



Volume conversion device

EK205

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Manual

**Application**

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# 1 General

## 1.1 Safety instructions

This application manual is intended for use as a supplement to the operating instructions. It must not be used without the operating instructions.



### **Danger of death!**

Never 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:

- Avoid any incorrect use of the EK205 in a potentially explosive atmosphere.
- Avoid improper battery use.



Should any instructions in this application manual conflict with those given in the operating instructions, the operating instructions shall take precedence.

## 1.2 Additional information

Further usage information can be found in the following documents, which are available from Honeywell on request:

- |   |                           |
|---|---------------------------|
| [1] EK205 Operating Instructions                  | Order No. 73023158        |
| [2] LIS-200 Device Readings – General Description |                           |
| [3] LIS-200 Device Readings – Annex EK205         |                           |
| [4] Modbus Communication with EK2x0_V2.0_*.pdf    | Only available in English |

You can download the operating instructions in various languages straight from the Honeywell Docuthek. Enter "EK205" as your search term. You will find the Docuthek at the following address:

<http://docuthek.kromschroeder.com>

For further information, contact the Elster Gas Technical Support team:

Tel.:	+49 6134 605-123
Website	<a href="http://www.elster-instromet.com">www.elster-instromet.com</a>
Knowledge Base:	<a href="http://www.honeywellprocess.com/Support">www.honeywellprocess.com/Support</a>
E-mail:	<a href="mailto:ElsterSupport@honeywell.com">ElsterSupport@honeywell.com</a>



### **Using secure communication**

Use secure communication methods, for example e-mail encryption, for sending confidential information.

See the section entitled "Security considerations for your network" in the operating instructions.

## 2 EK205 operation and display

The description of the key functions and basic information on the display are provided in the operating instructions for the EK205, supplied with the device.

This section contains additional detailed information.

### 2.1 Display settings

#### 2.1.1 Setting the display contrast

It is possible to change the display contrast of the EK205 to adapt it to the ambient conditions.

- Open the administrator lock as described in the EK205 operating instructions.
- Move the cursor in the “Serv.” or “Admin” tab to “Device settings” > “Display” > “Contr.”.
- Press the **ENTER** key combination. ⇒ A digit in the value will flash.
- To enter the display contrast value, move the cursor to the digits using the ► or ◀ arrow key and change them using the ▲ or ▼ arrow key.



*Only change the contrast value in small stages since otherwise it may become impossible to read the values.*

- Press the **ENTER** key combination to confirm the set value. The input process can be cancelled by pressing the **ESC** key combination.

#### 2.1.2 Automatic display shutdown

The display will shut down a few minutes after the last key is pressed to protect the batteries and achieve the specified battery service life. This time can be set.



*Increasing the display shutdown time will reduce the battery service life if the display is used frequently. You should therefore limit the shutdown time to the minimum required.*

Proceed as follows to set the display shutdown time:

- Open the administrator lock as described in the EK205 operating instructions.
- Move the cursor in the “Serv.” or “Admin” tab to “Device settings” > “Display” > “Disp.”.
- Press the **ENTER** key combination. ⇒ A digit in the value will flash.
- To change the value, move the cursor to the digits using the ► or ◀ arrow key and change them using the ▲ or ▼ arrow key.

#### 2.1.3 Automatic return to the main menu

The display will automatically return to the main menu (“Main” tab) a few minutes after the last key is pressed.

Proceed as follows to adjust this return time:

- Open the calibration lock as described in the EK205 operating instructions.
- Move the cursor in the “Serv.” or “Admin” tab to “Device settings” > “Display” > “Aut.V”.
- Press the **ENTER** key combination. ⇒ A digit in the value will flash.
- To change the value, move the cursor to the digits using the ► or ◀ arrow key and change them using the ▲ or ▼ arrow key.
- Close the calibration lock.

## 2.2 Configuring the displayed values

### 2.2.1 “Main” main display

In the “Ctrl.” display tab, you can select from various views and contents for the “Main” tab using the “Main” value, provided that the administrator lock is open.

“Main”	Meaning
<a href="#">volume+meas.</a>	The following are displayed: standard volume (volume at base conditions), actual volume (volume at measurement conditions), pressure and temperature Format of counter values: 8 integer places, no decimal places
<a href="#">List</a>	The following are displayed: standard volume, actual volume, pressure, temperature, conversion factor, compressibility ratio, actual flow rate (flow rate at measurement conditions), standard flow rate (flow rate at base conditions), date and time
-	This option appears depending on the system in question and is not intended for use. It has the same effect as “ <a href="#">volume+meas.</a> ” (see above)

## 2.2.2 Setting the number of tabs

In the “Ctrl.” tab, you can select the number of displayed tabs using the “Menu” value, provided that the calibration lock is open.

“Menu”	Meaning
<a href="#">2 registers</a>	The <a href="#">Main</a> and <a href="#">Ctrl.</a> tabs will be displayed.
<a href="#">3 registers</a>	The <a href="#">Main</a> , <a href="#">Cust.</a> and <a href="#">Ctrl.</a> tabs will be displayed.
<a href="#">4 registers</a>	The <a href="#">Main</a> , <a href="#">Cust.</a> , <a href="#">Admin.</a> and <a href="#">Ctrl.</a> tabs will be displayed.
<a href="#">5 registers</a>	All the tabs, <a href="#">Main</a> , <a href="#">Cust.</a> , <a href="#">Admin.</a> , <a href="#">Serv.</a> and <a href="#">Ctrl.</a> , will be displayed.

## 2.2.3 User values for the customer



*To parameterize the EK205, 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](http://www.elster-instromet.com).*

All the values displayed in the “Cust.” tab can be set using enSuite:

- Connect a PC or laptop with enSuite installed to the EK205 optical interface using the connection cable.
- Start enSuite and establish the communication link to the EK205. (See section [3.1 Setting up the communication link to the EK205 via the optical interface](#), page 15)
- Click on “[Parameterize online](#)” at the bottom of the “[Navigation](#)” window.
- In the top part of the device window (window containing the serial number of the EK205), open path “[Parameters](#)” > “[Device settings](#)” > “[Display](#)” by clicking on the relevant plus signs and then select “[User Column](#) “[Customer](#)””.
- In 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, click on an entry in the “[Value](#)” column, and then on the button with the 3 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.

## 2.2.4 User values for the administrator



To parameterize the EK205, 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](http://www.elster-instromet.com).

All the values displayed in the “Admin.” tab under “User values” can be set using enSuite:

- Connect a PC or laptop with enSuite installed to the EK205 optical interface using the connection cable.
- Start enSuite and establish the communication link to the EK205. (See section 3.1 [Setting up the communication link to the EK205 via the optical interface](#), page 15)
- 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” > “Device settings” > “Display” by clicking on the relevant plus signs and then select User Column “Administrator”.
- In 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, click on an entry in the “Value” column, and then on the button with the 3 dots. You can now select a new value to be displayed for this position in the display in the window that opens up.
- The first 10 values allow you to specify exactly what is to be displayed on the device display in the “Admin.” tab under “User values”. With the following 12 values, you can set the content of the display in the “User values” > “further...” path.
- Once you have set all values, click on the “Transfer changes to device” icon at the top of the enSuite window.

## 2.3 Archive display



A detailed description of the archives is available in section 9.

To display the contents of an archive, move the cursor to the archive heading and press the **ENTER** key combination or the **►** key. The archive headings can be found in the **Admin.** and **Serv.** tabs under **Archives**, the logbooks can also be found under **Status**.

The archive data is displayed as a table, i.e. in columns with headings. The individual columns are separated by at least one space. The column heading contains the name of the value displayed in the column and the unit, where necessary. Several columns can be displayed at the same time if there is sufficient space to do so.

The cursor can be moved to neighbouring columns with the **►** and **◀** keys. When doing so, the cursor remains on the left-hand side and the columns are moved. By using the **▼** and **▲** keys, the cursor can be moved towards older or newer entries (rows).

The key functions in the archive display are as follows:

- Move one column to the right. (The columns are shifted to the left by one column.)  
The first column then appears again after the last one.
- ◀ Move one column to the left. (The columns are shifted to the right by one column.)  
The last column appears after the first one.
- ▼ Move one row down. The first row then appears again after the last one.
- ▲ Move one row up. The last row appears after the first one.

**ENTER** Input for the search function in the archive, see section 2.3.2, page 6.  
The function relates to the column displayed on the left.

**ESC** Exit the archive, return to the archive heading.

- ◀ + ▲ Go to the archive entry point, i.e. to the top (newest) left value in the table.
- ◀ + ► The LIS address of the value is displayed.  
The function relates to the column displayed on the left.

### 2.3.1 Index progress

The index progress in comparison to each preceding archive entry is labelled with a “Δ” after its name in the table header (example: see “VbΔ” in Figure 1). The index progress is only shown in the display and is not transferred via the interface.

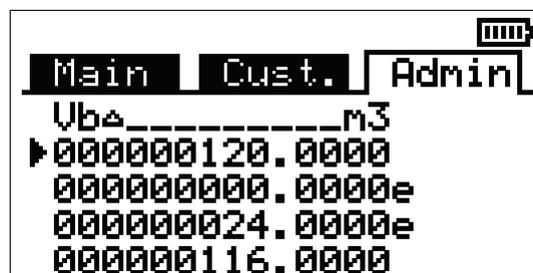


Figure 1: Display of index progress in the archive

The index progress is typically equal to the flow rate (consumption) over a measuring period. However, this is not the case if an archive row is added as a result of a specific event (e.g. setting the clock or a counter, displaying an important status message) or if a data error has been detected. Such an error is indicated as follows:

Display	Meaning
All values within an archive row flash.	It is not possible to calculate a valid index progress due to a data error in the <i>current</i> archive row. The data error has been detected using the checksum (CRC).
The index progress with a “c” appended to it flashes.	It is not possible to calculate a valid index progress due to a data error in the <i>preceding</i> archive row. The data error has been detected using the checksum (CRC).
The index progress with an “e” appended to it flashes.	The displayed index progress does not refer to a full measuring period, as the current or previous archive row was not entered as a result of measuring period completion, but instead due to setting the clock, for example. For an example of this, see <a href="#">Figure 1</a> : “000000000.0000e” and “000000024.0000e”. These values would flash in the actual display.

### 2.3.2 Search function for checking archive entries

The Measuring 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 for in the following rows:

- Sequence number
- Date and time
- Counter readings

To search, firstly move the cursor to the desired column in the relevant archive row. Pressing the **ENTER** key combination allows input of the value to be searched for in this column. Pressing the **ENTER** key combination 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.

## 2.4 Special commissioning functions

### 2.4.1 Device software version and checksum

- To display the device software version and checksum, move the cursor in the “Serv.” or “Admin” tab to “Identification” > “Volume converter” > “Vers” or “Chk”.
- The checksum “Chk” can be recalculated for verification purposes by pressing the ENTER key combination.

### 2.4.2 Clear volume and archive (“Clr.V”)



The “Clr.V” function described here clears all the volume counters and **all** archives and logbooks.

- To clear all volume counters and **all** archives and logbooks on the device, open the calibration lock as described in the EK205 operating instructions.
- Move the cursor in the “Serv.” tab to “Edit and delete” > “Clr.V”.
- Press the ENTER key combination. ⇒ “0” will flash.
- Change the value to “1” using the ▲ or ▼ arrow key.
- Press the ENTER key combination to confirm the set value. The input process can be cancelled by pressing the ESC key combination.

### 2.4.3 Clear archives (Clr.A)



Only the Measuring period archive, the Daily archive, Monthly archives 1 and 2 and the five user archives can be cleared using the “Clr.A” function described here.

- Open the administrator or calibration lock as described in the EK205 operating instructions to clear the Measuring period archive, the Daily archive, Monthly archives 1 and 2 and the five user archives on the device.
- Move the cursor in the “Serv.” tab to “Edit and delete” > “Clr.A”.
- Press the ENTER key combination. ⇒ A digit in the value will flash.
- A security function has been included to prevent the counters and archives being cleared by accident. The serial number of the device must be entered to execute the clear function. To do this, move the cursor to the digits using the ► or ◀ arrow key and change them using the ▲ or ▼ arrow key.



The device serial number is printed on the type label or can be found in the “Serv.” tab under “Identification” > “Volume converter” > “SNo”.

- Press the ENTER key combination to confirm the set value. The input process can be cancelled by pressing the ESC key combination.

## 2.4.4 Setting the “Vm” actual volume counter

To verify volume recording in practice, the “Vm” counter on the EK205 can be set to the same value as the gas meter on a one-off basis, provided the administrator lock is open.

On the other hand, the counter value can always be adjusted when the calibration lock is open. It can then also be entered directly in the “Serv.” or “Admin” tab under “Volume” > “Actual volume” > “Vm”.

For the value to be saved, a value is first entered in the field for the “adjustable counter” “VmA”, which is slightly higher than the gas meter reading. As soon as the gas meter has reached the value entered for “VmA”, you can have the meter reading copied from “VmA” to “Vm” at the touch of a button. The best method is to enter a value in “VmA”, which the gas meter will reach after around one minute, for example. If no gas is currently flowing, you can also enter the current gas meter reading.

Procedure (without opening the calibration lock):

- Open the administrator lock.
- Move the cursor to “Serv.” > “Volume” > “Actual volume” > “Synchronization Vm > “VmA”.
- Press the ENTER key combination. ⇒ A digit in the value will flash.
- Move the cursor to the digits using the ► or ◀ arrow key and change them using the ▲ or ▼ arrow key.
- After you have edited all the digits, press the ENTER key combination to confirm the input. The input process can be cancelled by pressing the ESC key combination.
- To save the set value, move the cursor downwards to “Store”.
- Press the ENTER key combination. ⇒ “0” will flash.
- Change the value to “1” using the ▲ or ▼ arrow key.
- Press the ENTER key combination to confirm the input. The input process can be cancelled by pressing the ESC key combination. ⇒ “VmA” will be saved for “Vm”.



*If saving “VmA” to “Vm” is rejected with the administrator lock open with message “--13--”, this means that the process has already been completed once.*

*A further change with the administrator lock open can be made possible by clearing the change information for synchronizing “Vm” with the gas meter after opening the calibration lock (see section 2.4.4.1).*

The following values are displayed in the same menu:

Display	Meaning
TimeX	Time of meter synchronization
Vm_o	“Old” counter reading for actual volume Vm
Vm_n	“New” counter reading for actual volume Vm

### 2.4.4.1 Clearing the change information for synchronizing Vm with the gas meter

The change information to synchronize “Vm” with the gas meter must be cleared by a calibration official so as to allow the volume at measurement conditions to be set again with the administrator lock open:

- Open the calibration lock.
- Move the cursor to “Serv.” > “Volume” > “Actual volume” > “Synchronization Vm > “Clear”.
- Press the ENTER key combination. ⇒ “0” will flash.
- Change the value to “1” using the ▲ or ▼ arrow key.
- After you have edited the value, press the ENTER key combination to confirm the input. This will clear values “TimeX” (time stamp of the synchronization), “Vm\_o” (old value of Vm), “Vm\_n” (new value of Vm) and counter “Vm” of the EK205 can be adjusted again, provided the administrator lock is open.

### 2.4.5 Setting the gas analysis method



The EK205 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 EK205, 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: Fixed value	No gas analysis considered; conversion using a fixed value (see “K.F”)
1: S-Gerg-88	Standard method with heating 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”/density ratio “dr”
3: AGA-8 GC1	“Gross characterization method 1”: Use of “Ho.b”/“CO2”/“dr”
4: AGA-8 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 the ENTER key combination. ⇒ 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 3).

- Establish an optical connection between enSuite and the EK205 as an administrator so that the “Admin” lock is open.
- Check the method and the gas analysis itself in “Parameters” > “Volume conversion” > “Parameter settings”:

Name	Value	Unit
Compressibility calculation mode "Md.K"	1: S-Gerg-88	
Compressibility factor ratio, substitute value "K.F"	1.00000	
Pressure at base conditions for gas analysis input "pbX"	1.01325	bar
Temperature at base conditions for gas analysis input "TbX"	0	°C
Calorific value (K computed, base: pbX, TbX) "Ho.b"	11.5	kWh/m3
Carbon dioxide CO2, gas parameter "CO2"	0.0000	mol-%
Hydrogen H2, gas parameter "H2"	0.0000	mol-%
Density gas at base conditions "Rhob"	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 EK205 will recalculate these internally using its own reference conditions.

**i**

Validity ranges of the values for calculations using S-Gerg-88 (Md.K = 1):

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

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

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

**i**

Validity ranges of the values for calculations using AGA-NX19 (Md.K = 2):

Ho.b	6.0	...	13.0	kWh/m <sup>3</sup>
CO <sub>2</sub>	0.0	...	30.0	mol%
Rhob	0.71	...	1.16	kg/m <sup>3</sup>
N <sub>2</sub>	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 <sub>4</sub>	50 – 100%	Propane	C <sub>3</sub> H <sub>8</sub>	0 – 5%
Nitrogen	N <sub>2</sub>	0 – 50%	Butane	C <sub>4</sub> H <sub>10</sub>	0 – 1%
Ethane	C <sub>2</sub> H <sub>6</sub>	0 – 20%	Pentane	C <sub>5</sub> H <sub>12</sub>	0 – 0.5%

**i**

Validity ranges of the values for calculations using AGA-8 DC92 (Md.K = 6):

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

**i**

With AGA-8 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.

#### 2.4.5.1 Nominal operating conditions of the conversion methods

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 *TMin*, *TMax*, *pMin* and *pMax* 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  $-10^{\circ}\text{C}$  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

- $+5^{\circ}\text{C}$  for gases with  $\text{Ho.b} < 11.5 \text{ kWh/m}^3$
- $+12^{\circ}\text{C}$  for gases with  $\text{Ho.b} \geq 11.5 \text{ kWh/m}^3$

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 $K \neq 1$ (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)
- AGA-8 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  $p_{\text{Min}}$ ,  $p_{\text{Max}}$ ,  $T_{\text{Min}}$  and  $T_{\text{Max}}$  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  $-10^{\circ}\text{C}$  and  $+60^{\circ}\text{C}$  and for absolute pressures up to 26 bar
- 2.) at temperatures between  $-10^{\circ}\text{C}$  and  $+60^{\circ}\text{C}$  also for absolute pressures above 26 bar if the following conditions are satisfied:

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

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

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

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

- 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 AGA-8 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. AGA-8 – 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 heating value is between 5.2 kWh/m<sup>3</sup> and 12.5 kWh/m<sup>3</sup> and whose components have the following molar fractions [in mol%]:

CH4	N2	CO2	C2H6	C3H8	C4H10	C5H12	C6+	He	H2	CO	H2O	H2S
≥ 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 Hering 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 AGA-8 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 AGA-8 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 AGA-8 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.

### 2.4.6 Calibration mode

The EK205 can be switched to calibration mode to make tests on site easier.

Calibration mode differs from normal mode in the following points:

- The display is switched on at all times and does not shut down automatically.
- The display does not automatically return to the main menu.
- All the values are updated at intervals of 2 seconds.

#### 2.4.6.1 Activating calibration mode



*More battery capacity is used in calibration mode, thus reducing the battery service life.*

*You should therefore limit the duration of calibration mode to the minimum required.*

*The following rule of thumb applies: One hour of calibration mode reduces the battery service life by around 2 days.*

Proceed as follows to activate calibration mode:

- Move the cursor in the “Serv.” tab to “Examination” > “CalMd”.
- Press the **ENTER** key combination. ⇒ “0” will flash.
- You can now enter the time after which calibration mode should be ended automatically at the latest: Adjust the time (in minutes) to the required value using the ▲ or ▼ arrow key.

- Press the **ENTER** key combination to confirm the set value. The input process can be cancelled by pressing the **ESC** key combination.

#### **2.4.6.2 Deactivating calibration mode**

Calibration mode is ended in the following cases:

- If the time entered in section 2.4.6.1 has elapsed after a key has been pressed without another key being pressed, calibration mode will be deactivated automatically.
- You can end calibration mode by entering the value “0” for “CalMd”. (Entering a value: see section 2.4.6.1)
- Calibration mode will be ended when the calibration lock is closed.

#### **2.4.7 Test archive “Frozen data”**

The Test archive “Frozen data” is provided for operating point tests. It is described in section 9.8.

## 2.5 Error messages when entering values

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

Display: --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. It is possible that the archive is currently being opened by the interface for reading.
4	The parameter cannot be changed (constant).
5	You are not authorized to change this value. The appropriate lock must be opened to change this value.
6	Invalid value The value entered is outside the permitted limits.
7	Incorrect key The entered key (number code) is incorrect, the lock will not be opened.
11	No input is possible due to special settings or configuration.
12	The input of this source (address) is not permitted.
13	No input is possible due to special settings or configuration, e.g.: <ul style="list-style-type: none"> <li>The "Clr.X" function cannot be executed until the clock has been set to its start value (initialized) using key combination ◀ + ▲.</li> <li>The "Store" function cannot be executed until the change information to synchronize "Vm" has been cleared (see section 2.4.4).</li> </ul>
14	The gas analysis parameters do not match.
20	The value for the user-specific display has not been defined. The value to be displayed 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 logbook is full.
22	The set value for recording in the archive no longer exists. This problem may occur after a firmware update if the value being recorded no longer exists in the new version.

### 3 Working with enSuite

“enSuite” is the parameterization program for the EK205 and other Honeywell products. Only the main functions are briefly explained here. For a more detailed description, please refer to the enSuite documentation.



The “enSuite” parameterization program can be downloaded free of charge from [www.elster-instromet.com](http://www.elster-instromet.com).

#### 3.1 Setting up the communication link to the EK205 via the optical interface



You need an optical read head cable, which you can order from Honeywell, to set the EK205 parameters using the optical interface.

- Insert the optical read head into the ring on the front panel of the EK205 and connect the other end to a COM or USB port on your PC or laptop.
- Start the enSuite program (e.g.: [Start > All Programs > Elster > enSuite](#)).
- Click on the “[Search device...](#)” icon (magnifying glass icon).
- Click on the “[LIS200](#)” tab in the “[Search device and connect](#)” window.
- Select “[Access](#)” → “[LIS200](#)”, “[User](#)” → “[Administrator](#)”, “[Use default settings](#)” and “[Connection](#)” → “[Optical](#)”.
- Enter the administrator key in the “[Key](#)” field.
- Click on “[OK](#)”.
- Wait a few seconds until “[Connected](#)” is displayed at the bottom of the “[Output](#)” window.

#### 3.2 Establishing a direct communication link to the EK205

Requirements:

- The laptop or PC on which enSuite is installed has a free COM port.
- The connection and parameterization has been completed as described in section [7.1.1](#).

Procedure:

- Start the enSuite program (e.g.: [Start > All Programs > Elster > enSuite](#)).
- Click on the “[Search device...](#)” icon (magnifying glass icon).
- Click on the “[LIS200](#)” tab in the “[Search device and connect](#)” window.
- Select “[Access](#)” → “[LIS200](#)”, “[User](#)” → “[Administrator](#)”, “[Use default settings](#)” and “[Connection](#)” → “[Serial RS232](#)”.
- Enter the value “[9600](#)” in “[Baud rate](#)”.
- Click on “[OK](#)”.
- Wait a few seconds until “[Connected](#)” is displayed at the bottom of the “[Output](#)” window.

### 3.3 Changing individual parameters

Requirement: one of the communication links described in the previous sections has been established between enSuite and the EK205.

- If the “[Navigation](#)” window is not yet open, click on “[Navigation](#)” on the left-hand side.
- Click on the plus sign next to “[Devices](#)” in the navigation window which then opens to see a list of your devices.
- Click on the entry beginning with the serial number of the connected device.
- The device identifier is then displayed as a heading at the bottom of the navigation window. If no command list is displayed below it, click on the arrow next to the device identifier.
- Select “[Parameterize online](#)” at the bottom of the navigation window.
- Click on the plus sign next to “[Parameters](#)” at the top of the navigation window to open the parameter tree.
- In this parameter tree, you can open parameter pages in order to change parameters or drill down in order to open more parameter pages.

### 3.4 Sending the parameter file

Requirement: a communication link has been established between enSuite and the EK205, e.g. using the optical interface or serial interface (see section 7).

- Select “[Navigation](#)” on the left-hand side.
- Click on the plus sign next to “[Connections](#)” in the navigation window which then opens.
- Click on the entry beginning with the serial number of the connected device.
- The device identifier is then displayed as a heading at the bottom of the navigation window. If no command list is displayed below it, click on the arrow next to the device identifier.
- Select “[Send parameter file](#)” at the bottom of the navigation window.
- Click on “[Open...](#)” at the top right of the new “[Send parameter file](#)” tab.
- Select the appropriate directory and parameter file in the “[Select wpp file](#)” window and click on “[OK](#)”.



*In enSuite from version 2.7 onwards, both the file name and the version (in brackets) are displayed. The file extension “\*.wpp” is not displayed.*



*Any wpp file can be selected if necessary using the “[File system...](#)” button. Please check that this manually selected wpp file is indeed suitable for this software version of the EK205.*

- Click on “[Start](#)” at the bottom right and wait until the parameter file has been successfully sent.



*In the centre 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 whether the file used is suitable for the device version. Contact the Honeywell hotline if necessary.*

- To start other another task, click on “[Navigation](#)” again on the left-hand side.

## 4 Volume measurement

Input 1 (terminal “DE1”) is used as the counter input for the volume conversion device; in addition, input 2 (terminal “DE2”) is used for applications involving automatic switchover.

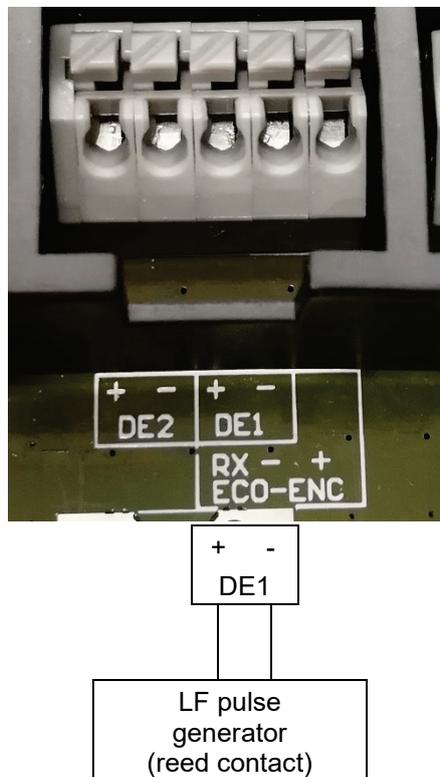
Counter inputs for recording the gas volume for conversion are generally protected by the calibration lock, i.e. the connection terminals are sealed and parameters affecting the counter can only be changed when the calibration lock is open.

The following pulse generator can be connected to input 1:

Volume encoder	Specifications
LF pulse generator	Reed contact or open collector transistor

### 4.1 LF pulse generator (reed contact)

#### 4.1.1 Connection



- Connect the gas meter’s low-frequency pulse generator (reed contact) to terminal “DE1” on the EK205.
- For measurements subject to calibration, have input 1 (terminal “DE1”) secured by the calibration official with a seal.

### 4.1.2 Parameterization

The parameterization process with the help of the EK205 keypad is described below.

Alternatively, the device can be parameterized using *enSuite*. The paths described below can be found in *enSuite* under “[Parameterize online](#)” > “[Parameters](#)”.

Setting the input mode:

- Open the administrator lock as described in the EK205 operating instructions.
- Move the cursor in the display to the “[Serv.](#)” or “[Admin](#)” tab using the arrow keys and via the following path to input mode “[Md.11](#)”:  
→ [Inputs](#) → [Input 1](#) → [Md.11](#)
- Press the [ENTER](#) key combination. ⇒ The set value will flash.
- Repeatedly press arrow key ▲ or ▼ until the text “[Pulse input](#)” flashes.
- Press the [ENTER](#) key combination to confirm the set value. The input process can be cancelled by pressing the [ESC](#) key combination.

Setting the cp value (pulse constant):

- Move the cursor in the same path to the cp value “[cp.11](#)”.
- Press the [ENTER](#) key combination. ⇒ A digit in the value will flash.
- Move the cursor to the digits using the ► or ◀ arrow key and change them using the ▲ or ▼ arrow key.
- Press the [ENTER](#) key combination to confirm the set value. The input process can be cancelled by pressing the [ESC](#) key combination.
- Close the administrator lock on the EK205.

Setting the meter reading:

- If necessary, the meter reading on the gas meter can be used as the start value for the actual volume  $V_m$ . The procedure is described in section [2.4.4](#).

## 5 Other counter and status inputs

Input 2 (terminal DE2) can be programmed freely as a status or pulse input:

- Active warning input
- Inactive warning input
- Active information input
- Inactive information input
- Time synchronization input
- Counter input (cannot be calibrated)

The meanings are as follows:

- Active: .....The signal is valid if the poles of the terminals are conductively connected.
- Inactive: .....The signal is valid if the poles of the terminals are not connected (open).
- Information input: .....A valid signal at the input generates an information message in the momentary status for the input.
- Warning input: .....A valid signal at the input generates a warning message in the momentary status for the input and in the status register.
- Time synchronization: ...A valid signal at the input enables the clock on the EK205 to be synchronized (set) to the full hour.
- Counter input .....For use as an additional counter input for non-calibrated measurements.

### 5.1 Active warning input

Input 2 (terminal DE2) can be programmed as an active warning input. This means:

If the “+” and “-” poles of the input are electrically connected,

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

If the input is open again (the poles are no longer connected), the message in the momentary status will disappear. The message will still exist in the status register until it is deleted by the user and the “W” will be permanently displayed (unless another warning is active).

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

To program an input as an active warning input, send the appropriate one of the following parameter files to the EK205 using the “enSuite” parameterization program (see section [3.4 Sending the parameter file](#), page 16):

- Eingang 2 = Warnsignal aktiv\_\*.wpp

## 5.2 Inactive warning input

Input 2 (terminal DE2) can be programmed as an inactive warning input. This means:

If the “+” and “-” poles of the input are open (not electrically connected),

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

If the poles of the input terminal are connected, the message in the momentary status will disappear. The message will still exist in the status register until it is deleted by the user and the “W” will be permanently displayed (unless another warning is active).

The status message can be used, for example, to generate an entry in an archive or to switch an output. Tamper detection for a reed contact acting as a pulse generator is a special application for an “inactive warning input”.

To program an input as an inactive warning input, send the appropriate one of the following parameter files to the EK205 using the “enSuite” parameterization program (see section 3.4 [Sending the parameter file](#), page 16):

- [Eingang 2 = Warnsignal inaktiv\\_\\*.wpp](#)

## 5.3 Active information input

Input 2 (terminal DE2) can be programmed as an active information input. This means: If the “+” and “-” poles of the input are electrically connected, message “13” is entered in the momentary status for the input.

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

To program an input as an active information input, send the appropriate one of the following parameter files to the EK205 using the “enSuite” parameterization program (see section 3.4 [Sending the parameter file](#), page 16):

- [Eingang 2 = Hinweissignal aktiv\\_\\*.wpp](#)

## 5.4 Inactive information input

Input 2 (terminal DE2) can be programmed as an inactive information input. This means: If the “+” and “-” poles of the input are open (not electrically connected), message “13” is entered in the momentary status for the input.

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

To program an input as an inactive information input, send the appropriate one of the following parameter files to the EK205 using the “enSuite” parameterization program (see section 3.4 [Sending the parameter file](#), page 16):

- [Eingang 2 = Hinweissignal inaktiv\\_\\*.wpp](#)

## 5.5 Time synchronization input

Input 2 (terminal DE2) can be programmed as a time synchronization input. This means: At the moment the input poles are electrically connected, the time is set to the full hour. However, the following conditions must be satisfied for this:

- The pulse at the input must be received within one minute before or after a full hour. The time in the EK205 takes precedence.
- Only one synchronization cycle per hour may be completed.

To program an input as a time synchronization input, send the appropriate one of the following parameter files to the EK205 using the “enSuite” parameterization program (see section 3.4 [Sending the parameter file](#), page 16):

- [Eingang 2 = Zähleingang\\_\\*.wpp](#)

We recommend that an input used for time synchronization be sealed to prevent abuse.

## 5.6 Additional counter input (input 2)

Input 2 (terminal DE2) can be programmed as an additional counter input.



*A reed contact or a transistor output with the technical data shown in section 3.6 (Digital inputs) of the EK205 operating instructions is suitable for connecting to input 2 as an additional counter input.*

If the “+” and “-” poles on input 2 are electrically connected for an adequate length of time (to suit the set pulse and period duration), an input pulse will be detected, converted using the set cp value and added to the counter reading.

In this case, for example, an additional gas meter with a low-frequency pulse output can be connected to record the volume.

Apart from the volume, the pulses can also have any other meaning, for example a count may be made using a connected door contact to show how often a door is opened. The physical unit of the counter can be changed arbitrarily with a maximum of 6 characters.

At the factory, the input is programmed as a pulse input, which means that normally it does not need to be converted. To reset input 2 to a counter input, send the following parameter file to the EK205 using the “enSuite” parameterization program (see section 3.4 [Sending the parameter file](#), page 16):

- [Eingang 2 = Zähleingang\\_\\*.wpp](#)

We recommend that input 2 be secured using a cover to prevent abuse.

## 6 Outputs

### 6.1 Scope of application

The digital outputs on the EK205 are primarily used to connect it to a control system or the like. Pulses are forwarded to this to provide counter information.

The pulses refer to a counter selected by the user, e.g. the total standard volume "VbT". The pulse value ("cp value") can be set to 0.01, 0.1, 1, 10 or 100 pulses per m<sup>3</sup>. cp.O1 = 0.1, for example, means that a pulse is emitted at output 1 for every 10 m<sup>3</sup> index progress.

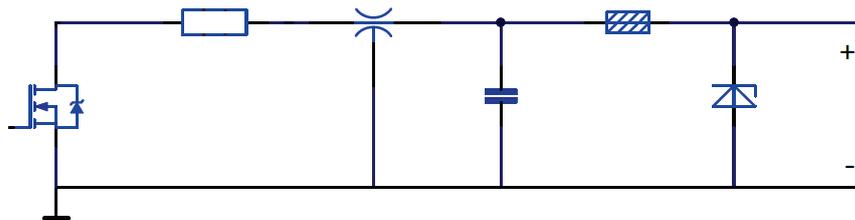
The following output functions are preset at the factory:

Output	Function
DA1	Pulse output for the total standard volume "VbT" (cp.O1 = 0.1 / m <sup>3</sup> )
DA2	Pulse output for the total actual volume "VmT" (cp.O2 = 0.1 / m <sup>3</sup> )

The outputs on the EK205 take the form of "open collector transistor outputs".

They are not generally suitable for switching a larger load (see section 6.2).

Output circuit:



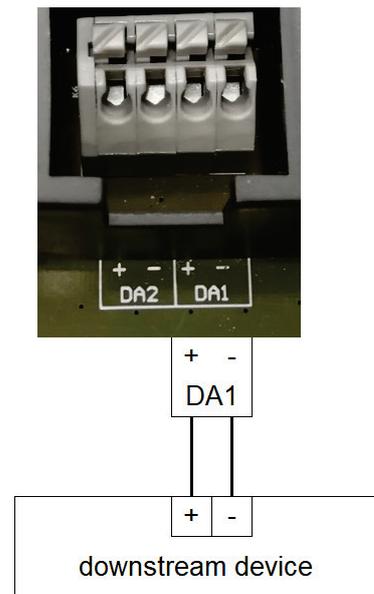
## 6.2 Connecting the outputs



**CAUTION!**  
**Damage to property caused by incorrect connection!**

- Polarity reversal during connection may cause a defect in the EK205!
  - Pay particular attention to the correct polarity during connection (“+” to “+” and “-” to “-”).
- The maximum switching current of the outputs is 100 mA.
  - Ensure that the device connected to an output requires no more than 100 mA. If this cannot be ensured, an isolating amplifier must be used in all cases.

- Connect the downstream device to the required digital output (terminals “DA1” or “DA2”) on the EK205. (The example on the right shows output 1 (terminal “DA1”).)



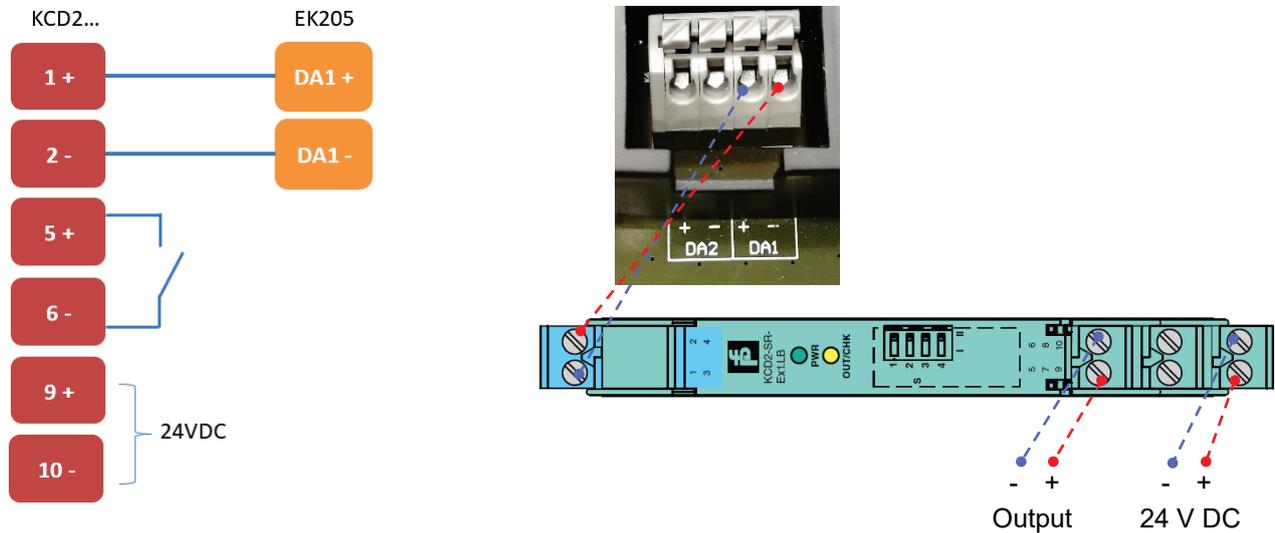
The cable length at the output is limited to 10 m. An isolating amplifier must be used for longer cables.

### 6.2.1 Connecting an isolating amplifier with a transistor output

Example: Pepperl+Fuchs KCD2-SOT-Ex1.LB

Properties of this isolating amplifier:

- Current limited to 8 mA
- All-round electrical isolation



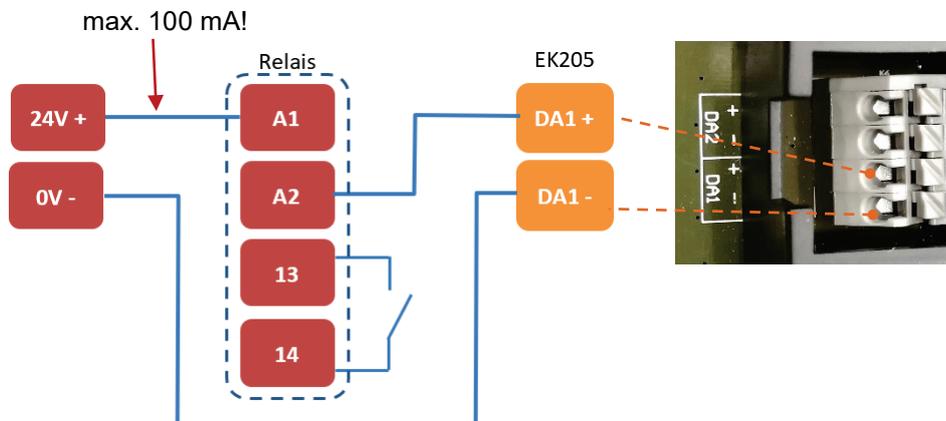
Most isolating amplifiers have an LED on each input. If this flashes, you can assume that the output of the EK205 is correctly connected and functional.

However, an LED is not an absolutely safe function indicator since it could also be defective.

### 6.2.2 Connecting a relay

Example: Phoenix Contact ST-REL2-KG 24/1

**i** The relay excitation coil, which is normally connected to the negative pole, must be connected to the positive pole on the output terminal (DA1+ or DA2+).



Most relays have an LED on the switch contact. If this flashes, you can assume that the output of the EK205 is correctly connected and functional.

However, an LED is not an absolutely safe function indicator since it could also be defective.

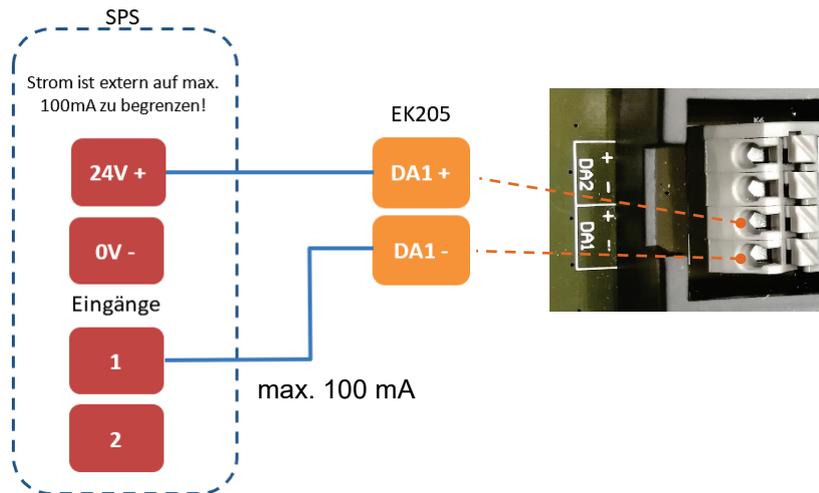
### 6.2.3 Connecting to a PLC



The circuit shown here will only work in single-channel mode, in other words if only 1 output on the EK205 is connected to a PLC.

Two outputs on the EK205 cannot be connected in this way since the negative poles on the outputs are interconnected.

If two outputs are connected to one PLC, isolating amplifiers must be connected between the outputs and the PLC for electrical isolation purposes.



## 6.3 Parameterizing the output function

### 6.3.1 LF pulse output (low frequency)

Both outputs 1 and 2 (terminals DA1 and DA2) can be programmed as a low-frequency pulse output.

#### 6.3.1.1 Parameterization

The parameterization process with the help of the EK205 keypad is described below.

Alternatively, the device can be parameterized using *enSuite*. The paths described below can be found in *enSuite* under “[Parameterize online](#)” > “[Parameters](#)”.

a) Setting the output mode:

- Move the cursor to the “[Serv.](#)” or “[Admin](#)” tab and via the following path to the mode for the appropriate output “[Md.O1](#)” or “[Md.O2](#)”:  
→ [Outputs](#) → [Output 1](#) → [Md.O1](#)  
→ [Outputs](#) → [Output 2](#) → [Md.O2](#)



The low-frequency pulse outputs on the EK205 can be operated with active or inactive logic (as makers or breakers). The output mode must be parameterized accordingly for this purpose (see below).

- Press the [ENTER](#) key combination. ⇒ The set value will flash.
- Repeatedly press arrow key ▲ or ▼ until the text “[Pulse+](#)” or “[Pulse-](#)” flashes. The meanings are as follows:  
- “+” = Maker: The pulse is output by switching on (making) the output.  
- “-” = Breaker: The pulse is output by switching off (breaking) the output.
- Press the [ENTER](#) key combination to confirm the set value. The input process can be cancelled by pressing the [ESC](#) key combination.

b) Setting the source for the output:

- Repeatedly press the ▼ key in the appropriate output menu until “Sc.O1” or “Sc.O2” is displayed.
- Press the ENTER key combination. ⇒ The set value will flash.
- Move the cursor to the digits using the ► or ◀ arrow key and change them to a value shown in the table using the ▲ or ▼ arrow key.

Sc.O...	Meaning
02:300_0	Vb Standard volume, not in error
02:301_0	VbD Standard volume, in error
02:302_0	VbT Standard volume, total (not in error + in error)
04:300_0	Vm Actual volume, not in error
04:301_0	VmD Actual volume, in error
04:302_0	VmT Actual volume, total (not in error + in error)

- Press the ENTER key combination to confirm the set value. The input process can be cancelled by pressing the ESC key combination.

c) Setting the cp value for the output:



The cp value of an output shows how many pulses are output per cubic metre. A cp value of 0.1/m<sup>3</sup> (0.1 pulses per m<sup>3</sup>) means, for example, that one pulse is output every 10 m<sup>3</sup>.

- Repeatedly press the ▼ key in the appropriate output menu until “cp.O1” or “cp.O2” is displayed.
- Press the ENTER key combination. ⇒ The set value will flash.
- Move the cursor to the digits using the ► or ◀ arrow key and change them to the required cp value for the output using the ▲ or ▼ arrow key.
- Press the ENTER key combination to confirm the set value. The input process can be cancelled by pressing the ESC key combination.

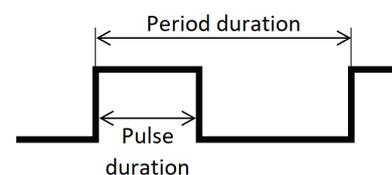
d) Setting the period and pulse duration:



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

Examples:

Period duration		Pulse duration		Output frequency
Per.O...	in ms	Pul.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



- Repeatedly press the ▼ key in the appropriate output menu until “PerO1” or “PerO2” is displayed.
- Press the ENTER key combination. ⇒ The set value will flash.
- Move the cursor to the digits using the ► or ◀ arrow key and change them to the required period duration using the ▲ or ▼ arrow key.
- Press the ENTER key combination to confirm the set value. The input process can be cancelled by pressing the ESC key combination.
- Repeatedly press the ▼ key in the appropriate output menu until “PW.O1” or “PW.O4” is displayed.
- Press the ENTER key combination. ⇒ The set value will flash.
- Move the cursor to the digits using the ► or ◀ arrow key and change them to the required period duration using the ▲ or ▼ arrow key.

- Press the **ENTER** key combination to confirm the set value. The input process can be cancelled by pressing the **ESC** key combination.

e) Setting the access rights for the output parameters:



*The access rights for the output parameters cannot be parameterized with the keypad on the EK205!*

*Parameterization can be completed using enSuite in "Parameterize online" > "Parameters" > "Outputs" > "Output 1" or "Output 2".*

### 6.3.2 Status output (message output)

Both outputs 1 and 2 (terminals DA1 and DA2) can be programmed as a status output (message output).

#### 6.3.2.1 Parameterization using the keypad



*We highly recommend that you use the "enSuite" parameterization software to parameterize a status output, since it is significantly easier. (See below: section 6.3.2.2).*

The parameterization process with the help of the EK205 keypad is also described below for general information.

a) Setting the output mode:



*The status outputs on the EK205 can be operated with active or inactive logic (as makers or breakers). The output mode must be parameterized accordingly for this purpose (see below).*

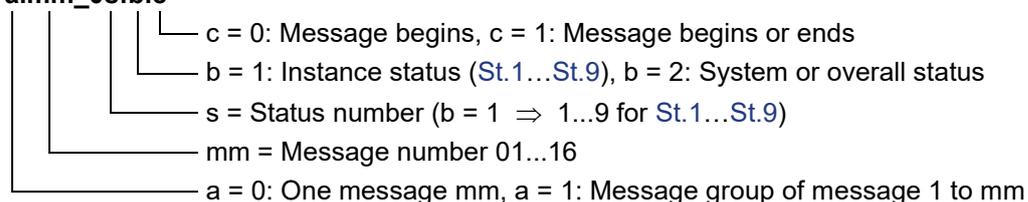
- Move the cursor to the "Serv." or "Admin" tab and via the following path to the mode for the appropriate output "Md.O1" or "Md.O2":  
→ Outputs → Output 1 → Md.O1  
→ Outputs → Output 2 → Md.O2
- Press the **ENTER** key combination. ⇒ The set value will flash.
- Repeatedly press arrow key ▲ or ▼ until the text "Status+" or "Status-" flashes.  
The meanings are as follows:
  - "+" = Maker: If a message is active, the output will be switched on (made).
  - "-" = Breaker: If a message is active, the output will be switched off (broken).
- Press the **ENTER** key combination to confirm the set value. The input process can be cancelled by pressing the **ESC** key combination.

b) Setting the status pointer for the output:

- Repeatedly press the ▼ key in the appropriate output menu until "SpO1" or "SpO2" is displayed.
- Press the **ENTER** key combination. ⇒ The set value will flash.
- Move the cursor to the digits using the ► or ◀ arrow key and change them to a value shown in the table using the ▲ or ▼ arrow key.

Key for status pointer Sp.O:

**a.mm\_0s:b.c**



Examples:

Sp.O...	Meaning
	<u>Individual messages:</u>
0.05_06:1.1	Message No. "5" in status <b>St.6</b> is active
0.07_03:1.1	Message No. "7" in status <b>St.3</b> is active
0.04_02:2.1	Message No. "4" in system status <b>StSy</b> is active
0.15_01:2.1	Message No. "15" in the overall status <b>Stat</b> is active (i.e. message "15" in any status)
	<u>Message groups:</u>
1.03_09:1.1	One of messages "1" to "3" in status <b>St.9</b> is active
1.16_02:2.1	One of messages "1" to "16" in system status <b>StSy</b> is active (i.e. any message in the system status)
1.13_01:2.1	One of messages "1" to "13" in the overall status <b>Stat</b> is active (i.e. any of messages 1 to "mm" in any status)

### 6.3.2.2 Parameterization with enSuite

In particular, the required message (or range) can be set conveniently using *enSuite*:

- The paths described below can be found in *enSuite* under "Parameterize online" > "Parameters" > "Outputs" > "Output 1" or ... "Output 2"

a) Setting the output mode:

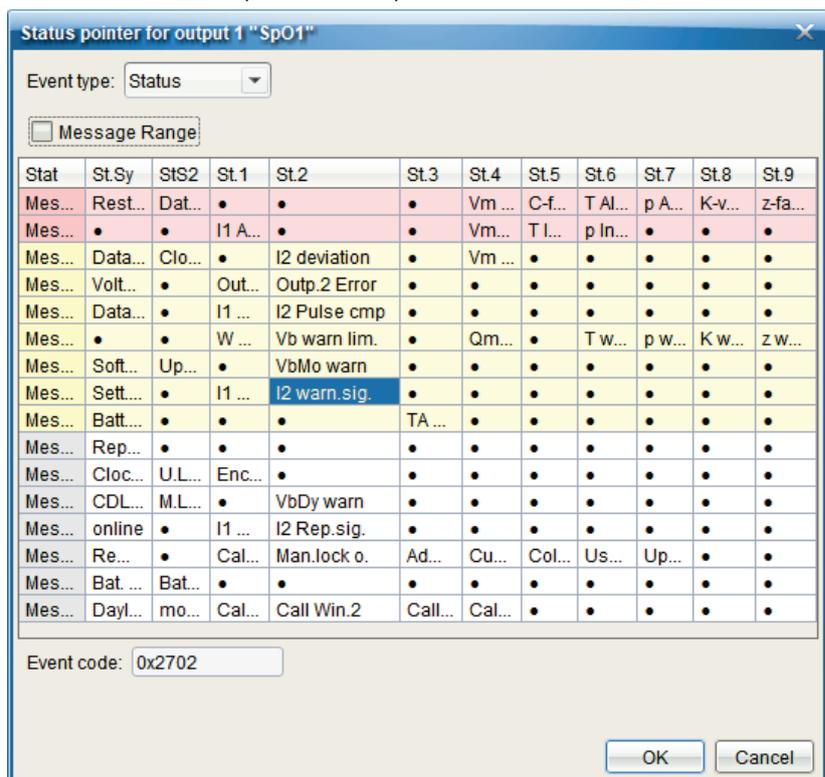
- First of all, the mode must be set to the required value:
  - "Status+" (logic active: message is active if the output is switched on) or
  - "Status-" (logic inactive: message is active if the output is switched off.)

b) Setting the status pointer for the output:

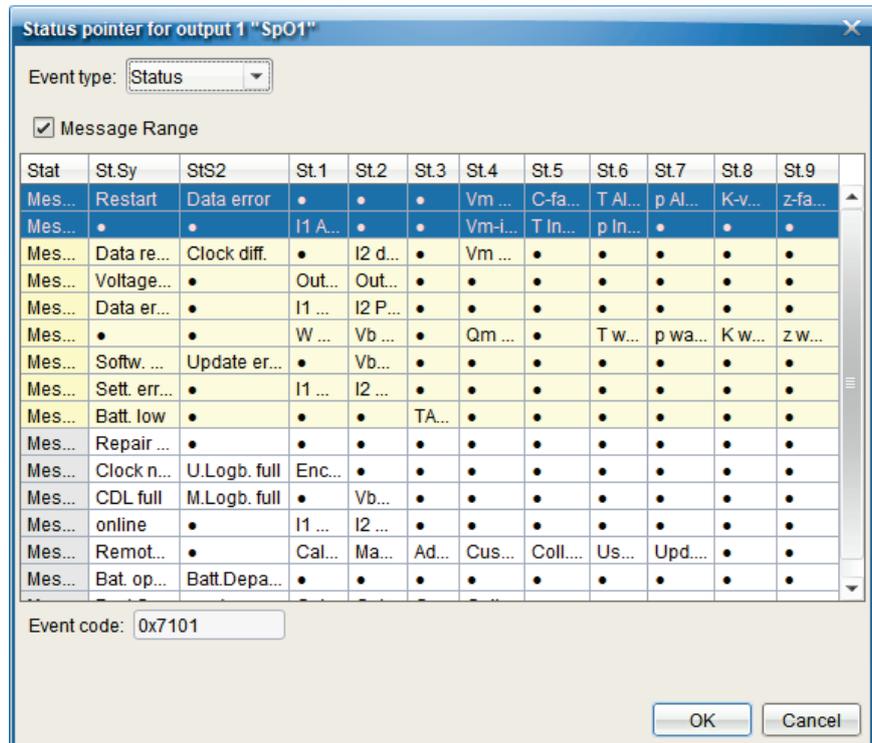
- Click on the button with the 3 dots "..." in the "Status pointer output x" menu item.
- If an individual specific message is used as the reason to switch the output, ensure that the marking "Message range" (see below) in *enSuite* is switched off (not checked):

- You can now click on the required message directly. The relevant input must be confirmed by clicking on "OK".  
 In the example on the right, input 2 is used as a warning signal (message input), i.e. the signal is forwarded to input 2 via the output.  
 (The irrelevant columns have been reduced in size for the sake of clarity.)

- Click on "OK" to save the setting.



- The “Message range” switch must be activated for a message range (e.g. “All alarms”).
- This means, for example, the first two lines (message 1 and 2) can be marked (blue in the figure).  
This means that any alarm would result in the output being switched.
- Click on “OK” to save the setting.



- c) Once you have set all values, click on the “Transfer changes to device” icon at the top of the enSuite window.

### 6.3.3 Time synchronization output

Both outputs 1 and 2 (terminals DA1 and DA2) can be programmed as a time synchronization output.

#### 6.3.3.1 Parameterization using the keypad

The parameterization process with the help of the EK205 keypad is described below.

Alternatively, the device can be parameterized using *enSuite*. The paths described below can be found in *enSuite* under “Parameterize online” > “Parameters”.

- a) Setting the output mode:

- Move the cursor to the “Serv.” or “Admin” tab and via the following path to the mode for the appropriate output “Md.O1” or “Md.O2”:  
→ Outputs → Output 1 → Md.O1  
→ Outputs → Output 2 → Md.O2



*The time synchronization outputs on the EK205 can be operated with active or inactive logic (as makers or breakers). The output mode must be parameterized accordingly for this purpose (see below).*

- Press the **ENTER** key combination. ⇒ The set value will flash.
- Repeatedly press arrow key ▲ or ▼ until the text “time sync+” or “time sync-” flashes.  
The meanings are as follows:
  - “+” = Maker: The time pulse is output by switching on (making) the output.
  - “-” = Breaker: The time pulse is output by switching off (breaking) the output.
- Press the **ENTER** key combination to confirm the set value. The input process can be cancelled by pressing the **ESC** key combination.

- b) Setting the source for the output:

- Repeatedly press the ▼ key in the appropriate output menu until “Sc.O1” or “Sc.O2” is displayed.

- Press the **ENTER** key combination. ⇒ The set value will flash.
- Move the cursor to the digits using the ► or ◀ arrow key and change them to a value shown in the table using the ▲ or ▼ arrow key.

Sc.O...	Meaning
01:143_0	At the start of each month at 0 o'clock
02:143_0	At the start of each month at 6 o'clock The "6 o'clock" day boundary can be adjusted using <a href="#">Serv. → Date and time → DayB.</a>
01:142_0	At the start of each day at 0 o'clock
02:142_0	At the start of each day at 6 o'clock The "6 o'clock" day boundary can be adjusted using <a href="#">Serv. → Date and time → DayB.</a>
01:403_0	At the start of each hour

- Press the **ENTER** key combination to confirm the set value. The input process can be cancelled by pressing the **ESC** key combination.

#### c) Setting the pulse duration

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

- Repeatedly press the ▼ key in the appropriate output menu until "PW.O1" or "PW.O2" is displayed.
- Press the **ENTER** key combination. ⇒ The set value will flash.
- Move the cursor to the digits using the ► or ◀ arrow key and change them to the required period duration using the ▲ or ▼ arrow key.
- Press the **ENTER** key combination to confirm the set value. The input process can be cancelled by pressing the **ESC** key combination.

### 6.3.4 Event output

Both outputs 1 and 2 (terminals DA1 and DA2) can be programmed as an event output.

An event output essentially has the same function as a status output (see section 6.3.2), but the pulse duration can also be set. With a status output, on the other hand, the pulse lasts as long as the corresponding status message.

#### 6.3.4.1 Parameterization using the keypad



*We highly recommend that you use the "enSuite" parameterization software to parameterize a status output, since it is significantly easier. (See below: section 6.3.4.2).*

The parameterization process with the help of the EK205 keypad is also described below for general information.

#### a) Setting the output mode:



*The event outputs on the EK205 can be operated with active or inactive logic (as makers or breakers). The output mode must be parameterized accordingly for this purpose (see below).*

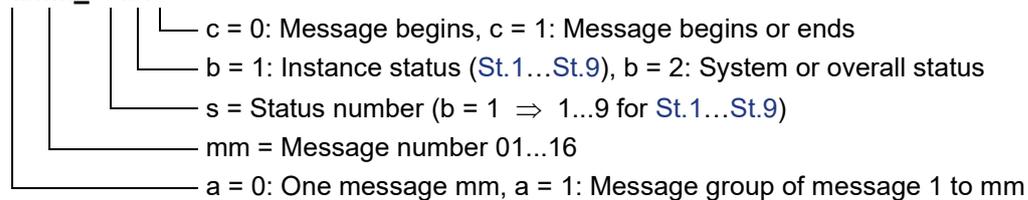
- Move the cursor to the “**Serv.**” or “**Admin**” tab and via the following path to the mode for the appropriate output “**Md.O1**” or “**Md.O2**”:  
→ **Outputs** → **Output 1** → **Md.O1**  
→ **Outputs** → **Output 2** → **Md.O2**
- Press the **ENTER** key combination. ⇒ The set value will flash.
- Repeatedly press arrow key **▲** or **▼** until the text “**Event+**” or “**Event-**” flashes. The meanings are as follows:  
- “**+**” = Maker: If a message is active, the output will be switched on (made).  
- “**-**” = Breaker: If a message is active, the output will be switched off (broken).
- Press the **ENTER** key combination to confirm the set value. The input process can be cancelled by pressing the **ESC** key combination.

b) Setting the status pointer for the output:

- Repeatedly press the **▼** key in the appropriate output menu until “**SpO1**” or “**SpO2**” is displayed.
- Press the **ENTER** key combination. ⇒ The set value will flash.
- Move the cursor to the digits using the **▶** or **◀** arrow key and change them to a value shown in the table using the **▲** or **▼** arrow key.

Key for status pointer Sp.O:

**a.mm\_0s:b.c**



Examples:

Sp.O...	Meaning
	<u>Individual messages:</u>
0.05_06:1.1	Message No. “5” in status <b>St.6</b> is active
0.07_03:1.1	Message No. “7” in status <b>St.3</b> is active
0.04_02:2.1	Message No. “4” in system status <b>StSy</b> is active
0.15_01:2.1	Message No. “15” in the overall status <b>Stat</b> is active (i.e. message “15” in any status)
	<u>Message groups:</u>
1.03_09:1.1	One of messages “1” to “3” in status <b>St.9</b> is active
1.16_02:2.1	One of messages “1” to “16” in system status <b>StSy</b> is active (i.e. any message in the system status)
1.13_01:2.1	One of messages “1” to “13” in the overall status <b>Stat</b> is active (i.e. any of messages 1 to “mm” in any status)

c) Setting the active time:

The event set as “Status pointer” only defines the time at which the output becomes active. You can set how long the output remains active using “Active time”. The active time be set individually for each output in seconds.

- Repeatedly press the **▼** key in the appropriate output menu until “**ActA1**” or “**ActA2**” is displayed.
- Press the **ENTER** key combination. ⇒ The set value will flash.
- Move the cursor to the digits using the **▶** or **◀** arrow key and change them to the required period duration using the **▲** or **▼** arrow key.
- Press the **ENTER** key combination to confirm the set value. The input process can be cancelled by pressing the **ESC** key combination.

**6.3.4.2 Parameterization with enSuite**

In particular, the required message (or range) can be set conveniently using *enSuite*:

- The paths described below can be found in *enSuite* under “Parameterize online” > “Parameters” > “Outputs” > “Output 1” or. ... “Output 2”

a) Setting the output mode:

- First of all, the mode must be set to the required value: “Event+” (logic active: message is active if the output is switched on) or “Event-” (logic inactive: message is active if the output is switched off.)

b) Setting the status pointer for the output:

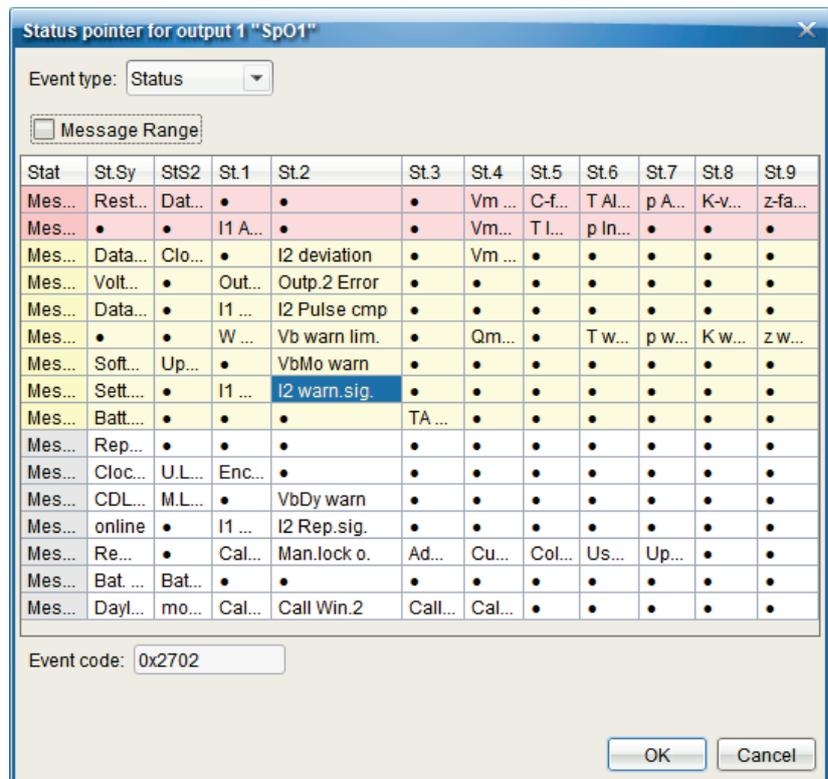
- Click on the button with the 3 dots “...” in the “Status pointer output...” menu item.
- If an individual specific message is used as the reason to switch the output, ensure that the marking “Message range” (see below) in *enSuite* is switched off (Not checked):

- You can now click on the required message directly. The relevant input must be confirmed by clicking on “OK”.

In the example on the right, input 2 is used as a warning signal (message input), i.e. the signal is forwarded to input 2 via the output.

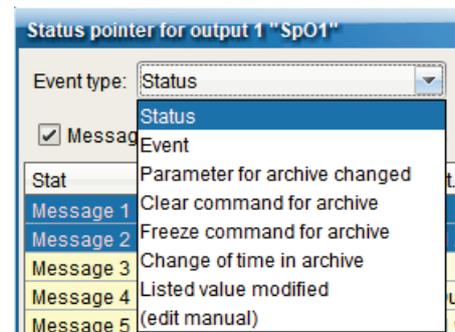
(The irrelevant columns have been reduced in size for the sake of clarity.)

- Click on “OK” to save the setting.

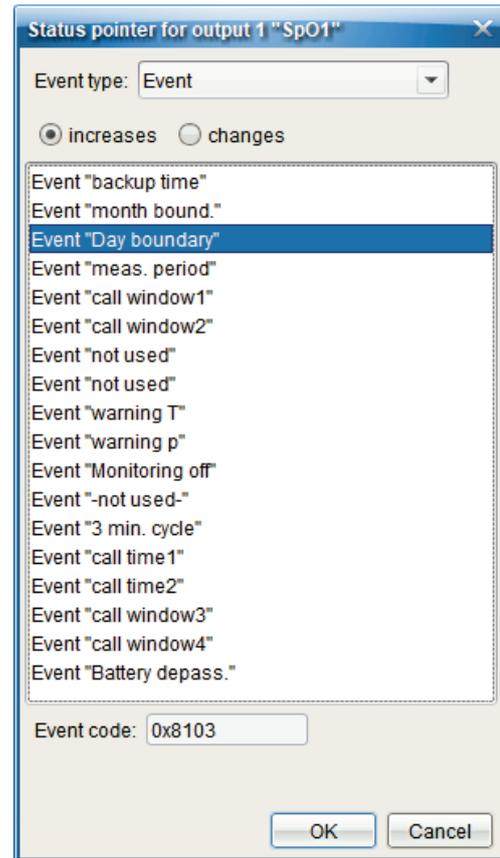


- The “Message range” switch must be activated for a message range (e.g. “All alarms”). The adjustment is made precisely as described in section 6.3.2.2 Status output (message output).

- In contrast to “Status output” mode, you can activate the output depending on events which do not generate a status message in the “Event output” mode described here. You can set events in the “Event type” pull-down menu. In this menu, “Event” means a programmable event which can also trigger an archive entry, for example. You can activate the output if certain parameters have been changed using the possible selections beneath it.



- If you set “Event type” “Event”, you can select one of the events shown to the side and if this event occurs, it will activate the output. The event “Day boundary” has been selected in the example. In this case, output 1 would be activated automatically every day at the day boundary (6 o'clock).



c) Setting the active time:

- The event set in “Status pointer output...” only defines the time at which the output becomes active. You can set how long the output remains active using “Active time”.

d) Once you have set all values, click on the “Transfer changes to device” icon at the top of the enSuite window.

### 6.3.5 Continuous pulse output

Both outputs 1 and 2 (terminals DA1 and DA2) can output continuous pulses for test purposes.

#### 6.3.5.1 Parameterization

The parameterization process with the help of the EK205 keypad is described below.

Alternatively, the device can be parameterized using *enSuite*. The paths described below can be found in *enSuite* under “Parameterize online” > “Parameters”.

a) Setting the output mode:

- Move the cursor to the “Serv.” or “Admin” tab and via the following path to the mode for the appropriate output “Md.O1” or “Md.O2”:

→ Outputs → Output 1 → Md.O1

→ Outputs → Output 2 → Md.O2

- Press the **ENTER** key combination. ⇒ The set value will flash.
- Repeatedly press one of the arrow keys ▲ or ▼ until the text “Cont.pulse” flashes.
- Press the **ENTER** key combination to confirm the set value. The input process can be cancelled by pressing the **ESC** key combination.

b) Setting the period and pulse duration:

You can set the period duration (frequency) and the pulse duration using PerO1 and PW.O1 (or PerO2 and PW.O2 for output2) as described in section 6.3.1.1 LF pulse output (low frequency).

### 6.3.6 Pulse output switched off or on

Both outputs 1 and 2 (terminals DA1 and DA1) can be switched off permanently (transistor blocked, “switch open”) or switched on permanently (transistor conducting, “switch closed”) for test purposes.

#### 6.3.6.1 Parameterization

The parameterization process with the help of the EK205 keypad is described below.

Alternatively, the device can be parameterized using *enSuite*. The paths described below can be found in *enSuite* under “[Parameterize online](#)” > “[Parameters](#)”.

Setting the output mode:

- Move the cursor to the “[Serv.](#)” or “[Admin](#)” tab and via the following path to the mode for the appropriate output “*Md.O1*” to “*Md.O4*”:
  - [Outputs](#) → [Output 1](#) → [Md.O1](#)
  - [Outputs](#) → [Output 2](#) → [Md.O2](#)
- Press the [ENTER](#) key combination. ⇒ The set value will flash.
- Repeatedly press one of the arrow keys ▲ or ▼ until the text “*off*” or “*on*” flashes.
- Press the [ENTER](#) key combination to confirm the set value. The input process can be cancelled by pressing the [ESC](#) key combination.

## 6.4 Testing the outputs

### 6.4.1 Testing the pulse forwarding to the connected device

If you wish to test the function of an output after connection, you can use the “Continuous pulse output” function. This enables a test to be carried out even if the connected gas meter is at a standstill.

To do so, proceed as described in section 6.3.5 and check whether the pulses output by the EK205 are registered on the connected device.

It is generally a good idea to set the pulse frequency to 1 Hz for this purpose so as not to exceed the frequency limit of the connected device. To do this, the period duration “*PerO...*” is set to 8 and the pulse duration “*PW.O...*” to 4. Setting the pulse frequency is explained in section 6.3.1.1, paragraph d).

### 6.4.2 Testing an output

If the connected device does not detect any pulses and you are not sure of the cause, you can test the function of the output to eliminate it as a source of error.

- To do this, use a cable to connect
  - the positive pole of the output you wish to test (terminal “*DA1+*” or “*DA2+*”)
  - to the positive pole on input 1 (terminal “*DE1+*”) or input 2 (terminal “*DE2+*”).

The example on the right shows the connection of output 1 (terminal “*DA1+*”) to input 1 (terminal “*DE1+*”).

The negative poles of the terminals do not have to be connected since they are connected internally.



- Set the pulse frequency of the output being tested to 1 Hz. To do this, the period duration “*PerO...*” is set to “8” and the pulse duration “*PW.O...*” to “4”. Setting the pulse frequency is explained in section 6.3.1.1, paragraph d).
- Then set the output you wish to test to “Continuous pulse output” mode as described in section 6.3.5.
- Check whether the input counter “*V1*” or “*V2*” on the EK205 is incremented. You will find the input counter in the EK205 display using the following path:
  - If you have connected the cable to terminal “*DE1+*”:  
In the “[Serv.](#)” or “[Admin](#)” tab: “[Inputs](#)” > “[Input 1](#)” > “*V1*”.
  - If you have connected the cable to terminal “*DE2+*”:  
In the “[Serv.](#)” or “[Admin](#)” tab: “[Inputs](#)” > “[Input 2](#)” > “*V2*”.

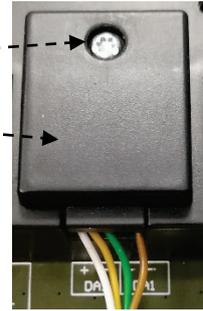
## 6.5 Securing the outputs

Every output can be secured individually with a terminal cover to prevent tampering and may be sealed with an adhesive seal if necessary.

Terminal covers are supplied for this purpose in the accessories bag. If necessary, place these over the connected terminals and screw tight. Then affix a seal to the retaining screw.

Retaining screw

Terminal cover



**i**

*Sealing of the pulse inputs and outputs is subject to national law (see WELMEC 11.1, section 2.7.1).*

*Depending on the legal situation in the country of use, the seals of the bodies legally specified for this purpose or of the meter operator must be used.*

*If the devices are supplied with a connected input and/or output cable, seals with the manufacturer's trademark have been applied at the factory. These may be replaced at the place of use if necessary.*

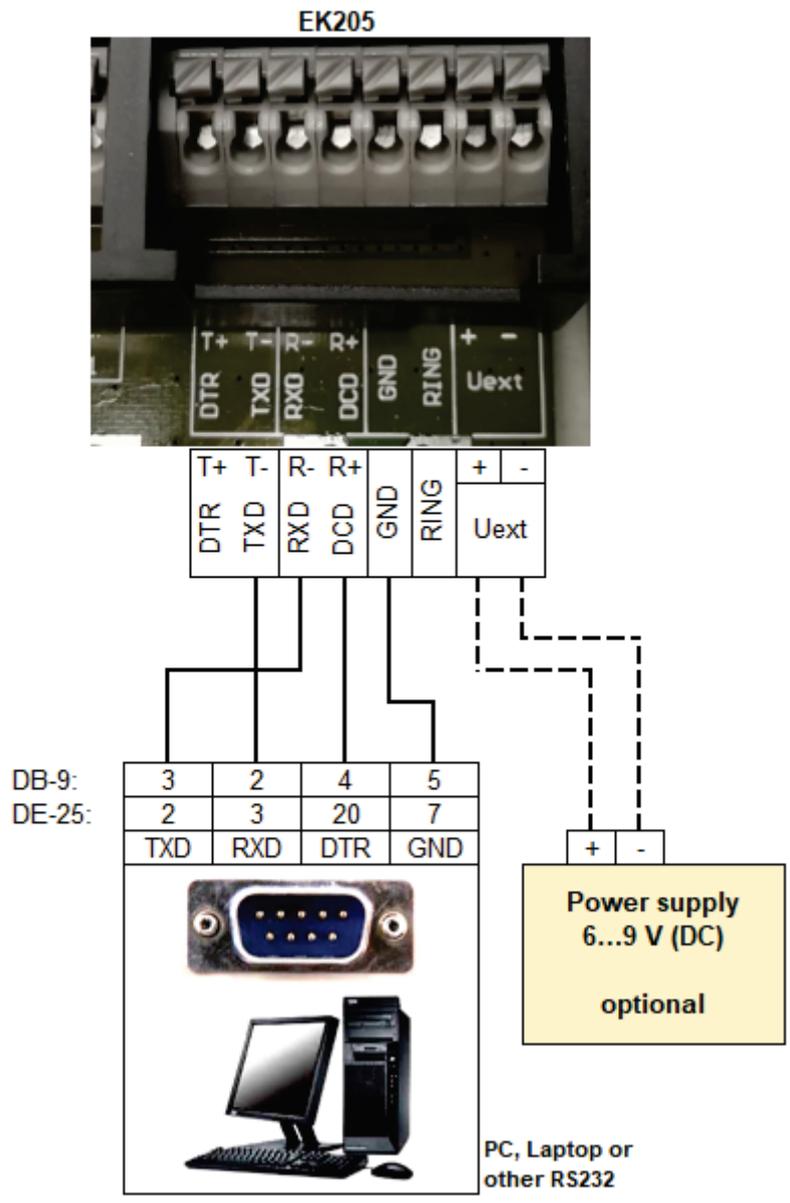
## 7 Data transfer

### 7.1 Devices on the serial interface

#### 7.1.1 Direct connection of the RS232 interface (e.g. COM port on a PC)

**i** *In battery operation, the battery service life can be significantly reduced by this application. Therefore, set the data call acceptance window for battery operation to the smallest possible value. (see chapter 7.1.1.2)*

##### 7.1.1.1 Connection



### 7.1.1.2 EK205 parameterization



To parameterize the EK205, 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](http://www.elster-instromet.com).

#### a) Closing the time windows

Time windows 3 and 4 must be closed for parameterization to function securely. To do this:

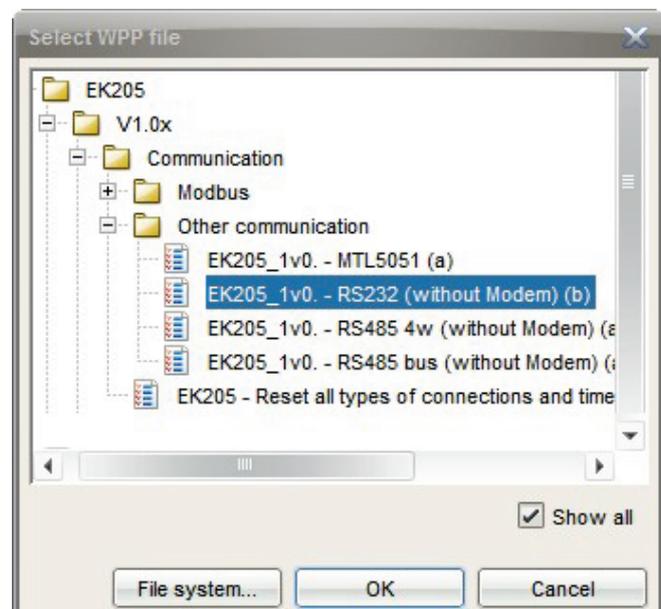
- Connect a PC or laptop with enSuite installed to the EK205 optical interface using the connection cable.
- Start enSuite and establish the communication link to the EK205 (see section 3.1).
- Select “Navigation” on the left-hand side and then “Parameterize online” at the bottom of the navigation window.
- At 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 acceptance windows 3 and 4, set start and end to the same value for each one and send the changes using the “Transfer changes to device” icon.
- Then wait a minute for any communications activity in progress on the EK205 to be safely stopped.

#### b) Sending the parameter file

- Send the following parameter file to the EK205 (see section 3.4, page 16):

[EK205\\_1v0. - RS232 \(without Modem\)](#)

On the right, you can see the navigation path to this parameter file in enSuite for software versions 1.0x of the EK205.



For any further customized settings and tests, click on “Navigation” on the left-hand side and then on “Parameterize online” at the bottom of the navigation window.

Name	Value	Unit
Data format serial interface 2 "DF.S2"	3: auto	
Start baud rate external modem "Bd.S2"	9600	Bd
Switched baud rate external modem "BdId2"	9600	Bd
Number of ring tones until answer "Num.T"	2	
Init modem "M.INI"	Init modem	
Device address terminal interface (bus address) ...		
Designation of the terminal interface "Name"	Term.interf.	
Configuration external modem "InStr"		
Finalization String for the modem "InEnd"		
Test call acceptance window "CWTst"	0	minutes
Reset terminal interface "ResI2"	0	
Enable protocols "Prot2"	1: LIS200, 2: DLMS, 3: MODBUS	

**i** All the values listed in enSuite under “Parameters” can be found in the “Serv.” and “Admin” display tabs of the EK205 using the same path.

c) Setting time windows for future data retrievals

In the basic configuration now set up, you can define time windows during which data can be retrieved cyclically from the EK205 via the modem. Time windows 1 and 3 are used here as an example.

You can deactivate time windows which are not needed by setting the start and end of the time window to the same value.

**i** Call acceptance window 1 is closed by default (setting: daily from 00:00 to 00:00).  
 If you want to transfer data in battery mode, set call acceptance window 1 to the smallest possible time range in order to protect the battery.  
 If the EK205 is operating in battery mode and call acceptance window 1 or 2 is permanently switched on, the battery may be empty within a few weeks.

- At the top of the device window, open the path “Parameters” > “Interfaces” by clicking on the relevant plus signs, and then select “Call time windows”.
- Change call acceptance window 1 only if you also want to transfer data in battery mode. Otherwise, the start and the end time should each be at “00:00”, so that the battery is saved.
- In call acceptance window 3, set the start to “00:00” and the end to “23:59”.

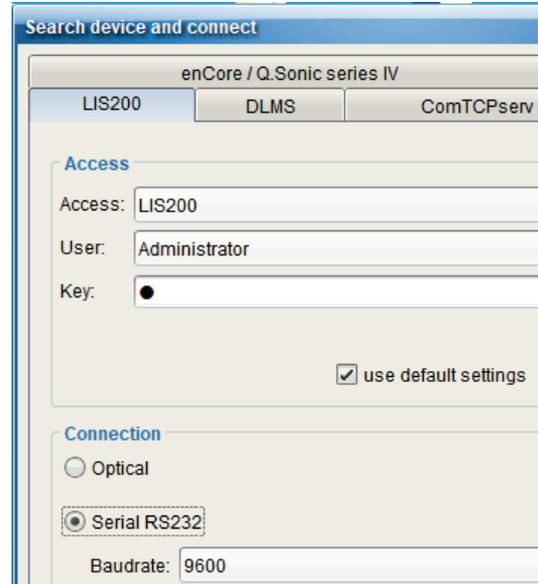
No.	Type	Event	Cycle	Begin	End	Interface	Supply
1	1: period		daily	00:00	00:00	2: Terminal i.	2: Battery
2	1: period		daily	00:00	00:00	2: Terminal i.	2: Battery
3	1: period		daily	00:00	23:59	2: Terminal i.	3: ext. supply
4	1: period		daily	00:00	00:00	2: Terminal i.	3: ext. supply

- Then click on the “Transfer changes to device” icon at the top of the enSuite window.

### 7.1.1.3 Retrieving data with enSuite

If the connected device is a PC with enSuite installed, you can now check the data transfer as described here.

- Start the enSuite program on the PC connected to the terminals (e.g.: Start > All Programs > Elster > enSuite).
- Click on the “Search device...” icon (magnifying glass icon).
- Click on the “LIS200” tab in the “Search device and connect” window, which then opens.
- Select
  - “Access” → “LIS200”
  - “User” → “Administrator”
  - “Use default settings”
  - “Connection” → “Serial RS232”
  - “Baud rate”: → “9600”
- Click on “OK”.
- Wait a few seconds until “Connected” is displayed at the bottom of the “Output” window.



- Once the communication link has been established, you can view certain parameters 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.

### 7.1.2 RS485 interface

#### 7.1.2.1 Connection

**i** These applications only work with an external power supply to the EK205, not in battery mode.

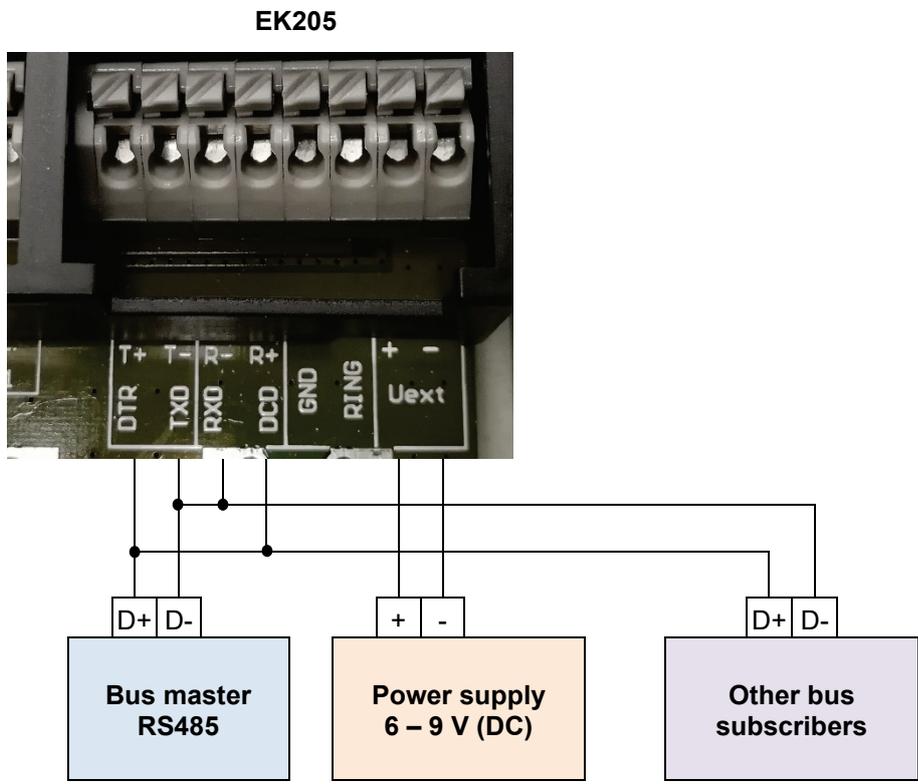
**i** If an EK205 is connected to an RS485 bus, no terminal resistors may be connected to the bus!

As a result of its current limit to obtain approval as an intrinsically safe apparatus, the EK205 cannot supply enough current for the terminal resistors. The terminal resistors are not required for the data transfer rates used.

If terminal resistors are essential in your application, connect the devices as described in section 7.1.2.1.2.

**i** For EMC reasons, we recommend that the subscribers are galvanically isolated from each other at the bus. You should therefore give preference to the installation described in section 7.1.2.1.2.

##### 7.1.2.1.1 Two-wire simplex wiring (RS485 mode)





### 7.1.2.2 EK205 parameterization



To parameterize the EK205, you will require a connection cable for the optical interface as well as the enSuite program, which can be downloaded free of charge from the “Software Downloads” section of the Honeywell website: [www.elster-instromet.com/en/software-downloads](http://www.elster-instromet.com/en/software-downloads)

This parameterization applies to both the applications described in sections 7.1.2.1.1 and 7.1.2.1.2.

#### a) Closing the time windows

Time windows 3 and 4 must be closed for parameterization to function securely. To do this:

- Connect a PC or laptop with enSuite installed to the EK205 optical interface using the connection cable.
- Start enSuite and establish the communication link to the EK205 (see section 3.1).
- Select “Navigation” on the left-hand side and then “Parameterize online” at the bottom of the navigation window.
- At 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 acceptance windows 3 and 4, set start and end to the same value for each one and send the changes using the “Transfer changes to device” icon.
- Then wait a minute for any communications activity in progress on the EK205 to be safely stopped.

#### b) Sending the parameter file

- Send the following parameter file to the EK205 (see section 3.4):  
`EK205_xvx. - RS485-Bus (ohne Modem) (*)1`
- For any further customized settings and tests, click on “Navigation” on the left-hand side 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 EK205 using the same path.

#### c) Setting the device address

Every bus subscriber requires an individual ID (“device address” or “bus address”) so that the bus master can select precisely one subscriber for data transfer. All other bus subscribers must switch the interface to inactive so as not to interfere with the data transfer.

The device address of the EK205 depends on which interface protocol you use:

→ Device address for LIS-200 protocol:

The device address for the LIS-200 protocol may be a text with up to 32 characters (no special symbols allowed). It has been set to the default value “1” by the above parameter file.

Proceed as follows to edit the device address of the EK205:

- In the top part of the enSuite device window, open the path “Parameters” > “Interfaces” by clicking on the relevant plus signs and then select “Terminal interface”.
- Edit the device address of the EK205 in the “All parameters” window in the line “Device address terminal interface (bus address)”.

→ Device address for Modbus protocol:

The device address for the Modbus protocol may be a number between 1 and 247. The default value is “1”.

Proceed as follows to edit the device address for the Modbus protocol:

- In the top part of the enSuite device window, open the path “Parameters” > “Interfaces” > “Terminal interface” by clicking on the relevant plus signs and then select “Modbus”.

<sup>1</sup> The “x” stands for the device software version, e.g. “1v0”.

The asterisk (\*) stands for a lower-case letter which marks the version of the file, e.g. “a”.

- Edit the device address of the EK205 in the “All parameters” window in the line “Modbus device address (slave address)”.

Further details on using the Modbus protocol are provided in document ⇒ [4] (page 1).

d) Setting time windows for future data retrievals

In the basic configuration now set up, you can define time windows during which data can be retrieved cyclically from the EK205 via the RS485 bus. Time windows 3 and 4 are provided for operating the EK205 with a directly connected terminal interface, with time window 3 being the one which is normally used. You can deactivate time windows which are not needed by setting the start and end of the time window to the same value.

- At 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 acceptance 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.

Click on the “Transfer changes to device” icon at the top of the enSuite window.

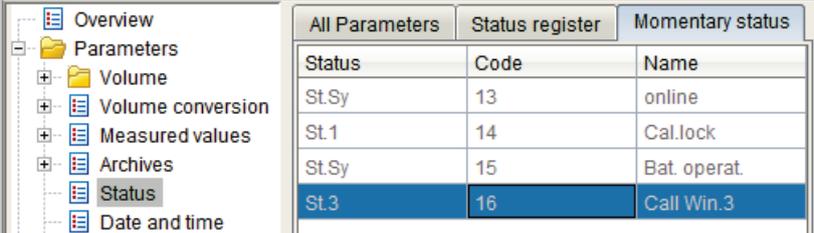
e) Data retrieval using the RS485 interface

Check the following points if data retrieval via the device connected to the RS485 interface does not now work:

- Are the wire straps between signals T+ and T- and between R+ and R- connected with the correct polarity as described in section 7.1.2.1.1 or 7.1.2.1.2?  
(Attention: the sequence of “+” and “-” is different for T+ and T- than for R+ and R-!)
- Is the power supply to the “Uext” terminals on the EK205 switched on?
- Does the connected device send the device address set as described in 7.1.2.2 c) when the connection is established?
- Is the time window set as described in 7.1.2.2 d) active?

You can check this as follows:

- Start *enSuite* and establish the communication link to the EK205 via the optical interface (see section 3.1).
- 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” by clicking on the relevant plus sign and then select “Status” and the “Momentary status” tab in the right-hand window.
- Check whether there is a line there with the entries “St.3”, “16” and “Call Win.3”.



Status	Code	Name
St.Sy	13	online
St.1	14	Cal.lock
St.Sy	15	Bat. operat.
St.3	16	Call Win.3

- If this is not the case, set the time window as described in section 7.1.2.2 d).
- Complete a reset on the terminal interface of the EK205:
  - Start *enSuite* and establish the communication link to the EK205 via the optical interface (see section 3.1).
  - 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” > “Terminal interface” by clicking on the relevant plus signs.
  - Enter the value “1” in “Reset terminal interface “ResI2”” and then click on the “Transfer changes to device” icon at the top of the enSuite window.

### 7.1.3 MTL5051

The MTL5051 is approved as an “associated apparatus” and can therefore be used as an interface isolator if the EK205 is installed in Zone 1.



*The MTL5051 only works with EK205 units with a year of construction starting from 2019.*

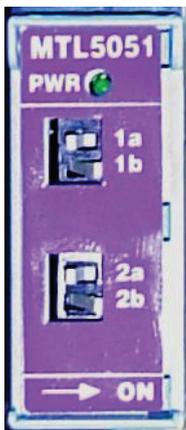


#### **Risk of explosion!**

If the EK205 is installed in a potentially explosive atmosphere, strictly follow all relevant safety instructions in the EK205 operating instructions!

#### 7.1.3.1 Switch settings of the MTL5051

Before connecting the MTL5051 to the EK205, set the switches of the MTL5051 to the required setting for this application:



1a = OFF (push switch to the left)  
1b = ON (push switch to the right)

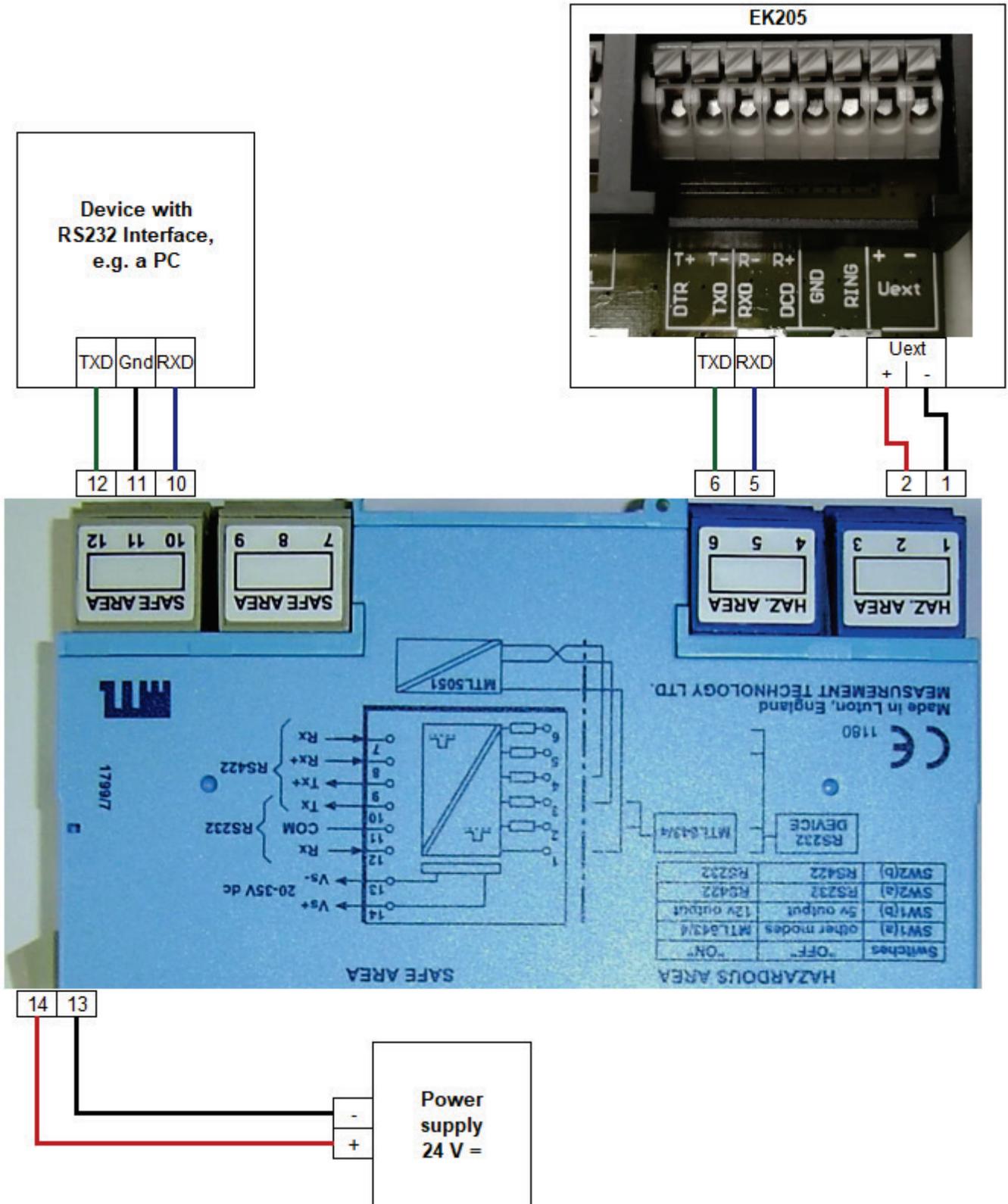
2a = OFF (push switch to the left)  
2b = ON (push switch to the right)

### 7.1.3.2 Connection



#### Risk of explosion!

If the EK205 is installed in a potentially explosive atmosphere, strictly follow all relevant safety instructions in the EK205 operating instructions!



### 7.1.3.3 EK205 parameterization



To parameterize the EK205, 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](http://www.elster-instromet.com).

#### a) Closing the time windows

Time windows 3 and 4 must be closed for parameterization to function securely. To do this:

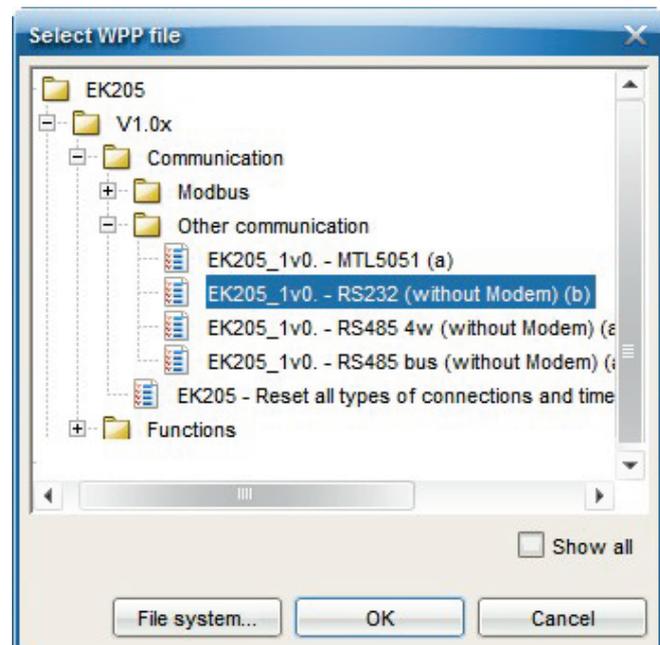
- Connect a PC or laptop with enSuite installed to the EK205 optical interface using the connection cable.
- Start enSuite and establish the communication link to the EK205 (see section 3.1).
- Select “Navigation” on the left-hand side and then “Parameterize online” at the bottom of the navigation window.
- At 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 acceptance windows 3 and 4, set start and end to the same value for each one and send the changes using the “Transfer changes to device” icon.
- Then wait a minute for any communications activity in progress on the EK205 to be safely stopped.

#### b) Sending the parameter file

- Send the following parameter file to the EK205 (see section 3.4, page 16):

EK205\_1v0. - MTL5051

On the right, you can see the navigation path to this parameter file in enSuite for software versions 1.0x of the EK205.



- For any further customized settings and tests, click on “Navigation” on the left-hand side and then on “Parameterize online” at the bottom of the navigation window.

Name	Value	Unit
Data format serial interface 2 "DF.S2"	3: auto	
Start baud rate external modem "Bd.S2"	9600	Bd
Switched baud rate external modem "BdId2"	9600	Bd
Number of ring tones until answer "Num.T"	2	
Init modem "M.INI"	Init modem	
Device address terminal interface (bus address) ...		
Designation of the terminal interface "Name"	Term.interf.	
Configuration external modem "InStr"		
Finalization String for the modem "InEnd"		
Test call acceptance window "CWTst"	0	minutes
Reset terminal interface "ResI2"	0	
Enable protocols "Prot2"	1: LIS200, 2: DLMS, 3: MODBUS	

**i** All the values listed in enSuite under "Parameters" can be found in the "Serv." and "Admin" display tabs of the EK205 using the same path.

c) Setting time windows for future data retrievals

In the basic configuration now set up, you can define time windows during which data can be retrieved cyclically from the EK205 via the modem. Time window 3 is used here as an example.

You can deactivate time windows which are not needed by setting the start and end of the time window to the same value.

- At 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 acceptance window 3, set the start to "00:00" and the end to "23:59".

No.	Type	Event	Cycle	Begin	End	Interface	Supply
1	1: period		daily	00:00	00:00	2: Terminal i.	2: Battery
2	1: period		daily	00:00	00:00	2: Terminal i.	2: Battery
3	1: period		daily	00:00	23:59	2: Terminal i.	3: ext. supply
4	1: period		daily	00:00	00:00	2: Terminal i.	3: ext. supply

- Then click on the "Transfer changes to device" icon at the top of the enSuite window.

**7.1.3.4 Retrieving data with enSuite**

If the device connected to the MTL5051 is a PC with enSuite installed, you can check the data retrieval as described in section 7.1.1.3. The process is identical.

## 7.2 Data transfer verification

The communication link (e.g. call window, modem used) to a destination must be established before the data can actually be transmitted. You can program six separate connections.



To parameterize the EK205, 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](http://www.elster-instromet.com).

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

“Parameterize online” > “Parameters” > “Interfaces”

All connections are inactive by default and preset as follows, as can be seen in *enSuite* under:

“Parameterize online” > “Parameters” > “Interfaces” > “Call time windows”

Connection	Event type	Interface	Power supply
1	Time window	Terminal / ext. modem	Always
2	Time window	Terminal / ext. modem	Always
3	Time window	Terminal / ext. modem	Ext. power supply
4	Time window	Terminal / ext. modem	Ext. power supply
5	Time	Terminal / ext. modem	Always
6	Time	Terminal / ext. modem	Always

### 7.2.1 Time window connection

The major parameters for activating a time window connection are listed below. For parameterization, go to the following sub-menu in *enSuite*:

“Connections” > “Connection 1” to ... > “Connection 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 23:59 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 EK205 is ready for reception. If a modem is connected to this interface, the EK205 will only be ready for reception after a further 30 seconds.

The conditions for activating a time window connection are as follows:

- Is the current device time within the parameterized time window?
- Does the supply to the EK205 correspond with the parameterization of the connection?



If the supply type “Always” is used, the EK205 is active during the set time window regardless of the voltage supply! In battery mode (in the same way as for supply type “Battery”), this can result in a significant reduction in the battery service life to just a few months!

The forecast remaining battery service life “Bat.R” does not take account of this case.

## 7.2.2 Connection configuration status StCon

Display	Meaning
0	Establishment of a connection has not yet started.
2	The interface is being activated for the connection.
3	The interface to be used for the connection (e.g. the modem) is busy, the EK205 will wait until the connection can be established. Either the interface is still being used for another connection or the EK205 is waiting to try again after a failed connection attempt. This state may persist for several minutes.
4	The interface (e.g. the modem) is ready to establish a connection (e.g. the call time window is open).
5	The interface is being released for the connection.
6	The interface (e.g. the modem) is released for use by other connections (e.g. 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 LIS-200 protocol is in progress.
12	Data transfer via LIS-200 protocol is complete.
15	SMS transfer is in progress.
16	SMS transfer is complete.
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.
31	The modem's supply voltage is too low.
32	The modem cannot be used due to a 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	The communication link to the network cannot be established or the communication link to the network was lost before the communication link to the remote subscriber could be established.
36	The communication link to the GSM network was denied.
37	The APN parameters required to establish a GPRS communication link are missing. <sup>1</sup>
38	The communication link to the APN <sup>2</sup> was denied.
39	The port for server connection was not configured.
40	The destination name or port was not configured.
41	The remote subscriber has disconnected.
42	The communication link to the network was lost after a communication link to the remote subscriber had already been established.
43	The telephone number of the SMS service center is wrong or missing on the SIM card. The mobile service provider must be contacted.
44	The APN password or APN user name is wrong.
45	The APN parameters are already in use by another mobile phone subscriber.

---

<sup>1</sup> APN = "Access Point Name"

Display	Meaning
70	Failure to establish a communication link to the remote subscriber. Possible cause: blocked by remote subscriber firewall, for example.
71	The remote subscriber did not respond (timeout). Possible causes: the remote subscriber is switched off or the remote subscriber has not been started.
72	The remote subscriber reports "unknown device type".
73	The EK205 does not understand the remote subscriber response. Possible cause: e.g. transfer error.
74	Sending error: when attempting to send data to the remote subscriber, the modem reported an error.
255	An unknown error has occurred.

### 7.2.3 Status of remote subscriber "MDst"

Display	Meaning
0	No connection started to the remote subscriber.
1	The remote subscriber is not fully configured. Check the related EK205 telephone book entry.
2	Connection to remote subscriber is being established.
3	Remote subscriber is busy.
4	Connection to remote subscriber established.
5	Disconnection from remote subscriber in progress.
6	Disconnection from remote subscriber finished.
7	Remote subscriber not reached. Check the related EK205 telephone book entry or check the readiness for reception of the remote subscriber.
8	Remote subscriber refused the connection. Check the related EK205 telephone book entry or check the readiness for reception of the remote subscriber.
9	Connection to remote subscriber aborted during communication.
11	Connection denied.
12	Connection denied (invalid access data).
13	Connection to the remote subscriber aborted (timeout).

## **8 Data transfer protocols**

### **8.1 LIS-200 protocol**

A description of the LIS-200 protocol can be found in the following documents:

- LIS-200 Device Readings – General Description ([2], page 1)
- LIS-200 Device Readings – Annex EK205 ([3], page 1)

## 8.2 Modbus

### 8.2.1 Default settings for the Modbus map

The following Modbus register default settings are used:

Register Address	Abbrev.	Designation/Value	Format	Unit	LIS200 address
1	Bat.R	Remaining battery service life	3	Months	2:404
2	Stat	Momentary status, total	3		1:100
3	VmT	Vm total, decimal places	3	10-4 m3	4:302_2
4	VbT	Vb total, decimal places	3	10-4 m3	2:302_2
5	W.T	W total, decimal places	3	10-4 kWh	1:302_2
101	VmT	Vm total, integers	4	m3	4:302_1
103	VbT	Vb total, integers	4	m3	2:302_1
105	W.T	W total, integers	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	Absolute pressure measurement	32	bar	6:210_1
307	p.Mes	Pressure measurement	32	bar	6:211_1
309	T.Mes	Temperature measurement	32	°C	5:210_1
311	C	Conversion factor	32		5:310
313	K	Compressibility ratio	32		8:310
315	p.F	Pressure substitute value	32	bar	7:311_1
317	T.F	Temperature substitute 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	Gas density at base conditions	32	kg/m <sup>3</sup>	13:314_1
327	Qm	Flow rate at measurement conditions	32	m <sup>3</sup> /h	4:310
329	Qb	Flow rate at base conditions	32	m <sup>3</sup> /h	2:310
331	P	Power	32	kW	1:310
333	Ho.b	Heating value	32	kWh/m <sup>3</sup>	10:314_1
335	dr	Density ratio	32		15:314
337	p	Pressure used	32	bar	7:310_1
339	T	Temperature used	32	°C	6:310_1
501	VmT	Vm total	9	m <sup>3</sup>	4:302
504	VbT	Vb total	9	m <sup>3</sup>	2:302
507	W.T	W total	9	kWh	1:302
801	VmT	Vm total	17	10 <sup>-4</sup> m <sup>3</sup>	4:302
805	VbT	Vb total	17	10 <sup>-4</sup> m <sup>3</sup>	2:302
809	W.T	W total	17	10 <sup>-4</sup> 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)

Changes to the Modbus register settings can be made using the enSuite parameterization software, e.g. via the optical interface.

### 8.2.2 Formats

Meaning of the formats used:

Format	Meaning
3	Ushort, 16 bits
4	Ulong, 32 bits
9	Counter6
12	Array2, BCD, 4 digits

Format	Meaning
16	Array6, BCD, 12 digits
17	Array8, BCD, 16 digits
32	IEEEfloat, 32 bits

Code	Format	Number of registers
------	--------	---------------------

a) Binary formats:

Code	Format	Number of registers
3	Number	1
4	Number	2
32	Exponential	2
9	Counter	3

Value
-------

MS word	LS word
Upper part	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
Integer, upper part	Integer, lower part	Decimal places

b) Decimal formats:

Code	Format	Number of registers
17	BCD counter*	4
	BCD time stamp*	4
16	BCD number	3
12	BCD time	1

MS word	...	...	LS word
Integers			Decimal places

MS word	...	...	LS word
CCYY**	MMDD**	hhmm**	ss00**

MS word	...	LS word
12 digits		

hhmm**
--------

- \* Counter or time stamp depending on the assigned LIS-200 address (see below)
- \*\* CC = Century, YY = Year, MM = Month, DD = Day, hh = Hour, mm = Minute, ss = Second

### 8.2.3 Preparing and editing the Modbus map

The preparation and editing of the Modbus map are described in document [4] "Modbus Communication with EK2x0\_V2.0\_\*.pdf". This document is available from Honeywell on request.

### 8.2.4 Reading values via Modbus

The "Read Holding Registers" (FC03) and "Read Input Registers" (FC04) Modbus functions have been implemented to read values.

Reading values is described in document [4] "Modbus Communication with EK2x0\_V2.0\_\*.pdf". This document is available from Honeywell on request.

### 8.2.5 Editing values via Modbus

The "Write Single Register" (FC06) and "Write Multiple Registers" (FC16) Modbus functions are implemented to edit values.

Editing values is described in document [4] "Modbus Communication with EK2x0\_V2.0\_\*.pdf". This document is available from Honeywell on request.

## 8.2.6 Requirements for Modbus operation

### 8.2.6.1 Power supply

In practical operation, Modbus is designed for permanent connection to a PLC. Since the latter often reads the values in cycles of one second or one minute, an external power supply is required. In exceptional cases (query once per day or less frequently), the connection can also be made in battery mode. In this case, the call acceptance window should be made as short as possible so that the batteries in the EK205 are not loaded more than necessary.

The set-up of the connections required for this is described in section 7.2.1.

### 8.2.6.2 Call acceptance window

An appropriate call acceptance window must be open depending on the connection used. The call acceptance window is also set during parameterization of the connections in section 7.2.1.

A standard call acceptance window of 00:00 – 23:59 in mains mode means, however, that no Modbus request can be answered at 23:59:30. If this request is necessary, a second call acceptance window, e.g. from 23:55 – 00:05, must be defined.

### 8.2.6.3 Open lock

A lock in the EK205 must be open so that values can be read via Modbus. Honeywell recommends that the customer lock be left open (attention: automatic closure of the lock must be disabled (= "0")). This enables all the values on the Modbus map to be read as well as the archives, if applicable, using Modbus. However, it is not possible to change values when only the customer lock is open.

To enable values to be adjusted using Modbus, the required lock (generally the administrator lock) must also be open. To use the administrator lock, therefore, the opening and closing of the lock should also be integrated in the Modbus map.

The procedure is described in document [4] "Modbus Communication with EK2x0\_V2.0\_\*.pdf".

### 8.2.6.4 Modbus map

The Modbus map must be synchronized between the PLC and the EK205 (default setting: see section 8.2.1). However, it can also be adjusted using enSuite if necessary. This is particularly the case if:

- Additional values are to be transferred via Modbus (max. 70 values possible).
- The data format must be adjusted.
- The Modbus register address must be changed (e.g. lots of systems attach an "offset" of 40000 to the request "FC03").
- The data is to be read consecutively by a single request to reduce the transfer time and extend the battery service life.

### 8.2.6.5 Help for commissioning

Since a Modbus connection always requires synchronization between the end user, the PLC programming and the settings in the EK205, Honeywell provides relevant help sheets, depending on the electrical connection, for downloading from its website in the section "Products, Solutions & Services" > "Support" > "RDT commissioning". The requirements for successful commissioning are also listed there. Honeywell can also provide support for this in the form of a mini project on request. Contact the Honeywell hotline for further details.

### 8.2.6.6 Query in bus mode

In bus mode, all subscribers must check whether a Modbus query is intended for them or another subscriber. Therefore, the following points must be maintained to ensure stable operation:



A pause of 3 seconds must be ensured between queries of values from subscriber "a" to "b" (change of slave address).



Since the EK205 operates with a cycle of at least 2 seconds, all values are only updated every 2 seconds in principle. Therefore, if a query was made every second, new values would still only be supplied every 2 seconds. Therefore, a pause of two seconds must be guaranteed between the individual queries to the EK205.

The timing parameters of the interface can be adjusted if necessary:

Abbrev.	Designation	Address	Value	Contents
–	Char Off 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 the end of the transfer to the next query
–	Protocol timeout in seconds	2:713	5	Waiting time after the end of the transfer to the next protocol detection

Table 2: Timing parameters

## 8.2.7 Modbus via the RS232 interface

In the EK205, Modbus can be used to communicate, among other things, via the terminal interface in RS232 mode. Values can be read and edited and archives can be read.

### 8.2.7.1 Connection

The connection of the RS232 interface is described in section 7.1.1.1.

### 8.2.7.2 EK205 parameterization

a) The parameterization of the RS232 interface function is described in section 7.1.1.2.

b) Parameter file for Modbus parameterization

Send the following parameter file to the EK205 (see section 3.4, page 16):

- [EK205\\_xvx.. - RS232 & Modbus-RTU \(über Verb.3 & ext.Vers.\)](#) <sup>1</sup>

c) For customized settings, the Modbus parameters (see section 8.2.9) can be set on the device using the “Admin” > “Interfaces” > “Terminal interface” > “Modbus” path.



All the values listed in the “Admin.” display tab of the EK205 can be found in enSuite under “Parameters” using the same path. To do so, click on “Navigation” on the left-hand side and then on “Parameterize online” at the bottom of the navigation window.

<sup>1</sup> The “x” in “xvx” stands for the device’s software version, e.g. “1v0..”.

The asterisk (\*) stands for a lower-case letter which marks the version of the file, e.g. “a”.

## 8.2.8 Modbus via RS485 – 2-wire bus mode

In the EK205, among other things, Modbus can be used to communicate via the terminal interface in RS485 bus mode. Values can be read and edited, and archives can be read.

### 8.2.8.1 Connection

The connection of the RS485-2w interface is described in section 7.1.2.1.2 on page 41.

### 8.2.8.2 EK205 parameterization

a) The parameterization of the RS485-2w interface function is described in section 7.1.2.2.

b) Parameter file for Modbus parameterization

Send the following parameter file to the EK205 depending on the required baud rate. (see section 3.4, page 16):

- EK205\_xvx. - RS485 2-Draht-Bus & Modbus-RTU 9600 Bd (über Verb.3 & ext.Vers.)
- EK205\_1v0. - RS485 2-Draht-Bus & Modbus-RTU 19200 Bd (über Verb.3 & ext.Vers.)<sup>1</sup>

c) For customized settings, the Modbus parameters can be set on the device using the “Admin” > “Interfaces” > “Terminal interface” > “Modbus” path (see section 8.2.9).



All the values listed in the “Admin.” display tab of the EK205 can be found in enSuite under “Parameters” using the same path. To access this, click on “Navigation” on the left-hand side and then on “Parameterize online” at the bottom of the navigation window.

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<sup>1</sup> The “x” in “xvx” stands for the device’s software version, e.g. “1v0.”.

The asterisk (\*) stands for a lower-case letter which marks the version of the file, e.g. “a”.

### 8.2.9 Customized settings for the Modbus values

The following Modbus parameters are preset by the parameter file (see section 8.2.7.2, paragraph “b)” or section 8.2.8.2, paragraph “b”):

Abbrev.	Designation	Address	Value	Contents
MBTrM	Transfer type	2:7B1	1	0: ASCII – the content of each register is transferred in the form of four ASCII-coded hexadecimal digits. 1: RTU – the content of each register is transferred in the form of two bytes. 2: TCP – transfer as in RTU mode with additional information for Modbus TCP protocol
MBDir	Data direction	2:7B0	1	0: H word first → the highest value word is in the first register 1: L word first → the lowest value word is in the first register (the byte sequence is always highbyte first)
MBAAdr	Device address (Modbus slave ID)	2:7B2	1 <sup>1</sup>	Value range from 1...247 (0 = “Broadcast”)
MBRSz	Register size	2:7B8	2	2: Register size 2 bytes 4: Register size 4 bytes Specifying the register size directly affects the possible register addresses in the Modbus table mentioned above. Therefore, the register size setting applies to both interfaces!
MBAMd	Addressing mode	2:7B9	0f	0: Log. mode (starting with “1”) 1: Phys. mode (starting with “0”)

Table 3: Preset Modbus parameters

#### Addressing mode

The Modbus addresses parameterized in the device are assigned on the basis of physical addresses. Depending on the retrieval software used, it may be necessary to edit the address in the protocol to the physical address.

0 = Logical address in the Modbus register with addresses starting with 1.

1 = Physical address in the Modbus register with addresses starting with 0.

Querying the registers depending on the addressing mode must take this into consideration as follows:

Value from table below	Addressing mode MBAMd	Value being queried (register)
301	“0” (logical → offset of “-1”)	“300”
	“1” (physical)	“301”

Table 4: Modbus addressing mode

<sup>1</sup> Value to be determined by the user.

The following connection parameters for connection 3 are preset by the parameter file (see section 8.2.7.2, paragraph “b)” or section 8.2.8.2, paragraph “b)”):

Abbrev.	Designation	Address	Value	Contents
CW3.S	Start of call time window	16:150	00:00	Start of call acceptance window
CW3.E	End of call time window	16:158	23:59	End of call acceptance window
Event	Connection event	3:D70	2F03	Call time window 3 begins
EvTyp	Connection event type	3:D75	1	0: Time 1: Period
Iface	Connection interface	3:D72	2	Terminal interface
SupIT	Connection supply type	3:D76	2	0: All 1: Battery mode 2: External supply
TypPr	Connection protocol type	3:D77	0	0: Server (protocol detection)

Table 5: Preset connection parameters

### 8.2.10 Reading archives via Modbus

Reading the archives is described in document [4] “Modbus Communication with EK2x0\_V2.0\_\*.pdf”. This document is available from Honeywell on request.

## 8.3 Interface applications

### 8.3.1 Resetting after a power failure

Most data transfers take place using an external power supply. In Modbus mode, in particular, a PLC will request data in very short cycles. If the external power supply fails, however, communication in progress will not necessarily be ended. This means that the device battery maintains communication and is therefore subject to a very high load. This will discharge the device battery very quickly.



Communication in battery mode places a very high load on the device battery. Since, however, active communication is not automatically interrupted, it must be guaranteed by suitable settings.

Using a parameter file in enSuite, you can make a setting to ensure that in the event that the external power supply fails, the interface is reset immediately. This file is included in the enSuite parameterization software from version 4.7.

#### 8.3.1.1 EK205 parameterization

a) Parameter file for Modbus parameterization

Send the following parameter file to the EK205 (see section 3.4, page 16) in the path:

EK205 from V1.05 – application: Reset terminal interface if the external power supply fails 1

b) No other settings are required.

<sup>1</sup> The “x” in “xvx” stands for the device’s software version, e.g. “1v0.”.

The asterisk (\*) stands for a lower-case letter which marks the version of the file, e.g. “a”.

## 9 Archives



A change to the default flexible archive structures may result in the incorrect processing of the read data by a downstream system!



In the event of a failure in the external voltage supply and the device battery, no archive data will be lost, since all the archives are saved in non-volatile memory blocks.

### 9.1 Measuring period archive

Meter readings and measurements are logged in the Measuring period archive at intervals of the measuring period “MPer”. The content of the Measuring period archive can be displayed on the device using the “Serv.” or “Admin” > “Archives” > “Meas.period archive” path.



The Measuring period archive is a flexible archive.

The archive contents and the storage capacity can be adjusted by a settings file using the “enSuite” parameterization software, provided the administrator lock is open.

If you require further information, please do not hesitate to contact our application team.

#### 9.1.1 Archive structure

Archive No.		3		
Name		Measuring period archive		
Type		Flexible		
Memory		DFLASH		
Datasets		8784		
No.	*	Address	Name	Meaning
1	a)	1:01F8	GONo	Global sequence number for archives
2		3:0A20	ABNo	Archive sequence number for archive 3
3		1:0400	Time	Date and time
4		2:0300	Vb	Main counter, standard volume (not in error)
5	b)		Vb Δ	Delta main counter, standard volume (not in error)
6		2:0302	VbT	Total standard volume
7	b)		VbT Δ	Delta total standard volume
8		4:0300	Vm	Main counter, actual volume (not in error)
9	b)		Vm Δ	Delta main counter, actual volume (not in error)
10		4:0302	VmT	Total actual volume
11	b)		VmT Δ	Delta total actual volume
12		16:0161	p.MP ∅	Mean value for p in last measuring period
13		15:0161	T.MP ∅	Mean value for T in last measuring period
14		17:0161	K.MP ∅	Mean value for K in last measuring period
15		18:0161	C.MP ∅	Mean value for C in last measuring period
16		2:0110	St.2	Momentary status 2
17		4:0110	St.4	Momentary status 4
18		7:0110	St.7	Momentary status 7
19		6:0110	St.6	Momentary status 6
20		2:0100	StSy	System status
21	b)	3:0A23	ErReg	Error register (16 bits)
22		3:0A22	Ev	Event triggering data logging for archive 3
23		3:0A21	Check	Archive dataset checksum (CRC) for archive 3
* a)		Not displayed		

\* b) Not transferred using LIS-200 protocol

The index progress in comparison to each preceding entry is labelled with a “Δ”. Normally, this is the flow rate (consumption) over a measuring period. This is only not the case if an archive row is added as a result of a specific event (e.g. setting the clock or a counter, displaying an important status message). In this case, the reading for the displayed index progress flashes so as to notify the user of this special event (for more details, see also operating manual “Use as a load registration device”).

### 9.1.2 Storage capacity

By default, the archive has 8784 data rows, which corresponds to a storage capacity of more than 12 months for a measuring period of 60 minutes.

The number of data rows and thus the recording duration of the archive can be increased by reducing the number of parameters to be recorded.



*The Measuring period archive is a ring memory. Once the archive is full, the oldest entries are overwritten.*

### 9.1.3 Changing the measuring period

All the values relating to the measuring period are formed using the measuring period set here.

- To set the measuring period to a different value on the device, open the administrator or calibration lock as described in the EK205 operating instructions.



*If there are still at least two entries empty in the certification data log, the measuring period can be changed when the administrator lock is open. Otherwise, the value can only be changed with the calibration lock open.*

- Move the cursor in the “Serv.” or “Admin” tab to “Archives” > “MPer”.
- Press the **ENTER** key combination. ⇒ A digit in the value will flash.
- Move the cursor to the digits using the **▶** or **◀** arrow key and change them using the **▲** or **▼** arrow key.



*The measuring period is set to “60 minutes” as default.  
Sensible and conventional values are 5, 10, 15, 20, 30 or 60 minutes.*

- Press the **ENTER** key combination to confirm the set value. The input process can be cancelled by pressing the **ESC** key combination.

### 9.1.4 Values relating to the measuring period

#### 9.1.4.1.1 Conversion values

To display the current conversion values relating to the measuring period, move the cursor in the “Serv.” or “Admin” tab to “Volume conversion” > “per measuring period”.

Short name	Description
K.MPc Ø	Mean K factor for the current measuring period
K.MP Ø	Mean K factor for the previous measuring period
C.MPc Ø	Mean C factor for the current measuring period
C.MP Ø	Mean C factor for the previous measuring period

If a short name flashes, this means that the mean value does not refer precisely to a measuring period because a relevant measuring period boundary has been skipped. The cause of this may be setting the clock beyond a measuring period boundary or a power failure.

### 9.1.4.1.2 Measurements

To display the current measurements relating to the measuring period, move the cursor in the “[Serv.](#)” or “[Admin](#)” tab to “[Measured values](#)” > “[per measuring period](#)”.

Short name	Description
<a href="#">T.MPc Ø</a>	Mean temperature value for the current measuring period
<a href="#">T.MP Ø</a>	Mean temperature value for the previous measuring period
<a href="#">p.MPc Ø</a>	Mean pressure value for the current measuring period
<a href="#">p.MP Ø</a>	Mean pressure value for the previous measuring period

If a short name flashes, this means that the mean value does not refer precisely to a measuring period because a relevant measuring period boundary has been skipped. The cause of this may be setting the clock beyond a measuring period boundary or a power failure.

### 9.1.5 Residual duration of the measuring period

The residual duration of the current measuring period can be displayed on the device. To do this, move the cursor in the “[Serv.](#)” or “[Admin](#)” tab to “[Archives](#)” > “[MP.Re](#)”.

### 9.1.6 Freezing data in the Measuring period archive

This function enables a data row to be saved in the Measuring period archive.

- Open the administrator lock as described in the EK205 operating instructions.
- Move the cursor in the “[Serv.](#)” or “[Admin](#)” tab to “[Archives](#)” > “[FrMP](#)”.
- Press the [ENTER](#) key combination. ⇒ “0” will flash.
- Change the value to “1” using the ▲ or ▼ arrow key.
- Press the [ENTER](#) key combination to confirm the set value. The input process can be cancelled by pressing the [ESC](#) key combination.

As the triggering event “[Ev](#)” is also saved, the data row indicates why it has been saved: if the “[Ev](#)” column contains the entry “[FrMP↑](#)”, the row was written by entering “[FrMP](#)”.

### 9.1.7 Clearing the Measuring period archive

The content of this archive can be cleared along with other archives using the “[Clr.A](#)” function as described in section [2.4.3](#).

The content of this archive can also be cleared using the “[Clr.V](#)” function as described in section [2.4.2](#).

## 9.2 Daily archive

Meter readings and measurements are logged in the Daily archive at intervals of the day boundary “DayB”. The content of the Daily archive can be displayed on the device using the “Serv.” or “Admin” > “Archives” > “Daily archive” path.



*The Daily archive is a flexible archive.*

*The archive contents and the storage capacity can be adjusted by a settings file using the “enSuite” parameterization software, provided the administrator lock is open.*

*If you require further information, please do not hesitate to contact our application team.*

### 9.2.1 Archive structure

Archive No.		7		
Name		Daily archive		
Type		Flexible		
Memory		DFLASH		
Data rows		600		
No.	*	Address	Name	Meaning
1	a)	1:01F8	GONo	Global sequence number for archives
2		7:0A20	ABNo	Archive sequence number for archive 7
3		1:0400	Time	Date and time
4		2:0300	Vb	Main counter, standard volume (not in error)
5	b)		Vb Δ	Delta main counter, standard volume (not in error)
6		2:0302	VbT	Total standard volume
7	b)		VbT Δ	Delta total standard volume
8		4:0300	Vm	Main counter, actual volume (not in error)
9	b)		Vm Δ	Delta main counter, actual volume (not in error)
10		4:0302	VmT	Total actual volume
11	b)		VmT Δ	Delta total actual volume
12		20:0161	p.Dy ∅	Mean value for p on the last day
13		19:0161	T.Dy ∅	Mean value for T on the last day
14		21:0161	K.Dy ∅	Mean value for K on the last day
15		22:0161	C.Dy ∅	Mean value for C on the last day
16		2:0110	St.2	Momentary status 2
17		4:0110	St.4	Momentary status 4
18		7:0110	St.7	Momentary status 7
19		6:0110	St.6	Momentary status 6
20		2:0100	StSy	System status
21	b)	7:0A23	ErReg	Error register (16 bits)
22		7:0A22	Ev	Event triggering data logging for archive 7
23		7:0A21	Check	Archive dataset checksum (CRC) for archive 7
* a)		Not displayed		
* b)		Not transferred using LIS-200 protocol		

The index progress in comparison to each preceding entry is labelled with a “Δ”. Normally, this is the flow rate (consumption) over one day. This is only not the case if an archive row is added as a result of a specific event (e.g. setting the clock or a counter, displaying an important status message). In this case, the reading for the displayed index progress flashes so as to notify the user of this special event (for more details, see also operating manual “Use as a load registration device”).

## 9.2.2 Storage capacity

By default, the archive has 600 data rows, which corresponds to a storage capacity of around 19 months.



*The Daily archive is a ring memory. Once the archive is full, the oldest entries are overwritten.*

## 9.2.3 Changing the day boundary

All the values relating to the day boundary are formed using the day boundary.

- To set the day boundary to a different value on the device, open the administrator lock as described in the EK205 operating instructions.
- Move the cursor in the “[Serv.](#)” or “[Admin](#)” tab to “[Archives](#)” > “[DayB](#)”.
- Press the [ENTER](#) key combination. ⇒ A digit in the value will flash.
- Move the cursor to the digits using the [▶](#) or [◀](#) arrow key and change them using the [▲](#) or [▼](#) arrow key.
- Press the [ENTER](#) key combination to confirm the set value. The input process can be cancelled by pressing the [ESC](#) key combination.

## 9.2.4 Values relating to the day boundary

### 9.2.4.1.1 Conversion values

To display the current conversion values relating to the day boundary, move the cursor in the “[Serv.](#)” or “[Admin](#)” tab to “[Volume conversion](#)” > “[per day](#)”.

Short name	Description
<a href="#">K.Dyc</a> Ø	Mean K factor for the current day
<a href="#">K.Dy</a> Ø	Mean K factor for the previous day
<a href="#">C.Dyc</a> Ø	Mean C factor for the current day
<a href="#">C.Dy</a> Ø	Mean C factor for the previous day

If a short name flashes, this means that the mean value does not refer precisely to a day because a relevant day boundary has been skipped. The cause of this may be setting the clock beyond a day boundary or a power failure.

### 9.2.4.1.2 Measurements

To display the measurements relating to the day boundary, move the cursor in the “[Serv.](#)” or “[Admin](#)” tab to “[Measured values](#)” > “[per day](#)”.

Short name	Description
<a href="#">T.Dyc</a> Ø	Mean temperature value for the current day
<a href="#">T.Dy</a> Ø	Mean temperature value for the previous day
<a href="#">p.Dyc</a> Ø	Mean pressure value for the current day
<a href="#">p.Dy</a> Ø	Mean pressure value for the previous day

If a short name flashes, this means that the mean value does not refer precisely to a day because a relevant day boundary has been skipped. The cause of this may be setting the clock beyond a day boundary or a power failure.

## 9.2.5 Elapsed time since the day boundary

The time which has elapsed since the last skipped day boundary can be displayed on the device. To do this, move the cursor in the “[Serv.](#)” or “[Admin](#)” tab to “[Archives](#)” > “[TmDBy](#)”.

## 9.2.6 Clearing the Daily archive

The content of this archive can be cleared along with other archives using the “[Clr.A](#)” function as described in section [2.4.3](#).

The content of this archive can also be cleared using the “[Clr.V](#)” function as described in section [2.4.2](#).

### 9.3 Monthly archive 1 (monthly meter readings)

Meter readings and maximum consumption levels from the previous months are logged in Monthly archive 1 at intervals of the month boundary (= day boundary on the first of each month).

The content of Monthly archive 1 can be displayed on the device using the “Serv.” or “Admin” > “Archives” > “Monthly archive 1” path.



*Monthly archive 1 is a flexible archive.*

*The archive contents and the storage capacity can be adjusted by a settings file using the “enSuite” parameterization software, provided the administrator lock is open.*

*If you require further information, please do not hesitate to contact our application team.*

#### 9.3.1 Archive structure

Archive No.		1		
Name		Monthly archive 1		
Type		Flexible		
Memory		DFLASH		
Data rows		24		
No.	*	Address	Name	Meaning
1	a)	1:01F8	GONo	Global sequence number for archives
2		1:0A20	ABNo	Archive sequence number for archive 1
3		1:0400	Time	Date and time
4		2:0300	Vb	Main counter, standard volume (not in error)
5		2:0302	VbT	Total standard volume
6		3:0161	VbMP ↑	Max. measuring period counter for Vb in the last month
7		3:0165	Time	Time stamp for max. measuring period counter for Vb in the last month
8		3:0169	Stat	Related status
9		4:0161	VbDy ↑	Max. day counter for Vb in the last month
10		4:0165	Time	Time stamp for max. day counter for Vb in the last month
11		4:0169	Stat	Related status
12		4:0300	Vm	Main counter, actual volume (not in error)
13		4:0302	VmT	Total actual volume
14		10:0161	VmMP ↑	Max. measuring period counter for Vm in the last month
15		10:0165	Time	Time stamp for max. measuring period counter for Vm in the last month
16		10:0169	Stat	Related status
17		11:0161	VmDy ↑	Max. day counter for Vm in the last month
18		11:0165	Time	Time stamp for max. day counter for Vm in the last month
19		11:0169	Stat	Related status
20		2:0110	St.2	Momentary status 2
21		4:0110	St.4	Momentary status 4
22	b)	1:0A23	ErReg	Error register (16 bits)
23		1:0A21	Check	Archive dataset checksum (CRC) for archive 1
* a) Not displayed * b) Not transferred using LIS-200 protocol				

#### 9.3.2 Storage capacity

By default, the archive has 24 data rows, which corresponds to a storage capacity of around 2 years.



*Monthly archive 1 is a ring memory. Once the archive is full, the oldest entries are overwritten.*

### 9.3.3 Changing the month boundary (= day boundary)

See section 9.2.3 Changing the day boundary.

### 9.3.4 Clearing Monthly archive 1

The content of this archive can be cleared along with other archives using the “[Clr.A](#)” function as described in section 2.4.3.

The content of this archive can also be cleared using the “[Clr.V](#)” function as described in section 2.4.2.

## 9.4 Logbook (event logbook)

Status changes are logged in the logbook.

The content of the logbook can be displayed on the device using the “[Serv.](#)” or “[Admin](#)” > “[Archives](#)” > “[Logbook](#)” path.



*The logbook is not a flexible archive, in other words, the content and storage capacity cannot be changed.*

### 9.4.1 Archive structure

Archive No.		4		
Name		Event logbook		
Type		Fixed		
Memory		EEPROM		
Data rows		500		
No.	*	Address	Name	Meaning
1	a)	1:01F8	<a href="#">GONo</a>	Global sequence number for archives
2		4:0A20	<a href="#">ABNo</a>	Archive sequence number for archive 4
3		1:0400	<a href="#">Time</a>	Date and time
4		4:0A22	<a href="#">Ev</a>	Event triggering data logging for archive 4
5		4:0A21	<a href="#">Check</a>	Archive dataset checksum (CRC) for archive 4
* a)		Not displayed		

### 9.4.2 Storage capacity

The archive can save the last 500 status changes.



*The logbook is a ring memory. Once the archive is full, the oldest entries are overwritten.*

### 9.4.3 Clearing the logbook

The content of this archive can only be cleared after opening the calibration lock using the “[Clr.V](#)” function as described in section 2.4.2.

The “[Clr.A](#)” function described in section 2.4.3 has no effect on this archive.

## 9.5 Audit trail

Changes to settings (parameterizations) are logged in the Audit trail.

The content of the Audit trail can be displayed on the device using the “[Serv.](#)” or “[Admin](#)” > “[Archives](#)” > “[Audit trail](#)” path.



*The Audit trail is not a flexible archive, in other words, the content and storage capacity cannot be changed.*

### 9.5.1 Archive structure

Archive No.		5		
Name	Audit trail			
Type	Fixed			
Memory	EEPROM			
Data rows	200			
No.	*	Address	Name	Meaning
1	a)	1:01F8	<a href="#">GONo</a>	Global sequence number for archives
2		5:0A20	<a href="#">ABNo</a>	Archive sequence number for archive 5
3		1:0400	<a href="#">Time</a>	Date and time
4		5:0810	<a href="#">Addr</a>	Address of the changed value
5		5:0811	<a href="#">old</a>	Old value
6		5:0812	<a href="#">new</a>	New value
7		1:0170	<a href="#">St.PL</a>	Calibration lock: Status / close
8		2:0170	<a href="#">St.ML</a>	Manufacturer lock: Status / close
9		3:0170	<a href="#">St.AL</a>	Supplier lock: Status / close
10		4:0170	<a href="#">St.CL</a>	Customer lock: Status / close
11		5:0A21	<a href="#">Check</a>	Archive dataset checksum (CRC) for archive 5
* a) Not displayed				

### 9.5.2 Storage capacity

The archive can save the last 200 settings changes (parameterizations).



*The Audit trail is a ring memory. Once the archive is full, the oldest entries are overwritten.*

### 9.5.3 Clearing the Audit trail

The content of this archive can only be cleared after opening the calibration lock using the “[Clr.V](#)” function as described in section [2.4.2](#).

The “[Clr.A](#)” function described in section [2.4.3](#) has no effect on this archive.

## 9.6 Update archive

Updates to the device software attempted or completed using the interface are logged in the Update archive. The content of the Update archive can be displayed on the device using the “Serv.” or “Admin” > “Archives” > “Update archive” path.



*The Update archive is not a flexible archive, in other words, the content and storage capacity cannot be changed.*

### 9.6.1 Archive structure

Archive No.		8		
Name	Software update archive pursuant to Welmec			
Type	Fixed			
Memory	EEPROM			
Data rows	20			
No.	*	Address	Name	Meaning
1	a)	1:01F8	GONo	Global sequence number for archives
2		8:0A20	ABNo	Archive sequence number for archive 8
3		1:0400	Time	Date and time
4		2:0197	NVers	New firmware version
5		1:0198_1	SigRL	Signature of the new firmware version, part 'R', low part
6		1:0198_2	SigRH	Signature of the new firmware version, part 'R', high part
7		2:0198_1	SigSL	Signature of the new firmware version, part 'S', low part
8		2:0198_2	SigSH	Signature of the new firmware version, part 'S', high part
9		8:0811	User	User who started the firmware update
10		8:0812	Reslt	Result of the firmware update
11		8:0A21	Check	Archive dataset checksum (CRC) for archive 8
* a) Not displayed				

### 9.6.2 Storage capacity

The archive can save the last 20 updates or update attempts for the device software.



*The Update archive is not a ring memory.*

When the archive is full, it must be cleared to enable further updates or update attempts to be completed (see section 9.6.3).

### 9.6.3 Clearing the Update archive



*The Update archive is also cleared using the “ClrV” function (see section 2.4.2 Clear volume and archive (“Clr.V”).*

- To clear the Update archive on the device, open the calibration lock as described in the EK205 operating instructions.
- Move the cursor in the “Serv.” or “Admin” tab to “Archives” > “ClrUL”.
- Press the ENTER key combination. ⇒ “0” will flash.
- Change the value to “1” using the ▲ or ▼ arrow key.
- Press the ENTER key combination to confirm the set value. The input process can be cancelled by pressing the ESC key combination.

## 9.7 Certification data logbook

Using the certification data logbook, several parameters which are relevant from a statutory calibration viewpoint (see EK205 operating instructions) can be edited, provided the administrator lock is open.

A data row is entered for every change to one of these parameters when the calibration lock is closed. Furthermore, an entry is always made when the calibration lock is opened or closed.



*The certification data logbook is not a flexible archive, in other words, the content and storage capacity cannot be changed.*

### 9.7.1 Activating and deactivating the certification data logbook

- To activate or deactivate the certification data logbook on the device, open the calibration lock as described in the EK205 operating instructions.
- Move the cursor in the “Serv.” or “Admin” tab to “Archives” > “CDL”.
- Press the **ENTER** key combination. ⇒ The previously set value will flash.
- Change the value to “0” using the ▲ or ▼ arrow key to deactivate the certification data logbook or to “1” to activate it.
- Press the **ENTER** key combination to confirm the set value. The input process can be cancelled by pressing the **ESC** key combination.



*If the certification data logbook is deactivated, the affected values will be protected by the calibration lock.*

### 9.7.2 Archive structure

Archive No.		9		
Name		Certification data logbook		
Type		Fixed		
Memory		EEPROM		
Data rows		50		
No.	*	Address	Name	Meaning
1	a)	1:01F8	GONo	Global sequence number for archives
2		9:0A20	ABNo	Archive sequence number for archive 9
3		1:0400	Time	Date and time
4		9:0810	Addr	Address of the changed value
5		9:0811	old	Old value
6		9:0812	new	New value
7		1:0170	St.PL	Calibration lock: Status / close
8		2:0170	St.ML	Manufacturer lock: Status / close
9		3:0170	St.AL	Supplier lock: Status / close
10		4:0170	St.CL	Customer lock: Status / close
11		5:0170	St.DL	Data reader lock: Status / close
12		6:0170	StU6L	Lock 6: Status / close
13		7:0170	StUpL	Update lock: Status / close
14		8:0170	StCDL	Certification data log lock: status
15		1:070C	UsOpt	User logged in on the optical interface
16		2:070C	UsTrm	User logged in on the terminal interface
17		9:0A21	Check	Archive dataset checksum (CRC) for archive 9
* a)		Not displayed		

### 9.7.3 Storage capacity

The certification data logbook trail has 50 data rows.

Since the first data row always logs the closure of the calibration lock and the last data row is always kept clear for opening the calibration lock, a maximum of 48 parameter changes can be entered.



*The certification data logbook is not a ring memory.*

*When the archive is full, it must be cleared (see section 9.7.4) before further changes to calibration values can be made with the administrator lock open (see EK205 operating manual).*

### 9.7.4 Clearing the certification data logbook



*The certification data logbook is also cleared using the “ClrV” function (see section 2.4.2 Clear volume and archive (“Clr.V”)).*

- To clear the certification data logbook on the device, open the calibration lock as described in the EK205 operating instructions.
- Move the cursor in the “Serv.” or “Admin” tab to “Archives” > “CICDL”.
- Press the **ENTER** key combination. ⇒ “0” will flash.
- Change the value to “1” using the ▲ or ▼ arrow key.
- Press the **ENTER** key combination to confirm the set value. The input process can be cancelled by pressing the **ESC** key combination.

## 9.8 Test archive “Frozen data”

The Test archive “Frozen data” is provided for operating point tests. Using the keypad command “Frz” (“freeze”), you can synchronously save all the values relevant to volume conversion in one data row (one dataset). If you save two data rows, you can also read the index progress of the volumes.



*The Test archive “Frozen data” is a flexible archive.*

*The archive contents and the storage capacity can be adjusted by a settings file using the “enSuite” parameterization software, provided the administrator lock is open.*

*If you require further information, please do not hesitate to contact our application team.*

### 9.8.1 Archive structure

Archive No.		6		
Name		Test archive		
Type		Flexible		
Memory		FRAM		
Data rows		2		
No.	*	Address	Name	Meaning
1	a)	1:01F8	GONo	Global sequence number for archives
2		6:0A20	ABNo	Archive sequence number for archive 6
3		1:0400	Time	Date and time
4		2:0300	Vb	Main counter, standard volume (not in error)
5	b)		Vb Δ	Delta main counter, standard volume (not in error)
6		4:0300	Vm	Main counter, actual volume (not in error)
7	b)		Vm Δ	Delta main counter, actual volume (not in error)
8		2:0305	VbRp	Standard volume revision counter
9	b)		VbRp Δ	Delta standard volume revision counter
10		4:0305	VmRp	Actual volume revision counter
11	b)		VmRp Δ	Delta actual volume revision counter
12		7:0310	p	Gas pressure (absolute)
13	b)	6:0310_1	T	Gas temperature
14	a)	6:0310	T	Gas temperature
15		8:0310	K	Compressibility ratio
16		5:0310	C	Conversion factor
17		2:0310	Qb	Flow rate at base conditions
18		4:0310	Qm	Flow rate at measurement conditions
19		6:0A21	Check	Archive dataset checksum (CRC) for archive 6
* a)		Not displayed		
* b)		Not transferred using LIS-200 protocol		

### 9.8.2 Saving (freezing) values in the archive

Proceed as follows to save a new data row in the Test archive “Frozen data”:

- Move the cursor in the “Serv.” tab to “Examination” > “Frz”.
- Press the ENTER key combination. ⇒ “0” will flash.
- Change the value to “1” using the ▲ or ▼ arrow key.
- Press the ENTER key combination to confirm the set value. The input process can be cancelled by pressing the ESC key combination.
- You can now view the saved data row in the archive by moving the cursor in the “Serv.” tab to “Examination” > “Frozen data” and opening the archive with the ► arrow key.

## 9.9 User archives

The EK205 has four user archives (archives No. 12 to 15).

The content of the user archives can be displayed on the device using the “[Serv.](#)” or “[Admin](#)” > “[Archives](#)” > “[User archives](#)” path.

The user archives are flexible archives and are designed for configuration by the user.

The archive contents and the storage capacity can be adjusted by a settings file using the “enSuite” parameterization software, provided the administrator lock is open.

If you require further information, please do not hesitate to contact our application team.

All user archives are ring memories. Once the archives are full, the oldest entries are overwritten.

### 9.9.1 Clearing the user archives

The content of the user archives can be cleared along with other archives using the “[Clr.A](#)” function as described in section [2.4.3](#).

The content of this archive can also be cleared using the “[Clr.V](#)” function as described in section [2.4.2](#).

If you reconfigure a user archive, it may also be cleared, depending on the type of change. This may also result in other user archives being cleared.

## 10 Status messages

The EK205 delivers two types of status information: Momentary status “Stat” (also known as “status”) and status register “SReg”. These can be found in the “Admin.” and “Serv.” display tabs under Status.

Messages in the momentary status “Stat” indicate current conditions such as pending errors. As soon as the state no longer applies, the relevant message is removed from the momentary status.

Alarms, warnings and notes are displayed in the momentary statuses (i.e. messages with numbers in the range of 1 to 16).

All the messages since the last time the register was cleared manually will be collected in the 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 registers (i.e. messages with numbers in the range from “1” to “8”). Notes are not stored as they communicate events which do not cause disruption or are even intended (e.g. “Daylight saving time – Dayl.Sav.Tim”, “Calibration lock open” or “Connection to remote terminal is in progress”).

SReg and Stat are summaries of multiple status words. They initially display all existing messages as numbers. These can be opened individually as short texts using <ENTER>: first of all, the most important message (with the lowest number) will be displayed. You can scroll to the next or previous message using the ► and ◀ keys. The display shows the name of the relevant status word and the message number preceded by a # and then the short text. This information can be useful for entering a status pointer for the outputs.

### 10.1 Clearing messages in the status register

The messages in SReg (not in Stat) can be cleared using the “Clr” command.

- To clear the status register with the “Clr” function on the device, open the administrator lock as described in the EK205 operating instructions.
- Move the cursor in the “Serv.” or “Admin” tab to “Status > “Clr”.
- Press the ENTER key combination. ⇒ “0” will flash.
- Change the value to “1” using the ▲ or ▼ arrow key.
- Press the ENTER key combination to confirm the set value. The input process can be cancelled by pressing the ESC key combination.

### 10.2 List of status messages

Message	Status	Designation	Description, procedure
<b>a) Alarms, faults</b>			
1	StSy	<b>Restart</b>	If this message appears during operation, the device is defective. Please contact the Honeywell Customer Service Department.
1	StS2	<b>Data error</b>	An error was detected during the cyclic check of data subject to calibration. Please contact the Honeywell Customer Service Department.
1	St.5	<b>C-fact. err.</b>	The conversion factor could not be calculated as the measured gas temperature is outside the range from -100°C to +100°C or no useful compressibility ratio is available.
1	St.6	<b>T Alarm lim.</b>	The measured gas temperature is outside the permitted limits. The limits can be changed during the commissioning procedure in the presence of a calibration official (see operating instructions [1]).
1	St.7	<b>p Alarm lim.</b>	The measured gas pressure is outside the permitted limits. The limits can be changed during the commissioning procedure in the presence of a calibration official (see operating instructions [1]).
1	St.8	<b>K-val. error</b>	The compressibility ratio could not be calculated as a valid compressibility factor has not yet been found.

Message	Status	Designation	Description, procedure
1	St.9	<b>z-fact. err.</b>	The compressibility factor could not be calculated. At least one of the gas analysis values Ho.b, CO <sub>2</sub> , H <sub>2</sub> or Rhob is outside the permitted range.
2	St.5	<b>T Inp. error</b>	The gas temperature cannot be measured as a result of a fault. Please contact the Honeywell Customer Service Department.
2	St.6	<b>p Inp. error</b>	The gas pressure cannot be measured as a result of a fault. Please contact the Honeywell Customer Service Department.
<b>b) Warnings</b>			
3	StSy	<b>Data restore</b>	The batteries of the EK205 have intermittently failed. As a result of this, the time has not changed and no measurements have been logged and converted. However, all the data have been retained. This message appears when old batteries are removed before connecting the new ones (see operating instructions [1]). Procedure using the "enSuite" parameterization program: - Set the time of the EK205. - Clear the status register.
4	St.1	<b>Outp.1 Error</b>	More pulses should be emitted from the specified output than are permitted by its settings. To rectify the cause of the problem, you can - either reduce the cp value of the output - or increase the output frequency
4	St.2	<b>Outp.2 Error</b>	using the "enSuite" parameterization program. In both cases, the change must be tailored to the device connected to the output.
6	St.2	<b>Vb warn lim.</b>	The monitored standard volume consumption value (default value: hourly consumption) is outside the set warning limits. Which value is monitored and the warning limits can be adjusted using the "enSuite" parameterization program, for example.
6	St.4	<b>Qm warn lim.</b>	The flow rate at measurement conditions (the gas flow rate) is outside the set warning limits. The warning limits can be adjusted using the "enSuite" parameterization program, for example.
6	St.6	<b>T warn lim.</b>	The measured gas temperature is outside the set warning limits. The warning limits can be adjusted using the "enSuite" parameterization program, for example.
6	St.7	<b>p warn lim.</b>	The measured gas pressure is outside the set warning limits. The warning limits can be adjusted using the "enSuite" parameterization program, for example.
6	St.9	<b>z warning</b>	The total of the gas analysis values pursuant to AGA8-92-DC is greater or less than 100%. This means that a correct calculation of the compressibility factor and the compressibility ratio could not be carried out.
7	StSy	<b>Softw. error</b>	This message is used for factory diagnosis. Please contact the Honeywell Customer Service Department.
7	StS2	<b>Update error</b>	Before the software update, an error was detected in the cached software image.
8	StSy	<b>Sett. error</b>	The programming of the device has generated an incompatible combination of settings. Please contact the Honeywell Customer Service Department.
9	StSy	<b>Batt. low</b>	The remaining battery service life is less than six months. The batteries need to be changed soon.

Message	Status	Designation	Description, procedure
<b>c) Notes</b>			
11	StSy	<b>Clock n. set</b>	The internal clock of the volume conversion device has not been adjusted at the factory.
11	StS2	<b>U.Logb. full</b>	The software update logbook is full. An update is only possible if the content of the software update logbook has been cleared.
12	StSy	<b>CDL full</b>	The certification data logbook is full. Changing the parameters marked with "CDL" without opening the calibration lock is only possible if the content of the certification data logbook has been cleared.
13	StSy	<b>online</b>	Data is currently being transmitted via an interface (modem, optical interface or terminal interface). If this message is displayed, the "o" in the "Status" field of the display will flash.
13	St.2	<b>I2 Rep.sig.</b>	If input 2 has been configured as an information input, this message will be displayed if there is an active signal at terminal DE2. The input configuration can be adjusted using the "enSuite" parameterization program.
14	St.1	<b>Cal.lock</b>	The calibration lock is open. In normal operation, the calibration lock should be closed to prevent unauthorized changes. To close the calibration lock, go to Ctrl. -> St.PL and enter the value "0".
14	St.3	<b>Admin. lock</b>	The administrator lock is open.
14	St.4	<b>Cust.lock o.</b>	The customer lock is open.
15	StSy	<b>Bat. operat.</b>	The EK205 is in battery mode. This note is primarily used to inform a remote data readout system that the batteries will discharge more quickly during long periods of data transfer.
16	StSy	<b>Dayl.Sav.Tim</b>	The time displayed in the volume conversion device is daylight saving time. The switchover mode can be changed using the "enSuite" parameterization program.
16	St.1	<b>Call Win.1</b>	The specified call acceptance time window is active, i.e. the volume conversion device will accept data transfer calls.
16	St.2	<b>Call Win.2</b>	
16	St.3	<b>Call Win.3</b>	
16	St.4	<b>Call Win.4</b>	
16	St.5	<b>Call Win.5</b>	
16	St.6	<b>Call Win.6</b>	

# 11 Batteries

## 11.1 Service life of the device battery

Please contact our application team for further information on other operating modes than those listed below.

### 11.1.1 Standard mode

In standard mode with no special settings, the battery service life is at least 5 years.

Standard mode is defined as follows:

Batteries:..... 1 battery pack

Measuring cycle: ..... 30 seconds

Communication:..... 15 minutes data transfer per month via the optical interface

Display switched on: ..... 15 minutes per month

The battery service life in other operating modes is shown in the following sections.

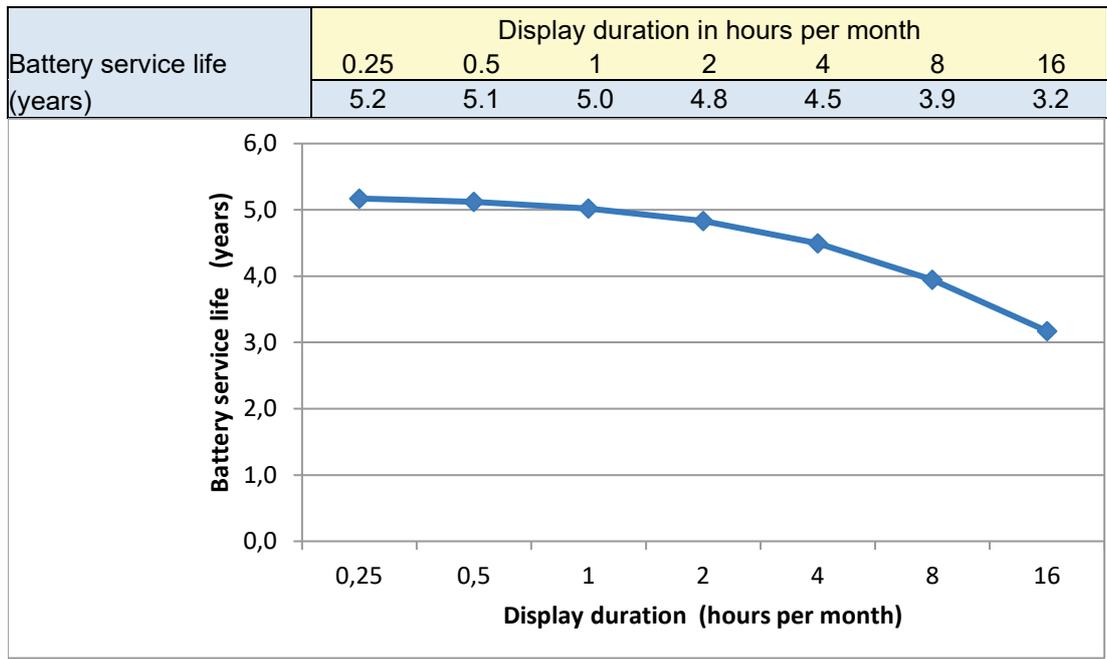
### 11.1.2 Depending on the display duration

Conditions:

Batteries:..... 1 battery pack

Measuring cycle: ..... 30 seconds

Communication:..... 15 minutes data transfer per month via the optical interface



### 11.1.3 Depending on the readout duration

Conditions:

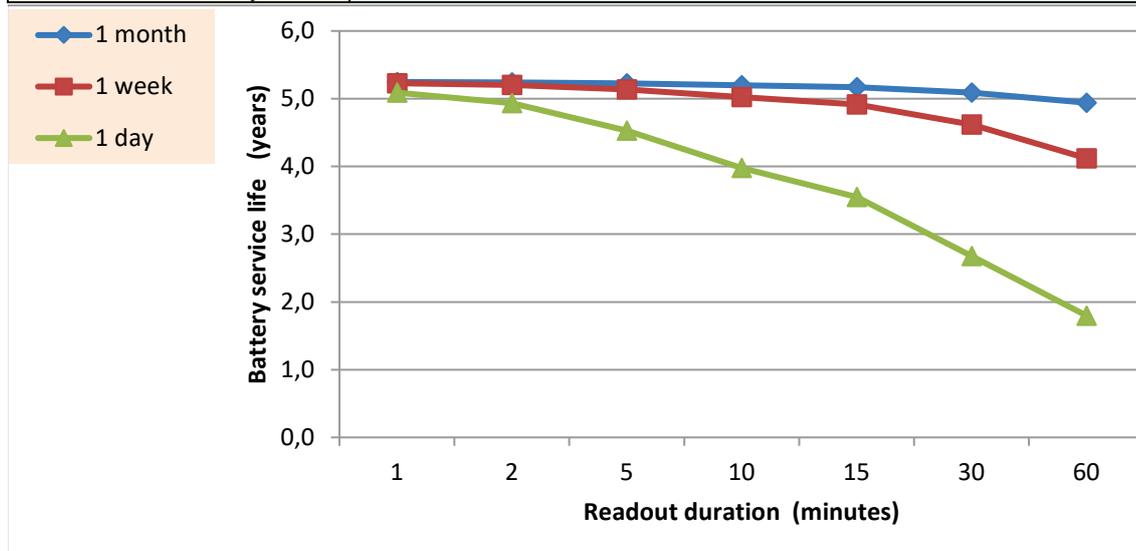
Batteries:..... 1 battery pack

Measuring cycle: ..... 30 seconds

Communication:..... Data transfer via the optical interface (duration: see diagram)

Display switched on: ..... 15 minutes per month

Battery service life (years)		Readout duration (minutes)						
		1	2	5	10	15	30	60
Readout cycle	1 month	5.2	5.2	5.2	5.2	5.2	5.1	4.9
	1 week	5.2	5.2	5.1	5.0	4.9	4.6	4.1
	1 day	5.1	4.9	4.5	4.0	3.5	2.7	1.8



### 11.1.4 Depending on the readout time window for battery supply

Conditions:

Batteries:..... 1 battery pack

Measuring cycle: ..... 30 seconds

Communication:..... Data transfer via the terminal interface

Display switched on: ..... 15 minutes per month

Battery service life (years)		Time window duration (hours)						
		0.1	0.25	0.5	1	2	4	8
Time window cycle	1 month	5.2	5.1	5.0	4.7	4.3	3.7	2.9
	1 week	4.9	4.6	4.2	3.6	2.7	1.9	1.1
	1 day	3.6	2.7	1.9	1.2			

