

Honeywell

Data logger

DL230

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 DL230 in a potentially explosive atmosphere.
- Avoid improper battery use.
- Avoid contact with live parts in the DL230 version with internal power supply.



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

1.2 List of supported functions depending on the software version

This list shows the software version from which new DL230 device functions are supported. This means that not all the sections of this manual apply to all software versions.

Section	Function	Valid for version					
		V1.01	V1.02	V1.03	V1.10	V1.15	
2	Operation and display	x	x	x	x	x	
3	Working with enSuite	x	x	x	x	x	
4	Pulse count, encoder inputs	x	x	x	x	x	
5	Status inputs	x	x	x	x	x	
6	Output functions	x	x	x	x	x	
7.1	Soldered GSM/GPRS modem	x	x	x	x	x	
7.1	Soldered UMTS modem				x	x	
7.1.4	FTP data transfer				x	x	
7.2	Ethernet Interface iCE280				x	x	

Section	Function	Valid for version					
		V1.01	V1.02	V1.03	V1.10	V1.15	
7.3	GSM/GPRS modem modules		x	x	x	x	
7.3	UMTS modem module				x	x	
7.3	LTE modem module					x	
7.4	External modems		x	x	x	x	
7.5	RS232/485 interface board		x	x	x	x	
7.6	Checking data transfer	x	x	x	x	x	
8.1	Modbus data transfer				x	x	
8.2	Sending text messages	x	x	x	x	x	
8.3	Time synchronization via NTP server				x	x	
9	Status messages	x	x	x	x	x	
10.1 10.2	Power supply versions		x	x	x	x	
10.3.1	Service life of the modem battery	x	x	x			
10.3.2	Service life of the modem battery				x	x	

1.3 Connecting, replacing and retrofitting assemblies

The various ATEX approvals of the DL230 are only valid for devices in the state in which they are delivered. To ensure that the ATEX approvals remain in force, no modifications are allowed to the device, or they must at least be restricted to a few cases.

The table shows all the permitted actions and shows the conditions in which connections may be made to the DL230 and assemblies replaced or retrofitted.

When replacing or retrofitting the power supply, the modem module or the interface module, a device-specific individual verification is required, which must be returned to Honeywell. As the manufacturer, we are obliged to keep complete device documentation for ATEX approval.

Device version	Functional range	Permitted action in the field			Completion permitted by	Additional activity	Effect on warranty?
		Replace-ment	Retro-fit	Connec-tion			
All (associated apparatus for ATEX Zone 0/1 and ATEX Zone 2)	Digital inputs	–	–	✓	Operator ¹	–	No
	Digital outputs	–	–	✓	Operator ¹	–	No
	Integrated power supply	✓	–	✓	Operator ¹	Individual verification required	Warranty claims void
		–	✓	✓	Honeywell customer service (with ATEX training)	Tests pursuant to Low Voltage Directive; individual verification required	No
		–	–	✓	Operator ¹	–	No
	Fuse of integrated power supply	✓	–	–	Operator ¹		No
	Device battery	✓	–	✓	Operator ¹	–	No
	Modem battery	✓	✓	✓	Operator ¹		No
	Battery adapter board	✓	✓	✓	Operator ¹	–	No
	Modem module	✓	✓	✓	Operator ¹	Individual verification required	No
Antenna	✓ ²	✓	✓	Operator ¹	–	No	

¹ Depending on the organization, this may be the grid operator, meter operator or owner

² Including replacement of the internal antenna with an external antenna

Device version	Functional range	Permitted action in the field			Completion permitted by	Additional activity	Effect on warranty?
		Replacement	Retro-fit	Connection			
ATEX Zone 2	Interface module: Ethernet or RS232/RS485	✓	✓	✓	Operator ¹	Individual verification required	No

1.4 Additional information

Further information about the DL230 can be found in the following documents:

No.	Documents/Online help	Order number
[1]	DL230 Operating Instructions	73022386
[2]	LIS-200 Device Readings – General Description	–
[3]	LIS-200 Device Readings – Annex DL230	–
[4]	(n/a)	
[5]	enSuite Online Help (part of enSuite) enSuite is available for download from the “ Software Downloads ” section of the Honeywell website.	www.elster-instromet.com/en/software-downloads
[6]	Modbus Communication with EK2x0_V2.0_*.pdf (English)	–
[7]	FTP_LIS200 devices	73024342

You will receive the documents on request from Honeywell.

You can reach our Technical Assistance Center (TAC) at:

Phone: +49 6134 605-123

Email: ElsterSupport@Honeywell.com

You can download the Operating Instructions in different languages directly from the Honeywell Docuthek at <http://docuthek.kromschroeder.com>. Enter "DL230" as search term.

2 DL230 operation and display

2.1 Display configuration

2.1.1 “Main” main display

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

<i>Main</i>	Meaning
<i>V1...V4</i>	The following are displayed: main counter of inputs 1 to 4 and the current date and time on the device. Format: 9 integers and 4 decimals with abbreviations and units
<i>Vo1 V2...4</i>	The following are displayed: original counter reading of the encoder on input 1, main counter of inputs 2 to 4 and the current date and time on the device. Format: 9 integers and 4 decimals with abbreviations and units
<i>Vo1,2 V3,4</i>	The following are displayed: original counter reading of the encoders on inputs 1 and 2, main counter of inputs 3 and 4 and the current date and time on the device. Format: 9 integers and 4 decimals with abbreviations and units
<i>large V1 V2</i>	The following are displayed: main counter of inputs 1 and 2 Format: 8 integers and 3 decimals with input, abbreviations and units
<i>large Vo1 V2</i>	The following are displayed: original counter reading of the encoder on input 1, main counter of input 2 Format: 8 integers and 3 decimals with input, abbreviations and units
<i>large Vo1 Vo2</i>	The following are displayed: original counter reading of the encoder on inputs 1 and 2 Format: 8 integers and 3 decimals with input, abbreviations and units

2.1.2 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
<i>2 tabs</i>	The <i>Main</i> and <i>Ctrl</i> tabs will be displayed.
<i>3 tabs</i>	The <i>Main</i> , <i>Cust.</i> and <i>Ctrl</i> tabs will be displayed.
<i>4 tabs</i>	The <i>Main</i> , <i>Cust.</i> , <i>Admin.</i> and <i>Ctrl</i> tabs will be displayed.
<i>5 tabs</i>	All the tabs, <i>Main</i> , <i>Cust.</i> , <i>Admin.</i> , <i>Serv.</i> and <i>Ctrl</i> , will be displayed.
-	This option appears depending on the system in question and is not intended for use. It has the same effect as <i>2 tabs</i> (see above)

2.1.3 User values for the customer



For parameterization of the DL230, you will require a connection cable for the optical interface as well as the enSuite program.

enSuite can be downloaded free of charge from the “[Software Downloads](#)” section of the Honeywell website (⇒ [\[5\]](#)).

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

- Connect a PC or laptop with enSuite installed to the DL230 optical interface using the connection cable.
- Start enSuite and establish the communication link to the DL230.
⇒ section [3.1 Setting up the communication link to the DL230 via the optical interface](#) (p. 18)
- 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 “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, press an entry in the “Value” column, and then the button with the three dots. You can now select a new value to be displayed for this position in the display in the window that opens up.
- Once you have set all values, click on the *Transfer changes to device* icon  at the top of the enSuite window.

2.1.4 User values for the administrator



For parameterization of the DL230, you will require a connection cable for the optical interface as well as the enSuite program.

enSuite can be downloaded free of charge from the “[Software Downloads](#)” section of the Honeywell website (⇒ [\[5\]](#)).

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 DL230 optical interface using the connection cable.

- Start enSuite and establish the communication link to the DL230.
⇒ Section 3.1 [Setting up the communication link to the DL230 via the optical interface](#) (p. 18)
- 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, press an entry in the “Value” column, and then the button with the three dots. You can now select a new value to be displayed for this position in the display in the window that opens up.
- The first ten 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 ten 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.

2.2 Archive display on the DL230

To display the contents of an archive, move the cursor to the archive heading and press the ENTER or ► keys. The archive headings can be found in the [Admin.](#) and [Serv.](#) tabs under [Archives](#), the logbooks can also be found under [Status](#) and the input-related archives can also be found under the appropriate input ([Input 1](#) to [Input 4](#)).

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 (⇒ Section 2.2.2, p. 13).
The function relates to the column displayed on the left.

ESC Exit the archive, return to the archive heading.

- ◀ + ▲ Move to the entry point of the archive, i.e., to the top left value in the table.
- ◀ + ► The LIS address and the OBIS code of the value are displayed.
The function relates to the column displayed on the left.

2.2.1 Index progress

The index progress in comparison to each preceding archive entry is labelled with a “Δ” after its name in the table heading (example: ⇒ V1 Δ in Fig. 1). They are shown in the display only and are not read out via the interface.

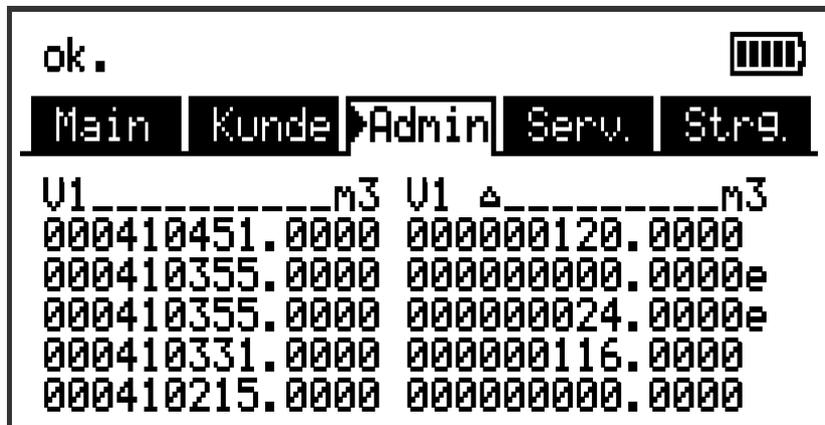


Fig. 1: Display of index progress in the archive

The index progress is typically equal to the flow (consumption) over a measurement 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 measurement period, as the current or previous archive row was not entered as a result of measurement period completion, but instead due to setting the clock, for example. Example: ⇒ Fig. 1: 000000000.0000e and 000000024.0000e. These values would flash in the actual display.

2.2.2 Search function for checking archive entries

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

- Block number
- Date and time
- Counter readings

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

2.3 Context menu

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

The context menu is accessed using the  key.

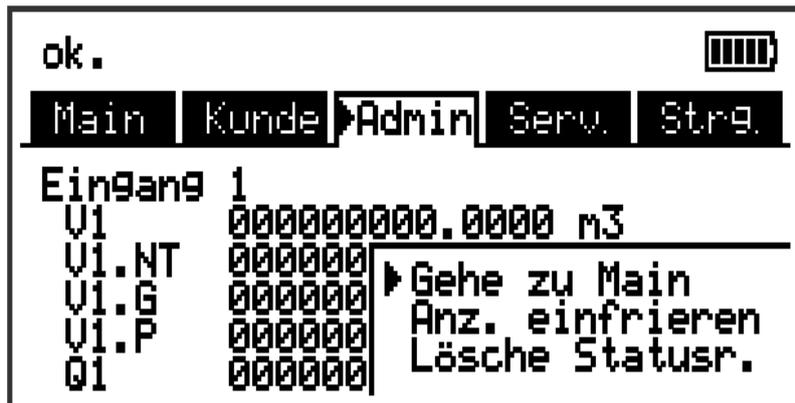


Fig. 2: Displayed context menu

2.3.1 Jump to main display (Goto Main)

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

2.3.2 Freeze display (Freeze display)

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

All currently displayed values are frozen, i.e., they are cached and displayed immediately instead of the real-time values until the display is unfrozen.

Measurement is unaffected and continues in the background. This state is indicated by a blinking snowflake icon ❄️ (frozen) in the status bar. Pressing any button unfreezes the display and the real-time values are displayed again.



Fig. 3: Frozen display

2.3.3 Clear status register (Clear Status R.)

The status register is cleared (⇒ Section 8.2.4.2, p. 104).



Clearing the status is only possible if the administrator or calibration lock is open. If both locks are closed, then the context menu is exited without clearing the status register.

2.4 Special commissioning functions

2.4.1 Device software and checksum

- Move the cursor in the *Serv.* tab to: *Identification > Data Logger > Vers* or *Chk*
- The checksum *Chk* can be recalculated for verification purposes by pressing ENTER.

2.4.2 Clear volume counters and archives (Clr.V)



The *Clr.V* function described here is used to clear all 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 ⇒ DL230 operating instructions [1].
- Move the cursor in the *Serv.* tab to *Edit and delete > Clr.V..*
- Press ENTER. ⇒ 0 will flash.
- Change the value using the arrow key ▲ or ▼ to 1.
- Press ENTER to confirm the set value. The input process can be cancelled by pressing ESC.

2.4.3 Clear archives (Clr.A)



The *Clr.A* function described here only clears the measurement period, daily and monthly archives.

- Open the administrator lock or calibration lock as described in the ⇒ DL230 operating instructions [1] to clear the measurement period, daily and monthly archives on the device.
- Move the cursor in the *Serv.* tab to *Edit and delete > Clr.A.*
- Press ENTER. ⇒ A digit in the value will flash.
- To enter the serial number of the device, 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 > Data Logger > SNo.*

- Press ENTER to confirm the set value.
As an option, you can cancel the input process by pressing ESC.

2.5 Setting the display contrast

It is possible to change the display contrast of the DL230 to adapt it to the ambient conditions.

- Open the administrator lock as described in the ⇒ DL230 operating instructions [1].
- Move the cursor in the *Serv.* tab to *Device settings > Display > Contr.*
- Press ENTER. ⇒ 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.



The default setting for the display contrast is *150*.

Values above *150* will darken the contrast, lower values will make the display brighter.

Do not enter a value greater than *210* as this will make reading values almost impossible. Edit the value using the enSuite parameterization software, where necessary.

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

2.6 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	Meaning
1	The archive is empty; no values have been entered.
2	The archive value cannot be read. This may be due to the archive currently being read and accessed by an interface.
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 permissible limits.
7	Incorrect code The code entered (numerical code) is incorrect. The lock is not opened.
11	Input not possible due to special settings or configuration, e.g.: Vo cannot be entered in encoder mode.
12	The input of this source (address) is not permitted.
13	Input not possible due to special settings or configuration, e.g.: The <i>Clr.X</i> function cannot be executed until the clock has been set to its start value (initialized) using the key combination ◀ + ▲.
20	Value has not been defined for the user-specific display. 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.

3 Working with enSuite

enSuite is the parameterization program used for the DL230 and other Honeywell products. Only the main functions are briefly explained here.

3.1 Setting up the communication link to the DL230 via the optical interface



You need an optical read head cable, which you can order from Honeywell, to set the DL230 parameters using the optical interface.

enSuite can be downloaded free of charge from the “[Software Downloads](#)” section of the Honeywell website (⇒ [\[5\]](#)).

- Insert the optical read head into the ring on the front panel of the DL230 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*).
- At the top of the enSuite window, 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* and *Use default settings* and also *Connection* → *Optical*.
- Enter the administrator code in the *Key* field.
- Click on *OK*.
- Wait a few seconds until the found device is marked with a green dot in the *Navigation* window under *Connections*. In addition, the *Scanning for devices* bar will disappear from the bottom left of the enSuite window.

3.2 Setting up the communication link to the DL230 via a modem

Requirement: a DL230 with a modem registered on the GSM network (⇒ Section 7) and a modem connected to your laptop or PC.

- Ensure your laptop or PC is configured for remote data transfer, for example it is connected to a modem.
- Start the enSuite program (e.g., *Start > All Programs > Elster > enSuite*).
- At the top of the enSuite window, 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* and *Use default settings* and also *Connection* → *Modem*.
- Enter the administrator code in the *Key* field.
- Enter the telephone number of the SIM card in the DL230 under *Modem*.
- Click on *OK*.
- Wait until the found device is marked with a green dot in the *Navigation* window under *Connections*. In addition, the *Scanning for devices* bar will disappear from the bottom left of the enSuite window. This may take up to a minute for a GSM link.

3.3 Setting up the communication link to the DL230 via a network (TCP/IP)

Requirement: a DL230 with a modem registered on the UMTS/GPRS network (⇒ Section 7) and a network connection to your laptop or PC. Your laptop or PC as well as the DL230 must be connected to the same network (VPN = Virtual Private Network).

- Start the enSuite program (e.g., *Start > All Programs > Elster > enSuite*).
- At the top of the enSuite window, 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* and *Use default settings* and also *Connection* → *TCP/IP*.
- Enter the IP address of the DL230 under *Address* and the port number under *Port*.
- Click on *OK*.
- Wait until the found device is marked with a green dot in the *Navigation* window under *Connections*. In addition, the *Scanning for devices* bar will disappear from the bottom left of the enSuite window.

3.4 Changing individual parameters

Requirement: a communication link has been established between enSuite and the DL230 via the optical interface, modem or network (TCP/IP) (⇒ Sections 3.1 to 3.3).

- Select *Navigation* on the left-hand side.
- Click on the plus sign next to *My 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* in the bottom part of the navigation window.
- Click on the plus sign next to *Parameters* at the top of the navigation window to expand 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.

3.5 Sending the parameter file

Requirement: a communication link has been established between enSuite and the DL230 via the optical interface, modem or network (TCP/IP) (⇒ Sections 3.1 to 3.3).

- 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*.
- Click on *Open...* at the top right.

- Select the directory and the parameter file (with the suffix “.wpp”) in the *Select parameter 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 DL230.

- 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/or whether the file used is suitable for the device version. If necessary, contact the Technical Assistance Center (⇒ DL230 operating instructions [1]).

- To start another task, click on *Navigation* again on the left-hand side.

4 Volume measurement

In order to measure consumption, the pulse generators from up to four meters can be connected to the digital inputs DE1 to DE4 of the DL230. Alternatively, encoders can be connected to the inputs DE1 and DE2.

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 generators or encoders may be connected to inputs 1 and 2:

Volume encoder	Specifications
LF pulse generator	Reed contact or open collector transistor
Namur a encoder	Encoder with Namur a protocol
Namur a-b encoder	Encoder with Namur a and b protocols
SCR EDIS encoder	SCR EDIS encoder with EDIS95 protocol
SCR OBIS encoder	SCR EDIS encoder with OBIS05 protocol
SCR+ EDIS encoder	SCR EDIS encoder with EDIS95 protocol
SCR+ OBIS encoder	SCR EDIS encoder with OBIS05 protocol

Only LF pulse generators or encoders may be connected to inputs 3 and 4.



Refer to the instructions in Section [1.3 Connecting, replacing and retrofitting assemblies](#) for connecting the inputs.

4.1 LF pulse generator (reed contact)



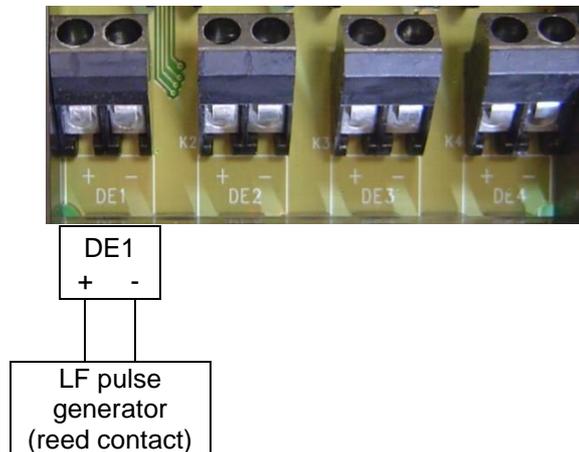
The connection of an LF pulse generator and the parameterization of the device shown in ⇒ Sections [0](#) and [4.1.2](#) can be used in the same way for all four inputs.
Input 1 is used as an example to describe this in ⇒ Sections [0](#) and [4.1.2](#).

4.1.1 Connection



Danger of death!

For the DL230 with internal power supply, the mains voltage must be switched off before opening the housing. Ensure it is not turned back on and verify that there is no voltage.



- Connect the gas meter's low-frequency pulse generator (reed contact) to terminal DE1 on the DL230.
- Have input 1 (terminal DE1) sealed by the calibration officer.

4.1.2 Parameterization

The parameterization process with the help of the DL230 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 calibration lock as described in the ⇒ DL230 operating instructions [1].
 - Move the cursor to the *Serv.* tab and via the following path to the value *Md.11*: *Input 1* → *Parameter settings* → *Md.11*.
 - Press ENTER. ⇒ The set value will flash.
 - Repeatedly press arrow key ▲ or ▼ until the text *Pulse input* flashes.
 - Press ENTER to confirm the set value. The input process can be cancelled by pressing ESC.
- Setting the cp value (pulse constant):
 - Move the cursor in the same path to the cp value *cp.11*.
 - Press ENTER. ⇒ 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 ENTER to confirm the set value. The input process can be cancelled by pressing ESC.
 - Close the DL230 calibration lock.

4.2 Encoder



The encoder connection and device parameterization shown in ⇒ Sections 4.2.1 and 4.2.2 can be used in exactly the same way for inputs 1 and 2.

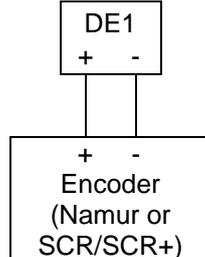
Input 1 is used as an example to describe this in ⇒ Sections 4.2.1 and 4.2.2.

4.2.1 Connection



Danger of death!

For the DL230 with internal power supply, the mains voltage must be switched off before opening the housing. Ensure it is not turned back on and verify that there is no voltage.



- Connect the gas meter encoder to terminal DE1 of the DL230.
- Have input 1 (terminal DE1) sealed by the calibration officer.



When using a radio module for communication:

Route the cable as far as possible from the DL230 antenna to the encoder, with a minimum distance of 20 cm. This avoids disturbances of the encoder telegram during data transmission.

4.2.2 Parameterization



If you use different parameter settings for the encoder (e.g., timings) in the DL230, the battery life may be reduced.

The parameterization process with the help of the DL230 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) Start the “Auto-Encoder” function using the DL230 keypad as follows:
- Open the calibration lock as described in the ⇒ DL230 operating instructions [1].
 - Move the cursor to the *Serv.* tab and via the following path to the value *Md.11*:
Input 1 → Parameter settings → Md.11.
 - Press ENTER. ⇒ The set value will flash.
 - Repeatedly press one of the arrow keys ▲ or ▼ until the value *Auto-Encoder* flashes.
 - Press ENTER to confirm the set value. The input process can be cancelled by pressing ESC.
 - Wait until the *Auto-Encoder* display is updated with a new value. This can take up to a minute as the DL230 activates and tests all known encoder protocols in sequence.
 - If it makes a successful detection, the DL230 will display the meter reading of the gas meter with the designation *Vo1: Serv. → Input 1 → Vo1.*
 - Close the DL230 calibration lock.

b) Archiving *Vo1*:

To save *Vo1* (meter reading from the gas meter) in the measurement period, daily and monthly archives instead of *V1P*, send the following parameter file to the DL230 using the *enSuite* parameterization program (⇒ Section 3.5 [Sending the parameter file](#), p. 19):



After uploading this parameter file, the measurement period archive, the daily archive and the monthly archive are deleted.

- *DL230 Archive1,2,13 Vo1 into Archives (ATTENTION these Archives will be deleted!)*.WPP*³
- *DL230 Archive3,4,14 Vo2 into Archives (ATTENTION these Archives will be deleted!)*.WPP*³

c) Resetting archiving to default settings:

To save *V1P* in the measurement period, daily and monthly archives instead of *Vo1* (meter reading from the gas meter) (default setting), send the following parameter file to the DL230 using the *enSuite* parameterization program (⇒ Section 3.5 [Sending the parameter file](#), p. 19):



After uploading this parameter file, the measurement period archive, the daily archive and the monthly archive are deleted.

- *DL230 Archive1,2,13 V1.P into Archives (ATTENTION these Archives will be deleted!)*.WPP*³
- *DL230 Archive3,4,14 V2.P into Archives (ATTENTION these Archives will be deleted!)*.WPP*³

³ The asterisk (*) stands for a lower case letter which marks the version of the file, e.g., “a”.

5 Other counter and status inputs

Inputs 1 to 4 (terminals DE1 to DE4) can be programmed freely as status or pulse inputs.

Each input can be programmed for the following functions as described in the subsections below:

- Active warning input
- Inactive warning input
- Active information input
- Inactive information input
- Time synchronization input

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 conductively connected (open).
- Information input: A valid signal at the input generates an information message in the current status for the input.
- Warning input: A valid signal at the input generates a warning message in the current status for the input and in the status register.
- Time synchronization: A valid signal at the input enables the clock on the DL230 to be synchronized (set) to the full hour.

5.1 Active warning input

Each of inputs 1 to 4 (terminals DE1 to DE4) 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 current 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 current 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 DL230 using the “enSuite” parameterization program (⇒ Section [3.5 Sending the parameter file](#), p. 19):

- *DL230 - Input 1 = Warning signal active_*.WPP*⁴
- *DL230 - Input 2 = Warning signal active_*.WPP*⁴
- *DL230 - Input 3 = Warning signal active_*.WPP*⁴
- *DL230 - Input 4 = Warning signal active_*.WPP*⁴

⁴ The asterisk (*) stands for a lower case letter which marks the version of the file, e.g., “a”.

5.2 Inactive warning input

Each of inputs 1 to 4 (terminals DE1 to DE4) 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 current 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 current 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 DL230 using the “enSuite” parameterization program (⇒ Section [3.5 Sending the parameter file](#), p. 19):

- *DL230 - Input 1 = Warning signal not active*
- *DL230 - Input 2 = Warning signal not active*
- *DL230 - Input 3 = Warning signal not active*
- *DL230 - Input 4 = Warning signal not active*

5.3 Active information input

Each of inputs 1 to 4 (terminals DE1 to DE4) 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 current 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 DL230 using the “enSuite” parameterization program (⇒ Section [3.5 Sending the parameter file](#), p. 19):

- *DL230 - Input 1 = Message signal active*
- *DL230 - Input 2 = Message signal active*
- *DL230 - Input 3 = Message signal active*
- *DL230 - Input 4 = Message signal active*

5.4 Inactive information input

Each of inputs 1 to 4 (terminals DE1 to DE4) 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 current 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 DL230 using the “enSuite” parameterization program (⇒ Section [3.5 Sending the parameter file](#), p. 19):

- *DL230 - Input 1 = Message signal not active_*.wpp*
- *DL230 - Input 2 = Message signal not active_*.wpp*
- *DL230 - Input 3 = Message signal not active_*.wpp*
- *DL230 - Input 4 = Message signal not active_*.wpp*

5.5 Time synchronization input

An arbitrary input (terminals DE1 to DE4) can be used 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 DL230 takes precedence.
- Only one synchronization cycle per hour may be completed.

To program an input as a time synchronization input, send one of the following parameter files to the DL230, depending on the input, using the “enSuite” parameterization program (⇒ Section [3.5 Sending the parameter file](#), p. 19):

- *DL230 - Input 1 = Time sync_*.wpp*
- *DL230 - Input 2 = Time sync_*.wpp*
- *DL230 - Input 3 = Time sync_*.wpp*
- *DL230 - Input 4 = Time sync_*.wpp*

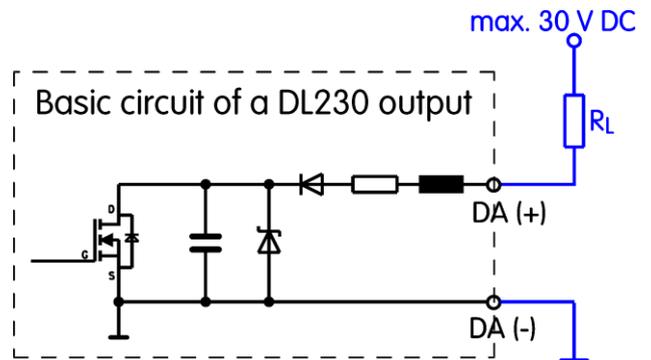
We recommend that an input used for time synchronization is sealed to prevent abuse.

6 Outputs

The outputs on the DL230 take the form of “open collector outputs”.

So as not to put unnecessary strain on the internal battery, the isolation of the outputs (electrical isolation) is disabled as default (see Section 6.7).

The outputs are not generally suitable for switching large external loads (limit values: ⇒ Section entitled “Technical data” in the DL230 operating instructions [1])!



The following output functions are pre-set at the factory:

Output	Function
DA1	Pulse output for the consumption of the main counter of input 1 V1 (cp.O1 = 0.1)
DA2	Pulse output for the consumption of the main counter of input 2 V2 (cp.O2 = 0.1)

6.1 Connecting the outputs

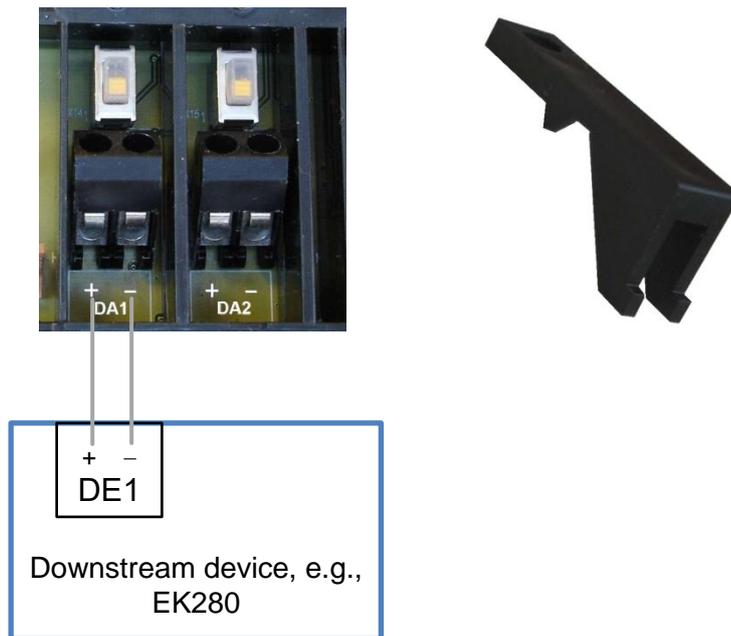


Refer to the instructions in Section [1.3 Connecting, replacing and retrofitting assemblies](#) for connecting the outputs.



Danger of death!

For the DL230 with internal power supply, the mains voltage must be switched off before opening the housing. Ensure it is not turned back on and verify that there is no voltage.



- Connect the downstream device to one of the two digital outputs (terminals DA1 or DA2) on the DL230.
- Refit the terminal covers after connecting the cables.

6.2 Pulse output

Each of the two outputs (terminals DA1 and DA2) can be programmed as a low-frequency pulse output.

6.2.1 Parameterization

The parameterization process with the help of the DL230 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 > Outputs](#).

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



The pulse outputs on the DL230 can be operated with active or inactive logic. The output mode must be parameterized accordingly for this purpose (see below).

- Press ENTER. ⇒ The set value will flash.
- Repeatedly press one of the arrow keys ▲ or ▼ until the text *Pulse input +* (logic active) or *Pulse input–* (logic inactive) flashes.
- Press ENTER to confirm the set value. The input process can be cancelled by pressing ESC.

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

Sc.O...	Meaning
01:200_0	V1 Main counter, input 1
01:203_0	V1.P Adjustable counter, input 1
01:240_0	Vo1 Original counter, input 1
02:200_0	V2 Main counter, input 2
02:203_0	V2.P Adjustable counter, input 2
02:240_0	Vo2 Original counter, input 2
03:200_0	V3 Main counter, input 3
03:203_0	V3.P Adjustable counter, input 3
04:200_0	V4 Main counter, input 4
04:203_0	V4.P Adjustable counter, input 4

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

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/m³ (0.1 pulses per m³) means, for example, that one pulse is output every 10 m³.

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

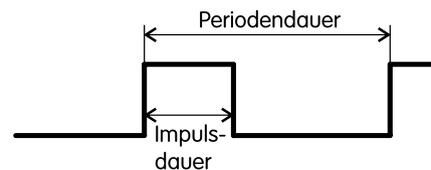
d) Setting the period and pulse duration:



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 width		Output frequency
Per.O...	in ms	Pul.O...	in ms	in Hz
2	250	1	125	4
4	500	2	250	2
8	1000	1	125	1
80	10000	40	5000	0,1



- Repeatedly press the ▼ key in the appropriate output menu until *PerO1* or *PerO2* is displayed.
- Press ENTER. ⇒ The set value will flash.
- Move the cursor to the digits using the arrow key ► or ◀ and change them to the required period duration using the arrow key ▲ or ▼.
- Press ENTER to confirm the set value. The input process can be cancelled by pressing ESC.
- Repeatedly press the ▼ key in the appropriate output menu until *PWO1* or *PWO2* is displayed.
- Press ENTER. ⇒ The set value will flash.
- Move the cursor to the digits using the arrow key ► or ◀ and change them to the required period duration using the arrow key ▲ or ▼.
- Press ENTER to confirm the set value. The input process can be cancelled by pressing ESC.

6.3 Status output (message output)

Each of the two outputs DA1 and DA2 can be programmed as a status output (message output).

6.3.1 Parameterization

The parameterization process with the help of the DL230 keypad is described below.

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

a) Setting the output mode:

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



The status outputs on the DL230 can be operated with active or inactive logic. The output mode must be parameterized accordingly for this purpose (see below).

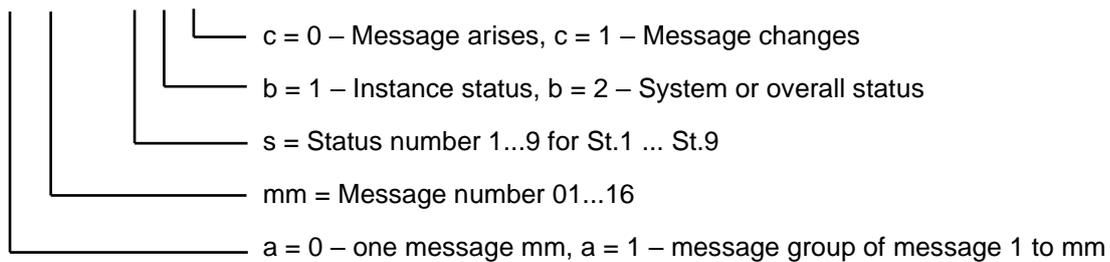
- Press ENTER. ⇒ The set value will flash.
- Repeatedly press one of the arrow keys ▲ or ▼ until the text *Status+* (logic active: message is active, if the output is switched on) or *Status-* (logic inactive: message is active, if the output is switched off) flashes.
- Press ENTER to confirm the set value. The input process can be cancelled by pressing ESC.

b) Setting the status pointer for the output:

- Press the ▼ key in the appropriate output menu until *Sp01* or *Sp02* is displayed.
- Press ENTER. ⇒ The set value will flash.
- Move the cursor to the digits using the arrow key ► or ◀ and change them to a value shown in the table using the arrow key ▲ or ▼.

- Key for the status pointer:

a.mm_0s:b.c



Examples

Sp.O...	Meaning
0.mm_0s:1.1	A message arises in status <i>St.1</i> to <i>St.9</i> .
0.mm_0s:1.0	A message changes in status <i>St.1</i> to <i>St.9</i> .
0.mm_02:2.1	A message arises in system status <i>StSy</i> .
0.mm_01:2.1	A message arises in overall status <i>Stat</i> .
1.mm_0s:1.1	Message group (message 1 to mm) arises in status <i>St.1</i> to <i>St.9</i> .
1.mm_02:2.1	Message group (message 1 to mm) arises in system status <i>StSy</i> .
1.mm_01:2.1	Message group (message 1 to mm) arises in overall status <i>Stat</i> .

6.4 Time synchronization output

Each of the two outputs (terminals DA1 and DA2) can be programmed as a time synchronization output.

6.4.1 Parameterization

The parameterization process with the help of the DL230 keypad is described below.

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

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



The time synchronization outputs on the DL230 can be operated with active or inactive logic. The output mode must be parameterized accordingly for this purpose (see below).

- Press ENTER. ⇒ The set value will flash.
 - Repeatedly press one of the arrow keys ▲ or ▼ until the text [Time sync+](#) (logic active) or [Time sync-](#) (logic inactive) flashes.
 - Press ENTER to confirm the set value. The input process can be cancelled by pressing ESC.
- b) Setting the source for the output:
- Press the ▼ key in the appropriate output menu until [Sc.O1](#) or [Sc.O2](#) is displayed.
 - Press ENTER. ⇒ The set value will flash.
 - Move the cursor to the digits using the arrow key ► or ◀ and change them to a value shown in the table using the arrow key ▲ or ▼.

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 (= month boundary) can be adjusted individually for each input using Serv. → Date and time → DB.I1-4 .
01:142_0	At the start of each day at 0 o'clock
05:142_0 : 08:142_0	At the start of each day using the day boundary set for inputs 1 to 4 The "6 o'clock" day boundary (= month boundary) can be adjusted individually for each input using Serv. → Date and time → DB.I1-4 .
01:403_0	At the start of each hour

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

c) Setting the pulse duration:



The pulse duration can be set individually for each output as a multiple of 125 ms.
The maximum value is 65534 which corresponds to a pulse duration of 8191.75 seconds.

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

6.5 Continuous pulse output

Each of the two outputs DA1 and DA2 can output continuous pulses for test purposes.

6.5.1 Parameterization

The parameterization process with the help of the DL230 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 > Outputs](#).

Setting the output mode:

- Move the cursor to the *Serv.* tab and via the following path to the mode for the appropriate output *Md.O1* and *Md.O2*:
Serv. → *Outputs* → *Output 1* → *Md.O1*
Serv. → *Outputs* → *Output 2* → *Md.O2*
- Press ENTER. ⇒ The set value will flash.
- Press one of the arrow keys ▲ or ▼ until the text *Cont.pulse* flashes.
- Press ENTER to confirm the set value. The input process can be cancelled by pressing ESC.



The settings made, for example, in the pulse output or time synchronization output mode are used as the pulse and period duration for the continuous pulses.

6.6 Pulse output switched off or on

Each of the two outputs DA1 and DA2 can be switched off permanently (transistor blocked, “switch open”) or switched on permanently (transistor conducting, “switch closed”).

6.6.1 Parameterization

The parameterization process with the help of the DL230 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 > Outputs](#).

Setting the output mode:

- Move the cursor to the *Serv.* tab and via the following path to the mode for the appropriate output *Md.O1* and *Md.O2*:
Serv. → *Outputs* → *Output 1* → *Md.A1*
Serv. → *Outputs* → *Output 2* → *Md.A2*
- Press ENTER. ⇒ The set value will flash.
- Press one of the arrow keys ▲ or ▼ until the text *off* or *on* flashes.
- Press ENTER to confirm the set value. The input process can be cancelled by pressing ESC.

6.7 Connecting the outputs to a PLC or an isolating amplifier



When connecting the outputs to a customer system (e.g., a PLC), we urgently recommend that both systems are electrically isolated. An external (Ex-rated) isolating amplifier is required, in particular if the DL230 is used or connected in a potentially explosive atmosphere (Ex Zone 0, 1 or 2).



But even outside a potentially explosive atmosphere, we still recommend electrical isolation to rule out the possibility of interference between the systems. This can be done separately for each output using the internal slide switches. Alternatively, an external isolating relay may be used.

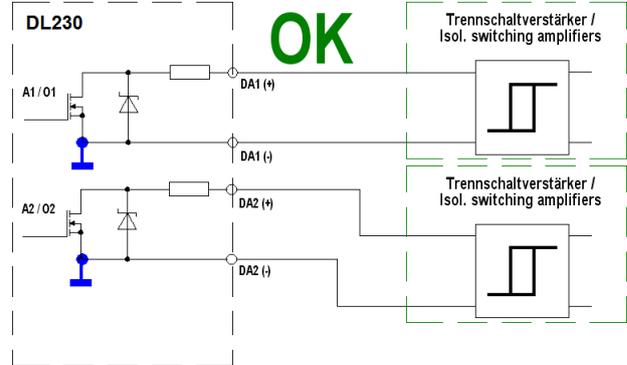
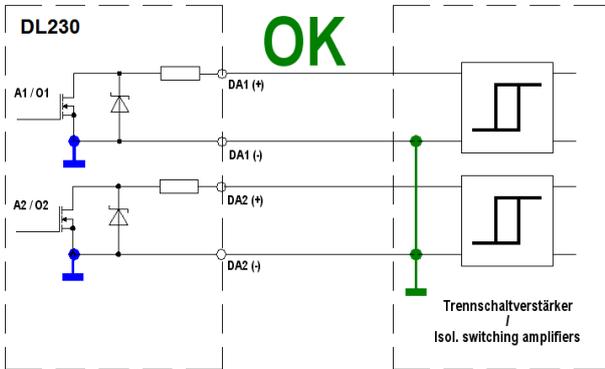


Particularly if you wish to connect more than one output to a PLC, you must remember that in the standard operating case, the two outputs have a common earth. The inputs on a PLC, however, often have a common “plus” contact which means that all the outputs are connected in parallel.

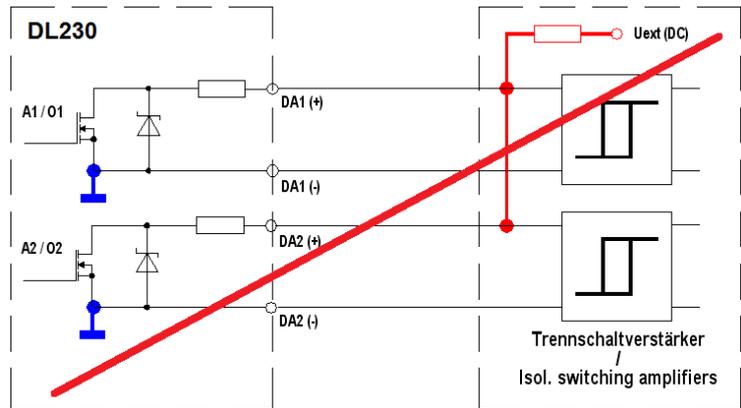
Possible correct connections:

Isolating amplifier with a common earth:

Separate isolating amplifier for each output (recommended):



Not permitted connection of the outputs to a PLC or to an isolating amplifier with more than one input and common plus potential in the downstream device:



6.8 Isolation of the outputs (electrical isolation)

In the standard case, all minus poles of the outputs are electrically connected to the main circuit board.

For special applications, for example switching a plus pole, each individual output can be electrically isolated from the main circuit board and from the other outputs.

Furthermore, by interconnecting devices, undesirable faults may be created by earth loops which can prevent the “isolation” of the outputs used for this purpose.



CAUTION!

Reduced battery service life

Activating the electrical isolation on the outputs reduces the battery service life in battery mode.



The electrical isolation of the outputs is NOT relevant for explosion protection.

An approved external Ex-barrier is required if the DL230 is used or connected in a potentially explosive atmosphere (Ex Zone 0, 1 or 2).



An electrically isolated output only requires current as long as the output is active (switched on). Therefore, you can minimize the adverse effect of an electrically isolated output on the battery service life when using it as a pulse output by setting the pulse duration to the minimum possible value.

⇒ Section [6.2](#), [6.3](#) or [6.4](#)

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

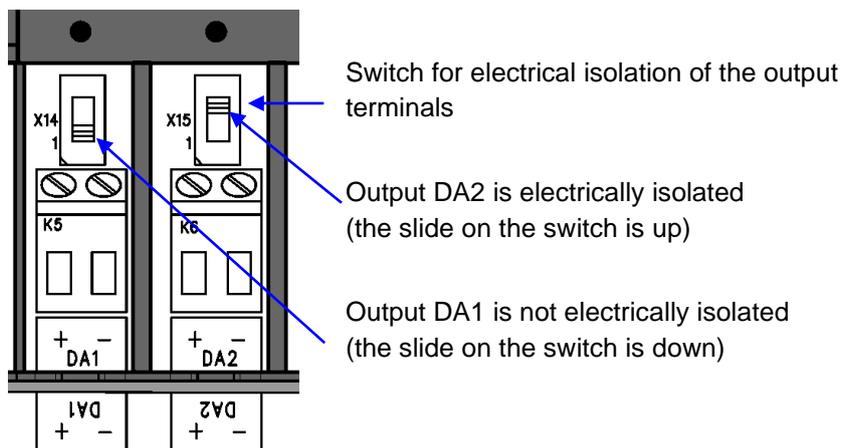


Fig. 4

6.9 Securing the outputs

Every output is secured individually with a terminal cover to prevent tampering and may be sealed with an adhesive seal if necessary. The terminal covers are already fitted to outputs DA1 and DA2 on delivery. After connecting the cables, place the terminal cover back over the terminal and screw tight. Affix a seal to the retaining screw if necessary.

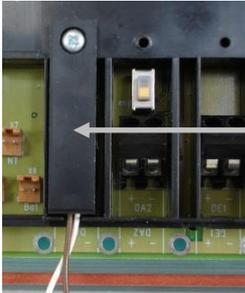


Fig. 5

Output DA1 is already secured with a terminal cover.

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



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.

7 Data transfer

7.1 Internal soldered GSM/GPRS/UMTS modem

The SIM card must always be correctly inserted as described in ⇒ Section 7.1.1. Then proceed according to the modem version as described in the corresponding Section below.



The LTE modem „CloudLink 5G“ is only available as a plug-in assembly (⇒ chapter **Fehler! Verweisquelle konnte nicht gefunden werden.**), not as an internal soldered modem.

7.1.1 SIM card insertion and unlocking

a) SIM card insertion

- For the DL230 with internal power supply, the mains voltage must be switched off before opening the housing.



Danger of death!

For the DL230 with internal power supply, the mains voltage must be switched off before opening the housing. Ensure it is not turned back on and verify that there is no voltage.

- Unscrew the four screws from the top of the DL230 and open it.
- Disconnect the modem (X9, X10, X11, ⇒ Fig. 6) from the power supply to avoid damaging the modem and SIM card. This also applies to a DL230 with power supply unit which is disconnected from the mains in case a back-up battery supply is connected.

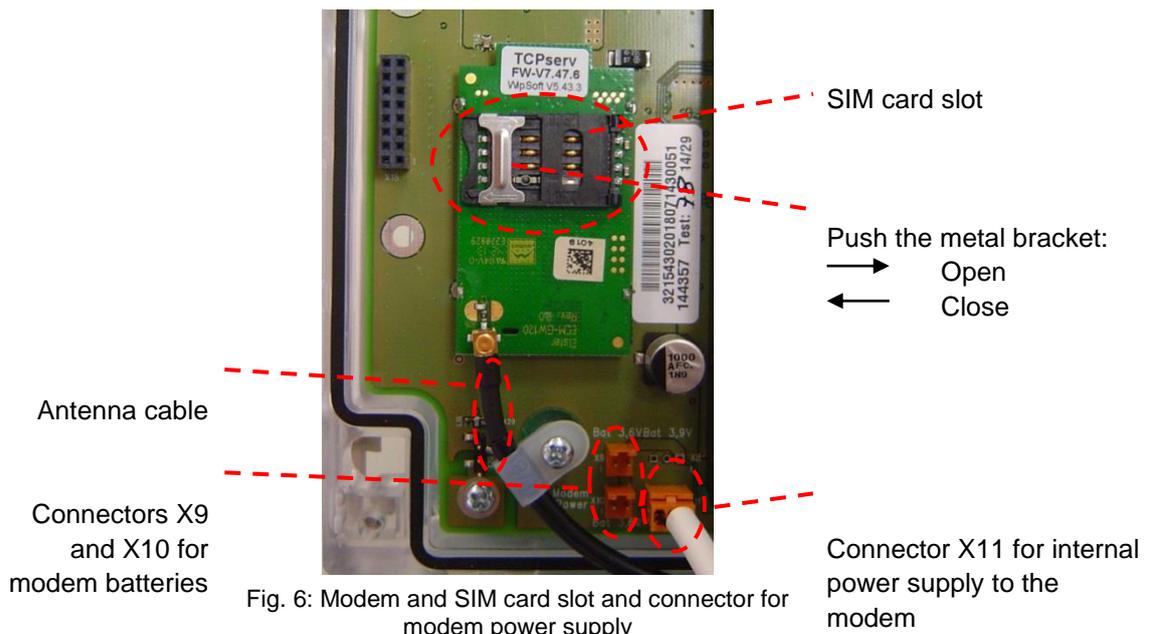


Fig. 6: Modem and SIM card slot and connector for modem power supply

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

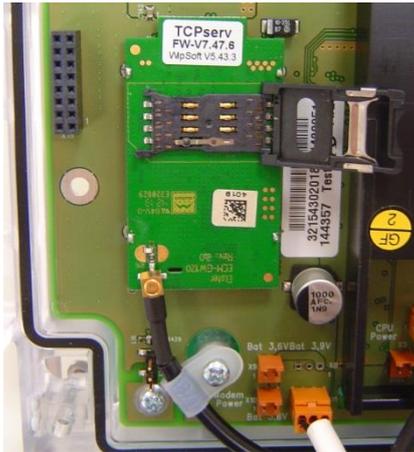


Fig. 7: Open SIM card slot

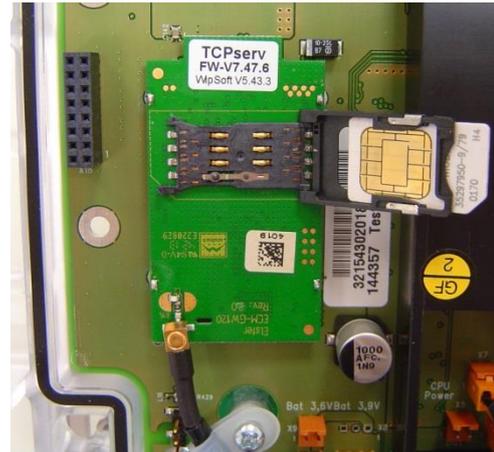


Fig. 8: SIM card inserted

- Insert the SIM card into the card slot (in the lid) so that the gold contacts face downwards in the closed end and the bevelled side is at the open end of the lid (⇒ Fig. 8).
- Click the lid shut again and gently slide the metal bracket outwards.
- Reconnect the plug(s) for the modem power supply (X9, X10, X11, ⇒ Fig. 6).



In case of a DL230 with internal power supply, the mains voltage must not be switched back on again at this point. Otherwise, the internal power supply unit and the internal modem may be damaged.

- Screw the DL230 housing back on.
- For a DL230 with power supply, reconnect the mains voltage.

b) If necessary, unlock the SIM card (enter the PIN).

If a PIN (Personal Identification Number) is activated on the inserted SIM card, enter it to unlock the card:

- Move the cursor in the *Serv.* tab of the DL230 display to *Interfaces > Internal module > PIN*
- Press *ENTER* and then press the ◀ key the number of times as digits in your PIN (e.g., 4 times for a 4-digit PIN → 4 zeroes “0000” will appear in the display).
- Edit the first (left) digit in the PIN using the arrow keys ▲ and ▼.
- Move the cursor through the digits using the ► key and change them.
- After entering the last digit, press *ENTER* to save the input.
- *Pin New* will now be displayed under *P.Sta* as confirmation.
If *P.Sta* is not displayed, move the cursor downwards using the ▼ arrow key.
- As soon as a communication time window is opened via the modem, the new PIN will be used. After a few seconds, under *P.Sta* you will see the message *Pin OK* if the pin was entered correctly or *Pin Error* if it was not.

7.1.2 GSM operation



The 2G modem is already prepared for GPRS transmission when delivered. If GSM operation (CSD) is explicitly desired, the modem must first be adapted to CSD operation according to the following chapter.

Please note that CSD operation is no longer guaranteed by the provider.

7.1.2.1 Parameterization



For parameterization of the DL230, you will require a connection cable for the optical interface as well as the enSuite program.

enSuite can be downloaded free of charge from the "[Software Downloads](#)" section of the Honeywell website (⇒ [\[5\]](#)).

a) Closing the time windows

Time windows 1 to 6 must be closed for parameterization to function securely. To do this:

- Connect a PC or laptop with enSuite installed to the DL230 optical interface using the connection cable.
- Start enSuite and establish the communication link to the DL230 via the optical interface. (⇒ [Section 3.1 Setting up the communication link to the DL230 via the optical interface](#), p. 18)
- Select [Navigation](#) on the left-hand side and then [Parameterize online](#) at the bottom of the navigation window.
- In the top part of the device window, open the path "[Parameters](#)" > "[Interfaces](#)" by clicking on the relevant plus signs and then select "[Call time windows](#)".
- In call acceptance windows 1 to 6, set start and end to the same value for each one and then click on the "[Transfer changes to device](#)" icon  at the top of the enSuite window.
- Then wait a minute for any communications activity in progress on the DL230 to be safely stopped.

b) Sending the parameter file

- Send one of the following parameter files to the DL230 (⇒ [Section 3.5 Sending the parameter file](#), p. 19).

Modem module (operating mode)	Parameter file
ECM-GW120 (GSM only)	DL230_xvx. - int. ECM-GW120 - TCPServ (CSD mode only) (*) ⁵
ECM-2G-UG350 (GSM only)	DL230_xvx. - int. ECM-2G-UG350 CSD/TCPServ/FTP/NTP (*) ⁵
ECM-3G-UU270 (GSM only)	DL230_xvx. - int. ECM-3G-UU270 CSD/TCPServ/FTP/NTP (2G mode only) (*) ⁵

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

⁵ The "x" stands for the device software version, e.g., "1v1".

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



All the values listed in enSuite under *Parameters* can be found in the *Serv.* display tab of the DL230 using the same path.

- c) If necessary, unlock the SIM card (enter the PIN).
- In the top part of the device window, open the path *Parameters > Interfaces > Internal module > Cellular* by clicking on the relevant plus signs and then select *SIM card PIN*.
 - Enter the SIM card PIN and then click on the *Transfer changes to device* icon  at the top of the enSuite window.
- d) Setting time windows for future data retrievals

In the basic configuration now set up, you can define cyclic time windows during which data can be retrieved from the DL230 via the modem. There are two available time windows which operate on DL230 battery power only, and for versions of the DL230 with power supply unit, there are four more which operate on mains voltage only.



Set the time windows for battery operation only for as long and as often as required. Each time window reduces the service life of the DL230 battery.

The set time windows are not directly accounted for in the calculation of the remaining battery service life *Bat.R* for the DL230. Therefore, the expected battery life is not updated if the time windows are changed. However, previous time windows and data transfers are taken into account in the calculation of the remaining capacity *BatRC* and the remaining service life.

- The two time windows for battery mode are set in the enSuite device window under:
 - *Parameters > Interfaces > Connections > Connection 1* and
 - *Parameters > Interfaces > Connections > Connection 2*
- The four time windows for mains operation are set under:
 - *Parameters > Interfaces > Connections > Connection 3* to
 - *Parameters > Interfaces > Connections > Connection 6*

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

- Click on the *Transfer changes to device* icon  at the top of the enSuite window.

7.1.2.2 Checking the GSM field strength

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

- a) Opening the test time window on the device



The test time window only needs to be opened if none of time windows 1 to 6 are open.

- Move the cursor in the *Serv.* tab of the DL230 display to *Interfaces > Internal module > Trace > CWTst*.
- Press ENTER to enter the duration of the test time window in minutes. ⇒ “0” will flash.

- Move the cursor to the digits using the arrow key ► or ◀ and change them to the required duration, e.g., 10, using the arrow key ▲ or ▼.
- After the desired digits have been changed, press ENTER to confirm the input. The input process can be cancelled by pressing ESC.



Only enable the test time window in battery mode for as long as is required. Each time the test time window is opened, the service life of the DL230 battery is reduced.

The set test time window is not directly accounted for in the calculation of the remaining battery service life *Bat.R* for the DL230. Therefore, the expected battery life is not updated if the test time window is changed. However, previous test time windows and data transfers are taken into account in the calculation of the remaining capacity *BatRC* and the remaining service life.

b) Displaying the GSM field strength

- Move the cursor in the *Serv.* tab of the DL230 display to *Interfaces > Internal module > Cellular > GSM.L.*
- When the cursor is in front of *GSM.L.*, press *ENTER* on the DL230 and wait around 30 seconds.
- The field strength in percent will then be displayed under *GSM.L.*



Data transfer issues may be encountered with a field strength below 50%. You can remedy this in the majority of cases with an external antenna mounted at a suitable location.

7.1.2.3 Retrieving data with enSuite

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



The test time window only needs to be opened if none of time windows 1 to 6 are open.

- If there is no communication link to the DL230 via the optical interface, it must be established. (⇒ Section 3.1 [Setting up the communication link to the DL230 via the optical interface](#), p. 18)
- Select *Navigation* on the left-hand side of the enSuite screen and then *Parameterize online* at the bottom of the navigation window.
- In the top part of the device window, open the path “*Parameters*” > “*Interfaces*” by clicking on the relevant plus signs, and then select “*Internal module*” (not the plus sign in front).
- Click on the value “0” next to “*Test call acceptance window*” in the right-hand part of the window and enter a duration in minutes (e.g., 10) for which the test time window should remain open for the test retrieval. For a battery-operated DL230, do not enter an excessively long duration as this will adversely affect the battery life.
- Click on the *Transfer changes to device* icon  at the top of the enSuite window. The DL230 can now be accessed via the modem and network for the duration set.
- At the top of the enSuite screen, click on the *Disconnect* or *Disconnect from all devices* icon to terminate the communication link between enSuite and the DL230 via the optical interface.

b) Test retrieval using a GSM modem connection

- Establish the communication link between enSuite and the DL230 via the modem. (⇒ Section 3.2 [Setting up the communication link to the DL230 via a modem](#), p. 18).

- 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 at the top of the enSuite screen to end the test retrieval.

7.1.3 TCPServ mode via GPRS or UMTS

In this operating mode, you can access the DL230 via the network (LAN, Ethernet, TCP/IP) to which your retrieval system is connected, i.e., you do not require an additional retrieval system modem. Data transfer is normally faster than with GSM operation, as explained in Section 7.1.2.

The DL230 acts as a TCP server and can be addressed by a TCP client which is included in your retrieval software via an IP address in conjunction with a TCP port. There are various ways of ensuring that the DL230 is always available at the same IP address (static IP) known to you. For example, you can use a SIM card to which a fixed IP address has already been assigned (public, static IP⁶). Or, you operate a virtual private network (VPN) together with your GPRS/UMTS provider, which can only be accessed (access point, APN) if the SIM card in the modem is enabled.

7.1.3.1 Parameterization



A modem parameterized for TCPServ operation can still be called using a CSD⁷ connection (GSM mode ⇒ Section 7.1.2). However, a CSD connection cannot exist at the same time as a TCP connection, only at different times!



For parameterization of the DL230, you will require a connection cable for the optical interface as well as the enSuite program.

enSuite can be downloaded free of charge from the “*Software Downloads*” section of the Honeywell website (⇒ [5]).

a) Closing the time windows

Time windows 1 to 6 must be closed for parameterization to function securely. To do this:

- Connect a PC or laptop with enSuite installed to the DL230 optical interface using the connection cable.
- Start enSuite and establish the communication link to the DL230 via the optical interface. (⇒ Section 3.1 *Setting up the communication link to the DL230 via the optical interface*, p. 18)
- Select *Navigation* on the left-hand side and then *Parameterize online* at the bottom of the navigation window.
- In the top part of the device window, open the path “*Parameters*” > “*Interfaces*” by clicking on the relevant plus signs and then select “*Call time windows*”.
- In call acceptance windows 1 to 6, set start and end to the same value for each one and then click on the “*Transfer changes to device*” icon  at the top of the enSuite window.
- Then wait a minute for any communications activity in progress on the DL230 to be safely stopped.

⁶ This option is no longer offered by most providers!

⁷ CSD = Circuit Switched Data, circuit-switched data service for mobile phones.

b) Sending the parameter file

- Send the following parameter file to the DL230 (⇒ Section 3.5 [Sending the parameter file](#), p. 19).

Modem module (operating mode)	Parameter file
ECM-GW120 (GPRS/GSM)	DL230_xvx. - int. ECM-GW120 - (CSD/TCPserv/FTP/NTP) (*) ⁸
ECM-2G-UG350 (GPRS/GSM)	DL230_xvx. – int. ECM-2G-UG350 CSD/TCPserv/FTP/NTP (*) ⁸
ECM-3G-UU270 (GPRS/GSM)	DL230_xvx. - int. ECM-3G-UU270 CSD/TCPserv/FTP/NTP (2G mode only) (*) ⁸
ECM-3G-UU270 (UMTS/GPRS)	DL230_xvx. – int. ECM-3G-UU270 TCPserv/FTP/NTP (2G+3G) (*) ⁸



If the “...[ECM-3G-UU270 CSD/TCPserv/FTP/NTP \(2G mode only\) \(*\)](#)” parameter file is used, the modem generally registers on the 2G network (GSM/GPRS). The higher data rates possible in the 3G network (UMTS) cannot be used in this case.

If the “...[ECM-3G-UU270 TCPserv/FTP/NTP \(2G+3G\) \(*\)](#)” parameter file is used, the modem ideally logs into the 3G network (UMTS) if this is available at the site. The modem will only use the 2G network (GSM/GPRS) if the 3G network is not available on site. **Attention:** the **CSD service** (Circuit Switched Data) is **not** supported in the 3G networks (Telekom, Vodafone, O²)!

Summary

If you wish to use CSD data transfer in addition to TCP in Germany, you must use the modem in the 2G network. You will have to clarify the situation in other countries with your network provider where necessary.

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



All the values listed in enSuite under [Parameters](#) can be found in the [Serv.](#) display tab of the DL230 using the same path.

c) If necessary, unlock the SIM card (enter the PIN).

- In the top part of the device window, open the path [Parameters](#) > [Interfaces](#) > [Internal module](#) > [Cellular](#) by clicking on the relevant plus signs and then select [SIM card PIN](#).
- Enter the SIM card PIN and then click on the [Transfer changes to device](#) icon  at the top of the enSuite window.

d) Setting individual parameters

- In the top part of the device window, open the path [Parameters](#) > [Interfaces](#) > [Internal module](#) by clicking on the relevant plus signs and then select [Cellular](#).

⁸ The “x” stands for the device software version, e.g., “1v1”.

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

- On the right-hand side of the window, you will now see several values, of which the following must be entered:

Value	Input
GPRS access point name “ <i>APN</i> ”	These values vary according to the SIM card and VPN (Virtual Private Network) in use. The values to be entered can normally be obtained from your IT department or SIM card provider. “Port” is the TCP/IP port number of the retrieval system.
APN User Name “ <i>UName</i> ”	
APN password “ <i>PwAPN</i> ”	
TCP/IP port “ <i>Port</i> ”	



If you do not enter an access point name (APN), some providers (e.g., Telekom) will use the APN saved on the SIM card. Since this is generally a public APN (no access to a VPN) and a dynamic IP address is assigned to the modem when establishing a GPRS session to a public APN, the TCP server function cannot be used. The reason is that this function requires a static IP address. In this case, the modem could only be used as a TCP client.



Unless an APN is entered, there is a risk that costs will be incurred by accident since each time a GPRS session is established, a minimum data volume, which depends on the provider and tariff (e.g., 10 or 100 kB), will be charged.

- Click on the [Transfer changes to device](#) icon  at the top of the enSuite window.
- If necessary (e.g., using the enSuite user lists), two additional addresses for a domain name system may be entered under addresses 3:0794.0 and 3:0795.0. This is however not essential.

e) Setting time windows for future data retrievals

In the basic configuration now set up, you can define cyclic time windows during which data can be retrieved from the DL230 via the modem. There are two available time windows which operate on DL230 battery power only, and for versions of the DL230 with power supply unit, there are four more which operate on mains voltage only.



Set the time windows for battery operation only for as long and as often as required. Each time window reduces the service life of the DL230 battery.

The set time windows are not directly accounted for in the calculation of the remaining battery service life *Bat.R* for the DL230. Therefore, the expected battery life is not updated if the time windows are changed. However, previous time windows and data transfers are taken into account in the calculation of the remaining capacity *BatRC* and the remaining service life.

- The two time windows for battery mode are set in the enSuite device window under:
 - [Parameters > Interfaces > Connections > Connection 1](#) and
 - [Parameters > Interfaces > Connections > Connection 2](#)
- The four time windows for mains operation are set under:
 - [Parameters > Interfaces > Connections > Connection 3](#) to
 - [Parameters > Interfaces > Connections > Connection 6](#)

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

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

7.1.3.2 Checking the GSM field strength

⇒ Section [7.1.2.2 Checking the GSM field strength](#) (p. 42)

7.1.3.3 Checking the GPRS/UMTS IP address and port

- In the top part of the device window, open the path *Parameters* > *Interfaces* > *Internal module* by clicking on the relevant plus signs and then select *Cellular*.
- Check the value of the current IP address “*IPAdr*”. If it is “*0.0.0.0*”, the DL230 has been unable to log into the GPRS network and there are no Internet services (TCP/IP, FTP, NTP, etc.) available. Otherwise, the IP address assigned to the device will be displayed here.



The IP address is only displayed during an active GPRS/UMTS session, i.e., within a time window. After the session has been closed at the end of the time window, “0.0.0.0” will be displayed again.

- Check the value of the current IP port. A TCP/IP client can establish a connection using this port.

7.1.3.4 TCP/IP test data retrieval using enSuite

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



The test time window only needs to be opened if none of time windows 1 to 6 are open.

- If there is no communication link to the DL230 via the optical interface, it must be established. (⇒ Section [3.1 Setting up the communication link to the DL230 via the optical interface](#), p. 18)
- Select *Navigation* on the left-hand side of the enSuite screen and then *Parameterize online* at the bottom of the navigation window.
- In the top part of the device window, open the path “*Parameters*” > “*Interfaces*” by clicking on the relevant plus signs, and then select “*Internal module*” (not the plus sign in front).
- Click on the value “*0*” next to “*Test call acceptance window*” in the right-hand part of the window and enter a duration in minutes (e.g., 10) for which the test time window should remain open for the test retrieval. For a battery-operated DL230, do not enter an excessively long duration as this will adversely affect the battery life.
- Click on the *Transfer changes to device* icon  at the top of the enSuite window. The DL230 can now be accessed via the modem and network for the duration set.
- At the top of the enSuite screen, click on the *Disconnect* or *Disconnect from all devices* icon to terminate the communication link between enSuite and the DL230 via the optical interface.

b) Test retrieval via the TCP/IP network

- Establish the communication link between enSuite and the DL230 via the network. (⇒ Section [3.3 Setting up the communication link to the DL230 via a network \(TCP/IP\)](#), p. 19)
- 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 at the top of the enSuite screen to end the test retrieval.

7.1.4 FTP data transfer via GPRS or UMTS (DL230 as from V1.10)

In this operating mode, data is compiled by the DL230 at a defined time and transferred to a previously configured FTP server using the PUSH principle.

In addition to the FTP function, all other operating modes (CSD, TCP/IP, SMS, etc.) are also possible, but not simultaneously.



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



Wireless networks can be disrupted which means that one hundred percent data transfer cannot be guaranteed in any case.



A detailed description of this operating mode can be found in the ⇒ [FTP Application Manual \[7\]](#).

7.1.4.1 Requirements for FTP operating mode

The following requirements must be satisfied for FTP operating mode:

- An FTP server must have been configured. It is vital to ensure that adequate free memory space is available. The directories used for standard response and archive transfer must exist.
- FTP server maintenance must also be ensured – the data must be processed in a timely manner. In the event of an overrun, data loss may occur. Talk to your IT department or relevant service provider about this.

7.1.4.2 Preparation

Preparation for the procedure described below:

- The device has been configured for GPRS/UMTS-TCP/IP server operation as described in [Section 7.1.3](#).

7.1.4.3 Parameterization



For parameterization of the DL230, you will require a connection cable for the optical interface as well as the enSuite program.

enSuite can be downloaded free of charge from the “[Software Downloads](#)” section of the Honeywell website (⇒ [\[5\]](#)).

a) Closing the time windows

Time windows 1 to 6 must be closed for parameterization to function securely. To do this:

- Connect a PC or laptop with enSuite installed to the DL230 optical interface using the connection cable.
- Start enSuite and establish the communication link to the DL230 via the optical interface.
(⇒ Section 3.1 [Setting up the communication link to the DL230 via the optical interface](#), p. 18)
- Select *Navigation* on the left-hand side and then *Parameterize online* at the bottom of the navigation window.
- In the top part of the device window, open the path "*Parameters*" > "*Interfaces*" by clicking on the relevant plus signs and then select "*Call time windows*".
- In call acceptance windows 1 to 6, set start and end to the same value for each one and then click on the "*Transfer changes to device*" icon  at the top of the enSuite window.
- Then wait a minute for any communications activity in progress on the DL230 to be safely stopped.

b) Setting individual parameters: *Telephone book*

All the required FTP server data are set here.

- In the top part of the device window, open the path "*Parameters*" > "*Interfaces*" > "*Telephone book*" by clicking on the relevant plus signs and then select an unused entry.
- On the right-hand side of the window, you will now see several values, of which the following must be entered:

Value	Input
Server address for recipient	IP address of the FTP server to be dialled
Port for recipient	FTP server port
Login name for the recipient server	FTP server login: user name
Password for the recipient server	FTP server login: user password
Name of recipient	Server designation (e.g., Honeywell FTP). This facilitates the remaining configuration work since this name will be displayed in enSuite selection fields.

- If you wish to use other FTP servers, repeat these steps for each new recipient.
- Click on the *Transfer changes to device* icon  at the top of the enSuite window.

c) Setting individual parameters: *FTP transfer*

The content of the file transferred to the FTP server is defined here.

- In the top part of the device window, open the path *Parameters* > *Interfaces* > *FTP Transmission* by clicking on the relevant plus signs and then select an unused entry.
- On the right-hand side of the window, you will now see several values, of which the following must be entered:

Value	Input
Type of readout period for the "TypeP" archive	0: from now on, 1: fixed period
Readout period "Per."	Period in combination with unit, e.g., 2 (days)
Unit for the readout period "Unit"	Unit for the "Archive readout period" parameter, e.g., days

Value	Input
List of the archives to be read "AList"	List with numbers of archives whose content is to be written to the file
Path on which the archive is to be saved	Path to save the file on the FTP server ⁹
File name of the archive on the FTP server "FName"	File name (including the extension after the full stop ".")
Address of the archive file name ID "AdrID"	1:180 "SNo" – serial number of the DL230
Format of the time stamp for archive file name "Ft.TS"	0: long / 1: short
File format to save the archive on the FTP server "Formt"	File format (GasX, Raw, ABL, etc.)

- If you wish to configure other FTP archive transfers, repeat these steps for each parameter set for a new archive transfer.
- Click on the *Transfer changes to device* icon  at the top of the enSuite window.

d) Setting individual parameters: *Connections*

This defines the event (generally a time) which causes a connection to a certain FTP server to be established and how the FTP transfer takes place.

- In the top part of the device window, open the path *Parameters > Interfaces > Connections* by clicking on the relevant plus signs and then select an unused entry.



In the default settings for the DL230, connections 7 to 12 are designed for FTP transfers based on time-related events ("*Call time 1...6*").

- On the right-hand side of the window, you will now see several values, of which the following must be entered:

Value	Input
Protocol type	11: FTP
Connection event "Event"	Call time, e.g., 0x811E Call time 1 ¹⁰
Data transfer cycle	Hourly, daily, weekly, etc.
Data transfer start time	Time, e.g., 00:00
Connection mode "Destn"	Destination 1 or 2
Destination 1 for the connection	FTP server entry from telephone book, e.g., Honeywell FTP
Connection interface	2: int.modem

⁹ The path is case sensitive, i.e. upper and lower case letters apply. The subdirectories are separated with a slash "/" (not with a backslash "\"). In addition, the path must be concluded with a slash "/".

¹⁰ Connection 7 → Call time 1, Connection 8 → Call time 2 ... Connection 12 → Call time 6

Value	Input
Power supply type	1: always, 2: battery, 3: ext. supply
Additional information for establishing the connection	Number of the archive transfer parameter set defined under "FTP transmission"

- If you wish to configure other connections, repeat these steps for each new connection parameter set.
- Click on the *Transfer changes to device* icon  at the top of the enSuite window.

7.1.4.4 Retrieving data with enSuite

- Open the optical connection in enSuite.
 - If there is no communication link to the DL230 via the optical interface, it must be established. (⇒ Section 3.1 [Setting up the communication link to the DL230 via the optical interface](#), p. 18)
 - Select *Navigation* on the left-hand side of the enSuite screen and then *Parameterize online* at the bottom of the navigation window.
- Initiating FTP transfer
 - In the top part of the device window, open the path *Parameters > Interfaces > Connections* by clicking on the relevant plus signs and then select one of the FTP connections you have configured (connection 7 to 12).
 - In the right-hand part of the window next to the command "*Connect now*", set the value to "1".
 - Click on the *Transfer changes to device* icon  at the top of the enSuite window. The DL230 will now start the data transfer.
 - Click on the *Refresh* icon at the top of the enSuite window. Under the *Protocol status* parameter, you will see the message "*2: The interface is being activated for the connection*".
 - Click on the *Refresh* icon at the top of the enSuite window. Under the *Protocol status for destination* parameter, you will see the message "*4: Connection to remote station established*".



The connection to the FTP server has been successfully established and the data transfer started. The next change of status will take place the end of the transfer whose timing depends on the data volume being transferred.

- Click on the *Refresh* icon at the top of the enSuite window. Under the *Protocol status* parameter, you will see the message "*6: The interface has been released for other connections*". Under the *Protocol status for destination* parameter, you will see the message "*6: Disconnection from remote station finished*".
- At the top of the enSuite screen, click on the *Disconnect* or *Disconnect from all devices* icon to terminate the communication link between enSuite and the DL230 via the optical interface.



If an error occurs when saving the file via FTP, this will be indicated by a message under the "Protocol status" parameter for the relevant connection.

7.1.4.5 Monitoring data transfer to the FTP server

After the test has been concluded, you can check the data transfer to the FTP server using a suitable FTP client (e.g., FileZilla). If you have chosen a time as the triggering event, the data will now be automatically transferred from the DL230 to the server at the programmed intervals.

7.1.5 Replacing the antenna



Refer to the instructions in Section [1.3 Connecting, replacing and retrofitting assemblies](#) for replacing the antenna.

If reception via the internal modem is too poor, it is possible to replace the fitted short antenna with an antenna with SMA connection. To do this, Elster GmbH offers various antennas of varying cable lengths.

7.1.5.1 Procedure

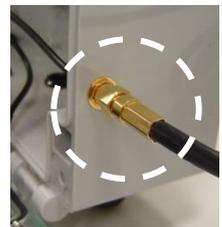
- Open the cover strips on the housing.
- Loosen the housing screws and open the housing cover.



Danger of death!

The mains voltage must be switched off before opening the housing of the DL230. Ensure it is not turned back on and verify that there is no voltage.

- Unscrew the short antenna from the antenna connection jack.
- Screw the external antenna onto the antenna connection jack.
- Close the housing cover and retighten the screws. The external antenna cable must then be fed through the opening on the antenna guard.



- Finally, close the cover strips on the housing again.



CAUTION!

Damage to property caused by improper device closure!

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

Therefore: ensure correct positioning of the cable guides when closing.

7.2 Internal Ethernet Interface iCE280

From software version 1.10 and higher, the DL230 supports an internal Ethernet interface (iCE280) for directly connecting a DL230 to a network.

7.2.1 Information about PoE operation (Power over Ethernet)

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

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

IEEE 802.3af PSE devices have a test mechanism to protect incompatible devices from damage when connected. Only devices that have an authenticating feature based on the IEEE 802.3af standard receive power over the data line. Once the PSE has detected a PD (Powered Device), it begins to classify, i.e., determine the power requirement of the connected device. The DL230 outputs a "Class 0 classification signature".

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

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

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

7.2.2 Information on the network cable

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

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

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

Weidmüller

Type: IE-C5ES8UG0050M40M40-G
 Part number: 1166000050

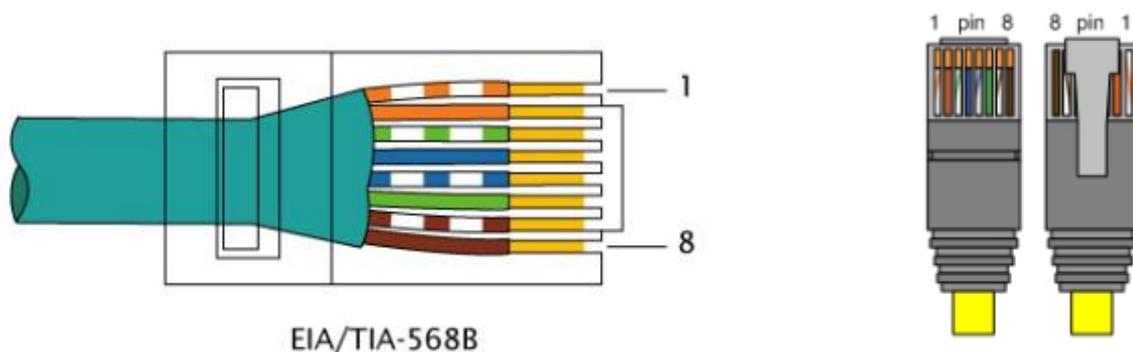
Telegärtner

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

The cables have the following specification:

Specification	
Operating temperature	-40°C to +75°C
PoE/PoE+	in accordance with IEEE 802.3at
Category	Cat 5 (ISO/IEC 11801)
Cable design:	
Conductor material	multi-wire tin-plated copper conductor
Strands (per core)	7
Cross-section	4 x 2 x AWG 26/7 (4 x 2 x 0.128 mm ²)
Number of cores	8
Core layout	twisted pair
Core pair screen	aluminum foil
Colour sequence of cores – core pairs	in accordance with EIA/TIA 568B
Screen	SF/UTP
Total screen	braid made from copper wires
Degree of screen coverage	min. 60%
Sheath material	PUR
Sheath diameter	5.8 mm ± 0.2 mm
Plugs	left: RJ45 IP20, right: RJ45 IP20

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



7.2.3 Connecting the network cable



Attention! Danger of death!

The mains voltage must be switched off before opening the housing of the DL230. Ensure it is not turned back on and verify that there is no voltage.



Attention!

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

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

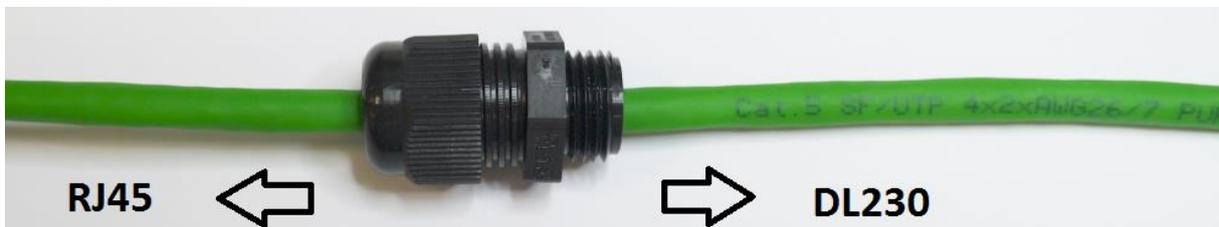
7.2.3.1 Cutting the cable to the required length

Shorten the Ethernet cable to the required length. Please note that you need around **20 cm** of additional length for connecting the cable in the DL230.

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

7.2.3.2 Dismantling the cable gland

Dismantle the cable gland from the DL230 housing remove the closing plug and pull cable gland over the cable (⇒ Fig. below).



7.2.3.3 Removing the cable sheath

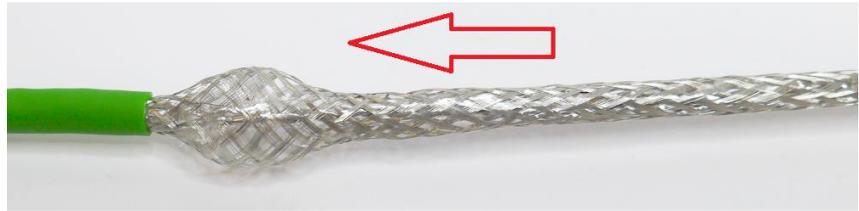
Remove the cable sheath for a length of approx. **6 cm**.



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

7.2.3.4 Bulging and shortening the cable screen

- To create a bulge in the screen, hold it near the sheath and push it towards the sheath.
(⇒ Fig. right)



- Separate the cable screen and the wire inside. Then twist the separated screen carefully.
(⇒ Fig. right)
- Cut the twisted part to **10 mm** length using diagonal pliers.



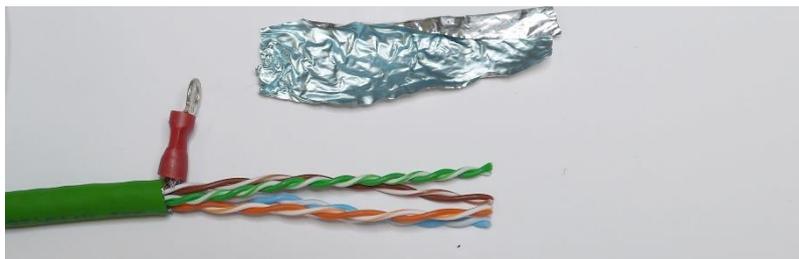
7.2.3.5 Crimp the ring terminal to the cable screen

Connect the ring terminal with the twisted cable screen with the help of a crimping tool. Make sure that all strands are inside the terminal. (⇒ Figure below)



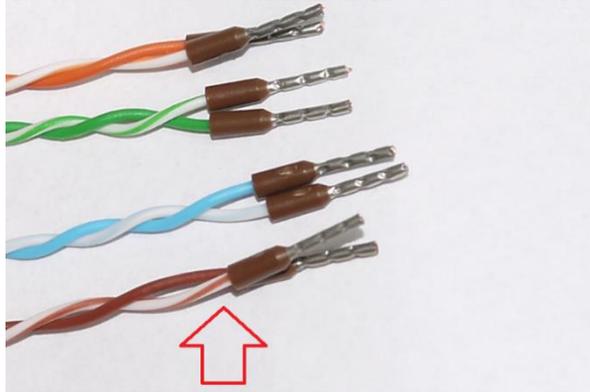
7.2.3.6 Removing the foil screen

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



7.2.3.7 Stripping cores and fitting with ferrules

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



The cores must remain twisted as far as possible.



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

7.2.3.8 Mount the cable gland at the right position

Mount the cable gland on the cable in such a way that a sheath length of 14 cm remains.



7.2.3.9 Mount cable gland in the DL230 housing

- Now insert the prepared cable into the DL230 and tighten the cable gland.

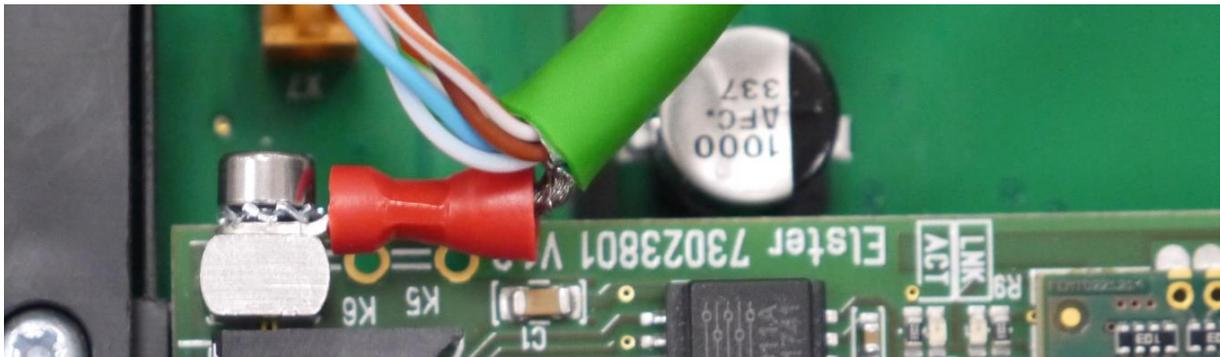




An A/F 20 wrench is required for the cable gland.

7.2.3.10 Connecting the cable screen to the Ethernet module

To attach the shield (with the ring terminal) to the Ethernet module, slide the lock washer for M3 over the M3x6 cylinder head screw and screw it to the ground block of the Ethernet module using a suitable 2.5mm Allen key. The red ferrule of the terminal must point towards the centre of the board, not outwards (as shown in the figure below).



7.2.3.11 Connecting the cable to the Ethernet module



Attention!

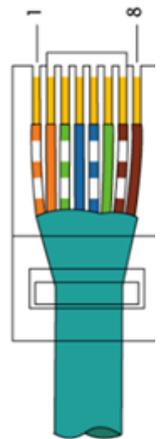
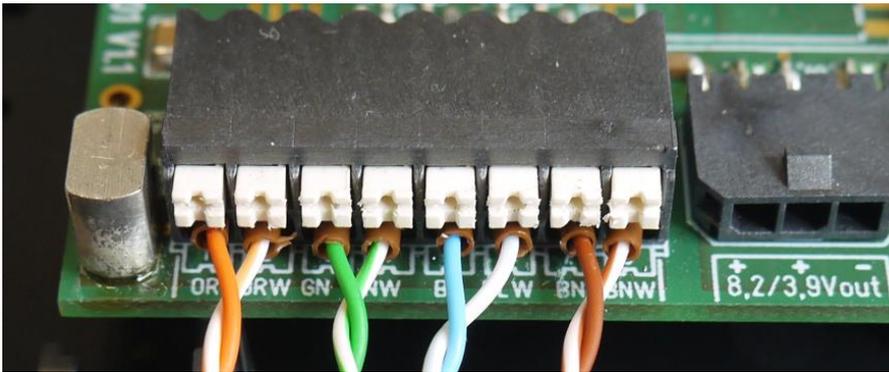
Always switch off the PoE power supply before connecting the network cable and secure it against being switched on again!
The safest way is to remove the network cable from the switch or the network socket.

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

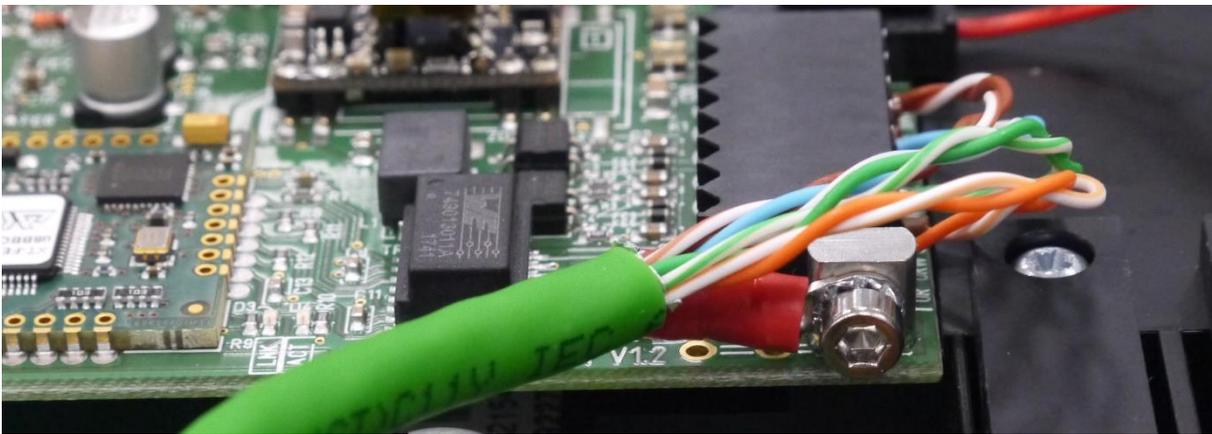


If you cannot insert the cable with your fingers, a small screwdriver can be used to press onto the collar of the ferrule (⇒ Fig. below).

This is what the connected cable looks like:



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



7.2.4 Connecting the power supply

7.2.4.1 Power supply via the internal power supply unit

- If the DL230 is fitted with an internal power supply, simply connect the Ethernet module to the power supply unit.



7.2.4.2 Power supply in PoE mode (Power over Ethernet)

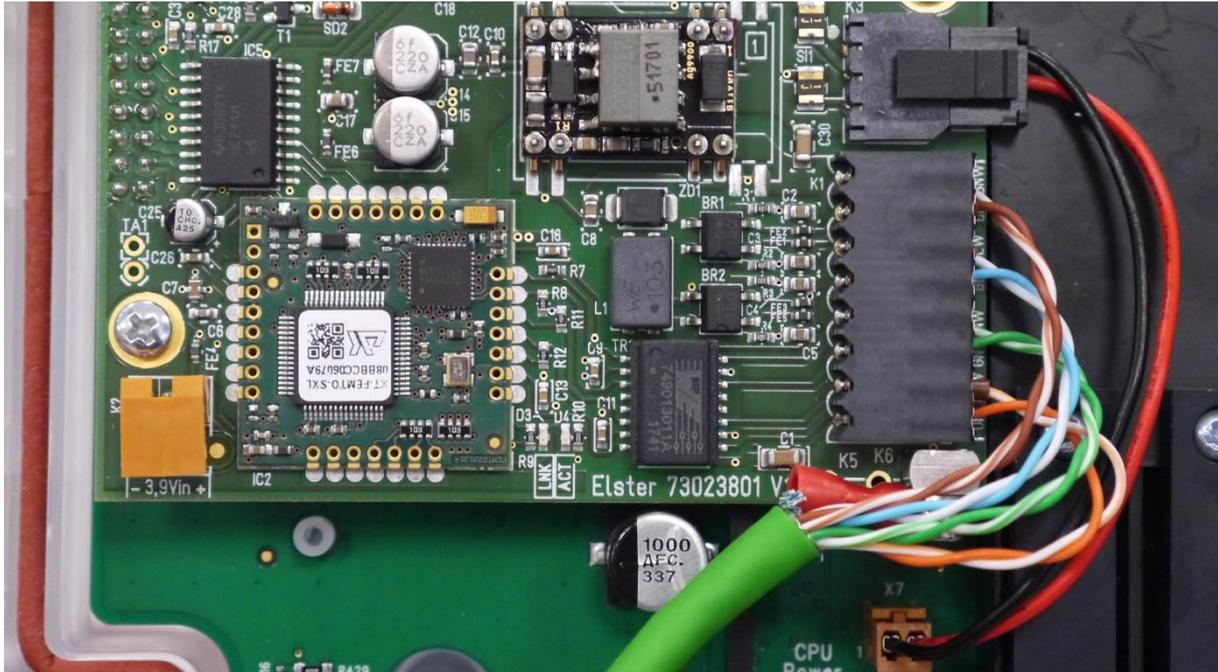
The Ethernet module supplies the DL230 with power when in PoE mode.

- Install the appropriate adapter cable in this case.



- For this, attach the brown connector to X7 on the DL230 board.

We recommend laying the cable beneath the Ethernet cable (⇒ Photo):



7.2.5 Setting the network parameters



For parameterization of the DL230 you need a connection cable for the optical interface as well as the enSuite program. enSuite can be downloaded free of charge from the Honeywell website in the "Software Downloads" section:

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

a) Closing the time windows

Time windows 1 to 6 must be closed for parameterization to function securely. To do this:

- Connect a PC or laptop with enSuite installed to the DL230 optical interface using the connection cable.
- Start enSuite and establish the communication link to the DL230.
(⇒ section 3.1 [Setting up the communication link to the DL230 via the optical interface](#), p. 18)
- Select "[Navigation](#)" on the left-hand side and then "[Parameterize online](#)" at the bottom of the navigation window.
- In the top part of the device window, open the path "[Parameters](#)" > "[Interfaces](#)" by clicking on the relevant plus signs, and then select "[Call time windows](#)".
- In call windows 1 to 6, set start and end to the same value for each one and then select the "[Transfer changes to device](#)" icon at the top of the enSuite window.
- Then wait a minute for any communications activity in progress on the DL230 to be safely stopped.

b) Sending the parameter file

- Send the following parameter file to the DL230 (⇒ section 3.5 Sending the parameter file, p.19). *DL230_xvx.. - internal Ethernet module (*)*¹¹
- For any further customized settings and tests, press “*Navigation*” on the left-hand side of the enSuite window and then “*Parameterize online*” at the bottom of the navigation window.

i All the values listed in enSuite under “Parameters” can be found in the “*Serv.*” display tab of the DL230 under the same path.

c) Setting the network parameters

You can find the network parameters in enSuite in the parameter tree under *Parameters > Interfaces > internal module > Ethernet* or on the device in the menu *Service – Interfaces - internal module* when the *Hardware Config.* is set to *Ethernet*.

The screenshot shows the enSuite interface with a tree view on the left containing folders like Overview, Parameters, Volume, etc. The main window displays a table of network parameters. To the right of the table is a summary table for DHCP usage.

All Parameters		Usage with DHCP =	
Name	Value	on	off
DHCP "DHCP"	0: No DHCP	x	(x)
Own IP address "OwnIP"	192.168.2.21		x
Port "Port"	40000	x	x
Current IP address "IPAdr"	0.0.0.0	x	
Subnet mask "SubN"	255.255.255.0		x
Gateway "Gatew"	192.168.2.1		x
Domain Name Server 1 "DNS12"	0.0.0.0		(x)
Domain Name Server 2 "DNS22"	0.0.0.0		(x)
Maximum number of log trials "MxLog"	30	x	

– **Automatic allocation of network address (DHCP):**

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

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

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

¹¹ The “x” stands for the device software version, e.g., “1v1”.

The star * stands for a small letter which indicates the version of the file, e.g., “a”.



The obtained IP address can be checked in the above Screen of the enSuite.
 Under "Maximum number of log trials", attempts to connect to the DHCP server may be restricted.

– **Dedicated network address:**

Set the parameter "**DHCP**" to the value "**No DHCP**".

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

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

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

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

You can define time windows within which you can access the DL230 in the basic configuration which is now set up. You can deactivate time windows which are not needed by setting the start and end of the time window to the same value.

- In the top part of the device window, open the path "**Parameters**" > "**Interfaces**" by clicking on the relevant plus signs, and then select "**Call time windows**".
- In call window 3, set the start to "00:00" and the end to "23:59" and then select the "Transfer changes to device" icon at the top of the enSuite window.
- Switch on the mains power supply of the DL230 again. The plug symbol in the Main Menu of the DL230 shows the external supply.
- Wait for around a minute for the DL230 to detect the iCE280.

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



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

7.2.6 Retrieving data with enSuite

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



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

- If there is no communication link to the DL230 via the optical interface, it must be established. (⇒ section [3.1 Setting up the communication link to the DL230 via the optical interface](#), p. 18)
- In the top part of the device window, open the path “*Parameters*” > “*Interfaces*” by clicking on the relevant plus signs, and then select “*internal module*” (not the plus sign in front).
- Click on the value “0” next to “*Test call acceptance window*” in the right-hand part of the window and enter a duration in minutes (e.g., 10) for which the test call acceptance window should remain open for the test retrieval. For a battery-operated DL230, do not enter an excessively long duration, as this will adversely affect the battery life.
- Press the “*Transfer changes to device*” icon at the top of the enSuite window. The DL230 can now be accessed via the modem for the duration set.
- In enSuite, press the “*Disconnect*” or “*Disconnect from all devices*” icon to terminate the optical interface communication link between enSuite and the DL230.

- b) Test retrieval via the TCP/IP network

Establish the communication link between enSuite and the DL230 via the network.

(⇒ Section [3.3 Setting up the communication link to the DL230 via a network \(TCP/IP\)](#), p. 19)

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

7.2.7 Retrofitting the internal Ethernet interface



Attention! Danger of death!

The mains voltage must be switched off before opening the housing of the DL230. Ensure it is not turned back on and verify that there is no voltage.



CAUTION !

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

- Before touching the module, discharge the static electricity of your body by touching an unpainted, grounded metal surface. This may be located on a heater, for example.
- Only touch the sides of the module, not the surface. Avoid touching pins and components.
- Do not remove the modem from its packaging until you are ready to install it, e.g., after the housing of the DL230 has been opened.

- Attach the Ethernet module to the right socket connector and secure it to the board with the screws provided.



Once you have installed the Ethernet module in the DL230

- attach the network cable (⇒ section 7.2.1) and
- parameterize the Ethernet module (⇒ section 7.2.5).

7.3 Installing a GSM/GPRS/UMTS/LTE modem module (retrofit)



Refer to the instructions in Section 1.3 [Connecting, replacing and retrofitting assemblies](#) for installing or replacing the communication module.

As an alternative to the permanently soldered GSM/GPRS/UMTS modem (⇒ Section 7.1), it is also possible to use a plug-in GSM/GPRS/UMTS/LTE modem module. However, this requires no modem to be soldered to the CPU circuit board in the DL230.



A plug-in communication module (e.g., a GPRS modem module) and the internal, soldered modem **are mutually exclusive**.

The DL230 can also be ordered without a communication option.

The communication module can also be ordered as a retrofit kit.



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

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



When operating the CloudLink 5G modem in the LTE cat.NB1 network (Narrowband IoT, NB-IoT), both the data volume as well as the transmission speed are limited. The exact conditions depend on the network provider and the selected tariff. For details, please contact your mobile network provider.

7.3.1 Components of retrofit kit 73023786 (GSM/GPRS modem)

The retrofit kit consists of the components listed below. The MMCX to SMA adapter cable is already connected to the modem.

Designation	Quantity	ID
EECM-2G-UG350(GPRS) on EK/DL adapt	1	73023788
Antenna adaptor MMCX-90° to SMA	1	73023751
2G/3G Stubby Antenna, SMA(m), 90° angled	1	04407114
Plastite oval-head screw 3x6	1	03017089
Fillister-head-screw M3x6 DIN 7985-4.8	2	03537125
Distance bolt M3 x 6 plast.	2	04195095

7.3.2 Components of retrofit kit 73023787 (UMTS modem)

The retrofit kit consists of the components listed below. The MMCX to SMA adapter cable is already connected to the modem.

Designation	Quantity	ID
ECM-3G-UU270(UMTS) on EK/DL adapt	1	73023789
Antenna adaptor MMCX-90° to SMA	1	73023751
2G/3G Stubby Antenna, SMA(m), 90° angled	1	04407114
Plastite oval-head screw 3x6	1	03017089
Fillister-head-screw M3x6 DIN 7985-4.8	2	03537125
Distance bolt M3 x 6 plast.	2	04195095

7.3.3 Components of retrofit kit 73025412 (LTE modem)

The retrofit kit consists of the components listed below. The MMCX to SMA adapter cable is already connected to the modem.

Designation	Quantity	ID
CCM-4G-nRF9160 (LTE-NB1/M1 modem) (= CloudLink 5G)	1	73025409
Antenna adaptor MMCX-90° to SMA	1	73023751

Designation	Quantity	ID
2G/3G/4G Stubby Antenna, SMA(m), 90° angled	1	04950004
Plastite oval-head screw 3x6	1	03017089
Fillister-head-screw M3x6 DIN 7985-4.8	2	03537125
Distance bolt M3 x 6 plast.	2	04195095

7.3.4 Installing the modem module



Danger of death!

For the DL230 with internal power supply, the mains voltage must be switched off before opening the housing. Ensure it is not turned back on and verify that there is no voltage.



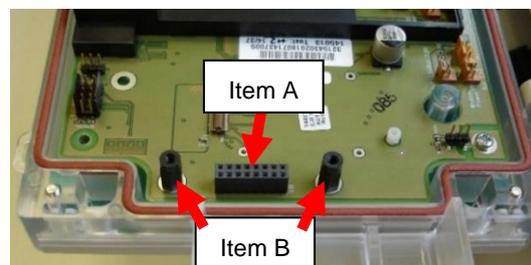
CAUTION !

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

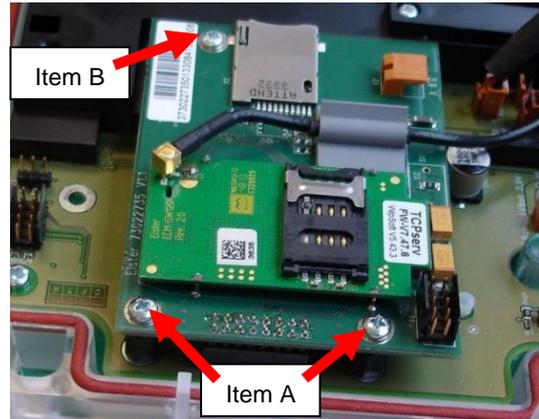
- Before touching the module, discharge the static electricity of your body by touching an unpainted, grounded metal surface. This may be located on a heater, for example.
- Only touch the sides of the module, not the surface. Avoid touching pins and components.
- Do not remove the modem from its packaging until you are ready to install it, e.g., after the housing of the DL230 has been opened.

This is what the CPU board in a DL230 looks like after being prepared for the retrofit. An internal modem is **not** fitted.

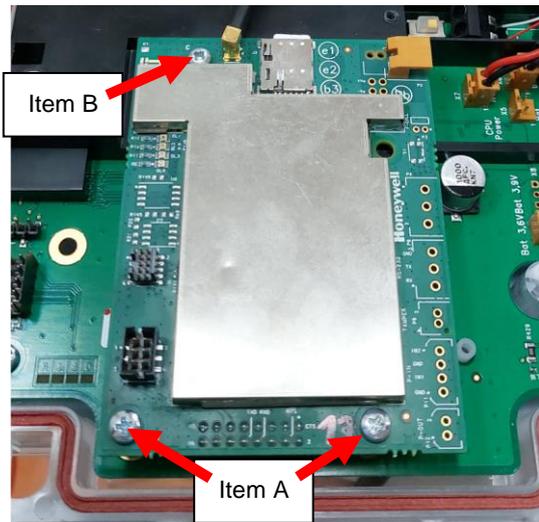
- To the right and left of X18 (⇒ Fig. right, Item A), the two spacers from the retrofit kit must be inserted in the holes provided for them to secure the communication module (⇒ Fig. right, Item B).
- The modem module is connected to socket connector X18 (⇒ Fig. right, Item A). Ensure that there is no offset between the pins on the modem module and the holes in the socket connector.



- Secure the modem module to the CPU board using the three screws supplied. The two screws with M3 threads must be inserted into the two spacers (⇒ Fig. right, Item A). Secure the modem module to the black circuit board cover using the self-tapping plastic screw (⇒ Fig. right, Item B).

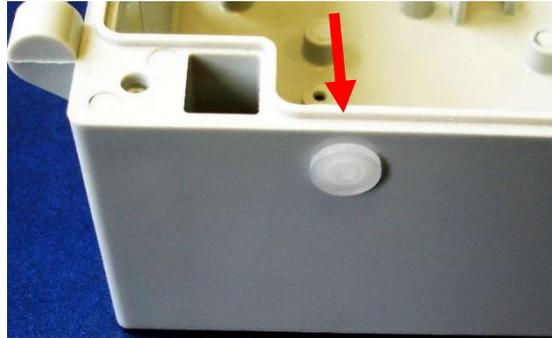


- The CloudLink 5G is mounted in the same way as a GPRS/UMTS modem (see above), with the same screws in the same positions (⇒ Fig. right):



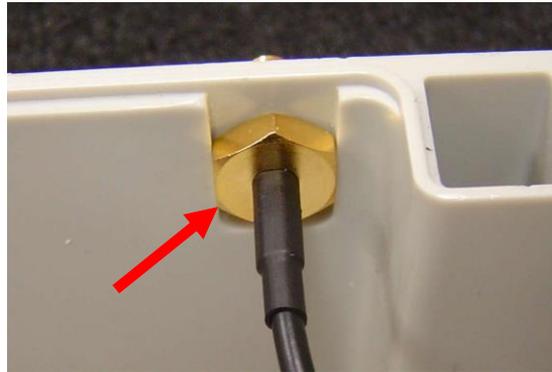
7.3.5 Installing the antenna jack and the antenna

- The hole for the antenna jack is sealed with a plug. This plug must be removed from the opening, pushing it from inside to outside.

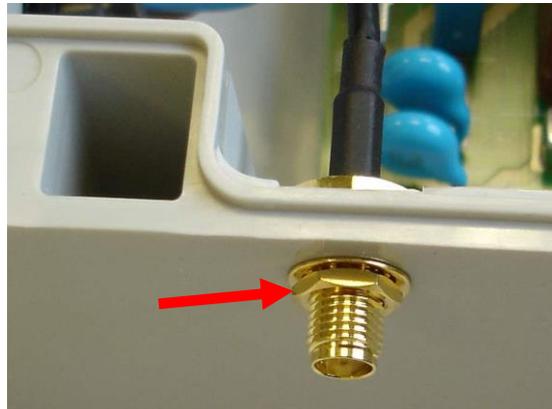


- The antenna adapter cable can then be inserted into the hole from the inside of the housing.

ATTENTION: the anti-twist lock and the seal provided by the antenna adapter cable seal will only work if the anti-twist lock is inserted in the corresponding recess in the housing wall.



- Secure the antenna adapter cable from the outside using the serrated washer and hexagonal nut supplied. Use an 8 mm socket wrench for this purpose.



- If the antenna jack is permanently secured in the housing, the supplied antenna can be screwed onto it and tightened using an 8 mm open-ended spanner.
- The antenna must run parallel to the top of the housing.



7.3.6 SIM card insertion

Installation of a 2FF ("mini") SIM card in a GPRS/UMTS modem:

- Slide the SIM card into the card slot from the right as shown in the figure.

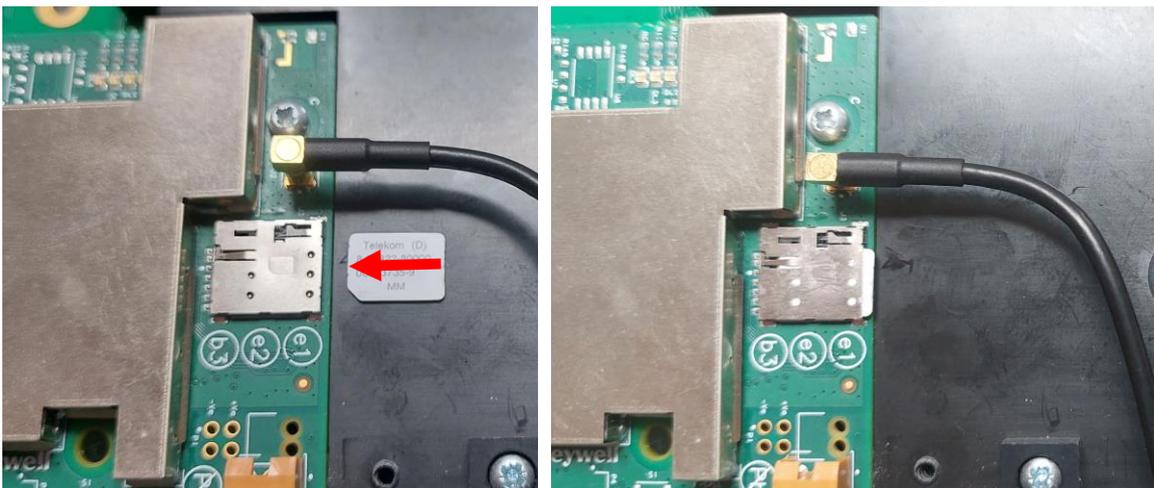


- Insert the SIM card into the card slot until the spring resistance has been overcome (click!) and the card engages.



Installation of a 4FF ("nano") SIM card in an LTE cat.M1/NB1 modem:

- In the case of a CloudLink 5G modem, the SIM card is installed in the same way as for a GPRS/UMTS modem (see above). The SIM card is also inserted from the right side (see Fig. left) until it clicks into place (see Fig. right). Please note, however, that the CloudLink 5G requires a SIM card in 4FF format ("nano" SIM).



7.3.7 Connecting the power supply

- Connect the modem power supply (white cable of the power supply unit or of the Battery adapter board) to X3 “3.9V” on the modem module.
- GPRS/UMTS modem
- LTE cat. M1/NB1 modem



Attention when installing a GPRS/UMTS modem!

If the modem module is powered by a battery (*), the modem must be commissioned **shortly** after connecting the power supply unit to the modem module as described in ⇒ Section 7.1.2 or 7.1.3 to avoid placing an unnecessary load on the modem battery.

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

(*) Modem battery connected via Battery adapter board

7.3.8 Parameterization of the DL230 for operation with a plug-in modem module

The DL230 is parameterized for GSM/GPRS/UMTS modem operation using the plug-in modem module in exactly the same way as for a permanently soldered modem. You should therefore proceed as described in the appropriate paragraph in ⇒ Section 7.1 to prepare the DL230 and the modem for the required operating mode. In the case of an LTE radio modem, section 7.3.9 must also be taken into account.

7.3.9 Operation with an LTE modem module



Since the CSD¹² service is not provided by the LTE¹³ network, the CloudLink 5G modem - unlike a GSM/GPRS/UMTS modem - cannot be used for CSD connections!

¹² CSD = Circuit Switched Data service

¹³ LTE = Long Term Evolution, 4th generation (4G) radio network

7.3.9.1 Parameterization of the DL230 for operation with an LTE modem module



For parameterization of the DL230, you will require a connection cable for the optical interface as well as the enSuite program.
enSuite can be downloaded free of charge from the “Software Downloads” section of the Honeywell website (⇒ [5]).

The following parameter files are provided for parameterizing the DL230 for operation with an LTE modem:

Modem module / Radio network / Operation mode	Parameter file
CloudLink 5G / LTE cat.M1 (=LTE-M) ¹⁴ / TCPserv + FTP	<i>DL230_1v15.. - int. CloudLink TCPserv/FTP/NTP (4G+5G LTE-M1) (*)</i> ¹⁵
CloudLink 5G / LTE cat.NB1 (=NB-IoT) ¹⁶ / TCPserv + FTP	<i>DL230_1v15.. - int. CloudLink TCPserv/FTP/NTP (4G+5G LTE-NB1)(*)</i> ¹⁵



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

To load the parameter file into the DL230, please follow the description in section 7.1.3.1.

7.3.9.2 TCPserv operation mode via an LTE modem module

Depending on the LTE network to be used (LTE-M or NB-IoT), the DL230 must be parameterized with the corresponding parameter file according to section 7.3.9.1. In addition, some individual parameters must be set for TCPserv operation, mainly the APN¹⁷ data. The individual parameters and the procedure for parameterizing the DL230 are described in section 7.1.3.1.

7.3.9.3 FTP data transmission via an LTE modem module

Depending on the LTE network to be used (LTE-M or NB-IoT), the DL230 must be parameterized with the corresponding parameter file according to section 7.3.9.1. Furthermore, some individual parameters have to be set for FTP data transfer, especially some specific FTP settings besides the APN data. The individual parameters and the procedure for parameterizing the DL230 are described in section 7.1.47.1.3.1.

¹⁴ LTE cat.M1 / LTE-M = Special LTE network for m2m applications (Machine to Machine)

¹⁵ The “x” stands for the device software version, e.g., “1v1”.

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

¹⁶ LTE cat.NB1 / NB-IoT = Special LTE network for narrowband applications, i.e. for applications with only low data volumes.

¹⁷ APN = Access Point Name = Access to the VPN (Virtual Private Network)

7.3.9.4 Checking the LTE field strength

The LTE field strength can be checked in the same way as the GSM field strength (see section 7.1.2.2).



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

7.4 External modems

As an alternative to the GSM/GPRS/UMTS modems (⇒ Sections 7.1 and 7.3), other communication methods are also possible. The DL230 is fitted with an RS232/485 interface board for this purpose, to which the other modems can be connected. This means that communication can be established using the analogue landline PSTN or via Ethernet.



A plug-in communication module (e.g., the RS232/485 interface board) and the internal, soldered modem **are mutually exclusive**.

The DL230 can also be ordered without a communication option.

The communication module can also be ordered as a retrofit kit.

7.4.1 RS232/485 interface board

The RS232/485 interface board enables the DL230 to be connected to an external modem, direct to a PC or to an RS485 bus.



Refer to the instructions in ⇒ Section 1.3 [Connecting, replacing and retrofitting assemblies](#) for installing or replacing the communication module.

7.4.1.1 Installing the RS232/485 interface module in the DL230

Retrofit kit 73022779 consists of the components listed below.

Designation	Quantity	ID
EK290/DL230 RS232/RS485 Board	1	73022304
Plastite oval-head screw 3x6	1	03017089
Fillister-head-screw M3x6 DIN 7985-4.8	2	03537125
Distance bolt M3 x 6 plast.	2	04195095



Danger of death!

For the DL230 with internal power supply, the mains voltage must be switched off before opening the housing. Ensure it is not turned back on and verify that there is no voltage.



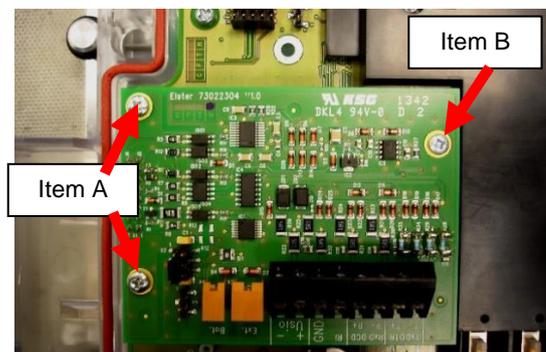
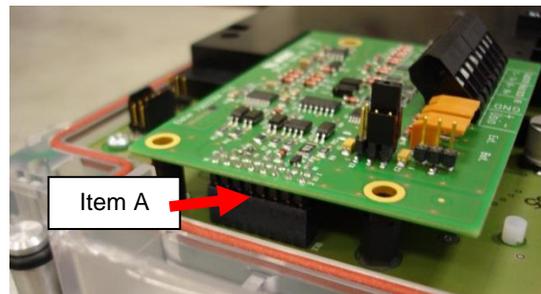
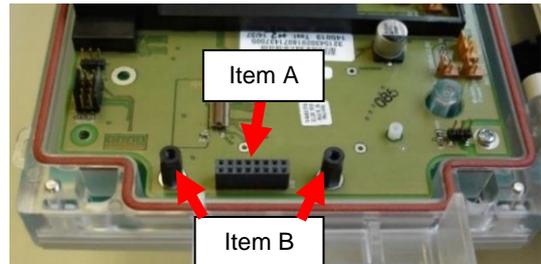
CAUTION !

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

- Before touching the module, discharge the static electricity of your body by touching an unpainted, grounded metal surface. This may be located on a heater, for example.
- Only touch the sides of the module, not the surface. Avoid touching pins and components.
- Do not remove the modem from its packaging until you are ready to install it, e.g., after the housing of the DL230 has been opened.

This is what the CPU board in a DL230 looks like after being prepared for the retrofit. An internal modem is not fitted.

- To the right and left of X18 (⇒ Fig. right, Item A), the two spacers from the retrofit kit must be inserted in the holes provided for them to secure the RS232/485 interface module (⇒ Fig. right, Item B).
- The RS232/485 interface module is connected to socket connector X18 (⇒ Fig. right, Item A). Ensure that there is no offset between the pins on the interface module and the holes in the socket connector.
- Secure the RS232/485 interface module to the CPU board using the three screws supplied. The two screws with M3 threads must be inserted into the two spacers (⇒ Fig. right, Item A). Secure the interface module to the black circuit board cover using the self-tapping plastic screw (⇒ Fig. right, Item B).



7.4.1.2 Power supply options

The interface signals are electrically isolated on the RS232/485 interface board. The part of the circuit facing the connected modem can be supplied by the modem if the latter provides an appropriate supply voltage. The DM130 modem available from Honeywell has this facility.

If other modems are used which do not provide a power supply for the DL230 interface board, we recommend that the DL230 is fitted with an internal power supply unit (Elster GmbH ID 73022645). This provides a power supply to the interface board.

Alternatively, the complete interface board can be supplied with energy by the DL230 CPU board.



If the interface board is supplied by the DL230 CPU board, the electrical isolation of the interface signals is **no** longer guaranteed.



If the interface board is supplied by the DL230 CPU board and the DL230 CPU board, in turn, is battery-powered, the battery service life will be reduced. This application is **not** recommended! Time windows 1 and 2 must be reduced to a minimum in this case.

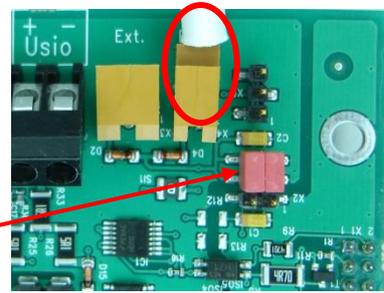
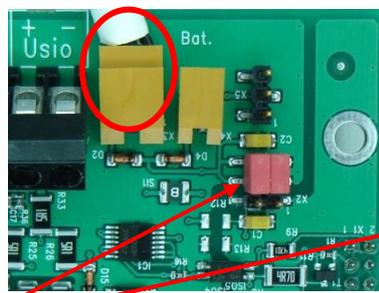
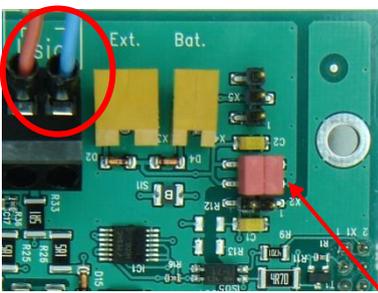
The voltage used for the supply is defined by the two plug-in jumpers at position X2 (⇒ photos):

– Interface board supply by:

– the **external modem**
(e.g., DM130)

– the **internal DL230 power supply unit**
(ID No. 73022645)

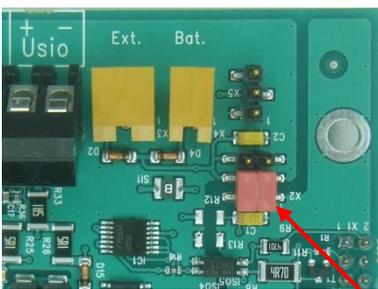
– a **separate battery**
(ID No. 73017964)



→ Both plug-in jumpers in the **upper** position

– Interface board supply by:

– the **DL230 CPU board**
(via the 16-pin plug connector X18)



→ Both plug-in jumpers in the **lower** position

Attention:

Electrical isolation is not guaranteed with these two supply options!!!

7.4.2 Analogue PSTN modem DM130

7.4.2.1 DM130 parameterization

There are three ways to parameterize the DM130:

- On site using the DIP switches in the DM130
- On site using the RJ10-type RS232 interface on the DM130
- Remotely using a modem connection

The easiest method is parameterization using the DIP switches. These enable you to make all the settings for operating a DM130 on a DL230 easily and locally. The switches cannot be set until the housing cover has been opened.



Caution! Danger of death!

The mains voltage must be disconnected on all poles before opening the housing of the DM130. Ensure it is not turned back on and verify that there is no voltage.

The following table lists the settings required for operation on a DL230:

D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	Meaning
0										V42/V42.bis/MNP active
	0									Password protection not active
		0	0							Call answering after 1 ring
				0						Multi-standard handshake telephone line
					1	0	1			Local baud rate is 19,200 bit/s
								1		Mode C off, fixed baud rate
									1	Character format 8N1 local

After switching on the mains voltage, the modem can be reset using the service button on the DM130. The service button is located to the right of the RS232 interface. If it is pressed and held for more than 5 seconds, the setting (0 or 1) of the switches is evaluated and the parameters set accordingly in the modem. The effectiveness of the DIP switch settings is indicated by the yellow status LED flashing.

You will require the DMSET parameterization program for the optional parameterization via the RS232 interface or using a modem connection. Details of its use are provided if required in the documentation for the DM130 or for the DMSET parameterization program.



Further information on the parameterization of the DM130 can be found in its documentation.

7.4.2.2 Connecting the DM130 to the RS232 interface board in the DL230

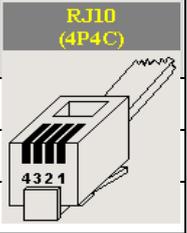
Both devices must be opened to connect a DM130 to the DL230.



Caution! Danger of death!

The mains voltage must be disconnected on all poles before opening the housings. Ensure it is not turned back on and verify that there is no voltage.

The RJ10 socket-type RS232 interface on the DM130 must be connected to the terminals on the RS232/485 interface board in the DL230 as follows to use the DM130 analogue modem on a DL230 data logger:

DL230		DM130	
Terminal designation on the RS232/485 interface board	Core colour	Pin No. on the RJ10 plug (4P4C) of the DM130 connection cable ¹⁸	
RxD	green	3 (TxD)	
TxD	yellow	4 (RxD)	
GND	brown	2 (Gnd)	

(The white DCD core connected to pin 1 of the RJ10 plug is not required for this application.)

Current loop CL1 must be closed on the DM130 if the RS232 interface is being used. This is ensured by short-circuiting terminals RTX- and RTX+:

Terminal designation on the DM130
RTX-
RTX+

The RS232/485 interface board in the DL230 can be supplied with power either by the internal power supply unit of the DL230 (ID 73022645) or by the +9 V DC auxiliary voltage of the DM130 (⇒ Section 7.4.1.2). The wiring must be completed as follows to connect the auxiliary voltage of the DM130:

Terminal designation on the RS232/485 interface board in the DL230	Terminal designation on the DM130
Usio+	HS+
Usio-	HS-

Finally, make sure that the housing on both the DL230 and the DM130 has been closed correctly.

7.4.2.3 Parameterization of the DL230 for operation with a DM130



To parameterize the DL230 for operation with a DM130, you will require a connection cable for the optical interface as well as the enSuite program.
enSuite can be downloaded free of charge from the “[Software Downloads](#)” section of the Honeywell website (⇒ [\[5\]](#)).

a) Closing the time windows

Time windows 1 to 6 must be closed for parameterization to function securely. To do this:

- Connect a PC or laptop with enSuite installed to the DL230 optical interface using the connection cable.
- Start enSuite and establish the communication link to the DL230 via the optical interface. (⇒ Section 3.1 [Setting up the communication link to the DL230 via the optical interface](#), p. 18)
- If necessary, click on [Navigation](#) on the left-hand side and then on [Parameterize online](#) at the bottom of the navigation window.
- In the top part of the device window, open the path “[Parameters](#)” > “[Interfaces](#)” by clicking on the relevant plus signs and then select “[Call time windows](#)”.
- In call acceptance windows 1 to 6, set start and end to the same value for each one and then click on the “[Transfer changes to device](#)” icon  at the top of the enSuite window.
- Then wait a minute for any communications activity in progress on the DL230 to be safely stopped.

¹⁸ “Adapter cable DM130 / RS232 - RJ10”, Order No. 73023135

b) Sending the parameter file

- Send one of the following parameter files to the DL230 depending on the power supply to the interface board in the DL230 (⇒ Section 3.5 [Sending the parameter file](#), p. 19):
- [DL230_up from 1v02. - DM130 \(PSTN modem\) + DL-serIO battery supplied \(*\)](#)¹⁹
- [DL230_up from 1v02. - DM130 \(PSTN modem\) + DL-SerIO mains supplied \(*\)](#)¹⁹

c) Setting time windows for future data retrievals



The DM130 must be parameterized (⇒ Section 7.4.2.1) and connected to the DL230 (⇒ Section 7.4.2.2) before a time window is opened for the first time.

In the basic configuration now set up, you can define cyclic time windows during which data can be retrieved from the DL230 via the modem. There are two available time windows which operate on DL230 battery power only, and for versions with power supply unit, there are four more which operate on mains voltage only.



Set the time windows for battery operation only for as long and as often as required. Each time window reduces the service life of the DL230 battery.

The set time windows are not directly accounted for in the calculation of the remaining battery service life *Bat.R* for the DL230. Therefore, the expected battery life is not updated if the time windows are changed. However, previous time windows and data transfers are taken into account in the calculation of the remaining capacity *BatRC* and the remaining service life.

- The two time windows for battery mode are set in the enSuite device window under:
 - - [Parameters > Interfaces > Connections > Connection 1](#) and
 - - [Parameters > Interfaces > Connections > Connection 2](#)
- The four time windows for mains operation are set under:
 - - [Parameters > Interfaces > Connections > Connection 3](#) to
 - - [Parameters > Interfaces > Connections > Connection 6](#)

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

- Click on the [Transfer changes to device](#) icon  at the top of the enSuite window.
- Finally, make sure that the housing on both the DL230 and the DM130 has been closed correctly and switch on the power supplies.

¹⁹ The “x” stands for the device software version, e.g., “1v1”.

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

7.4.2.4 Retrieving data with enSuite

- a) Opening the test time window for the following test retrieval with enSuite



The test time window only needs to be opened if none of time windows 1 to 6 are open.

- If there is no communication link to the DL230 via the optical interface, it must be established. (⇒ Section 3.1 [Setting up the communication link to the DL230 via the optical interface](#), p. 18)
 - Select [Navigation](#) on the left-hand side of the enSuite screen and then [Parameterize online](#) at the bottom of the navigation window.
 - In the top part of the device window, open the path “[Parameters](#)” > “[Interfaces](#)” by clicking on the relevant plus signs, and then select “[Internal module](#)” (not the plus sign in front).
 - Click on the value “0” next to “[Test call acceptance window](#)” in the right-hand part of the window and enter a duration in minutes (e.g., 10) for which the test time window should remain open for the test retrieval. For a battery-operated DL230, do not enter an excessively long duration as this will adversely affect the battery life.
 - Click on the [Transfer changes to device](#) icon  at the top of the enSuite window. The DL230 can now be accessed via the modem for the duration set.
 - At the top of the enSuite screen, click on the [Disconnect](#) or [Disconnect from all devices](#) icon to terminate the communication link between enSuite and the DL230 via the optical interface.
- b) Test retrieval via the modem
- Establish the communication link between enSuite and the DL230 via the modem. (⇒ Section 3.2 [Setting up the communication link to the DL230 via a modem](#), p. 18)
 - 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 at the top of the enSuite screen to end the test retrieval.

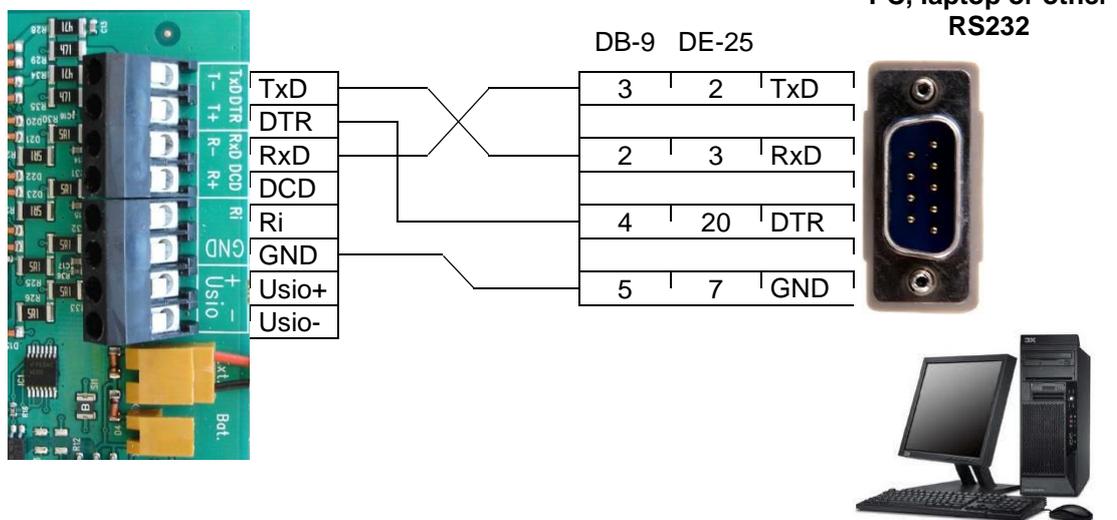
7.5 Connecting other devices to the serial interface

The DL230 can be ordered with an integrated RS232/485 interface board or without a communication option. In this case, the RS232/485 interface board can be ordered as a retrofit kit. This board can be installed in the DL230 as described in Section 7.4.1.

7.5.1 Connecting the RS232 interface to a PLC or a COM port on a PC

7.5.1.1 Connection

RS232/485 board in the DL230



7.5.1.2 DL230 parameterization



For parameterization of the DL230, you will require a connection cable for the optical interface as well as the enSuite program.

enSuite can be downloaded free of charge from the “[Software Downloads](#)” section of the Honeywell website (⇒ [\[5\]](#)).

a) Closing the time windows

Time windows 1 to 6 must be closed for parameterization to function securely. To do this:

- Connect a PC or laptop with enSuite installed to the DL230 optical interface using the connection cable.
- Start enSuite and establish the communication link to the DL230.
- Select *Navigation* on the left-hand side and then *Parameterize online* at the bottom of the navigation window.
- In the top part of the device window, open the path “*Parameters*” > “*Interfaces*” by clicking on the relevant plus signs and then select “*Call time windows*”.
- In call acceptance windows 1 to 6, set start and end to the same value for each one and then click on the “*Transfer changes to device*” icon  at the top of the enSuite window.
- Then wait a minute for any communications activity in progress on the DL230 to be safely stopped.

- b) Sending the parameter file
- Send the following parameter file to the DL230:
 - [DL230_xvx - RS-232 to PLC/PC \(RxD,TxD,DTR,GND\) \(*\)](#) ²⁰
 - 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 DL230 using the same path.

- c) Setting time windows for future data retrievals

In the basic configuration now set up, you can define cyclic time windows during which data can be retrieved from the DL230 using the PC. Time windows 1 to 6 are provided for operating the DL230 with a directly connected RS232. You can deactivate time windows which are not needed by setting the start and end of the time window to the same value.

- In the top part of the device window, open the path “[Parameters](#)” > “[Interfaces](#)” by clicking on the relevant plus signs and then select “[Call time windows](#)”.
- For example, you can set the start of call acceptance window 3 to “00.00” and the end to “23.59”.
- Click on the [Transfer changes to device](#) icon  at the top of the enSuite window.
- Ensure that the DL230 has a suitable voltage supply if time windows 3 – 6 are used.
- Terminate the optical link to the DL230.

7.5.1.3 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 (e.g.: [Start > All Programs > Elster > enSuite](#)) on the PC connected to the terminals.
- 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](#) and [Connection](#) → [Serial RS232](#) and [Use defaults settings](#).
- Set the baud rate for the serial RS232 connection in enSuite to the baud rate set in the DL230 (preset to 19,200 Bd by the wpp file).
- 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.

²⁰ The “x” stands for the device software version, e.g., “1v1”.

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

7.5.1.4 PC/PLC connection without DTR signal

There is no need to use the DTR signal when the DL230 is operating in mains mode. The DTR signal may not even exist, depending on the downstream device. In this case, the following adjustments must be made:

- Connect RxD/TxD and GND as described in ⇒ Section 7.5.1.1 (DTR is omitted).
- Use the keypad to go to *Admin* → *Interfaces* → *interface module* → *Hardware Config.* → and change switch **CfgI2** from “RS232-Dtr” to “RS232-direct”.
- A call window (by default, one of call windows 3 to 6) must be open.
- The external voltage supply must be connected.

7.5.2 RS485 interface, electrically isolated

7.5.2.1 Wiring

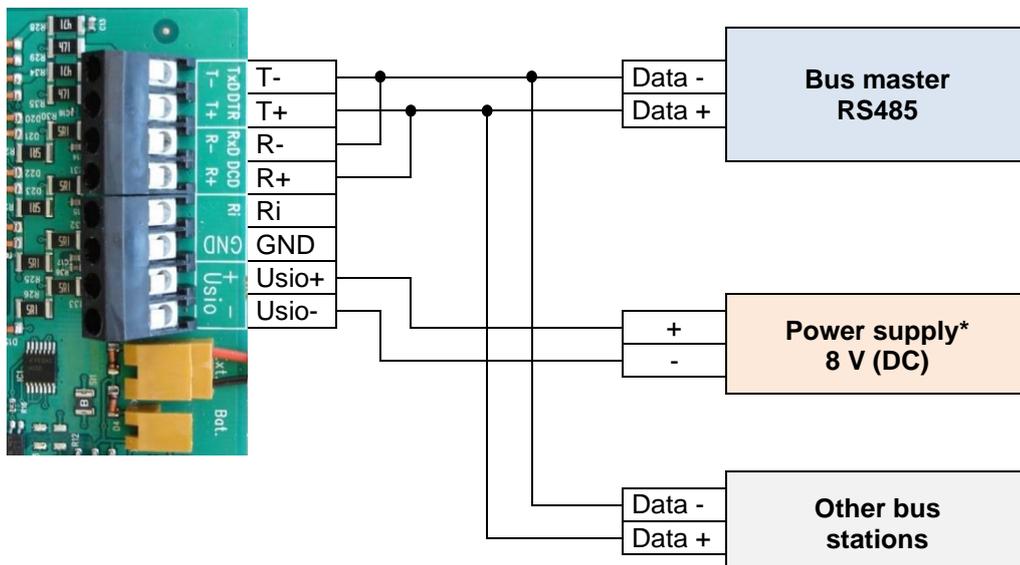


If a DL230 is connected to a RS485 bus, no terminal resistors may be connected to the bus!

As a result of its current limit to obtain approval as an intrinsically safe apparatus, the DL230 cannot supply enough current for the terminal resistors. The terminal resistors are not required for the data transfer rates used.

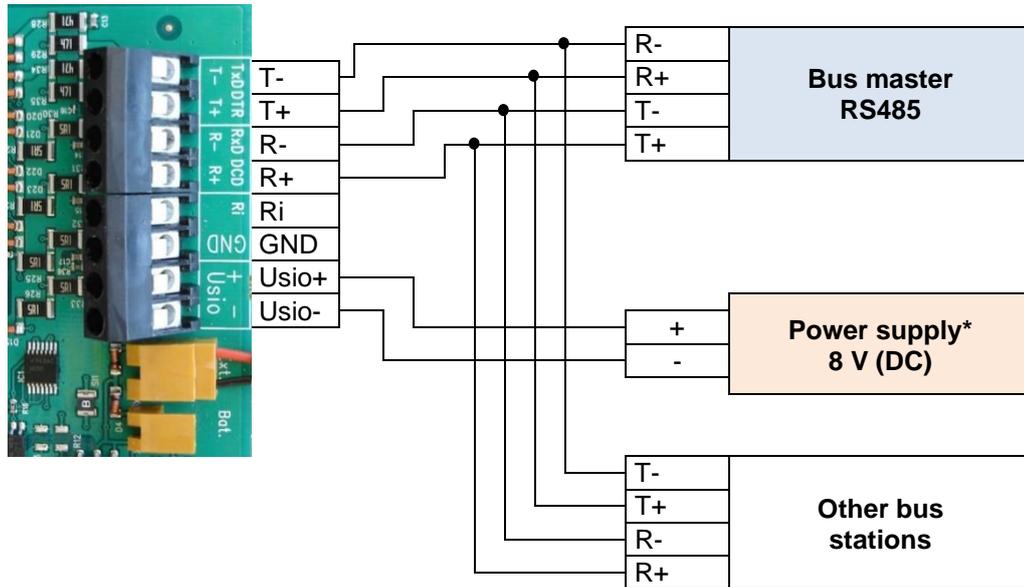
7.5.2.1.1 2-wire simplex wiring

RS232/485 board in the DL230



7.5.2.1.2 4-wire full duplex wiring

RS232/485 board in the DL230

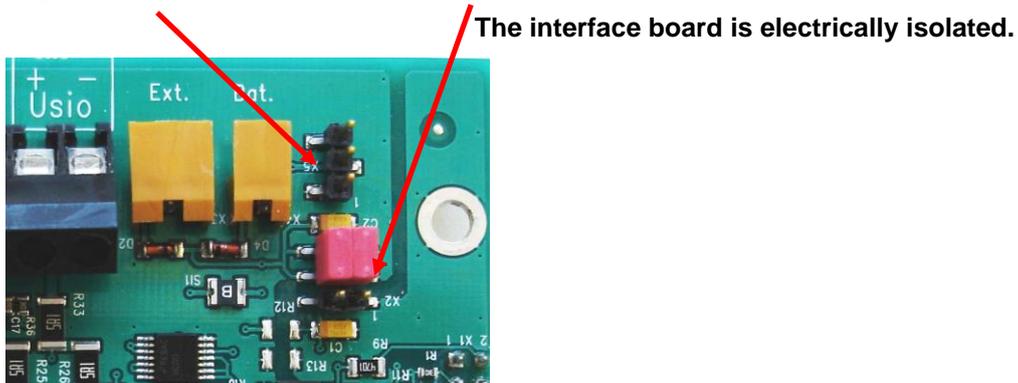


*) Power supply shown as an example (⇒ also Section 7.5.2.3).

7.5.2.2 Plug-in jumpers on the interface board – electrically isolated

X5: no plug-in jumpers
or one plug-in jumper on the two
pins which are close to the bottom
edge of the circuit board.

X2: no plug-in jumpers
or two plug-in jumpers on the pins which are
close to the bottom edge of the circuit board.



As a result of the position of the two plug-in jumpers on X2, the DL230 interface is electrically isolated from the remainder of the circuit, thus preventing the coupling of interference, for example.

7.5.2.3 Power supply for the RS232/485 interface board in the DL230 (electrically isolated)

If the interface board is electrically isolated, the power must be supplied using one of three routes:

1. Usio+ 6 – 11 V DC from an external power supply
Usio-
2. X3 Ext. To connect the white cable of the internal DL230 power supply unit
This cancels the electrical isolation of the earth of the DL230 and
the earth of the interface board.
3. X4 Bat. To connect a modem battery (730 17964)
Please note that even when the time window is closed, a current of
1 – 2 mA flows from the battery.

7.5.2.4 DL230 parameterization



For parameterization of the DL230, you will require a connection cable for the optical interface as well as the enSuite program.

enSuite can be downloaded free of charge from the “[Software Downloads](#)” section of the Honeywell website (⇒ [\[5\]](#)).

a) Closing the time windows

Time windows 1 to 6 must be closed for parameterization to function securely. To do this:

- Connect a PC or laptop with enSuite installed to the DL230 optical interface using the connection cable.
- Start enSuite and establish the communication link to the DL230.
- Select [Navigation](#) on the left-hand side and then [Parameterize online](#) at the bottom of the navigation window.
- In the top part of the device window, open the path “[Parameters](#)” > “[Interfaces](#)” by clicking on the relevant plus signs and then select “[Call time windows](#)”.
- In call acceptance windows 1 to 6, set start and end to the same value for each one and then click on the “[Transfer changes to device](#)” icon  at the top of the enSuite window.
- Then wait a minute for any communications activity in progress on the DL230 to be safely stopped.

b) Sending the parameter file

- Send the following parameter file to the DL230:
- [DL230_xvx - RS485 bus communication \(*\)](#)²¹
- 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 DL230 using the same path.

²¹ The “x” stands for the device software version, e.g., “1v1”.

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

c) Setting the device address

Every bus station requires an individual ID (“device address” or “bus address”) so that the bus master can select precisely one station for data transfer.

The device address may be a text with up to 32 characters (no special symbols allowed). The parameter file mentioned above does not assign an address.

Proceed as follows to edit the device address of the DL230:

- In the top part of the enSuite device window, open the path “*Parameters*” > “*Interfaces*” by clicking on the relevant plus signs and then select “*Internal module*”.
- Edit the device address of the DL230 in the *All Parameters* window in the line *Device address of the internal module “B.Adr”*.

d) Setting time windows for future data retrievals

In the basic configuration now set up, you can define cyclic time windows during which data can be retrieved from the DL230 via the RS485 bus. Time windows 1 to 6 are provided for operating the DL230 with a connected interface board. You can deactivate time windows which are not needed by setting the start and end of the time window to the same value.

- In the top part of the device window, open the path “*Parameters*” > “*Interfaces*” by clicking on the relevant plus signs and then select “*Call time windows*”.
- For example, you can set the start of call acceptance window 3 to “00.00” and the end to “23.59”.
- Click on the *Transfer changes to device* icon  at the top of the enSuite window.

7.5.3 RS485 interface board, not electrically isolated.

7.5.3.1 Wiring

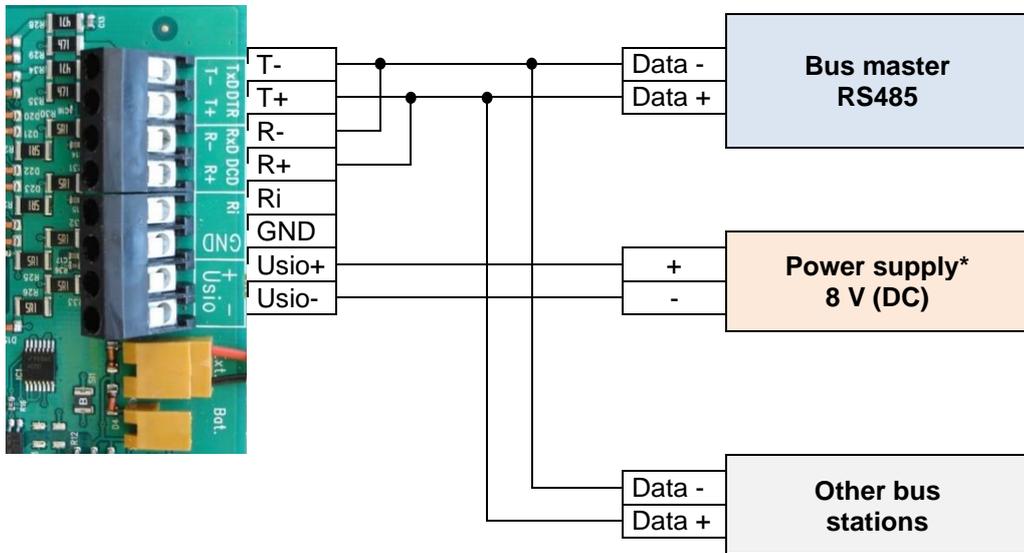


If a DL230 is connected to a RS485 bus, no terminal resistors may be connected to the bus!

As a result of its current limit to obtain approval as an intrinsically safe apparatus, the DL230 cannot supply enough current for the terminal resistors. The terminal resistors are not required for the data transfer rates used.

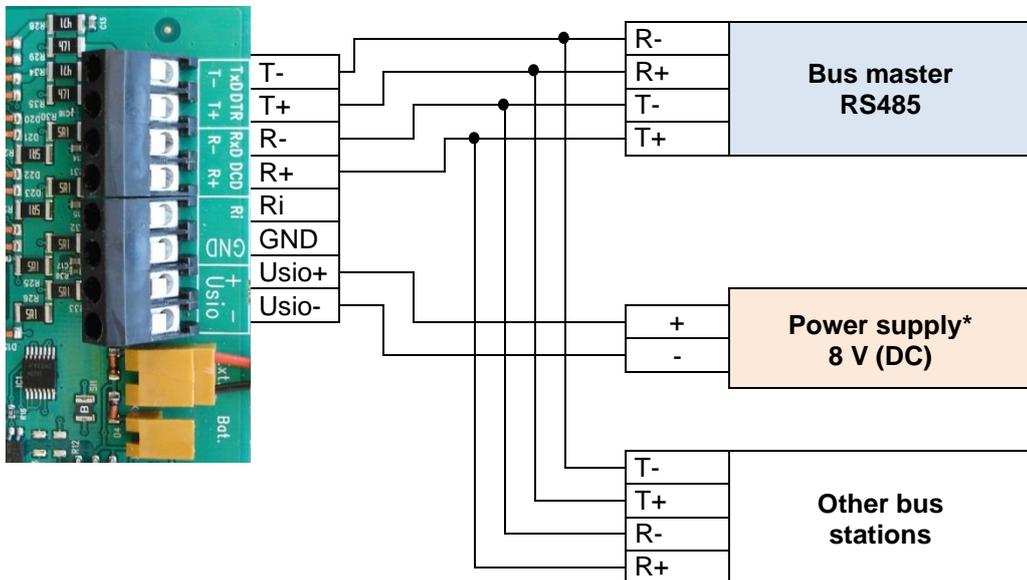
7.5.3.1.1 2-wire semi-duplex wiring

RS232/485 board in the DL230



7.5.3.1.2 4-wire full duplex wiring

RS232/485 board in the DL230

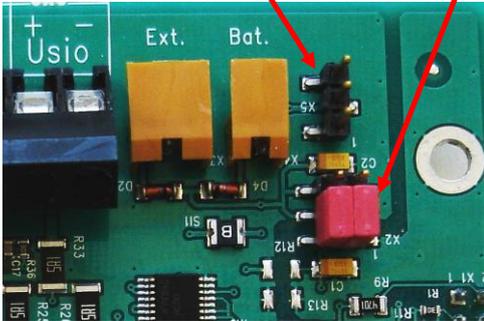


*) Power supply shown as an example (⇒ also Section 7.5.2.3).

7.5.3.2 Plug-in jumpers on the interface board – not electrically isolated

X5: no plug-in jumpers
or one plug-in jumper on the pins
close to the terminals.

X2: two plug-in jumpers
on the pins further away
from the terminals.



7.5.3.3 Power supply for the RS232/485 interface board in the DL230 (not isolated)

The power may be supplied using one of four routes:

1. No connection The power is supplied by the DL230.
The device battery will be used in battery mode. This will result in a shorter battery service life.
2. Usio+ 6 – 11 V DC from an external power supply
Usio-
3. X3 Ext. To connect the white cable of the internal DL230 power supply unit
Recommended!
4. X4 Bat. To connect a modem battery (730 17964)
Please note that even when the time window is closed, a current of 1 – 2 mA flows from the battery.

7.6 Data transfer verification

The communication link to a destination must be established before transmitting data. Eight separate connections can be programmed.



For parameterization of the DL230, you will require a connection cable for the optical interface as well as the enSuite program (version 2.8 or higher).

enSuite can be downloaded free of charge from the “[Software Downloads](#)” section of the Honeywell website (⇒ [\[5\]](#)).

The paths described below can be found in *enSuite* under [Parameterize online](#) > [Parameters](#) > [Interfaces](#) > [Connections](#).

All connections are inactive as per default settings and are preset as follows:

Connection	Event type	Interface	Power supply	From software version
1	Time window	Internal module	Battery	V1.00
2	Time window	Internal module	Battery	V1.00
3	Time window	Internal module	Ext. power supply	V1.00
4	Time window	Internal module	Ext. power supply	V1.00
5	Time window	Internal module	Ext. power supply	V1.00
6	Time window	Internal module	Ext. power supply	V1.00
7	Time	Internal module	Always	V1.00
8	Time	Internal module	Always	V1.00
9	Time	Internal module	Always	V1.10
10	Time	Internal module	Always	V1.10
11	Time	Internal module	Always	V1.10
12	Time	Internal module	Always	V1.10

7.6.1 Time window connection

The main parameters for activating a time-window-controlled connection are listed below. For parameterization, go to the sub-menu [Connections](#) > [Connection 1 to 6](#) in *enSuite*.

Time window connection	Meaning
Cycle	Cycle of a regular time window connection (e.g., hourly, daily, weekly, monthly)
Begin	Start of a time window connection (e.g., daily at 00:00 or another time)
End	End of a time window connection (e.g., daily at 11:59 pm or another time)
StCon	Current status of this connection

If the conditions for activating the time window connection are satisfied, then the interface is opened and the DL230 is ready for reception. If a modem is connected to this interface, the DL230 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 power supply to the DL230 correspond with the parameterization of the connection (battery/mains/always)?

7.6.2 Point-in-time connection

The main parameters for activating a point-in-time-controlled connection are listed below. In enSuite, go to the sub-menu [Connections](#) > [Connection 7 to 12](#).

Point-in-time connection	Meaning
Protocol type	0 = Server (not to be used for point-in-time connections) 3 = DLMS (the connection to the destination is a DLMS connection) 5 = IEC1107 (the connection to the destination is an IEC 1107 connection) 6 = EIServer (the destination is an EI server) 11 = FTP client (the destination is an FTP server) (default setting) 12 = NTP client (the destination is an NTP server)
Cycle	Cycle of a regular point-in-time connection (e.g., hourly, daily, weekly, monthly)
Time	Start of a point-in-time connection (e.g., daily at 06:00 or another time)
Destinations	0 = No connection (connection is inactive) 1 = Destination 1 or 2 (a connection to destination 1 is established or if a fault occurs, to destination 2 instead) 2 = Destination 1 and 2 (a connection to destination 1 and 2 is established)
Destination 1, 2	Reference to a number in the telephone book; the recipient with this telephone number will be called by the DL230.
Interface	2 = Internal module
StCon	Current status of this connection
SDst 1, 2	Current status of communication with the destination
TestC	The function for the point-in-time connection can be triggered at any time (e.g., for testing purposes).

In enSuite, now go to the sub-menu [Telephone book](#) > [Recipient 1 – 10](#).

Telephone book	Meaning
TelNo	Recipient's telephone number. If a GSM modem is used, this number will be called.
Serv.	Server TCP/IP address. If a GPRS/UMTS modem is used, an attempt will be made to reach this IP address, and if no IP address has been parameterized, then, alternatively, an attempt will be made to call the telephone number.
Port	Server port number. If a GPRS modem is used, an IP connection will be initiated via this port.
Name	Name of recipient

A point-in-time connection can be manually initiated at any time (e.g., for testing). To do so, change the "**TestC**" parameter to "1" (*open*). The DL230 opens the interface and attempts to reach the destination. To monitor the progress of the point-in-time connection, watch the "**StCon**" and "**SDst 1, 2**" parameters.

Click on the *Refresh* icon  at the top of the enSuite window to display current information in enSuite. If the conditions for the *regular* activation of the point-in-time connection are satisfied, then the interface will be opened and the DL230 will attempt to reach the destination.

The conditions for regular activation of the point-in-time connection are as follows:

- Has the device time currently exceeded the parameterized point in time?
- Does the supply to the DL230 correspond with the parameterization of the connection?
- Is there a valid telephone number or IP address and port of the recipient parameterized in the associated telephone book entry?

7.6.3 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 DL230 will wait until the connection can be established. Either the interface is still being used for another connection or the DL230 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 LIS200 protocol is in progress.
12	Data transfer via LIS200 protocol is complete.
13	The DL230 synchronizes with the EIServer in order to begin data transfer via the DLMS protocol.
14	EIServer synchronization is complete.
15	Data transfer via SMS is in progress.
16	Data transfer via SMS 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.

Display	Meaning
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 station 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. ²²
38	The communication link to the APN ²² was denied.
39	The port for server connection was not configured.
40	The destination name or port was not configured.
41	The remote station has disconnected.
42	The communication link to the network was lost after a communication link to the remote station 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 username is wrong. ²²
45	The APN parameters are already in use by another mobile phone subscriber. ²²
70	Failure to establish a communication link to the remote station. Possible cause: blocked by remote station firewall, for example.
71	The remote station did not respond. (Timeout) Possible causes: The remote station is switched off or the remote station has not been started.
72	The remote station reports "unknown device type".
73	The DL230 does not understand the remote station response. Possible cause: e.g., a transfer error.
74	Sending error: when attempting to send data to the remote station, the modem reported an error.
255	An unknown error has occurred.

²² APN = "Access Point Name", "Name of the GPRS access point"

7.6.4 Status of remote station SDst

Display	Meaning
0	No connection started to the remote station.
1	The remote station is not fully configured. Check the related DL230 telephone book entry.
2	Connection to remote station is being established.
3	Remote station is busy.
4	Connection to remote station established.
5	Disconnection from remote station in progress.
6	Disconnection from remote station finished.
7	Remote station not reached. Check the related DL230 telephone book entry or check the readiness for reception of the remote station.
8	Remote station refused the connection. Check the related DL230 telephone book entry or check the readiness for reception of the remote station.
9	Connection to remote station aborted during communication.
80	No connection possible
81	Login to FTP server failed (password/username correct?)
82	Error while setting the path
83	Error while creating file
84	Error while preparing the archive access
85	Error while writing the header data
86	Error while writing the archive data
87	Error when closing the file on the FTP server
88	Error when logging off from FTP server

7.6.5 GSM modem status StGSM

If a modem is in use, then, in addition to StCon and SDst, StGSM supplies information on the mobile network while one of the DL230 connections is in use.

Go to the following sub-menu in enSuite:

For the DL230 internal modem:

Interfaces > *Internal module* > *Cellular* > *StGSM*

Click on the *Refresh* icon  at the top of the enSuite window to display current information in enSuite.

Display	Meaning
Logged out	The GSM modem is not currently registered. If the modem should be registered and "Logged out" is displayed, check whether a SIM card has been inserted and whether a SIM PIN may have to be entered.
Own network	The modem is registered to its own network.
Searching...	The modem is currently registering to a network.
Denied	Modem registration was denied.
Third party	The modem is registered to a foreign network (roaming).
no command	The modem command for reading the modem status is undefined. If this text is displayed, the DL230 has not been correctly parameterized.

8 Data transfer protocols

8.1 Modbus

8.1.1 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	Current overall status	3		1:100
3	V1	Main counter V1, decimal places	3	10-4 m3	1:200_2
4	V2	Main counter V2, decimal places	3	10-4 m3	2:200_2
5	V3	Main counter V3, decimal places	3	10-4 m3	3:200_2
6	V4	Main counter V4, decimal places	3	10-4 m3	4:200_2
101	V1	Main counter V1, integers	4	m3	1:200_1
103	V2	Main counter V2, integers	4	m3	2:200_1
105	V3	Main counter V3, integers	4	m3	3:200_1
107	V4	Main counter V4, integers	4	m3	4:200_1
301	Q1	Operating load	32	m ³ /h	1:210
303	Q2	Operating load	32	m ³ /h	2:210
305	Q3	Operating load	32	m ³ /h	3:210
307	Q4	Operating load	32	m ³ /h	4:210
309	Ta	Ambient temperature	32	°C	3:310_1
501	V1	Main counter V1	9	m ³	1:200
504	V2	Main counter V2	9	m ³	2:200
507	V3	Main counter V3	9	m ³	3:200
510	V4	Main counter V4	9	m ³	4:200
801	V1	Main counter V1	17	10 ⁻⁴ m ³	1:200
805	V2	Main counter V2	17	10 ⁻⁴ m ³	2:200
809	V3	Main counter V3	17	10 ⁻⁴ m ³	3:200
813	V4	Main counter V4	17	10 ⁻⁴ m ³	4:200
817	Time	Date and time	17		1:400

Register Address	Abbrev.	Designation/Value	Format	Unit	LIS200 address
821	SNo	Device number (serial number)	16		1:180
823	DB.I1	Day boundary, input 1	12		5:141_1
824	DB.I2	Day boundary, input 2	12		6:141_1
825	DB.I3	Day boundary, input 3	12		7:141_1
826	DB.I4	Day boundary, input 4	12		8:141_1

Table 8-1: 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.

If necessary, the Modbus table can be reset to the default settings. To do this, load the following file into the DL230 using enSuite:

Modbus table basic settings:

- [DL230_xvx - Default Modbus map \(Factory setting\) \(*\)](#)²³

²³ The “x” stands for the device software version, e.g., “1v1”.

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

8.1.2 Formats

Meaning of the formats used:

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

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

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

a) Binary formats:

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:

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 LIS200 address (see below)

** CC = Century, YY = Year, MM = Month, DD = Day, hh = Hour, mm = Minute, ss = Second

8.1.3 Reading values via Modbus

The "Read Holding Registers" (3) and "Read Input Registers" (4) Modbus functions have been implemented to read values.

How to read values is described in the ⇒ Modbus Communication Manual [6].

8.1.4 Editing values via Modbus

The “Write Single Register” (6) and “Write Multiple Registers” (16) Modbus functions are implemented to edit values.

How to edit values is described in the ⇒ Modbus Communication Manual [6].

8.1.5 Modbus via internal interface

In the DL230, 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.

Connection

The connection of the RS232 interface is described in ⇒ Section 7.5.1, the connection for the RS485 interface is described in ⇒ Sections 7.5.2 and 7.5.3.

8.1.5.1 DL230 parameterization

- a) Parameterization for the RS232/RS485/sub-RS422 interface function is described in the subsections of the above connection.
- b) Parameter file for Modbus parameterization

Depending on the application (RS232/RS485/RS422), an appropriate wpp file must be loaded into the DL230:

- RS232 mode using RxD, TxD and GND:
DL230_xvx.. – RS-232 & Modbus-RTU (RxD/TxD/GND) ()*²⁴
 - RS485 – 2-wire mode using DATA+ and DATA-:
DL230_xvx.. – RS-485 2 wires & Modbus-RTU (DATA+/DATA-) ()*²⁴
 - RS422 – 4-wire mode using R+, R-, T+ and T-:
DL230_xvx.. – RS-485 4 wires & Modbus-RTU PtoP (R+/R-/T+/T-) ()*²⁴
- c) For customized settings, the Modbus parameters (⇒ next paragraph) can be set using the “Admin” → “Interfaces” → “Internal module” → “Modbus” path.



- All the values listed in the “Admin.” display tab of the DL230 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.

²⁴ The “x” stands for the device software version, e.g., “1v1”.

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

The following Modbus parameters are preset by the parameter file mentioned above:

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 ²⁵	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	0	0: Log. mode (starting with "1") 1: Phys. mode (starting with "0")

Table 8-2: 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 Modbus map	Addressing mode MBAMd	Value being queried (register)
501	"0" (logical → offset of "-1")	"500"
	"1" (physical)	"501"

Table 8-3: Modbus addressing mode

²⁵ Value to be determined by the user

The following connection parameters for connection 3 are preset by the parameter file mentioned above:

Abbrev.	Designation	Address	Value	Contents
CW3.S	Call acceptance window start	23:150	00:00	Start of call acceptance window
CW3.E	Call acceptance window end	23:158	23:59	End of call acceptance window
Event	Connection event	3:D70	2F03	Call time window 3 appears
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 8-4: Preset connection parameters

8.1.6 Modbus via internal module (Modbus RTU_TCP)

In the DL230, Modbus can be used to communicate, among other things, via the internal GPRS modem in TCP mode. Values can be read and edited.

Modbus communication is possible both in battery mode and with an external power supply. At least one call acceptance window must be open for both operating modes.

8.1.6.1 Connection

The internal GSM and GPRS modem is described in ⇨ Section 7.1. GSM mode and GPRS mode with TCP/IP are also described there.

8.1.6.2 DL230 parameterization

- a) Depending on the application (depending on the modem used and operating mode), an appropriate wpp file must be loaded into the DL230:
- Internal GPRS modem ECM-GW120 (with WipSoft):
DL230_xvx. - int. ECM-GW120 - (GPRS) - Modbus-TCP ()*²⁶
 - Internal GPRS modem ECM-2G-UG350:
DL230_xvx. - int. ECM-2G-UG350 (GPRS) - Modbus-TCP ()*²⁶
 - Internal UMTS modem ECM-3G-UU270 (GSM/GPRS mode):
DL230_xvx. - int. ECM-3G-UU270 (GSM/GPRS operation) - Modbus-TCP ()*²⁶

²⁶ The “x” stands for the device software version, e.g., “1v1”.

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

- Internal UMTS modem ECM-3G-UU270 (UMTS mode):
[DL230_xvx. - int. ECM-3G-UU270 \(UMTS\) - Modbus-TCP \(*\)](#)²⁶

b) This parameter file pre-parameterizes the interface for the modem, the Modbus parameters and the connection parameters for Modbus mode via the “internal GPRS/UMTS modem”.

c) The APN access data must then be set in enSuite under:
“Parameters” → “Interfaces” → “Internal module” → “Cellular”.

 The correct GPRS access data (APN data) must be parameterized for communication by GPRS (⇒ Section 7.1.3.1, paragraph c)).

d) Individual Modbus settings can be made using enSuite.

To do so, click on [Navigation](#) on the left-hand side and then on [Parameterize online](#) at the bottom of the navigation window. You will find the parameters required for this application under [Parameters](#) → [Interfaces](#) → [Internal module](#) → [Modbus](#).

The following Modbus parameters are preset by the parameter file mentioned above:

Abbrev.	Designation	Addresses	Value	Contents
MBTrM	Transfer type	2:7B1	2	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 Info: “H byte first” is permanently set.
MBAAdr	Device address (Modbus slave ID)	2:7B2	1*	Value range from 1...247 (0 = “Broadcast”)
MBRSz	Register size	2:7B8	2	2: Register size 2 bytes/16 bits
MBAMd	Addressing mode	2:7B9	0	0: Log. mode ⇒ Note on Section 8.1.5.1, paragraph 0.

Table 8-5: Preset Modbus parameters

* Value to be determined by the user.

e) A call time window must be opened. Call time window 3 is recommended for mains operation. This can be set using enSuite under: [Parameters](#) > [Interfaces](#) > [Call time windows](#).

The following connection parameters for connection 3 are preset by the parameter file mentioned above:

Abbrev.	Designation	Address	Value	Contents
Event	Connection event	3:D70	2F03	Call time window 3 appears
EvTyp	Connection event type	3:D75	1	1: Period
Iface	Connection interface	3:D72	3	3: Internal module

Abbrev.	Designation	Address	Value	Contents
SupIT	Connection supply type	3:D76	2	2: External supply
TypPr	Connection protocol type	3:D77	0	0: Server (protocol detection)
IPInf	Protocol information	3:D79	0	0: No action

Table 8-6: Preset connection parameters

8.1.7 Saving battery power by automatic reset in case of power failure

Most data transfers take place when the DL230 is powered by an external power supply. Especially in the Modbus operating mode, the PLC requests data in very short cycles. In the event of a failure of the external power supply, however, ongoing communication is maintained in battery mode, which can drain the device battery in a short time.



Data communication in battery mode places a heavy load on the device battery. Since an active data communication is not automatically interrupted, this must be ensured by an appropriate setting.

A special parameter file in the enSuite can be used to ensure that the interface is reset immediately if the external power supply fails. This file is provided by the parameterization software enSuite from version 4.9.

8.1.7.1 Parameterization of the DL230

Send the following parameter file in the "Application" directory of the enSuite to the DL230:

- DL230 from V1.15 - Application: Interface reset if external power supply failed

Further settings are not required.

8.2 Sending SMS messages

If the internal soldered GSM/GPRS/UMTS modem is connected (⇒ Section 7.1) or an GSM/GPRS/UMTS/LTE modem module and/or an external device including a GSM/GPRS/UMTS/LTE modem is connected to the serial interface, the DL230 can send SMS messages (Short Message Service by GSM providers) when defined events occur.



This function will incur costs due to continuous data transmission via SMS on a mobile network. Talk to your mobile phone provider to obtain an economical tariff. Optimization of this factor is your responsibility.



Failures may occur in data transmission due to interference of the radio connection.



This application will only work with a GSM/GPRS/UMTS/LTE modem.

8.2.1 Preparation

Prerequisites for the procedure described below:

- A GSM/GPRS/UMTS modem is connected and configured as described in Section 7.
- The function “SMS sending” is available with your SIM card.

8.2.2 Parameterization

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

- [Parameterize online](#) > [Parameters](#) > [Interfaces](#)
- a) Configuring short message contents
- In *enSuite*, go to the sub-menu [SMS](#) > [Layouts](#).
 - To configure an SMS, you can choose between free layouts (layout No. 1 – 10) and predefined layouts (layout No. 11 – 15) (the predefined layouts cannot be edited):

Layout	Meaning
(1) – (10)	10 freely definable SMS configurations. The values to be transferred can be compiled arbitrarily.
Volume profile (11)	The SMS contains the values of V1 (volume at base conditions) for the last 24 hours from the measurement period archive from the start of the previous day's gas day.
Load profile (12)	The SMS contains the value changes $\Delta V1$ for the last 24 hours from the measurement period archive from the start of the previous day's gas day.
Alarm (13)	The SMS contains the information as to whether the DL230 has an active alarm regarding pressure measurement, temperature measurement or remaining battery service life.
Archive entry (14)	The SMS contains the latest entry from the measurement period archive for input 1. The complete archive row will be transmitted.
Month end value (15)	The SMS contains the latest counters of V1 and its maximum values per measurement period of the previous month and per day boundary of the previous month.

- To configure the free layouts 1...10, go to the relevant layout sub-menu [Layout 1](#) to [Layout 10](#).
- In the free-layout menu, you can define up to 15 different sources and assign a name for this layout:

Address “xx” ²⁷	Meaning
xx:761	Name of the layout which should be included in text form in the SMS heading.
xx:750 to xx:75E	Value 1 to value 15: details of sources whose content should be included in the SMS.



You can define user texts in the address range 1:8D0 to 12:8D0 which you can use for your SMS layouts to furnish the SMS with additional text information.

You can enter these in enSuite under [Interfaces > SMS > User texts](#).

b) Configuring recipients of short messages

- You can define up to 2 recipients per SMS. In enSuite, go to sub-menu [Interfaces > Telephone book](#).
- Choose free telephone book entries and then go to the respective sub-menu in enSuite:

Telephone book	Meaning
TelNo	Phone number of the recipient including dialling code.
Name	Name of recipient
Email	Email address of the recipient (alternative).
SForm	0 = SMS will be sent in text format. 1 = SMS will be sent in binary format (not readable; for evaluation by software).
Sep.	ASCII character used to separate individual values in the SMS, e.g., 42 = *.
Ident	Details of a source whose content identifies the sender of the SMS, e.g.1:180 = DL230 serial number.

c) Configuring short message transmission

- In enSuite, go to the sub-menu [SMS > Settings](#).
- You can define up to 10 short messages. To do this, go to the respective sub-menu [SMS 1 to SMS 10](#).

SMS	Meaning
Event	DL230 event leading to the SMS being transmitted. In enSuite, activate the button and select a status, a unique event or a regular event from the list shown.
NoRcv	0 = SMS is not active (will not be sent to any recipient). 1 = SMS will be sent only to the first available recipient. 2 = SMS will be sent to both recipients.
LayNo	SMS layout number in the range 1 – 15 (⇒ Section 8.2.2, Paragraph a))
Iface	Interface 2 = serial interface or 3 = internal module to which the GSM modem is connected

²⁷ “xx” = Instance of the free layouts (value range from 1 to 10)

SMS	Meaning
Rcv1, 2	Recipient as a reference to the relevant telephone book number (⇒ Section 8.2.2) a)
Way1, 2	0 = Message will be sent by SMS. 1 = Message will be sent by email. 2 = Message will be sent by fax.
Delay	Delay for transmission in minutes since event occurred. The SMS is then automatically sent within the set period.
PrTyp	7 = Short SMS → in the event that the recipient is not able to display SMS messages with more than 160 characters. The message may be split into multiple short SMS if required. 8 = Long SMS → in the event that the recipient is able to display concatenated SMS messages with more than 160 characters.

Once you have changed the parameters, click on the [Transfer changes to device](#) icon  at the top of the enSuite window.

a) Setting individual parameters

- To transmit a short message by email or fax, you have to configure quick-dial numbers which differ depending on the mobile service provider.
- Use enSuite menu [Interfaces](#) > [Internal module](#) > [Cellular](#) for this purpose.

Gateway	Meaning
Gateway number SMS to email	Quick-dial number for the email gateway for your SIM card! The main network operators have the following numbers: Telekom: 8000 Vodafone: 3400 E-Plus: 7676245 O2: 6245
Gateway number SMS to fax	Quick-dial number for the fax gateway for your SIM card! The main network operators have the following numbers: Telekom: 99 Vodafone: 99 E-Plus: 1551 O2: 329



If your mobile service provider is not shown, please contact your IT department or the mobile service provider.

8.2.3 Checking SMS transmission

The transmission of an SMS can be initiated manually regardless of the configured event.

- In enSuite, go to the sub-menu for your short message:
[SMS > Settings > SMS 1 to SMS 10](#)
- Use the command [Trigger a short message](#). Click on the [Execute](#) button.
- Click on the [Refresh](#) icon  at the top of the enSuite window to display current information in enSuite.



Repeat this [Refresh](#) process at regular intervals to ensure that you always have the latest SMS status from the DL230.

- You can follow the progress of SMS transmission with the following status parameters.

SMS	Meaning
MStat	Current message status (⇒ Section 7.5.3)
SDst1, 2	Current status of SMS transmission to recipient 1, 2 (⇒ Section 7.5.4)

8.2.4 Additional functions for sending SMS

8.2.4.1 Resetting the SMS buffer

All outgoing SMS messages are written to a buffer so that they can be repeated if necessary. During the commissioning procedure, however, incorrect settings may be made which generally prevent SMS messages being sent. If, for example, no telephone number is entered for the recipient, the message can, of course, not be sent. Repeat cycles and saving the message in the buffer also do not improve the situation. It may therefore be necessary to delete these “old” SMS messages from the buffer.

- In enSuite, go to the sub-menu for your short message
[Interfaces > SMS > Settings > Clear SMS buffer](#)

As an option, the interface itself can also be reset under:

- [Interfaces > Internal module > Reset interface “Res.S2”](#)

8.2.4.2 Limiting the number of repeats

A number of repeat attempts can be entered for sending an SMS. The system waits 60 seconds after each attempt before restarting the send attempt. Depending on the error found (see above), however, this will be stopped immediately.

Address	Meaning
2:732 “No.D”	Number of repeat attempts to send an SMS



At the start of the SMS transmission, the number should be set to “1” or lower so that the commissioning procedure can be completed without long waiting times. If the test SMS messages are transferred correctly, the number can be increased accordingly.

8.3 Time synchronization with an NTP server

If the DL230 includes an integrated GSM/GPRS/UMTS modem or an Ethernet interface, the DL230 can synchronize its time with an NTP server based on definable events.



This function generates data volume and thus incurs costs. Talk to your provider to obtain an economical tariff. Optimization of this factor is your responsibility.



If time synchronization takes place using a wireless modem, it is not possible to guarantee that the time will be synchronized at every set event as a result of possible interference in the wireless connection.



This application will only work with a GSM/GPRS/UMTS modem or an Ethernet interface.

8.3.1 Preparation

Prerequisites for the procedure described below:

- A GSM/GPRS or UMTS modem is connected and configured as described in Section 7.
- Or an Ethernet interface is connected and configured.

8.3.2 Parameterization

The paths described below can be found in *enSuite* under [Parameterize online](#) > [Parameters](#) > [Interfaces](#).

- a) Entering the NTP server data in the telephone book
- In the top part of the device window, open the path “[Parameters](#)” > “[Interfaces](#)” > “[Telephone book](#)” by clicking on the relevant plus signs and then select an unused entry.
 - On the right-hand side of the window, you will now see several values, of which the following must be entered:

Value	Input
Server address for recipient	IP address of the NTP server
Server port for recipient	NTP server port
Login name for the recipient server	NTP server login: user name
Password for the recipient server	NTP server login: user password
Name of recipient	Arbitrary designation for the NTP server (e.g., PTB-NTP). This facilitates the remaining configuration work since this name will be displayed in enSuite selection fields.

- If you wish to use other NTP servers, repeat these steps for each new recipient.
- Click on the [Transfer changes to device](#) icon  at the top of the enSuite window.

b) Setting the connection data

This defines the event (generally a time) which causes a connection to a certain NTP server to be established and how the NTP transfer takes place.

- In the top part of the device window, open the path *Parameters > Interfaces > Connections* by clicking on the relevant plus signs and then select an unused entry.



In the default settings for the DL230, connections 7 to 12 are designed for NTP transfers based on time-related events (“*Call time 1...6*”).

- On the right-hand side of the window, you will now see several values, of which the following must be entered:

Value	Input
Protocol type	12: NTP
Connection event “Event”	Call time, e.g., 0x811E Call time 1 ²⁸
Data transfer <i>cycle</i>	Hourly, daily, weekly, etc.
Data transfer start time	Time, e.g., 00:00
Connection mode “Destn”	Destination 1 or 2 / Destination 1 and 2 ²⁹
Destination 1 for the connection	NTP server entry from telephone book, e.g., PTB-NTP
Destination 2 for the connection (optional)	Optional second NTP server entry from the telephone book
Connection interface	2: int. modem
Power supply type	1: always, 2: battery, 3: ext. supply

- If you wish to configure other connections, repeat these steps for each new connection parameter set.
- Click on the *Transfer changes to device* icon  at the top of the enSuite window.

8.3.3 Testing time synchronization

- a) Open the optical connection in enSuite and make a minor adjustment to the time in the DL230.
- If there is no communication link to the DL230 via the optical interface, it must be established. (⇒ Section 3.1 *Setting up the communication link to the DL230 via the optical interface*, p. 18)
 - Select *Navigation* on the left-hand side of the enSuite screen and then *Parameterize online* at the bottom of the navigation window.
 - In the top part of the device window, open the path *Parameters > Date and time* by clicking on the relevant plus signs.

²⁸ The following call times are permanently assigned by default to connections 7 to 12:
Connection 7 → Call time 1, Connection 8 → Call time 2 ... Connection 12 → Call time 6

²⁹ “Dest 1 or 2”: the second NTP server is only contacted if synchronization with the first one was not successful.
“Dest 1 and 2”: both NTP servers are contacted as a matter of course.

- Make a minor adjustment to the time, e.g., 10 seconds.
- Click on the *Transfer changes to device* icon  at the top of the enSuite window.

b) Initiating time synchronization

- In the top part of the device window, open the path *Parameters > Interfaces > Connections* by clicking on the relevant plus signs and then select one of the NTP connections you have configured (connection 7 to 12).
- In the right-hand part of the window next to the command *“Connect now”*, set the value to *“1”*.
- Click on the *Transfer changes to device* icon  at the top of the enSuite window. The DL230 will now start time synchronization.



The time synchronization process and its success can be checked as described in ⇒ paragraph c).

c) Checking the success of time synchronization

- Click on the *Refresh* icon at the top of the enSuite window during time synchronization. Under the *Protocol status* parameter, you will see the message *“2: The interface is being activated for the connection”*.
- At the top of the enSuite window, click on the *Refresh* icon again. Under the *Protocol status for destination* parameter, you will see the message *“4: Connection to remote station established”*.



The connection to the NTP server has been successfully established and data transfer started. The next change of status will take place at the end of the transfer.



Time synchronization with an NTP server will take around 30 to 60 seconds depending on the quality of the connection. This means that the process may take around 60 to 120 seconds if two destinations are defined (two NTP servers) and *“Connection mode”* = *“Dest 1 and 2”*.

- At the top of the enSuite window, click on the *Refresh* icon again. After the time synchronization process, under the *Protocol status* parameter you will see the message *“6: The interface is released for use by other connections”* and under the *Protocol status for destination* parameter, the message *“6: Disconnection from remote station finished”*. If this is not the case, the *Refresh* icon may be clicked multiple times.
- After the end of the time synchronization, open the *Parameters > Date and time* path.
- Check the value for *Date and time* and the *Difference to PC time*. After successful time synchronization, this should not exceed 2 seconds (assuming that your PC is set to the precise time).



If an error occurs during time synchronization with the NTP server, this will be indicated by a message under the *“Protocol status”* parameter for the relevant connection.

- Finally, click on the *Disconnect* or *Disconnect from all devices* icon at the top of the enSuite window to terminate the communication link between enSuite and the DL230 via the optical interface.

9 Status messages

The DL230 delivers two types of status information: current 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 current status *Stat* indicate current states such as active errors. As soon as the state no longer applies, the relevant message is removed from the current status.

Alarms, warnings and notes are displayed in the current status (i.e., messages with numbers in the range from “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.

9.1 Clearing messages in the status register

The messages in *SReg* (not in *Stat*) can be cleared using the *Clr* command or the context menu command  *Clear Status R.* (⇒ Section 2.3.3, p. 15).

- To clear the status register using the *Clr* function on the device, open the administrator lock as described in the ⇒ DL230 operating instructions [1].
- Move the cursor in the *Serv.* tab to *Status > Clr*.
- Press ENTER. ⇒ “0” will flash.
- Change the value to “1” using the arrow key ▲ or ▼.
- Press ENTER to confirm the set value. The input process can be cancelled by pressing ESC.

9.2 List of status messages

Message	Status	Name	Description, procedure
a) Faults, alarms:			
1	StSy	Restart	If this message appears during operation, the device battery is empty, or the device is defective. Please contact the Honeywell Customer Service Department.
1	StSy 2	Data error	An error was detected during the cyclic check of fiscal data. Please contact the Honeywell Customer Service Department.

Message	Status	Name	Description, procedure
1	St.1 St.2	I1 Alarm lim I2 Alarm lim	The pre-set encoder flow rate has been exceeded.
2	St.1 St.2	I1 Alarm I2 Alarm	The connected encoder does not supply any data at times relevant for billing purposes.
b) Warnings:			
3	StSy	Data restore	The batteries of the DL230 are intermittently dropping out. As a result of this, the time has not changed and no measurements have been logged. No data loss. This message appears when old batteries are removed before connecting the new ones. Procedure using the enSuite parameterization program: Set the time of the DL230. Clear the status register.
4	St.1 St.2	Outp.1 Error Outp.2 Error	More pulses should be emitted from the specified output than are permitted by its settings. In order to eliminate the cause of the problem, you can use the enSuite parameterization program to either: reduce the cp value of the output or increase the output frequency. In both cases, the change must be coordinated with the device connected to the DL230.
5	St.1 St.2	I1 warning I2 warning	The encoder could not be read at the end of the measurement period. The flow recording at this point is invalid.
7	StSy 2	Update error	Before the software update, an error was detected in the cached software image.
7	StSy	Softw. error	This message is used for factory diagnosis. Please contact the Honeywell Customer Service Department.
8	StSy	Sett. error	The programming of the device has generated an incompatible combination of settings. Please contact the Honeywell Customer Service Department.
8	St.1 St.2 St.3 St.4	I1 warn.sig. I2 warn.sig. I3 warn.sig. I4 warn.sig.	If an input has been configured as a warning input, this message will be displayed if there is an active signal at the relevant terminal (e.g., terminal DE2). The input configuration can be adjusted using the enSuite program.
9	StSy	Batt. low	The remaining battery service life is less than six months. The batteries need to be changed soon.
9	St.4	modem batt.	The voltage of the modem battery is in a critical range. The batteries should be replaced soon.

Message	Status	Name	Description, procedure
c) Remarks:			
11	StSy	Clock n. set	The internal clock of the DL230 has not been adjusted at the factory.
11	St.1 St.2	Encoder err.	No meter reading was recorded at the connected encoder on input 1 or input 2 for 20 seconds (with external power supply) or for one encoder read cycle (in battery mode).
11	StSy 2	U.Logb. full	The software update logbook is full. An update is only possible if the content of the software update logbook has been deleted.
12	StSy	CDL full	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 deleted.
13	StSy	online	Data is currently being transmitted via an interface (modem, optical interface or interface board). If this message is displayed, the "o" in the "Status" field of the display will flash.
13	St.1 St.2 St.3 St.4	I1 Rep.sig. I2 Rep.sig. I3 Rep.sig. I4 Rep.sig.	If an input has been configured as an information input, this message will be displayed if there is an active signal at the relevant terminal (e.g., terminal DE2). The input configuration can be adjusted using "enSuite".
14	St.1	Cal.lock	The calibration lock is open. In normal operation, the calibration lock should be closed to prevent unauthorized changes. To close the calibration lock, follow the path Ctrl → St.PL and enter the value "0".
14	St.3	Admin.lock o.	The administrator lock is open.
14	St.4	Cust.lock o.	The customer lock is open.
15	StSy	Bat. operat.	The DL230 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. For a DL230 with a mains power supply, this message indicates a power failure.
16	StSy	Dayl.Sav.Tim	The time displayed in the DL230 is daylight saving time. The switchover mode can be changed using enSuite or the keypad.
16	St.1 St.2 St.3 St.4 St.5 St.6	Call Win.1 Call Win.2 Call Win.3 Call Win.4 Call Win.5 Call Win.6	The specified call acceptance time window is active, i.e., the DL230 will accept data transfer calls.
16	St.7 St.8	call time1 call time2	The specified call time is active, i.e., the DL230 makes a data transfer call to the remote station.

10 Power supply

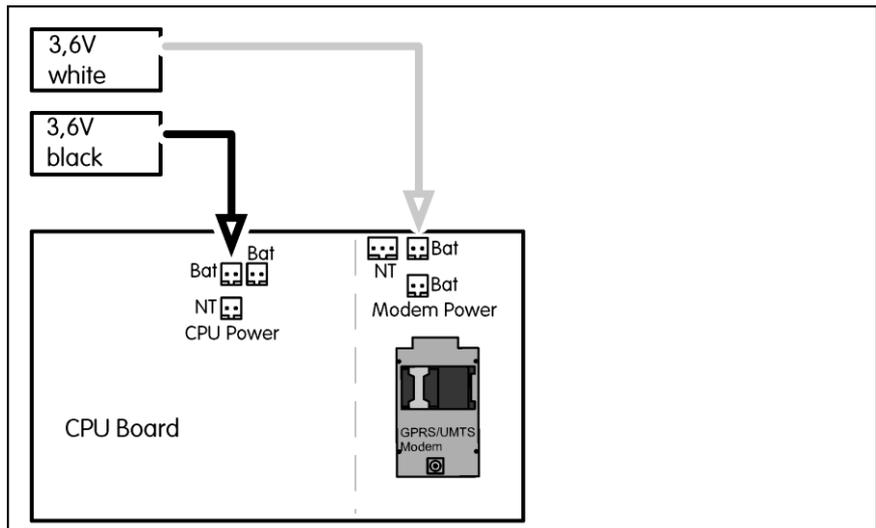
10.1 Overview of power supply versions for using various communication techniques

10.1.1 DL230 in battery mode without a power supply unit

- The device battery with the black cable supplies the DL230 CPU.
- The modem battery with the white cable supplies the modem.

ATEX use:

- Associated apparatus for Zone 0 and 1
- Suitable for Zone 2

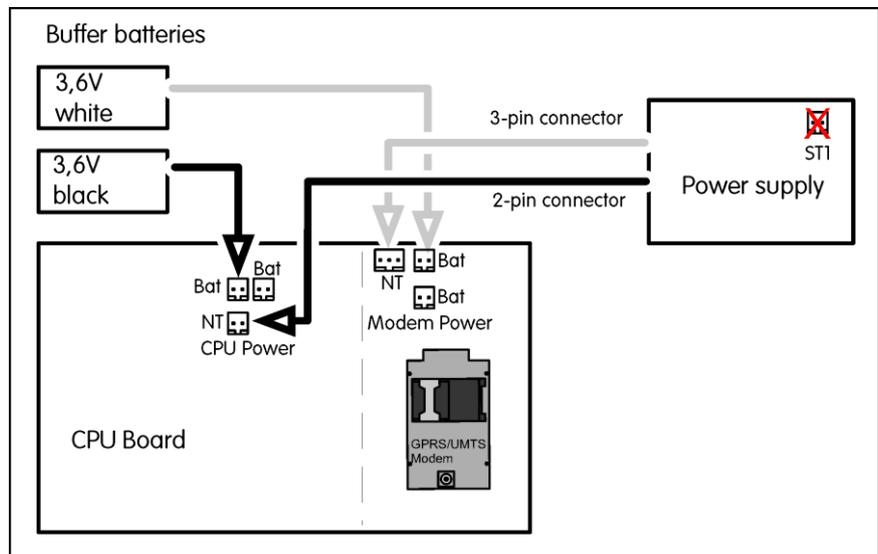


As the DL230 has space for three batteries in its base section, in addition to the two batteries shown, either another device battery or another modem battery may be used. The connection is then made to the relevant free battery connector **Bat** on the printed circuit board.

If encoders are connected to inputs I1 and I2 on the DL230, two device batteries must be used.

10.1.2 DL230 in mains mode with buffer batteries

- The black power supply cable with the two-pin plug supplies the CPU board.
- The white power supply cable with the three-pin plug supplies the modem.
- The batteries are connected as shown in paragraph 1.
- Connector ST1 on the power supply unit must not be used.



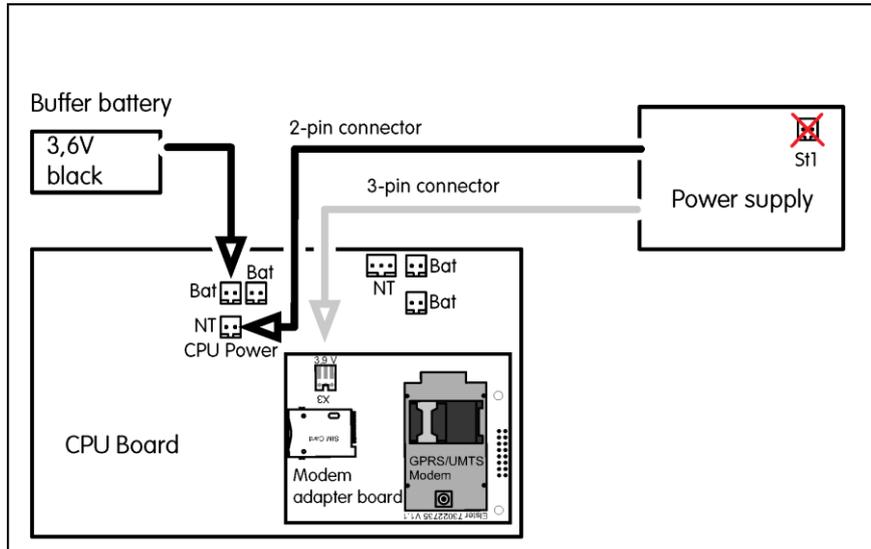
ATEX use:

- Associated apparatus for Zone 0 and 1
- Suitable for Zone 2

The two batteries are only designed to supply the DL230 and modem in the event of a mains failure.

10.1.3 DL230 in mains mode with GSM/GPRS modem module

- The black power supply cable with the two-pin plug and the battery with the black cable supply the CPU board.
- The white power supply cable with the three-pin plug is connected to the **3.9 V** connector on the modem adapter board.
- With the ATEX approval for Associated apparatus the connector ST1 on the power supply unit must not be used.

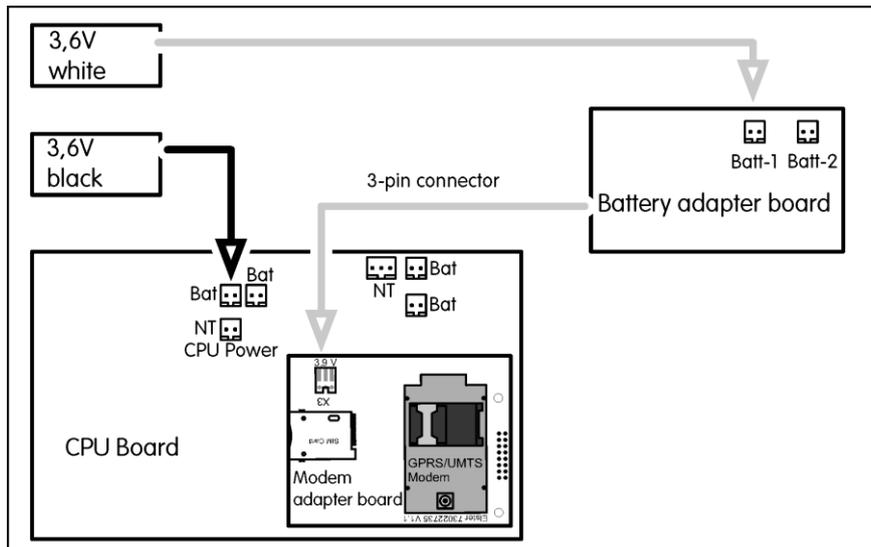


ATEX use:

- Associated apparatus for Zone 0 and 1
- Suitable for Zone 2

10.1.4 DL230 in battery mode with modem module and battery adapter board

- The device battery with the black cable with the two-pin plug supplies the DL230 CPU.
- The modem battery with the white cable is connected to the **Batt** connector on the battery adapter board. supplies the modem.
- The white cable of the battery adapter board is connected to the **3.9V** connector on the modem adapter board.



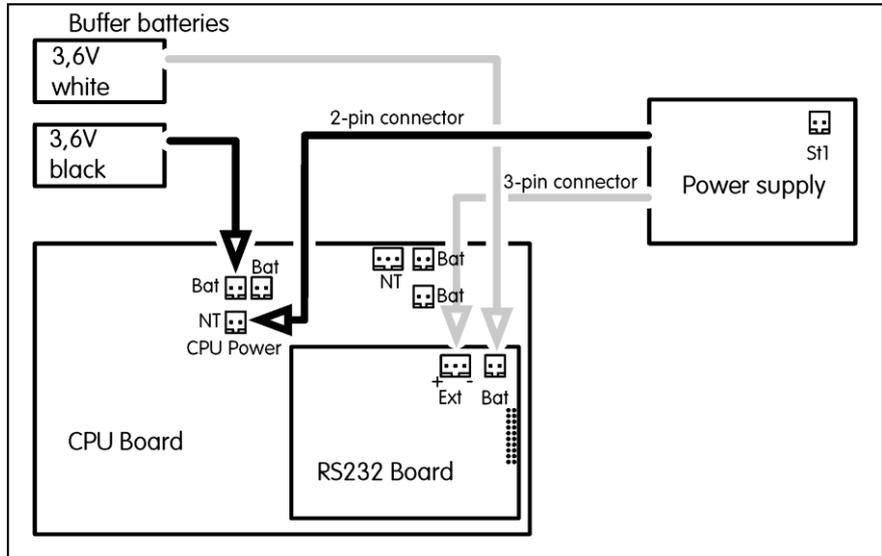
ATEX use:

- Associated apparatus for Zone 0 and 1
- Suitable for Zone 2

In this figure the respective second battery was omitted for the sake of clarity. A total of three batteries can be fixed in the bottom part of the DL230.

10.1.5 DL230 in mains mode with serial interface RS232/RS485

- The black power supply cable and the battery with the black cable supply the CPU board.
- The white power supply cable with the three-pin plug is connected to the **Ext** connector on the RS232 board.
- The modem battery with the white cable can be connected to the **Bat** connector on the RS232 board to buffer a mains failure.



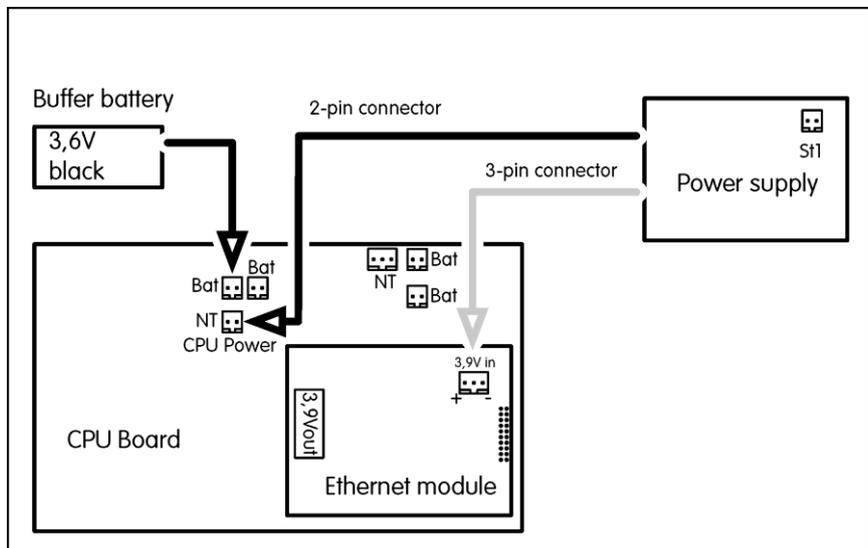
ATEX use:

- Suitable for Zone 2

The serial interface can be supplied both by the power supply unit and the modem battery. Nevertheless, we recommend you use the power supply unit because even if the time window is closed, a current of up to 2 mA flows into the interface board.

10.1.6 DL230 in mains mode with Ethernet module

- The device battery with black cable is connected to one **Bat** connector on the CPU Board for buffering purposes.
- The black power supply cable is connected to the **NT** connector on the CPU board.
- The white power supply cable with the three-pin plug is connected to the **3,9Vin** connector on the Ethernet module.

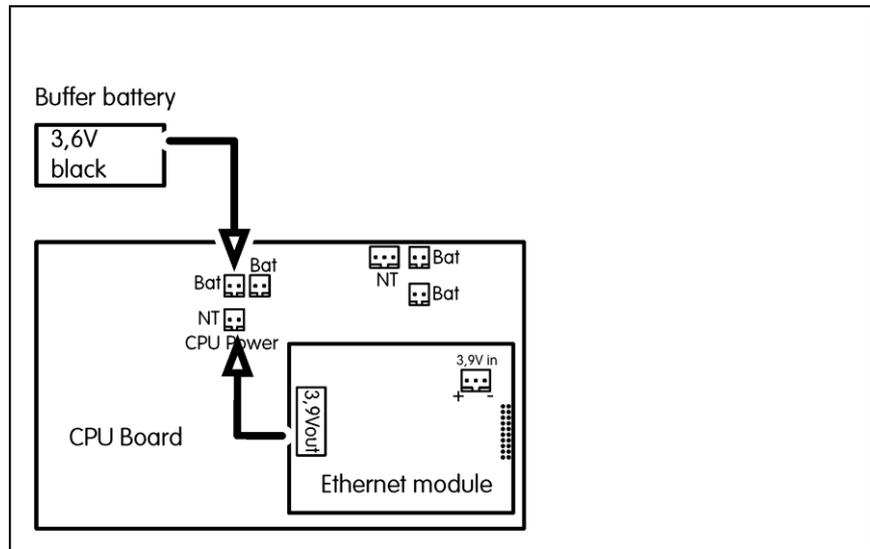


ATEX use:

- Suitable for Zone 2

10.1.7 DL230 with Ethernet module in Power over Ethernet supply mode

- The device battery with black cable is connected to one **Bat** connector on the CPU Board for buffering purposes.
- The Ethernet module supplies the power supply of the CPU board to connector **3.9Vout**. The cable leads from the Ethernet module to the **NT** connector on the CPU board.



ATEX use:

- Suitable for Zone 2

10.2 List of components

The table shows the parts and assemblies used in this respect and their order numbers.

Designation	Order number
Device battery (with black cable)	730 15774
Modem battery (with white cable)	730 17964
230 V AC power supply unit	730 22750
DL230 Battery adapter board	730 24681
GSM/GPRS modem module	730 23786
UMTS modem module	730 23787
LTE cat.M1/NB1 modem module	730 25409
Serial interface RS232/RS485 (Ex Zone 2)	730 22779
iCE230 Ethernet PoE for DL230	730 24446

10.3 Service life of the modem battery

The service life of the modem battery depends on various conditions such as the ambient temperature, reception field strength, network provider and the current network capacity. In addition, the communication time affects the power consumption. Various retrieval systems require different lengths of time to read archives. This depends on the volume of header data which are read, the block size and whether status messages or other parameters are read.

The data listed here is based on adverse conditions, i.e., the service life is often longer. However, in some cases it may also be shorter. The data listed should therefore be regarded as guide values.

The modem battery is essentially discharged by three operating conditions.

1. Registering in the GSM, GPRS or UMTS network (brief, high power consumption).
2. Call time windows (lengthy duration, low power consumption). The modem is switched on and registered in the relevant network but is still in an economy standby mode.
3. Data transfer (medium duration, high power consumption)

Depending on how often and how long these conditions last, the modem battery life will vary significantly. The following describes several typical usage scenarios and the resulting battery service lives.

The service life is specified for the use of one and two modem batteries.



Please note that when using two batteries, both batteries must be replaced at the same time and both batteries must come from a single batch. Batteries with different levels of discharge have an adverse effect on each other so that in the worst-case scenario, not even the power of a single battery is achieved.

10.3.1 DL230 up to software version 1.03

10.3.1.1 Daily data transfer

1. Push mode

The DL230 opens the time window, transfers the data automatically to the server and closes the time window.

Time window	3 minutes
Communication time	100 seconds
Service life with one battery	38 months = 3.2 years
Service life with two batteries	76 months = 6.3 years

To ensure that the DL230 can also be accessed for servicing, a one-hour call time window is additionally opened once per month.

Time window	3 minutes
Communication time	100 seconds
Service time window (once per month)	60 minutes
Service life with one battery	37 months = 3.1 years
Service life with two batteries	74 months = 6.2 years

2. Pull mode

The DL230 opens a time window and is then called at some point during the time window by the data readout computer. The time window is closed after the elapse of the time window duration or after the end of communication.

Time window	60 minutes
Communication time	2 minutes
Service life with one battery	20 months = 1.7 years
Service life with two batteries	40 months = 3.3 years

Time window	2 × 60 minutes
Communication time	2 × 2 minutes
Service life with one battery	10 months = 0.8 years
Service life with two batteries	20 months = 1.7 years

10.3.1.2 Monthly data transfer

Although the monthly readout is particularly energy-efficient, the meter readings and consumptions are required more often so that it cannot be used.

Service life of **one modem battery** in years for a monthly readout:

		Readout time		
		10 min	15 min	30 min
Monthly readout window	1 hour	12*	10.0	5.3
	2 hours	12*	9.2	5.0
	4 hours	10.4	7.9	4.6
	12 hours	6.0	5.1	3.5

Service life of **two modem batteries** in years for a monthly readout:

		Readout time		
		10 min	15 min	30 min
Monthly readout window	1 hour	12*	12*	10.5
	2 hours	12*	12*	10.0
	4 hours	12*	12*	9.2
	12 hours	11.9	10.1	6.9

* Although some configurations result in calculated battery service lives of more than 12 years, a maximum service life of 12 years should be assumed due to the self-discharge of the batteries and other ageing processes.

10.3.2 DL230 as from software version 1.10

10.3.2.1 Daily data transfer via GSM/GPRS modem

1. Push mode

The DL230 switches the modem on, transfers the data automatically to the server and switches the modem off.

Transfers per day	2
Communication time	45 seconds
Service life with one battery	67 months = 5.6 years
Service life with two batteries	133 months = 11 years

To ensure that the DL230 can also be accessed for servicing, a one-hour call time window is additionally opened once per month.

Transfers per day	2
Communication time	45 seconds
Service time window (once per month)	120 minutes
Service life with one battery	64 months = 5.4 years
Service life with two batteries	128 months = 10.7 years

2. Pull mode

The DL230 opens a time window and is then called at some point during the time window by the data readout computer. The time window is closed after the elapse of the time window duration or after the end of communication.

Time window (daily)	60 minutes
Communication time	45 seconds
Service life with one battery	63 months = 5.3 years
Service life with two batteries	126 months = 10.5 years

Time window (daily)	2 x 60 minutes
Communication time	2 x 45 seconds
Service life with one battery	31 months = 2.6 years
Service life with two batteries	63 months = 5.3 years

10.3.2.2 Daily data transfer via UMTS modem

1. Push mode

The DL230 switches the modem on, transfers the data automatically to the server and switches the modem off.

Transfers per day	2
Communication time	40 seconds
Service life with one battery	54 months = 4.5 years
Service life with two batteries	108 months = 9 years

To ensure that the DL230 can also be accessed for servicing, a one-hour call time window is additionally opened once per month.

Transfers per day	2
Communication time	40 seconds
Service time window (once per month)	120 minutes
Service life with one battery	50 months = 4.2 years
Service life with two batteries	101 months = 8.5 years

2. Pull mode

The DL230 opens a time window and is then called at some point during the time window by the data readout computer. The time window is closed after the elapse of the time window duration or after the end of communication.

Time window	60 minutes
Communication time	30 seconds
Service life with one battery	39 months = 3.3 years
Service life with two batteries	78 months = 6.5 years

Time window	2 x 60 minutes
Communication time	2 x 30 seconds
Service life with one battery	19 months = 1.6 years
Service life with two batteries	39 months = 3.3 years

10.3.2.3 Daily data transfer via LTE cat.M1/NB1 modem

1. Push mode

The DL230 switches the modem on, transfers the data automatically to the server and switches the modem off.

Transfers per day	2
Communication time	40 seconds
Service life with one battery	90 months = 7,6 years
Service life with two batteries	144* months = 12* years

To ensure that the DL230 can also be accessed for servicing, a one-hour call time window is additionally opened once per month.

Transfers per day	2
Communication time	40 seconds
Service time window (once per month)	120 minutes
Service life with one battery	84 months = 7 years
Service life with two batteries	144* months = 12* years

* Although some configurations result in calculated battery service lives of more than 12 years, a maximum service life of 12 years should be assumed due to the self-discharge of the batteries and other ageing processes.

2. Pull mode

The DL230 opens a time window and is then called at some point during the time window by the data readout computer. The time window is closed after the elapse of the time window duration or after the end of communication.

Time window	60 minutes
Communication time	30 seconds
Service life with one battery	60 months = 5 years
Service life with two batteries	120 months = 10 years

Time window	2 x 60 minutes
Communication time	2 x 30 seconds
Service life with one battery	32 months = 2,7 years
Service life with two batteries	64 months = 5.3 years

10.3.2.4 Monthly data transfer via GSM/GPRS modem

Although the monthly readout is particularly energy-efficient, the meter readings and consumptions are required more often so that it cannot be used.

Service life of **one modem battery** in years for a monthly readout:

		Readout time		
		10 min	15 min	30 min
Monthly readout window	1 hour	12 *	12 *	11
	2 hours	12 *	12 *	10
	4 hours	12 *	12 *	9.8
	12 hours	12 *	11	7.4

* Although some configurations result in calculated battery service lives of more than 12 years, a maximum service life of 12 years should be assumed due to the self-discharge of the batteries and other ageing processes.

10.3.2.5 Monthly data transfer via UMTS modem

Although the monthly readout is particularly energy-efficient, the meter readings and consumptions are required more often so that it cannot be used.

Service life of **one modem battery** in years for a monthly readout:

		Readout time		
		10 min	15 min	30 min
Monthly readout window	1 hour	12 *	12 *	7.5
	2 hours	12 *	12 *	7.0
	4 hours	12 *	10.5	6.3
	12 hours	7.3	6.3	4.5

* Although some configurations result in calculated battery service lives of more than 12 years, a maximum service life of 12 years should be assumed due to the self-discharge of the batteries and other ageing processes.

10.3.2.6 Monthly data transfer via LTE-cat.M1/NB1 modem

Although the monthly readout is particularly energy-efficient, the meter readings and consumptions are required more often so that it cannot be used.

Service life of one modem battery in years for a monthly readout:

		Readout time		
		10 min	15 min	30 min
Monthly readout window	1 hour	12 *	12 *	12 *
	2 hours	12 *	12 *	12 *
	4 hours	12 *	12 *	12 *
	12 hours	11,8	10,7	8,5

* Although some configurations result in calculated battery service lives of more than 12 years, a maximum service life of 12 years should be assumed due to the self-discharge of the batteries and other ageing processes.

10.4 Service life of the device battery

Although some configurations result in calculated battery service lives of more than 12 years, a maximum service life of 12 years should be assumed due to the self-discharge of the batteries and other ageing processes.

If two batteries are connected, the service life can be expected to be twice as long as that of one battery, but a maximum of 12 years.

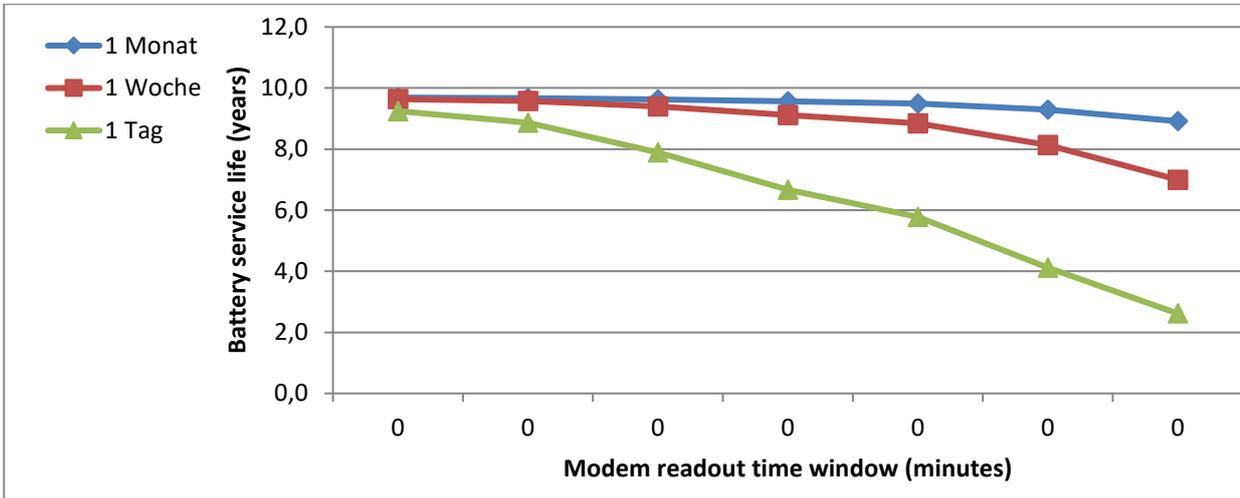
10.4.1 Standard operation

In standard operation without any special settings or sensors, the service life of the CPU battery depends mainly on the duration and frequency of the data transfer.

Conditions:

Batteries:..... 1 battery
Mode input 1: pulse input LF (mode 1)
Mode input 2: pulse input LF (mode 1)
Data transfer: via integrated modem
Outputs: not isolated (no galvanic separation)
Display switched on: 6 minutes per month
Measurement cycle: 10 seconds
Encoder read cycle: 15 minutes

Battery service life (years)		Modem readout duration (minutes)						
		1	2	5	10	15	30	60
Modem readout cycle	1 month	9,7	9,7	9,6	9,6	9,5	9,3	8,9
	1 week	9,6	9,6	9,4	9,1	8,8	8,1	7,0
	1 day	9,2	8,9	7,9	6,7	5,8	4,1	2,6



10.4.2 Encoder for volume measurement



If the settings for the encoder (e.g., timings) in the DL230 are changed, the battery service life may be reduced.



The values specified here apply to DL230 with firmware version 1.12 or higher. With older devices there is no separate "encoder read cycle", the encoders are read in the rhythm of the "measurement cycle".

Conditions:

- Data transfer: via integrated modem
- Outputs: not isolated (no galvanic separation)
- Display switched on: 6 minutes per month
- Measurement cycle: 10 seconds
- Encoder read cycle: 15 minutes

10.4.2.1 Encoder Namur a

10.4.2.1.1 One Encoder

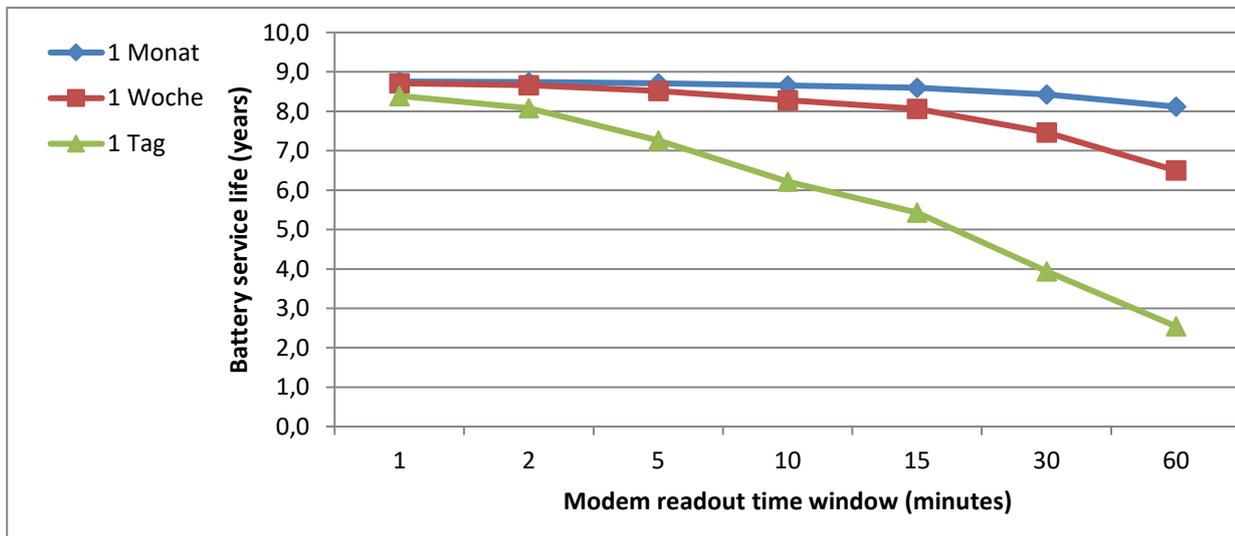
Conditions:

Batteries:..... 1 battery

Mode input 1: encoder Namur a protocol (mode 5)

Mode input 2: pulse input LF (mode 1)

Battery service life (years)		Modem readout duration (minutes)						
		1	2	5	10	15	30	60
Modem readout cycle	1 month	8,8	8,7	8,7	8,7	8,6	8,4	8,1
	1 week	8,7	8,7	8,5	8,3	8,1	7,5	6,5
	1 day	8,4	8,1	7,3	6,2	5,4	3,9	2,5



10.4.2.1.2 Two Encoders

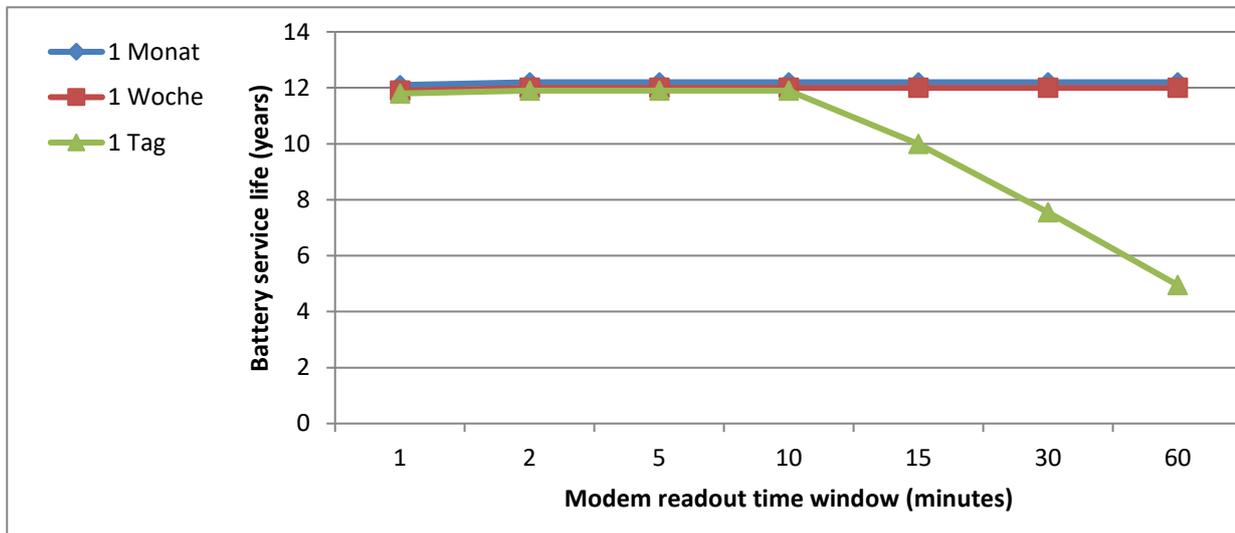
Conditions:

Batteries:..... 2 batteries

Mode input 1: encoder Namur a protocol (mode 5)

Mode input 2: encoder Namur a protocol (mode 5)

Battery service life (years)		Modem readout duration (minutes)						
		1	2	5	10	15	30	60
Modem readout cycle	1 month	12	12	12	12	12	12	12
	1 week	12	12	12	12	12	12	12
	1 day	12	12	12	12	10	7,7	5,0



10.4.2.2 Encoder Namur a+b

10.4.2.2.1 One Encoder

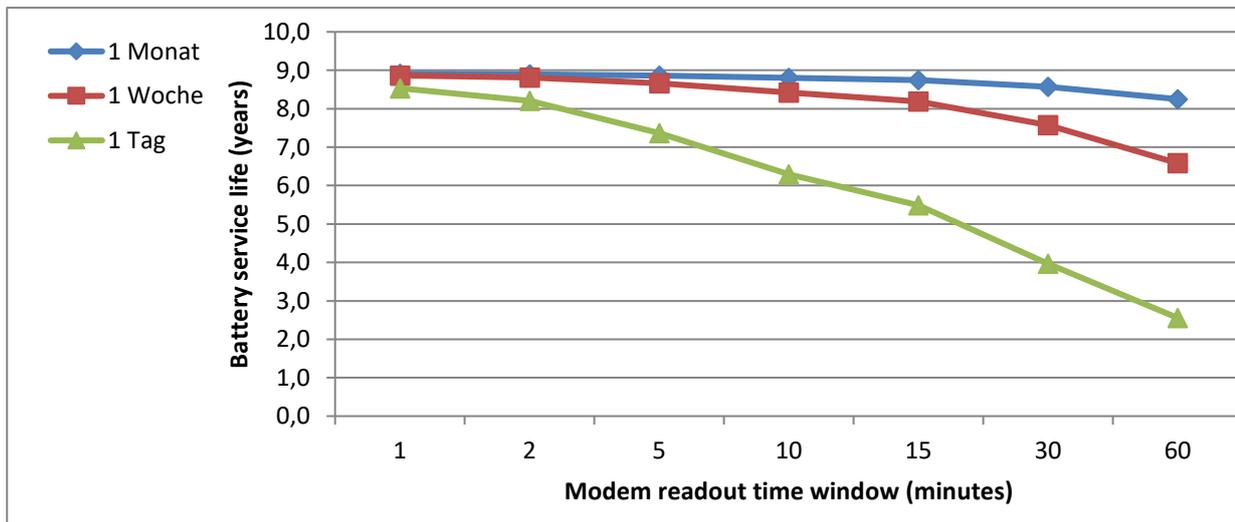
Conditions:

Batteries:..... 1 battery

Mode input 1: encoder Namur a+b protocol (mode 11)

Mode input 2: pulse input LF (mode 1)

Battery service life (years)		Modem readout duration (minutes)						
		1	2	5	10	15	30	60
Modem readout cycle	1 month	8,9	8,9	8,9	8,8	8,7	8,6	8,2
	1 week	8,9	8,8	8,7	8,4	8,2	7,6	6,6
	1 day	8,5	8,2	7,4	6,3	5,5	4,0	2,6



10.4.2.2.2 Two Encoders

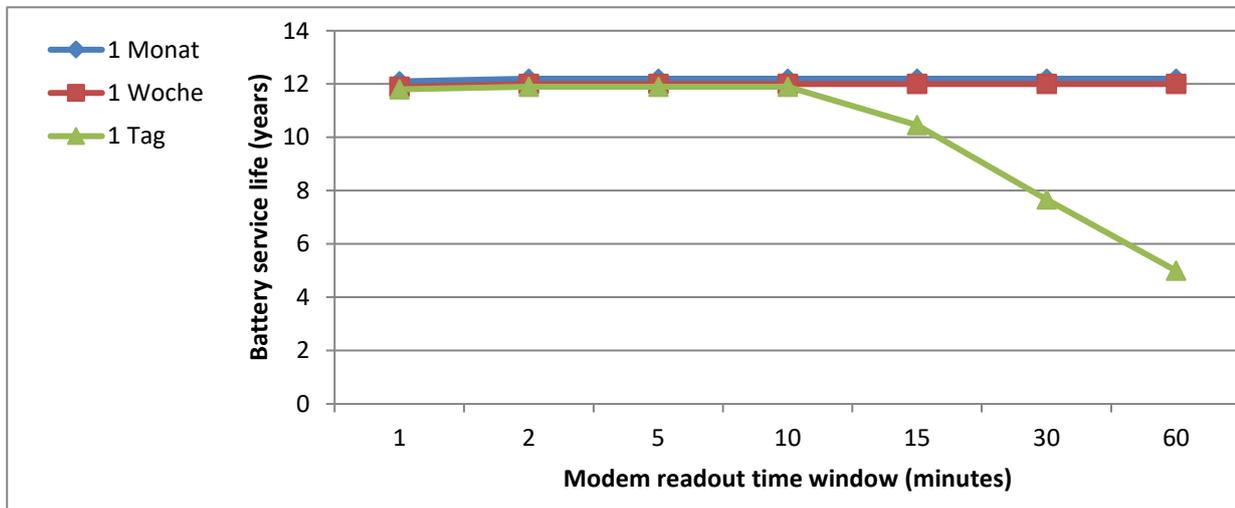
Conditions:

Batteries:..... 2 batteries

Mode input 1: encoder Namur a+b protocol (mode 11)

Mode input 2: encoder Namur a+b protocol (mode 11)

Battery service life (years)		Modem readout duration (minutes)						
		1	2	5	10	15	30	60
Modem readout cycle	1 month	12	12	12	12	12	12	12
	1 week	12	12	12	12	12	12	12
	1 day	12	12	12	12	10	7,7	5,0



10.4.2.3 Encoder SCR OBIS05

10.4.2.3.1 One Encoder

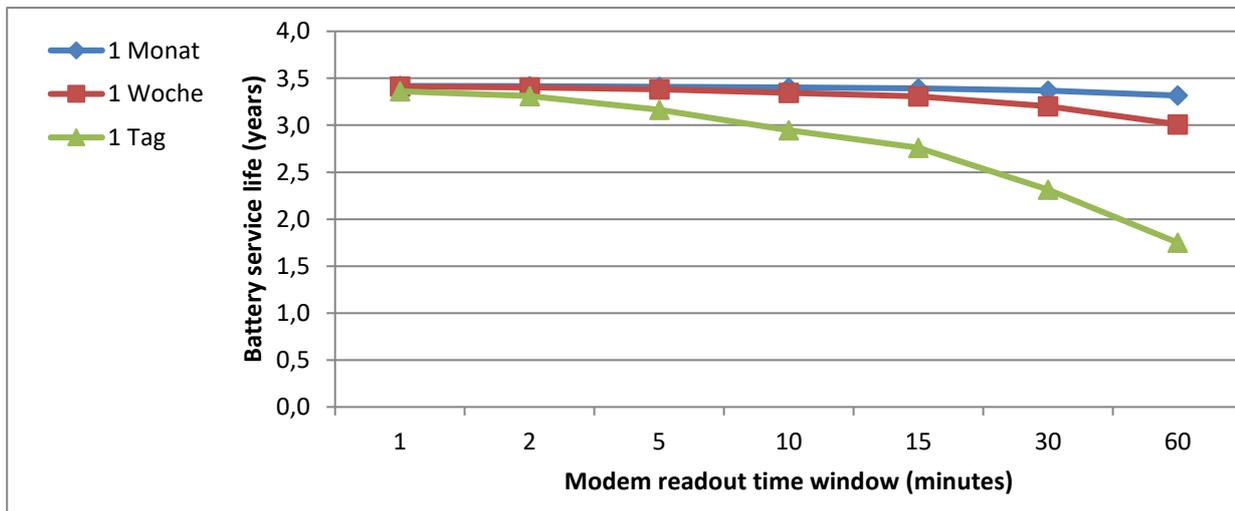
Conditions:

Batteries:..... 1 battery

Mode input 1: encoder SCR OBIS05 protocol (mode 8)

Mode input 2: pulse input LF (mode 1)

Battery service life (years)		Modem readout duration (minutes)						
		1	2	5	10	15	30	60
Modem readout cycle	1 month	3,4	3,4	3,4	3,4	3,4	3,4	3,3
	1 week	3,4	3,4	3,4	3,3	3,3	3,2	3,0
	1 day	3,4	3,3	3,2	2,9	2,8	2,3	1,8



10.4.2.3.2 Two Encoders

Conditions:

Batteries:..... 2 batteries

Mode input 1: encoder SCR OBIS05 protocol (mode 8)

Mode input 2: encoder SCR OBIS05 protocol (mode 8)

Battery service life (years)		Modem readout duration (minutes)						
		1	2	5	10	15	30	60
Modem readout cycle	1 month	4,2	4,1	4,1	4,1	4,1	4,1	4,1
	1 week	4,1	4,1	4,1	4,1	4,1	4,0	3,8
	1 day	4,1	4,1	4,0	3,8	3,6	3,2	2,6

