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### 1. Installation guide

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



The seal on the meter (see fig. IV, pos. 18) must not be damaged!

A damaged seal will result in immediate invalidation of the factory warranty and calibration/conformity.



The meter must be installed in compliance with the requirements of EN 14151 and the EC Type Examination Certificate!

The standards for drinking water installations (e.g. DIN 1988) must be observed!

Medium: Water without additives

The IZAR@SET software is used for readout/parametrization and is available online at [www.diehl.com/metering](http://www.diehl.com/metering).

**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.

**2. Transport and storage**

- Water meters are precision devices and must be protected against impact and vibration!
- Store meters in a frost-free place (also during transport).
- The meter can be damaged by frost.

**3. Installation / Initial operation**

- If a risk of frost exists, empty the system and, if necessary, remove the meter.
- Thoroughly flush out the pipes before installing the meter.
- If the water is soiled, fit the strainer in the pipe in front of the meter.
- The meter is to be installed so that the direction of the arrow on the meter housing corresponds to the direction of flow.
- Avoid the collection of air bubbles in the meter during the installation process.
- Make sure the meter is installed sufficiently far away from possible sources of electromagnetic interference (switches, electric motors, fluorescent lamps, etc.).
- Calming sections before and after the meter are not necessary.
- The meter must not be under any mechanical stress when installed in the pipe.
- Depending on the version, the meter is suitable for water temperatures from 0.1 °C to 90 °C.
- Slowly fill the pipe with water on completion of the installation.
- The meter must always be filled full with water.
- The meter must be protected against pressure shocks in the pipe.
- The meter may only be installed in frost-free areas.

## Non-return valve

- The meter can be supplied with a non-return valve (accessory) on request (nominal diameter DN 15 - DN 40).
- The non-return valve must be mounted in the meter outlet as shown in fig I for meters with a nominal diameter of DN 15 or fig II for meters with a nominal diameter for DN 20 and DN 40 or larger.
- For meters with a nominal diameter of DN 25/32, a compensating ring must be used to centre the non-return valve. (fig. III).



During the installation, the water meter must be held in this position (see fig. III) with a suitable tool to prevent damage to the plastic housing.

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## 4. Battery power supply (one or two batteries)

- Standard version with one 3.6 VDC lithium battery with a battery lifetime of up to 12 years depending on configuration and installation location.
- Meter version with two 3.6 VDC lithium batteries with a battery life time of up to 16 years depending on configuration and installation location.



Batteries cannot be retrofitted or replaced!

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## 5. Pin assignment of cable

The M-Bus, L-Bus or pulse variant of the meter is supplied with a 1.5-m long 3-wire cable with wire end ferrules.



Power supply takes place via the internal battery. An external power supply via a M-Bus Master is not possible.

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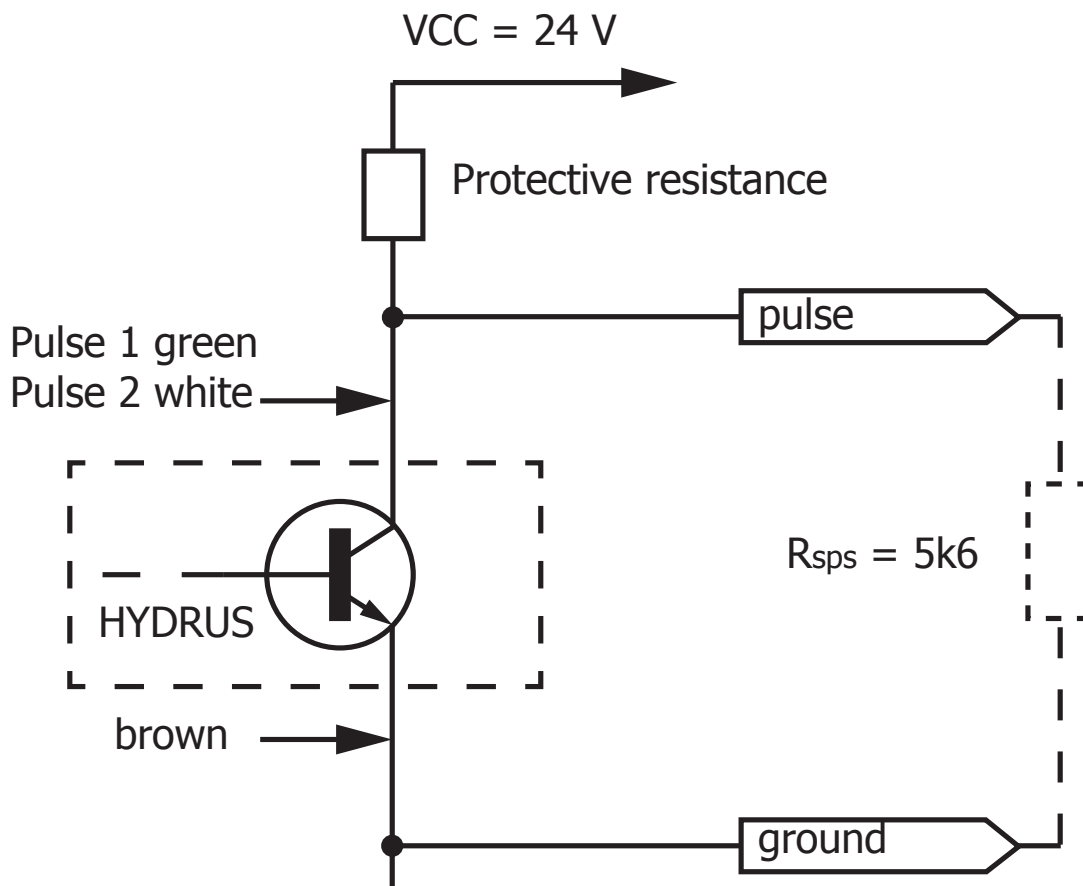
Version/colour	Pulse	L-Bus/pulse	M-Bus (2 wire)
white	Pulse 2	Pulse 2	M-Bus
brown	GND (ground)	GND (ground)	–
green	Pulse 1	L-Bus	M-Bus



### Galvanic isolation

Because of possible damage due to electrical corrosion a potential tension between the ground connection of the L-Bus / Pulse output and the meter housing (brass) should be avoided.

### Wiring diagram



The pulse outputs are open-collector circuits.

The collector branch has a resistance of just 0 ohm, i.e. there is no internal current limiting. If required, this must be provided by an external protective resistance.

The internal resistance of the switching device must be 5x of the protective resistance.

## 6. Due date function

The consumption values are stored in the memory on the set due date and kept until the next due date. They can be read off the display or transmitted over the M-Bus or optical interface. The due date can be programmed as required.

Ex works default setting = 31.12 of the year of delivery.

## 7. Pulse outputs (open collector)

The HYDRUS has two pulse interfaces. Depending on device configuration, the set pulse duration, pulse break and pulse frequency may be different.

Detailed description of the pulses can also be found in the HYDRUS product specification.

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

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

Input voltage	max. 30 V
Input current	max. 27 mA
Voltage drop at the active output	max. 2 V / 27 mA
Current through inactive output	max. 5 $\mu$ A / 30 V
Reverse current	max. 27 mA
Pulse duration, pulse break, pulse frequency	depending on device configuration (for a detailed description see "product specification")

### Available pulse variants:

- Pulse 1: Total volume or forward volume
- Pulse 2: Forward volume or direction or fault

## 8. Interfaces

The meter is equipped with various communication interfaces depending on the variant selected:

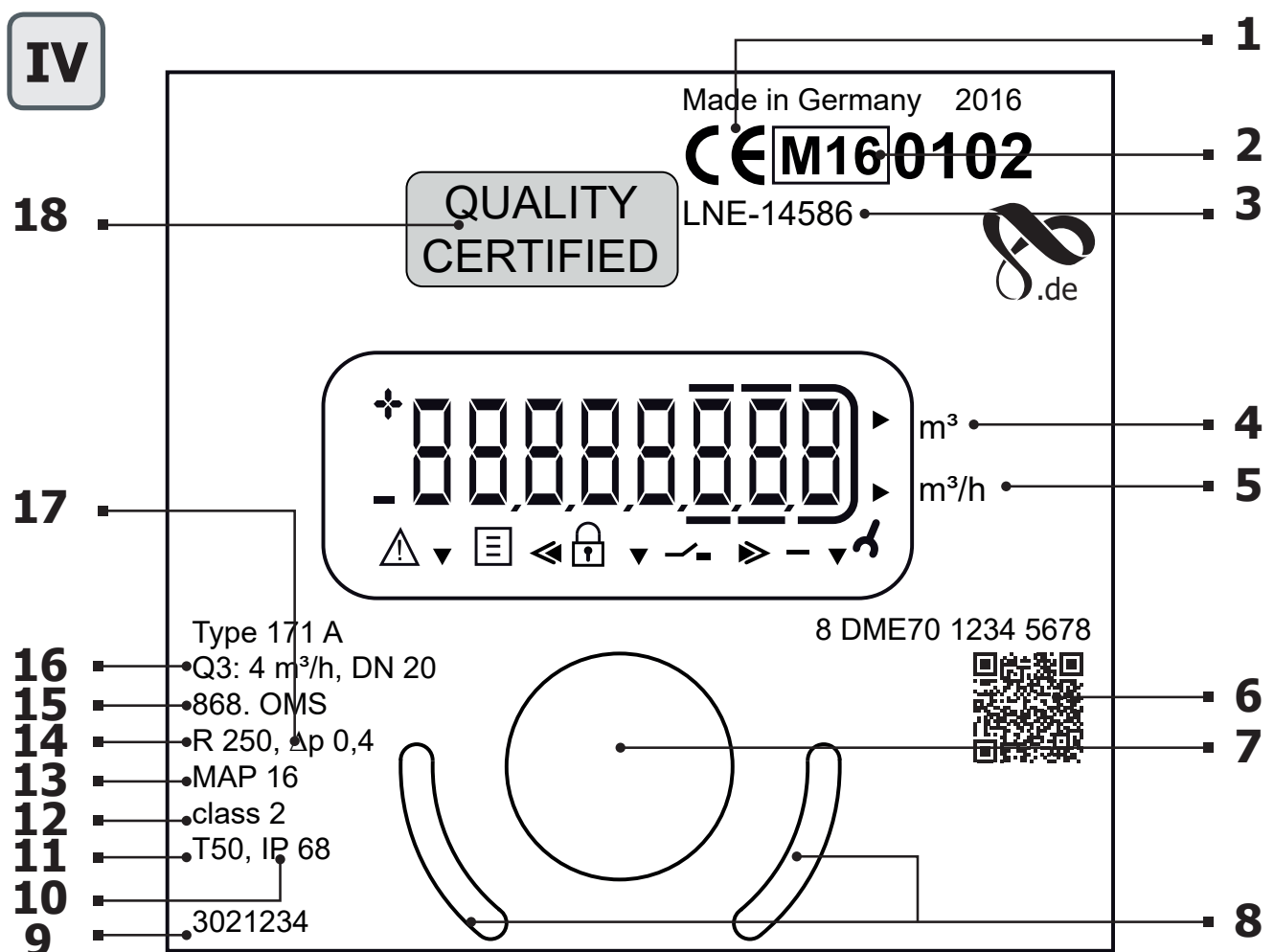
- Optical (standard)
- Radio 434 / 868 MHz (OMS or Real Data)
- Radio 868 MHz / L-Bus
- Radio 434 MHz / L-Bus
- M-Bus
- Pulse

The Communication Description of the interfaces is available on the Internet at <http://www.diehl.com/en/diehl-metering/products-solutions/product-download/>

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

## 9. Operation

To show the data read by the meter in the display, various windows have been created as functions that can be called up in succession to display the assigned system information (e.g. flow rate, volume, date, due date, medium temperature).



1	Conformity label	10	Protection class
2	Year of declaration of conformity	11	Max. temperature
3	Design examination certificate number	12	Metrological class
4	Water volume	13	Pressure stage
5	Flow	14	Dynamics
6	Serial number	15	Radio frequency MHz
7	Optical sensing device	16	Rated flow, internal diameter
8	Position aid optical head	17	Pressure drop
9	Article number	18	Lead seal

An optical touch button mounted on the front of the meter is used to switch to the various displays (see fig. IV pos. 7) This push button is used to switch to the various displays.

To save the battery, the meter switches to sleep mode (display off) if the button is not pressed for approx. 4 minutes; it can be woken up by pressing the button.

After wake-up, the current status appears in the display for approx. 2 seconds if an error exists; e.g. error message E -- 7 -- A (air in the pipe).

Ex works setting for operating mode of optical touch button (short press):

- Current total volume
- Display test (alternates between all on and all off)
- Error messages (if errors exist, e.g. "E -- 7 -- A")
- Flow rate (m<sup>3</sup>/h), display → "Err" if not installed
- Alternates between total volume on due date and due date
- Current reverse volume
- Alternates between software version and software checksum (e.g. "F05-005" → "C38520")
- Battery lifetime (display alternates between "batt" and date)

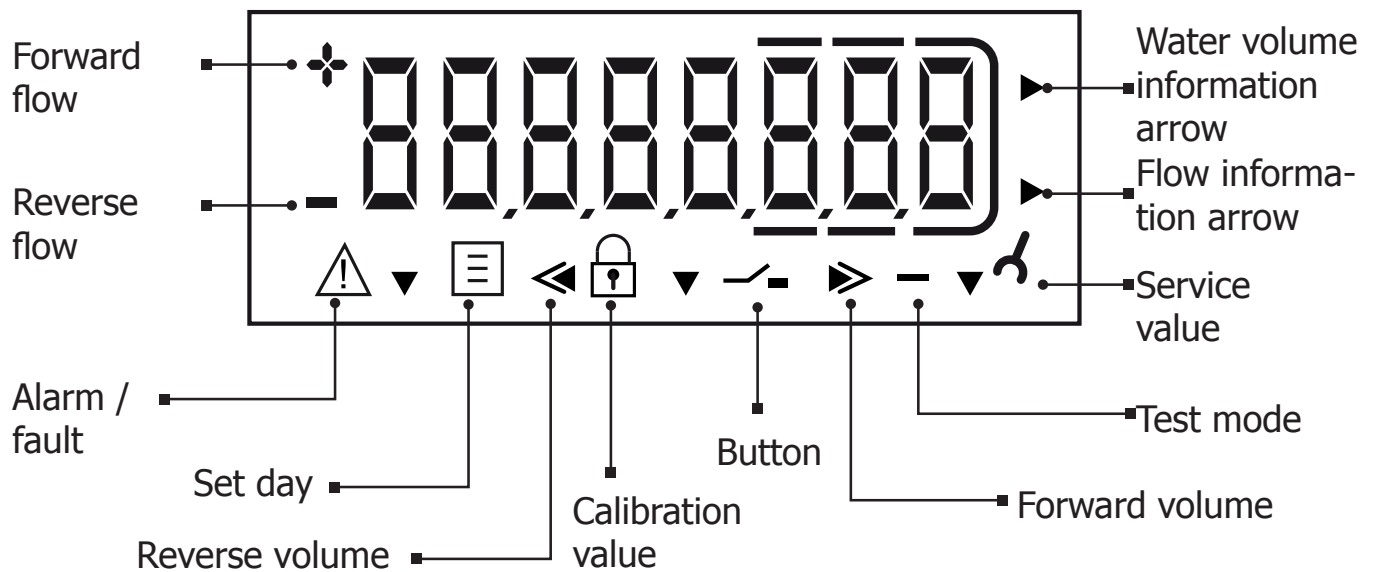


The loop settings can be programmed to suit customer-specific requirements using the IZAR@SET software.

## Additional display information (configurable)

- Medium temperature in °C or F
- Date and time
- Primary and secondary address
- Radio signal ON/OFF
- Pulse value (at interface Pulse)
- Forward volume
- Operating hours
- Due date reverse volume
- High resolution volume
- Error hours
- Error

## Display / symbols





## 10. Displays

**Error display** (visual indication on the LC display in the event of an error)

Error code	Description
C1	Basic parameter error in flash or RAM - Meter must be replaced The meter must be replaced.
E1	Temperature measurement error (temp. outside range, sensor short-circuit, sensor break) Replace meter if sensor short-circuit or sensor break
E4	Hardware error, faulty ultrasonic transducer or short-circuit in ultrasonic transducer The meter must be replaced.
E5	Too frequent reading (no communication possible for short time)
E7*	No meaningful ultrasonic signal, air in the measuring path

**Alarms** (Permanent visual indication on the LC display)

Alarm messages	Description
A1	Reverse flow
A3	no consumption
A4	Fault / failure of ultrasonic or temperature measurement
A5	Leakage alarm
A6	Low temperatures (below 3°C)
A7*	Air in the measuring path, no volume measurement
A9	Low battery

\*) If air is trapped in the measuring path, E7 is output to the display. After a defined time (standard 15 min.) the E7 changes to an A7. The A7 is output to the display and saved in the fault memory.



Combinations of error and alarm messages can occur simultaneously, e.g. E-7-A-1, corresponds to E7 and A1.

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## **11. Environmental note**

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

## **12. Declaration of conformity for MID meters**

See page 13.

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 "Water metering".