
- In enSuite press the "[Disconnect](#)" symbol or "[Disconnect from all devices](#)" to end the test retrieval.

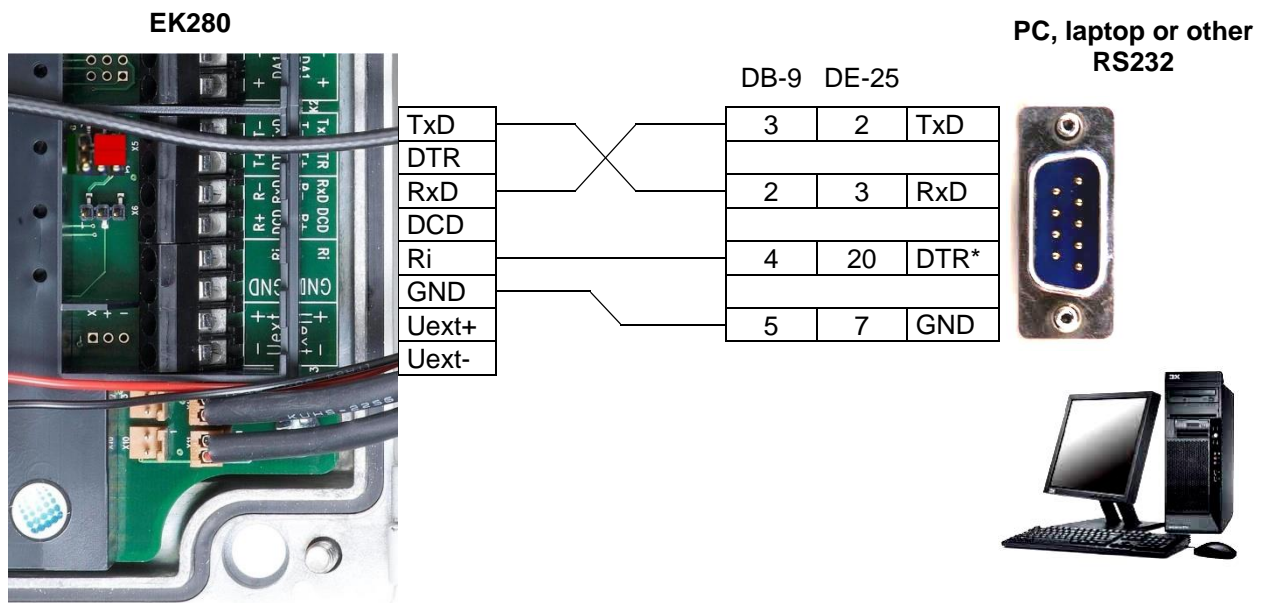
7.5 Other devices to serial interface

7.5.1 Direct RS232 interface connection (i.e., PC COM port)



Please follow the application instructions in ⇒ section [7.5.1.2 EK280 jumpers](#) to the letter, to prevent measurement interference.

7.5.1.1 Connection

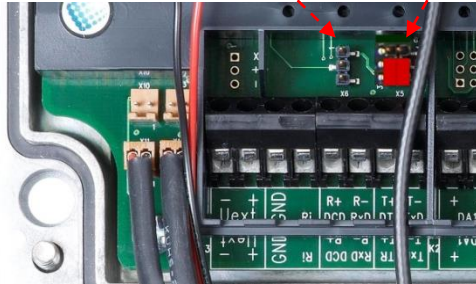


* In place of DTR you may use RTS (DB-9: Pin 7, DE-25: Pin 4). The signal must run continuously at positive voltage (high signal) throughout the data transfer. RI may not be used! In EK280 battery operation the signal is switched off again (voltage ≤ 0 V, low signal), in order to preserve the EK280 battery's life.

7.5.1.2 EK280 jumpers

X6: No jumper
or one jumper on the pins located
near the terminals

X5: No jumpers
or two jumpers on the pins located closer to the
terminals
("Park Position")



Connectible RS232 interface devices often have a direct or capacitive ground potential connection. There is therefore a risk of interference coupling via ground loops, which may affect pressure and temperature measurements.

The position of the two jumpers on X5 by the terminals means that the EK280 interface is electrically isolated from the rest of the circuit and therefore electromagnetic interference coupling is prevented.

The current required by the EK280 interface of around 1 to 2 mA is therefore supplied by the signal connected to the "Ri" terminal.

7.5.1.3 Parametrization of the EK280



For parameterization of the EK280 you need a connection cable for the optical interface as well as the enSuite program. enSuite can be downloaded free of charge from the Honeywell website in the "Software Downloads" section:

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

a) Closing the time windows

In order that the parameterization works correctly the time windows 5 and 6 must be closed. To do this:

- Connect a PC or laptop with enSuite installed to the EK280 optical interface using the connection cable.
- Start enSuite and set up the communication link to the EK280.
(⇒ section 3.1 [Setting up the communication link to the EK280 via optical interface](#), p. 26)
- Select "[Navigation](#)" on the left-hand side and then "[Parameterize online](#)" at the bottom of the navigation window.
- In the top of the device window open the path "[Parameters](#)" > "[Interfaces](#)" by clicking on the relevant plus signs, and then select "[Call time windows](#)".
- In call windows 5 and 6 set start and end to the same value for each one and then select the "Transfer changes to device" icon at the top of the enSuite window.
- Then wait a minute, for any communications activity in progress on the EK280 to be safely stopped.

b) Send parameter file

Send the following parameter file to the EK280 (⇒ section 3.6 [Send parameter file](#), p. 28):

- [EK280_xvx. - RS232 \(without Modem\) \(*\)](#)²⁹

²⁹ The "x" stands for the version of software on the device, e.g., "2v2".
The asterisk * stands for a small letter which indicates the version of the file, e.g., "a".

- For the following customized settings and tests required, press "[Navigation](#)" on the left-hand side and then "[Parameterize online](#)" at the bottom of the navigation window.



All the values listed in enSuite under "[Parameters](#)" can be found on the "[Serv.](#)" display tab of the EK280 under the same path.

c) Setting time window for potential data retrievals

In the base configuration now displayed you can define time windows, during which data can be cyclically retrieved from the EK280 via the modem. Time windows 5 and 6 are reserved for EK280 operation with a direct RS232 connection, and generally only time window 5 is used. Redundant time windows can be deactivated by setting the time window start and end to the same value.

- In the top of the device window open the path "[Parameters](#)" > "[Interfaces](#)" by clicking on the relevant plus signs, and then select "[Call time windows](#)".
- For call window 5, set the start to "00:00" and the end to "23:59" and then select the "Transfer changes to device" icon at the top of the enSuite window.
- Press the "[Transfer changes to device](#)" icon at the top of the enSuite window.


7.5.1.4 Retrieving data with enSuite

- Start the enSuite program (i.e., [Start](#) > [Programs](#) > [Elster](#) > [enSuite](#)) on the PC connected to the terminals.
- Select the "[Search device...](#)" icon (magnifying glass icon).
- In the "Search device and connect" window select the "[LIS200](#)" tab.
- Select "[Access](#)" → "[LIS200](#)", "[User](#)" → "[Administrator](#)", "[Connection](#)" → "[Serial RS232](#)" and "[use default settings](#)".
- Press "[OK](#)".
- After a few seconds "[connected](#)" is displayed at the bottom of the "[Output](#)" window.
- Once the communication link is set up, you can carry out checks, for instance view certain parameters. To do this press "[Navigation](#)" on the left-hand side of the enSuite window and then "[Parameterize online](#)" in the bottom of the navigation window, then click on the plus sign next to "[Parameters](#)" and then its subsections.
- In enSuite press the "[Disconnect](#)" symbol or "[Disconnect from all devices](#)" to end the test retrieval.

7.5.2 Ex isolator MTL5051

The MTL5051 is an approved "associated apparatus" and can therefore be used as an interface isolator, if the EK280 is installed in Zone 1.

7.5.2.1 Connection

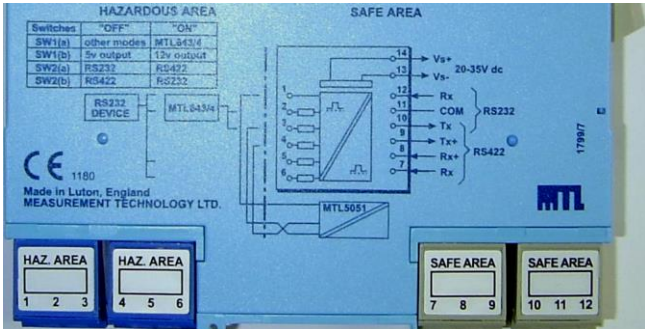


DANGER OF DEATH!
If EK280 operation takes place in a potentially explosive atmosphere, ensure that all safety instructions in the EK280 Operating Instructions are followed.


24V
=
- +
13 14

MTL5051

HAZARDOUS AREA		SAFE AREA	
Switches	"OFF"	"ON"	
SW1(a)	other modes	MTL643/d	
SW1(b)	5v output	15v output	
SW2(a)	RS232	RS422	
SW2(b)	RS422	RS232	



EK280



1 2 3 4 5 6

7 8 9 10 11 12


Device with RS232, e.g., PC

TxD

GnD

RxD

7.5.2.2 MTL5051 switch positions



1a = OFF

1b = ON

2a = OFF

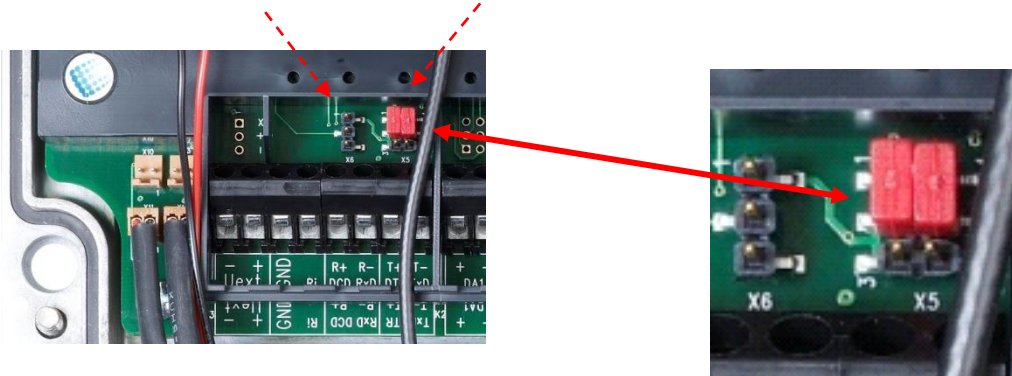
2b = ON

Hint:
With switch position 1b = "ON" the voltage is set to nominal 12V. Due to special features of the MTL5051, this is only permitted here (contrary to the specifications in the technical data).

7.5.2.3 EK280 jumpers

X6: No jumper
or one jumper on the pins located
near the terminals

X5: two jumpers
on the pins further
away from the terminals



7.5.2.4 Parametrization of the EK280



For parameterization of the EK280 you need a connection cable for the optical interface as well as the enSuite program. enSuite can be downloaded free of charge from the Honeywell website in the "Software Downloads" section:

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

a) Closing the time windows

In order that the parameterization works correctly the time windows 5 and 6 must be closed. To do this:

- Connect a PC or laptop with enSuite installed to the EK280 optical interface using the connection cable.
- Start enSuite and set up the communication link to the EK280.
(⇒ section 3.1 [Setting up the communication link to the EK280 via optical interface](#), p. 26)
- Select "[Navigation](#)" on the left-hand side and then "[Parameterize online](#)" at the bottom of the navigation window.
- In the top of the device window open the path "[Parameters](#)" > "[Interfaces](#)" by clicking on the relevant plus signs, and then select "[Call time windows](#)".
- In call windows 5 and 6 set start and end to the same value for each one and then select the "Transfer changes to device" icon at the top of the enSuite window.
- Then wait a minute, for any communications activity in progress on the EK280 to be safely stopped.

b) Send parameter file

- Send the following parameter file to the EK280 (⇒ section 3.6 [Send parameter file](#), p. 28):
- [EK280_xvx. - ext. MTL5051-converter \(RS-232\) \(*\)](#)³⁰
- For the following customized settings and tests required, press "[Navigation](#)" on the left-hand side and then "[Parameterize online](#)" at the bottom of the navigation window.



All the values listed in enSuite under "[Parameters](#)" can be found on the "[Serv.](#)" display tab of the EK280 under the same path.

³⁰ The "x" stands for the version of software on the device, e.g., "2v2".
The asterisk * stands for a small letter which indicates the version of the file, e.g., "a".

c) Setting time window for potential data retrievals

In the base configuration now displayed you can define time windows, during which data can be cyclically retrieved from the EK280 via the modem. Time windows 5 and 6 are reserved for EK280 operation with an MTL5051, and generally only time window 5 is used. Redundant time windows can be deactivated by setting the time window start and end to the same value.

- In the top of the device window open the path "[Parameters](#)" > "[Interfaces](#)" by clicking on the relevant plus signs, and then select "[Call time windows](#)".
- For call window 5, set the start to "00:00" and the end to "23:59" and then select the "Transfer changes to device" icon at the top of the enSuite window.
- Wait for around a minute for the EK280 to detect the FE260.
- Press the "[Transfer changes to device](#)" icon at the top of the enSuite window.

7.5.2.5 Retrieving data with enSuite

- Connect your PC or laptop to the MTL5051 as an "RS232 device" as described in ⇒ section 7.5.2.1.
- If the communication link to the EK280 is via the optical interface, press the "[Disconnect](#)" or the "[Disconnect from all devices](#)" icon to terminate the communication link between enSuite and the EK280 and then wait for the "o" on the EK280 display to stop flashing.
- Start the enSuite program (i.e., *Start > Programs > Elster > enSuite*).
- Select the "[Search device...](#)" icon (magnifying glass icon).
- In the "Search device and connect" window select the "LIS200" tab.
- Select "[Access > User](#)" → "[Administrator](#)" and "[Connection](#)" → "[Serial RS232](#)".
- Select the "[Baud rate:](#)" "[9600](#)".
- Press "OK".
- After a few seconds "[connected](#)" is displayed at the bottom of the "[Output](#)" window.
- Once the communication link is set up, you can carry out checks, for instance view certain parameters. To do this press "[Navigation](#)" on the left-hand side of the enSuite window and then "[Parameterize online](#)" in the bottom of the navigation window, then click on the plus sign next to "[Parameters](#)" and then its subsections.
- In enSuite press the "[Disconnect](#)" symbol or "[Disconnect from all devices](#)" to end the test retrieval.

7.5.3 RS485 interface, electrically isolated

7.5.3.1 Wiring



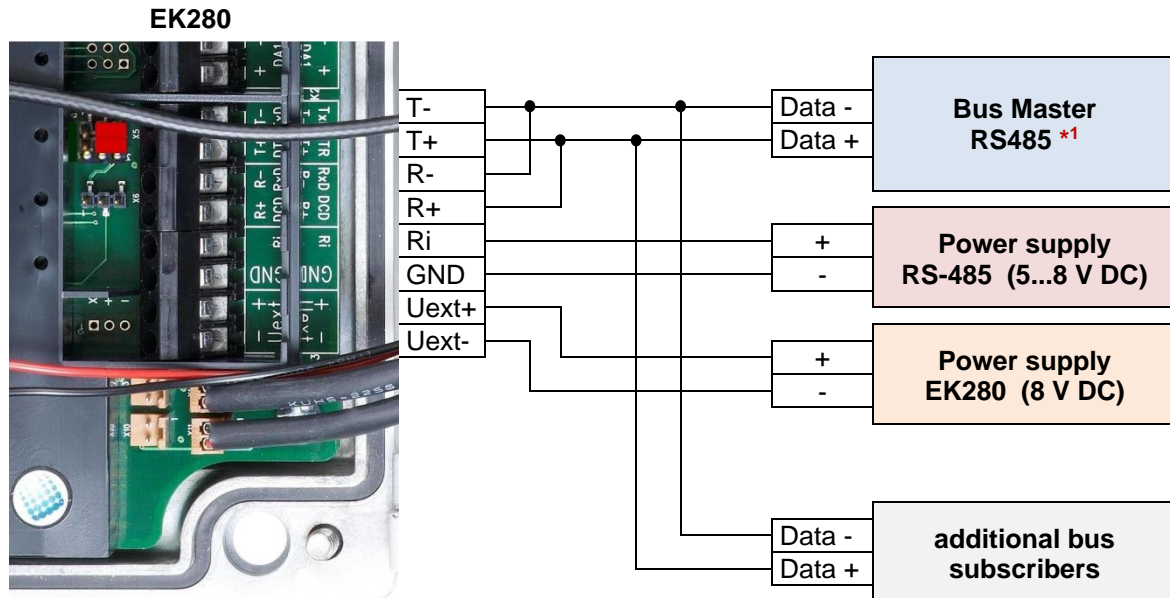
When the EK280 is connected to a RS485 bus there must be no terminal resistors connected to the bus!

Due to the current limit for intrinsically safe apparatus approval, the EK280 cannot supply sufficient current to power terminal resistors. At the data transfer rate used, terminal resistors are not required.

7.5.3.1.1 Two-wire simplex – wiring

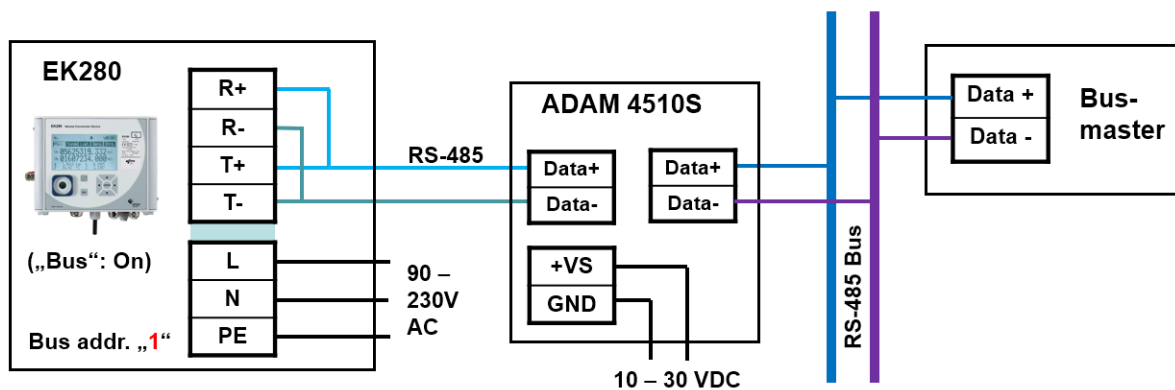


This function is only available since EK280 software version 2.20.

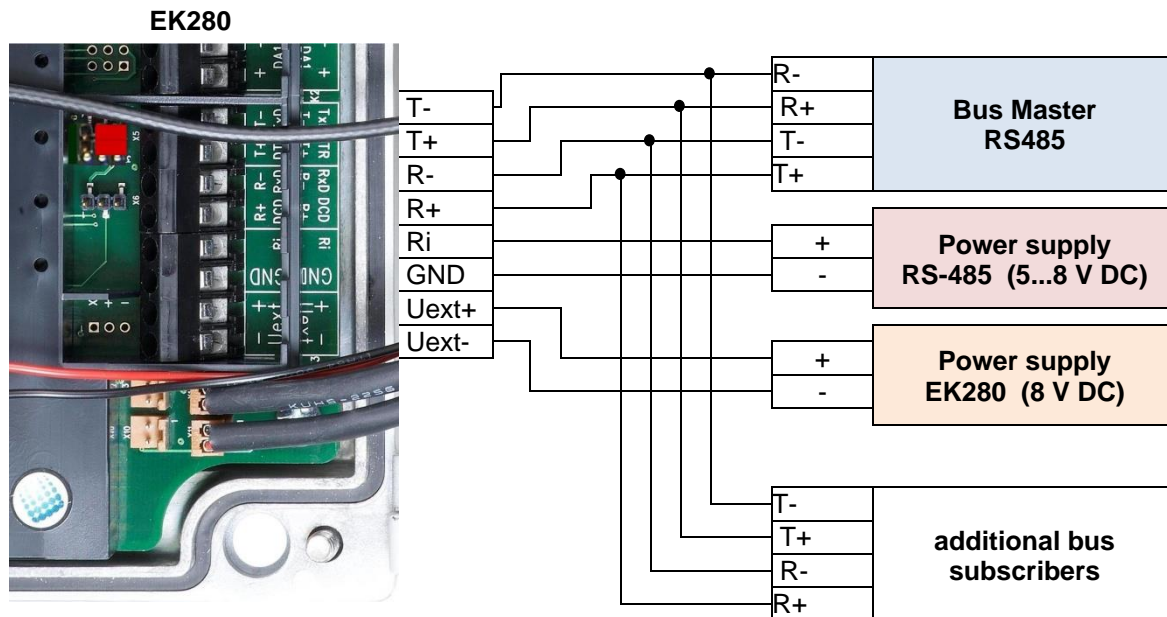


*1: In accordance with the above (\Rightarrow section 7.5.3.1), no bus terminations may be used. For the most RS-485-2-wire connections these are available or required. There are often several nodes connected to the bus, so that a galvanic isolation must be earmarked.

In this regard, Honeywell recommends the ADAM-45 “repeater” from Advantech for the galvanic separation as well as the proper electrical connection to the bus:



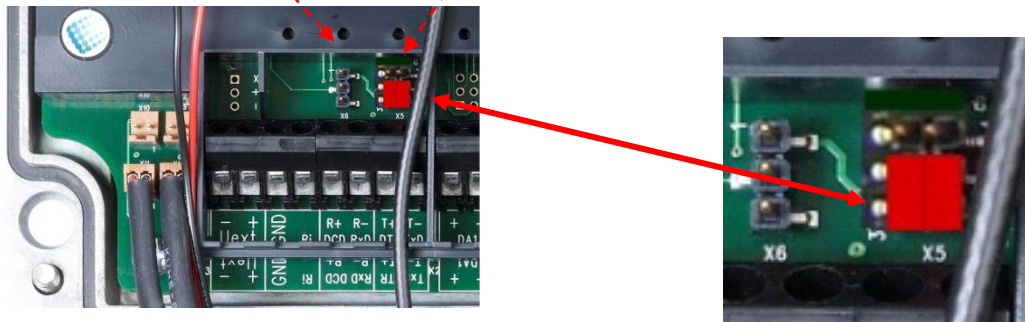
7.5.3.1.2 Four-wire full duplex — wiring



7.5.3.2 EK280 jumpers

X6: No jumper
or one jumper on the pins located
near the terminals

X5: No jumpers
or two jumpers on the pins located
near the terminals
("Park position")



If a connected RS485 interface device has a direct or capacitive ground potential connection, there is a risk of interference coupling via ground loops, which may affect pressure or temperature measurements. The position of the two jumpers on X5 means that the EK280 interface is electrically isolated from the rest of the circuit and therefore electromagnetic interference coupling is prevented.

To power the decoupled EK280 interface a voltage of between 5 and 8 volts (3 mA approx.) must be connected to the "Ri" and "GND" terminals.

7.5.3.3 Parametrization of the EK280



For parameterization of the EK280 you need a connection cable for the optical interface as well as the enSuite program. enSuite can be downloaded free of charge from the Honeywell website in the "Software Downloads" section:

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

a) Closing the time windows

In order that the parameterization works correctly the time windows 5 and 6 must be closed. To do this:

- Connect a PC or laptop with enSuite installed to the EK280 optical interface using the connection cable.
- Start enSuite and set up the communication link to the EK280.
(⇒ section 3.1 [Setting up the communication link to the EK280 via optical interface](#), p. 26)
- Select "[Navigation](#)" on the left-hand side and then "[Parameterize online](#)" at the bottom of the navigation window.
- In the top of the device window open the path "[Parameters](#)" > "[Interfaces](#)" by clicking on the relevant plus signs, and then select "[Call time windows](#)".
- In call windows 5 and 6 set start and end to the same value for each one and then select the "Transfer changes to device" icon at the top of the enSuite window.
- Then wait a minute, for any communications activity in progress on the EK280 to be safely stopped.

b) Send parameter file

- Send the following parameter file to the EK280 (⇒ section 3.6 [Send parameter file](#), p. 28):
- [EK280_xvx. - RS485 \(without Modem\) \(*\)](#)³¹
- For the following customized settings and tests required, press "[Navigation](#)" on the left-hand side and then "[Parameterize online](#)" at the bottom of the navigation window.



All the values listed in enSuite under "[Parameters](#)" can be found on the "[Serv.](#)" display tab of the EK280 under the same path.

c) Setting the device address

Each bus participant needs a unique identifier ("device address" or "bus address"), so that the bus master can select a single data transmission subscriber. The device address set in the EK280 depends on which interface protocol it uses:

→ Device address for [LIS-200 protocol](#):

The device address for LIS-200 protocol can be any text up to 32 characters long (special characters not allowed). With the above parameter file this has been set to the default value "1".

To change the EK280 device address, proceed as follows:

- In the top of the device window open the path "[Parameter](#)" > "[Interfaces](#)" by clicking on the relevant plus signs, and then select "[Terminal interface](#)".
- In the "All parameters" window change the EK280 device address in the "Device address terminal interface (bus address) "B.Adr"" line.

→ Device address for [Modbus protocol](#):

³¹ The "x" stands for the version of software on the device, e.g., "2v2".
The asterisk * stands for a small letter which indicates the version of the file, e.g., "a".

The device address for Modbus protocol can be one digit between 1 and 247 inclusive. The default value is "1".

To change the Modbus protocol device address, proceed as follows:

- In the top of the enSuite device window open the path "[Parameters](#)" > "[Interfaces](#)" > "[Terminal interface](#)" and then select "[Modbus](#)".
- In the "All parameters" window change the EK280 device address in the "Modbus device address (slave address) "MBAdr"" line.

For further details on usage of Modbus protocol please refer to document [\[6\]](#).

d) Setting time window for potential data retrievals

In the base configuration now displayed you can define time windows, during which data can be cyclically retrieved from the EK280 via the RS485 bus. Time windows 5 and 6 are reserved for EK280 operation with a direct terminal interface connection, and generally only time window 5 is used. Redundant time windows can be deactivated by setting the time window start and end to the same value.

- In the top of the device window open the path "[Parameters](#)" > "[Interfaces](#)" by clicking on the relevant plus signs, and then select "[Call time windows](#)".
- For call window 5, set the start to "00:00" and the end to "23:59" and then select the "Transfer changes to device" icon at the top of the enSuite window.

Press the "[Transfer changes to device](#)" icon at the top of the enSuite window.

7.5.4 RS485 interface, without electrical isolation

If a connected RS485 interface device has a direct or capacitive ground potential connection, there is a risk of interference coupling via ground loops, which may affect pressure or temperature measurements. Therefore, it is recommended that you use the isolated port as described in ⇒ section [7.5.3](#) if possible.

7.5.4.1 Wiring



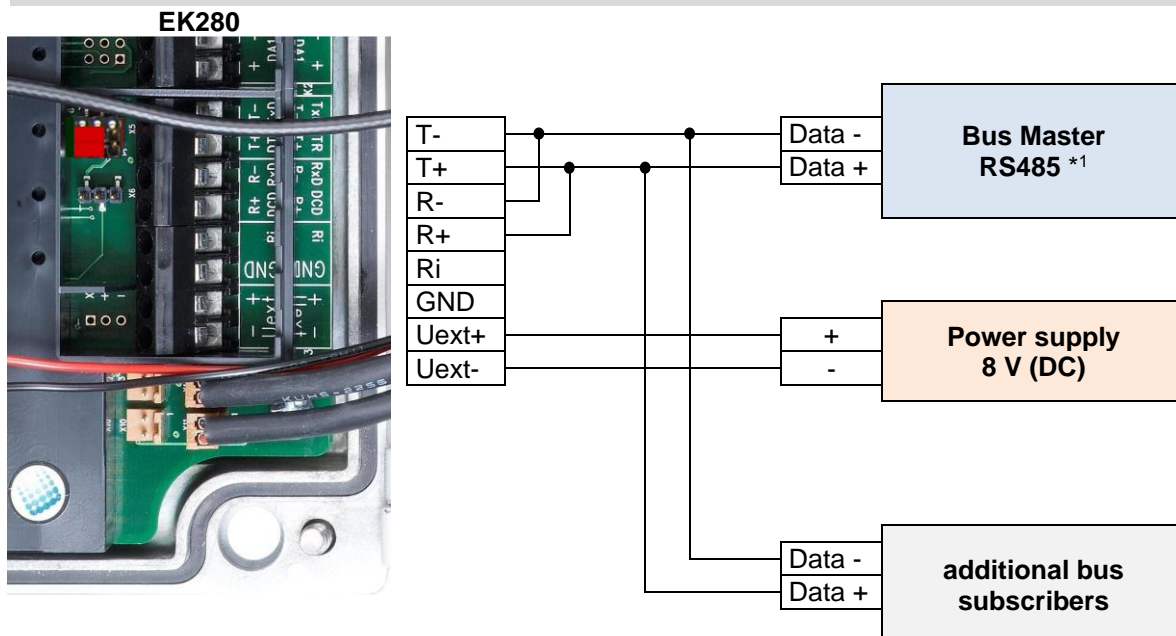
When the EK280 is connected to a RS485 bus there must be no terminal resistors connected to the bus!

Due to the current limit for intrinsically safe apparatus approval, the EK280 cannot supply sufficient current to power terminal resistors. At the data transfer rate used, terminal resistors are not required.

7.5.4.1.1 Two-wire simplex – wiring

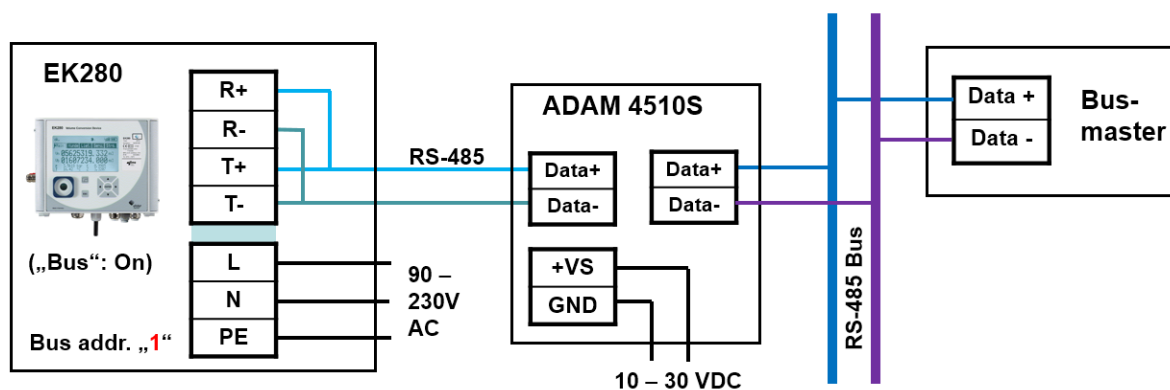


This function is only available since EK280 software version 2.20.



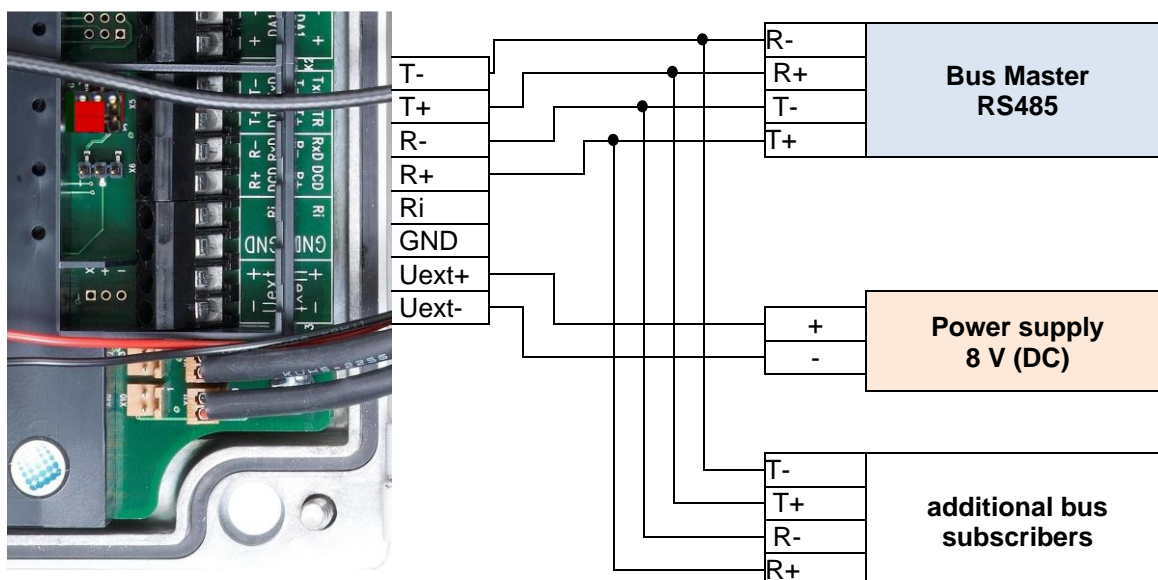
*1: For connection to a bus system, refer to the information in ⇒ section [7.5.3.1.1](#).

There are often several nodes connected to the bus, so that a galvanic isolation must be earmarked. In this regard, Honeywell recommends the ADAM-45 “repeater” from Advantech for the galvanic separation as well as the proper electrical connection to the bus:



7.5.4.1.2 Four-wire full duplex – wiring

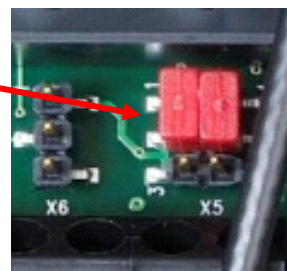
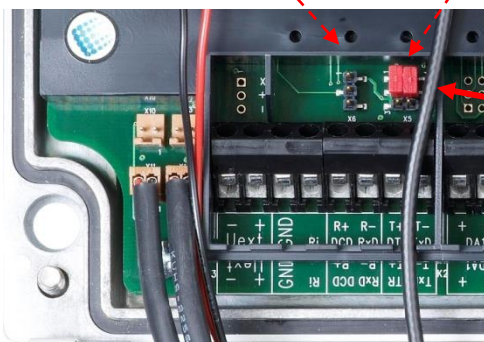
EK280



7.5.4.2 EK280 jumpers

X6: No jumper
or one jumper on the pins located
near the terminals

X5: two jumpers
on the pins located
furthest from the terminals.



7.5.4.3 EK280 Parameterization



For parameterization of the EK280 you need a connection cable for the optical interface as well as the enSuite program. enSuite can be downloaded free of charge from the Honeywell website in the "Software Downloads" section:

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

Follow the steps given in ⇒ section [7.5.3.3 Parametrization of the EK280](#) (p. 145).

7.5.5 Analogue PSTN Modem DM130

7.5.5.1 Connection of a DM130 to the RS232 interface of the EK280

For the connection of a DM130 to the EL280 both devices must be opened



DANGER OF DEATH!

Ensure the mains voltage is disconnected before opening the FE260 housing, ensure it is not turned back on and verify that there is no voltage!

For the operation of the analog modem DM130 to a conversion device EK280, the RJ10 socket running RS232 interface of the DM130 must be connected with the terminals of the RS232/485 interface in the EK280 as follows:

EK280		DM130	
Terminal designation on the RS232/485 interface	Wire Color ³²	Pin-Nr. on the RJ10-connector (4P4C) of the DM130 connection cable ³²	
RxD	green	3 (TxD)	
TxD	yellow	4 (RxD)	
GND	brown	2 (GND)	

(The white DCD core connected to pin 1 of the RJ10 connector is not required for this application.)

On the DM130, the current loop CL1 must be closed when using the RS232 interface! This is guaranteed by the short-circuiting of terminals RTX- and RTX+:

Terminal designation on the DM130
RTX-
RTX+

The conversion device EK280 can optionally be supplied by means of its internal AC power supply or the +9 VDC auxiliary voltage of the DM130. For the connection of the auxiliary voltage of the DM130, the wiring must be carried out as follows:

Terminal designation on the RS232/485 interface in EK280		Terminal designation on the DM130
Usio+	←	HS+
Usio-	←	HS-

7.5.5.2 Parameterization of the EK280 for operation with an DM130



For parameterization of the EK280 for use with an EM260/analog modem you need a connection cable for the optical interface as well as the enSuite program. enSuite can be downloaded free of charge from the Honeywell website in the "Software Downloads" section:

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

³² "Adapter Cable DM130/RS232 – RJ10", Honeywell Order No.: 73023135

a) Closing the time window

For the parameterization to work correctly, time windows 1 to 6 must be connected. To do this:

- Connect a PC or laptop with enSuite installed to the EK280 optical interface using the connection cable.
- Start enSuite and establish the communication link to the EK280 via the optical interface (⇒ section 3.1).
- To do this, select "Navigation" on the left-hand side and then "[Parameterize online](#)" at the bottom of the navigation window.
- In the top of the device window open the path "[Parameter](#)" > "[Interfaces](#)" by clicking on the relevant plus signs, and then select "[Call time windows](#)".
- In the call windows 1 to 6, set start and end to the same value and then select click the "[Transfer changes to device](#)" icon at the top edge of the enSuite window.
- Then wait a minute, for any communications activity in progress on the EK280 to be safely stopped

b) Send parameter file

- Send the following parameter file to the EK280 (⇒ section 3.6):
[EK280_xvx.. - DM130 \(*\)](#)³³

c) Setting time window for potential data queries



Before the first opening of a time window, the DM130 must be connected to the EK280 (⇒ section 7.5.1.1) and the parameters be set (⇒ section 7.5.1.3)!

In the base configuration now displayed you can define time windows, during which data can be retrieved cyclically from the EK280 via the modem. There are two available time windows, which operate on EK280 battery power only and for versions of the EK280 with power supply there are two more which operate only on mains voltage.



Make the battery power time windows only as long and frequent as absolutely necessary. Each time window reduces the EK280's battery life. The preset time windows are not directly included in the calculation of expected battery life of the "Bat.R" EK280 batteries. Therefore, the expected battery life is not updated when the time windows are changed. However, past time windows and data transfers are used in the remaining capacity calculation "BatRK" and the forecast of the available remaining usage time.

- The two battery-power time windows are set in the enSuite device window under:
 - [Parameter](#) > [Interfaces](#) > [Connections](#) > [Connection 1](#) and
 - [Parameter](#) > [Interfaces](#) > [Connections](#) > [Connection 2](#)
- The four mains voltage time windows are set under:
 - [Parameter](#) > [Interfaces](#) > [Connections](#) > [Connection 3](#) to
 - [Parameter](#) > [Interfaces](#) > [Connections](#) > [Connection 6](#)

If you do not need a time window, you can deactivate it by setting the time window start and end to the same value.

- Press "[Transfer changes to device](#)" icon at the top edge of the enSuite window.

³³ The "x" stands for the software version on the device, e.g., "1v0".

The asterisk * stands for a small letter which indicates the version of the file, e.g., "a".

7.5.5.3 Parameterization of the DM130 analog modem

The DM130 can be parameterized in three ways:

- On site by means of a DIP switch in the DM130
- On site via the RJ10-type running RS232 interface of the DM130
- Remotely via a modem connection

The easiest way is the configuration by means of a DIP switch. In this way, all the necessary EK280 operations settings can easily be performed on site. The switch can only be set up after opening the housing cover.



DANGER OF DEATH!

Ensure the mains voltage is disconnected before opening the DM130 housing, ensure it is not turned back on and verify that there is no voltage!

The necessary settings for the operation of an EK280 are shown in the table below:

D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	Description
0										V42 / V42.bis / MNP active
	0									Password protection is not active.
		0	0							Answer after 1 ring
				0						Multistandard handshake telephone line
					1	0	1			Local baud rate is 19200 bit/sec
								1		Mode C operation, fixed baud rate
									1	Character format 8N1 local

After switching on the mains voltage, the modem can be reset via the service button on the DM 130. The service button is located to the right of the RS232 interface. If it is longer than 5 seconds, the value (0 or 1) of the switch is evaluated and the parameters in the Modem is set appropriately. The effectiveness of the DIP switch creation is indicated by a yellow flashing LED status light.

For the optional parameter assignment via the RS232 interface or via a modem connection, you need the DMSET configuration program. For operation instructions, please refer to the relevant documentation of the DM130 or the DMSET configuration program.



More information on the configuration of the DM130 can be obtained from its' documentation.

7.5.5.4 Retrieving data with enSuite

a) Opening the test time window for the following test retrievals with enSuite



The test time window only needs to be open if none of the time windows 1 to 6 are open.

- If no communication link to the EK280 via the optical interface exists, it must be created (⇒ section 3.1).

- Select "**Navigation**" on the left-hand side of the enSuite window and then "**Parameterize online**" at the bottom of the navigation window.
- At the top of the device window open the path "**Parameter**" > "**Interfaces**" by clicking on the relevant plus sign, and then select "internal modem" (not the plus sign before that).
- Click on the "0" value next to "**Test call acceptance window**" on the right-hand side of the window and enter a period in minutes (e.g., 10), for the test time window retrieval to remain open. For a battery-operated EK280 please do not enter an excessively long duration, as this will adversely affect the battery life.
- Press "**Transfer changes to device**" icon at the top edge of the enSuite window. The EK280 is now available via the modem for the duration set.
- In enSuite press the "**Disconnect**" or "**Disconnect from all devices**" icon to terminate the optical interface communication link between enSuite and the EK280.

b) Test retrieval via the modem

- Set up the modem communication link between enSuite and EK280 (⇒ section 3.2).
- Once the communication link is set up, you can carry out checks, for instance view certain parameters. To do this press "**Navigation**" on the left-hand side of the enSuite window and then "**Parameterize online**" at the bottom of the navigation window, then click on the plus sign next to "**Parameter**" and then its subsections.
- In enSuite press the "**Disconnect**" symbol or "**Disconnect from all devices**" to end the test retrieval.

7.6 Data transfer verification

Before the actual data transmission, the communication link (e.g., call window, modem used) for a destination must be specified. Eight separate connections can be programmed.



For parameterization of the EK280 you need a connection cable for the optical interface as well as the enSuite program version 2.4 or higher. enSuite can be downloaded free of charge from the Honeywell website in the "Software Downloads" section:

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

The paths which are subsequently described can be found in the enSuite program under "**Parameterize online**" > "**Parameters**" > "**Interfaces**".

All connections are inactive as per factory settings and are preset as follows:

Connection	Event type	Interface	Power supply
1	Time window	internal modem	Battery
2	Time window	internal modem	Battery
3	Time window	internal modem	ext. power supply
4	Time window	internal modem	ext. power supply
5	Time window	Terminal / ext. modem	ext. power supply
6	Time window	Terminal / ext. modem	ext. power supply
7	Time	internal modem	always
8	Time	internal modem	always

Connection	Event type	Interface	Power supply
9	Time	internal modem	always
10	Time	internal modem	always
11	Time	internal modem	always
12	Time	internal modem	always

7.6.1 Time window connection

The major parameters for activating a time window connection are listed below.

For parameterizing, use the enSuite program and change over to the sub-menu "[Connections](#)" > "[Connection 1 to 6](#)".

Time window connection	Meaning
cycle	Cycle of a regular time window connection (e.g., hourly, daily, weekly, monthly)
start	Start of a time window connection (e.g., daily at 00:00, or another time)
end	End of a time window connection (e.g., daily at 11:59 PM, or another time)
StCon	Current status of this connection

If the conditions for activating the time window connection are satisfied, then the interface is opened and the EK280 is ready to act as a recipient. If a modem is connected to this interface, then the EK280 is only ready to act as a recipient after a further 30 seconds.

The conditions for activating a time window connection are:

- Is the current device time within the time window which has been parameterized?
- Does the supply to the EK280 correspond with the parametrization of the connection?



If the supply type "always" is used, the EK280 is active during the set time window regardless of the voltage supply! In battery operation, this may lead to a massive reduction in the battery service life down to a few months.



The use of the supply type "always" only makes sense if an appropriate power supply for the modem (mains supply or modem batteries) is available! Please particularly make a note of this when placing the EK280 in storage.

7.6.2 Point-in-time connection

The major parameters for activating a point in time connection are listed below.


To do so, in the enSuite program, go to the sub menu "[Connections](#)" > "[Connection 7 or 8](#)".

Point-in-time connection	Meaning
TypPr	0 = Server (not to be used for point in time connections) 3 = DLMS (the connection to the target is a DLMS connection) 4 = Modbus-Master (the connection to the target is a Modbus connection) 5 = IEC1107 (the connection to the target is a IEC-1107 connection) 6 = EIServer (the target is an EI server)
Cycle	Cycle of a regular point in time connection (e.g., hourly, daily, weekly, monthly)
CW1.S	Start of a point in time connection (e.g., daily at 6:00 AM, or another time)
Destn	0 = no conn. (connection is inactive) 1 = dest 1 or 2 (a connection to target 1 is being constructed or if a fault occurs, to target 2 instead) 2 = dest 1 and 2 (a connection to target 1 and target 2 is being constructed)
Dst1, 2	Reference to a number in the telephone book, the recipient of this telephone book entry will be called by the EK280.
Iface	2 = terminal / ext. modem 3 = internal modem
SuplT	Type of power supply as a condition for the connection 1 = always 2 = battery 3 = ext. supply
StCon	Current status of this connection
SDst1, 2	Current status of communication with the target
TestC	The function for the point in time connection can be triggered at any time (e.g., for testing purposes).

Use the enSuite program and change over to the sub-menu "[Telephone book](#)" > "[Receiver 1 – 10](#)".

Telephone book	Definition
TelNo	Recipient's telephone number If a GSM modem is in use, then this number will be called.
Serv.	Server TCP/IP address If a GPRS modem is in use then an attempt is made to reach this IP address, and if no IP address has been parameterized then alternatively an attempt is made to call the telephone number.
Port	Server port number If a GPRS modem is in use then an IP connection is started off via this port.
Name	Name of recipient

A point in time connection can be manually initiated at any time (e.g., for a test). To do so, change the parameter "[TestC](#)" to 1 ("open"). The EK280 opens the interface and attempts to reach the target. In order to follow the progress of the point in time connection, observe the "[StCon](#)" parameter and "[SDst 1, 2](#)".

Use the enSuite button "[Refresh](#)"  at the menu bar of enSuite, to get the actual information in the enSuite.

If the conditions for regular activation of the point in time connection are met, then the interface is opened and the EK280 attempts to reach the target.

Conditions for regular activation of the point in time connection are as follows:

- Has the device time currently exceeded the parameterized point in time?
- Does the supply to the EK280 correspond with the parametrization of the connection?
- Is there a valid telephone number or IP address and the port of the recipient parameterized within the associated telephone book entry?

7.6.3 Connection configuration status "StCon"

Display	Description
0	Establishment of a connection has not yet started.
2	The interface is activated specifically for the connection.
3	The interface to be used for the connection (i.e., the modem) is busy, the EK280 will wait until connection can be established. Either the interface has just been used for another connection or the EK280 is waiting to try again after a failed connection attempt. This state may persist for several minutes.
4	The interface (i.e., the modem) is ready to establish a connection (i.e., the call time window is open).
5	The interface is released specifically for the connection.
6	The interface (i.e., the modem) is released from other connections for use. (i.e., when the time window is no longer open)
7	Data transfer via DLMS protocol is in progress.
8	Data transfer via DLMS protocol is complete.
9	Data transfer via Modbus protocol is in progress.
10	Data transfer via Modbus protocol is complete.
11	Data transfer via LIS200 protocol is in progress.
12	Data transfer via LIS200 protocol is complete.
13	The EK280 is synchronizing with the EIServer, in readiness to begin data transfer via DLMS protocol.
14	EIServer synchronization is complete.
15	Data transfer via SMS is in progress. ³⁴
16	Data transfer via SMS is complete. ³⁴
29	No valid recipient specified.
30	A communication error occurred. This message is shown for example, if a modem to be used has no power supply.

³⁴ SMS only available from Software Version 2.20 or later

Display	Description
31	The modem's supply voltage is too low.
32	The modem cannot be used due to SIM card error (modem message: "SIM Error")
33	The modem cannot be used as an incorrect PIN has been entered.
34	The modem cannot be used as an incorrect PUK has been entered.
35	Communication link to the network cannot be established or the communication link to the network was lost, before the communication link to the remote site could be established.
36	Communication link to the GSM network was denied.
37	The APN parameters required to establish a GPRS communication link are missing. ³⁵
38	Communication link to APN ³⁵ was denied.
39	The port for server connection is not defined.
40	The target name or port is not defined.
41	The other party has disconnected.
42	The communication link to the network was lost, after a communication link to the remote party was already established.
43	The phone number of the SMS service center is wrong or missing at the SIM card. The mobile service provider must be contacted. ³⁴
44	The APN password or APN user name is wrong.
45	The APN parameters are already in use by another mobile phone subscriber.
46	The connected modem is different to the one which is parameterized (incorrect wpp file loaded)
70	Failed to establish communication link to the remote terminal Possible cause: i.e., blocked by remote terminal firewall.
71	The remote terminal did not respond (timeout) Possible causes: The remote terminal machine is switched off or the remote terminal has not been started.
72	The remote terminal reports "unknown device type".
73	The EK280 does not understand the remote terminal response. Possible causes: e.g., transfer error.
74	Sending error: When attempting to send data to the remote terminal, the modem reported an error.
255	Unknown error

³⁵ APN = "Access Point Name"

7.6.4 Status of remote terminal "SDst"

Display	Description
0	No connection started to a remote terminal.
1	No valid remote terminal specified. Check the related EK280-phonebook entry.
2	Connection to remote terminal is in progress.
3	Remote terminal is busy.
4	Connection to remote terminal established.
5	Disconnection from remote terminal in progress.
6	Disconnection from remote terminal finished.
7	Remote terminal not reached. Check the related EK280-phonebook entry or check the readiness for reception of the remote terminal.
8	Remote terminal refused the connection. Check the related EK280-phonebook entry or check the readiness for reception of the remote terminal.
9	Connection to remote terminal aborted during communication.
11	Connection denied.
12	Connection denied (invalid access data).
13	Connection to remote terminal aborted (timeout).
14	The message could not be created
80	No connection possible
81	Error logging on to the FTP server (user name/password correct?)
82	Error when setting the path
83	Error when creating the file
84	Error while preparing the archive access
85	Error when writing the header data
86	Error when writing the archive data
87	Error when closing the file on the FTP server
88	Error logging off from the FTP server

7.6.5 GSM modem status "StM"

If a GSM/GPRS/UMTS modem is in use then "*StM*" supplies in addition to "*StCon*" and "*SDst*" information to the mobile communications network whilst one of the EK280 connections is in use.


Use the enSuite program and change over to following the sub-menu.

For the EK280 internal modem:

Interfaces > *internal modem* > *GSM and GPRS* > *StM*

For a terminal-connected modem:

Interfaces > *Terminal interface* > *GSM and GPRS* > *StM*

Use the enSuite button "Refresh"  at the menu bar of enSuite, to get the actual information in the enSuite.

Display	Description
Logged out	The GSM modem is not currently registered. If the modem should be registered and "Logged out" is displayed, please check whether a SIM card is inserted and where necessary a SIM-PIN has been entered.
Own network	The modem is registered to its own network.
Searching...	The modem is currently registering to a network.
Denied	Modem registration is denied.
Third party	The modem is registered to a foreign network ("roaming").
no command	The modem command for reading the modem status is undefined. If this text is displayed, the EK280 is not correctly parameterized.

7.7 Registration of the GSM receiving level in a flexible archive

The EK280 offers a facility for recording the GSM receiving level determined. The purpose is to identify the cause of any remote data transmission problem more accurately. For this purpose, the receiving level, the modem status and the system status are recorded every 5 minutes. In the parameter file below, the number of pre-populated lines is 2000. The scope of storage covers approx. 7 days (ring buffer), so that at all times the data from the last 7 days can be called off.

Below the application will be described for the internal GSM/GPRS modem and for the GSN/GPRS modem in the FE260 device.

7.7.1 Connection

No additional hardware is needed for the application. The only requirements are the internal GSM/GPRS modem in the EK280 or a GSM/GPRS modem in the FE260. The application May be used with GSM or GPRS modems (however, GPRS data cannot be recorded). Internal modems in the EK280 may be operated either with mains or with battery power.

7.7.2 Parameterization

To ensure that the necessary values are parameterized, use the parameterization program enSuite to send the following parameter file to the EK280 (⇒ section 3.6 [Send parameter file](#), p. 28):

GSM/GPRS modem in the EK280:

- *EK280 V2.xx - Application: Registration of receiver level (internal modem) every 5 min. in flex. arc. 15 (*)*
- GSM/GPRS modem in the FE260
- *EK280 V2.xx - Application: Registration of receiver level (FE260) every 5 min. in flex. arc. 15 (*)*
- Since the flexible archive 15 is used in both cases, only one of the two parameter files may be used.

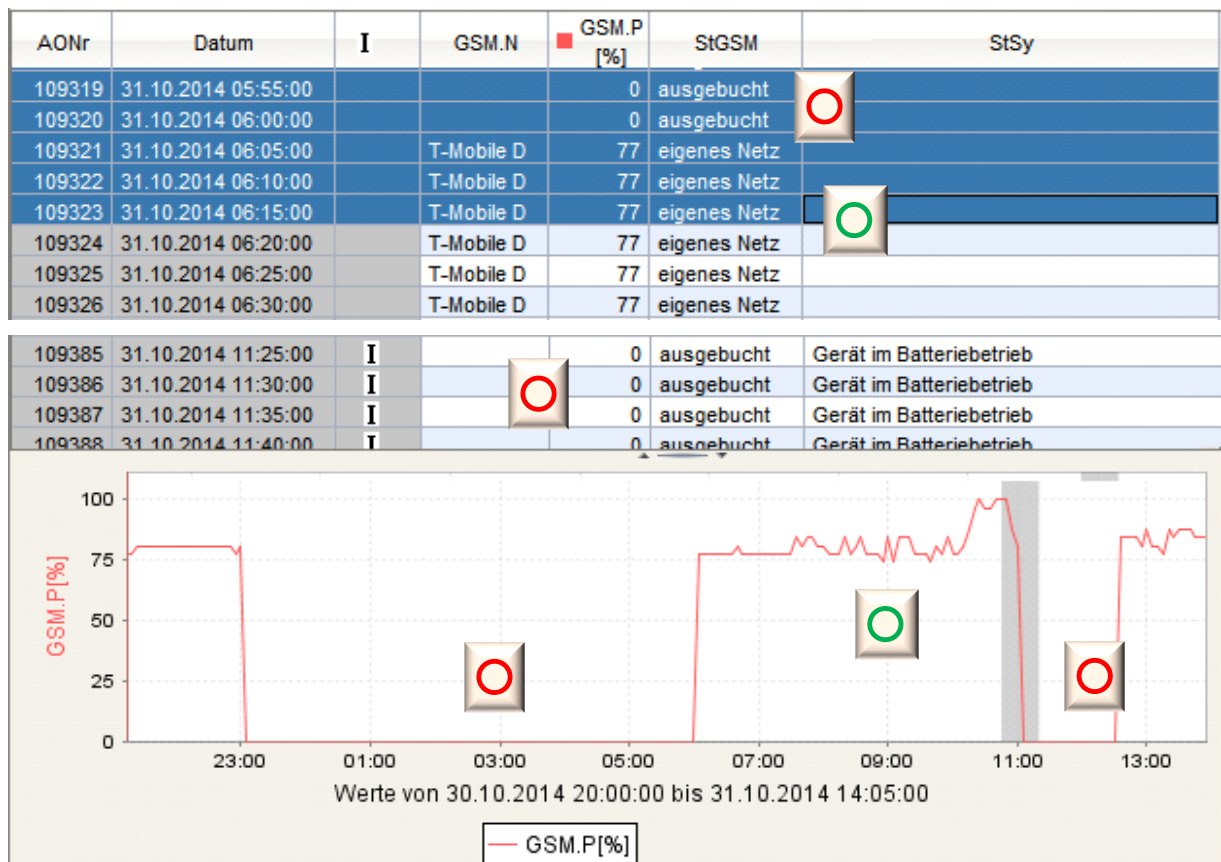
After loading of the data, no further activity is required, and from now the level is recorded every 5 min.

7.7.3 Evaluation with enSuite

If there are receiving problems, archive 15 can be read and displayed with the aid of enSuite.

To do this, it is first necessary to read the contents of this archive with enSuite.

- Set up a connection to EK280.
- In the left task area, select the option "*Readout archive*"
- Mark the *Archive 15* (GSM-Archive int.Modem "Ar.Pi") and select the required period.
- Use "*Start readout*" to read out the Archive and allow the enSuite database to take it over.
- Displaying the archive contents:
- In enSuite press "*Navigation*" and select the relevant "*Device*", then "*LIS-200*", "*Archives*" and then "*GSM-Archive int. Modem "Ar.Pi"*" and the requested archive is displayed:



- Evaluation:

- ① Logged on to own network; level is 77% and therefore in the acceptable range: Since the system status shows no entries, the device is also externally supplied (no battery operation)
The level is also relatively constant (no fluctuations or break in of the level)
- ② Modem logged out, although mains power supply is on!
→ Call window closed?
→ No connection to the GSM network possible (GSM station switched off...)!
- ③ Modem logged out, battery powered! The modem was unable to log on, as the external power supply failed!
→ For example: Maybe the EK280 is connected to the lighting system by mistake, so the power to the EK280 is switched off when the light is switched off.

8 Data transmission protocols

8.1 Modbus

8.1.1 Standard settings of the Modbus Map

Following Modbus register assignment is factory-set:

Register Address	Short Desc.	Designation / value	Format	Unit	LIS200 Address
1	Bat.R	Remaining battery life	3	Months	2:404
2	Stat	Momentary status total	3		1:100
3	VmT	Vm total, fractional digits	3	10-4 m ³	4:302_2
4	VbT	Vb total, fractional digits	3	10-4 m ³	2:302_2
5	W.T	W total, fractional digits	3	10-4 kWh	1:302_2
101	VmT	Vm total, pre-decimal position	4	m ³	4:302_1
103	VbT	Vb total, pre-decimal position	4	m ³	2:302_1
105	W.T	W total, pre-decimal position	4	kWh	1:302_1
301	pb	Pressure at base conditions	32	bar	7:312_1
303	Tb	Temperature at base conditions	32	°C	6:312_1
305	p.Abs	Measured absolute pressure value	32	bar	6:210_1
307	p.Mes	Measured pressure value	32	bar	6:211_1
309	T.Mes	Measured temperature value	32	°C	5:210_1
311	C	Conversion factor	32		5:310
313	K	Compressibility	32		8:310
315	p.F	Substitute pressure value	32	bar	7:311_1
317	T.F	Substitute temperature value in °C	32	°C	6:311_1
319	N2	Nitrogen content	32	%	14:314
321	H2	Hydrogen content	32	%	12:314
323	CO2	Carbon dioxide content	32	%	11:314
325	Rhob	Standard gas density	32	kg/m ³	13:314_1
327	Qm	Operational load	32	m ³ /h	4:310
329	Qb	Standard load	32	m ³ /h	2:310
331	P	Power	32	kW	1:310
333	Ho.b	Calorific value	32	kWh/m ³	10:314_1
335	dr	Relative density	32		15:314
337	P	Pressure used	32	bar	7:310_1
339	T	Temperature used	32	°C	6:310_1
501	VmT	Vb total	9	m ³	4:302
504	VbT	Vn total	9	m ³	2:302
507	W.T	W total	9	kWh	1:302
801	VmT	Vb total	17	10 ⁻⁴ m ³	4:302

Register Address	Short Desc.	Designation / value	Format	Unit	LIS200 Address
805	VbT	Vn total	17	10 ⁻⁴ m ³	2:302
809	W.T	W total	17	10 ⁻⁴ kWh	1:302
813	Time	Date and time	17		1:400
817	SNo	Device number (serial number)	16		1:180
820	DayB	Day boundary	12		2:141_1

Table 1: Standard Modbus table
(the register number is based on the physical address form)

The Modbus register assignment can be updated using the enSuite parameter software i.e., via the optical interface.

8.1.2 Formats

Meanings of formats used:

Format	Description
3	Ushort, 16 Bit
4	Ulong, 32 Bit
9	Counter6
12	Array2, BCD, 4 Bit

Format	Description
16	Array6, BCD, 12 Bit
17	Array8, BCD, 16 Bit
32	IEEEfloat, 32 Bit

Code	Format	Number of registers
------	--------	---------------------

a) binary formats:

3	Number	1
4	Number	2
32	Exponential	2
9	Counter	3

Value

MS Word upper part	LS Word lower part
-----------------------	-----------------------

Bit 31	MS Word Bit 30...23	Bit 22...16	LS Word Bit 15...0
Sign	Exponent	Mantissa upper part	Mantissa lower part

MS Word	...	LS Word
Pre-decimal position upper part	Pre-decimal position lower part	Fractional digits

b) decimal formats:

17	BCD numerator *	4
	BCD time stamp *	4
16	BCD number	3
12	BCD time	1

MS Word	LS Word
Pre-decimal position			Fractional digits

MS Word	LS Word
CCYY **	MMDD **	hhmm **	ss00 **

MS Word	...	LS Word
12 digits		

hhmm **

* Counter or time stamp, depending on assigned LIS-200 Address (⇒ below)

** CC = century, YY = year, MM = month, DD = day, hh = hour, mm = minute, ss = second

8.1.3 Creation and modification of MODBUS Map

The creation and change of Modbus-Map is described in the document ⇒ *Modbus Communication with EK2x0_V2.0_*.pdf* 0. The document is available on request from Honeywell.

8.1.4 Value readout via Modbus

For reading values the Modbus functions "Read Holding Registers" (3) and "Read Input Registers" (4) are implemented.

Readout of values is described in document ⇒ *Modbus Communication with EK2x0_V2.0_*.pdf* 0. The document is available on request from Honeywell

8.1.5 Value change via Modbus

For changing values, the Modbus functions "Write Single Register" (6), and "Write Multiple Registers" (16) are implemented.

Update of values is described in document ⇒ *Modbus Communication with EK2x0_V2.0_*.pdf* [6]. The document is available on request from Honeywell.

8.1.6 Conditions for Modbus operation

8.1.6.1 Supply voltage

For everyday operations, Modbus is suitable for continuous connection to a PLC. As these values are often read out in seconds or minutes, an external power supply is required. In exceptional cases (query 1x daily and less frequent), the connection can also be completed in Battery mode. In this case, the call window should be made as small as possible to ensure that the batteries in the EK280 are not charged more than necessary.

The setting of the required connection is described in ⇒ section 7.6.1 [Time window connection](#) (p. 153).

8.1.6.2 Supply voltage

Depending on the connection used, a corresponding call acceptance window should be opened. The call acceptance window settings are also done during connection parameterization in ⇒ section 7.6.1 [Time window connection](#) (p. 153).

A standard call acceptance window from 00:00 – 23:59 in network operation does, however, indicate that at 23:59:30 no Modbus request can be answered. If this request is required, a second call acceptance window must be specified between 11:55 PM and 12:05 AM.

8.1.6.3 Open lock

In order for values to be ready out via Modbus, a lock must be in place in the EK280. Honeywell recommends the customer to leave open lock (Note: The automatic closing of the lock must be deactivated (= 0)). This allows all the values of the Modbus map, as well as the Archive to be read out via Modbus. Changing values is not possible when there is an exclusive client lock.

In order for values to be changed via Modbus, the required lock must be opened additionally (usually the admin lock). To use the Admin lock, the opening and closing of the lock should also be integrated in Modbus Map.

The procedure is described in Document ⇒ *Modbus Communication with EK2x0_V2.0_*.pdf* [6].

8.1.6.4 Modbus Map

The Modbus map must be synchronized between the SPS and the EK280. If necessary, this can be adjusted with enSuite. This is specifically applicable when:

- Other values should be transferred via Modbus (max. 70 values are possible).

- The data format needs to be adjusted.
- The Modbus Register Address must be changed (e.g., many systems specify an "Offset" of 40000 for a "FC03" query).
- The data can be read out sequentially by means of a query in order to minimize transfer time/battery life.

8.1.6.5 Help on commissioning

Since a Modbus connection always requires a balance between the end user, the programming of the PLC, as well as the settings of the EK280, Honeywell's Homepage offers: "Products/Solutions/Service" / "Support" / "DIAL commissioning" corresponding electrical connection help sheets for download. It also contains the necessary prerequisites for a successful commissioning. On request, Honeywell also offers support in the form of a mini project. If necessary, please contact the Honeywell hotline.

8.1.6.6 Query in bus operation

In bus mode, all participants must check whether a Modbus request is intended for them or for another station. The following points must therefore be ensured for stable operation:

- A pause of 3 seconds should be ensured between the queries of values from station "a" to "b" (change of slave address).
- Since the EK280 has a working cycle of at least 2 seconds, all values are only updated every 2 seconds. Therefore, if a query is made for each second, new values would still only be supplied every 2 seconds. Therefore, a pause of two seconds should be ensured between the individual queries to the EK280.
- If necessary, the timing parameters of the interface can be adapted:

Short Desc.	Description	Address	Value	Content
-	Character timeout in ms terminal interface	2:710	3 / 6	Baud rate 9600 = 6 ms, Baud rate 19200 = 3 ms
-	Inactivity timeout in seconds	2:712	7	Waiting time after end of transmission until next request
-	Protocol timeout in seconds	2:713	5	Waiting time after end of transmission until next protocol detection

8.1.7 Modbus via RS232 or RS485 interface

In the EK280 communication via the terminal interface in RS232, RS485- (2-wire) oder RS422 (4-wire) operation can be via Modbus amongst others. Values can be read and updated, and archives can be retrieved.

8.1.7.1 Connection

The connection of the RS232 interface is described in ⇒ sections [7.5.1.1 "Connection"](#) and [7.5.1.2 "EK280 jumpers"](#).

The connection of the RS422 interface (4-wire) is described in section [7.5.4.1.2 "Four-wire full duplex – wiring"](#)

The connection of the RS485 interface (2-wire, incl. bus operation) is described in section [7.5.4.1.1 "Two-wire simplex – wiring"](#)



For connection to a bus system, it is essential to observe the notes in sections [7.5.3.1.1](#) und [8.1.6.6](#)

8.1.7.2 Parametrization of the EK280

Parameterization of the functions of the RS232 interface is described in ⇒ section [7.5.1.3](#).

The parameterization for the function of the RS422 (4-wire) and RS485 (2-wire) interface is described in section [7.5.3.3 "Parameterization of the EK280"](#).

a) Parameter file for Modbus parameterization

Depending on the application, send the following parameter file to the EK280 (⇒ section [3.6](#)):

- [EK280_xvx.. - RS232 & Modbus-RTU \(via connection 5 & ext. power supply\) \(*\)](#) ³⁶
- [EK280_xvx.. - RS485 4-wire & Modbus-RTU \(via connection 5 & ext. power supply\) \(*\)](#) ³⁶
- [EK280_xvx.. - RS485 2-wire & Modbus-RTU 9600Bd \(via connection 5 & ext. power supply\) \(*\)](#) ³⁶
- [EK280_xvx.. - RS485 2-wire & Modbus-RTU 19200Bd \(via connection 5 & ext. power supply\) \(*\)](#) ³⁶

b) customized settings

For customized settings, the Modbus parameters can be set on the device under the path ["Admin" > "Interfaces" > "Terminal interface" > "Modbus"](#) (⇒ paragraph "0").



All parameters listed on the EK280 ["Admin"](#) tab can be found in enSuite under ["Parameters"](#) under the same path. To do this select ["Navigation"](#) on the left-hand side and then ["Parameterize online"](#) at the bottom of the navigation window.

c) Modbus parameters

The following Modbus parameters are set by default via parameter file (⇒ paragraph a) of this section):

³⁶ The "x" stands for the version of software on the device, e.g., "2v2".
The asterisk * stands for a small letter which indicates the version of the file, e.g., "a".

Short Desc.	Description	Address	Value	Content
<i>MBTrM</i>	Transfer mode	2:7B1	1	<i>0: ASCII</i> - The content of each register is transmitted as four ASCII-encoded hexadecimal digits <i>1: RTU</i> - The content of each register is transmitted as two bytes <i>2: TCP</i> - Transmission as for RTU mode with additional information for Modbus TCP protocol
<i>MBDir</i>	Data direction	2:7B0	1	<i>0: H word first</i> → The most significant word is located in the first register <i>1: L-Word first</i> → The least significant word is located in the first register (the Byte order is always High Byte first).
<i>MBAAdr</i>	Device address (Modbus Slave ID)	2:7B2	1 ³⁷	Value range from 1...247 (0 = "Broadcast")
<i>MBRSz</i>	Register size	2:7B8	2	<i>2: Register size 2Byte</i> <i>4 Register size 4 Byte</i> The statement of the register size has a direct influence on the possible register address in the above Modbus table. Hence the setting of the register size applies to both interfaces!
<i>MBAMd</i>	Addressing mode	2:7B9	0	<i>0: Log. Mode</i> (staring with "1") <i>1 Phys. Mode</i> (staring with "0")

Table 2: Default Modbus parameter

d) Addressing mode

The Modbus addresses parameterized in the device are assigned according to logical addressing. Depending on the retrieval software used, it may be necessary to change the addressing in the protocol to physical addressing.

0 = Logical addressing of the Modbus registers with addresses starting with 1.

1 = Physical addressing of the Modbus registers with addresses starting with 0.

Querying the registers according to the addressing mode must take this into account as follows:

Value as per table below	Addressing mode MBAMd	Queried value (Register)
301	"0" (logic → Offset of "-1")	"300"
	"1" (physical)	"301"

Table 3: Modbus Addressing mode

³⁷ User-determined value

The following connection parameters for “[connection 1](#)” are set by default via parameter file (⇒ paragraph a) of this section):

Short Descrip.	Description	Address	Value	Content
CW5.S	Call acceptance window start	14:150	00:00	Start call acceptance window
CW5.E	Call acceptance window end	14:158	11:59 PM	End call acceptance window
Event	Connection event	5:D70	2F05	Call window 5 created
EvTyp	Connection event type	5:D75	1	0: Time 1: Period
Iface	Connection interface	5:D72	2	Terminal i.
SuplT	Connection power supply type	5:D76	2	0: all 1: Battery 2: ext. supply
TypPr	Connection protocol type	5:D77	0	0: Server (Protocol recognition) 4: Modbus (fix)

Table 4: Default connection parameters

8.1.8 Modbus via internal modem (Modbus RTU_TCP)

In the EK280 communication via the internal GPRS modem in RTU_TCP mode can be via Modbus amongst others. Values can be read and updated, and archives can be retrieved. Modbus communication is available for both battery and external power supply operation. For both operation types it is necessary for at least one call acceptance window to be open.

8.1.8.1 Connection

The internal GSM and GPRS modem is described in ⇒ section 7.1. GSM and GPRS operation with TCP-IP is also described here.

8.1.8.2 Parametrization of the EK280

- a) Send the following parameter file to the EK280 (⇒ section 3.6 Send parameter file, p. 28):

– *EK280_xvx. - int. ECM-GW-120 - Modbus-TCP (*)*³⁸

The “[internal modem](#)” interface, the Modbus parameters and the connection parameters for Modbus operation via internal modem are preset in this parameter file.

- b) Customized settings can be set using enSuite.

To do this select “[Navigation](#)” on the left-hand side and then “[Parameterize online](#)” at the bottom of the navigation window. Under “[Parameters](#)” > “[Interfaces](#)” > “[internal modem](#)” > “[Modbus](#)” you will find the parameters required for this application.

³⁸ The “x” stands for the version of software on the device, e.g., “2v2”.
The asterisk * stands for a small letter which indicates the version of the file, e.g., “a”.

The following Modbus parameters are set by default via parameter file (⇒ section 8.1.8.2, paragraph "a"):

Short Desc.	Description	Address	Value	Content
MBTrM	Transfer mode	2:7B1	2	2: TCP - Transmission as for RTU mode with additional information for Modbus TCP protocol
MBDir	Data direction	2:7B0	1	0: H word first → The most significant word is located in the first register 1: L word first → The least significant word is located in the first register Info: "H-Byte first" has a fixed setting
MBAAdr	Device address (Modbus Slave ID)	2:7B2	1*	Value range from 1...247 (0 = "Broadcast")
MBRSz	Register size	2:7B8	2	2: Register size 2Byte/16Bit
MBAMd	Addressing mode	2:7B9	0	0: Log. Mode ⇒ note in section 8.1.7.2, paragraph "c")

Table 5: Preset Modbus parameter

* Value to be determined by the user.

The following connection parameters for connection 1 are set by default via parameter file (see paragraph a) of this section):

Short Desc.	Description	Address	Value	Content
Event	Connection event	1:D70	2F01	Call window1 created
EvTyp	Connection event type	1:D75	1	1: Period
Iface	Connection interface	1:D72	3	3: internal modem
SuplT	Connection power supply type	1:D76	2	2: Battery operation
TypPr	Connection protocol type	1:D77	0	0: Server (protocol detection)
IPInf	Additional information for the connection	1:D79	0	0: no action

Table 6: Default connection parameters



For communication time window 1 (⇒ section 7.1.6.1, paragraph "d)") and the correct APN Data (⇒ section 7.1.6.1, paragraph "c)") must be set.

8.1.9 Save batteries by automatic resetting in case of power failure

Most data transmissions are done with external power supply. Especially in Modbus operation, a PLC requests data in a very short cycle. However, if the external power supply fails, ongoing communication is maintained in battery mode, which means that the device battery can be discharged in a short time.



Communication in battery mode places a heavy load on the device battery. However, since active communication is not automatically interrupted, this must be ensured by suitable settings.

By means of a parameter file in enSuite, you can set that the interface is reset immediately in case of a failure of the external power supply. The file is included in the parameterization software enSuite from 4.7.

8.1.9.1 Parameterization of the EK280

Send the following parameter file in the "Application" path of enSuite to EK280:

- EK280 from V2.55 - Application: Terminal interface reset if external power supply failed

No further settings are required.

8.2 Operating a Modbus Master

Modbus is a stateless single master protocol. Within the Modbus slave function of the EK280 (⇒ section 8.1) the master (retrieval system) can only retrieve the data from the terminal (slave) during an open time window. Opened time windows are always linked to increased energy consumption as the time window is usually open for a longer period of time than what is required for communication and also during this time e.g., the modem must be ready for reception.

With the Modbus master operation, this energy consumption can be reduced to the required minimum where e.g., the modem is only switched on for the short period required for transmitting data. In such cases the retrieval system takes over the role of the slave.

The Modbus master operation serves to send (time and/or) event-driven Modbus data (e.g., register or archive data) to a slave, or to retrieve e.g., new configuration data or parameters from there.

The EK280 can communicate as a Modbus master by means of the terminal device (external modem) and the internal modem in any transmission mode (ASCII, RTU, RTU-TCP).

8.2.1 General parameterization

Three parameter groups must be parameterized for operating the Modbus master.

1 The Modbus master task list:

The Modbus master task list contains up to 70 tasks. Each task consists of a register start address, the number of registers and the access mode to the respective register(s).

There is only a single Modbus master task list in the device which is used together for all connections. In the Modbus master task list (AL) only register start addresses can be used which are present in the standard Modbus table (⇒ section 8.1.1).

2 The Modbus master parameters (Modbus master info):

There are 8 Modbus master info instances. In each of the 8 possible connections, it is possible to refer to another Modbus master info instance. However, an instance may also be used more than once. The Modbus master info contains the index of the task list and the number of tasks to be processed from this index.

3 A link:

A minimum of one link from a possible 8 must be parameterized for Modbus master operations.

Amongst other things, the (trigger) event is established in this link which should lead to the construction of this link. The link contains a reference to the instance of the corresponding Modbus master info.



As only register start addresses which are present in the standard Modbus table can be used in the Modbus master task list (⇒ section 8.1.1) then before setting up Modbus master operations this standard Modbus table must always be correctly parameterized first.

Fig. 24 gives an overview of the dependencies of parameterization:

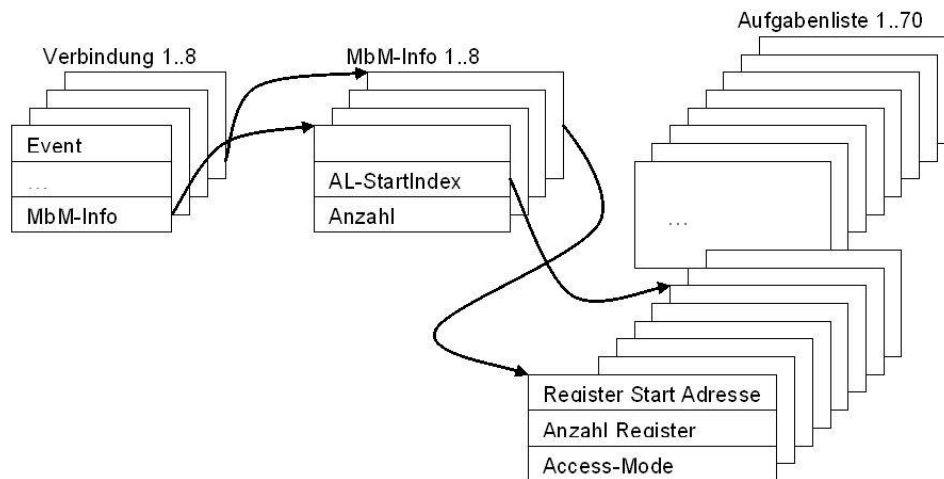


Fig. 24: Dependencies within Modbus master parameterization

8.2.2 Parameterization of Modbus master tasks

It is established via the Modbus master task list which and how much data shall be read or written. This Modbus master task list, just like the standard Modbus table (⇒ section 8.1.1) contains a maximum of 70 entries (instances).

There is only one Modbus master task list for the whole device. Various links can be parameterized, which due to various events access different parts of the Modbus master task list via the parameterized Modbus master info instance. The corresponding part of the Modbus master task list must therefore be parameterized for each of these events. Parts of the Modbus master task list can also belong to several connections.

The task list consists of three parameters per instance:

Display	Designation	Meaning	Address "x" ³⁹	MBAdr
MMSAd	Modbus_Master_AufgList – MdbStartAdr	The Modbus address from which the number of registers shall be read / written	x:8C5	All Modbus addresses are possible here which can be found in the standard Modbus table (⇒ section 8.1.1)
MMAR	Modbus_Master_AufgList – MdbAnzReg	Number of registers, from which the Modbus address shall be read / written	x:8C6	
MMRW	Modbus_Master_AufgList – MdbRegRWMode	RW-Mode	x:8C7	0: Read-FC03 1: Read-FC04 2: Write-FC06 3: Write-FC16

Table 7: Parameters of the task list

a) Push-Mode (Write-FC06 / Write-FC16)

The Modbus addresses configured in the task list are read in the device. In this case the corresponding LIS rights are used. For this reason, the lock level is also transferred in the link. It must be noted in this case that the lock level cannot be higher than the lock level used for parameterization of the task list.

³⁹ "x" = Instance of the task (value range from 1-70)

The writing of data to the remote object can take place by means of two different function codes (FC).

FC06: Write Single Register

FC16: Write Multiple Registers

b) Pull Mode (Read-FC03 / Read-FC04)

The Modbus addresses configured in the task list are retrieved in the Modbus slave (retrieval system) and written internally. In this case the LIS rights of the respective data are used. For this reason, the lock level is also transferred in the link. It must be noted in this case that the lock level cannot be higher than the lock level used for parameterization of the task list.

The retrieval of data to the remote object can take place by means of two different function codes (FC).

FC03: Read Holding Register

FC04: Read Input Register

The data format within which the data in this register is transferred, is parameterized via the Modbus list (⇒ section 8.1.1).

8.2.3 Modbus Master Parameter (Modbus Master Info)

The Modbus master info which is to be parameterized is configured separately. The connection parameter "[connection_protocol info](#)" (LIS address x:D79) refers to the Modbus master info instance (1-8), which should be used for the link. Individual Modbus master info can be used for each link.

Display	Designation	Meaning	Address "x" ⁴⁰	MBAdr
MMDir	Modbus_Master_AdrDirection	Data direction	x:7C0	0: H-Word first 1: L Word first
MMTrM	Modbus_Master_TransMode	Transmission mode	x:7C1	0: ASCII 1: RTU 2: RTU_TCP
MMAAdr	Modbus_Master_SlaveAddress	Modbus slave address of the remote object	x:7C2	Range: 0..247
MMAdM	Modbus_Master_AddressModus	Addressing mode	x:7C3	0: Log. mode 1: Phys. Addressing
MMALx	Modbus_Master_TaskListIndex	Index (instance) on the task list as first task (1..70)	x:7C4	1..70
MMAAz	Modbus_Master_TaskListNoTasks	Number of tasks from the list index	x:7C5	1..70

Table 8: Modbus master info

⁴⁰ "x" = Instance of the task (value range from 1-70)

8.2.4 Modbus parameters which are valid for the entire device

Some parameters cannot be parameterized for each link but are valid regardless of the interface as well as for Modbus master operation via all links as well as for Modbus slave operation.

Designation	Meaning	Address "x" ⁴¹	MBAdr
Modbus_DeviceAddress	Own Modbus address	x:7B2	0...247 valid for the entire device. It is the same as in slave mode
Modbus_RegisterSize	Register size = number of bytes per register	x:7B8	2: 2 bytes (for 16-bit registers) 4 4 bytes (for 32-bit registers) This applies to the entire device regarding Modbus communication (master and slave)

Table 9: Interface-dependent Modbus parameters for master and slave operations



Whilst both of these parameters are available in two instances, they both contain the same value. The last described parameter overwrites the parameter in the other instance.

8.2.5 Connection parameters

The connection parameters which shall be set for the respective applications will be explained in the examples below:

8.2.6 Modbus master via the terminal device (RS232 directly, RTU or ASCII format)

8.2.6.1 Connection

The connection of the RS232 interface is described in ⇒ sections [7.5.1](#) and [7.5.1.2](#).

8.2.6.2 Parametrization of the EK280

Parameterization of the functions of the RS232 interface is described in ⇒ section [7.5.1.3](#).

a) Send the parameter file for Modbus parameterization

- Send the following parameter file to the EK280 (⇒ section [3.6 Send parameter file](#), p. 28):
EK280_xvx. – RS-232 & Modbus-Master RTU (via connection 8 & ext. power supply) ()* ⁴²

The following Modbus parameters are preset in the file stated above:

- The first 24 tasks on the task list are processed.
- A task list is parameterized which writes several Modbus addresses from the standard Modbus table (⇒ section [8.1.1](#)) to the client.
- Telephone book entries are filled with dummy data.
- Link 8 is set up for Modbus master communications via the terminal device
- "Always" is proposed as the supply type (battery operation and external power supply)
- Reference is made to instance 7 of Modbus master information

⁴¹ "x" = instance of the interface (2 = terminal device (external modem), 3 = internal modem)

⁴² The "x" stands for the version of software on the device, e.g., "2v2".

The asterisk * stands for a small letter which indicates the version of the file, e.g., "a".

Display	Designation	Address	Value	Content
MMDir	Modbus_Master_AdrDirection	7:7C0	0	0: H-Wort first
MMTrM	Modbus_Master_TransMode	7:7C1	1	1: RTU
MMAAdr	Modbus_Master_SlaveAddress	7:7C2	100	Modbus address of the remote object
MMAAdM	Modbus_Master_AddressModus	7:7C3	1	1: Phys. mode
MMALx	Modbus_Master_TaskListIndex	7:7C4	1	From index 1 (start) of the task list
MMAAz	Modbus_Master_TaskListNoTasks	7:7C5	24	24 tasks

Table 10: Preset parameter for instance 7 of the Modbus-Master-Info

Display	Designation	Address	Value	Content
iface	Connection_Interface	8:D72	2	2: Terminal i.
Destn	Connection_Mode	8:D74	1	1: Until a connection has been successfully set up for the first time
EvTyp	Connection_EventType	8:D75	0	0: Time
SupIT	Connection_PowerSupplyType	8:D76	1	1: always
TypPr	Connection_ProtocolType	8:D77	4	4 Modbus
IPInf	Connection_ProtocolInfo	8:D79	7	7: Instance of Modbus-Master-Info
V8SE	Connection_Schloss_Ebene	8:D7D	3	3: Admin 4 Customer 5: Meter Reader 6: User 6

Table 11: preset connection parameters for link 8 (RTU, RS232)

Designation Modbus_Master_ TaskList_ ...	Meaning	Address	Value	Content
...MdbStartAdr	Modbus-Adr.	1:8C5	1	2:404→ Bat.R - Remaining battery service lifetime [timemonths]
...MdbNoReg	Disp. Register	1:8C6	1	1 Register
...MdbRegRWMode	RW-Mode	1:8C7	2	2: Write-FC06
...MdbStartAdr	Modbus-Adr.	2:8C5	2	1:100→Stat - Momentary status, total
...MdbNoReg	Disp. Register	2:8C6	1	1 Register
...MdbRegRWMode	RW-Mode	2:8C7	2	2: Write-FC06
...MdbStartAdr	Modbus-Adr.	3:8C5	3	4:302_2→VmT - Total actual volume (post-decimal places) [10E-4 m3]
...MdbNoReg	Disp. Register	3:8C6	1	1 Register
...MdbRegRWMode	RW-Mode	3:8C7	2	2: Write-FC06
...MdbStartAdr	Modbus-Adr.	4:8C5	4	2:302_2→VbT - Total volume at base conditions (post-decimal places) [10E-4 m3]
...MdbNoReg	Disp. Register	4:8C6	1	1 Register
...MdbRegRWMode	RW-Mode	4:8C7	2	2: Write-FC06
...MdbStartAdr	Modbus-Adr.	5:8C5	5	1:302_2→W.T - Total Energy (post-decimal places) [10E-4 kWh]
...MdbNoReg	Disp. Register	5:8C6	1	1 Register

Designation Modbus_Master_ TaskList_ ...	Meaning	Address	Value	Content
...MdbRegRWMode	RW-Mode	5:8C7	2	2: Write-FC06
...MdbStartAdr	Modbus-Adr.	6:8C5	101	4:302_1→VmT - Total actual volume (pre-decimal places) [m³]
...MdbNoReg	Disp. Register	6:8C6	2	2 registers
...MdbRegRWMode	RW-Mode	6:8C7	3	3: Write-FC16
...MdbStartAdr	Modbus-Adr.	7:8C5	103	2:302_1→VbT - Total volume at base conditions (pre-decimal places) [m³]
...MdbNoReg	Disp. Register	7:8C6	2	2 registers
...MdbRegRWMode	RW-Mode	7:8C7	3	3: Write-FC16
...MdbStartAdr	Modbus-Adr.	8:8C5	105	1:302_1→W.T - Total Energy (pre-decimal places) [kWh]
...MdbNoReg	Disp. Register	8:8C6	2	2 registers
...MdbRegRWMode	RW-Mode	8:8C7	3	3: Write-FC16
...MdbStartAdr	Modbus-Adr.	9:8C5	301	7:312_1→pb - Pressure at base conditions [bar]
...MdbNoReg	Disp. Register	9:8C6	2	2 registers
...MdbRegRWMode	RW-Mode	9:8C7	3	3: Write-FC16
...MdbStartAdr	Modbus-Adr.	10:8C5	303	6:312_1→Tb - Temperature at base conditions [°C]
...MdbNoReg	Disp. Register	10:8C6	2	2 registers
...MdbRegRWMode	RW-Mode	10:8C7	3	3: Write-FC16
...MdbStartAdr	Modbus-Adr.	11:8C5	305	6:210_1→p.Abs - Absolute pressure measurement [bar]
...MdbNoReg	Disp. Register	11:8C6	2	2 registers
...MdbRegRWMode	RW-Mode	11:8C7	3	3: Write-FC16
...MdbStartAdr	Modbus-Adr.	12:8C5	307	6:211_1→p.Mes - Pressure - measured value [bar]
...MdbNoReg	Disp. Register	12:8C6	2	2 registers
...MdbRegRWMode	RW-Mode	12:8C7	3	3: Write-FC16
...MdbStartAdr	Modbus-Adr.	13:8C5	309	5:210_1→T.Mes - Temperature – measured value [°C]
...MdbNoReg	Disp. Register	13:8C6	2	2 registers
...MdbRegRWMode	RW-Mode	13:8C7	3	3: Write-FC16
...MdbStartAdr	Modbus-Adr.	14:8C5	311	5:310→C - Conversion factor
...MdbNoReg	Disp. Register	14:8C6	2	2 registers
...MdbRegRWMode	RW-Mode	14:8C7	3	3: Write-FC16
...MdbStartAdr	Modbus-Adr.	15:8C5	313	8:310→K - K-value, 1/K = supercompressibility ratio factor (Fpv)²
...MdbNoReg	Disp. Register	15:8C6	2	2 registers
...MdbRegRWMode	RW-Mode	15:8C7	3	3: Write-FC16
...MdbStartAdr	Modbus-Adr.	16:8C5	315	7:311_1→p.F - Pressure substitute value [bar]

Designation Modbus_Master_ TaskList_ ...	Meaning	Address	Value	Content
...MdbNoReg	Disp. Register	16:8C6	2	2 registers
...MdbRegRWMode	RW-Mode	16:8C7	3	3: Write-FC16
...MdbStartAdr	Modbus-Adr.	17:8C5	317	6:311_1→T.F - Temperature substitute value [°C]
...MdbNoReg	Disp. Register	17:8C6	2	2 registers
...MdbRegRWMode	RW-Mode	17:8C7	3	3: Write-FC16
...MdbStartAdr	Modbus-Adr.	18:8C5	319	14:314→N2 - Nitrogen content [%]
...MdbNoReg	Disp. Register	18:8C6	2	2 registers
...MdbRegRWMode	RW-Mode	18:8C7	3	3: Write-FC16

Table 12: Extract from the preprogrammed tasks in the Modbus task list

The parameterized trigger event must take place for communication to start. For testing communication, the parameter 8:D71 can be set with the brief designation "TestC" to 1 on the device under link 8. The link is then started as a test. Otherwise, there will be a wait until the parameterized trigger event takes place.

8.2.7 Modbus master via internal modem (RTU_TCP)

Parameterization of the functions of the internal modem is described in ⇒ section 7.1.

a) Send the parameter file for Modbus parameterization

- Send the following parameter file to the EK280 (⇒ section 3.6 [Send parameter file](#), p. 28):
EK280_xvx. - Modbus-Master RTU-TCP int.Modem Connection7 ext. Power supply ()*⁴³

The following Modbus parameters are preset in this file:

- Link 7 is set up for Modbus master communications via the integrated modem. The event type is a point in time. Telephone book instances 1 and 9 (as alternative) are accessed
- Reference is made to instance 6 of Modbus master information
- "External supply" is set up as a supply type.
- The first 24 tasks on the task list are processed.
- A task list is parameterized which writes several Modbus addresses from the standard Modbus table (⇒ section 8.1.1) to the client.
- Dummy APN data and dummy telephone book parameters. Such data must naturally be overwritten with the correct parameters to enable communication to take place.

⁴³ The "x" stands for the version of software on the device, e.g., "2v2".

The asterisk * stands for a small letter which indicates the version of the file, e.g., "a"

Display	Designation	Address	Value	Content
MMDir	Modbus_Master_AdrDirection	6:7C0	0	0: H-Wort erst
MMTrM	Modbus_Master_TransMode	6:7C1	2	2: RTU_TCP
MMAdr	Modbus_Master_SlaveAddress	6:7C2	100	Modbus address of the remote object
MMAdM	Modbus_Master_AddressModus	6:7C3	1	1: Phys. mode
MMALx	Modbus_Master_TaskListIndex	6:7C4	1	From index 1 (start) of the task list
MMAAz	Modbus_Master_TaskListNoTasks	6:7C5	24	24 tasks

Table 13: Preset parameter for instance 6 of the Modbus master info

Display	Designation	Address	Value	Content
iface	Connection_Interface	7:D72	3	3: internal modem
TOutV	Connection TimeOut	7:D73	60	60 seconds
Destn	Connection_Mode	7:D74	1	1: Until a connection has been successfully set up for the first time
EvTyp	Connection_EventType	7:D75	0	0: Time
SuplT	Connection_PowerSupplyType	7:D76	3	3: External supply
TypPr	Connection_ProtocolType	7:D77	4	4 Modbus
StCon	Connection_ProtocolStatus	7:D78	0	Delete status at the beginning
IPInf	Connection_ProtocolInfo	7:D79	6	With Modbus: refers to instance 6 of the Modbus master info (1...8)
IPFak	Connection_Factor	7:D7A	2	Resulting waiting time: Base time * factor ^{repeat-1} in minutes
IPVer	Connection_Number	7:D7B	1	1 attempt
V7SE	Connection_Schloss_Ebene	7:D7D	3	3: Admin 4 Customer 5: Meter reader 6: User 6
Dst1	Connection_- TelephoneBookInstanceDest1	7:D80	1	Establish a link to the receiver from telephone book instance 1
Dst2	Connection_- TelephoneBookInstanceDest2	7:D81	9	Alternative target (telephone book instance 9)

Table 14: preprogrammed connection parameters for link 7 (RTU_TCP)

The parameters of a link which produce the actual reference to the Modbus are the "Connection_-ProtocolType" (states that the Modbus "shall be communicated with") and "Connection_ProtocolInfo" (contains the index regarding the Modbus master information which is relevant for this link).

b) Access-Point-Parameter

Display	Designation	Address	Value	Content
APN	Access Point Name	3:780	elstermz.ic.t-mobile	IP address of the access server
UName	Access Point UserName	3:781	<u>ELSTERxy@elstermz.ic.t-mobile</u>	User name (with necessary authentication)
PwAPN	Access Point UserPassword	3:782	gprsxy	Password (with necessary authentication)
IPAdr	OwnIpAddress	3:783		Own IP address, this value is not parameterized

Display	Designation	Address	Value	Content
Port	OwnTcpIpPort	3:784	40000	Own port, via which a distant client can create a TCP/IP connection. This port must also be known to the retrieving (client) system!
DNS12	Dynamic Name Server 1	3:794	10.1.2.201	Optional indication
DNS22	Dynamic Name Server 2	3:795	10.1.2.202	Optional indication

Table 15: Access-Point-Parameter



Evidently, the correct APN data must be parameterized in order to establish a TCP connection. The values entered above serve as dummy data, which must be overwritten with the correct data.

c) Telephone book parameters

Display	Designation	Address "x" ⁴⁴	Value	Content
Name	Telephonbook_Name	x:D20	MdBusMaster TCP_x	
Serv.	Telephonbook_Server	x:D27	10.1.13.251	IP address of the server to be dialed
Port	Telephonbook_ServerPort	x:D28	37357	
Login	Telephonbook_ServerUsername	x:D29	unknown	User name (with necessary authentication on the server)
Passw	Telephonbook_ServerPassword	x:D2A	unknown	Password (with necessary authentication on the server)

Table 16: Telephone book parameters



Dummy telephone book data is entered in the above table. Such data must naturally be overwritten with the correct parameters to enable communication to take place.

The same Modbus master task list is parameterized for operations via an internal modem as for operations via the terminal device (⇒ section 8.2.6).

The parameterized trigger event must take place for communication to start. For testing communication, the device on link 7 with parameter 7:D71 can be set with the brief description "TestC" to 1. The connection is then started as a test. Otherwise there will be a wait until the parameterized trigger event takes place.

⁴⁴ "x" = Instance of the telephone book (value range from 1-10)

8.3 Sending SMS messages

If the internal GSM/GPRS/UMTS modem is connected (⇒ section 7.1) or an external GSM/GPRS/UMTS modem respectively an external device including a GSM modem is connected to the serial interface, the EK280 is able to send SMS messages (Short Message Service of GSM-Providers) at occurrence of defined events.



This function is only available since EK280 software version 2.20.



This function creates costs due to data transmission via SMS. Contact your mobile service provider to get a favorable tariff. It is your responsibility to optimize this cost factor.



Due to interference of the radio connection failures may occur in data transmission.



This feature only works with a GSM/GPRS/UMTS modem.

8.3.1 Preparation

Initial conditions:

- A GSM modem is applied as described in ⇒ section 7.
- Transmission of SMS is available with your SIM card.

8.3.2 Parameterization

You can find the following menu paths in *enSuite* at "[Parameterize online](#)" > "[Parameters](#)" > "[Interfaces](#)".

a) Configure message contents

- With *enSuite* change to the sub-menu "[SMS](#)" > "[Layouts](#)"
- You can choose between free SMS layouts (no. 1 - 10) and pre-defined SMS layouts (no. 11 - 15). The pre-defined layouts are not changeable and are defined as follows:

Layout	Definition
Volume profile (11)	The message contains all values of V_m (volume at measurement conditions) copied from the measure period profile of the last 24 hours beginning at last gas day start.
Load profile (12)	The message contains all value changes ΔV_m (volume at measurement conditions) copied from the measure period profile of the last 24 hours beginning at last gas day start.
Alarm (13)	The message contains the information if the EK280 has an active alarm regarding pressure measurement, temperature measurement or remaining battery lifetime.
Archive entry (14)	The message contains the latest entry of the measure period profile. The complete profile line will be transmitted.

Layout	Definition
Month end value (15)	The message contains the latest values of Vm and Vb and their last month's maximum values at end of measure period and start of gas day.

- Additionally you can configure up to 10 free SMS layouts, with enSuite change to related sub-menu "[Layout 1](#)" – "[Layout 10](#)".
- At the free layout menu you can define up to 15 sources and assign a name for this layout:

Address "xx" ⁴⁵	Definition
xx:761	Name of the layout, which will be copied to the message.
xx:750 up to xx:75E	value 1 up to value 15: Declaration of sources. The content of those sources will be copied to the message.



In address range 1:8D0 up to 12:8D0 you can define user texts, which can be used for SMS messages for additional text information


b) Configure recipients of SMS

- You can define up to 2 recipients per SMS message, with enSuite change to sub-menu "[Interfaces](#)" > "[Telephone book](#)".
- Choose free entries of the EK280 phone book and change to the related sub-menu:

Telephone book	Definition
TelNo	Phone number of the recipient including dialing code.
Name	Name of the recipient
Email	E-Mail address of the recipient (alternative).
SForm	0 = The SMS message will be transmitted as text. 1 = The SMS message will be transmitted as binary (not readable, for evaluation by software).
Sep	ASCII character used to separate values in the short message, e.g., 42 = *.
Ident	The content of the source is used to identify the sender of the short message, e.g., 1:180 = serial number of EK280.

c) Configure message transmission

- With enSuite change to sub-menu "[SMS](#)" > "[Settings](#)".
- You can define up to 10 SMS messages, change to the related sub-menu "[SMS 1](#)" up to "[SMS 10](#)".

SMS	Definition
Event	EK280 event, at occurrence the message will be transmitted. Within enSuite, press the  button and select a status, a unique event or a regular event from the list shown.

⁴⁵ "xx" = instance of free layouts (value range from 1 to 10)

SMS	Definition
NoRcv	0 = no conn. (SMS is not active; will not be sent to any recipient) 1 = Dest 1 or 2 (SMS will be sent only to the first recipient which is reachable) 2 = Dest 1 and 2 (SMS will be sent to both recipients)
LayNo	SMS layout number in the range 1 – 15 (⇒ a))
Iface	Interface 2 = serial interface or 3 = internal modem, where the GSM modem is connected.
Rcv1, 2	Receiver number related to EK280 phone book (⇒ b))
Way1, 2	0 = message will be sent as SMS 1 = message will be sent as email 2 = message will be sent as fax
Delay	Delay of transmission in minutes since event occurs.
PrTyp	7 = short SMS → in case of recipient is not able to display messages with more than 160 characters. The message may be split into multiple short messages. 8 = long SMS → in case of recipient is able to display concatenated messages with more than 160 characters.

After you changed EK280 parameters activate "[Transfer changes to device](#)" at the menu bar in enSuite.

d) Configure individual parameters

- To transmit a message as email or fax you have to configure abbreviated numbers (different for each mobile service provider).
- Use the enSuite menu "[Read and set single parameters](#)"


Address	Definition
2:739 (if modem connected to serial interface)	Abbreviated numbers for email gateway. Known numbers: Telecom-D1: 8000 Vodafone-D2: 3400 E-Plus: 7676245 O2: 6245
3:739 (if internal modem)	
2:73A (if modem connected to serial interface)	Abbreviated numbers for fax gateway. Known numbers: Telecom-D1: 99 Vodafone-D2: 99 E-Plus: 1551 O2: 329
3:73A (if internal modem)	



If your mobile service provider is not shown, please contact your IT department.

8.3.3 Check SMS dispatch

The transmission of an SMS can be executed manually regardless of the configured event.

- Change your short message in the enSuite submenu **"SMS"** > **"Settings"** > **"SMS 1"** bis **"SMS 10"**
- Use the command: Send short message now. Press the **"Execute"** button.
- Press the **"Update"**  button at the top end of enSuite to display current information in enSuite.



Repeat this process at regular intervals in order to obtain the latest EK280 status.

- You can follow the progress of the SMS transmission with the following status parameters.

SMS	Description
NStat	Current Message Status (⇒ section 7.6.3)
SDst1, 2	The current status of the SMS dispatch to the receiver 1, 2 (⇒ section 7.6.4).

8.3.4 Additional functions for sending SMS messages

8.3.4.1 Reset the SMS buffers

All outgoing SMS messages are written to a buffer and can thus be repeated if necessary. On commissioning, incorrect settings can also be entered which will generally make the delivery of the SMS impossible. For example, if no telephone number is entered for the receiver, it can not be sent. Repeat cycles and buffer storage also don't improve the situation. Therefore, it may be necessary to remove such "old" SMS from the buffer!

- Change your short message in the enSuite submenu **Interfaces** > **SMS** > **Setting** > **Clear SMS buffer**
- Optionally you can also reset the interface itself under:
Interfaces > **Internal modem** > **Reset modem interface „ResI3“** resp.
Interfaces > **Terminal interface** > **Reset terminal interface „ResI2“**

8.3.4.2 Limit the number of repetitions

A number of repeat attempts may be applied for sending an SMS. There is a pause of 60 seconds after each attempt, before a new attempt is initiated. Depending on the faults detected (⇒ above), these are also suppressed immediately

Address	Description
2:732 "No.D"	The number of retries for sending an SMS (terminal interface)
3:732 "No.D"	The number of retries for sending an SMS (internal modem)



At the beginning of the SMS dispatch, the number should be set to "1" or less, to ensure commissioning without long waiting times. If the SMS test is transmitted correctly, the number can be increased accordingly!

8.4 NTP Time Synchronization

If the internal radio modem (⇒ section 7.1) or an external radio modem in the FE260 is connected to the serial interface, the EK280 can establish a connection to an NTP time server for definable events and synchronize the current time of the EK280 to the NTP time.



This function is only available with device software version 2.52 and higher.



This function causes costs due to an IP connection in the mobile network (GPRS, UMTS, LTE). Talk to your mobile operator to get a suitable rate. The optimization of this factor is your own responsibility.



Due to disturbances in the radio connection, the time query may fail. Synchronization is then resumed at the next due date.



This application only works with a GPRS/UMTS/LTE modem or an Ethernet connection.



The NTP time servers must be located in your own VPN or access to public time servers must be set up accordingly via your IT.



The time synchronization is carried out from a detected deviation of 5 seconds. There is no upper limit.

8.4.1 Preparation

Prerequisites for the procedure described below:

- A GPRS/UMTS modem or an Ethernet connection is connected and configured according to section 7.
- The NTP servers are available in your VPN network or the public NTP time servers can be reached by the EK280.

8.4.2 Parameterization

You can find the following menu paths in *enSuite* at "[Parameterize online](#)" > "[Parameters](#)" > "[Interfaces](#)".

a) Configuring the recipient of the short message

- You can specify up to two NTP time servers per synchronization time. To do this, use the *enSuite* to switch to the submenu "[Interfaces](#)" > "[Telephone book](#)".
- Wählen Sie freie Telefonbucheinträge und wechseln Sie mit der *enSuite* in das jeweilige Untermenü:

Telephone book	Meaning
Name	Free name of the NTP time server
Server address	IP address or name (assuming valid DNS addresses in the "GSM and GPRS" menu) of the NTP server (max. 62 characters)
Port of the server	Standard port is 123, may differ in a VPN if necessary

- The other values are not needed for NTP synchronization.



If the device or time server is behind a firewall, make sure that the UDP protocol for the configured port is enabled for the NTP function as well.



Examples of public NTP time servers are given in section 8.4.3.

b) Defining the Start Time for NTP Synchronization

- The start time and the repetition rate must be set. To do this, switch to the submenu „[Interfaces](#)“ > „[Connections](#)“ with the enSuite.
- Select free connection (recommendation: the last connection "12") and switch to the corresponding submenu with the enSuite:

Connection	Meaning
Protocol type	For an NTP transmission, always select "12: NTP" at this point.
Data transfer start time, cycle	Synchronization cycle: hourly, daily (recommended), weekly, monthly
Data transfer start time	The appropriate time is set up here. Attention: please note the following remarks
Connection mode " Destn "	Setting how the two time servers are to be addressed, if necessary: „0: no conn. “ No connection setup is started „1: Dest 1 or 2 “ Only if the 1st time server was not reached, time server 2 is "selected" (recommendation). „2: Dest 1 and 2 “ The device tries to connect to both time servers.
Destination 1 and 2 for the connection	Determining the sequence of the two NTP time servers configured in the phone book
Interface for the connection	Select whether the synchronization is to take place via the internal modem or via an external modem.
Power supply type	Select whether the synchronization is to take place in "battery operation", with "external supply" or "always" (with power supply unit and modem batteries).
Establish connection now	By setting this value to "1", the immediate connection setup is started independently of the set connection time and the device tries to synchronize the time.

- The remaining values are not required for NTP synchronization.



No 2 or more connections can be started at the same execution time! Thus, the execution times are to be selected time-shifted.

The specified time depends on the EK280's measuring cycle. Therefore, the selection of the time is very limited, especially with battery operation:

Measuring cycle in battery operation = 30 s: start of synchronization possible in a 30 s grid, e.g., at 10:01:30

Measuring cycle in mains operation = 2 s: Synchronization can be started in a 2 s grid, e.g., 10:00:02

8.4.3 Public NTP Time Servers

Ptbttime1.ptb.de	Ntp.eim.gr
Ntp1.t-online.de	Ntp.univ-lyon1.fr
ntp.web.de	Info.cyr-kr.edu.pl
ntp1-0.cs.tu-berlin.de	Biofiz.mf.uni-lj.si
0.de.pool.ntp.org	



In these examples it is mandatory to enter two valid DNS addresses in the "GSM and GPRS" menu (see section [7.1.8.2](#)).

9 Archive



Changes to the flexible archive structures which were programmed as factory settings may lead to erroneous processing of read data in a subsequent system.



In case of e.g., a power failure, no archived data is lost as all archives are stored in non-volatile memories.

9.1 Measurement period archive

In the measurement period archive meter readings and measured values are archived in regular measurement periods *"MPer"*. The content of the measurement period archive can be shown on the display of the device via the path *"Serv." > "Archives" > "Meas.period archive"*.



*The measurement period archive is a flexible archive.
Archive contents and the memory capacity can be adapted with corresponding settings via parameterization software enSuite when the administrator lock is open.
Our applications team is available if you require further information.*

9.1.1 Archive content

Pos.	Address	Display	Description	Retrievable D = via Display I = via Interface
1	01:01F8	GONo	Global Block number	I
2	03:0A20	ABNo	Archive Block number	D + I
3	01:0400	Time	Date and time	D + I
4	02:0300	Vb	Volume at base conditions	D + I
5	-	Δ Vb	Meter progress Volume at base conditions	D
6	02:0302	VbT	Volume at base conditions total	D + I
7	-	Δ VbT	Meter progress Volume at base conditions total	D
8	04:0300	Vm	Volume at measurement conditions	D + I
9	-	Δ Vm	Meter progress Volume at measurement conditions	D
10	04:0302	VmT	Volume at measurement conditions total ⁴⁶	D + I
11	-	Δ VmT	Meter progress Volume at measurement cond. total	D
12	19:0161	p.MPØ	Pressure mean value of last meas period	D + I
13	15:0161	T.MPØ	Temp. interval mean value	D + I
14	23:0161	K.MPØ	Mean value K of last meas period	D + I
15	25:0161	C.MPØ	Mean value C of last meas period	D + I
16	02:0110	St.2	Instance-Status 2 (incl. Vn)	D + I
17	04:0110	St.4	Instance Status 4 (incl. Vb)	D + I
18	07:0110	St.7	Instance Status 7 (incl. p)	D + I
19	06:0110	St.6	Instance Status 6 (incl. T)	D + I
20	02:0100	StSy	System status	D + I
21	03:0A23	ErReg	Error register	D
22	03:0A22	Ev	Event causing data line to be archived	D + I
23	03:0A21	Check	Check sum result („CRC OK“ or „Error“)	D + I

The counter progress compared to the respective previous entry is denoted with a " Δ ". Normally it is a flow (consumption) in this case within a measurement period. This, however, does not apply when an archive row is entered due to a particular event (e.g., setting the clock or a counter, appearance of an important status message). The meter reading flashes with the meter progress to point out this feature to the user (for further information, refer to the instruction manual "usage as a registration device").

⁴⁶ When using an encoder then the original operating volume "Vo" (01 240) can also be set.

9.1.2 Memory capacity

Based on factory settings, the archive contains 9504 data rows, which corresponds to a memory capacity of approx. 13 months with a measurement period of 60 minutes.



The measurement period archive is a ring-type memory. If the archive is full then the oldest entries are overwritten.

9.1.3 Changing the measurement period

All values relating to measurement periods can be created with the measurement period which can be set here.

- In order to set the measurement period on the device to another value, open the administrator or calibration lock as described in the ⇒ EK280 Operating Instructions [1].



If at least two entries are still free in the calibration manual, then it is possible to change the measurement periods when the administrator lock is open. Otherwise the value can only be changed when the calibration lock is open.

- Move the cursor in the register **"Serv."** to **"Archives" > "MPer"**.
- Press the ENTER key. ⇒ One digit of the value flashes.
- Move the cursor with the arrow keys ► or ◀ to the digits and change these with the arrow keys ▲ or ▼.



*The measuring period is set to "60 minutes" as standard.
Sensible and typical values include 5, 10, 15, 20, 30 or 60 minutes.*

- Press the ENTER key to confirm the set value. It is possible to abort the entry by pressing the ESC key.

9.1.4 Values relating to measurement periods

- To display the volumes relating to the measurement periods, move the cursor to the **"Serv." > "Volume" > "per measuring period"**.

Display	Description
VbMPc Δ	Vb Interval meter progress of the current month
VbMP Δ	Vb Interval meter progress of the previous month
VbMPc↑	Maximum VbMP of current month
VbMP↑	Maximum VbMP of last month
VmMPc Δ	Vm Interval meter progress of the current month
VmMP Δ	Vm Interval meter progress of the previous month
VmMPc↑	Maximum VmMP of current month
VmMP↑	Maximum VmMP of last month

Display	Description
W.MPc Δ^{47}	W Interval meter progress of the current month
W.MP Δ^{47}	W Interval meter progress of the previous month
W.MPc \uparrow^{47}	Maximum W.MP of current month
W.MP \uparrow^{47}	Maximum W.MP of last month
MPer	Measuring period

- To display the measured values relating to the measurement period, move the cursor to *"Serv."* > *"Volume conversion"* > *"per measuring period"*.

Display	Description
K.MPc Ø	Mean value K of current meas. period
K.MP Ø	Mean value K of last meas. period
C.MPc Ø	Mean value C of current meas. period
C.MP Ø	Mean value C of last meas. Period
MPer	Measuring period

- To display the measured values relating to the measurement period, move the cursor to *"Serv."* > *"Measured values"* > *"per measuring period"*.

Display	Description
T.MPc Ø	Temperature mean value of current meas. period
T.MP Ø	Temperature mean value of last meas. period
p.MPc Ø	Pressure mean value of current meas. period
p.MP Ø	Pressure mean value of last meas. Period
MPer	Measuring period

9.1.5 Remainder of the measurement period

The remainder of the ongoing measurement period is displayed on the device. In this case, move the cursor to *"Serv."* > *"Archives"* > *"MP.Re"*.

9.1.6 Freeze metering period archive

This function can be used to store a data row in the measurement period archive.

- Open the administrator lock as described in the ⇒ EK280 Operating Instructions [1].
- Move the cursor to *"Serv."* > *"Archives"* > *"FrMP"*.
- Press the ENTER key. ⇒ *"0"* flashes.
- Change the value using the arrow keys ▲ or ▼ to *"1"*.
- Press the ENTER key to confirm the set value. It is possible to abort the entry by pressing the ESC key.

⁴⁷ This value is only displayed when the *"Menu option 1: With energy"* is set. Use enSuite *Parameters* > *Device settings* > *Display* > *Menu options*.

On the basis of the event "Ev" stored as a triggering event the data row indicates whether it was stored automatically due to the elapsed measurement period or by triggering the *"FrMP"*.

9.1.7 Delete measurement period archive

⇒ section [2.4.2 Clear volumes and archives \("Clr.V"\)](#) or [2.4.3 Clear archives \("Clr.A"\)](#)

9.2 Daily archive

In the daily archive meter readings and measured values are archived in regular daily period *"DayB"*.

The content of the daily archive can be shown on the display of the device via the path *"Serv." > "Archives" > "Daily Archive"*.



The daily archive period archive is a flexible archive.

Archive contents and the memory capacity can be adapted with corresponding settings via parameterization software enSuite when the administrator lock is open.

Our applications team is available if you require further information.

9.2.1 Archive content

Pos.	Address	Display	Description	Retrievable D = via Display I = via Interface
1	01:01F8	GONo	Global Block number	I
2	07:0A20	ABNo	Archive Block number	D + I
3	01:0400	Time	Date and time	D + I
4	02:0300	Vb	Volume at base conditions	D + I
5	-	Δ Vb	Meter progress Volume at base conditions	D
6	02:0302	VbT	Volume at base conditions total	D + I
7	-	Δ VbT	Meter progress Volume at base conditions total	D
8	04:0300	Vm	Volume at measurement conditions	D + I
9	-	Δ Vm	Meter progress Volume at measurement conditions	D
10	04:0302	VmT	Volume at measurement conditions total ⁴⁸	D + I
11	-	Δ VmT	Meter progress Volume at measurement cond. total	D
12	35:0161	p.MP \emptyset	Pressure mean value of last meas period	D + I
13	34:0161	T.MP \emptyset	Daily mean temperature value	D + I
14	36:0161	K.MP \emptyset	Mean value K of last meas period	D + I
15	37:0161	C.MP \emptyset	Mean value C of last meas period	D + I
16	02:0110	St.2	Instance-Status 2 (incl. Vn)	D + I
17	04:0110	St.4	Instance -Status 4 (incl. Vb)	D + I
18	07:0110	St.7	Instance -Status 7 (incl. p)	D + I
19	06:0110	St.6	Instance -Status 6 (incl. T)	D + I
20	02:0100	StSy	System-Status	D + I
21	03:0A23	ErReg	Error register	D
22	07:0A22	Ev	Event causing data line to be archived	D + I
23	07:0A21	Check	Check sum result („CRC OK“ or „Error“)	D + I

The counter progress compared to the respective previous entry is denoted with a " Δ ". Normally it is a flow (consumption) in this case within a day. This, however, does not apply when an archive row is entered due to a particular event (e.g., setting the clock or a counter, appearance of an important status message). The meter reading flashes with the meter progress to point out this feature to the user (for further information, refer to the instruction manual "usage as a registration device").

9.2.2 Memory capacity

Based on factory settings, the archive contains 600 data rows, which corresponds to a memory capacity of approx. 19 months.



The daily archive is a ring-type memory. If the archive is full then the oldest entries are overwritten.

⁴⁸ When using an encoder then the original operating volume "Vo" (01 240) can also be set.

9.2.3 Changing the day boundary

All values relating to day boundaries can be created with the day boundary which can be set here.

- In order to set the day boundary on the device to another value, open the administrator lock as described in the ⇒ EK280 Operating Instructions [1].
- Move the cursor to *"Serv." > "Archive" > "DayB"*.
- Press the ENTER key. ⇒ One digit of the value flashes.
- Move the cursor with the arrow keys ► or ◀ to the digits and change these with the arrow keys ▲ or ▼.
- Press the ENTER key to confirm the set value. It is possible to abort the entry by pressing the ESC key.

9.2.4 Values relating to day boundaries

- To display the volumes relating to the day boundary, move the cursor to *"Serv." > "Volume" > "per day"*.

Display	Description
VbDyc Δ	Vb Daily interval meter progress of the current month
VbDy Δ	Vb Daily interval meter progress of the previous month
VbDyc↑	Maximum VbDy of current month
VbDy↑	Maximum VbDy of last month
VmDyc Δ	Vm Daily interval meter progress of the current month
VmDy Δ	Vm Daily interval meter progress of the previous month
VmDyc↑	Maximum VmDy of current month
VmDy↑	Maximum VmDy of last month
W.Dyc Δ ⁴⁹	W Daily interval meter progress of the current month
W.Dy Δ ⁴⁹	W Daily interval meter progress of the previous month
W.Dyc↑ ⁴⁹	Maximum W.Dy of current month
W.Dy↑ ⁴⁹	Maximum W.Dy of last month
DayB	Day boundary, indicates the begin of the gas day

The counter progress compared to the respective previous entry is denoted with a "Δ". Normally it is a flow (consumption) in this case within a day. This, however, does not apply when an archive row is entered due to a particular event (e.g., setting the clock or a counter, appearance of an important status message). The meter reading flashes with the meter progress to point out this feature to the user (for further information, refer to the instruction manual "usage as a registration device").

- To display the measured values relating to the day boundary, move the cursor to *"Serv." > "Volume conversion" > "per day"*.

⁴⁹ This value is only displayed when the *"Menu option 1: With energy"* is set. Use enSuite *Parameters > Device settings > Display > Menu options*.

Display	Description
K.Dyc Ø	Mean value K of current day
K.DyØ	Mean value K of last day
C.Dyc Ø	Mean value C of current day
C.Dy Ø	Mean value C of last day
DayB	Day boundary, indicates the begin of the gas day

- To display the measured values relating to the day boundary, move the cursor to *"Serv."* > *"Measured values"* > *"per day"*.

Display	Description
T.Dyc Ø	Mean value Temperature of current day
T.Dy Ø	Mean value Temperature of last day
p.Dyc Ø	Mean value p of current day
p.Dy Ø	Mean value p of last day
DayB	Day boundary, indicates the begin of the gas day

9.2.5 Time elapsed since the day boundary

The time elapsed since the day boundary was last exceeded is displayed on the device. In this case, move the cursor to *"Serv."* > *"Archives"* > *"TmDBy"*.

9.2.6 Deleting the daily archive

⇒ section 2.4.2 Clear volumes and archives (*"Clr.V"*) or. 2.4.3 Clear archives (*"Clr.A"*)

9.3 Monthly archive 1 (Monthly meter readings)

In monthly archive 1 meter readings and maximum consumption figures are archived on a monthly basis based on the month boundary (= day boundary on the first day of each month) of the previous months.

The content of monthly archive 1 can be shown on the display of the device via the path *"Serv."* > *"Archives"* > *"Monthly Archive 1"*.



Monthly archive 1 is a flexible archive.

Archive contents and the memory capacity can be adapted with corresponding settings via parameterization software enSuite when the administrator lock is open.

Our applications team is available if you require further information.

9.3.1 Archive content

Pos.	Address	Display	Description	Retrievable D = via Display I = via Interface
1	01:01F8	GONo	Global Block number	I
2	01:0A20	ABNo	Archive Block number	D + I
3	01:0400	Time	Date and time	D + I
4	02:0300	Vb	Volume at base conditions	D + I
5	02:0302	VbT	Volume at base conditions total	D + I
6	03:0161	VbMP↑	Maximum VbMP of last month	D + I
7	03:0165	Time	Date and time of Vb.MP	D + I
8	03:0169	Stat	Status of Vb.MP	D + I
9	04:0161	VbDy↑	Maximum VbDy of last month	D + I
10	04:0165	Time	Date and time of VbDy	D + I
11	04:0169	Stat	Status of VbDy	D + I
12	04:0300	Vm	Volume at measurement conditions	D + I
13	04:0302	VmT	Volume at measurement conditions total ⁵⁰	D + I
14	10:0161	VmMP↑	Maximum VmMP of last month	D + I
15	10:0165	Time	Date and time of VmMP	D + I
16	10:0169	Stat	Status of VmMP	D + I
17	11:0161	VmDy↑	Maximum VmDy of last month	D + I
18	11:0165	Time	Date and time of VmDy	D + I
19	11:0169	Stat	Status of VmDy	D + I
20	02:0110	St.2	Instance-Status 2 (incl. Vn)	D + I
21	04:0110	St.4	Instance -Status 4 (incl. Vb)	D + I
22	03:0A23	ErReg	Error register	D
23	01:0A21	Check	Check sum result („CRC OK“ or „Error“)	D + I

9.3.2 Memory capacity

Based on factory settings, the archive contains 24 data rows, which corresponds to a memory capacity of approx. 2 years.



Monthly archive 1 is a ring-type memory. If the archive is full then the oldest entries are overwritten.

⁵⁰ When using an encoder then the original operating volume "Vo" (01:240) can also be set.

9.3.3 Changing the month boundary (= day boundary)

See ⇒ section [9.2.3](#)

9.3.4 Values relating to months

9.3.4.1 In the current month

- To display the volumes relating to the month boundary, move the cursor to *"Serv."* > *"Volume"* > *"current month"*.

Display	Description
VbMPc↑	Maximum VbMP of current month
VbDyc↑	Maximum VbDy of current month
VbMoc Δ	Vb Monthly interval meter progress of the current month
VmMPc↑	Maximum VmMP of current month
VmDyc↑	Maximum VmDy of current month
VmMoc Δ	Vm Monthly interval meter progress of the current month
W.MPc↑ ⁵¹	Maximum W.MP of current month
W.Dyc↑ ⁵¹	Maximum W.Dy of current month

The counter progress compared to the respective previous entry is denoted with a "Δ". Normally it is a flow (consumption) in this case within a day. This, however, does not apply when an archive row is entered due to a particular event (e.g., setting the clock or a counter, appearance of an important status message). The meter reading flashes with the meter progress to point out this feature to the user (for further information, refer to the instruction manual "usage as a registration device").

9.3.4.2 In the previous month

- To display the volumes relating to the month boundary, move the cursor to *"Serv."* > *"Volume"* > *"previous month"*.

Display	Description
VbMP↑	Maximum VbMP of last month
VbDy↑	Maximum VbDy of last month
VbMo Δ	Vb Monthly interval meter progress of the previous month
VmMP↑	Maximum VmMP of last month
VmDy↑	Maximum VmDy of last month
VmMo Δ	Vm Monthly interval meter progress of the previous month
W.MP↑	Maximum W.MP of last month
W.Dy↑	Maximum W.Dy of last month

⁵¹ This value is only displayed when the *"Menu option 1: With energy"* is set. Use enSuite *Parameters > Device settings > Display > Menu options*.

The counter progress compared to the respective previous entry is denoted with a "Δ". Normally it is a flow (consumption) in this case within a day. This, however, does not apply when an archive row is entered due to a particular event (e.g., setting the clock or a counter, appearance of an important status message). The meter reading flashes with the meter progress to point out this feature to the user (for further information, refer to the instruction manual "usage as a registration device").

9.3.5 Delete monthly archive 1

⇒ section 2.4.2 Clear volumes and archives ("Clr.V") or 2.4.3 Clear archives ("Clr.A")

9.4 Monthly archive 2 (Measured values)

In monthly archive 2 maximum, minimum and occasionally median values for Qb, Qm, p, T the previous months are archived on a monthly basis based on the month boundary (= day boundary on the first day of each month).

The content of monthly archive 2 can be shown on the display of the device via the path **"Serv." > "Archives" > "Monthly Archive 2"**.



Monthly archive 2 is a flexible archive.

Archive contents and the memory capacity can be adapted with corresponding settings via parameterization software enSuite when the administrator lock is open.

Our applications team is available if you require further information.

9.4.1 Archive content

Pos.	Address	Display	Description	Retrievable D = via Display I = via Interface
1	01:01F8	GONo	Global Block number	I
2	02:0A20	ABNo	Archive Block number	D + I
3	01:0400	Time	Date and time	D + I
4	05:0161	Qb↑	Maximum Qb of last month	D + I
5	05:0165	Time	Date and time of Qb↑	D + I
6	05:0169	Stat	Status of Qb↑	D + I
7	06:0161	Qb	Minimum Qb of last month	D + I
8	06:0165	Time	Date and time of Qb	D + I
9	06:0169	Stat	Status of Qb	D + I
10	12:0161	Qm↑	Maximum Qm of last month	D + I
11	12:0165	Time	Date and time of Qm↑	D + I
12	12:0169	Stat	Status of Qm↑	D + I
13	13:0161	Qm	Minimum Qm of last month	D + I
14	13:0165	Time	Date and time of Qm	D + I
15	13:0169	Stat	Status of Qm	D + I
16	20:0161	p.MoØ	Mean value p of last month	D + I
17	21:0161	p.Mo↑	Maximum p of last month	D + I
18	21:0165	Time	Date and time of p.Mo↑	D + I
19	21:0169	Stat	Status of p.Mo↑	D + I

Pos.	Address	Display	Description	Retrievable D = via Display I = via Interface
20	22:0161	p.Mo	Minimum p of last month	D + I
21	22:0165	Time	Date and time of p.Mo	D + I
22	22:0169	Stat	Status of p.Mo	D + I
23	16:0161	T.MoØ	Mean value T of last month	D + I
24	17:0161	T.Mo↑	Maximum T of last month	D + I
25	17:0165	Time	Date and time of T.Mo↑	D + I
26	17:0169	Stat	Status of T.Mo↑	D + I
27	18:0161	T.Mon	Minimum T of last month	D + I
28	18:0165	Time	Date and time of T.Mo	D + I
29	18:0169	Stat	Status of T.Mo	D + I
30	24:0161	K.MoØ	Mean value K of last month	D + I
31	26:0161	C.MoØ	Mean value C of last month	D + I
32	07:0110	St.7	Instance -Status 7 (incl. p)	D + I
33	06:0110	St.6	Instance -Status 6 (incl. T)	D + I
34	08:0110	St.8	Instance -Status 8 (incl. K)	D + I
35	05:0110	St.5	Instance -Status 5 (incl. C)	D + I
22	03:0A23	ErReg	Error register	D
36	02:0A21	Check	Check sum result („CRC OK“ or „Error“)	D + I

9.4.2 Memory capacity

Based on factory settings, the archive contains 24 data rows, which corresponds to a memory capacity of approx. 2 years.



Monthly archive 2 is a ring-type memory. If the archive is full then the oldest entries are overwritten.

9.4.3 Changing the month boundary (= day boundary)

See ⇒ section [9.2.3](#)

9.4.4 Values relating to months

9.4.4.1 In the current month

- To display the measured values relating to the day boundary, move the cursor to **"Serv."** > **"Volume conversion"** > **"current month"**.

Display	Description
K.Moc Ø	Mean value K of current month
C.Moc Ø	Mean value C of current month
Qb_c↑	Maximum Qb of current month
Qm_c↑	Maximum Qm of current month

- To display the measured values relating to the month boundary, move the cursor to *"Serv." > "Measured values" > "current month"*.

Display	Description
T.Moc Ø	Mean value T of current month
T.Moc↑	Maximum T of current month
T.Moc↓	Minimum T of current month
p.Moc Ø	Mean value p of current month
p.Moc↑	Maximum p of current month
p.Moc↓	Minimum p of current month

9.4.4.2 In the previous month

- To display the measured values relating to the month boundary, move the cursor to *"Serv." > "Volume conversion" > "previous month"*.

Display	Description
K.Mo Ø	Mean value K of last month
C.Mo Ø	Mean value C of last month
Qb↑	Maximum Qb of last month
Qm↑	Maximum Qm of last month
DayB	Day boundary, indicates the begin of the gas day

- To display the measured values relating to the month boundary, move the cursor to *"Serv." > "Measured values" > "previous month"*.

Display	Description
T.Mo Ø	Mean value T of last month
T.Mo↑	Maximum T of last month
T.Mo↓	Minimum T of last month
p.Mo Ø	Mean value p of last month
p.Mo↑	Maximum p of last month
p.Mo↓	Minimum p of last month
DayB	Day boundary, indicates the begin of the gas day

9.4.5 Delete monthly archive 2

⇒ section [2.4.2 Clear volumes and archives \("Clr.V"\)](#) or [2.4.3 Clear archives \("Clr.A"\)](#)

9.5 Manual (Events manual)

Status changes are archived in the manual.

The content of the manual can be shown on the display of the device via the path ["Serv." > "Archives" > "Logbook"](#).



The manual is not a flexible archive.

9.5.1 Archive content

Pos.	Address	Display	Description	Retrievable D = via Display I = via Interface
1	01:01F8	GONo	Global Block number	I
2	04:0A20	ABNo	Archive Block number	D + I
3	01:0400	Time	Date and time	D + I
4	04:0A22	Ev	Event causing data line to be archived	D + I
5	04:0A21	Check	Check sum (CRC)	D + I

9.5.2 Memory capacity

The archive can store the last 500 status changes.



The manual is a ring-type memory. If the archive is full then the oldest entries are overwritten.

9.5.3 Deleting the manual

⇒ section [2.4.2 Clear volumes and archives \("Clr.V"\)](#)

9.6 Modifications archive (audit trail)

Changes to settings (parameterization) is archived in the audit trail.

The content of the audit trail can be shown on the display of the device via the path ["Serv." > "Archives" > "Audit Trail"](#).



The modifications archive is not a flexible archive.

9.6.1 Archive content

Pos.	Address	Display	Description	Retrievable D = via Display I = via Interface
1	01:01F8	GONo	Global Block number	I
2	05:0A20	ABNo	Archive Block number	D + I
3	01:0400	Time	Date and time	D + I
4	05:0810	Addr	Address	D + I
5	05:0811	old	old value	D + I
6	05:0812	new	new value	D + I
7	01:0170	St.PL	Status of calibration lock	D + I
8	02:0170	St.ML	Status of manufacturer lock	D + I
9	03:0170	St.AL	Status of administrator lock	D + I
10	04:0170	St.CL	Status of customer lock	D + I
11	05:0A21	Check	Check sum result („CRC OK“ or „Error“)	D + I

9.6.2 Memory capacity

The archive can store the last 200 settings changes (parametrization).



The modification archive is a ring-type memory. If the archive is full then the oldest entries are overwritten.

9.6.3 Deleting the modification archive

⇒ section [2.4.2 Clear volumes and archives \("Clr.V"\)](#)

9.7 Updates archive

Attempted or completed updates of the device software are archived in the updates archive via an interface.

The content of the update archive can be shown on the display of the device via the path ["Serv." > "Archives" > "Update archive"](#).



The update archive is not a flexible archive.

9.7.1 Archive content

Pos.	Address	Display	Description	Retrievable D = via Display I = via Interface
1	01:01F8	GONo	Global Block number	I
2	08:0A20	ABNo	Archive Block number	D + I
3	01:0400	Time	Date and time	D + I
4	02:0197	NVers	New firmware version	D + I
5	01:0198_1	SigRL	Firmware signature part 'R', low part	D + I
6	01:0198_2	SigRH	Firmware signature part 'R', high part	D + I
7	02:0198_1	SigSL	Firmware signature part 'S', low part	D + I
8	02:0198_2	SigSH	Firmware signature part 'S', high part	D + I
9	08:0811	User	User who started the firmware update	D + I
10	08:0812	Reslt	Result entries of the software updates	D + I
11	08:0A21	Check	Check sum result („CRC OK“ or „Error“)	D + I

9.7.2 Memory capacity

The archive can store the last 20 updates or update attempts on the device software.



*The updates archive is not a ring-type memory.
If the archive is full, then the archive must be deleted in order to carry out further updates or to attempt to do so (⇒ section 9.7.3).*

9.7.3 Delete updates archive



The update archive is also deleted via the function "ClrV" (⇒ section 2.4.2 Clear volumes and archives ("Clr.V")).

- So that the updates archive is deleted from the device, open the calibration lock as described in the ⇒ EK280 Operating Instructions [1].
- Move the cursor to *"Serv."* > *"Archives"* > *"ClrUL"*.
- Press the ENTER key. ⇒ "0" flashes.
- Change the value using the arrow keys ▲ or ▼ to *"1"*.
- Press the ENTER key to confirm the set value. It is possible to abort the entry by pressing the ESC key.

9.8 Calibration data log

With the aid of the calibration data log, several parameters which are relevant from a statutory calibration viewpoint (⇒ EK280 Operating Instructions [1]) can be changed when the administrator lock is open.

A data row is entered for each alteration of such a parameter when the calibration lock is closed. In addition, an entry is always made when opening and closing the calibration lock.



The calibration data log is not a flexible archive.

9.8.1 Deactivating the calibration data log

- In order to deactivate the calibration data log on the device, open the calibration lock as described in the ⇒ EK280 Operating Instructions [1].
- Move the cursor to *"Serv."* > *"Archives"* > *"CDL"*.
- Press the ENTER key. ⇒ *"on"* flashes.
- Change the value using the arrow keys ▲ or ▼ to *"off"*.
- Press the ENTER key to confirm the set value. It is possible to abort the entry by pressing the ESC key.



If the calibration data log is deactivated, then the values affected are locked in a calibration lock.

9.8.2 Archive content

Pos.	Address	Display	Description	Retrievable D = via Display I = via Interface
1	01:01F8	GONo	Global Block number	I
2	09:0A20	ABNo	Archive Block number	D + I
3	01:0400	Time	Date and time	D + I
4	09:0810	Add	Address	D + I
5	09:0811	old	old value	D + I
6	09:0812	new	new value	D + I
7	01:0170	St.PL	Status of calibration lock	D + I
8	02:0170	St.ML	Status of manufacturer lock	D + I
9	03:0170	St.AL	Status of administrator lock	D + I
10	04:0170	St.CL	Status of customer lock	D + I
11	05:0170	St.DL	Status of data collectors lock	D + I
12	06:0170	StU6L	Status lock 6	D + I
13	07:0170	StUpL	Status of software update lock	D + I
14	08:0170	StCDL	Status of CDL lock	D + I
15	01:070C	UsOpt	Active Interface: Optical interface	D + I
16	02:070C	UsTrm	Active Interface: Terminal interface	D + I
17	03:070C	UsMod	Active Interface: Internal modem	D + I
18	09:0A21	Check	Check sum result („CRC OK“ or „Error“)	D + I

9.8.3 Memory capacity

The calibration data log contains 50 data rows.

As the first data row always logs the closing of the calibration lock, and the last row is always kept free for the opening of the calibration lock then a maximum of 48 parameter changes can be entered.



*The calibration data log is not a ring-type memory.
If the archive is full, then the archive must be deleted (⇒ section 9.8.4) so that further changes to calibration values can be made when the administrator lock is open (⇒ EK280 Operating Instructions [1]).*

9.8.4 Deleting the calibration data log



The calibration data log is also deleted via the function "ClrV" (⇒ section 2.4.2 Clear volumes and archives ("Clr.V")).

- In order to delete the calibration data log on the device, open the calibration lock as described in the ⇒ EK280 Operating Instructions [1].
- Move the cursor to "Serv." > "Archives" > "ClrCDL".
- Press the ENTER key. ⇒ "0" flashes.
- Change the value using the arrow keys ▲ or ▼ to "1".
- Press the ENTER key to confirm the set value. It is possible to abort the entry by pressing the ESC key.

9.9 User archive

The EK280 has five user archives (archive 11, archive 12, archive 13, archive 14 and archive 15).

The contents of the user archives can be shown on the display of the device via the path "Serv." > "Archives" > "User archives" > "Archive 11" or "Archive 12" or "Archive 13" or "Archive 14" or "Archive 15".



*User archives are flexible archives.
Archive contents and the memory capacity can be adapted with corresponding settings via parameterization software enSuite when the administrator lock is open.
Our applications team is available if you require further information.*

9.9.1 Archive content



*The establishment of a user archive is preconfigured with factory settings and can be adapted with corresponding settings files via parameterization software enSuite when the administrator lock is open.
Our applications team is available if you require further information.*

9.9.2 Memory capacity



*The memory capacity of a user archive is preconfigured with factory settings and can be adapted with corresponding settings files via parameterization software enSuite when the administrator lock is open.
Our applications team is available if you require further information.*



The user archives are ring-type memories. If the archives are full then the oldest entries are overwritten.

9.9.3 Delete user archive

⇒ section 2.4.2 Clear volumes and archives ("Clr.V") or 2.4.3 Clear archives ("Clr.A")

10 Status messages

The EK280 gives two types of status information: Momentary status "*Stat*" (also referred to as "status") and status register "*SReg*". These are located on the "*Admin*." and "*Serv.*" display tabs under "*Status*".

Messages in the "*Stat*" momentary status indicate current conditions such as pending errors. As soon as the condition is no longer present, the relevant message is removed from the momentary status.

Alarms, warnings and remarks are displayed in the momentary statuses (i.e., messages with numbers in the range of "1" to "16")

All messages since the last manual clear are collected in status register "*SReg*". Here you can see, which messages have been generated since the last station inspection or data retrieval. Status register messages can be cleared by the user.

Only alarms and warnings are displayed in the status register (i.e., messages with numbers in the range "1" to "8"). Remarks are not stored as they communicate events which do not cause disruption or are not persistently relevant (i.e., "summertime", "calibration lock open" or "data transfer in progress").

S.Reg and *Stat* are summaries of multiple status values. *They* initially display all available messages as numbers.

Pressing <ENTER> allows you to see these individually as short texts: The most important message (with the lowest number) is displayed first. Using the ► and ◀ keys you can move to the next or preceding message.

The display shows the name of the relevant status word and the message number with preceding "#" in front of the short text. This information can be useful for entering a "status point" for the outputs.

10.1 Clearing messages in the status register

The messages in *SReg* (not *Stat*) can be cleared using the *Clr* command, or with the context menu command "*Clear Status R.*" (⇒ section 2.3.3, p. 16).

- In order to delete the status register with the function "*Clr*" on the device, open the administration lock as described in the ⇒ EK280 Operating Instructions [1].
- Move the cursor to "*Serv.*" > "*Status*" > "*Clr*".
- Press the ENTER key. ⇒ "0" flashes.
- Change the value using the arrow keys ▲ or ▼ to "1".
- Press the ENTER key to confirm the set value. It is possible to abort the entry by pressing the ESC key.

10.2 List of status messages

Message	Status	Name	Description, Procedure
a) Alarms, faults			
1	StSy	Restart	If this message appears whilst in operation, the device is faulty. ⇒ Contact the Honeywell Technical Assistance Center.
1	StSy 2	Data error	An error was detected during the cyclic check of the data subject to calibration regulations. ⇒ Contact the Honeywell Technical Assistance Center.
1	St.4	Vm-Alarm	No volume was recorded at the used input for conversion. (Automatic switching to a second pulse generator as described in ⇒ section 4.4 is not configured).
1	St.5	C-fact. err.	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.
1	St.6	T Alarm Lim.	The gas temperature measured is outside acceptable limits. The limit values can be changed when putting the device into operation in the presence of a calibration officer (⇒ Operating Instructions [1]).
1	St.7	p Alarm Lim.	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 (⇒ Operating Instructions [1]).
1	St.8	K-val. error	The compressibility ratio factor could not be calculated as no valid real gas factor could be determined.
1	St.9	z-fact. err.	The real gas factor could not be calculated. At least one of the gas analysis values Ho.n, CO ₂ , H ₂ , rhon, is outside the permissible range.
2	St.4	Vm Inp. error	No volume at measurement conditions was recorded at the connected encoder on input 1 for 40 seconds (with external power supply) or for one measurement cycle + 1 second (battery powered).
2	St.5	T Inp. error	The gas temperature cannot be measured due to a fault. ⇒ Contact the Honeywell Technical Assistance Center.
2	St.6	p Inp. error	The gas pressure cannot be measured due to a fault. ⇒ Contact the Honeywell Technical Assistance Center.

Message	Status	Name	Description, Procedure
b) Warnings			
3	StSy	Dat.restaur.	<p>E 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 is available.</p> <p>This message appears when the battery is changed, and the old batteries are removed before the new ones are connected. (⇒ Operating Instructions [1]).</p> <p>Proceed with the help of the parameterization software enSuite:</p> <ul style="list-style-type: none"> – Set the time of the EK280. – Clear the status register <p>Delete the status register</p>
3	St.4	Vm warning	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.
4	St.1	Outp.1 Error	<p>There should be more pulses being emitted from the specified output than are permitted under its configured settings.</p> <p>In order to eliminate the cause of the problem, you can use the parameterization software enSuite to either:</p> <ul style="list-style-type: none"> – reduce the cp value of the output, or – increase the output frequency. <p>In both cases, the change must be aligned with the connected device.</p>
4	St.2	Outp.2 Error	
4	St.3	Outp.3 Error	
4	St.4	Outp.4 Error	
5	St.1	I1-Warning	The encoder could not be read at the end of the measurement period. The flow recording at this point is invalid.
5	St.2	I2 Pulse cmp	In the pulse comparison, e.g., between input 1 and input 2, the deviation was too high (⇒ section 4.4).
6	St.1	W Warn Lim.	<p>The displayed value is outside the set warning limit values.</p> <p>The warning limits can be adjusted using the parameterization software enSuite.</p>
6	St.2	Vb Warn Lim.	<p>The monitored standard volume consumption value (default: hourly consumption) is outside the set warning thresholds.</p> <p>The monitored values and the warning limits can be adjusted using the parameterization program enSuite.</p>
6	St.4	Qm Warn Lim.	<p>The actual flow rate (gas flow rate) is outside the set warning limit values.</p> <p>The warning limits can be adjusted using the parameterization program enSuite.</p>
6	St.6	T Warn Lim.	<p>The measured gas temperature is outside the set warning limit values.</p> <p>The warning limits can be adjusted using the parameterization program enSuite.</p>
6	St.7	p Warn Lim..	<p>The measured gas pressure is outside the set warning limit values.</p> <p>The warning limits can be adjusted using the parameterization program enSuite.</p>

Message	Status	Name	Description, Procedure
6	St.9	z Warning	The sum of the gas analysis values for AGA-8 DC92 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.
7	StSy	Softw. error	This message is used for factory diagnosis. Please contact Honeywell Technical Assistance Center.
7	StSy 2	Update error	Before the software update, an error was detected in the cached software image.
8	StSy	Sett. error	The programming of the device has generated an unusable combination of settings. ⇒ Contact the Honeywell Technical Assistance Center.
8	St.1	I1 Warn.sig.	When an input is configured as a warning input, if an active signal is present on the relevant terminal (i.e., terminal DE2) this message is displayed. The input configuration can be adjusted using the parameterization program enSuite.
8	St.2	I2 Warn.sig.	
8	St.3	I3 Warn.sig.	
8	St.4	I4 Warn.sig.	
8	St.9	I5 Warn.sig.	
8	St.10	I6 Warn.sig.	
8	St.6	T2 Warn Lim.	The measured gas temperature of the second sensor is outside the set warning limit values. The warning limits can be adjusted using the parameterization program enSuite.
8	St.7	p2 Warn Lim.	The measured gas pressure of the second sensor is outside the set warning limit values. The warning limits can be adjusted using the parameterization program enSuite.
9	StSy	Batt. low	The remaining battery power is less than six months. The batteries need to be changed soon.
9	St.3	TA Warn Lim.	The measured ambient temperature is outside the set warning limit values. The warning limits can be adjusted using the parameterization program enSuite.
c) Remarks			
10	StSy	Repair mode	The device is in revision mode.
11	StSy	Clock n. set	The internal clock of the volume corrector has not been adjusted at the factory.
11	StSy 2	U.Logb. full	The software update log is full. An update is only possible if the content of the software update log has been deleted.
11	St.1	Encoder err.	No volume at measurement conditions was recorded at the connected encoder on input 1 for 20 seconds (with external power supply) or for one measurement cycle +1 second (battery powered).

Message	Status	Name	Description, Procedure
12	StSy	CDL full	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.
13	StSy	online	Data is currently being transmitted via an interface (modem, optical interface or terminal interface). If this message is displayed, the "o" will flash in the "Status" field of the display.
13	St.1	I1 Warn.sig.	When an input is configured as an information input, if an active signal is present on the relevant terminal (i.e., terminal DE2) this message is displayed. The input configuration can be adjusted using the parameterization program enSuite.
13	St.2	I2 Warn.sig.	
13	St.3	I3 Warn.sig.	
13	St.4	I4 Warn.sig.	
13	St.9	I5 Warn.sig.	
13	St.10	I6 Warn.sig.	
14	St.1	Cal.lock o.	The calibration lock is open. In normal operating conditions, the calibration lock should be closed to prevent unauthorized changes. To close the calibration lock, please go to " <i>Ctrl.</i> " → " <i>St.PL</i> " and enter the value "0".
14	St.3	Admin.lock	The administrator lock is open.
14	St.4	Cust.lock	The customer lock is open.
15	StSy	Bat. operat.	The EK280 is in battery mode. This signal is primarily used to inform a remote data transmission system that the batteries run down more quickly during long periods of data transmission.
16	StSy	Dayl.Sav.Tim	The time displayed in volume corrector is daylight saving time. The switchover mode can be changed using the parameterization program enSuite.
16	St.1	Call Win.1	The specified call pickup time is active, i.e., the volume corrector will accept data transmission calls.
16	St.2	Call Win.2	
16	St.3	Call Win.3	
16	St.4	Call Win.4	
16	St.5	Call Win.5	
16	St.6	Call Win.6	
16	St.7	call time1	The specified call time is active, i.e., the EK280 makes a data transmission call to the remote terminal.
16	St.8	call time2	

11 Batteries

11.1 Device battery life

To obtain further information on other operation types listed below, please contact our applications team.

11.1.1 Standard operation

In standard operation with no special settings or sensors the CPU battery life depends mainly on the duration and frequency of data transfer.

Example: For a weekly data transfer via the internal modem, which lasts for 15 minutes, battery life is 5 years approx.

Conditions:

Batteries:..... 1 battery pack

Mode input 1: NF pulse input (mode1)

Sensors:..... 1 pressure and 1 temperature sensor

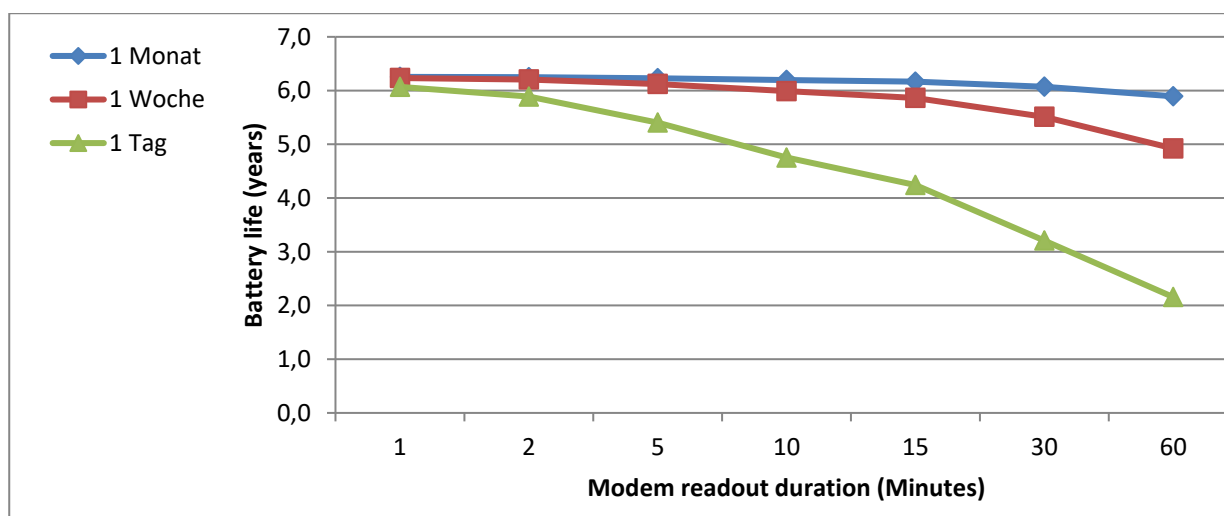
Communication:..... Data transfer via modem with "Ring" signal,
i.e., internal GSM modem or an analog modem connected to terminals

Outputs: Not isolated (no galvanic separation)

Display active:..... 60 minutes per month

Measurement cycle: 30 seconds

Battery life (years)		Modem readout duration (Minutes)						
		1	2	5	10	15	30	60
Modem readout cycle	1 month	6,3	6,2	6,2	6,2	6,2	6,1	5,9
	1 week	6,2	6,2	6,1	6,0	5,9	5,5	4,9
	1 day	6,1	5,9	5,4	4,8	4,2	3,2	2,2



11.1.2 Encoder for volume measurement



When using other parameter settings for the encoder (e.g., timings) in the EK280 then the battery life may become shorter.

Conditions:

Batteries:..... **2 battery packs**

Sensors:..... 1 pressure and 1 temperature sensor

Communication:..... Data transfer via modem with "Ring" signal, i.e., internal GSM modem or an analog modem connected to terminals

Outputs: Not isolated (no galvanic separation)

Display active:..... 60 minutes per month

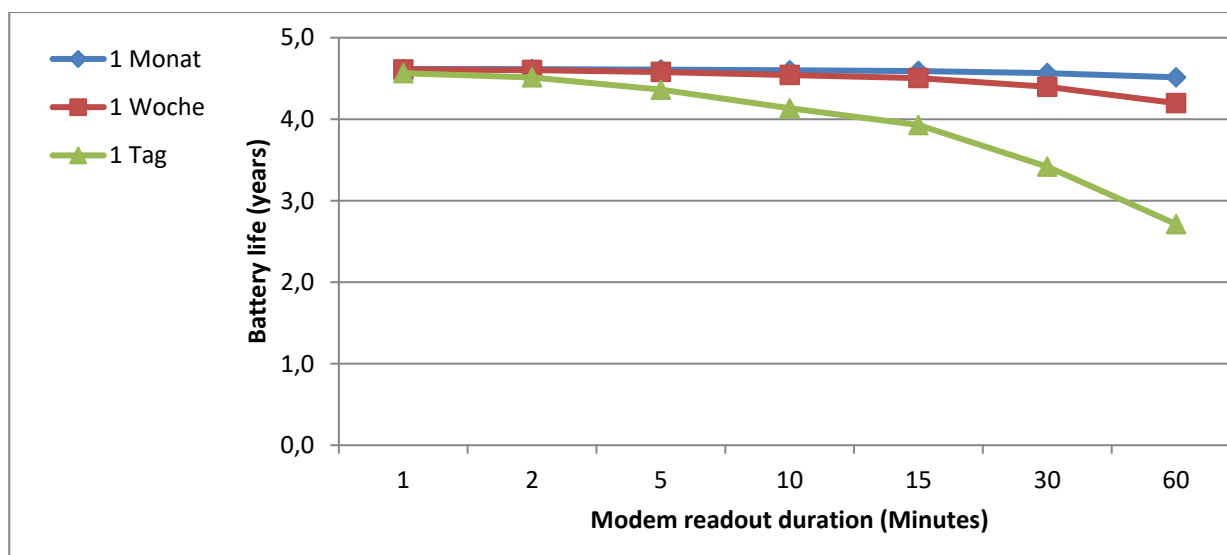
Measurement cycle: 30 seconds

11.1.2.1 Encoder Namur a

Batteries:..... **2 batterie packs**

Mode input 1: Encoder Namur a (Mode 5)

Battery life (years)		Modem readout duration (Minutes)						
		1	2	5	10	15	30	60
Modem readout cycle	1 month	4,6	4,6	4,6	4,6	4,6	4,6	4,5
	1 week	4,6	4,6	4,6	4,5	4,5	4,4	4,2
	1 day	4,6	4,5	4,4	4,1	3,9	3,4	2,7

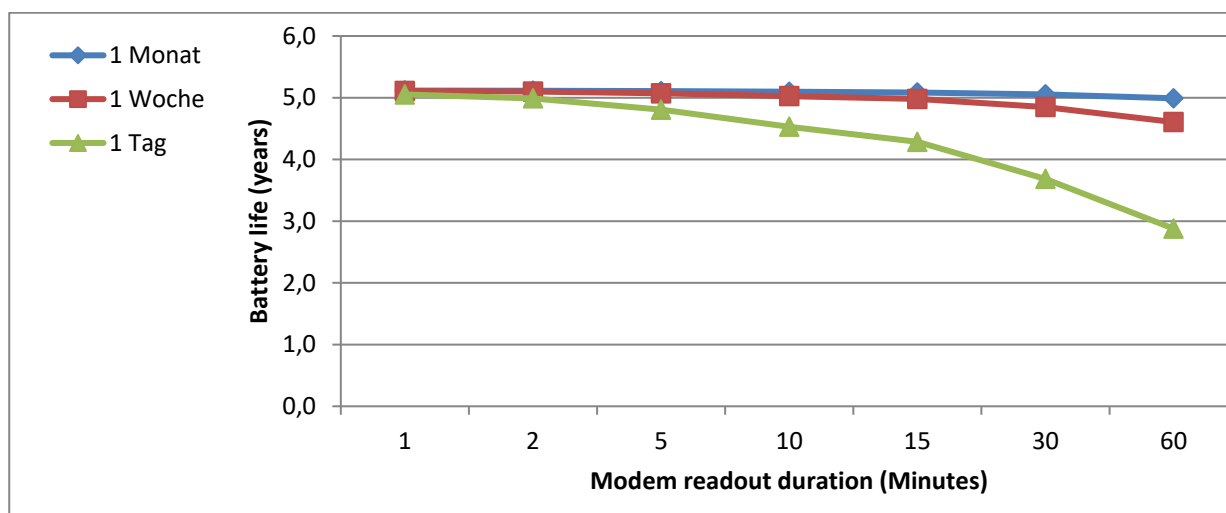


11.1.2.2 Encoder Namur a+b

Batteries:..... **2 batterie packs**

Mode input 1: Encoder Namur a+b (Mode 11)

Battery life (years)		Modem readout duration (Minutes)						
		1	2	5	10	15	30	60
Modem readout cycle	1 month	5,1	5,1	5,1	5,1	5,1	5,1	5,0
	1 week	5,1	5,1	5,1	5,0	5,0	4,8	4,6
	1 day	5,1	5,0	4,8	4,5	4,3	3,7	2,9

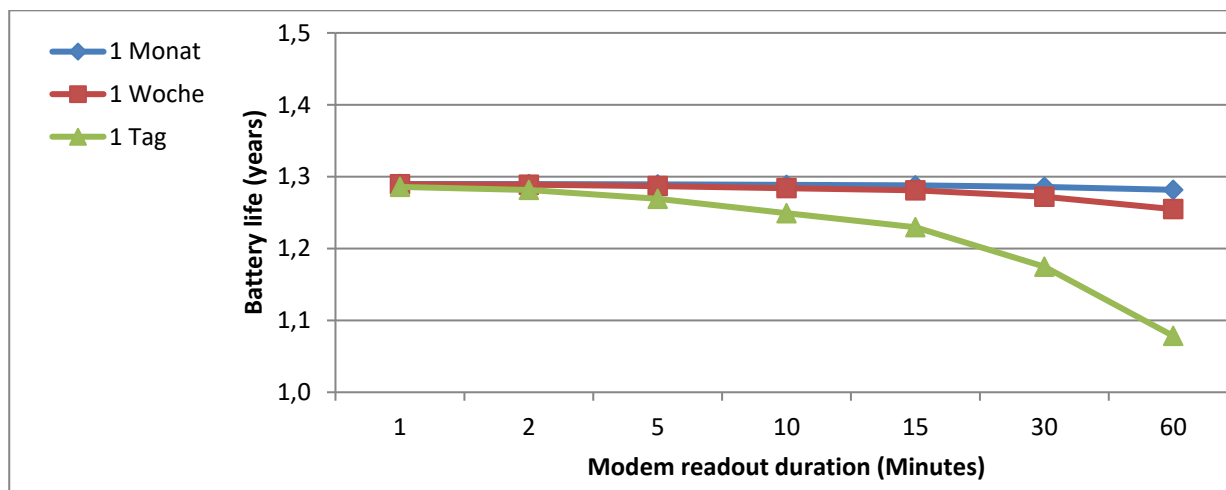


11.1.2.3 SCR OBIS05

Batteries:..... **2 batterie packs**

Mode input 1: Encoder SCR OBIS05 (Mode 8), 300 Bd

Battery life (years)		Modem readout duration (Minutes)						
		1	2	5	10	15	30	60
Modem readout cycle	1 month	1,3	1,3	1,3	1,3	1,3	1,3	1,3
	1 week	1,3	1,3	1,3	1,3	1,3	1,3	1,3
	1 day	1,3	1,3	1,3	1,2	1,2	1,2	1,1



11.1.3 Additional pressure or temperature sensors

Conditions:

Batteries:..... **2 battery packs**

Mode input 1: NF pulse input (mode1)

Communication:..... Data transfer via modem with "Ring" signal,
i.e., internal GSM modem or an analog modem connected to terminals

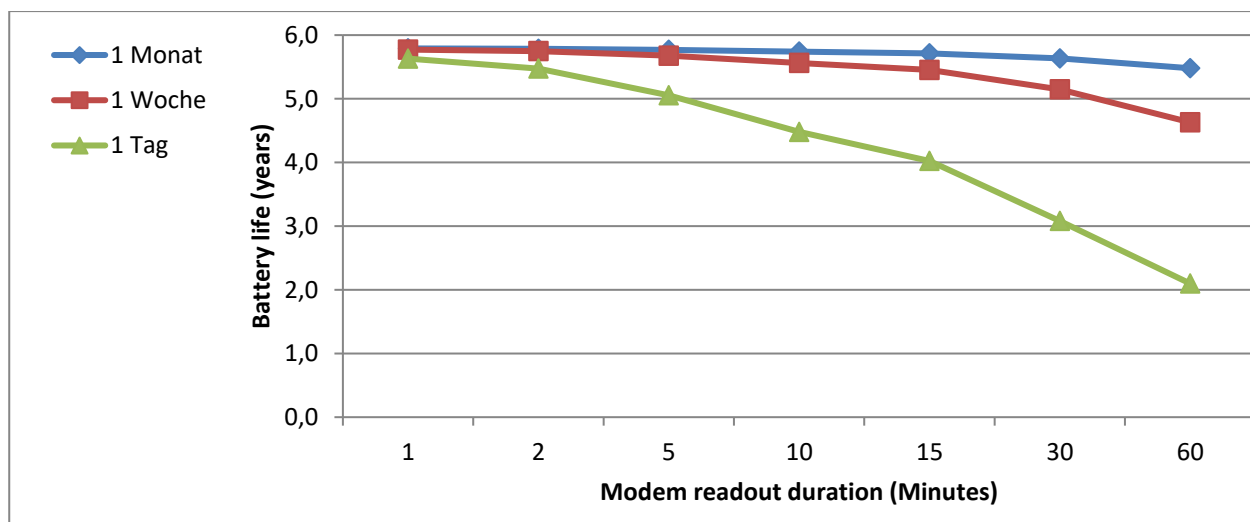
Outputs: Not isolated (no galvanic separation)

Display active:..... 60 minutes per month

Measurement cycle: 30 seconds

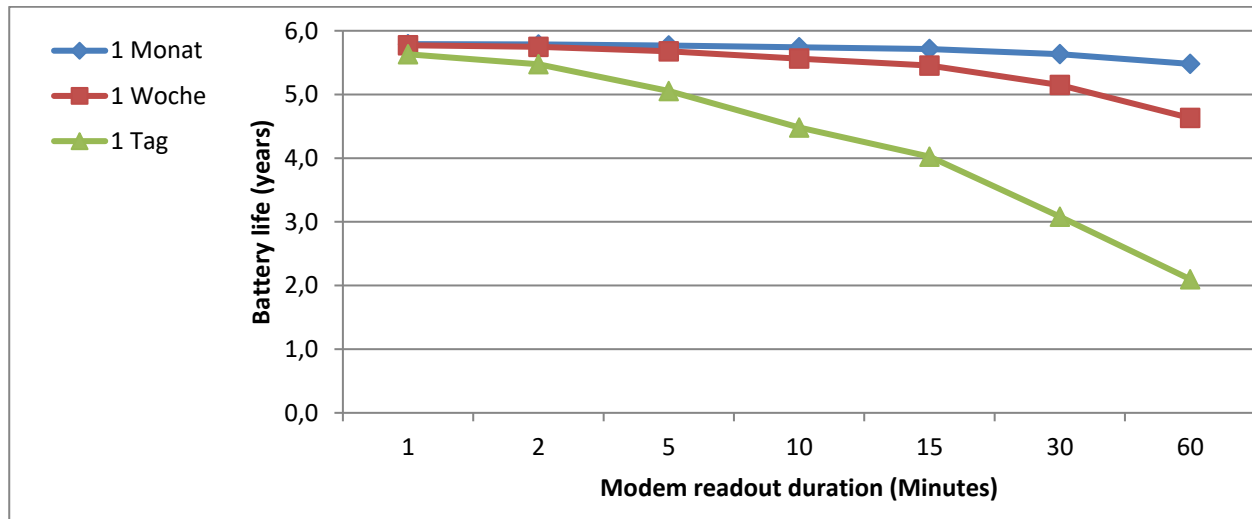
11.1.3.1 2 pressure sensors, 1 temperature sensor

Battery life (years)		Modem readout duration (Minutes)						
		1	2	5	10	15	30	60
Modem readout cycle	1 month	5,8	5,8	5,8	5,7	5,7	5,6	5,5
	1 week	5,8	5,7	5,7	5,6	5,5	5,1	4,6
	1 day	5,6	5,5	5,1	4,5	4,0	3,1	2,1



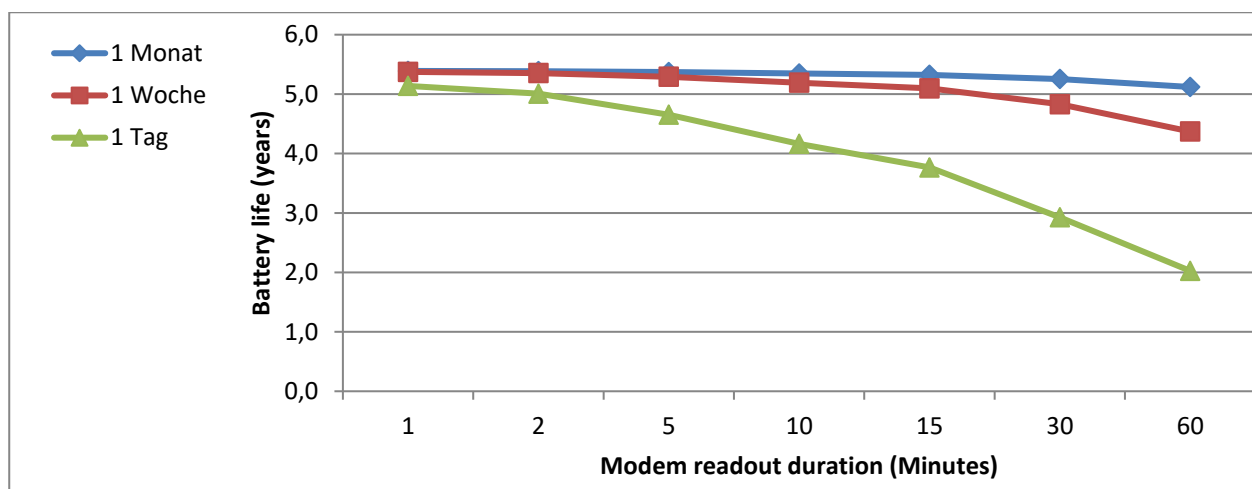
11.1.3.2 2 temperature sensors, 1 pressure sensor

Battery life (years)		Modem readout duration (Minutes)						
		1	2	5	10	15	30	60
Modem readout cycle	1 month	5,8	5,8	5,8	5,7	5,7	5,6	5,5
	1 week	5,8	5,8	5,7	5,6	5,5	5,2	4,6
	1 day	5,6	5,5	5,1	4,5	4,0	3,1	2,1



11.1.3.3 2 temperature sensors, 2 pressure sensors

Battery life (years)		Modem readout duration (Minutes)						
		1	2	5	10	15	30	60
Modem readout cycle	1 month	5,4	5,4	5,4	5,3	5,3	5,3	5,1
	1 week	5,4	5,4	5,3	5,2	5,1	4,8	4,4
	1 day	5,1	5,0	4,7	4,2	3,8	2,9	2,0



11.1.4 Output isolation (galvanic separation)

As described in ⇒ section 6.9, each of the four pulse and message outputs (terminals "DA1" to "DA4") can be isolated (galvanically isolated) from the rest of the EK280 circuitry. Isolation of the outputs decreases the CPU battery life. It is therefore advisable, prior to isolation activation as described in these ⇒ section, to estimate battery life.

Each pulse output via an isolated output requires additional power. The battery life therefore depends on the following factors:

- Number of isolated outputs
- Number of pulses output
- Duration of pulses output

To assess the influence of these factors, in the following some examples of battery life with various combinations of these factors are given.

Since consumption and therefore base and measurement condition volume pulse outputs will vary widely over the course of a year, it is useful to calculate the annual pulse output consumption.

The number of output pulses is moreover inversely proportional to the cp value of the output. To preserve battery life, the chosen cp value of an isolated output should be as low as possible.

Also the adjustable pulse duration of an isolated output should be as low as possible, i.e., only as long as required by the connected device.

The battery capacity required by an isolated output for pulse output is determined by the EK280 and subtracted from the "BatRC" remaining battery life. However, as the EK280 does not know how many pulses are to be output in the future, the predicted remaining battery life "Bat.R" is derived from the remaining battery life and calculated based on a default value.

Conditions:

Batteries:..... 1 battery pack

Mode input 1: NF pulse input (mode1)

Sensors:..... 1 pressure and 1 temperature sensor

Communication:..... Data transfer via modem with "Ring" signal, i.e., internal GSM modem or an analog modem connected to terminals

Readout duration: 60 minutes per month

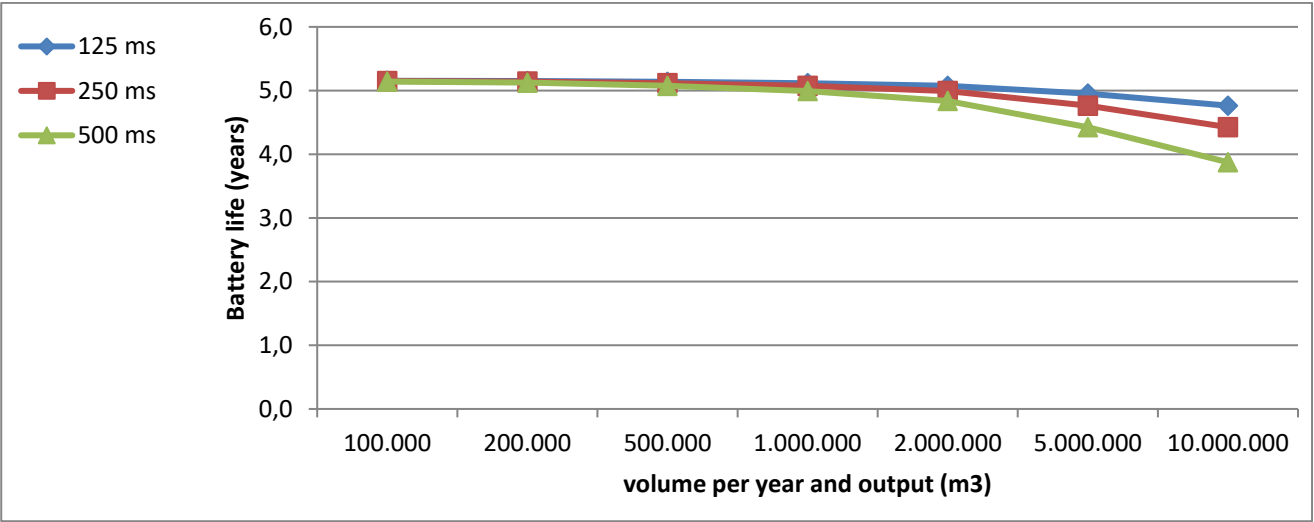
Display active:..... 60 minutes per month

Measurement cycle: 30 seconds

11.1.4.1 One isolated output

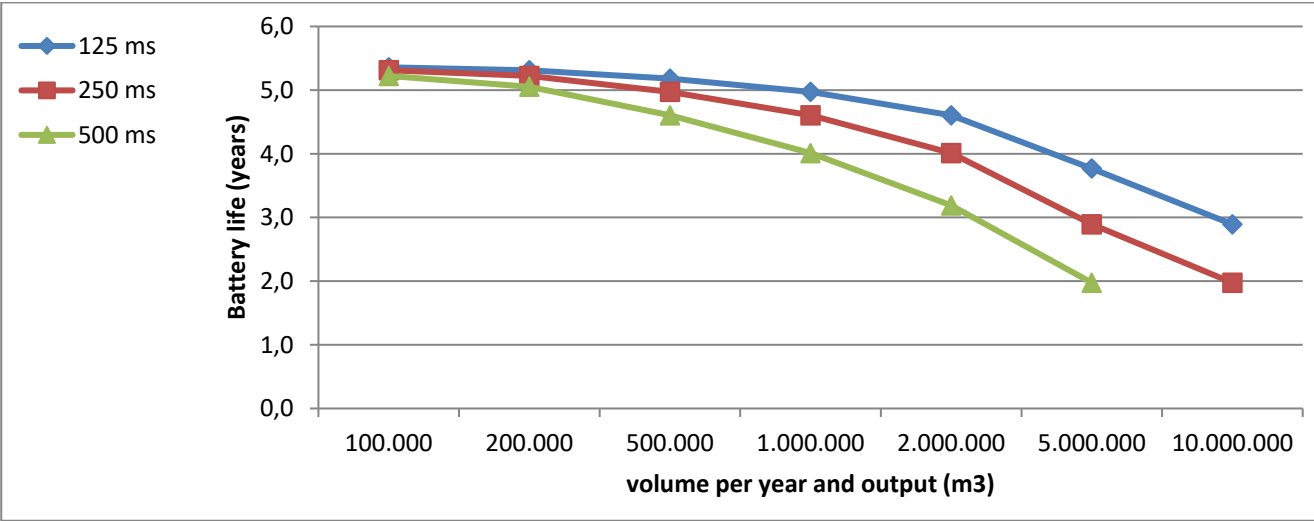
cp value of the output = 1 pulse/m3

Battery life (years)		volume to be output per year (m3)						
		100.000	200.000	500.000	1.000.000	2.000.000	5.000.000	10.000.000
pulse duration (Millisec.)	125 ms	5,2	5,1	5,1	5,1	5,1	5,0	4,8
	250 ms	5,1	5,1	5,1	5,1	5,0	4,8	4,4
	500 ms	5,1	5,1	5,1	5,0	4,8	4,4	3,9



cp value of the output = 10 pulses/m3

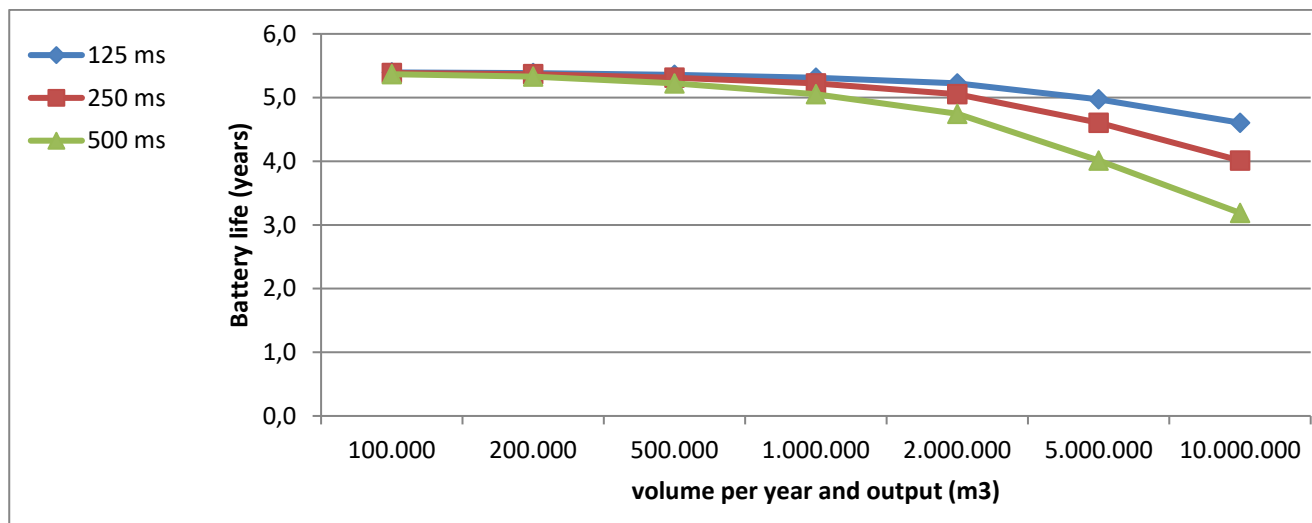
Battery life (years)		volume to be output per year (m3)						
		100.000	200.000	500.000	1.000.000	2.000.000	5.000.000	10.000.000
pulse duration (Millisec.)	125 ms	5,4	5,3	5,2	5,0	4,6	3,8	2,9
	250 ms	5,3	5,2	5,0	4,6	4,0	2,9	2,0
	500 ms	5,2	5,1	4,6	4,0	3,2	2,0	-



11.1.4.2 Two isolated outputs

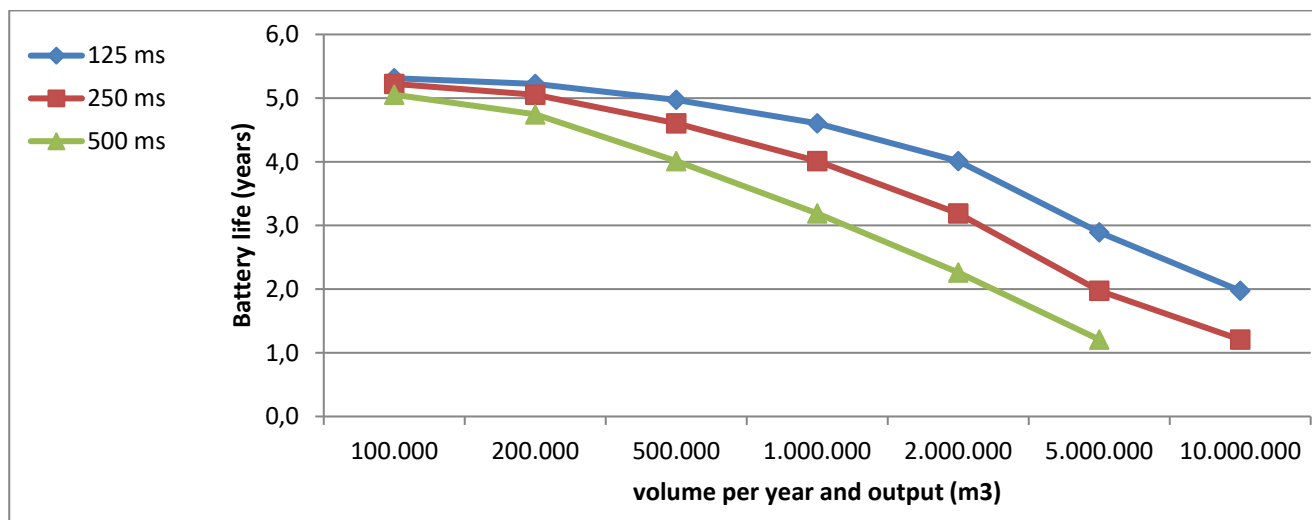
cp value of the outputs = 1 pulse/m³

Battery life (years)		volume to be output per year at each output (m ³)						
		100.000	200.000	500.000	1.000.000	2.000.000	5.000.000	10.000.000
pulse duration (Millisec.)	125 ms	5,4	5,4	5,4	5,3	5,2	5,0	4,6
	250 ms	5,4	5,4	5,3	5,2	5,1	4,6	4,0
	500 ms	5,4	5,3	5,2	5,1	4,7	4,0	3,2



cp value of the outputs = 10 pulses/m³

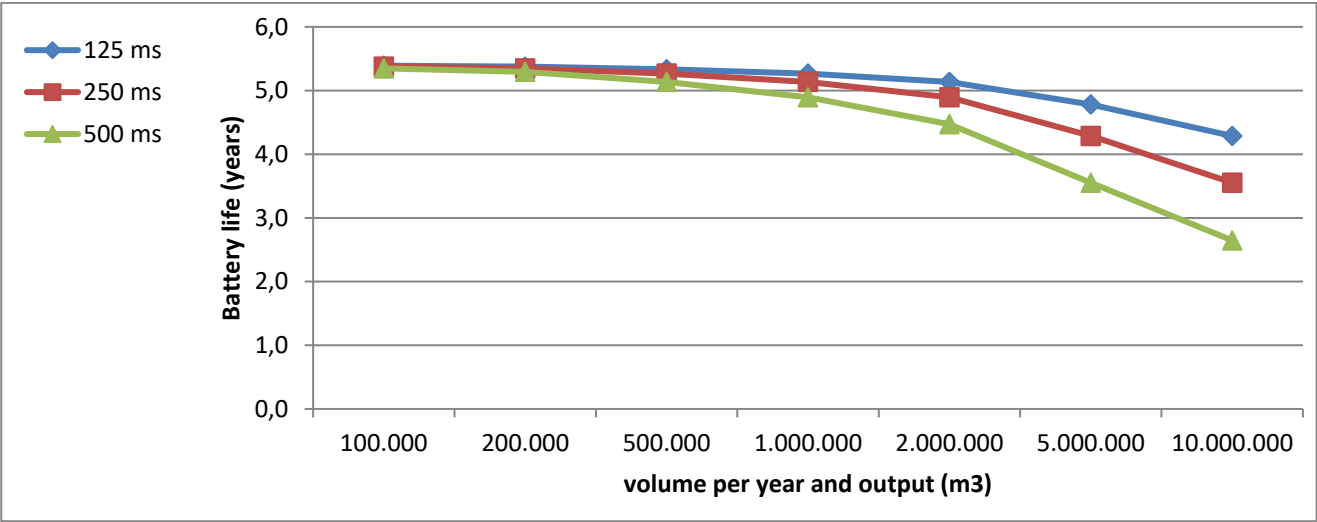
Battery life (years)		volume to be output per year at each output (m ³)						
		100.000	200.000	500.000	1.000.000	2.000.000	5.000.000	10.000.000
pulse duration (Millisec.)	125 ms	5,3	5,2	5,0	4,6	4,0	2,9	2,0
	250 ms	5,2	5,1	4,6	4,0	3,2	2,0	1,2
	500 ms	5,1	4,7	4,0	3,2	2,3	1,2	-



11.1.4.1 Three isolated outputs

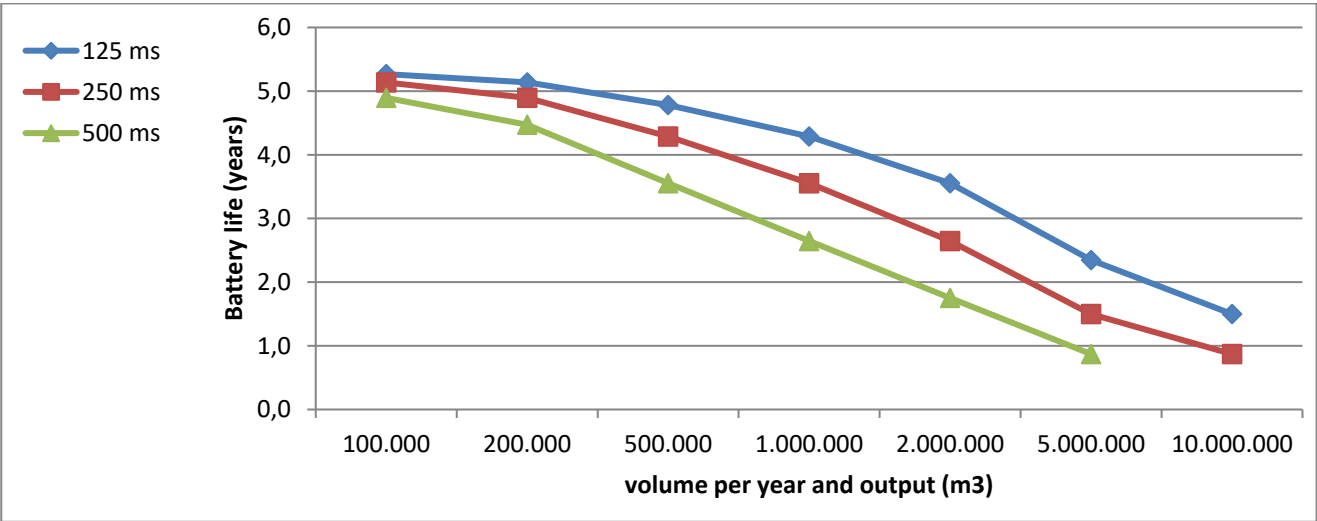
cp value of the outputs = 1 pulse/m3

Battery life (years)		volume to be output per year at each output (m3)						
		100.000	200.000	500.000	1.000.000	2.000.000	5.000.000	10.000.000
pulse duration (Millisec.)	125 ms	5,4	5,4	5,3	5,3	5,1	4,8	4,3
	250 ms	5,4	5,3	5,3	5,1	4,9	4,3	3,6
	500 ms	5,3	5,3	5,1	4,9	4,5	3,6	2,6



cp value of the outputs = 10 pulses/m3

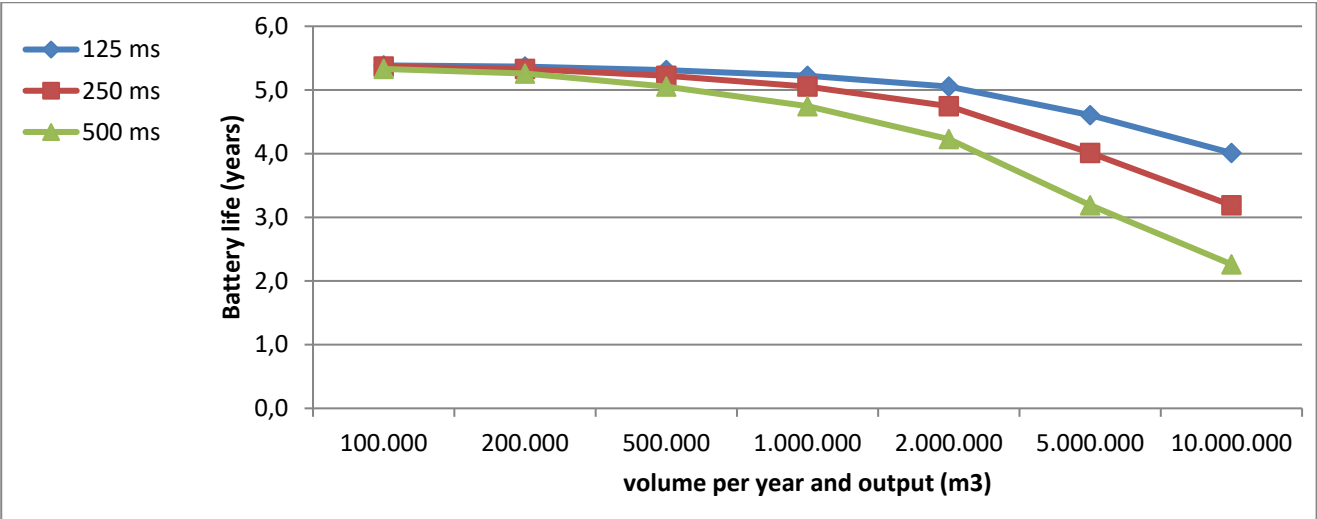
Battery life (years)		volume to be output per year at each output (m3)						
		100.000	200.000	500.000	1.000.000	2.000.000	5.000.000	10.000.000
pulse duration (Millisec.)	125 ms	5,3	5,1	4,8	4,3	3,6	2,3	1,5
	250 ms	5,1	4,9	4,3	3,6	2,6	1,5	0,9
	500 ms	4,9	4,5	3,6	2,6	1,8	0,9	-



11.1.4.1 Four isolated outputs

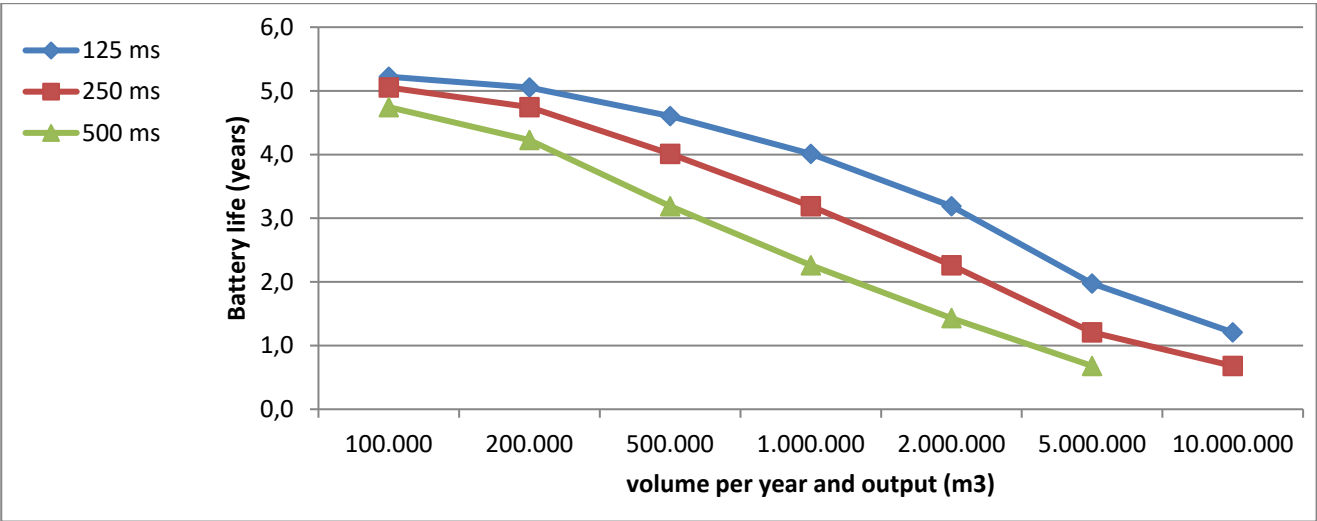
cp value of the outputs = 1 pulse/m3

Battery life (years)		volume to be output per year at each output (m3)						
		100.000	200.000	500.000	1.000.000	2.000.000	5.000.000	10.000.000
pulse duration (Millisec.)	125 ms	5,4	5,4	5,3	5,2	5,1	4,6	4,0
	250 ms	5,4	5,3	5,2	5,1	4,7	4,0	3,2
	500 ms	5,3	5,3	5,1	4,7	4,2	3,2	2,3



cp value of the outputs = 10 pulses/m3

Battery life (years)		volume to be output per year at each output (m3)						
		100.000	200.000	500.000	1.000.000	2.000.000	5.000.000	10.000.000
pulse duration (Millisec.)	125 ms	5,2	5,1	4,6	4,0	3,2	2,0	1,2
	250 ms	5,1	4,7	4,0	3,2	2,3	1,2	0,7
	500 ms	4,7	4,2	3,2	2,3	1,4	0,7	-



11.2 Modem battery life

The modem battery life depends on various conditions such as ambient temperature and reception field strength. The data given here is calculated for adverse conditions, i.e., battery life is normally longer. It can however be even shorter in some cases. The data provided should therefore be taken as a guideline.



The service life of the modem battery depends heavily on the reception level in the station during normal operation. The battery service lives shown below are therefore only guide values and refer to a reception level of $\geq 80\%$.

Please note that at a level of 50%, the current through the modem batteries may increase more than twofold.

If the level is below 50%, the service life of the modem battery cannot be specified.



Not only the total duration, but also the number of time windows is relevant to battery life.

So, for example the battery life for a monthly 4 hour time window differs from that for four time windows, each lasting 1 hour.



At low ambient temperatures, the data transfer duration is limited.

Please take into consideration the information given in [⇒ section 11.3 Data transfer duration in battery operation depending on ambient temperature](#).



If the modem batteries are used as buffer batteries on the power supply, two batteries (Order No. 73017964) must always be connected.



*Explanation of the "**Pull mode**":*

The EK280 opens a time window and is then called by the readout computer at a specific time during the time window. The time window is closed after the time window duration has expired or after the end of communication (if communication continues beyond the end of the time window).



*Explanation of the "**Push mode**":*

The EK280 switches the modem on, transfers the data automatically to the server and switches the modem off.

11.2.1 EK280 with modem iCM280-2G GPRS (73022169, includes ECM-GW120)

11.2.1.1 Monthly data transfer (Pull Mode)

Battery life (Years)		Readout duration (minutes)			
		5	10	15	30
Monthly Readout time window	1 hour	12*	12*	10.0	9.0
	4 hours	12*	12	10.0	8.2
	12 hours	12	11.4	9.4	6.3

* Although some configurations result in calculated battery service lives of more than 12 years, a service life of more than 12 years cannot be guaranteed due to the self-discharge of the batteries and other ageing processes.

11.2.1.2 Weekly data transfer (Pull Mode)

Battery life (Years)		Readout duration (minutes)			
		2	5	10	15
Weekly Readout time window	1 hour	10.0	10.0	5.7	4.0
	2 hours	10.0	8.9	5.2	3.7

11.2.1.3 Daily data transfer (Pull Mode)

Battery life (Years)		Readout duration (minutes)		
		1	2	5
Daily Readout time window	10 minutes	6.5	3.8	1.7
	15 minutes	6.2	3.7	1.7
	30 minutes	5.3	3.3	1.6
	1 hour	4.1	2.8	1.5

11.2.2 EK280 with Modem iCM280-2G GPRS (73023782, includes ECM-2G-UG350)

11.2.2.1 Daily data transfer

1. Push mode

The EK280 switches the modem on, transfers the data automatically to the server and switches the modem off.

Transfers per day	2
Communication time	45 seconds
Service life of the battery	120 months = 10 years

To ensure that the EK280 can also be accessed for servicing, a four-hour call time window is opened once per month in addition to the push operation:

Transfers per day	2
Communication time	45 seconds
Service time window (once per month)	240 minutes
Service life of the battery	107 months = 8.9 years

2. Pull mode

The EK280 opens a time window and is then called at some point during the time window by the data readout computer. The time window is closed after the elapse of the time window duration or after the end of communication.

Time window (daily)	60 minutes	2 × 60 minutes
Communication time	90 seconds	1 × 60 seconds
Service life of the battery	61 months = 5.1 years	44 months = 3.7 years

11.2.2.2 Monthly data transfer

Although the monthly readout is particularly energy-efficient, the meter readings and consumptions are required more often so that it cannot always be used.

Service life of the modem battery in years for a monthly readout in Pull mode:

Battery life (Years)		Readout time		
		10 min	15 min	30 min
Monthly readout window	4 x 1 hour	12*	12*	12*
	4 x 2 hours	12*	12*	12
	4 x 4 hours	12*	12	9
	4 x 12 hours	6.1	5.7	4.9

* Although some configurations result in calculated battery service lives of more than 12 years, a service life of more than 12 years cannot be guaranteed due to the self-discharge of the batteries and other ageing processes.

11.2.3 EK280 with modem iCM280 3G UMTS (73023783)

11.2.3.1 Daily data transfer

1. Push mode

The EK280 switches the modem on, transfers the data automatically to the server and switches the modem off.

Transfers per day	2
Communication time	40 seconds
Service life of the battery	74 months = 6.2 years

To ensure that the EK280 can also be accessed for servicing, a two-hour call time window is opened once per month in addition to the push operation:

Transfers per day	2
Communication time	40 seconds
Service time window (once per month)	120 minutes
Service life of the battery	69 months = 5.8 years

2. Pull mode

The EK280 opens a time window and is then called at some point during the time window by the data readout computer. The time window is closed after the elapse of the time window duration or after the end of communication.

Time window (daily)	60 minutes	2 × 60 minutes
Communication time	30 seconds	2 × 30 seconds
Service life of the battery	43 months = 3.6 years	22 months = 1.8 years

11.2.3.2 Monthly data transfer

Although the monthly readout is particularly energy-efficient, the meter readings and consumptions are required more often so that it cannot always be used.

Service life of the modem battery in years for a monthly readout in Pull mode:

Battery life (Years)		Readout time		
		10 min	15 min	30 min
Monthly readout window	4 x 1 hour	12*	12*	8.7
	4 x 2 hours	11.7	10	7.0
	4 x 4 hours	7.2	6.5	5.1
	4 x 12 hours	2.8	2.7	2.4

* Although some configurations result in calculated battery service lives of more than 12 years, a service life of more than 12 years cannot be guaranteed due to the self-discharge of the batteries and other ageing processes.

11.2.4 EK280 with modem CloudLink 5G

11.2.4.1 Daily data transfer

1. Push mode

The EK280 switches the modem on, transfers the data automatically to the server and switches the modem off.

Transfers per day	2
Communication time	40 seconds
Service life of the battery	240 months = 20 years

2. Pull mode

The EK280 opens a time window and is then called at some point during the time window by the data readout computer. The time window is closed after the elapse of the time window duration or after the end of communication.

Time window (daily)	60 minutes	2 × 60 minutes
Communication time	30 seconds	2 × 30 seconds
Service life of the battery	300 months = 25 years	150 months = 12.5 years

Further calculations:

Battery life (Years)		Readout duration (minutes)		
		1	2	5
Daily Readout time window	10 minutes	14.8	9.5	4.6
	15 minutes	14.7	9.5	4.6
	30 minutes	14.1	9.2	4.5
	1 hour	13.1	8.8	4.4

11.2.4.2 Weekly Data Transfer (Pull mode)

Battery life (Years)		Readout duration (minutes)			
		2	5	10	15
Weekly Readout time window	1 hour	24.8*	17.7	12.0	9.1
	2 hours	23.9	17.0	11.8	9

* Although some configurations result in calculated battery service lives of more than 20 years, a service life of more than 20 years cannot be guaranteed due to the self-discharge of the batteries and other ageing processes.

11.2.4.3 Monthly Data Transfer (Pull mode)

Battery life (Years)		Readout duration (minutes)			
		5	10	15	30
Monthly Readout time window	1 hour	28.8*	24.4*	21.2*	15.2
	4 hours	27.9*	23.8*	20.7	14.9
	12 hours	25.8*	22.3	19.5	14.3

* Although some configurations result in calculated battery service lives of more than 20 years, a service life of more than 20 years cannot be guaranteed due to the self-discharge of the batteries and other ageing processes.

11.3 Data transfer duration in battery operation depending on ambient temperature

In battery operation, the modem battery voltage is reduced during data transfer. At a low ambient temperature, it is reduced more quickly than at a high ambient temperature.

If the data transfer takes too long, the battery voltage falls below its minimum 3.2V and the data transfer is terminated. After data transfer the voltage rises again, more slowly in low ambient temperatures than in higher (recovering phase).

If the data transfer regularly begins before the battery voltage has returned to its starting value, the voltage is always lower in the long term. As a result of this the data transfer may at some point be terminated due to low battery voltage or may even fail to start.

This effect must be considered in particular for daily data transfer and lower ambient temperatures. This can be avoided by reducing the amount of data to be transmitted daily so that the maximum data transfer duration given in the table below is not exceeded.

With data transfer cycles of a week or more, even at low temperatures the modem battery has adequate time to recover between transfers.

The following table gives maximum data transmission duration values at daily and weekly intervals at different ambient temperatures.

Ambient temperature	Maximum Data transfer at daily intervals	Maximum Data transfer at weekly intervals
-25 °C	5 minutes	11 minutes
-10 °C	7 minutes	20 minutes
0 °C	10 minutes	30 minutes
+10 °C	20 minutes	34 minutes
+25 °C	50 minutes	50 minutes
+50 °C	80 minutes	80 minutes



Uploading new software to the EK280 takes between 17 and 30 minutes, depending on the type of modem. A software update should therefore only be carried out at temperatures above 0 °C.