

ELICIUS
Electronic Energy Meter
Installation and user guide V1.0



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1 General

1.1 Information about the installation and user guide

This installation and user guide relates solely to the ELICIUS electronic electricity meter and forms part of the product. It describes the intended and safe use throughout the product life cycle.

1.1.1 Target groups

Operating organisation

The operating organisation must, beside other responsibilities, ensure that the personal working with the energy meter read and observe this manual and all other relevant documents, in particular the safety and warning information.

Specialised personnel/operators

The specialised personnel must read and observe this manual and all other relevant documents, in particular the safety and warning information.

1.1.2 Right of modification, validity

The information contained in this installation and user guide is valid at the time of release of this version. The version number and release date of this installation and user guide are printed on the back page of the document. Changes may be made to this guide at any time.

1.1.3 Completeness

This installation and user guide is only complete when read in conjunction with the associated documents relevant for the particular application.

1.1.4 Storage location

This installation and user guide together with all the documents relevant for the particular application must always be accessible and must always be stored in the vicinity of the meter or the system of which it is part.




1.1.5 Warning information in this guide

Warning levels are clarified here.

Signal word	Danger level	Consequences if ignored
DANGER	Direct danger	Death or severe bodily injury
WARNING	Possible danger	Death or severe bodily injury
CAUTION	Possibly hazardous situation	Slight bodily injuries

1.1.6 Symbols

The symbols used in the installation and user guide are described here.

Symbol	Meaning
	This symbol is the safety sign. All actions that are labelled with the safety sign must be followed. It is used in warnings.
	This symbol is a safety sign that indicates the ESD (electrostatic discharge) regulations must be observed. It is used in warnings.
	This symbol indicates important information.
.	This sign indicates an action requirement
1. , 2. , ...	These numbers indicate numbered steps in a multi-step sequence.
.	This symbol indicates the action instructions to avoid dangers associated with a warning or an individual step.

1.2 Marking

1.2.1 CE marking

The product is provided with the CE marking, the metrology marking and the code number of the notified body. See chapter 3.

1.2.2 EC declaration of conformity

The ELICIUS electronic electricity meter complies with the directives and standards stated in the EC declaration of conformity for devices approved according to the MID. The number of the EC type examination certificate is specified in the EC declaration of conformity.

1.3 Copyright

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No part of the installation and user guide may be reproduced in any format (print, photocopy or another method) without our written authorisation; likewise it must not be processed, reproduced or distributed by use of electronic systems. We will claim compensation in the event of infringement. We reserve the right to make changes.

2 Safety



NOTE

Observe the following conditions for the performance of all activities.

2.1 Intended use

The electricity meter is used to measure all billing relevant data in connection with the task of a meter point operator or relevant market players.

2.1.1 Obvious misuse

Operation of the meter outside the specified usage and environmental conditions is not permitted.

2.2 Basic safety instructions

2.2.1 Product safety

The ELICIUS electronic electricity meter is produced according to the state of the art and the latest recognised safety rules. Nevertheless, use of the meter can result in hazards for the user or a risk of property damage.

- The electricity meter must only be operated in a defect-free state for its intended purpose and in a safety and hazard-aware manner in accordance with this guide.
- Keep this guide and all applicable documents complete and legible, and store in a location accessible to personnel at all times.
- Do not allow any working approach that endangers personnel, uninvolved staff or third parties.
- In addition to the overall documentation, legal or other health and safety regulations plus the relevant standards and directives of the respective country of operation must be adhered to.

2.2.2 Duties of the operating organisation

Safety awareness when working

The system operating organisation is responsible for ensuring that the electricity meter is only operated with awareness for safety and of the hazards involved while observing this installation and user guide.

It must ensure the adherence to and/or monitoring of:

- Intended use
- Legal and other health and safety regulations
- Applicable standards and directives of the operating country

It must provide protective equipment.

Personnel qualifications

The operating organisation must ensure that personnel charged with working on or using the electricity meter have read and understood this installation and user guide plus any other relevant documents prior to starting work, in particular the safety and repair instructions.

It must ensure that all work is performed by specialised technical personnel:

- Assembly, maintenance work
- Working on the electronics

Safety equipment

If necessary, safety equipment must be provided.

- E.g. to switch-off the power supply of the electricity meter to simplify removal and refitting.

Warranty

- During the warranty period you must obtain the manufacturer's approval prior to conversion, repair or modification work.

- Use only original spare parts or parts approved by the manufacturer.

2.2.3 Duties of the specialised personnel/operator

- Observe all instructions in the installation and user guide and on the device that are relevant for the use of the meter.
- Use protective equipment if required.
- Switch the electricity meter off from power before performing any repairs.

2.3 Special hazards



DANGER

Contact with electrical parts during the installation.

Can result in severe injuries or even death!

- ⇒ The installation must only be carried out by a specialist installation or electrical company.
 - ⇒ The personnel must be trained in the installation and handling of medium voltage electrical equipment (up to 1000 V).
-



WARNING

Electrostatic discharge.

Can result in damage to the energy meter, especially the electronics, for which no liability will be accepted!

- ⇒ Observe the relevant ESD regulations (electrostatic discharge).
-



CAUTION

Electrical and magnetic fields.

Can interfere with electronic components in the energy meter!

- ⇒ Do not install the device itself nor the incoming and outgoing cables in the direct surroundings of heavy electrical consumers or their supply line.
 - ⇒ Pay attention to the precise separation. This depends on the magnitude of the voltage and current at the installation place.
 - ⇒ In case of doubt consult an expert.
-

3 Product description

3.1 Layout



Fig. A Layout of the electronic electricity meter

1. Communication module
2. LCD display
3. Push button
4. Optical interface
5. Laser marking
6. Terminal cover

3.2 Scope of supply

The standard version is supplied with the following:

- Electronic energy meter
- Declaration of Conformity
- Installation guide
- Terminal cover

3.3 Laser marking

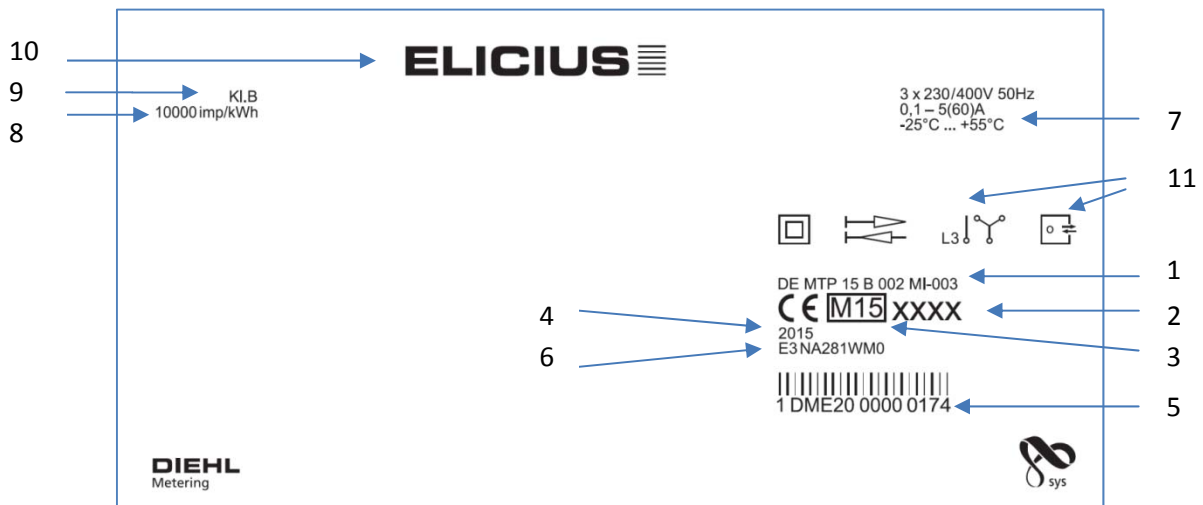


Fig. B Marking (Example)

Marking of the meter is performed with a laser.

- 1 EC design examination certificate number
- 2 Year of declaration of conformity
- 3 Conformity marking
- 4 Year of manufacture
- 5 Meter serial number
- 6 Article number of the meter
- 7 Nominal operating conditions of the meter
- 8 Meter constant of the test-LED
- 9 Accuracy class
- 10 Product name
- 11 Connection grid and measuring type

3.4 Function description

The ELICIUS is a direct connected tariff-less watt-hour meter for three-phases that can be used in a single-phase environment. The functionality is based on the EDL concept. The electricity meter is designed for a DIN three-point installation according to DIN 43857-02. The connection block corresponds to the dimensions of DIN 43857-04. Integrated within the housing are the measurement sensors, the individual PCBs with the electronics and the LCD display. Current measurement is performed using shunts. The voltage is received via a resistance-voltage divider.

Moreover a wired and a radio (wireless) M-Bus interface, which are integrated in a plug-in housing, are available. The name plate is attached on the middle of the meter. The connection diagram is printed directly above the terminals. The housing comprises four parts that are screwed to each other:

- Box-shaped base part
- Box-shaped top part with LCD display and operating button
- Terminal cover
- Cover for communication chamber with or without communication module

The operating button is used to display the individual information items in the display. The display has 2 lines.

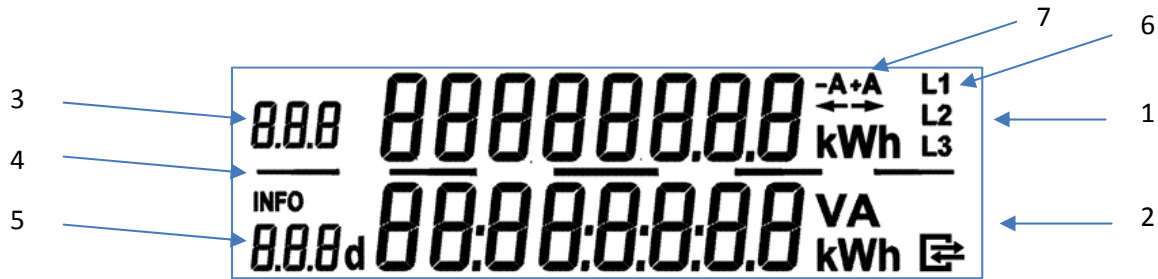


Fig. C Display

- 1 First line
- 2 Second line
- 3 OBIS code
- 4 Running indication
- 5 Measuring duration, due day period
- 6 Phase voltage active
- 7 Energy direction indicator

The first line is used to display consumption values and the second line contains only additional information. A six or eight digits LCD display without decimal places is available for display of the consumption values. The unit "kWh" is displayed on the right next to the consumption value in the display. Meter readings and additional information that are necessary for calibration are displayed.

- The three digits OBIS code on the left of the 1st line is for identification of the meter value. The energy import and export data are displayed in an alternating rolling fashion that changes every 10 sec.
- The 2nd line contains information values, such as the absolute value of the actual power, which the user can protect with a PIN. To identify this, the "Info" field is displayed. If the "Info" field is not displayed, the second line contains additional information, for clarification of the register value.

If the meter is optionally configured with a due day value determination, the information in the second line clarifies

- Left, the repetition period of the due day value (e.g. 30 d (for 1 month) and
- Right, the due day date of the last stored due day value (register value), which is displayed in the first line.

Additional operating information is displayed on the right of the display.

- The presence of the respective phase voltage L1, L2, L3
- The energy direction of the actual energy recording indicated by arrows and +A, -A
- In the middle a running indication (operating check) comprised of segments, indicating that the power is above the starting threshold (independent of the energy direction), sequentially illuminate from left to right.



NOTE

After pressing of the push button to the right next to the display the meter switches from rolling display operation to step operation. In step operation, the respective information can be stepped through by sequential key pressing. After 2 minutes without pressing of the push button, the meter automatically switches back to rolling display operation. After a loss of power, the meter always starts in rolling display operation.

3.5 Power supply

The ELICIUS is supplied via the voltage connections of the three-phase mains voltage. At least one phase and N must be connected. At least the L3 phase should be used for a billing relevant AC power measurement.

The ELICIUS can be supplied with optional lithium battery and due day generation. The lithium cell is permanently mounted on the measuring PCB of the meter and is used for the internal supply of the real-time clock in case of power outage. Fitted with:

1/2 AA cell 3.6 V DC lithium battery,
 Lifecycle without mains operation: typically 4 years

3.6 Calculator interfaces

As standard, the meter is equipped with an optical interface compliant with DIN EN 62056-21. It is arranged below the display (Fig. D). This display allows communication with the ELICIUS and testing of the meter.

Communication protocol is according to the DIN EN 62056-21 mode C. A standard readout head compliant with DIN EN 62056-21 can be used for the readout.

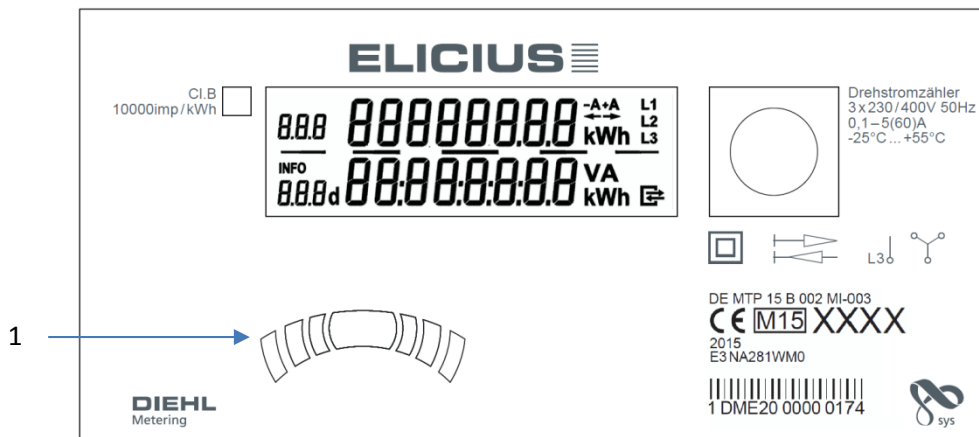


Fig. D Front of the ELICIUS
 1 Optical interface

The ELICIUS has an expansion module slot (Fig. F). A plug-in combination module with 2 M-Bus interfaces (radio and wired) is available. The module is incorporated in the meter module flap (Fig. E) for covering the push-in slot (Fig. F) of the ELICIUS.

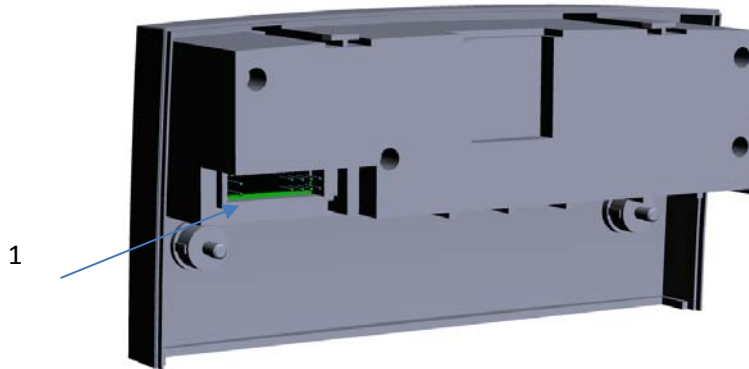


Fig. E Meter module flap
1 Slot (plug)

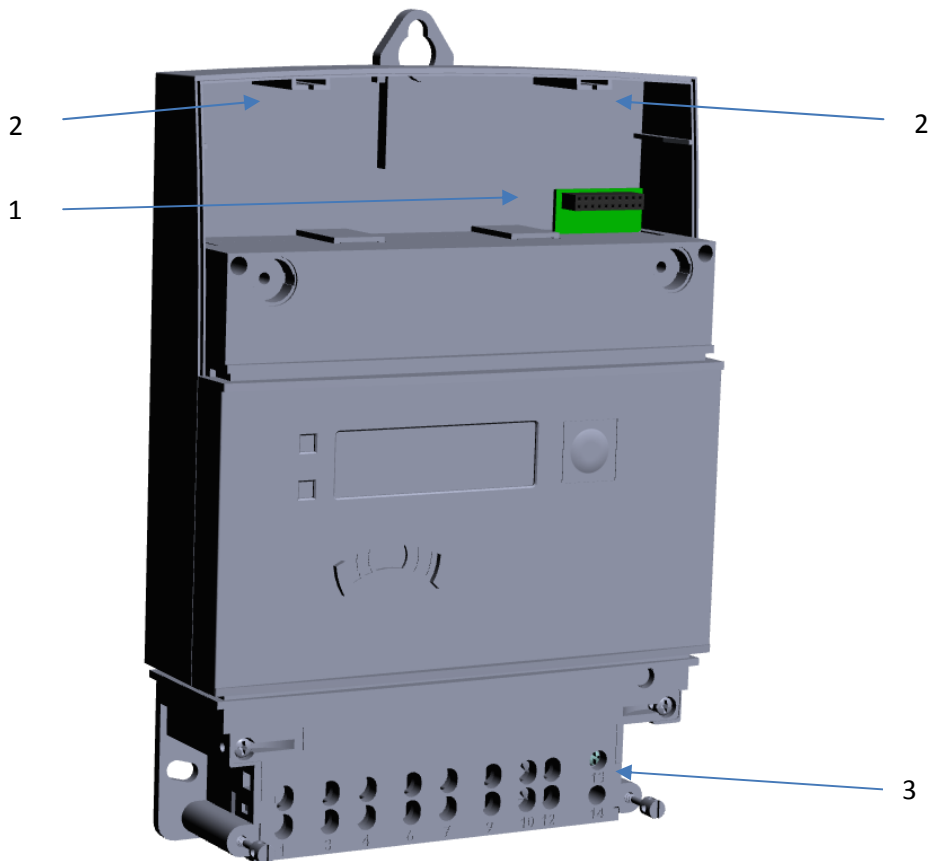


Fig. F Slot in the ELICIUS
1 Slot (socket)
2 Module guide
3 M-bus input



NOTE

The meter does not identify which module is plugged in. The "data list" transferred from the meter to the module must be selected when ordering. Both, M-Bus and wM-Bus interfaces transfer the same data lists to M-bus receivers and operate in parallel.



NOTE

When connecting an M-bus master to the meter, the maximum supply voltage of 40 V must be observed. The M-bus input at the ELICIUS is intrinsically safe and meets the safety extra-low voltage (SELV) requirements according to EN 60950-1.



WARNING

To avoid electrostatic discharging of the connection socket of the communication module in the ELICIUS and on the connection plug of the communication module, direct contacting of plug and socket should be avoided. The relevant ESD regulations (electrostatic discharge) must be observed.

3.6.1 Communication module

The ELICIUS supports two communication channels via the same mechanical PCB interface.

The protocol is the same for both channels and the data list (1A or B, 2 or 3) to be transferred is pre-set in the factory.

Upon delivery, the M-bus channel has the primary address "0x00", which can be changed via a standard-compliant M-BUS master and remains permanently saved (including when there is a loss of power to the ELICIUS). The secondary M-Bus address is the same as the meter serial number (basic meter). The module has automatic baud rate detection.

The unidirectional radio M-Bus channel transfers both the individual serial number of the communication module as well as the serial number of the basic meter. The meter/module combination can be identified via these two. Additionally, an individual key is used with the algorithm AES 128 to provide access protection. In case the module will be replaced, both the module serial number and the individual key will change. The serial number of the basic meter is received by the communication module in each meter telegram sent across the UART slot interface.

M-Bus communication

The M-Bus communication module contains the serial interface for communication with external M-Bus devices (such as an M-Bus Master), e.g. the IZAR CENTER. Several meters can be connected to an M-Bus Master. The protocol used complies with the standard DIN EN 13757.

Communication via radio

The integrated radio interface is used for communication with Diehl Metering radio receivers via predefined protocols. As standard the radio integrated in the module is always activated. The communication protocol is pre-set in the factory and corresponds to the Open Metering System Specification Vol. 2 for primary communication in version 4.0.2.

4 Technical data

4.1 Dimensions / weight

Weight of the ELICIUS

Meter with communications module: 1190 g

Meter with communications module in the individual packaging: 1330 g

Communication module in the housing: 160 g

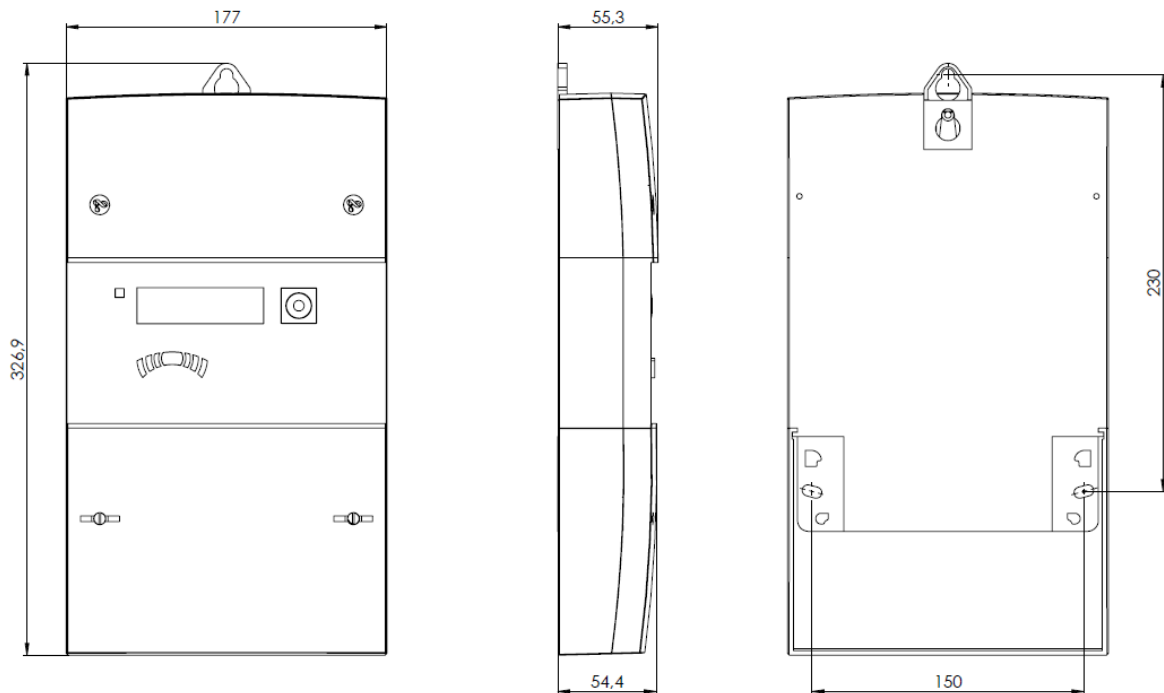


Fig. G Dimensions of the ELICIUS

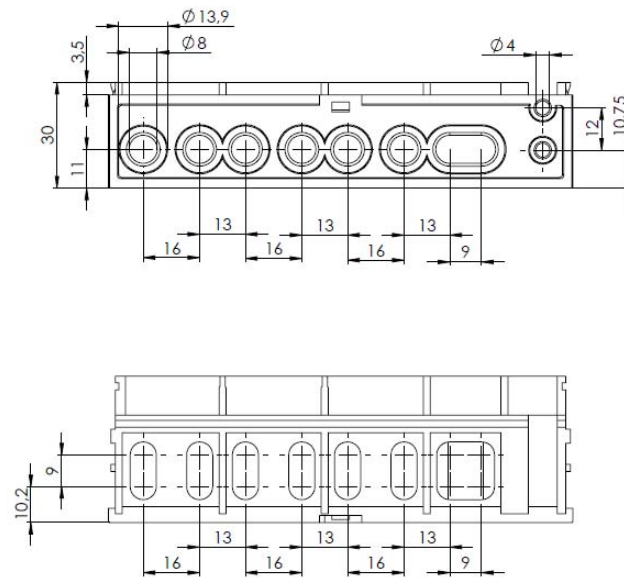


Fig. H Dimensions of the ELICIUS terminal block

4.2 Nominal operating conditions

U_n	3x230/400V 1x230 V over L3
I_{ref} or I_b or I_n (limit current I_{max})	5(60) A or 5(65) A
I_{st}	0.02 A
I_{min}	0.1 A
f_n	50 Hz
Accuracy class	Cl. A, B
Measuring type	Import: +A, Export: -A
Test pulse element, LED	10000 imp/kWh
Energy register for import energy	1
Energy register for export energy	1
Operating temperature range	-25 °C to +55 °C (3K6)
Ambient conditions/humidity	< 100 %
Mechanical ambient conditions	M1
Use of the meter for	Inside
Protection class	II
Protection class	IP51

4.3 Suppressor operating values

Power consumption with communication module	Voltage circuit 0.5 W / 2 VA three phase Voltage circuit 1.2 W / 2.5 VA single phase Current circuit: Measuring shunt with 300 μ Ohm per phase
EMC, pulse and HF test	Corresponding to DIN EN 50470-1 and -3, IEC 62052-11, IEC 62053-21, CLC/FprTR 50579 Pulse test 0.1/2000 μ s, 8 kV / 1 Ws
Magnetic fields	Resistant, additional magnetic field detection and alarm message (saved for 24h)
Terminal cover	Detection of the opening and alarm message
Device clock	Second based index according to EDL meter specification Additional real time clock for due day generation, battery supplied (accuracy \pm 10ppm)
Ambient temperature for storage	-25°C to +70°C
Data safety	Provided via non-volatile memory

4.4 Voltage and current connection

The ELICIUS is operated in a three-phase/four wire or single phase/two wire network with L3. Current and voltage inputs cannot be separated (closed voltage link), both are permanently connected with each other internally.

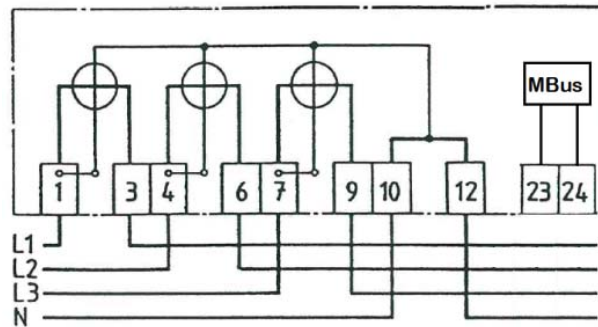


Fig. I ELICIUIS connection diagram

4.5 Meter interfaces, data list

4.5.1 Communication module

M-Bus

- M-Bus module according to DIN EN 13757
- 2-wire connection with the terminal block identified as "23" and "24".
- Terminals suitable for cable with 2 x 2.5 mm² conductors
- Galvanic isolation, SELV protection
- Polarity reversal protection
- Maximum voltage: 40 V DC
- Power consumption: Two M-Bus loads
- Primary or secondary addressing
- Baud rates 300, 2400 or 9600 baud (automatic baud rate detection)
- Protocol: M-Bus
- M-Bus supply via external master
- Readout frequency: unlimited

Communication via radio

The radio interface is specified with:

- unidirectional transmitting direction
- The module transmits every 8 ... 35 s (variable, depending on protocol length)
- Radio transmitting power is typically:

434 MHz	10 dBm ERP corresponds to 10 mW
868 MHz	13 dBm ERP corresponds to 23 mW
- Periodical M-Bus data transmissions are always based on the actual transmitted values of the basic meter (age of the UART update in average 1 sec)
- Transmission frequency: 868 MHz or 434 MHz
- Various Diehl Metering receivers are available for receiving the protocol (e.g. Bluetooth, GPRS, LAN, etc.)
- Encrypted protocol according to Vol. 2 for primary communication in version 4.0.2.
- Reading modes: Walk-By, Drive-By, Fixed Network

For problematic radio installations (shielding) and inadequate radio range the Diehl Metering system devices IZAR Radio Extend (repeater) or IZAR radio external M-Bus (M-Bus/wM-Bus converter) can be added to the installation to increase the radio range.

4.5.2 Data lists and transfer interval

Four data lists are available in ELICIUS, one of each must be selected for ex-works orders. The data lists differ in their scope and as such define the transmission intervals of the radio M-Bus primary communication. Based on the protocol length, the radio module calculates the duty cycle of 0.1% and determines the transmission period.

List	Measurement type *), metered values **)	Transmission interval
Data list 1 A	+A or -A	8 sec
Data list 1 A	+A and -A	8 sec
Data list 1 B	+A, due day value +A	10 sec
Data list 1 B	+A, 13 x load profile value +A	14.5 sec
Data list 1 B	+A, -A, due day value +A, due day value -A	12.5 sec
Data list 1 B	+A, -A, 13 x load profile value +A	14.5 sec
Data list 2	+A, -A, ΣP , V_{L1} , V_{L2} , V_{L3}	12.5 sec
Data list 3	+A, -A, ΣP , V_{L1} , V_{L2} , V_{L3} , R_I , R_{II} , R_{III} , R_{IV} , Q_I , Q_{II} , Q_{III} , Q_{IV} , I_{L1} , I_{L2} , I_{L3} , f	27.5 sec

*) The measurement types import energy and/or export energy must be selected for ex-works orders and are fixed for the ordered device.

**)

+A	is the import active energy register level,
-A	is the export active energy register level
ΣP	is the actual three-phase total power
V_{L1}	is the voltage L1/N
$R_I, R_{II}, R_{III}, R_{IV}$	is the reactive energy register level in quadrant I, II, III or IV
$Q_I, Q_{II}, Q_{III}, Q_{IV}$	is the actual reactive power in quadrant I, II, III or IV
I_{L1}, I_{L2}, I_{L3}	is the current in L1, L2 or L3
f	is the frequency of the alternating voltage

4.5.3 Test output

The infrared LED test output located on the rating plate is provided for metrological checking (Fig. J)

The LED can be sensed with conventional scanning heads according to DIN EN 62056-21. The pulse constant is 10000 pulses per kWh (imp/kWh). If the power is below the starting level, the LED is constantly illuminated. The LED colour is infrared.

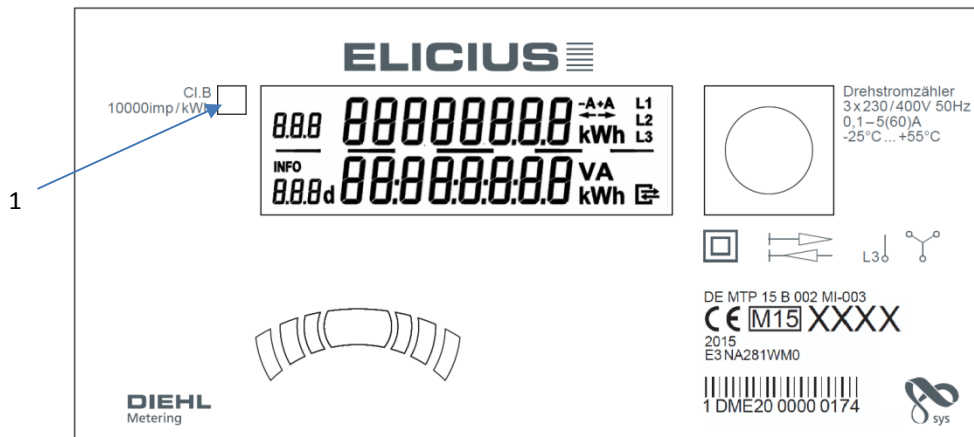


Fig. J LED test output
1 Infrared LED

5 Transport, storage

5.1 Unpacking the energy meter

Electricity meters are measuring instruments and must be handled with appropriate care. To protect against damage and soiling, they should only be unpacked prior to installation.

5.2 Transporting the electricity meter

The meter should only be transported in its original packaging.

5.3 Storing the electricity meter

- The meter must only be stored in a dry location.
- Storage temperature -25 °C ... +70 °C
- Relative humidity < 90 %

6 Installation



NOTE

This guide is intended for trained specialised personnel. Ensure that the meter is only installed in dry, frost-free meter cabinets.

Important! The meter seal (Fig. K) must not be damaged! A damaged seal will result in immediate invalidation of the factory warranty and the declaration of conformity.

Live parts can be exposed when opening covers or removing parts. Moreover connection points may be live.



DANGER

Contact with electrical parts during the installation.

Can result in severe injuries or even death!

- ⇒ The installation must only be carried out by a specialist installation or electrical company.
- ⇒ The personnel must be trained in the installation and handling of medium voltage electrical equipment (up to 1000 V).

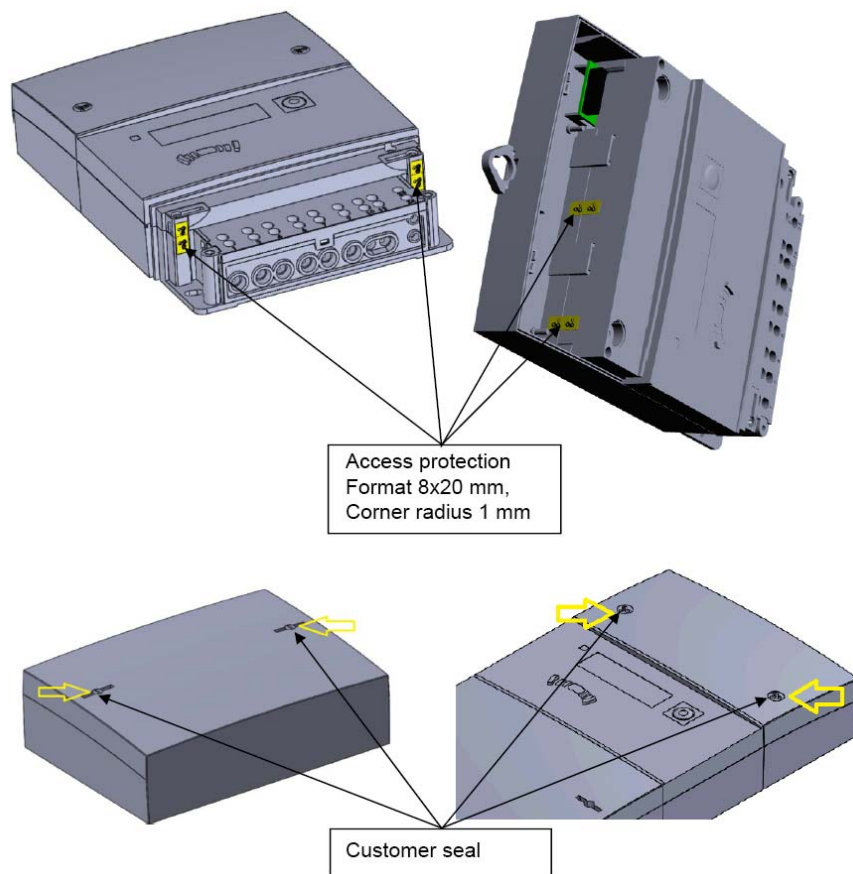


Fig. K Meter seals

6.1 Connecting the meter

The meter is connected to the three-phase network with the mandatory cables of the installation environment. The cables must be inserted into the numbered terminals of the terminal block and tightened with 2 screws each per terminal.



NOTE

The screws must be tightened to a maximum 2.3 Nm. Regulations for the use of electricity meters and electric installations must be observed! Furthermore, all instructions contained in the installation guide must be observed. The following screws are screwed into the terminal block

Power connection terminal block screws	2 x M5 per power terminal
Terminal screws M-Bus connection	1 x M3 per terminal

6.2 Installing the communication module



CAUTION

The meter is supplied ex-works with the module compartment fitted.

If the module is to be exchanged, the replacement module must be inserted carefully into the provided module guides in the ELICIUS housing. Plug and socket must not be forcefully pushed into each other.

This can result in destruction of the contact.

⇒ Plug modules in correctly when fitting.

Overview of the possible communication interfaces in the module housing

The communication interfaces can be combined as per table.

		Module version					
		Empty	1	2	3	4	5
Function	No communication	•	-	-	-	-	-
	M-Bus wire	-	•	•	-	-	•
	Radio M-Bus 434 MHz	-	-	•	-	•	-
	Radio M-Bus 868 MHz	-	•	-	•	-	-

• Function installed - Function not installed



NOTE

These modules have no effect on measurement and can be fitted retrospectively without damaging the verification mark.



WARNING

Electrostatic discharge.

Can result in damage to the electricity meter, especially the electronics, for which no liability will be accepted!

Observe the relevant ESD regulations (electrostatic discharge). No responsibility is accepted for damage (especially to the electronics), resulting from non-observation of the rules.

1. Remove the customer seal from the module housing and open the screws (1) (Fig. L).
2. Pull the module housing from the module slot of the ELICIUS, replace it with your module and push it in such way that module plug and meter socket are matched to each other.
3. Push the module guidance (2) into the corresponding ELICIUS guides (3).

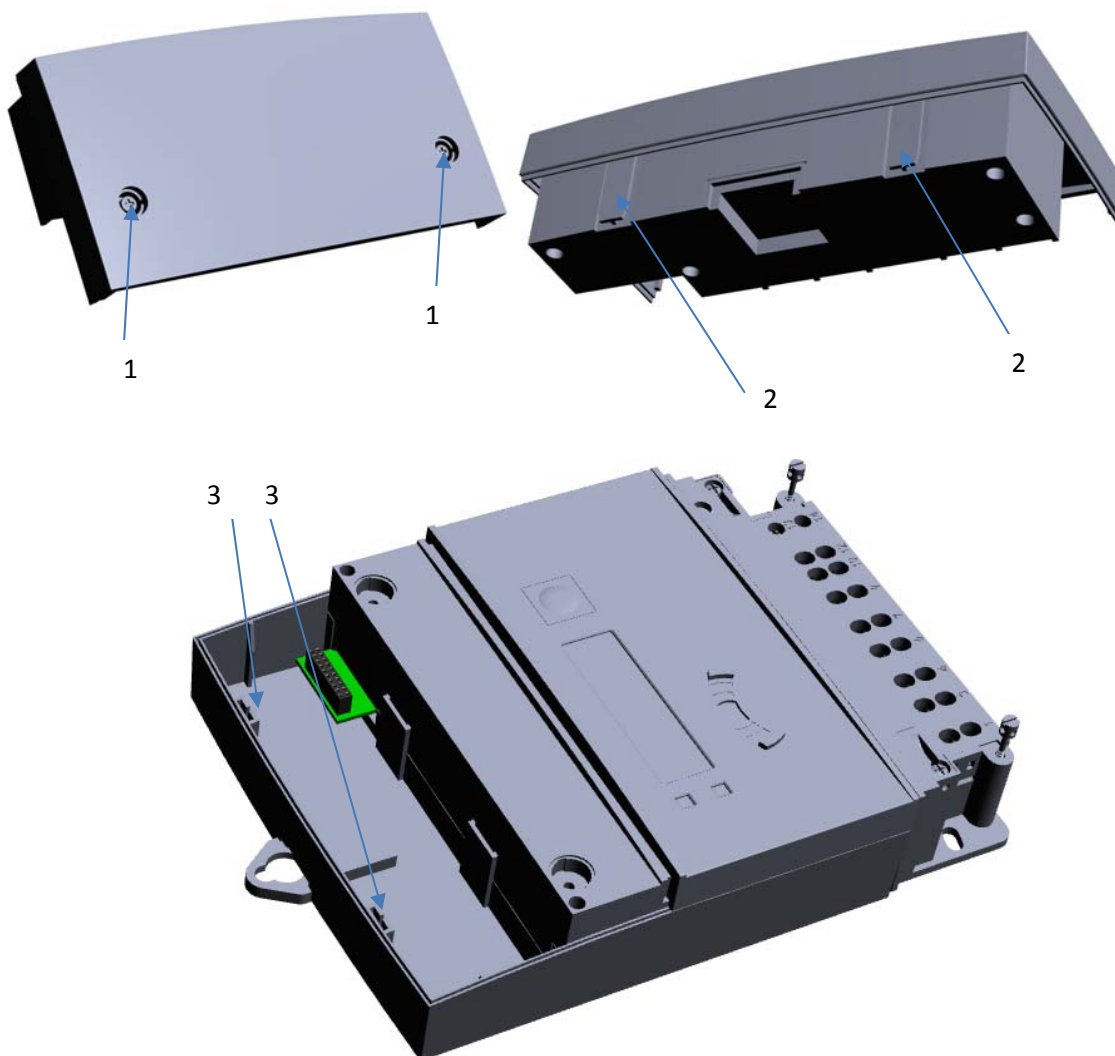


Fig. L Mounting position of the module and the ELICIUS meter base

4. Carefully press the module into the module opening of the ELICIUS until the socket and contact plug of the module are fully pushed into each other.

5. The module housing edge must be tightly closed and flush with the edge of the meter base plate.

6.3 External connection of the communication module

Wired M-Bus connection



NOTE

The terminal block of the ELICIUS has 2 connectors with the labelled connections 23, 24. Further M-Bus devices or a master are connected to these. Both connectors do not have any preferred direction and can be interchanged (polarity independent).

The primary address of the ELICIUS M-Bus cannot be set by means at the ELICIUS. The address 0x00 is selected in the factory. Secondary addressing based on the module serial number or primary addressing via a corresponding master is recommended (IZAR M-Bus Master).

6.4 Configuring the meter



NOTE

A number of meter settings can be programmed using a parametrisation software.

7 Start-up operation

After the meter has been installed and the power switched on, the ELICIUS can be immediately operated.



NOTE

The meter is in its operating state after a few seconds.

8 Operation

8.1 Meter operation

A push button is mounted on the front plate of the meter. This push button is used to switch to the various displays.



NOTE

After pressing of the push button to the right next to the display the meter switches from rolling display operation to step operation. In step operation, the respective information can be stepped through by sequential key pressing. After 2 minutes without pressing of the push button, the meter automatically switches back to rolling display operation. After a loss of power, the meter always starts in rolling display operation.

8.2 Display output

The meter display is provided by an 8 digit, two-line LCD with value, unit and symbol indication. The display can be 8-digits or 6-digits. In the latter case, the first two positions of the 8-digit display (to be specified when ordering) are hidden. Display of consumption values is default set without a decimal place.

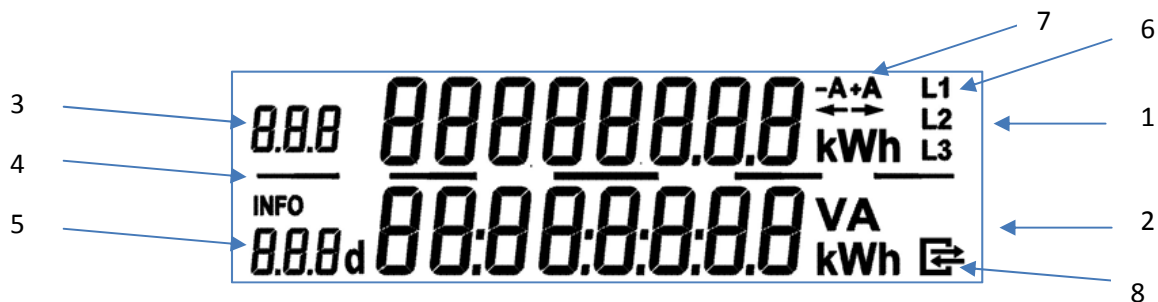


Fig. M Display

- 1 First line
- 2 Second line
- 3 OBIS code
- 4 Running indication
- 5 Measuring duration, due day period
- 6 Phase voltage active
- 7 Energy direction indicator
8. Communication symbol

8.2.1 Energy import and export display (rolling)

The first line is used to display consumption values and the second line contains only additional information. A 6 or 8 digit LCD display without decimal places is on default available for display of the consumption values. The unit "kWh" is displayed on the right next to the energy value in the display. Meter readings and additional information that are necessary for calibration are displayed.

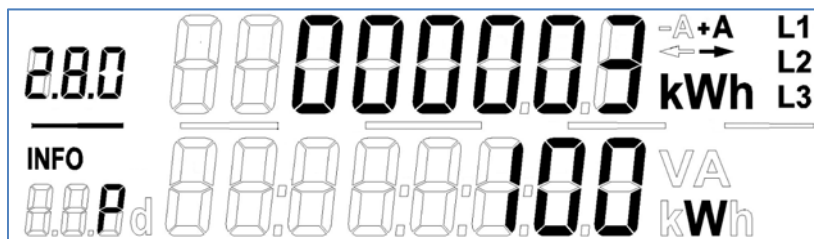
- The three figure OBIS code on the left of the 1st line is for identification of the meter value. The import and export energy are displayed in an alternating rolling mode that changes every 10 sec.

- The 2nd line contains information values, such as the absolute value of the actual active power, which the user can protect with a PIN (according the EDL function). The actual energy direction/the actual power sign is indicated by arrows and the display +A or -A.

Example 1 display of the import register 1.8.0 +A, actual power P



Example 2 display of the export register 2.8.0 -A, actual power P



8.2.2 Display with optional due day value (rolling)

The ELICIUS can display an optional due day register value. The register value is "frozen" at the end of the last day of a due day period and displayed with the additional information about the repetition period and the due day date. The periods 7 days, 30 days and 365 days can be selected in the factory for the basic meter.

- The three digit OBIS code is on the left of the 1st line. The due day register value for the import energy (1.8.0) is displayed for 10 sec. alternating with the other displays of the first line.
- The 2nd line contains additional information about the due day. During display of the due day register value in the first line, the field "Info" in the second line is hidden. Visible are:

Left the repetition duration of the due day value (e.g. 30 d (every month) and
 Right the due day date of the last stored due day value (register value), e.g.
 30.4.2015 (last day in the month)



8.2.3 Additional information about the operating condition

In addition to the register values operating information is displayed on the right of the display. This includes:

- Indications L1, L2, L3
which indicates the presence of the respective phase voltage L1, L2, L3
- Arrows with the identifier +A, -A
indicating the actual energy direction or the instantaneous power sign.

The arrows and +A, -A are only visible if the actual power is greater than the meter starting threshold.

- In the middle a running indication (operating check),
comprised of segments, indicating power above the starting threshold, independent of the energy direction, sequentially illuminate from left to right.

The segments are only illuminated if the actual power is above the starting threshold. The "Running speed" of the segments is dependent on the power measured.

- A communication symbol for bidirectional communication
This is not used in the current ELICIUS (Fig. M).

8.2.4 Optional EDL information (step operation)

If the button is pressed once, the display switches to "Step operation".

In step operation the ELICIUS displays "historical consumption values" optional for the import energy. These are energy consumption values during periods of the last 1 day, 7 days, 30 days (1 month) or 365 days (1 year). They are displayed with 1 decimal digit in the 2nd display line, are not suitable for billing purposes and serve to inform the end user of their energy consumption. The period over which the historical value is formed, moves forward by one hour after each completed hour. Simultaneously the first hour of the old period is subtracted. The historical consumption values are displayed together with the "Info" indication and the unit "kWh" in the 2nd display line.

- Further on, the three digit OBIS code and the actual value of the register is on the left of the 1st line. The information for the values 1.8.0 and 2.8.0 is displayed alternating until the button is pressed again. Only a display segment test interrupts the output.
- The 2nd line contains information about the historical consumption value. The "Info" field is displayed. The value is displayed until the button is pressed again. Then the historical value of the next period appears. The indications are:

Left the period of the historical consumption value, e.g. over 30 d (one month) and
Right the energy consumed during the period, e.g. 232.1 kWh.



If the historical period is not completed, no energy values are displayed until the period is finished. The display then appears as follows:



In the ELICIUS a further historical consumption value is formed with the label "E". This is the label for a resettable register that counts up until it is reset by pressing the button with a long push. If pressing and holding the button (more than 3 seconds) while "E" is displayed resets the register E. In step operation the display "E" appears as the first historical value before the values for 1, 7, 30 and 365 days are displayed.

- The three figure OBIS code and the actual register value are shown on the left of the 1st line. The information is displayed until the button is pressed again.
- The 2nd line contains information about the historical consumption value. The "Info" field is displayed until the button is pressed again. Then the historical value of the next period appears. The indications are:

Left the label E for a historical consumption value and
 Right the energy consumed since the last reset, e.g. 30.8 kWh.



8.2.5 Other indications

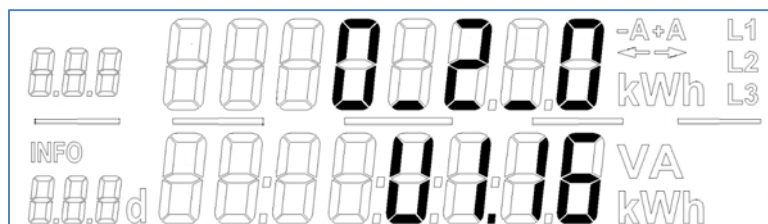
A display segment test is performed in rolling and step operation separated on upper and lower display lines.



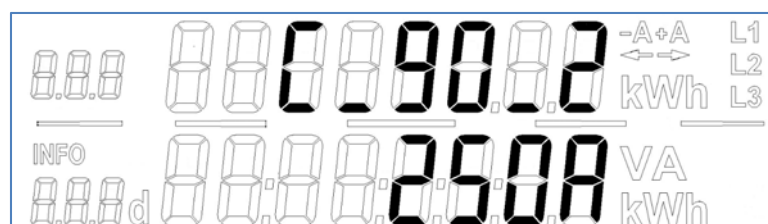
Actual date (optional, in rolling operation)



Display of the meter firmware version (once after voltage on)



Display of the firmware checksum (once after voltage on)



9 Variant strip of the meter

The ELICIUS is configured in the factory depending on the application ordered. The following variant list is available for the meter.

9.1 Determination of the total energy E_{total} in the basic meter

The ELICIUS enables measuring modes of the active energy for five different conditions. The registers are always labelled with either 1.8.0 or 2.8.0.



NOTE

The metrological labelling and article number on the meter rating plate and the meter designation lead unambiguously to the measuring variant (Fig. B).

Variant 1: Import energy meter with reverse running stop

$$\begin{aligned} E_{\text{total}} &= E_{L1} + E_{L2} + E_{L3} && \text{for } E_{L1} + E_{L2} + E_{L3} > 0 \text{ in register 1.8.0 and} \\ E_{\text{total}} &= 0 && \text{for } E_{L1} + E_{L2} + E_{L3} < 0 \end{aligned}$$

Variant 2: Two direction meter

$$\begin{aligned} E_{\text{total}} &= E_{L1} + E_{L2} + E_{L3} && \text{for } E_{\text{total}} > 0 \text{ then } E_{\text{total}} \text{ in register 1.8.0} \\ & && \text{for } E_{\text{total}} < 0 \text{ then } E_{\text{total}} \text{ in register 2.8.0} \end{aligned}$$

Variant 3: Export energy meter with reverse running stop

$$\begin{aligned} E_{\text{total}} &= E_{L1} + E_{L2} + E_{L3} && \text{for } E_{L1} + E_{L2} + E_{L3} < 0 \text{ in register 2.8.0 and} \\ E_{\text{total}} &= 0 && \text{for } E_{L1} + E_{L2} + E_{L3} > 0 \end{aligned}$$

Variant 4: Export energy meter without reverse running stop

$$\begin{aligned} E_{\text{total}} &= E_{L1} + E_{L2} + E_{L3} && \text{for } E_{\text{total}} < 0 \text{ then add in register 2.8.0} \\ & && \text{for } E_{\text{total}} > 0 \text{ then subtract in register 2.8.0} \end{aligned}$$

Variant 5: Two direction meter with always positive registration direction

$$E_{\text{total}} = |E_{L1}| + |E_{L2}| + |E_{L3}| \text{ in register 1.8.0}$$

9.2 Variant designations of the ELICIUS

The following variant designation is printed on the rating plate of the meter.

E3		ELICIUS three-phase meter	
			<u>Current range</u>
	N - -		0.1 - 5(60)A
	M - -		0.1 - 5(65)A
	H - -		0.1 - 5(100)A
			<u>Data list</u>
	- A -		List 1A or 1B (with due day)
	- B -		List 2
	- C -		List 3
			<u>Measuring type</u>
	- - 1		Import energy meter with reverse running block
	- - 2		2 direction meter
	- - 3		Export energy meter with reverse running block
	- - 4		Export energy meter without reverse running block
	- - 5		2 direction meter with always positive metering direction
			<u>Decimal places of the display:</u>
		6 - -	6 places, no decimals
		8 - -	8 places, no decimals
			<u>Due day generation, battery</u>
		- 0 -	without
		- 1 -	with
			<u>Module communication 1</u>
		- - 0	not fitted
		- - B	wM-Bus, unidirectional, mode 7, T1
		- - W	wM-Bus, unidirectional, mode 5, T1
			<u>Module communication 2</u>
		0 -	not fitted
		M -	M-Bus
			<u>Communication module changeability</u>
		- 0	Module can be changed
		- 1	Module is mounted below the seal (not changeable)

9.3 Basic meter parameter list

Parametername	OBIS code						Wertebereich
	value group C		value group D		value group E		
Device ID 10 (EVU)	96	.	1	.	9		32 ASCII
Erasing of "Historical Value"	1	.	8	.	0	* 96	Delete
"Historical Value" ON/OFF	94	.	49	.	1	* 8	0: OFF 1: ON
PIN Protection ON/OFF	94	.	49	.	1	* 6	0: OFF 1: ON
Protection of the Power indication ON/OFF	94	.	49	.	1	* 1	0: OFF, Power indication in rolling Modus; 1: ON, Power indication in Step Modus, if PIN Protection ON, otherwise NO indication
PIN Code Value	94	.	49	.	1	* 7	0001 bis 9999
Due Date Periode	96	.	8	.	12		0: Yearly 1: Monthly 2: weekly
Due Date	96	.	8	.	14		YYMMDD Attention: Changes force the erasing of historical due date registers
Time	0	.	9	.	1		hhmmss
Date	0	.	9	.	2		YYMMDD
Realtime Clock Synchronisation	96	.	8	.	15		YYYYMMDDhhmmss
Password 0	0E	.	05	.	00		8digit ASCII e.g. 0XXXXXXX
Password 1	0E	.	05	.	01		8digit ASCII e.g. 1XXXXXXX
Password 2	0E	.	05	.	02		8digit ASCII e.g. 2XXXXXXX
	Features are delivered exworks						

9.4 Communication module parameter list

		Default	Option
RF configuration (EN 13757-4)	RF function	On	Off
	Encryption Mode	5	7
	Mobile periods (min. 0.1% duty cycle)	8 sec	Range: 8 to 255 sec
	Fixed network periods	Off	Range: 1 to 255 min
	Fixed network periods (DM mode)	5 min	Range: 4 to 255 min
	RF M-Bus Header	Long	Short
	AES key	Individual	Fixed
	Due day configuration	Due day	Load profile
	M-Bus primary address	0	1 to 250

10 Maintenance and repair



NOTE

Information concerning reconditioning or maintenance can be found in the processing concept.

11 Testing



NOTE

Detailed information about testing can be found in the corresponding inspection and testing guide.

Can also be found in the EC type examination certificate (documents for testing) and in DIN EN 50470. The number of the type examination certificate can be taken from the print-out on the ELICIUS.

12 Removal



CAUTION

Danger due to applied voltage.

Can result in electric shocks!

⇒ Before removing the meter, open the main circuit breakers/remove the main fuses.

⇒ Remove the electricity meter.

12.1 Disposing of the electricity meter



NOTE

The device contains an optional lithium battery. Do not use force to open it. The battery must never come into contact with water, be short-circuited or exposed to temperatures over 85 °C. Empty batteries and no longer required electronic devices or components are hazardous waste.

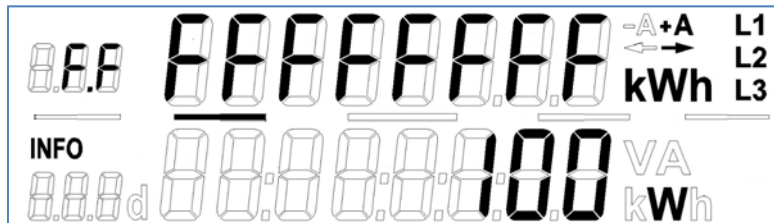
⇒ Dismantle the electricity meter.

⇒ Dispose of individual meter parts at suitable collection points.

13 Troubleshooting

The meter constantly performs self-diagnostics and can display various error messages. The occurrence of a fault is displayed every 2 sec in rolling display operation.

Error display (displayed every 2 sec in alternation with the default display)



NOTE

If the above fault indication occurs in the display, the meter is defect and must be replaced.

14 Declaration of Conformity

The Declaration of Conformity for supplied goods is enclosed with every shipment.