



THE POWER OF **CONNECTED**

Data Logger DL230

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Operating Instructions

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1 General

1.1 Information about this manual

This manual allows for safe and efficient use of the device. Compliance with all safety information and instructions for use contained in this operating manual is a prerequisite for safe working processes and proper use of the device. Furthermore, the valid guidelines, standards, local accident prevention regulations, and general safety regulations must be complied with for the respective area of application of the device. This manual forms a constituent part of the product and must be stored within the immediate vicinity of the device and be accessible to installation, service, maintenance, and cleaning personnel at all times. The graphic illustrations used in this manual serve as a visual representation of the described processes and are therefore not necessarily to scale and may deviate from the actual design of the device.



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



The application manual is available for you for the commissioning of the various communication and device applications.

1.2 Warranty provisions

The current warranty provisions can be found in the general terms and conditions online under:
<http://www.elster-instromet.com/en/general-terms-of-business>

1.3 Customer service

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

1.3.1 Customer service and repairs

- Tel. +49 (0) 61 34 / 605-0
- Fax +49 (0) 61 34 / 605-390
- E-mail: Katinka.Fiedler@Honeywell.com

1.3.2 Electronic hotline



In the event of faults, you can also contact the electronic hotline.

- Tel. +49 (0) 6134 / 605-123
- <http://www.elster-instromet.com/en/support>
- E-mail: ElsterSupport@Honeywell.com

1.4 Meaning of symbols

1.4.1 Safety instructions

In this manual, safety information is denoted by the use of symbols. The safety information is introduced by signal words, which identify the level of risk.

This safety information must be complied with and care should be taken to prevent accidents, personal injury, and material damage.



DANGER!

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



WARNING!

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



CAUTION!

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



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

**CAUTION!**

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

1.4.2 Tips and recommendations



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

1.5 Limitation of liability

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

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

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

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



This manual should be read carefully before commencing all works on and with the device, particularly before putting the device into operation! The manufacturer shall not assume any liability for damage and errors caused by failing to observe these instructions.

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

1.6 Copyright protection

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

1.7 Scope of delivery

The scope of delivery for the DL230 includes:

- Data Logger DL230
- Dispatch list
- Design data sheet
- Manual
- Bag of accessories

1.8 Spare parts and accessories



WARNING!

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

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

Therefore:

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

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

The free "enSuite" program also belongs to the accessories for the DL230 and is available under www.elster-instromet.com. This can be used to program the DL230 data logger via its data interfaces to perform advanced applications.

The DL230 can be supplied as a calibrated and non-calibrated device and is also available in different models.

Further details can be found under www.elster-instromet.com and in the "Assembly, Connection and Putting into Operation" chapter.

1.9 Storage

**CAUTION!**

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

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

Therefore:

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

**CAUTION!**

Material damage caused by the formation of condensation.

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

Therefore:

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



If the power supply to the device is cut off during storage due to disconnecting the batteries then the date and time must be reset.

The following rules apply for storage:

- The relative humidity should be a maximum of 93%.
- Do not store packages in the open air.
- The storage temperature should not fall below $-25\text{ }^{\circ}\text{C}$ and should not exceed $+60\text{ }^{\circ}\text{C}$.
- Avoid mechanical vibrations during storage of the device.

2 Safety

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

2.1 General

The DL230 is an intrinsically safe device as per the ATEX Product Directive 94/9/EC and the ATEX Operating Directive 1999/92/EC EN, and is suitable for operation within the following explosive gas atmospheres:

- DL230 with integrated power supply unit and integrated modem:
Associated apparatus for zones 0 and 1
- DL230 with integrated power supply unit and integrated modem:
Zone 2 for gases in temperature class T4



DANGER!

Using incorrect batteries presents a risk of explosion!

Only use batteries prescribed by Elster in accordance with Chapter 9.1.2.



When connecting and operating the DL230 in explosive gas atmospheres, the corresponding standards must be observed:

DIN EN 60079-0

DIN EN 60079-14

The device may only be used as associated apparatus for zone 0 and 1 or inside zone 2, if installation has been carried out according to the separate requirements stipulated under DIN EN 60079-14 and the operating conditions (see "Technical Data" chapter) as well as the connection conditions (see "Assembly, Connection and Putting into Operation" chapter).

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

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

2.2 Intended use

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

Data logger DL230 is provided as a compact device which can be calibrated for measuring and saving counter pulses, meter readings or level changes for various types of energy.

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



WARNING! **Danger resulting from misuse.**

Misuse of the device may lead to dangerous situations.

Therefore:

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

2.3 Personnel



WARNING!

Risk of injury to unqualified personnel.

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

Therefore:

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

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

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



WARNING!
Risk to unauthorized persons!

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

Therefore:

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

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

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

2.4 Personal protective equipment

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

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

2.5 Specific risks

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



WARNING!

Misuse of batteries may present a risk of injury.

Special care must be taken when handling batteries.

Therefore:

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



WARNING!

Risk of fire from highly flammable substances!

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

Therefore:

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

2.6 Environmental protection



CAUTION! **Environmentally hazardous substances!**

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

Therefore:

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

The following environmentally hazardous substances are used:

- Batteries

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

2.7 Operator's responsibility

The device will be used in the commercial sector. The operator of the device will therefore be subject to legal obligations concerning occupational safety.



Important information

To protect the device from unauthorized manual access, make sure that only authorized persons have direct access to the device after installation.

In addition to the safety information contained in these instructions, the valid safety, accident prevention, and environmental protection regulations for the area of application of the device, must be adhered to. In particular:

- The operator must ensure that the valid safety, accident prevention, and environmental protection regulations for the entire plant in which the device is being integrated, are complied with.

- The operator must be familiar with the valid occupational safety regulations and must also be able to conduct a risk assessment to determine risks arising from the specific working conditions in the respective area of application of the device. The operator must then implement this in the form of operating instructions for the operation of the device.
- Throughout the entire life cycle of the device, the operator must determine whether their prepared operating instructions are compatible with current regulations and amend these if and when necessary.
- The operator must clearly regulate and define responsibilities for the assembly, connection, putting into operation, and maintenance of the device.
- The operator must ensure that all employees who use the device have read and understood this manual. Furthermore, the operator must provide training to personnel at regular intervals and inform them of the potential risks.
- The operator of the entire plant in which the device is to be integrated, must provide personnel with the necessary protective equipment.

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

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

3 Technical data

3.1 General data

Data	Value	Unit
Width (incl. antenna cover)	250	mm
Height (incl. cable glands)	175	mm
Depth	85	mm
Permissible ambient temperature range	-25 ... +60	°C

3.2 Power supply for DL230 without integrated power supply unit

3.2.1 Battery power supply for the basic device

Data	Value	Unit
Voltage	3.6	V
General nominal capacity	16.5	Ah
Usable capacity	13.0	Ah
Minimum number of batteries required	1	units
Minimum operating life (at standard measurement conditions)	8	years

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

Data	Value
Measurement cycle	10 seconds
Mode input 1 to 4	Pulse input
Display active	60 minutes per month
Interface or modem active	30 minutes per month
Ambient temperature	-10 ... +50°C

3.2.2 Battery power supply for the integrated modem

Data	Value	Unit
Voltage	3.6	V
General nominal capacity	13.0	Ah
Usable capacity	8.0	Ah
Minimum number of batteries required	1	units

3.2.3 Battery power supply for the modem module

If the DL230 has a plug-in modem module (not a soldered modem), the modem battery is connected to the connection board in the housing base. For this purpose, any of the two connectors can be used.



WARNING!

If you use two batteries, always connect only two new and unused batteries !

Connecting two batteries with different charge states at the same time may cause a battery to explode.

The information in chapter 3.2.2 applies to the battery.
Order number of the connection board for the modem battery for retrofitting: see chapter 9.1.2.

3.3 Power supply for the DL230 with integrated power supply unit

3.3.1 External power supply

Data	Value	Unit
Supply voltage	230	V AC
Power consumption, maximum	10	W
cable cross-section of solid wire	0,14 ... 2,5	mm ²
cable cross-section of stranded wire with wire ferrules	0,25 ... 2,5	mm ²

3.3.2 Battery power supply for the DL230 during power failure

Connect the batteries to X5 or X6 of the CPU board for switching to battery mode in the event of a power failure. See chapter 3.2.1 "Battery power supply for the basic device"

3.3.3 Buffer batteries for the integrated modem during power failure

The buffer batteries can optionally be connected to the X9 or X10 of the CPU board to ensure that data continues to be transmitted, even in the event of a power failure. For technical data of the battery, see chapter 3.2.2 "Battery power supply for the integrated modem".

3.3.4 Buffer battery for the modem module during power failure

The buffer battery for the modem module can optionally be connected to the ST1 of the power supply board to ensure that data continues to be transmitted, even in the event of a power failure. For technical data of the battery, see chapter 3.2.2 “Battery power supply for the integrated modem”.

3.4 Power supply for the DL230 with Power over Ethernet (PoE)

If the DL230 is equipped with an Ethernet module and if the Ethernet network (or a switch) provides the Power over Ethernet function, the DL230 can be supplied with power from the Ethernet module. An integrated power supply is not required.

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

3.5 Digital inputs

Pulse transducer and Encoders, which are installed in a hazardous area (Zone 0, 1 or 2) have to keep the following electrical parameters.

Connector	Electrical Parameters				
	U _o	I _o	P _o	C _o	L _o
DE1, DE2	9,56V	19,6mA	46,9mW	3,6µF	92mH
DE3, DE4	9,56V	1,7mA	4,1mW	3,6µF	12,1H

3.5.1 Pulse and signal inputs

Data		Value		Unit
Open-circuit voltage U_0 (at DE1 and DE2)		typ.	2.7	V
Open-circuit voltage U_0 (at DE3 and DE4)		typ.	3.1	V
Internal resistance R_i			> 1	MΩ
Short circuit current I_k		max.	5	μA
Switch point "ON":	▪ Resistance R_e	max.	100	kΩ
	▪ Voltage U_e	max.	0.8	V
Switch point "OFF":	▪ Resistance R_a	min.	2	MΩ
	▪ Voltage U_a	min.	3	V
Pulse duration t_e		min.	62.5	ms
Pause duration t_a		min.	62.5	ms
Counting frequency f		max.	10	Hz
Cable length		max.	30	m
Cable cross-section			0,3 ... 2,5	mm ²

The maximum counting frequency of the digital inputs can be adjusted using the "enSuite" software. The limit values specified for frequency and duration shall only apply if the so-called "software debounce" has been switched off.



The maximum counting frequency is parameterized to 2 Hz as a default. Changing parameters to $f_{\max} \leq 10$ Hz is only possible with skilled, qualified staff and when administrator or calibration lock is open. Changes to the input frequency must be documented by the operator of the device.



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

3.5.2 Encoder inputs



An encoder can only be connected to inputs 1 and 2 (terminals DE1 and DE2).

Data	Value	Unit
Encoder protocol	Namur, SCR, SCR+	-
Cable length	max. 30	m

3.6 Digital outputs

Both DA1 and DA2 digital outputs can be configured as low frequency pulse or signal outputs.

3.6.1 Nominal data

Data	Value		Unit
Maximum switching voltage	30		V DC
Maximum switching current	100		mA DC
Maximum voltage drop	1		V
Maximum residual current	0.001		mA
Pulse duration	min.	125	ms
Pause duration	min.	125	ms
Output frequency	max.	4	Hz
cable cross-section	0,3 ... 2,5		mm ²

3.7 Interfaces

3.7.1 Serial optical interface

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



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

3.7.2 Integrated modem

Data	Value	Unit
Modem type	2G: GSM / GPRS 3G: GSM / GPRS / UMTS	
Frequency bands	2G: 850 / 900 / 1800 / 1900 3G: 850 / 900 / 1800 / 1900 / 2100	MHz

3.7.3 Serial electrical interface (optional)

The serial interface can be used if the DL230 is not equipped with an integrated modem and if it is only used in the safe area or in ATEX zone 2.

Data	Value
Adjustable interface types	RS232 or RS485
Supply voltage at Usio	7.5 ... 9 V

3.7.3.1 Intrinsic safety parameters of the serial interface of the DL230

Highest voltage which is permitted to be applied to the data lines, and current limitation on the data lines.

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

3.7.3.2 Technical Data of the RS485-Interface of the DL230

Parameter	Value
Mode of operation	RS485 2-Draht (half duplex) RS485 4-Draht (full duplex)
Termination	Do not use termination resistors at the remote terminals.
Maximum data rate	19.200 Baud
Number of remote terminals	Driver output power: max. 16 Unit Loads ¹ Input power consumption ² : - 6 Unit Loads (RS485, not. insulated) - 3 Unit Loads (RS485, electrical insulated)

3.7.4 GSM / GPRS modem module

The modem module can be used if the DL230 is not equipped with an integrated modem and if it is only used in the safe area or in ATEX zone 2.

Data	Value	Unit
Modem type	2G: GSM / GPRS 3G: GSM / GPRS / UMTS	
Frequency bands	2G: 850 /900 /1800 /1900 3G: 850 /900 /1800 /1900 /2100	MHz

¹ Unit Load: Standard RS-485 Receiver with input resistor = 12 kOhm

² See application manual for details of RS-485 interface connection

3.7.5 Ethernet Module (optional)

The Ethernet Module can be used if the DL230 is not equipped with an integrated modem and if the DL230 is only used in the safe area or in ATEX zone 2.

3.7.5.1 Intrinsic safety parameters of the Ethernet Module

The Power over Ethernet function (PoE) of the Ethernet module supports power class 0. This results in the highest possible current that can be supplied from a PoE power supply.

Connector	Voltage	Current
Ethernet Module K1-1 to K1-6	$U_i \leq 57 \text{ V}$	$I_i \leq 270 \text{ mA}$

3.7.5.2 Technical Data of the Ethernet Module

Parameter	Value
Ethernet Type	10/100 Mbit/s auto sensing
Power supply	with integrated power supply unit or Power over Ethernet (PoE)
Functions	TCP-IP Client/Server, FTP

3.8 Measurement conditions

3.8.1 Environment

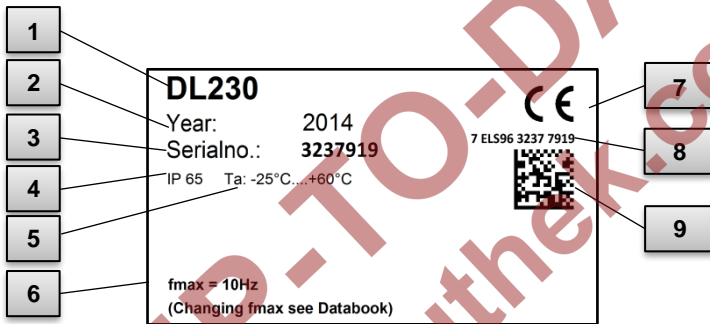
Data	Value	Unit
Temperature range	-25...+60	°C
Relative humidity, max.	93	%

3.9 Labelling

The label is placed on the front panel of the device (see “Construction and Function” chapter).

3.9.1 Designation Data Logger

The designation of the DL230 contains the following information:



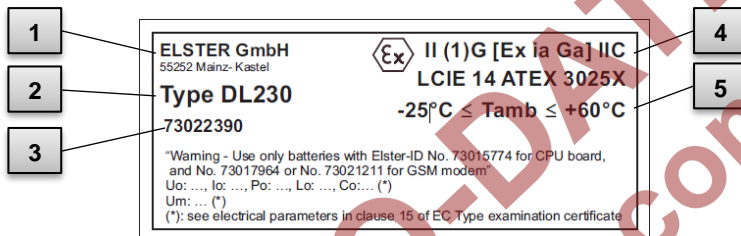
Ill.: 1

- | | |
|-----------------------------|--|
| 1 Type designation | 6 Maximum input frequency |
| 2 Year of manufacture | 7 CE marking |
| 3 Serial number | 8 Manufacturer independent identification number |
| 4 IP protection class data | 9 Datamatrix Code |
| 5 Ambient temperature range | |

3.9.2 ATEX marking

The plates for the "ATEX" marking of the DL230 are located on the top panel of the device housing.

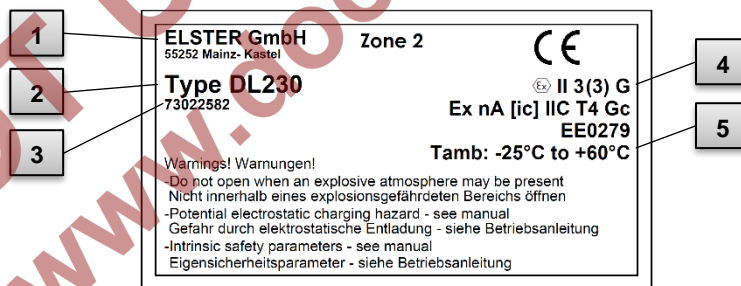
3.9.2.1 Associated apparatus for Zone 0 and 1



III.: 2

- | | |
|--------------------------------------|---|
| 1 Manufacturer and address | 4 ATEX-marking |
| 2 Type designation of the device | 5 Permissible ambient temperature range |
| 3 Identification number on the plate | |

3.9.2.2 Zone 2



III. 3

- | | |
|--------------------------------------|---|
| 1 Manufacturer and address | 4 ATEX-marking |
| 2 Type designation of the device | 5 Permissible ambient temperature range |
| 3 Identification number on the plate | |

3.9.3 Device software Identification

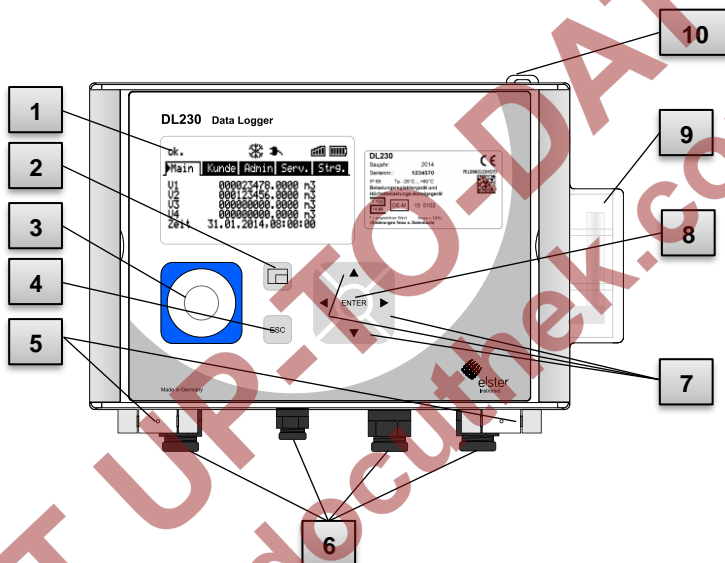
- Move the cursor using the arrow keys to the "Serv." register and to the values "Vers" (device software version) and "Chk" (checksum) via the following path:

Serv. → Identification → Data Logger → Vers or Chk

- The checksum "Chk" can be recalculated for verification purposes by pressing the ENTER button.

4 Construction and Function

4.1 External view



III. 4

1 Display

2 Function key 

3 Optical interface

4 Escape button „ESC“

5 Hinge

6 Cable glands

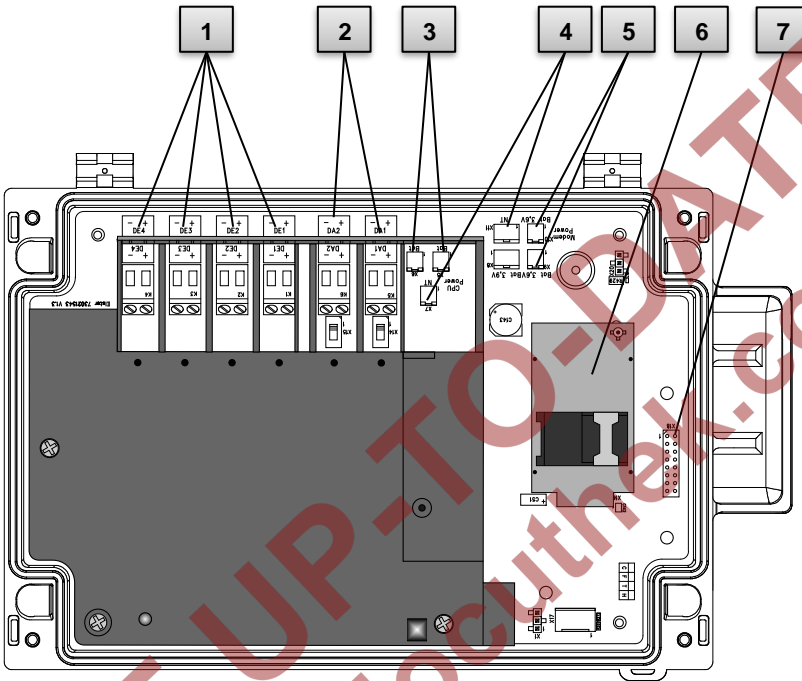
7 Arrow keys ▲ ▼ ► ◀

8 Enter button „ENTER“

9 Aerial

10 Sealing eyelets

4.2 Internal view



III. 5

- | | |
|---|---|
| 1 Connections for counting and signal inputs DE1 to DE4 | 4 Connections for the power supply unit |
| 2 Connections for pulse and signal outputs DA1 to DA2 | 5 Modem battery connections |
| 3 Device battery connections | 6 Modem with SIM card holder |
| | 7 Connector for interface boards (optional use in place of the modem) |

4.3 Short description

The DL230 data logger is used to determine maximum load and to register load profiles in gas plants for special-rate clients. Up to four meters or low-frequency pulse outputs from volume correctors can be connected to the data logger. This means that the device is suitable for plants with more than one measurement.

Two of the input channels can also alternatively be connected to encoder counters. Inputs which do not capture consumption information or original meter readings can also be parameterized as status inputs.

Simple monitoring functions are possible with this. Events can be stored in an archive, emitted as a status signal or transmitted to a central location via SMS if required.

Two digital outputs can be used to transfer consumption information or to signal warnings and alarms.

Energy supply is with lithium batteries. In addition, the device can also be equipped with a 230VAC power supply unit.

For data communication purposes an integrated modem is available, which supports the GSM, GPRS and UMTS (2G and 3G) radio standards. Alternatively, communication modules can be used for Ethernet communication or for communication via RS232/RS485 interface.

Use of the DL230 is via 7 keys and an alphanumeric display on the front panel.

4.4 Connections

The DL230 memory can be connected to:

- a maximum of three batteries (2x device batteries and 1x modem battery or 1x device battery and 2x modem batteries)
- Optional 230V connection to an internal power supply unit

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

- 4 counting and signal inputs DE1, DE2, DE3, DE4
- 2 pulse and signal outputs DA1, DA2
- Integrated GSM/GPRS modem
- Optical data interface



Further details on the connection possibilities for the DL230 and the available equipment versions can be found in the "Technical Data" chapter and in chapter "Assembly, Connection and Putting into Operation".

5 Assembly, Connection and Putting into Operation

5.1 Assembly

The DL230 can be operated as associated apparatus for ATEX zone 0 or 1 and inside ATEX zone 2. Notice the yellow ATEX marking on each device.

When using in zone 2, the following warning applies:

**DANGER!**

The DL230 must not be used in Zone 0 or Zone 1!

**WARNING!**

When using in Zone 2 may present a risk of explosion!

- Do not open when an explosive atmosphere may be present!
- Potential electrostatic charging hazard: Do not rub against the display-window!
- Notice the intrinsic safety parameters of chapter 3.7.3.1 when connecting the serial interface.



The DL230 can either be mounted on a wall or a pipeline.

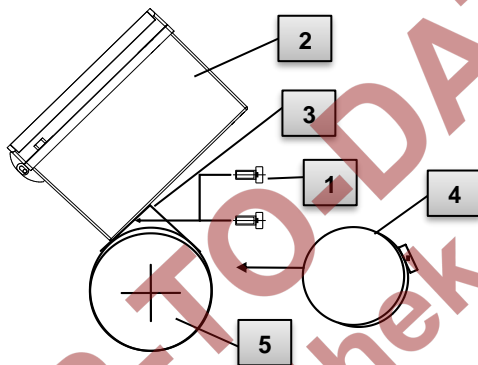


Should problems arise during assembly, e.g. with regard to the selection of suitable assembly tools, please contact our customer service team (see "General" chapter).

5.1.1 Assembly on a pipeline



Mount the DL230 to a pipeline using an A2 universal bracket with a pipe clamp (see Appendix) as well as corresponding cylinder screws.



III. 6

1. Screw into place with the aid of two self-tapping screws for plastic 4x13 mm (III. 6: 1) cylinder screws, insert the A2 universal bracket in the boreholes provided (III. 6: 3) on the DL230 (III. 6: 2).
2. Tighten the screws so that the bracket is sitting in a fixed position.
3. The A2 universal bracket (III. 6: 3) and the device (III. 6: 2) should be fastened to the pipeline (III. 6: 5) using the pipe clamp (III. 6: 4)
4. The device should be mounted on the pipeline in such a way that it is in a fixed position and cannot fall down or twisted.



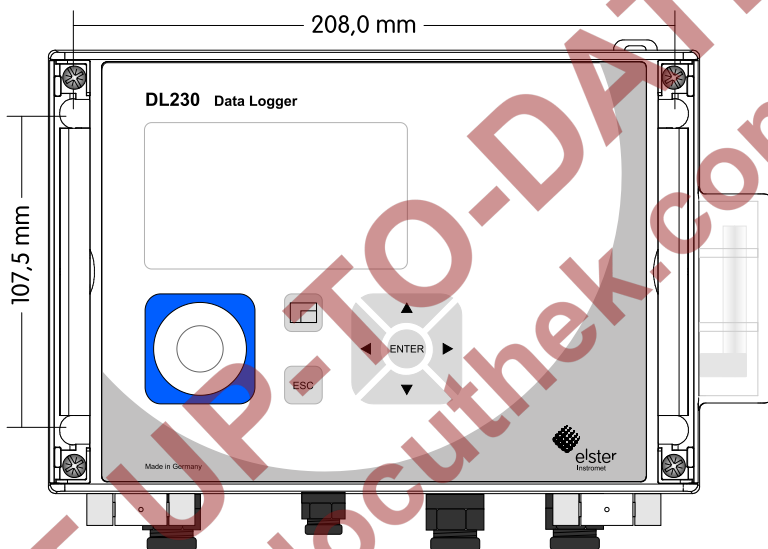
WARNING!

When using longer self-tapping screws then there is a risk of leaks in the housing

5.1.2 Assembly on a wall



The DL230 can be mounted on the wall without opening the housing. The holes are accessible by pressing the grey covering strips on both the right and left-hand side of the cover out-wards at the small groove.



III. 7

1. Bore four holes in the positions marked on the wall (see dimensions in III. 7).
2. Select wall plugs, which correspond to the size of the screws and insert these in the boreholes in the wall.
3. Use four universal screws 50mm x 5mm for attaching the DL230 to a wall.

5.2 Connection



The DL230 is available as officially calibrated or a factory calibrated device. Information regarding additional equipment versions of the DL230 can be found under www.elster-instromet.com.



DANGER!

The connection of non-intrinsically-safe or non-associated apparatus presents a risk of explosion!

The operation of the DL230 as associated apparatus for zone 0 or 1 and the connection of non-intrinsically-safe equipment which exceeds those conditions and limit values specified in the declaration of conformity, presents a risk of explosion.

Therefore:

- When the DL230 is used as associated apparatus only devices with intrinsically-safe circuits and electrical data that corresponds to those requirements stipulated in the declaration of conformity for the DL230 (see Appendix), should be connected.
- When connecting the DL230 and putting it into operation, the guidelines of the corresponding EN 60079-0 and EN 60079-14 standards should be observed.
- The wiring of the connections should be professionally carried out by a gas specialist or a calibration officer.
- Active outputs cannot be switched.
- Connect unused cable glands as per EN 60079-14 with the help of a plug or a suitable screw cap.

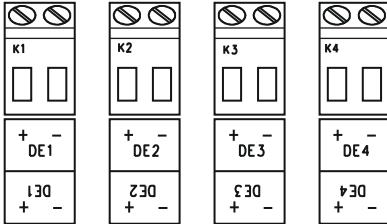
To program the device and carry out further applications the optical interface of the DL230 (see the "Construction and Function" chapter) can be used. Further details can be found under www.elster-instromet.com.



The connections described below should only be sealed by a calibration officer. If the DL230 is used for operations, which are not subject to calibration regulations, the seals on the respective connections can be omitted.

5.2.1 Connecting meters

For the purpose of measuring consumption the pulse transducers from up to four meters can be connected to the DE1 to DE4 digital inputs of the DL230. Alternatively, encoders can be connected to inputs DE1 and DE2.



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

III. 8



The wire cross-section for the connection to the DL230 inputs is 0.3 ... 2.5 mm².
When using stranded wire, use appropriate wire ferrules.



Use only cables, which fit to the cable glands in order to keep IP protection class also after the installation.
Minimum cable diameter:
Cable gland M12 ≥ 5 mm
Cable gland M16 ≥ 5,5 mm.

5.2.1.1 Connection to a pulse transducer

1. Connect the meter's pulse transducers to the DE1 to DE4 terminals (III. 8) of the DL230. The polarity can be freely selected (the symbols "+" and "-" on the terminals are used for the connection of other pulse transducers or encoders).
2. Adjust the measurement parameters, e.g. the cp value (pulse constant), as described in chapter 5.3.1.2.

5.2.1.2 Connection to an encoder

1. Connect the meter's encoder(s) to the DE1 and DE2 terminals (III. 8) of the DL230.
The polarity should be taken into consideration, i.e. connect the "+" of the encoder to the "DE1 +" terminal and "-" to the "DE1 -" terminal respectively.
2. Adjust the measurement parameters, e.g. the encoder type, as described in chapter 5.3.1.3.

5.2.2 Sealing the input terminals

After connecting to the meter as per chapter 5.2.1 the respective DE1 to DE4 input terminal must be sealed for official calibration measurements. For this purpose, terminal covers are provided in the bag of accessories. If required, these should be screwed over the connected terminals and an adhesive seal should then be bonded to the fastening screw (see chapter 5.3.2).

5.2.3 Connecting the power supply

5.2.3.1 Power supply for the DL230 with integrated power supply unit



DANGER!

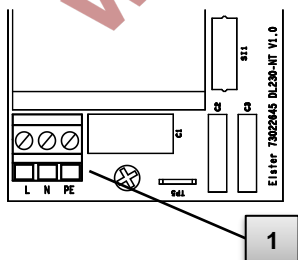
Danger to life from electrical current!

Touching live parts poses an imminent danger to life.

Therefore:

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

The power supply unit to connect the 230 V~ power supply, is in-built into the base of the DL230.



1. Switch off the supply voltage and secure it against an accidental restart!
2. Connect the 230V~ supply voltage to the terminal block (1) of the power supply. Terminal "PE" is the connection for the protective conductor (protective earthing).



The wire cross-section for the connection to the integrated power supply unit is 0.3 ... 2.5 mm².
When using stranded wire, use appropriate wire ferrules.



Use only cables, which fit to the cable glands in order to keep IP protection class also after the installation.
Minimum cable diameter:
Cable gland M12 ≥ 5 mm
Cable gland M16 ≥ 5,5 mm.



DANGER!
Danger to life from electrical current!

Connect the protective earthing of the mains power supply to the J2 screw terminal, connection "E"!

5.2.4 Connect outputs of the DL230



DANGER!
The connection of non-intrinsically-safe or non-associated apparatus presents a risk of explosion!

The operation of the DL230 as associated apparatus for zone 0 or 1 and the connection of non-intrinsically-safe equipment which exceeds those conditions and limit values specified in the declaration of conformity, presents a risk of explosion.

Therefore:

- When the DL230 is used as associated apparatus only devices with intrinsically-safe circuits and electrical data that corresponds to those requirements stipulated in the ATEX declaration for the DL230 (see Appendix), should be connected. Notice also the limitations of chapter 3.6.1.
- Screw the terminal covers over the connected output terminals again.



The wire cross-section for the connection to the DL230 outputs is 0.3 ... 2.5 mm².
When using stranded wire, use appropriate wire ferrules.



Use only cables, which fit to the cable glands in order to keep IP protection class also after the installation.

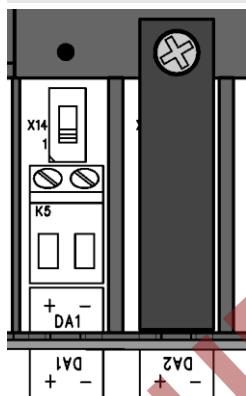
Minimum cable diameter:

Cable gland M12 ≥ 5 mm

Cable gland M16 $\geq 5,5$ mm.



Different downstream devices can be connected to the digital outputs of the DL230. The outputs are preconfigured for this purpose (see chapter 5.3.1.5).



III.: 10

1. Remove the terminal cover for the digital outputs (terminals DA1 and / or DA2) (III.: 10).
2. Connect the downstream device to the corresponding digital outputs (terminals DA1 to DA2) of the DL230 (III.: 10).
3. Screw the terminal covers over the connected terminals after connecting the cables. If required, a seal should then be bonded to the fastening screw (see chapter 5.3.2).
4. If necessary, adjust the cp value (pulse contact) for the pulse outputs as described in chapter 5.3.1.5.

5.2.4.1 Electrical insulation of the outputs

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

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



CAUTION!

Reduced battery life

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

It is then impossible to give a reliable prediction of the remaining battery life.



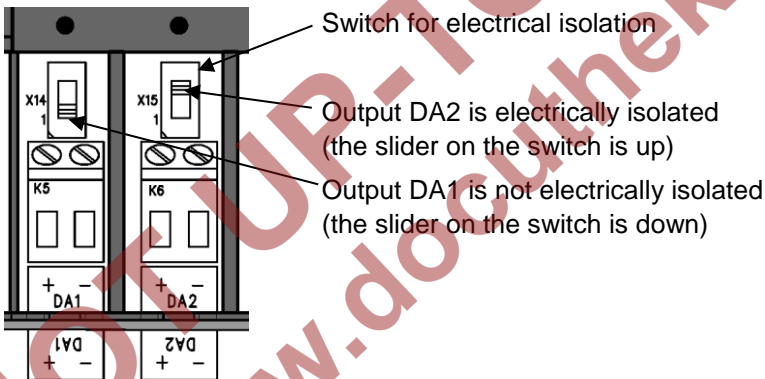
An electrically-insulated output only requires electricity if the output is active (switched-on). You can therefore minimize the negative influence of an electrically-insulated output on the battery life by setting the pulse duration to the lowest possible value when using it as a pulse output.

The configuration software "enSuite" is suitable for this purpose.



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

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



5.3 Putting into operation

5.3.1 Configuration of measurement parameters



If the DL230 is subject to calibration regulations, the works described below should only be performed by legally authorized individuals.

The necessary operating parameters can be adjusted using the free configuration program "enSuite", which is available under www.elster-instromet.com.

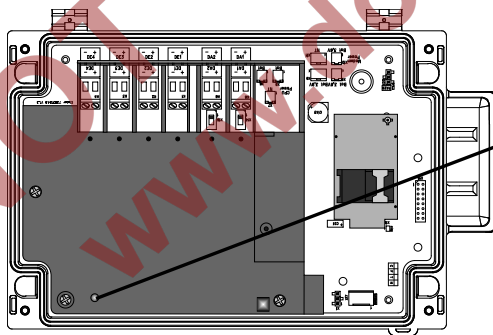
If the program is not available, the configuration can also be carried out using the keyboard as described below (see chapter 5.3.1.2).



Before adjusting the measurement parameters via the keyboard, please read chapter 6 to learn how the device is operated.

5.3.1.1 Opening the calibration lock

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



Position of the push-button to open the calibration lock.

III.: 12

5.3.1.2 Adjusting the parameters for the pulse transducer of the meter

If a pulse transducer is connected as per 0 then adjust the input mode and the cp value as follows:

1. Setting the input mode:

- Move the cursor to the "Serv." tab and via the path below to the input mode "Md.E1":
Serv. → Input 1 → Settings → Md.E1
- Press the ENTER button ⇒ The set value flashes.
- Repeatedly press one of the ▲ or ▼ arrow keys until the text "Pulse Input" flashes.
- Press the ENTER key to confirm the value setting. The input value can be deleted by using the ESC key.

2. Setting the cp (pulse constant) value:

- Move the cursor to cp value "cp.E1" in the same path
- Press the ENTER ⇒ button. One of the value's digits flashes.
- Move the cursor to the digits using the ► or ◀ arrow keys and update them using the ▲ or ▼ arrow keys.
- Press the ENTER key to confirm the value setting. The input value can be deleted by using the ESC key.

The same process can also be used for the other inputs, *inputs 2 to 4*.

5.3.1.3 Activating encoder mode

If an encoder is connected as per 5.2.1.2, the encoder mode is activated as follows:

Start the "Encoder Recognition" function using the DL230 keypad as follows:

- Move the cursor to the "Serv." register and to the value "Md.I1" (input mode) via the following path:
Serv. → Input 1 → Parameter settings → Md.I1
- Press the ENTER button ⇒ the set value flashes.
- Repeatedly press one of the ▲ or ▼ arrow keys until the value "Auto-Encoder" flashes.
- Press the ENTER key to confirm the value setting. Input can be cancelled using the ESC key.
- Wait until "Auto-Encoder" is replaced by another value. This can take up to a minute as the DL230 activates and test all known encoder protocols consecutively.

- On successful detection the DL230 displays the label "Vo1" on the meter reading of the meter:
Serv. → Input 1 → Vo1

Unlike the "Auto Detect" function, you can also select the connected encoder type directly under "Md.I1".

Serv. → Input 1 → Parameter settings → Md.I1

The following encoder types can be selected:

Md.E1	Description
Enc.Namur a	Encoder with Namur a protocol
Enc.SCR EDIS	Encoder SCR with EDIS95 protocol
Enc.SCR OBIS	Encoder SCR with OBIS05 protocol
Enc.SCR+EDIS	Encoder SCR+ with EDIS95 protocol
Enc.SCR+OBIS	Encoder SCR+ with OBIS05 protocol
Enc.Nam. a-b	Encoder with Namur a and b protocols

The same process can be used for input 2.

With the parameter "EZYk" you can set for both encoder inputs at what intervals the encoder is read out. Default is 900 seconds (15 minutes).

Changing this parameter has a significant impact on battery life !

"EZYk" can be found in the display under the path:

Serv. → Device settings → Measurement

5.3.1.4 Adjusting meter readings

To control the measuring of volumes, the meters (V1 to V4) of the DL230 can be adjusted to the same respective value as the meters connected when the calibration or administrator lock is open (with an entry in the PTB log).

- Open the calibration lock or the administration lock
- Move the cursor to the "Serv." register and to the value "V1", "V2", "V3" or "V4":
Serv. → Input 1 → V1
Serv. → Input 2 → V2
Serv. → Input 3 → V3
Serv. → Input 4 → V4
- Press the ENTER ⇒ button. One of the value's digits flashes.
- Move the cursor to the digits using the ► or ◀ arrow keys and update them using the ▲ or ▼ arrow keys.

- Once you have changed all of the digits, press the ENTER key in order to confirm your entry. The input value can be deleted by using the ESC key.

5.3.1.5 Configuration of the outputs



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

The following functions are preset ex-factory for the outputs:

Output	Function
DA1	Pulse output for volume "V1" (cp.A1= 0.1)
DA2	Pulse output for volume "V2" (cp.A2= 0.1)

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

To change the cp values for output 1 or output 2, move the cursor to the "Serv." register and go to "cp.A1" (for output 1) or "cp.A2" (for output 2) via the following path:

Serv. → Outputs → Output 1 → cp.01

or *Serv. → Outputs → Output 2 → cp.02*

- Press the ENTER button ⇒ a digit of the cp value will flash.
- Move the cursor to the digits using the ► or ◀ arrow keys and update them using the ▲ or ▼ arrow keys.
- Press ENTER, so that the value setting is confirmed. The input value can be deleted by using the ESC key.



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

A complete description can be found in the DL230 Application Manual that can be downloaded under www.elster-instromet.com.

5.3.1.6 Setting the daylight-saving time

- Move the cursor to the "Serv." register and to the "MdTim" value (daylight saving mode) via the following path:
Serv. → Date and time → MdTim
- Press the ENTER button ⇒ the set value flashes.
- Change the value using the arrow keys ▲ or ▼:

MdTim	Description
CEST off	No switchover to daylight saving time (CEST = Central European Summer Time)
CEST auto	Automatic conversion to summertime in accordance with EU regulations
CEST man.	The start and end of daylight saving time is configured by the control centre every year.

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

5.3.1.7 Deleting the measurement archive



Deleting the archive is not absolutely necessary when putting the device into operation.

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



All measurement archives (no logs) will be deleted.

In order to ensure that the archive is not accidentally deleted, the serial number of the DL230 must be entered whilst the calibration lock is open (this number is located on the identification plate of the device).

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

5.3.1.8 Deleting the Certification Data Log



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

- Move the cursor to the "Serv." register and to the value "CICDL" (delete certification data log) via the following path:

Serv. → Edit and delete → CICDL

- Press the ENTER key ⇒ "0" flashes.
- Change the value using the arrow buttons ▲ or ▼ to "1".
- After you have entered the value, press the ENTER button to confirm the input. The display shows as "busy" temporarily. The certification data log is then deleted. The input value can be deleted by using the ESC key.

5.3.1.9 Closing and securing the calibration lock

After all settings subject to calibration regulations have been adjusted, close the calibration lock in the same way that it was opened: Press the buttons described in chapter 5.3.1.1 once again.

The calibration switch is secured with an adhesive label as described in chapter 5.3.2.2.

5.3.1.10 Use of the "HT/LT switch-over"

The DL230 also offers an option to carry out the switch over from the high tariff meter (HT) to the low tariff (LT) meter.

Whether such a switch over has been parameterized can be found under:

- Serv. → Input 1 → Parameter settings → HTLT1*
 or *Serv. → Input 2 → Parameter settings → HTLT2*
 or *Serv. → Input 3 → Parameter settings → HTLT3*
 or *Serv. → Input 4 → Parameter settings → HTLT4*

If the displayed value is "-.-.-", then no switch over took place. If the value is not equal to "-.-.-", then a switch over to the set event is taking place.

In principle two settings are possible:

- a) Meter 1 counts, meter 2 does not
- b) Meter 1 counts at high tariff (HT) and meter 2 at low tariff (LT)

In case b) the switch over between HT and LT should be parameterized via a settings file. Switch over either takes place in a "time-dependent" manner or "controlled by an input". With the inactive meter, the short description will be shown flashing.

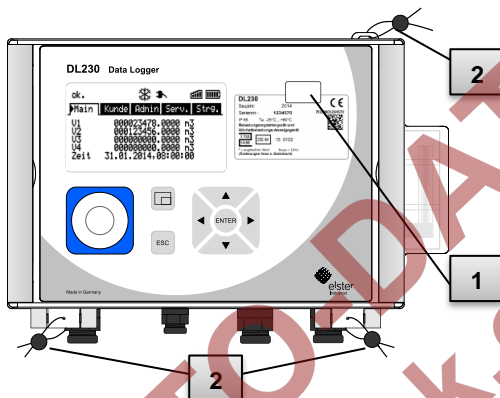


Adjustment is simple to carry out via enSuite configuration software.

Parameterization of the device is described in the DL230 application manual.

5.3.2 Sealing

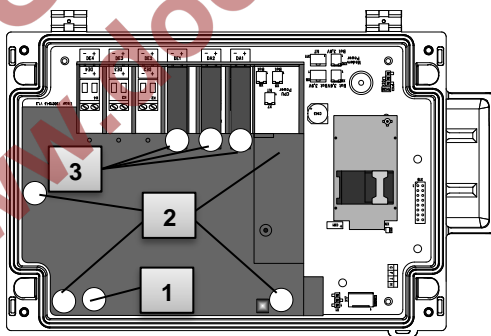
5.3.2.1 External view



Ill.: 13

- 1 Possible sealing point to secure the identification plate via adhesive seal.
- 2 Optional user lock: Sealing the cover by means of wire seals through the sealing eyelet at the top and the hinge at the bottom.

5.3.2.2 Internal view



Ill.: 14

- 1 Sealing point to secure the calibration switch.
- 2 Sealing points to secure the circuit board cover.
- 3 Sealing points to secure the terminal covers of the inputs and outputs used.



These sealing points *Ill.: 14/3* to secure the pulse inputs and pulse outputs are subject to national regulations (cf. WELMEC 11.1, chapter 2.7.1).

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

5.3.3 Closing the housing



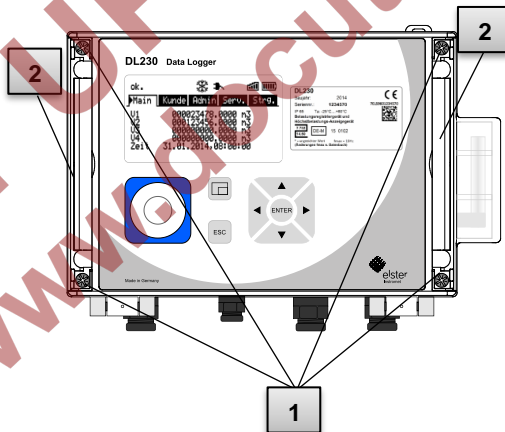
CAUTION!

Damage to property caused by improper device closure!

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

Therefore:

- Please ensure that the cable ducts are positioned correctly when closing the device.



Ill.: 15

1. The grey covering strips on both the right and left-hand side of the cover are pressed outwards at the small groove (2). This means that the screws on the cover become visible.
2. Close the housing using the four screws provided (1).
3. Press the grey covering strips back onto the cover until they snap into place.

5.3.4 Verifying assembly and connection

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

Incorrect assembly and connection of the DL230 may lead to life-threatening situations.

Therefore:

- Assemble and connect the DL230 correctly.
- Sealing should solely be carried out by a calibration officer.
- Follow the guidelines of DIN EN 60079-14, DIN EN 60079-0, the ATEX Product Directive 94/9/EC as well as the ATEX Operating Directive 1999/92/EC EN.

5.3.5 Data transfer

For the various options available regarding data transmission to a control centre via the integrated modem then please follow the corresponding instructions in the DL230 applications manual which can be downloaded from <http://www.dl230.de/> (DOWNLOADS → Dokumente).

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

6 Operation



The "enSuite" software and data interfaces of the DL230 can be used to perform further applications other than those described below. Instructions can be found under www.elster-instromet.com.

6.1 Safety

6.1.1 Personal protective equipment

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

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

6.2 Operating personnel

The following groups of people are authorized to perform different functions when operating the DL230.

6.2.1 Instructed personnel

A person instructed on how to operate the DL230, who,

- will be informed of the tasks assigned to them and possible risks resulting from inappropriate behaviour, in a training session provided by the operator.
- is authorized to read and take note of values and parameters using the control elements of the DL230.

6.2.2 Qualified personnel

A person qualified to operate the DL230, who,

- on the basis of their specialist training, knowledge and experience, as well as their awareness of the relevant statutory provisions, are in a position to perform their assigned tasks on the device and are able to independently identify and prevent possible risks.

- is authorized to read and take note of values and parameters using the control elements of the DL230, and to perform changes which are not subject to calibration regulations.

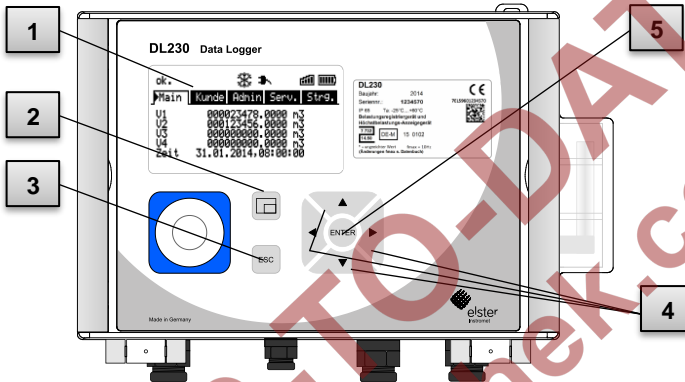
6.2.3 Calibration officer

A calibration officer, who,

- on the basis of their professional training, knowledge and experience and awareness of applicable standards and regulations, is in a position to perform the works on gas systems. The calibration officer will be trained on works on devices and installations subject to calibration regulations and will be familiar with the relevant standards and regulations.
- is authorized to read and take note of values and parameters using the control elements of the DL230, and to perform changes which are subject to calibration regulations.

6.3 Basic principles

As already explained in the "Construction and Function" chapter, the DL230 can be operated and programmed using the control elements on the front panel of the device.



III. 16: Front panel of the DL230

1 Alphanumeric display

4 Arrow keys ▲ ▼ ► ◀

2 Function key

5 Enter button

3 Escape button

ESC

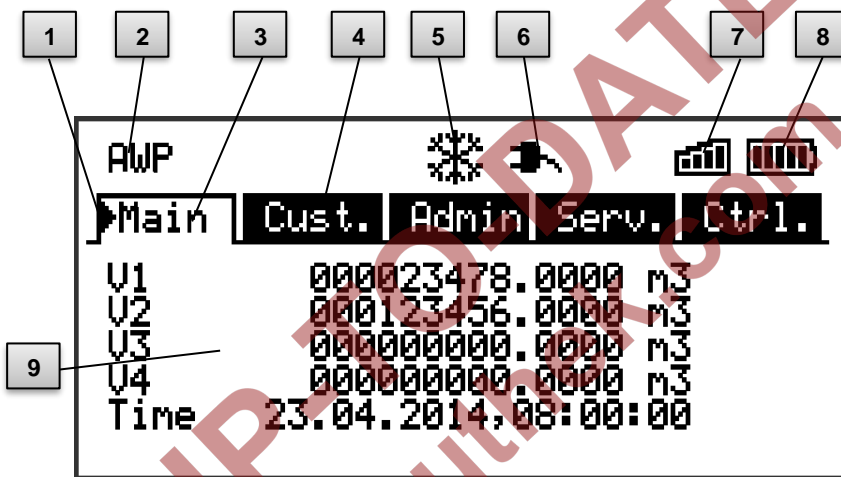
Enter



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

6.3.1 Display

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




III. 17 Display layout

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

The display in the data field in III. 17/ 9 (starting here with "V1") is different in each of the registers. All other display sections (in the top part of the screen) remain the same, regardless of the register displayed.

6.3.2 Button functions

The pressure and arrow buttons have the following functions:

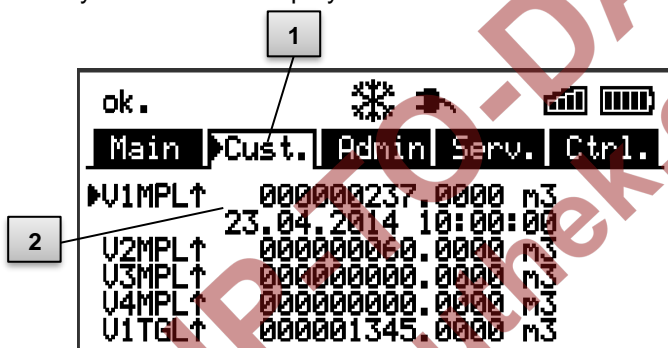
Button	Function
▶	<ul style="list-style-type: none"> – Jump right to another data list. – Jump to the second part of a two-part value.
▼	<ul style="list-style-type: none"> – Jump down through a data list.
◀	<ul style="list-style-type: none"> – Jump left to another data list.
▲	<ul style="list-style-type: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

6.3.3 Data recall, display navigation

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

Pressing the "ESC" key means you move up a level until you reach one of the "Main", "Cust.", "Admin", "Serv." or "Ctrl." registers (→ 6.3.1, Ill. 17). The active register, over which the cursor is hovering, is presented with a light-coloured background (Ill. 18/1).

In the "register" bar, you can move the cursor to other registers using the arrow keys ► and ◀ to display their content.



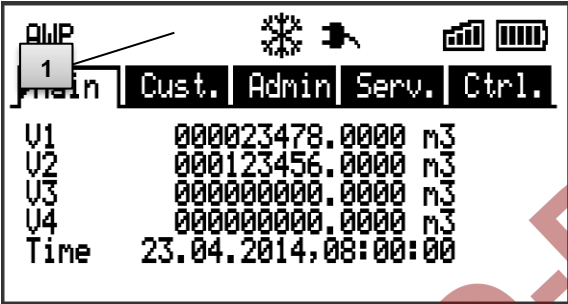
Ill. 18: "Cust." register

- 1 Active register
- 2 Value with corresponding timestamp

The "Cust." register contains more data than can simultaneously be displayed. The arrow key ▼ is used to move the cursor from the register to the data field (the bottom part of the display). By moving the cursor to the lowest visible value, the display can be shifted upwards by re-pressing the ▼ button to display further data. The ▲ button can also be used to move the cursor and therefore the display upwards by moving to the highest visible value. If the cursor hovers over a value which has been saved with a corresponding timestamp, it will automatically display this value. (Ill. 18/2)

6.3.4 Meaning of status symbols

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








Ill. 19: Status symbols in the display

1 Status Symbol

Symbol	Description
AWP	In the upper left-hand side of the screen, individual letters are displayed as symbols for the following signals:
ok.	No special messages
A	Alarm – Collective message for "any alarm"
a	Administrator lock – The administrator lock is open.
B	Battery warning – The battery is almost empty
L	Log – The certification data log is full.
M	Measurement error – The connected gas meter encoder is not giving accurate meter readings.
o	Online – A data transfer is underway.
P	Programing mode – The calibration lock is open.
W	Warning – Collective message for "any warning"

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

For further details on the meaning and potentially necessary procedures, see chapter 8.1.4 "Behaviour"

Symbol	Description
	<p>Frozen display</p> <p>The displayed values have "frozen" (are not up-to-date). The current values will be displayed after pressing any button. The display freezing can be caused by pressing the function key .</p>
	<p>External power supply</p> <p>This symbol indicates that the DL230 is supplied via the integrated power supply unit.</p>
	<p>Signal strength of the radio network for the GSM modem.</p> <p>This symbol will only be shown if the modem is active.</p>
	Battery life display

6.3.5 Error messages when entering values

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

This is shown as follows: -- x --

x = error code according to the following table

Code	Description
1	The archive is empty. No values have been entered.
2	<p>The archive value cannot be read.</p> <p>The archive may already have been opened by the interface for readings.</p>
4	This parameter cannot be changed (constant).
5	<p>You are no authorized to change this value.</p> <p>To change this value, a corresponding lock must be opened.</p>
6	<p>Invalid value</p> <p>The value entered is outside the permissible limits.</p>
7	<p>Incorrect code</p> <p>The code entered (numerical code) is incorrect; the lock will not be opened.</p>

Code	Description
11	Entry based on specific setting or configuration not possible, e.g. The input of Vo is not possible in encoder mode.
12	The input of this source (address) is not permitted.
13	Entry based on specific setting or configuration not possible, e.g.: The "C/r.X" function can only be performed once the time has been set to its start value with the key combination ◀ + ▲ (initialized).
20	Value for the user-specific display is not defined The value to be displayed can be defined by the user by entering the address. As this address has not yet been entered, no value will be displayed.
21	The value can only be changed when the calibration lock is open as the PTB log is full.

6.3.6 Access rights

The following parties can access the DL230.

Access	Description
PL	Calibration officer
CDL	Certification Data Log
A	Administrator
C	Customer
-	No access

Each access party has one lock and a corresponding key.

The access rights apply for entries made via the keyboard, and for access via the optical or integrated modem interface. If the lock is closed, all attempts to enter values will result in a corresponding error message being displayed (see chapter 6.3.5, "Error messages when entering values").

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

6.3.6.1 Calibration lock

The calibration lock is used to protect parameters subject to calibration regulations. This includes all values, which influence volume readings. The calibration lock is designed as a button, which is positioned inside the DL230 housing underneath the circuit board cover. It can be protected with an adhesive label (see chapter 5.3.1.1, "Opening the calibration lock"). The calibration lock is opened by pressing the button ("P" symbol flashes in the display) and is closed again by pressing the same button ("P" symbol fades). It can also be closed by deleting the value "St.PL" (see chapter 6.4.6, "Ctrl." register (control)) via the keyboard or interface. Using the configuration software "enSuite", a time can also be set (in minutes) after which the calibration lock will automatically close.

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

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

6.3.6.2 Certification Data Log

The certification data log is activated as standard but can also be disabled. The corresponding parameters will then be protected by the calibration lock.

Using the "certification data log" as per PTB-A 50.7, several parameters subject to calibration regulations can also be adjusted when the calibration lock is closed. This is subject to the following conditions:

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

The following parameters are set as default:

- "Md.I1" to "Md.I4" modes for inputs 1 to 4
- "V1" to "V4" Main counter for inputs 1 to 4
- "cp.I1" to "cp.I4" cp values for inputs 1 to 4
- "MP.I1" to "MP.I4" measurement periods for inputs 1 to 4
- "TG.I1" to "TG.I4" daily limits for inputs 1 to 4
- "Clr.A" delete measurement archive
- "HTLT1" to "HTLT4" settings for HTLT conversion

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

If the certification data log is full, it can be deleted using the command "CICDL" if the calibration lock is open (see chapter 5.3.1.8).



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

6.3.6.3 Administrator and customer locks

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

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

These values can be found under the following path:

Admin → *Device settings* → *Access*

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

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

6.4 Data register content

6.4.1 Access rights

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

Access	Description
E	Calibration officer
PL	Certification Data Log
A	Administrator
K	Customer
-	No access

6.4.2 "Main" register (main display)

An overview of the most important measurements is presented in the "Main" register. Depending on settings, the contents (see Chapter 6.4.6.5) may vary.

Display	Description	Unit	Access	Address
V1	Main counter input 1	m ³	PL	1:200
V2	Main counter input 2	m ³	PL	2:200
V3	Main counter input 3	m ³	PL	3:200
V4	Main counter input 4	m ³	PL	4:200
Time	Time on the device	-	PL	1:400

6.4.2.1 V1 to V4 – Main counter of the respective input

This meter counts the incoming pulses and converts these into a volume via the cp value set. To control the measurements, the V1 can be kept at the same level as the meter at this input when putting the device into operation (→ chapter 5.3.1 "Configuration of measurement parameters").

6.4.2.2 Vo1 and Vo2 - Original meter readings of the respective inputs

This meter is only available in encoder mode. It shows the original meter reading of the respective meter, which was transmitted by the encoder. This means that Vo is always automatically on the state of the meter and cannot be changed.

6.4.2.3 Time – Date and time

The time displayed is updated every 900 seconds in battery operation and naturally, the update takes place immediately when switching on the display. In mains operation and during communication, updating takes place every two seconds.

6.4.3 "Cust." Register (Customer)


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

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

The following parameters are programmed ex-works:


Display	Description	Unit	Access	Address
V1MPL↑	Metering period maximum in the previous month at input 1	m ³	-	3:161
V2MPL↑	Metering period maximum in the previous month at input 2	m ³	E	7:161
V3MPL↑	Metering period maximum in the previous month at input 3	m ³	E	11:161
V4MPL↑	Metering period maximum in the previous month at input 4	m ³	-	15:161
V1DGL↑	Daily maximum in the previous month at input 1	m ³	-	4:161
V2DGL↑	Daily maximum in the previous month at input 2	m ³	-	8:161
V3DGL↑	Daily maximum in the previous month at input 3	m ³	-	12:161
V4DGL↑	Daily maximum in the previous month at input 4	m ³	-	16:161
V1MPLΔ	Consumption during the last measurement period at input 1	m ³	-	1:161
V2MPLΔ	Consumption during the last measurement period at input 2	m ³	-	5:161
V3MPLΔ	Consumption during the last measurement period at input 3	m ³	-	9:161
V4MPLΔ	Consumption during the last measurement period at input 4	m ³	-	13:161

6.4.3.1 VxMPL↑ – Maximum measurement period counter of the respective input in the previous month

The displayed value is the metering period maximum of the counter input of the previous (Last) month. The maximum time stamp is displayed in the following line after moving the cursor  to the value "VxMPL↑".

The maximum values from the past 15 months can be requested in the monthly archive of the respective input (see chapter 6.4.4 "Admin" Register (Administrator)).


6.4.3.2 VxDGL↑ – Maximum daily counter of the respective input in the previous month

The value is the daily maximum of the counter input of the previous (Last) month dependent on the daily limit. The maximum time stamp is displayed in the following line after moving the cursor  to the value "VxDGL↑".

The maximum values from the past 15 months can be requested in the monthly archive of the respective input (see chapter 6.4.4 "Admin" Register (Administrator)).

6.4.3.3 VxMPLΔ – Consumption of the last measurement period of the respective input

The value is the difference between the meter readings at the end of the last and the second-to-last measurement periods of the respective input.

The consumption time stamp is displayed in the following line after moving the cursor  to the value "VxMPLΔ".

6.4.4 "Admin" Register (Administrator)

This register is used to display and check special device settings and conditions. This application is provided for meter operators.

Display	Description
User values ³	Sub-menu for user-specific parameters
Input 1	Sub-menu for values and parameters for input 1
Input 2	Sub-menu for values and parameters for input 2
Input 3	Sub-menu for values and parameters for input 3
Input 4	Sub-menu for values and parameters for input 4
Tariff programs	Sub-menu for revaluation and the corresponding parameters
Measured values	Sub-menu for measured values and the corresponding parameters
Archives	Sub-menu for existing archives in the device
Status	Sub-menu for current status, status register and logs
Date and time	Sub-menu for date, time and the corresponding parameters
Batteries	Sub-menu for the device battery and the corresponding parameters
Outputs	Sub-menu for both outputs and the corresponding parameters
Interfaces	Sub-menu for existing interfaces in the device
Device settings	Sub-menu for all device settings
Identification	Sub-menu for the identification of the gas system

6.4.4.1 SReg – Status register (total)

All messages since the last manual clear are collected in the status register. It can be seen here what e.g. has occurred since the last visit. The reports can be (*Serv.* → *Status* → *Clr*) deleted from the device. Only alarms and warnings are displayed (see Chapter 8.2) in status registers.

³ In the "User Values" sub-menu, the user can set up to 10 freely programmable parameters and up to 12 freely programmable parameters in a further sub-menu within this list.

6.4.5 "Serv." register (Service)

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

Display	Description
Input 1	Sub-menu for values and parameters for input 1
Input 2	Sub-menu for values and parameters for input 2
Input 3	Sub-menu for values and parameters for input 3
Input 4	Sub-menu for values and parameters for input 4
Tariff programs	Sub-menu for revaluation and the corresponding parameters
Measured values	Sub-menu for measured values and the corresponding parameters
Archives	Sub-menu for existing archives in the device
Status	Sub-menu for current status, status register and logs
Date and time	Sub-menu for date, time and the corresponding parameters
Batteries	Sub-menu for the device battery and the corresponding parameters
Outputs	Sub-menu for both outputs and the corresponding parameters
Interfaces	Sub-menu for existing interfaces in the device
Device settings	Sub-menu for all device settings
Identification	Sub-menu for the identification of the gas system
Edit and delete	Sub-menu to activate a range of delete functions
Data book	Sub-menu with information from the device data book

6.4.6 "Ctrl." register (control)

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

Display	Value	Unit	Access	Address
St.AL ⁴	Administrator lock: State/close	-	-	3:170
Cod.A ⁴	Enter / change administrator code	-	-	3:171
St.PL	Calibration lock: State/close	-	-	1:170
Menu	Selection of the display menu	-	E	1:1A1
Main	Content of the "Main" register	-	A	2:1A1

6.4.6.1 St.AL – Administrator lock: State/close

The administrator lock must be opened in order to modify certain measurement parameters. The administrator lock should be closed when in normal operating mode. An open administrator lock can be closed by pressing the "Enter" key and selecting the "locked" option.

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

⁴ If the device is operated with high-level security (see application manual) then this menu item is not shown in the display.

6.4.6.2 Cod.A – enter / change administrator code

By entering the correct code (hexadecimal characters) here it is possible to open the administrator lock. After opening the administrator lock, the existing code can be changed.

Individual characters of the code can have the values 0 to 9 and A to F.

6.4.6.3 St.PL – Calibration lock: State/close

The calibration lock must be opened in order to modify certain measurement parameters. The calibration lock can only be opened by pressing the calibration switch on the CPU board. An open calibration lock can be closed by pressing the "Enter" key and selecting the "locked" option. The calibration lock should be closed when in normal operating mode.

Display	Description
locked	The calibration lock is closed.
open	The calibration lock is open. In this case, the "P" will also flash in the upper left-hand side of the display (see chapter 6.3.4 "Meaning of status symbols")

6.4.6.4 Menu - Selection of the display menu

In an as-delivered condition, the display of the DL230 has the following five registers: "Main", "Cust.", "Admin.", "Serv." and "Ctrl.". Registers can be displayed and hidden for certain purposes using the "Menu" value.

6.4.6.5 Main – Content of the "Main" register

The content of the "Main" display register can be adjusted here.

The default setting is "V1...V4". This corresponds to the content displayed in chapter 6.3.1.

Display	Description
V1...V4	Displayed: Main counter of inputs 1 to 4, current date and time of device, Format: 9 digits before and 4 digits after decimal point with short descriptions and units
Vo1 V2...V4	Displayed: Original meter reading of input 1, main counters of inputs 2 to 4, current date and time of device, Format: 9 digits before and 4 digits after decimal point with short descriptions and units

Display	Description
Vo1,2 V3,4	Displayed: Original meter readings of inputs 1 and 2, main counters of inputs 3 to 4, current date and time of device, Format: 9 digits before and 4 digits after decimal point with short descriptions and units
large V1 V2	Displayed: Main counters of inputs 1 and 2 Format: 8 digits before and 3 digits after decimal point with input, short descriptions and units
large Vo1 V2	Displayed: Original meter reading of input 1, Main counter of input 2 Format: 8 digits before and 3 digits after decimal point with input, short descriptions and units
large Vo1,2	Displayed: Original meter readings of inputs 1 and 2 Format: 8 digits before and 3 digits after decimal point with input, short descriptions and units

6.5 Use as high-flow display device

The DL230 has an integrated high-load display function and has national approval.

The following consumption figures are calculated and stored for each of the four inputs along with timestamps and can be shown on the device when requested:

- the load registered during the current measurement period (VxMPcΔ)
- the load registered during the previous measurement period (VxMPLΔ)
- the highest load registered within a measurement period within the current month (VxMPc↑)
- the load registered during the current day (VxDGcΔ)
- the load registered during the previous day (VxDGLΔ)
- the highest daily load registered during the current month (VxDGc↑)

The measurement period maximum (VxMPL↑) and the daily maximum (VxDGL↑) of the **last 15 months** are stored in the monthly archive of the respective input. The content of this archive can be found under:

Admin → Input x → Monthly Archive Ix

The **resulting maximum values of the current month** can be found under:

Admin → *Input x* → *per measuring period* and under:

Admin → *Input x* → *per day*

At the end of each month the "resulting maximum values" of the month just gone are written into the newest data record of the monthly archive. At the same time, the oldest data record is deleted so that the monthly archive always covers 15 months at most.

The end of the month can be parameterized separately for each input and takes place at an adjustable time on the first day of each month. This **monthly limit (=daily limit)** is set to 6:00 AM as a default setting.

The **daily limit** (DG.lx) can be found under the following path:

Admin → *Input x* → *per day*

If at least two entries are still free in the certification data log then it is possible to change the daily limit when the administrator lock is open. Otherwise, the value can only be changed when the calibration lock is open. All full hours of the day (0:00 to 23:00) can be set.

Labelling of faulty maximum values in the display is carried out as follows:

Display	Description
The maximum values flash with their timestamps + "t" in an archive row.	During creation of a maximum value, the time or the date is adjusted.

6.6 Use as flow-recording device

The DL230 has an integrated flow-recording registration function and has national approval.

The meter readings V_x and $V_{x.P}$ used for billing as well as their progressions ΔV_x and $\Delta V_{x.P}$ are contained in the measurement period archive. The progressions always refer to the respective previous archive row.

The measurement periods can be found under the following path:

Admin → *Input x* → *MP.lx*

The measurement period is set to "60 minutes" as standard.

If at least two entries are still free in the certification data log then it is possible to change the measurement periods when the administrator lock is

open. Otherwise the value can only be changed when the calibration lock is open. Sensible and typical values include 5, 10, 15, 20, 30 or 60 minutes.

For monitoring invoicing data on the display, the device is equipped with the following functions:

- All invoicing-relevant data is displayed under:
Admin → Input x → Measurement period lx
- Additional display of the progress of the counter (consumption values) in the measurement period archive
- Search function for checking archive entries (see Chapter 6.6.1)
- Display of the set measurement period *MP lx* and the remaining duration of the current measurement period under:
Admin → Input x → MP.lx or MP.Re
- Labelling of uncalibrated values using an asterisk in front of the short description

Labelling of faulty measurement periods in the display is carried out as follows:

Display	Description
All values within an archive row flash.	A data error (checksum error) was recognized in the current archive row.
The "delta" values + "c" flash in an archive row.	A data error (checksum error) was recognized in the previous archive row.
The "delta" values + "e" flash in an archive row.	The current or previous archive row was not generated due to the end of a measurement period (e.g. adjustment of time).

6.6.1 Search function for checking archive entries

The measurement period archive has a large number of entries. Individual values from these datasets can be displayed for verification purposes, as the device includes an archive entry search function. Values can be searched on in the following archive rows:

- Identification number
- Date and time
- Meter reading

Initially, the search takes place by selecting the desired column in any archive row. Pressing the "ENTER" key now allows entry of the value to be searched for in this column. Pressing "ENTER" after entering the search

value will cause the display to jump to the archive row containing the entered value. If the entry is not found, it jumps to the next closest entry.

7 Maintenance

7.1 Safety



DANGER!

Danger to life from electrical current!

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

Therefore:

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

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

Special care must be taken when handling batteries.

Therefore:

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

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

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

Therefore:

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

7.1.1 Personnel

Maintenance works must be carried out correctly.

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



WARNING!

Risk of injury if maintenance works are carried out incorrectly.

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

Therefore:

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

7.1.2 Personal protective equipment

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

7.1.3 Environmental protection

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



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

7.2 Testing and changing device batteries

7.2.1 Changing and connecting device batteries

**DANGER!**

Using the incorrect batteries may present a risk of explosion!

Only use batteries prescribed by Elster in accordance with Chapter 9.1.2.

**WARNING!****When using in Zone 2**

- Do not open when an explosive atmosphere may be present!
- Potential electrostatic charging hazard: Do not rub against the display- window!

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

Special care must be taken when handling batteries.

Therefore:

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

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



In the delivered state, one or two device batteries are connected to the base plate of the DL230 depending on the order. With two batteries, the service life is doubled provided that the settings remain the same.



Always leave at least one battery connected to the DL230 (to X5 or X6) when changing batteries. This way, the DL230 will continue to work whilst the batteries are being changed.

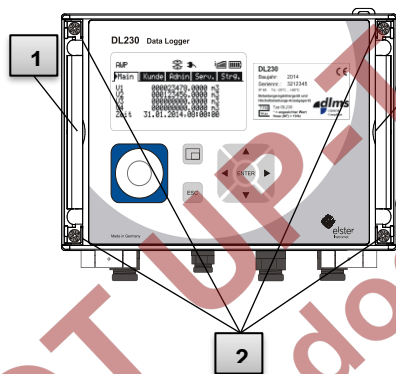


CAUTION! Reduced battery power!

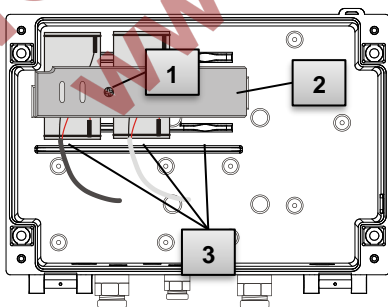
The simultaneous use of an old and a new battery considerably reduces battery power.

Therefore:

- When using two batteries always exchange both at the same time.

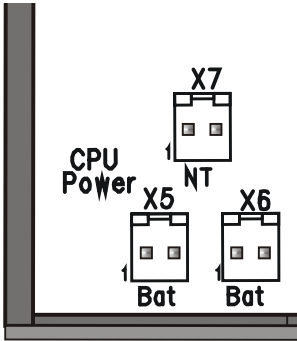


Ill.: 20



Ill.: 21

1. If the external power supply is connected, then disconnect it.
2. The grey covering strips on both the right and left-hand side of the cover are pressed out-wards at the small groove (Ill.: 20 1). This means that the screws on the cover become visible.
3. Loosen the four screws (Ill.: 20 2) with which the housing is connected.
4. Open the cover of the DL230 by pushing down on it.
5. Loosen the screw on the battery holder Ill.: 21: 1 and pull out the mounting element for the battery 2. The element fits very snugly in the guides.
6. Mark the old battery using e.g. a felt-tipped pen or stickers.
7. Choose the free **CPU Power** connection on the board to connect to the new battery (Ill.: 22: X5 or X6).
8. Place the new battery onto the base of one of the three locations provided for it (Ill.: 21: 3).



III.: 22

9. Fix the new battery into place with the mounting element. The mounting element can then be fixedly pushed into the left- and right-hand guides.
 10. Remove the old battery from the housing and dispose of it correctly.
 11. Close the housing using the screws provided (III.: 20-2).
 12. Re-enter the start capacity of the batteries, as described in chapter 7.2.2.
13. Check the calculated service life as described in chapter 7.2.3. At standard measurement conditions (see chapter 3.2.1), the service life should display at least 96 months. If not, compare the settings with those for standard measurement conditions and repeat step 12 if necessary.



Please ensure that the new batteries are connected correctly and are in a fixed position inside the DL230.



CAUTION!

Damage to property caused by improper device closure!

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

Therefore:

- Ensure correct positioning of the cable guide when closing.

7.2.2 Entering the battery capacity



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

If the device is operated with high-level security (see application manual) then the battery capacity can only be entered using the enSuite software!

- To open the administrator lock move the cursor to the "Admin" register and then via the following path to the "Cod.A" value (Administrator code entry):

Admin. → Device settings → Access → Cod.A



After delivery, the administrator code for keyboard input is "00000000".

- Press the ENTER ⇒ button. One of the value's digits flashes.
- Move the cursor to the digits using the ► or ◀ arrow keys and update them using the ▲ or ▼ arrow keys.
- Once you have changed all of the digits, press the ENTER key in order to confirm your entry. The input value can be deleted by pressing the ESC button.
- To enter the battery capacity move the cursor to the "Serv." register and to the "Bat.K" value (battery capacity) via the following path:

Admin → Batteries → Bat.C

- Press the ENTER ⇒ button. One of the value's digits flashes.
- Move the cursor to the digits using the ► or ◀ arrow keys and update them using the ▲ or ▼ arrow keys.



When using one size D battery, the value 13.0 Ah should be entered for "Bat.C". When using 2 batteries, the value 26.0 Ah must be entered.

- Once you have changed all of the digits, press the ENTER key in order to confirm your entry. The input value can be deleted by pressing the ESC button.
- To close the administrator lock move the cursor to the "Admin" register and to the "St.AS" value (Status of administration lock) via the following path:

Admin. → Device settings → Access → St.AL

- Press the ENTER key ⇒ "open" flashes.

- Move the cursor with the arrow keys ▲ or ▼ in order to change the value to "locked".
- After making the change, press the ENTER button to confirm the input. The input value can be deleted by pressing the ESC button.

7.2.3 Display remaining battery power



The calculation of the remaining battery power depends on the consumed capacity (which is measured) and on the anticipated future consumption under typical conditions. These two values lead to the theoretical remaining battery power, which is displayed under Bat.R. For applications with atypical high power consumption, this procedure may cause the actual remaining battery power to drop quicker than the displayed predicted remaining battery power.

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

- Move the cursor to the "Admin" register and to the "Bat.R" value (remaining battery power) via the following path:
Admin → *Batteries* → *Bat.R*



After entering the new battery capacity, a value of at least 96 months will be displayed in standard measurement conditions (see chapter 3.2.1) for "Bat.R".

7.3 Changing and testing modem batteries

7.3.1 Changing and connecting modem batteries



DANGER!

Using the incorrect batteries may present a risk of explosion!

Only use batteries prescribed by Elster in accordance with Chapter 9.1.2.

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

Special care must be taken when handling batteries.

Therefore:

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

**WARNING!****When using in Zone 2 may present a risk of explosion!**

- Do not open when an explosive atmosphere may be present!
- Potential electrostatic charging hazard: Do not rub against the display window!

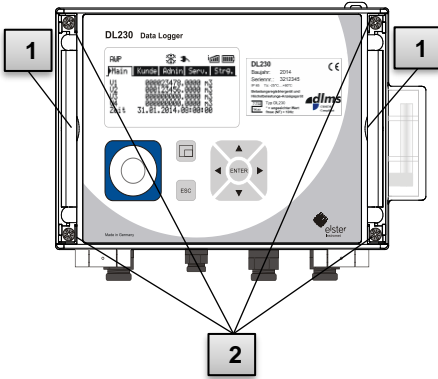
The batteries can be exchanged without a calibration officer as the housing does not need to be sealed.



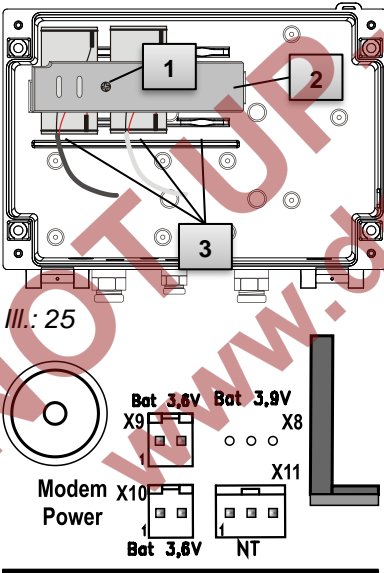
In the delivered state, one or two modem batteries are connected to the main board of the DL230 depending on the order. With two batteries, the modem service life is doubled provided that the settings remain the same.



During battery exchange there is no modem communication possible.



III.: 23



III.: 25

III.: 26

1. If the external power supply is connected, then disconnect the DL230 from the mains.
2. The grey covering strips on both the right and left-hand side of the cover are pressed outwards at the small groove (III.: 24 1). This means that the screws on the cover become visible.
3. Loosen the four screws (III.: 23 2) with which the housing is connected.
4. Open the cover of the DL230 by pushing down on it.
5. Loosen the screw on the battery holder (III.: 25 1) and pull out the mounting element for the battery (III.: 25 2). The element fits very snugly in the guides.
6. Mark the old battery using e.g. a felt-tipped pen or stickers.
7. Remove the old battery cables from the connectors for **Modem Power** X9 or X10. If both slots are occupied as two modem batteries are in use then remove both batteries before you proceed.

8. Connect the new battery on one of the slots X9 or X10 on the CPU board (III.: 25).

**DANGER!**

The concurrent operation of an old battery and a new one may present a risk of explosion!

When using two modem batteries, both batteries must always be replaced!

9. Place the new battery onto the base of a location provided for it (Ill.: 25 3).
10. Fix the new battery into place with the mounting element. The mounting element can then be fixedly pushed into the left- and right-hand guides.
11. Remove the old battery from the housing and dispose of it correctly.
12. Close the housing using the four screws provided (Ill.: 23 2).
13. Monitoring of the battery change can take place by checking the voltage of the modem battery as described in chapter 7.3.2.



Please ensure that the new batteries are connected correctly and are in a fixed position inside the DL230.

**CAUTION!**

Damage to property caused by improper device closure!

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

Therefore, ensure correct positioning of the cable guide when closing.

7.3.2 Display modem battery voltage

- The voltage of the modem battery can be checked under *Admin* → *Batteries* → *UBatM* (Voltage of the modem battery)

If a call window is active, UBatM shows the measured value of the supply voltage of the modem. If no call window is active, UBatM shows 0.00 V. To update the measurement although the call window is not active simply press the ENTER button.

The voltage measurement is carried out by the modem itself. Therefore, the update of the displayed modem voltage takes up to 10 seconds.

If no modem is assembled or if the modem battery is empty, no measurement can be carried out. The voltage displayed stays at 0.00 V.



The voltage of the modem battery has to be between 3.4 V und 4.0 V in order to communicate properly.

7.4 Changing the fuse of the power supply unit



WARNING!

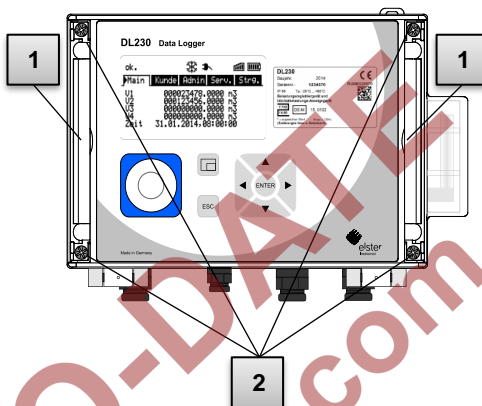
When using in Zone 2

- Do not open when an explosive atmosphere may be present!
- Potential electrostatic charging hazard: Do not rub against the display window!

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

1. If the external power supply is connected, then disconnect it.

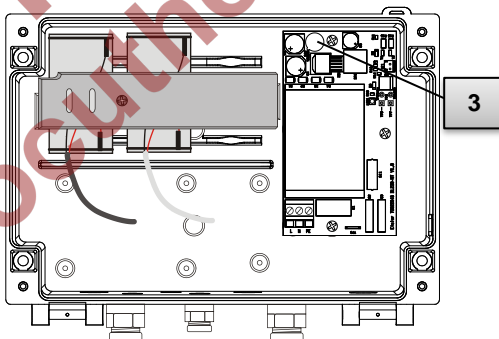
2. The grey covering strips on both the right and left-hand side of the cover are pressed outwards at the small groove (III.: 27 1). This means that the screws on the cover become visible.



3. Loosen the four screws (III.: 28 2) with which the housing is connected. III. 29

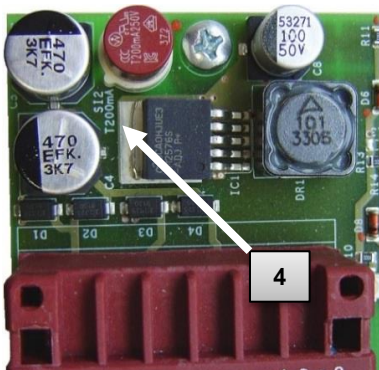
4. Open the cover of the DL230 by pushing down on it.

5. The fuse SI2 is located at the upper edge of the power supply unit. (Pos. 3).



III. 30

6. Pull the old fuse **SI2** upwards and push the new fuse into the socket.
7. Use only fuses of the type TR5 with the current value of **200 mA T** (Slow-Blow) stated on the board (Pos. 4).



III. 31

8. Close the housing using the four screws provided (Ill.: 23 2)



Pay heed to use only fuses of the type TR5 with the current value of 200 mA T (Slow-Blow or Time Lag).



CAUTION!

Damage to property caused by improper device closure!

If the device is not properly closed, cables can get pinched and cause damage. Therefore, ensure correct positioning of the cable guide when closing.

8 Faults

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



For faults, which cannot be resolved by the instructions below, please contact our customer service team (see chapter **Fehler! Verweisquelle konnte nicht gefunden werden.**) or our Electronic Hotline:

Tel. +49 (0) 6134 / 605-123

<http://www.elster-instromet.com/en/support>

E-Mail: ElsterSupport@Honeywell.com

8.1 Safety



DANGER!

Danger to life from electrical current!

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

Therefore:

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

8.1.1 Personnel

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

8.1.2 Personal protective equipment

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

8.1.3 Improper elimination of faults



WARNING!

Risk of injury through improper elimination of faults!

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

Therefore:

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



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

8.1.4 Behaviour in the event of faults

The following generally applies:

1. If works in the danger zone are necessary, the entire plant must be switched off and protected against an accidental restart.
2. The cause of the fault must be determined.
3. The person responsible for the area in which the fault occurred should be informed immediately.
4. Depending on the type of fault, the manufacturer may have to be contacted and will then have the fault removed by an authorized specialist, or will remove the fault themselves.

8.2 Fault and other status messages

Faults (synonymously used here for "alarms") during the operation of the DL230, can be identified by means of status symbols in the first line of the display (see chapter 6.3.4).

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

- in the register *Admin* → *Status* and *Serv.* → *Status*.

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

Message	Description, process
a) Faults, alarms:	
Restart	Should this message be shown during operation, the device is faulty. Please contact the Elster customer service team (see chapter 1.3 "Customer service").
Data error	An error was detected during cyclic checking of calibration-relevant data. Please contact the Elster customer service team (see chapter 1.3 "Customer service").
I1-Alarm Lim I2-Alarm Lim	The rate of flow set for the encoder has been exceeded.
I1-Alarm I2-Alarm	The encoder connected does not supply any data at times which may be invoicing-relevant.

Message	Description, process
b) Warnings:	
Data restore	<p>DL230 batteries failed intermittently. As a result of this, the time has not changed and measurement acquisition has failed. All data has been saved.</p> <p>This message appears when the battery is changed and the old batteries are removed before the new ones are connected. (see chapter 7.2, page 76).</p> <p>Process using parameterization program "enSuite":</p> <ul style="list-style-type: none"> ■ Set the DL230 clock ■ Clear the status register
Outp.1 Error Outp.2 Error	<p>More pulses need to be sent to the named output, than its programming permits.</p> <p>To eliminate the cause of this problem, use the "enSuite" parameterization program to</p> <ul style="list-style-type: none"> ■ either reduce the cp value of the output ■ or increase the output frequency. <p>In both cases, the change must be aligned with the device connected to the DL230.</p>
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.
Update error	An error in the cached software image was found prior to the software update.
Softw. error	<p>This message is used for factory diagnostics.</p> <p>Please contact the Elster customer service team (see chapter 1.3 "Customer service").</p>
Sett. error	<p>Due to the programming carried out an unusable settings combination has been created.</p> <p>Please contact the Elster customer service team (see chapter 1.3 "Customer service").</p>

Message	Description, process
I1 Warn. sig. I2 Warn. sig. I3 Warn. sig. I4 Warn. sig.	When an input is configured as a warning input, if an active signal is present on the relevant terminal (i.e. terminal DI2) this message is displayed. The input configurations can be changed using the parameterization program "enSuite".
Batt. low	The remaining battery service life is less than 6 months. The batteries must be replaced soon.
c) Remarks:	
Clock n. set	Calibration of the volume corrector's internal clock has not yet been carried out by the factory.
Encoder err.	On the encoder connected to input 1 or input 2 no meter reading could be detected for 20 seconds (with external voltage supply) or for the duration of an encoder readout cycle "Ezyk" (with battery power supply).
CDL full	The Certification Data Log is full. A change to "PL" identified access parameters without calibration lock is not possible, until the contents of the Certification Data Log are cleared.
U.Logb. full	The software Update Log is full. An update is not possible until the contents of the software update log are cleared.
online	Data is currently being transmitted via an interface (modem or optical interface). If this message is displayed, the "o" will flash in the "Status" field of the display (see chapter 6.3.4, page 58).
I1-Rep. sig. I2-Rep. sig. I3-Rep. sig. I4-Rep. sig.	When an input is configured as a remark input, if an active signal is present on the relevant terminal (i.e. terminal DI2) this message is displayed. The input configurations can be changed using the parameterization program "enSuite".

Message	Description, process
Calibration lock	<p>The calibration lock is open.</p> <p>During normal operation the calibration lock should be closed so that no unauthorized changes can be carried out.</p> <p>To close the calibration lock please go to <i>Ctrl. → St.PL</i> and enter the value "0".</p>
Admin lock	The administrator lock is open.
Cust. lock o.	The customer lock is open.
Bat. operat.	<p>The DL230 is in battery operation.</p> <p>This remark is intended primarily to signal to a remote data readout system, that lengthy data transfers will cause the batteries to discharge more quickly.</p>
Dayl.Sav.Tim	<p>The time displayed on the DL230 is summertime.</p> <p>The conversion mode can be changed using the parameterization program "enSuite".</p>
Call Win. 1 Call Win. 2 Call Win. 3 Call Win. 4 Call Win. 5 Call Win. 6	The named call window is active, i.e. the DL230 can accept data transfer calls.
Call time 1 Call time 2 Call time 3 Call time 4 Call time 5 Call time 6	The named call time is active, i.e. the DL230 calls the remote terminal for the purpose of data transmission.

9 Appendix

9.1 List of spare parts and accessories



Images of the spare parts and accessories described below can be found in the manufacturer's catalogue, which is available to order under www.elster-instromet.com.

9.1.1 Fastening elements

Spare parts and accessories	Order number
Universal bracket with pipe clamps for pipe mounting	73 018 057



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

9.1.2 Small parts and miscellaneous

Spare parts and accessories	Order number
Device: Battery module 13 Ah	73 015 774
Device: Battery module 13 Ah ⁵	73 023 225
Battery module 8 Ah for the modem of the DL230	73 017 964
Connection board for the modem battery for retrofitting	73 024 772
External 2G/3G rod antenna, 3 m cable, SMA connector	04 407 115
External 2G/3G rod antenna, 5 m cable, SMA connector	04 407 116
External 2G/3G rod antenna, 10m cable, SMA connector	04 407 117
10 m antenna extension cable with SMA connector	73 020 149
Internal power supply module 230 V AC	73 022 750
Serial Interface RS232/RS485 (for Ex zone 2 only)	73 022 779

⁵ After consultation for special applications.

Spare parts and accessories	Order number
GSM/GPRS/UMTS modem module (for Ex zone 2 only)	73 023 786
Ethernet Module iCE230 (for Ex zone 2 only)	73 024 445

9.1.3 Documentation

Spare parts and accessories	Order number
German manual	73 022 386
English manual	73 022 387

9.2 Connection, Replacement and Retrofit of Components

The different ATEX approvals are only valid for the DL230 device at the time they leave the company (ex-works). In order to retain the validity of the approvals, modifications to the DL230 are not allowed or are limited to only a few cases.

The table below lists all permitted actions and states how the device can be connected as well as under which conditions components can be replaced or retrofitted.

When replacing or retrofitting the power supply unit it is necessary to have an individual certificate for each DL230 and this must be returned to EL-STER.

In accordance with the ATEX approval guidelines, the manufacturer is obliged to record the complete history of each device.

Variant of Device	Function Block	allowed field action			Carrying out allowed by ...	Additional Activity	Influence on Warranty?
		Replacement ⁶⁾	Retrofit ⁶⁾	Connection			
All (associated apparatus for ATEX-Zone 0/1 and ATEX-Zone 2)	Digital Inputs	-	-	x	Operator ⁷⁾	-	no
	Digital Outputs	-	-	x	Operator ⁷⁾	-	no
	integrated power supply unit	x	-	-	Operator ⁷⁾	Individual certificate needed	Warranty expires
		-	x	-	Elster Service (ATEX instructed)	Test according to EU low-voltage directive; Individual certificate needed	-
		-	-	x	Operator ⁷⁾	-	no
		x	-	-	Operator ⁷⁾	-	no
		x	-	-	Operator ⁷⁾	-	no
	Device battery	x	-	-	Operator ⁷⁾	-	no
	Modem battery	x	-	-	Operator ⁷⁾	-	no
	Antenna	x ⁸⁾	-	-	Operator ⁷⁾	-	no

Variant of Device	Function Block	allowed field action			Carrying out allowed by ...	Additional Activity	Influence on Warranty?
		Replacement ⁶⁾	Retrofit ⁶⁾	Connection			
ATEX-Zone 2	Internal communication module	x	x	x	Operator ⁷⁾	-	no
	Antenna	x ⁸⁾	x ⁸⁾	x ⁸⁾	Operator ⁷⁾	-	no

6) The actions 'Replacement' and 'Retrofit' are also always include the action 'Connection'

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

8) Includes also the exchange of internal antenna for external antenna.

Variant of Device	Function Block	Replacement	Retrofit	Connection	The carrying out of the action is described in:
All (associated apparatus for ATEX-Zone 0/1 and ATEX-Zone 2)	Digital Inputs	-	-	x	Chapter 5.2.1
	Digital Outputs	-	-	x	Chapter 5.2.4
	integrated power supply unit	x	-	-	Please contact the Elster Support.
		-	-	x	Chapter 5.2.3
	Fuse Si2 at power supply unit	x	-	-	Chapter 7.4
	Device battery	x	-	-	Chapter 7.2
	Modem battery	x	-	-	Chapter 7.3
	Antenna	x	-	-	Application Manual Chapter 7.1.6
ATEX-Zone 2	Internal communication module	x	x	x	Application Manual Chapter 7.2, 7.3 and 7.4.1
	Antenna	x	x	x	Application Manual Chapter 7.3.4

9.3 EC Declaration of Conformity



EU Declaration of Conformity No. **DEMZE1801**
EU-Konformitätserklärung Nr.

Honeywell

Type, Model
Typ, Ausführung

DL230

Manufacturer
Hersteller

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

Product
Produkt

Data logger device
Datenlogger

The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:

Der oben beschriebene Gegenstand der Erklärung erfüllt die einschlägigen Harmonisierungsrechtsvorschriften der Union:

2014/30/EU (EMC)	2014/34/EU (ATEX)	2014/34/EU (ATEX)	2014/53/EU (RED)	2011/65/EU (RoHS)
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Relevant harmonised standards used:

Einschlägige harmonisierte Normen, die zugrunde gelegt wurden:

EN 61326-1:2013	EN 60079-0:2012 + A11:2013, EN 60079-11:2012	EN 60079-0:2012 + A11:2013, EN 60079-11:2012 EN 60079-15:2010	EN 301511 V9.0.2, EN 301908-1 V11.1.1, EN 301908-2 V11.1.1	EN 50581:2012
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Certificates and interventions by notified bodies:

Bescheinigungen und Maßnahmen durch notifizierte Stellen:

Not applicable Entfällt	LCIE 14 ATEX 3025 X EU-type examination EU-Baumusterprüfung Notified Body 0081 Bureau Veritas LCIE 33 avenue du Général Leclerc F-92260 Fontenay-aux-Roses	Not applicable Entfällt	Not applicable Entfällt	Not applicable Entfällt
----------------------------	--	----------------------------	----------------------------	----------------------------

This declaration of conformity is valid for products labelled accordingly:

Diese Konformitätserklärung gilt für entsprechend gekennzeichnete Produkte:

	 II (1) G [Ex Ia Ga] IIC	 II 3 (3) G Ex nA [ic] IIC T4 Gc		
--	-----------------------------	--	--	--

The production is subject to the following surveillance procedures:

Die Herstellung unterliegt folgenden Überwachungsverfahren:

Directive Module C Richtlinie Modul C	Directive Annex IV+VII Richtlinie Anhang IV+VII	Directive Annex II Richtlinie Anhang II	Directive Article 7 Richtlinie Artikel 7
	Notified Body 0044 TÜV NORD CERT GmbH D-30519 Hannover		

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

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

Elster GmbH

Mainz-Kastel, 23.04.2018

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

Place and date of issue
Ort und Datum der
Ausstellung

Piet Platschorre,
Managing Director, General
Manager PMC Europe

Jörg Kern,
Sr R&D Manager
Gas Metering

9.4 ATEX Type Examination Certificate

9.4.1 Associated apparatus for Zone 0/1



LCIE

1 ATTESTATION D'EXAMEN CE DE TYPE

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

3 Numéro de l'attestation d'examen CE de type
LCIE 14 ATEX 3025 X

4 Appareil ou système de protection :
Enregistreur de données

Type : DL230

5 Demandeur : Elster GmbH
Adresse : Steinernstrasse 19-21,
55252 Mainz-Kastel, Allemagne

6 Fabricant : Elster GmbH
Adresse : Steinernstrasse 19-21,
55252 Mainz-Kastel, Allemagne

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

8 Le LCIE, organisme notifié sous la référence 0081 conformément à l'article 9 de la directive 94/9/CE du Parlement européen et du Conseil du 23 mars 1994, certifie que cet appareil ou système de protection est conforme aux exigences essentielles de sécurité et de santé pour la conception et la construction d'appareils et de systèmes de protection destinés à être utilisés en atmosphères explosibles, données dans l'annexe II de la directive.
Les résultats des vérifications et essais figurent dans le rapport confidentiel n°125105-651470.

9 Le respect des exigences essentielles de sécurité et de santé est assuré par la conformité à :

EN 60079-0:2012, EN 60079-11:2012

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

11 Cette attestation d'examen CE de type concerne uniquement la conception et la construction de l'appareil ou du système de protection spécifié, conformément à l'annexe III de la directive 94/9/CE.

Des exigences supplémentaires de la directive sont applicables pour la fabrication et la fourniture de l'appareil ou du système de protection. Ces dernières ne sont pas couvertes par la présente attestation.

12 Le marquage de l'appareil ou du système de protection doit comporter les informations détaillées au point 15.

Fontenay-aux-Roses, le 29 juillet 2014

1 EC TYPE EXAMINATION CERTIFICATE

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

3 EC type examination certificate number
LCIE 14 ATEX 3025 X

4 Equipment or protective system :
Data logger

Type : DL230

5 Applicant : Elster GmbH
Address : Steinernstrasse 19-21,
55252 Mainz-Kastel, Germany

6 Manufacturer : Elster GmbH
Address : Steinernstrasse 19-21,
55252 Mainz-Kastel, Germany

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

8 LCIE, notified body number 0081 in accordance with article 9 of the Directive 94/9/EC of the European Parliament and the Council of 23 March 1994, certifies that this equipment or protective system has been found to comply with the essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.
The examination and test results are recorded in confidential report n°125105-651470.

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

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

11 This EC type examination certificate relates only to the design and construction of this specified equipment or protective system in accordance with annex III to the directive 94/9/EC.

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

12 The marking of the equipment or protective system shall include information as detailed at 15.

Le Responsable de Certification ATEX
ATEX Certification Officer

JULIEN GAUTHIER





13 ANNEXE

14 ATTESTATION D'EXAMEN CE DE TYPE

LCIE 14 ATEX 3025 X

15 DESCRIPTION DE L'APPAREIL OU DU SYSTEME DE PROTECTION

Enregistreur de données
Type : DL230

L'enregistreur de données qui peut être exploité comme équipement associé pour l'acquisition et le stockage des impulsions de comptage, de la lecture du codeur ou des changements de niveau des différents types d'énergie. L'enregistreur de données, le modem GSM intégré dans un boîtier plastique et l'antenne externe sont alimentés soit par l'alimentation principale interne ou par des piles. Il dispose de 4 entrées de sécurité intrinsèque, en option 2 connecteurs de sécurité intrinsèque, 2 sorties numériques de non-sécurité intrinsèque et une interface optique pour le paramétrage et la lecture de données.

Paramètres spécifiques du ou des modes de protection concernés :

Les piles utilisées dans l'appareil sont les suivantes :

- pour CPU board: Elster-ID No. 73015774.
- pour GSM modem: Elster-ID No. 73017964 ou No. 73021211.

Connecteur / Connector	Paramètres électriques / Electrical parameters					
KL1	U_n : 230 VAC					
DA1, DA2	U_n : 30 V					
DE1, DE2	U_o : 9.56 V	I_o : 19.6 mA	P_o : 46.9 mW	C_o : 3.6 μ F	L_o : 92 mH	
DE3, DE4	U_o : 9.56 V	I_o : 1.7 mA	P_o : 4.1 mW	C_o : 3.6 μ F	L_o : 12.1 H	
X12	U_o : 16.8 V	I_o : 4.4 mA	P_o : 18.6 mW	C_o : 0.39 μ F	L_o : 1.8 H	
X13	U_o : 16.8 V	I_o : 24.3 mA	P_o : 102.2 mW	C_o : 0.39 μ F	L_o : 60.1 mH	

Le marquage doit être :

Elster GmbH
Adresse : ...
Type : DL230
N° de fabrication : ...
Année de fabrication : ...
II (1) G
[Ex ia Ga] IIC
-25°C ≤ Tamb ≤ +60°C
LCIE 14 ATEX 3025 X
AVERTISSEMENT – UTILISER UNIQUEMENT LES ACCUMULATEURS ELSTER-ID No. 73015774 POUR CPU BOARD, ET No. 73017964 OU No. 73021211 POUR GSM MODEM

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

(*) : voir les paramètres électriques dans le paragraphe 15 de l'attestation d'examen CE de type.

L'appareil doit également comporter le marquage normalement prévu par les normes de construction qui le concerne.

16 DOCUMENTS DESCRIPTIFS

Dossier de certification n° EE0261 rév. 1, du 19/05/2014.
Ce dossier comprend 33 rubriques (292 pages).

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13 SCHEDULE

14 EC TYPE EXAMINATION CERTIFICATE

LCIE 14 ATEX 3025 X

15 DESCRIPTION OF EQUIPMENT OR PROTECTIVE SYSTEM

Data logger
Type: DL230

The apparatus is a data logger which can be operated as associated equipment for the acquisition and storage of metering pulses or encoder readings as well as level changes for various types of energy. The data logger with an integrated GSM modem inside a plastic housing and an external antenna are powered either by internal main power supply or by batteries. It has 4 intrinsically safe inputs, 2 optional intrinsically safe connectors, 2 non-intrinsically safe digital outputs and 1 optical interface for parameterization and data readout.

Specific parameters of the concerned protection mode:

Batteries used within the apparatus are as follows:

- for CPU board: Elster-ID No. 73015774.
- for GSM modem: Elster-ID No. 73017964 or No. 73021211.

The marking shall be:

Elster GmbH
Address: ...
Type: DL230
Serial number: ...
Year of construction: ...
II (1) G
[Ex ia Ga] IIC
-25°C ≤ Tamb ≤ +60°C
LCIE 14 ATEX 3025 X
WARNING – USE ONLY BATTERIES ELSTER-ID No. 73015774 FOR CPU BOARD, AND No. 73017964 OR No. 73021211 FOR GSM MODEM

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

(*) : see electrical parameters in clause 15 of EC type examination certificate.

The equipment shall also bear the usual marking required by the manufacturing standards applying to such equipment.

16 DESCRIPTIVE DOCUMENTS

Certification file N° EE0261 rev. 1, dated 2014/05/19.
This file includes 33 items (292 pages).

Rev. A

01-Annexe III_CE_tpe_app – rev2 DOC
Page 2 of 3



13 ANNEXE (suite)

14 ATTESTATION D'EXAMEN CE DE TYPE

LCIE 14 ATEX 3025 X

17 CONDITIONS SPECIALES POUR UNE UTILISATION SÛRE

- Les connecteurs de sécurité intrinsèque de l'appareil ne doivent être raccordés qu'à des matériels de sécurité intrinsèque certifiés pour l'usage considéré. Cette association doit répondre aux exigences de la norme EN 60079-25 (voir les paramètres électriques dans le paragraphe 15 de l'attestation d'examen CE de type).

- Paramètres électriques des connecteurs d'un autre matériel ou capteur certifié de sécurité intrinsèque pouvant être raccordé aux connecteurs de l'appareil DL230

Electrical parameters of connectors from another intrinsically safe certified equipment or sensor that can be connected to the connectors of DL230:

Connecteurs du DL230 <i>Connectors of DL230</i>	Paramètres électriques des connecteurs d'un autre matériel ou capteur certifié de sécurité intrinsèque <i>Electrical parameters of connectors from another intrinsically safe certified equipment or sensor</i>				
DE1, DE2	$U_i \geq 9.56 \text{ V}$	$I_i \geq 19.6 \text{ mA}$	$P_i \geq 46.9 \text{ mW}$	$C_i + C_{c \text{ max}} \leq 3.6 \text{ }\mu\text{F}$	$L_i + L_{c \text{ max}} \leq 92 \text{ mH}$
DE3, DE4	$U_i \geq 9.56 \text{ V}$	$I_i \geq 1.7 \text{ mA}$	$P_i \geq 4.1 \text{ mW}$	$C_i + C_{c \text{ max}} \leq 3.6 \text{ }\mu\text{F}$	$L_i + L_{c \text{ max}} \leq 12.1 \text{ H}$
X12	$U_i \geq 16.8 \text{ V}$	$I_i \geq 4.4 \text{ mA}$	$P_i \geq 18.6 \text{ mW}$	$C_i + C_{c \text{ max}} \leq 0.39 \text{ }\mu\text{F}$	$L_i + L_{c \text{ max}} \leq 1.8 \text{ H}$
X13	$U_i \geq 16.8 \text{ V}$	$I_i \geq 24.3 \text{ mA}$	$P_i \geq 102.2 \text{ mW}$	$C_i + C_{c \text{ max}} \leq 0.39 \text{ }\mu\text{F}$	$L_i + L_{c \text{ max}} \leq 60.1 \text{ mH}$

$C_{c \text{ max}}, L_{c \text{ max}}$: valeur maximale de capacité et d'inductance du câble de liaison entre DL230 et un autre matériel certifié de sécurité intrinsèque.

$C_{c \text{ max}}, L_{c \text{ max}}$: maximum value of capacitance and inductance of the connected cable between DL230 and intrinsically safe certified equipment.

18 EXIGENCES ESSENTIELLES DE SECURITE ET DE SANTE

Couvertes par les normes EN 60079-0:2012 et EN 60079-11:2012.

19 VERIFICATIONS ET ESSAIS INDIVIDUELS

Conformément au paragraphe 11.2 de la norme EN 60079-11, le transformateur infailible dans chaque exemplaire de l'équipement doit être soumis à un essai de rigidité diélectrique avec une tension de 2500 V_{rms} entre enroulements d'entrée et de sortie.

20 CONDITIONS DE CERTIFICATION

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

13 SCHEDULE (continued)

14 EC TYPE EXAMINATION CERTIFICATE

LCIE 14 ATEX 3025 X

17 SPECIAL CONDITIONS FOR SAFE USE

- The intrinsically safe connectors of the apparatus shall only be connected to intrinsically safe apparatus certified for the intended use. This association shall comply with the requirements of the standard EN 60079-25 (see electrical parameters in clause 15 of EC type examination certificate).

- Parameters of connectors of another intrinsically safe certified equipment or sensor that can be connected to the connectors of the apparatus

Electrical parameters of connectors from another intrinsically safe certified equipment or sensor that can be connected to the connectors of the apparatus:

Connectors of the DL230 <i>Connectors of DL230</i>	Electrical parameters of connectors from another intrinsically safe certified equipment or sensor <i>Electrical parameters of connectors from another intrinsically safe certified equipment or sensor</i>				
DE1, DE2	$U_i \geq 9.56 \text{ V}$	$I_i \geq 19.6 \text{ mA}$	$P_i \geq 46.9 \text{ mW}$	$C_i + C_{c \text{ max}} \leq 3.6 \text{ }\mu\text{F}$	$L_i + L_{c \text{ max}} \leq 92 \text{ mH}$
DE3, DE4	$U_i \geq 9.56 \text{ V}$	$I_i \geq 1.7 \text{ mA}$	$P_i \geq 4.1 \text{ mW}$	$C_i + C_{c \text{ max}} \leq 3.6 \text{ }\mu\text{F}$	$L_i + L_{c \text{ max}} \leq 12.1 \text{ H}$
X12	$U_i \geq 16.8 \text{ V}$	$I_i \geq 4.4 \text{ mA}$	$P_i \geq 18.6 \text{ mW}$	$C_i + C_{c \text{ max}} \leq 0.39 \text{ }\mu\text{F}$	$L_i + L_{c \text{ max}} \leq 1.8 \text{ H}$
X13	$U_i \geq 16.8 \text{ V}$	$I_i \geq 24.3 \text{ mA}$	$P_i \geq 102.2 \text{ mW}$	$C_i + C_{c \text{ max}} \leq 0.39 \text{ }\mu\text{F}$	$L_i + L_{c \text{ max}} \leq 60.1 \text{ mH}$

$C_{c \text{ max}}, L_{c \text{ max}}$: maximum value of capacitance and inductance of the connected cable between DL230 and intrinsically safe certified equipment.

18 ESSENTIAL HEALTH AND SAFETY REQUIREMENTS

Covered by standards EN 60079-0:2012 and EN 60079-11:2012.

19 ROUTINE VERIFICATIONS AND TESTS

According to clause 11.2 of standard EN 60079-11, the infailible transformer in each above apparatus shall succeed a dielectric strength test with the voltage of 2500 V_{rms} applied between input and output windings.

20 CONDITIONS OF CERTIFICATION

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



L C I E

1 AVENANT D'ATTESTATION D'EXAMEN CE DE TYPE

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

3 Numéro de l'avenant :
LCIE 14 ATEX 3025 X / 01

4 Appareil ou système de protection :
Enregistreur de données
Type : DL230

5 Demandeur : Elster GmbH

15 DESCRIPTION DE L'AVENANT

- Ajout de la batterie Tekcell comme une alternative pour l'alimentation de la carte CPU.

- Mise à jour normative selon la norme EN 60079-0 :2012 + A11:2013.

Les résultats des vérifications et essais figurent dans le rapport confidentiel N° 137850-677466-02.

Paramètres spécifiques du ou des modes de protection concerné(s) :

Modifiés comme suit :

Les piles utilisées dans l'appareil sont les suivantes :

Batterie / Battery	Carte CPU / CPU board	Modem GSM / GSM modem
73015774	x	
73021211		x
73017964		x
73023225	x	

1 SUPPLEMENTARY EC TYPE EXAMINATION CERTIFICATE

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

3 Supplementary certificate number :
LCIE 14 ATEX 3025 X / 01

4 Equipment or protective system :
Data logger
Type : DL230

5 Applicant : Elster GmbH

15 DESCRIPTION OF THE SUPPLEMENTARY CERTIFICATE

- Add Tekcell battery as alternative supply for both CPU board.

- Normative update according to EN 60079-0:2012 + A11:2013.

The examination and test results are recorded in confidential report N° 137850-677466-02.

Specific parameters of the concerned protection mode:

Modified as follows:

Batteries used within the apparatus are as follows:

Connecteur / Connector	Paramètres électriques / Electrical parameters					
KL1	U_n : 230 VAC					
DA1, DA2	U_n : 30 V					
DE1, DE2	U_o : 9.56 V	I_o : 19.6 mA	P_o : 46.9 mW	C_o : 3.6 μ F	L_o : 92 mH	
DE3, DE4	U_o : 9.56 V	I_o : 1.7 mA	P_o : 4.1 mW	C_o : 3.6 μ F	L_o : 12.1 H	
X12	U_o : 16.8 V	I_o : 4.4 mA	P_o : 18.6 mW	C_o : 0.39 μ F	L_o : 1.8 H	
X13	U_o : 16.8 V	I_o : 24.3 mA	P_o : 102.2 mW	C_o : 0.39 μ F	L_o : 60.1 mH	

Fontenay-aux-Roses, le 28 janvier 2016

Le Responsable de Certification ATEX
ATEX Certification Officer

Julien Gauthier



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au capital de 15 745 984 €

RCS Nanterre B 408 363 J14

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13 ANNEXE

14 AVENANT D'ATTESTATION D'EXAMEN CE DE TYPE

LCIE 14 ATEX 3025 X / 01

15 DESCRIPTION DE L'AVENANT (suite)

Le marquage doit être : Modifié comme suit

Elster GmbH

Adresse : ...

Type : DL230

N° de fabrication : ... ;

Année de fabrication : ...

Ⓢ II (1) G

[Ex ia Ga] IIC

-25°C ≤ T_{amb} ≤ +60°C

LCIE 14 ATEX 3025 X

AVERTISSEMENT – UTILISER UNIQUEMENT LES ACCUMULATEURS ELSTER-ID N°73015774 OU N°73023225 POUR CPU BOARD, ET N°73017964 OU N°73021211 POUR GSM MODEM.

U₀: ..., I₀: ..., P₀: ..., L₀: ..., C₀: ... (*)U_m: ... (*)

(*) : voir les paramètres électriques dans le paragraphe 15 de l'attestation d'examen CE de type.

16 DOCUMENTS DESCRIPTIFS

Dossier de certification N° EE0261 Rev.1 du 11/11/2015.
Ce dossier comprend 35 rubriques (301 pages).

17 CONDITIONS SPECIALES POUR UNE UTILISATION SURE

- Les connecteurs de sécurité intrinsèque de l'appareil ne doivent être raccordés qu'à des matériels de sécurité intrinsèque certifiés pour l'usage considéré. Cette association doit répondre aux exigences de la norme EN 60079-25 (voir les paramètres électriques dans le paragraphe 15 de l'attestation d'examen CE de type).

Paramètres électriques des connecteurs d'un autre matériel ou capteur certifié de sécurité intrinsèque pouvant être raccordé aux connecteurs de l'appareil DL230 /

Electrical parameters of connectors from another intrinsically safe certified equipment or sensor that can be connected to the connectors of DL230:

Connecteurs Connectors	Paramètres électriques des connecteurs d'un autre matériel ou capteur certifié de sécurité intrinsèque <i>Electrical parameters of connectors from another intrinsically safe certified equipment or sensor</i>					
DE1, DE2	U _i ≥ 9.56 V	I _i ≥ 19.6 mA	P _i ≥ 46.9 mW	C _i + C _{c max} ≤ 3.6 µF	L _i + L _{c max} ≤ 92 mH	
DE3, DE4	U _i ≥ 9.56 V	I _i ≥ 1.7 mA	P _i ≥ 4.1 mW	C _i + C _{c max} ≤ 3.6 µF	L _i + L _{c max} ≤ 12.1 H	
X12	U _i ≥ 16.8 V	I _i ≥ 4.4 mA	P _i ≥ 18.6 mW	C _i + C _{c max} ≤ 0.39 µF	L _i + L _{c max} ≤ 1.8 H	
X13	U _i ≥ 16.8 V	I _i ≥ 24.3 mA	P _i ≥ 102.2 mW	C _i + C _{c max} ≤ 0.39 µF	L _i + L _{c max} ≤ 60.1 mH	

C_{c max}, L_{c max} : valeur maximale de capacité et d'inductance du câble de liaison entre DL230 et un autre matériel certifié de sécurité intrinsèque.

C_{c max}, L_{c max} : maximum value of capacitance and inductance of the connected cable between DL230 and intrinsically safe certified equipment.

13 SCHEDULE

14 SUPPLEMENTARY EC TYPE EXAMINATION CERTIFICATE

LCIE 14 ATEX 3025 X / 01

15 DESCRIPTION OF THE SUPPLEMENTARY CERTIFICATE (continued)

The marking shall be : Modifié as follows

Elster GmbH

Address: ...

Type : DL230

Serial number: ... ;

Year of construction: ...

Ⓢ II (1) G

[Ex ia Ga] IIC

-25°C ≤ T_{amb} ≤ +60°C

LCIE 14 ATEX 3025 X

WARNING – USE ONLY BATTERIES ELSTER-ID N°73015774 OR N°73023225 FOR CPU BOARD, AND N°73017964 OU N°73021211 FOR GSM MODEM.

U₀: ..., I₀: ..., P₀: ..., L₀: ..., C₀: ... (*)U_m: ... (*)

(*) : see electrical parameters in clause 15 of EC type examination certificate.

16 DESCRIPTIVE DOCUMENTS

Certification file N° EE0261 Rev.1 dated 2015/11/11.
This file includes 35 items (301 pages).

17 SPECIAL CONDITIONS FOR SAFE USE

- The intrinsically safe connectors of the apparatus shall only be connected to intrinsically safe apparatus certified for the intended use. This association shall comply with the requirements of the standard EN 60079-25 (see electrical parameters in clause 15 of EC type examination certificate).



13 ANNEXE (suite)

14 AVENANT D'ATTESTATION D'EXAMEN CE DE TYPE

LCIE 14 ATEX 3025 X / 01

18 EXIGENCES ESSENTIELLES DE SECURITE ET DE SANTE

Couvertes par les normes EN 60079-0:2012 + A11:2013 et EN 60079-11:2012.

19 VERIFICATIONS ET ESSAIS INDIVIDUELS

Conformément au paragraphe 11.2 de la norme EN 60079-11, le transformateur infailible dans chaque exemplaire de l'équipement doit être soumis à un essai de rigidité diélectrique avec une tension de 2500 V_{eff} entre enroulements d'entrée et de sortie.

13 SCHEDULE (continued)

14 SUPPLEMENTARY EC TYPE EXAMINATION CERTIFICATE

LCIE 14 ATEX 3025 X / 01

18 ESSENTIAL HEALTH AND SAFETY REQUIREMENTS

Covered by EN 60079-0:2012 + A11:2013 and EN 60079-11:2012 standards.

19 ROUTINE VERIFICATIONS AND TESTS

According to clause 11.2 of standard EN 60079-11, the infailible transformer in each above apparatus shall succeed a dielectric strength test with the voltage of 2500 V_{r.m.s} applied between input and output windings.