

Ultrasonic energy meter

Contatore di energia ad ultra suoni

Ultralydsenergimålere

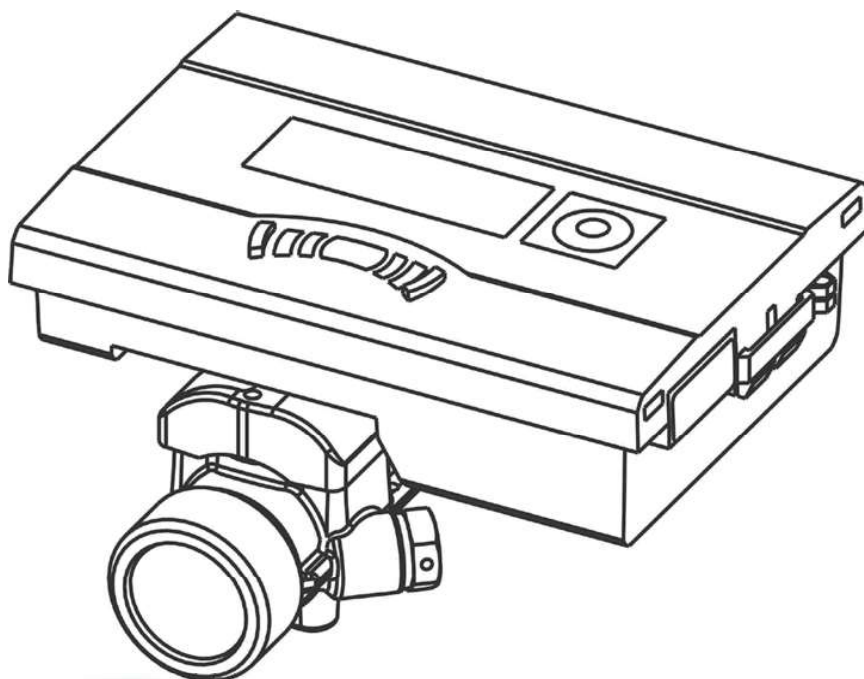
Ultraljuds-energimätare

Installation guide

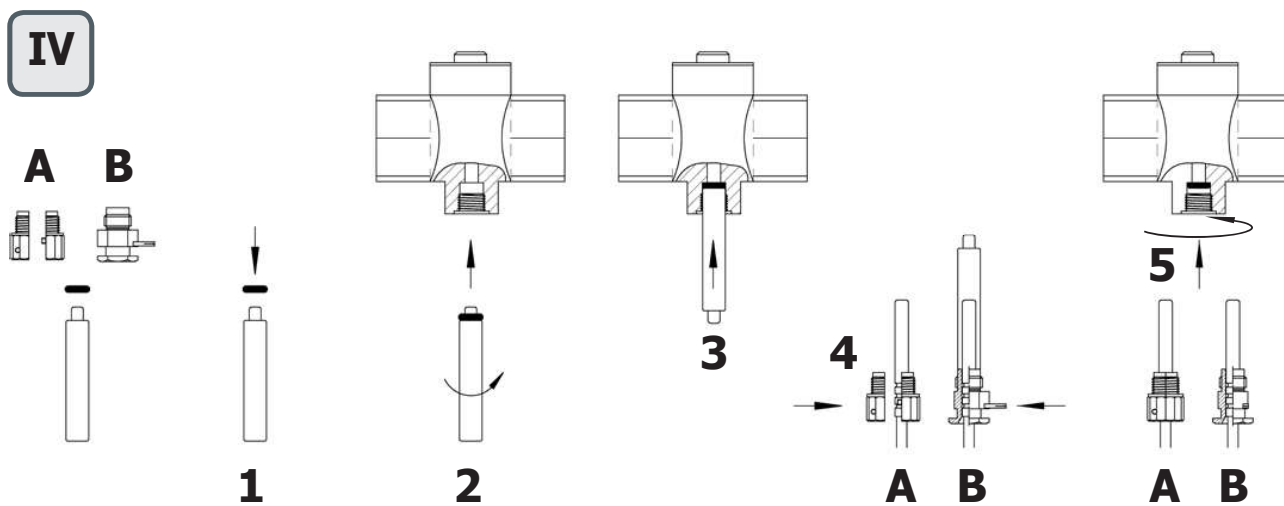
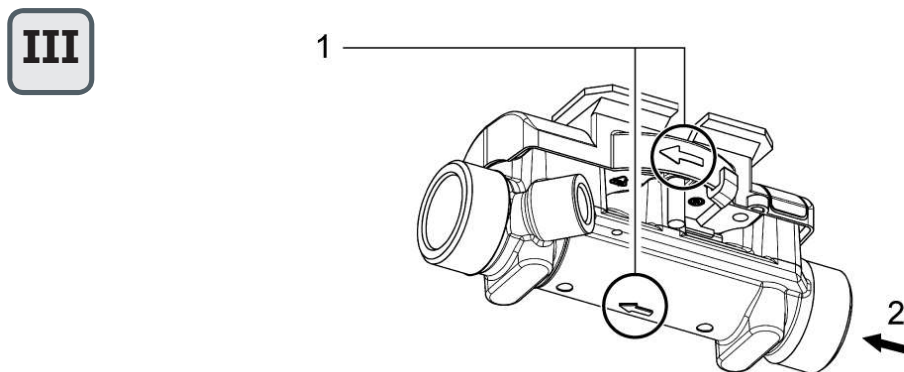
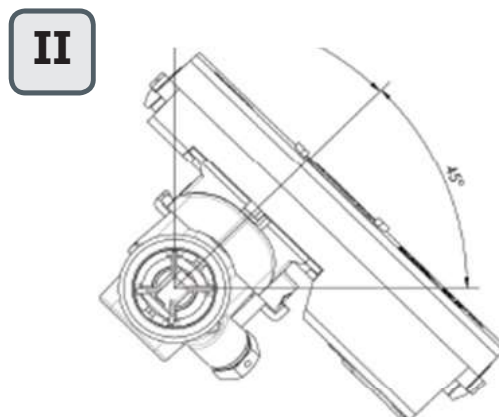
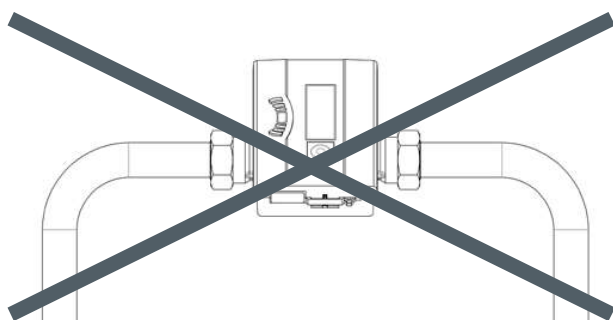
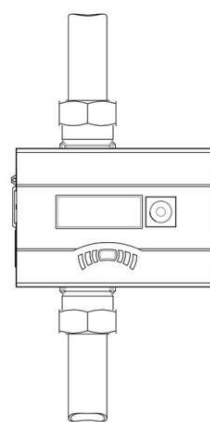
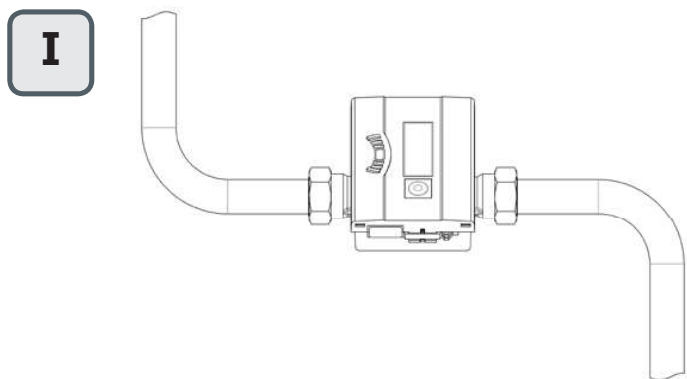
Istruzioni per il montaggio

Installationsvejledning

Monteringsanvisning



This guide must be given to the end consumer. Consegnare queste istruzioni al cliente finale. Denne vejledning skal afleveres til montøren. Denna bruksanvisning ska överlämnas till kunden.



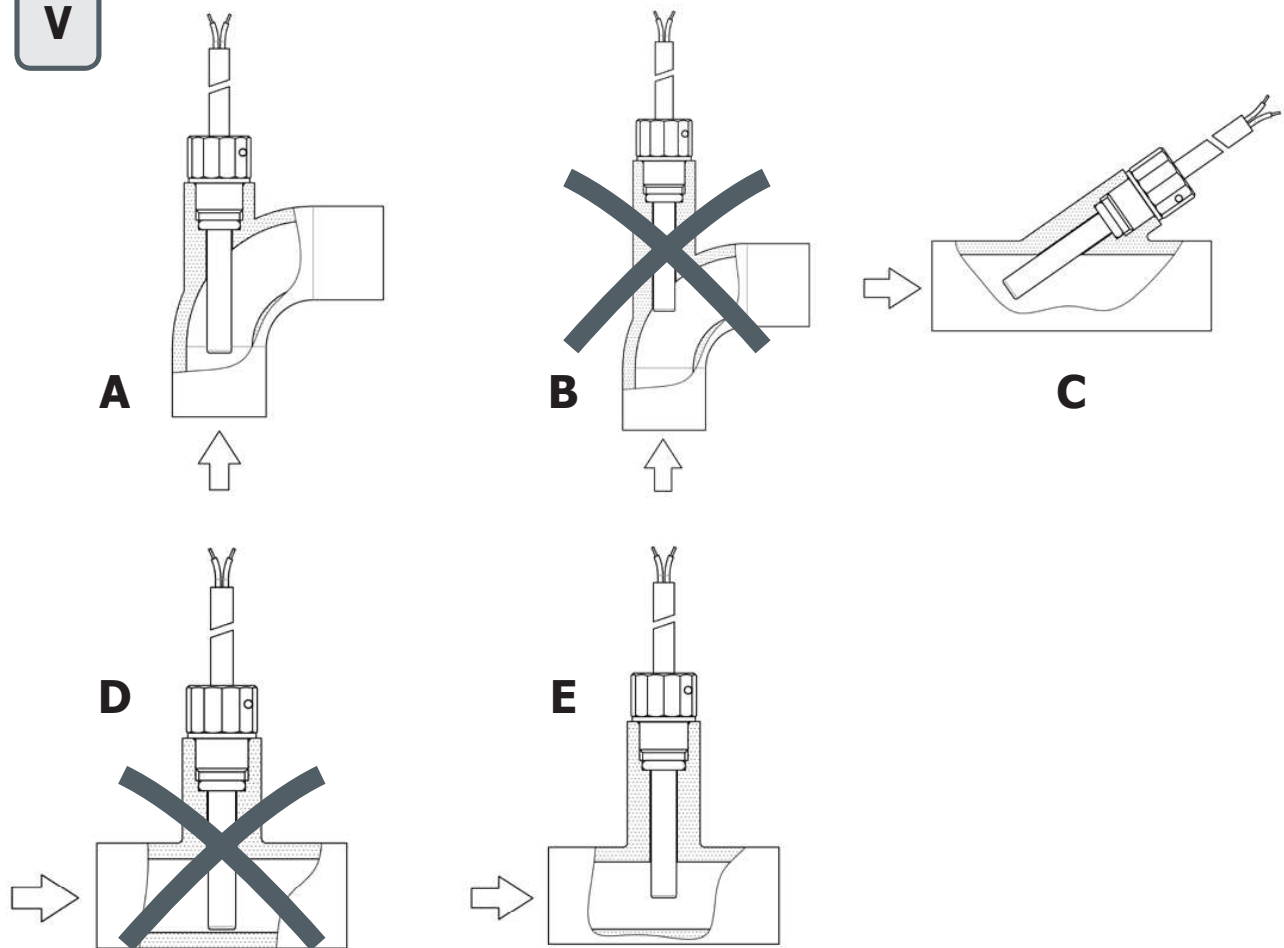
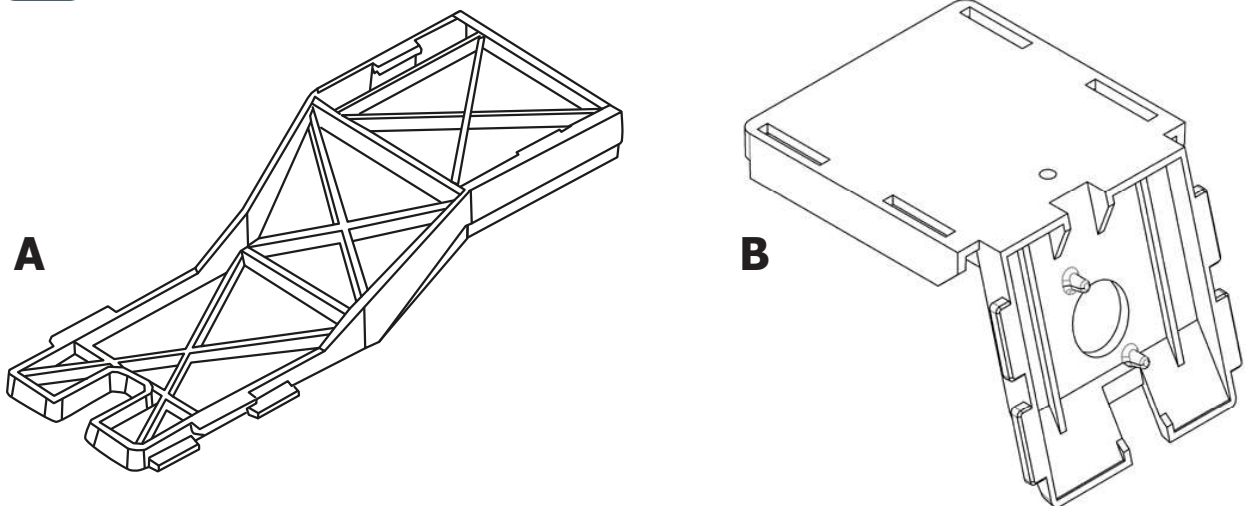
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1. General

This guide is intended for trained specialised personnel. For this reason no basic working steps are included.



The meter tamper-evident seal must not be damaged!
A damaged seal will result in immediate invalidation of the factory warranty and verification or declaration of conformity. The cables supplied with the meter must neither be shortened, extended nor changed in any other way.



The regulations on the use of energy meters must be observed!
The installation must only be carried out by a specialist company. The personnel must be trained in the installation and handling of electrical equipment.



Medium

Water according to AGFW-Worksheet FW510 (the lifecycle of the meter may be impaired if not observed).

- The temperature range depends on variant and nominal size.

Detailed user guide available at <http://www.diehl.com/en/diehl-metering/products-solutions/product-download/>.

This user guide must be observed without fail.

The IZAR@SET software is used for readout/parametrization and is available online at <http://www.diehl.com/en/diehl-metering/products-solutions/product-download/>.

Please select the partner "Diehl Metering GmbH" and the product area "Metering Systems".

1.1 Operating conditions



The temperature conditions for the flow sensor and the temperature sensor depend on the application and can be found on the printing of the meter.

Climatic conditions

The ambient temperature must be between 5...55 °C.

Temperatures > 35 °C have a positive effect on battery lifetime.

2. Transport and storage

Unpacking

Energy meter are measuring devices and must be handled with care. To protect against damage and soiling, they should only be unpacked immediately prior to installation.

Transport

The transport of the meter is permitted only in the original package.



When sending wireless measuring instruments / components by air, deactivate the wireless before shipping.

Storage

- The meter must only be stored in a dry location.
- Typical storage temperature +5 °C ... 55 °C
- Maximum storage temperature -20 °C ... 60 °C (dry, duration up to 4 weeks)
- Relative humid environment < 93 %

3. Assembly / installation



The meter may only be installed in frost-free spaces. Be careful of sharp edges.

Assembly and disassembly only in depressurised system.



The meter is to be protected against damages due to impacts and vibrations.

The pipelines are to be attached before and behind the meter.



Pipes for measuring signals are to be installed far away from other power lines.



When choosing the installation location, make sure that the meter is perfectly accessible for service and operating personnel.

It is recommended that shut-off valves are fitted before and after the meter to simplify removing the meter.

3.1 Preparatory work

1. Rinse the conduit thoroughly.
 2. Close the stop valves upstream and downstream of the meter and depressurise the pipeline.
-



It is recommended to install a dirt trap in front of the flow sensor or at another suitable position of the circulation.

No inlet or outlet path is necessary for the installation of a flow sensor.

With heating systems without temperature mixing or temperature stratification, the pre-connection of a feeding length of 3-10 DN in front of the meter is recommended.

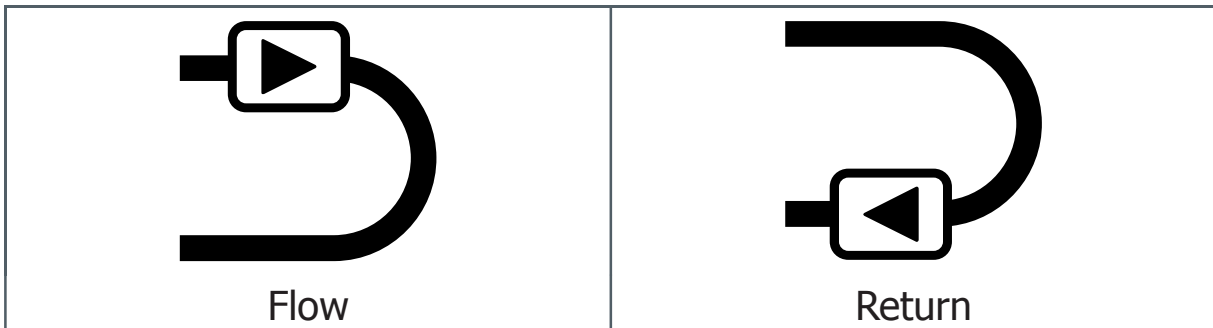
3.2 Installing the flow sensor



During heat application, $T_{\text{water}} > T_{\text{ambient}}$ must be permanent. During cold application or with $T_{\text{water}} < T_{\text{ambient}}$ variant cooling meter is to be used.

Mounting position / Position

- The meter can be installed in both horizontal and vertical pipe sections (see fig. I).
- We recommend installing the flow sensor in a tilted position, to transport possible air bubbles from the circulation (see fig. II).
- Install the flow sensor so that the flow direction matches the arrow direction on the sensor (see fig. III).
- Depending on the version, the flow sensor must be installed in flow or return. The installation position is displayed in the info loop 3.4 (see "Information loop (3)" at page 15) and also by means of a pictogram.



Please make sure that the flow sensor is always filled with water. The meter measures only the energy of completely filled pipelines. Otherwise a corresponding error message is shown in the display.

The minimum system pressure to avoid cavitation is 1 bar.

3.3 Fitting the temperature sensor pair



The meter is only sold with separately approved temperature sensor pairs of type Pt 500.

Handle the temperature sensor carefully!

The sensor cables are provided with coloured type plates:

- Red: sensor in the hot line
 - Blue: sensor in the cold line
-



The connecting lines of the temperature sensors, may not be shortened or extended.

A common routing in cable conduits or on cable racks with power supply lines are not admissible.

The minimum distance for low voltage cables according to EN 1434 - 6 of 50 mm must be observed.

3.3.1 Installation in the ball valve with adapter

(coupling set in a separate bag)

Use ball valves with installation option for temperature sensor with thread M10 x 1.

Preparatory measures

- Close the ball valve.
- Unscrew the plug screw from the ball valve.

Installation (see fig. IV)

1. Place the O-ring from the attached coupling set (type A or B) on the mounting pin.
2. Insert the O-ring with the mounting pin into the sensor hole of the ball valve (turn the mounting pin).
3. Position the O-ring in its final position using the other end of the mounting pin.
4. Fastening screws
 - Type A (plastic) - put the fastening screw onto the temperature sensor.

- Type B (brass) - slide the fastening screw onto the temperature sensor and attach the fastening screw with the dowel pin. Press in the dowel pin completely and remove the mounting pin from the temperature sensor.
- 5. Insert the temperature sensor with adapter fitting into the ball valve and tighten fastening screw by hand (2-3 Nm).

3.3.2 Installation in a pocket

In case of new installations, temperature sensors for nominal sizes DN25 or smaller should only be installed immersed.

This ensures higher measuring accuracy.

3.4 Installing the integrator



Pay attention to sufficient distance between integrator and possible electromagnetic sources of interference (switches, electric motors, fluorescent lamp, etc.) during installation.

For medium temperatures from 90 °C or for $T_{\text{Water}} < T_{\text{Ambient}}$ (cooling meter application) the integrator must be removed and fitted at a sufficient distance from any heat/cold sources. The adapters VI A or VI B are available.

3.5 Functional testing

After installation of the meter, putting into operation and functional testing can be performed.

Proceed as follows:

- Open the stop valves
- Check system for tightness
- Bleed the system till the flow indication is stable. Adjust the system by means of the flow indication
- After a short while the message "E-7" disappears in the display.
- Press the push button next to the display and check the displays for temperature and flow for plausibility.
- Attach tampering protection at the integrator and the temperature sensors.
- Read and note meter data for energy, volume and serial number.

Error messages when assembly is wrong

Error code	Description
E - 3	Temperature sensors were mixed up during installation or connection.
E - 6	Meter were installed against the planned flow direction.



During system downtime the error messages "E - 3" and "E - 6" may appear without possible wrong assembly inside.

4. Communication

4.1 M-Bus wired (optional)



A 2 pin M-Bus line lead out of the housing.
Connect the M-Bus line with the marked connections of the M-Bus Master.

Here it concerns a serial interface for communication with external devices (M-Bus control centres), e.g. IZAR CENTER.

- Standardised according to EN 13757-3
- Galvanic isolation
- Polarity reversal protection
- Power consumption: One M-Bus load
- Primary or secondary addressing
- Baud rate 300 or 2400 baud (automatic baud rate detection)
- Protocol: M-Bus
- Reading interval: every 3 minutes *

* the meter detects, if the reading is done more often than every 3 minutes. The meter stopped sending responses and confirms with the error code E-5 (too frequent read-out via M-Bus). The error is automatically deleted after a variable break time and communication is then possible again.

4.2 M-Bus wireless radio (optional)

The integrated radio module is an interface for communication of protocols with Diehl Metering radio receivers. The communication protocol is preset.



Note on radio function

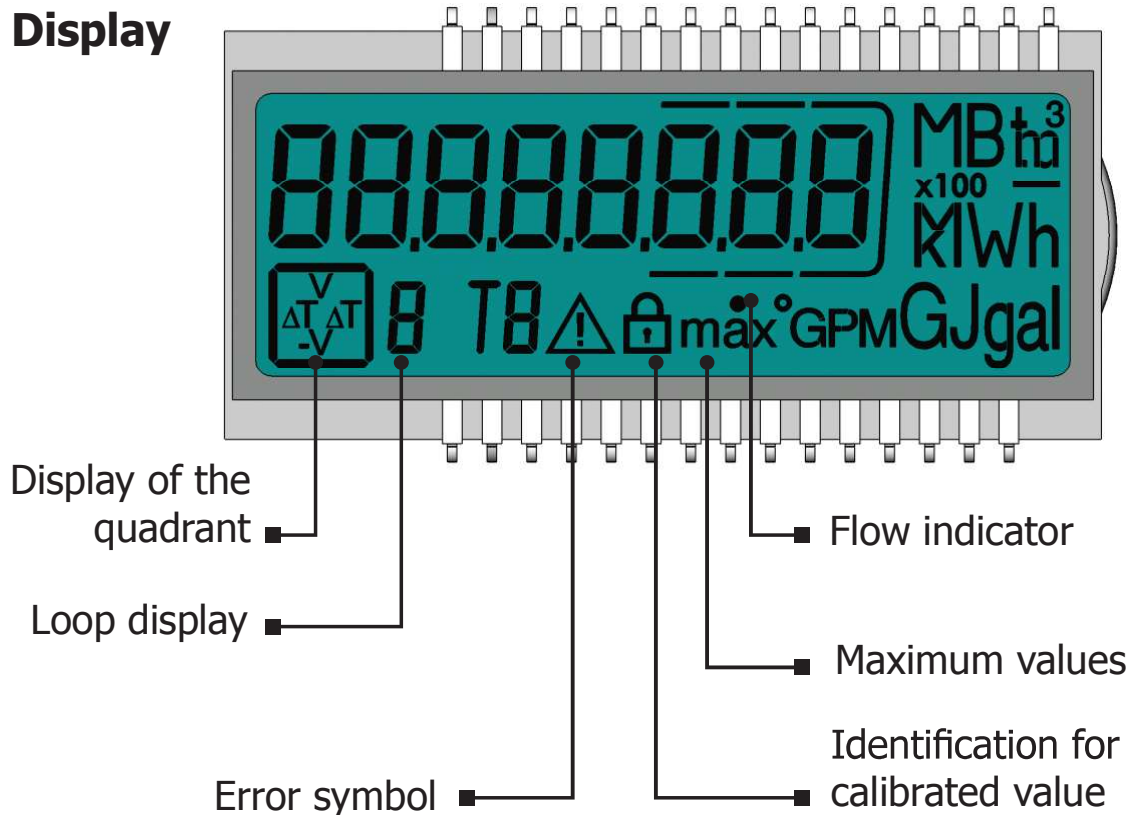
The radio function is switched off on delivery and activated automatically when water is detected in the meter. The radio function remains permanently active after a period of continuous operation (>3 hours) with water.

The integrated radio interface is specified with:

- Unidirectional transmitting direction
- Data timeliness: Online - no time delay between data logging and data communication
- The integrated radio accesses always the actual meter readings
- Transmission frequency: 868 MHz
- Various Diehl Metering receivers are available for receiving the protocol (e.g. Bluetooth, GPRS, LAN, ...)
- Encrypted protocol: Open Metering Standard
- Reading modes: Walk-By, Drive-By, Fixed-Network

5. Display / Operation

5.1 Display



The visualization at the meter is done via a 8 digit LCD with unit and symbol display.

5.2 Push button

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

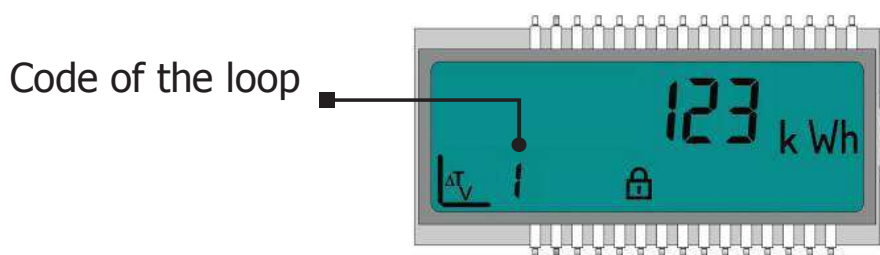
Action	Function
Briefly press the key (<3 seconds)	Switch within one loop
Hold the key (> 3 seconds)	Switch to the next display loop
Do not press the key for 4 minutes	Meter turns off the display automatically (energy saving, only if no error prevails)
Press the key again	The meter is in the basic display

5.3 Display loops

The data read by the integrator can be viewed in several displays. These displays contain the assigned system information (e.g. accumulated energy, accumulated volume, flow, power, actual temperatures, ...) and can be accessed by calling the displays in the pre-defined sequence / loop. The display content of each loop is programmed at factory with standard information.

Various display windows consist of up to seven value displays alternating in the 2 - 4 s rhythm.

The display is updated every 2s, since an internal calculation takes place every 2s.



Main loop (1)

Sequence	Window 1	Window 2
1.1	Accumulated energy	
1.2	Accumulated volume	
1.3	Accumulated cold energy (heat meters with cooling tariff)	
1.4	Flow	
1.5	Power	
1.6	Flow temperature Return flow temperature *)	Return flow temperature **)
1.7	Differential temperature	
1.8	Operating days	
1.9	Error status	Error hours
1.10	Display test	

*) without a decimal place; **) with one decimal place respectively

The basic display shows the display "energy", if the meter is integrated into the pipeline, the pipeline is filled completely with water and no error prevails (sequence 1.1).



As soon as an error occurs, it is permanently shown in the basic display. The meter will not enter the power saving mode. If the cause of the error is eliminated, the error in the display disappears.

Due date loop (2)

Sequence	Window 1	Window 2	Window 3
2.1	Due date 1 date	Due date 1 energy	"Accd 1A"
2.2	"Accd 1"	Date of future due date 1	
2.3	Due date 1 previous year	Date due date 1 previous year energy	"Accd 1L"
2.4	Due date 2 date	Due date 2 energy	"Accd 2A"
2.5	"Accd 2"	Date of future due date 2	
2.6	Due date 2 previous year date	Due date 2 previous year energy	"Accd 2L"

Information loop (3)

Sequence	Window 1	Window 2
3.1	Actual date	
3.2	"SEC_Adr"	Secondary address
3.3	"PRI_Adr 1"	Primary address
3.4	Installation location	
3.5	Software version	Check sum

Month loop (6) (heat- or cooling meter)

Sequence	Window 1	Window 2	Window 3	Window 4
6.1	"LOG"	Date last month	Energy	Volume
6.2	"LOG"	Date -1	Energy	Volume
:	:	:	:	:
6.24	"LOG"	Date -23	Energy	Volume

Month loop (6) (heat meters with cooling tariff)

Sequence	Window 1	Window 2	Window 3	Window 4	Window 5
6.1	"LOG"	Date last month	Heat energy	Cold energy	Volume
6.2	"LOG"	Date -1	Heat energy	Cold energy	Volume
:	:	:	:	:	:
6.24	"LOG"	Date -23	Heat energy	Cold energy	Volume

6. Error messages



The meter constantly performs self-diagnostics and can display various error messages. If an error occurs, the error code is displayed in the main loop.

All windows, however, can still be accessed by pressing the key. The error message disappears automatically as soon as the source of the error is corrected. All errors that occur for longer than 6 minutes without interruption, are saved in the error memory.

Error code	Description
C - 1	Basic parameter error in flash or RAM - Meter must be replaced
E - 1	Erroneous temperature measurement Temperature range exceeds [-19.9 °C...190 °C] Sensor short circuit Sensor break
E - 3**	Temperature sensor mixed up in hot and cold line
E - 4	Hardware error during ultrasonic measuring Ultrasonic transducer defective Short-circuit ultrasonic transducer
E - 5	too frequent reading no M-Bus communication possible for a short time
E - 6**	flow direction incorrect Installation of flow sensor wrong
E - 7	No reasonable ultrasonic receive signal Air in the measuring path
E - 9	Warning: Running out of battery capacity

** application dependent

7. Maintenance



Flow sensor and temperature sensor may not be connected from the integrator.

After repair work, perform recalibration in an accredited testing agency.



Information concerning reconditioning or maintenance can be found in the processing concept (this will be made available for laboratories and testing agencies upon request).

8. Disposal



The meter contains a lithium battery, which is not rechargeable. Do not use force to open the battery. It must never come into contact with water, short-circuited or exposed to temperatures over 75 °C.

Empty batteries and no longer required electronic devices or components are hazardous waste.

This device must not be disposed together with the domestic waste. Return it to the manufacturer for recycling.

9. Declaration of conformity for MID meters

See from page 65 onwards.

Further information as well as the actual declaration of conformity are available at:

<http://www.diehl.com/en/diehl-metering/products-solutions/product-download/>

Please select the partner "Diehl Metering GmbH" and the product area "Thermal Energy Metering".