DIEHL
Metering

HYDRUS Residential USA

Ultrasonic Water Meter 173

User guide

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1 PRODUCT DESCRIPTION

1.1 GENERAL APPLICATION

HYDRUS is a static water meter suitable for all applications in the water industry and designed for maintenance-free long-term operation under almost all environmental and operating conditions. HYDRUS meters are tamper-protected, waterproof and UV-resistant and can be installed in any position and without calming sections. They are characterized by their outstanding long-term accuracy and functional reliability.

1.2 FUNCTIONAL PRINCIPLE

The measuring principle is based on the transit time difference of ultrasonic signals with and against the flow. With one pair of wetted transducers form a signal path the mean flow velocity is reliably measured even with a disturbed flow profile.

1.3 PERFORMANCE DATA

HYDRUS meets or exceeds the AWWA C-715 accuracy requirements for type I and type II meters.

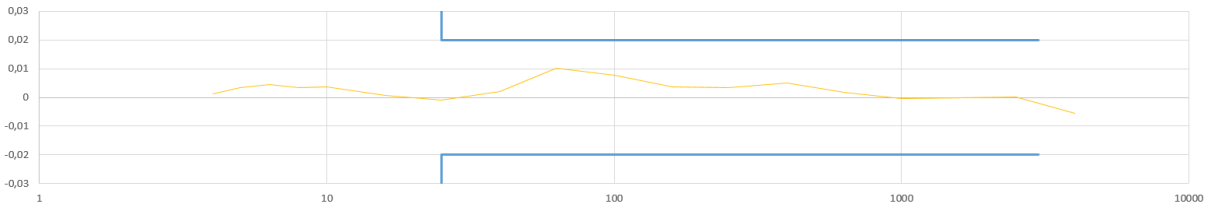
Measuring range

Size		⅝" x ½"	⅝" x ¾"	¾"S	¾"
Lay length	inch	7½	7½	7½	9
Operating flow range	gpm	0.08 - 22	0.08 - 22	0.1 - 32	0.1 - 32
Low flow range	gpm	0.025 - 0.08	0.025 - 0.08	0.04 - 0.1	0.04 - 0.1
Starting flow	gpm	0.011	0.011	0.017	0.017
Operating range accuracy	%	±1.5	±1.5	±1.5	±1.5
Low flow range accuracy	%	±5	±5	±5	±5
Pressure loss	psi	4.3@15 gpm	4.3@15 gpm	2.0@15 gpm	2.0@15 gpm

Size		1"	1 ½"	2" *
Lay length	inch	10¾	13	17
Operating flow range	gpm	0.1 - 55	0.16 - 100	0.8 - 170
Low flow range	gpm	0.055 - 0.1	0.1 - 0.16	0.55 - 0.8
Starting flow	gpm	0.025	0.038	0.11
Operating range accuracy	%	±1.5	±1.5	±1.5
Low flow range accuracy	%	±5	±5	±5
Pressure loss	psi	1.5@25 gpm	3.5@70 gpm	3.6@110 gpm

*Please contact Diehl Metering US for 2" availability.

Typical accuracy curve 5/8" x 3/4"

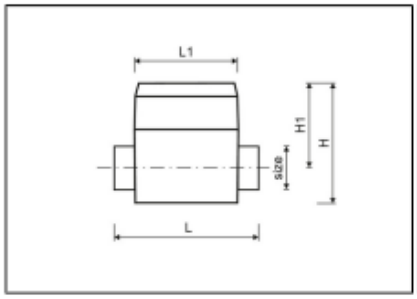


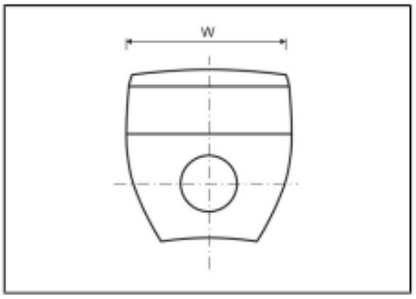
1.4 TECHNICAL DATA

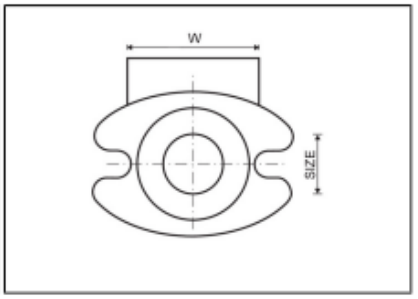
Technical Data	
Electromagnetic environmental class (OIML D11)	E2 (industrial)
Mechanical environmental class	M2 (high level of vibration and shock)
Environmental classification (OIML R49)	class O (outdoor installation)
Calming sections (upstream / downstream)	U0 / D0 (None)
Degree of Protection	IP 68
Maximum admissable pressure	300 psi*
Medium temperature	33 … 122°F
Ambient temperature	14 … 131 °F
Storage temperature	14 … 158 °F (<95°F max. 4 weeks)
Ultrasonic Measurement	every second
Measurement water temperature	every 16 seconds
Display value update	every 2 seconds
LCD display	9-digit
Communication interfaces	Optical, DM encoder interface
Battery lifetime	up to 20 years

*Flanges according to ANSI B16.1 Class 125

1.5 DIMENSIONS







Size			⅝" x ½"	⅝" x ¾"	¾"S	¾"
Lay length		inch	7½	7½	7½	9
Register length	L1	inch	3.5	3.5	3.5	3.5
Register width	W	inch	3.7	3.7	3.7	3.7
Overall height	H	inch	4.0	4.0	4.0	4.0
Height from center of pipe to top	H1	inch	2.7	2.7	2.7	2.7
Nominal thread size			¾" - 14 NPSM	1" - 11½ NPSM	1" - 11½ NPSM	1" - 11½ NPSM
Net weight		lbs.	2.8	2.8	2.8	3.1

Size			1"	1 ½"	2" *
Lay length		inch	10¾	13	17
Register length	L1	inch	3.5	3.5	3.5
Register width	W	inch	3.7	3.7	3.7
Overall height	H	inch	4.2	5.3	5.8
Height from center of pipe to top	H1	inch	2.8	3.3	3.3
Nominal thread size			1¼" - 11½ NPSM	oval flanges	oval flanges
Net weight		lbs.	3.5	14.1	19.2

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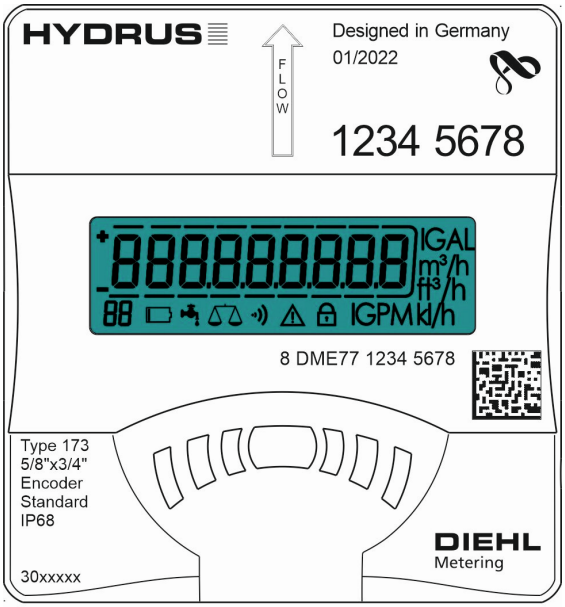
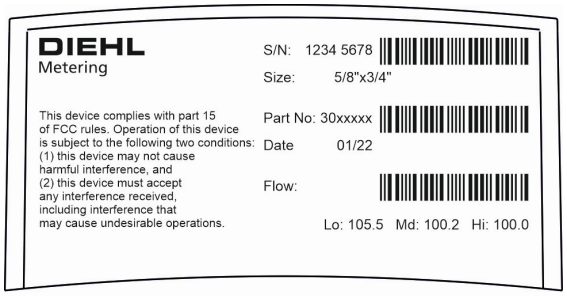
2 REGISTER

2.1 TYPE PLATE





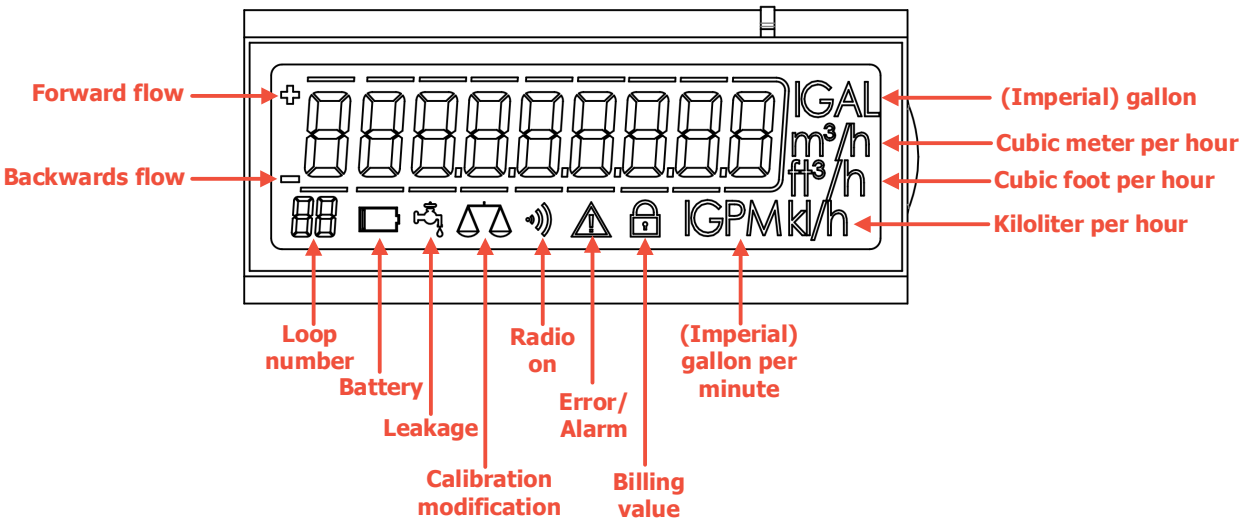
2.2 DISPLAY

The data generated by the meter can be viewed in various display loops with system information (e.g. flow rate, volume, date, due date, medium temperature). The loops are numbered from 01 to 09.

The optical button located on the front panel enables scrolling these individual display loops.

To save battery lifetime, the display switches automatically to power save mode after 4 minutes of inactivity. The display is awakened again by pressing the optical button.

After awakening, the display shows first a screen check (i.e. all symbols in the display are briefly switched on and off) and then the total volume. This remains for at least 10 seconds on the display (also when the optical button is pressed). Afterwards the display loop can be switched with the help of the optical button.



The meter is factory pre-configured with one of the following loops:

Minimum loop
Display test
Total volume
Battery lifetime
Firmware version / Checksum

Medium loop
Display test
Total volume
Battery lifetime
Firmware version / Checksum
Current flow
Errors / Alarms

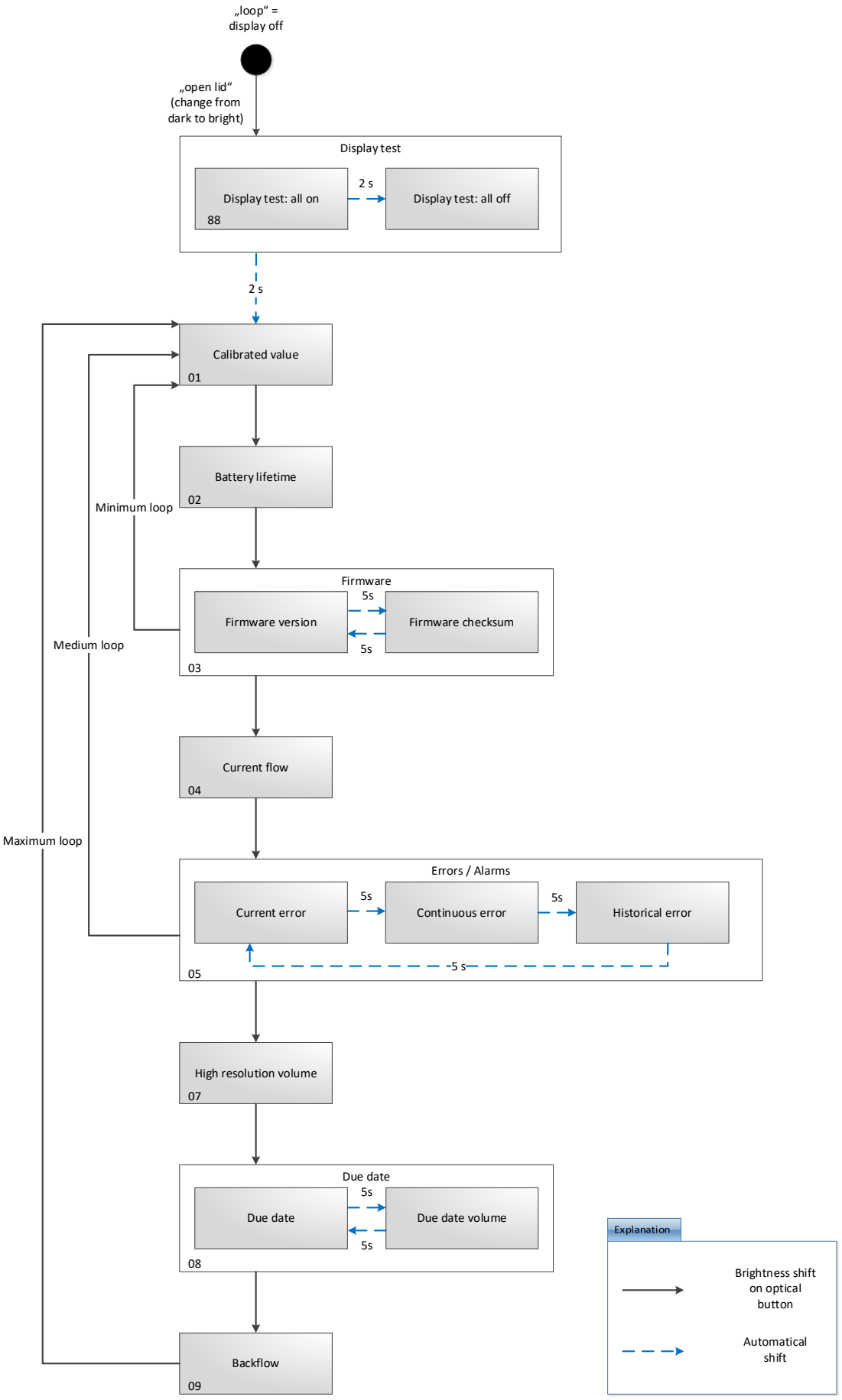
Maximum loop
Display test
Total volume
Battery lifetime
Firmware version / Checksum
Current flow
Errors / Alarms
High resolution total volume
Due date / Due date volume
Reverse volume

In the following, you can see the comprehensive factory settings for the loops

(Loop number in brackets)

- Display test (88)
- Current total volume (01)
- Battery lifetime (02)
- Software version alternating with the checked sum of the software (03)
- Current flow rate (m^3/h) (04)
- Error messages (05)
- Total volume high resolution (07)
- Total volume of the due date function alternating with the modification of the due date (08)
- Current reverse volume (09)

Please note that the configuration of the display is only possible with IZAR@MOBILE 2 version 2.10 onwards and Set Expert license + Bluetooth® opto head.


„loop“ =
display off
„open lid“
(change from
dark to bright)
Display test
Display test: all on
88
2 s
Display test: all off
2 s
Calibrated value
01
Battery lifetime
02
Minimum loop
Firmware
Firmware version
5s
Firmware checksum
5s
03
Medium loop
Current flow
04
Maximum loop
Errors / Alarms
Current error
5s
Continuous error
5s
Historical error
5 s
05
High resolution volume
07
Due date
Due date
5s
Due date volume
5s
08
Backflow
09
Explanation
Brightness shift
on optical
button
Automatical
shift

2.3 ERROR MESSAGES DETAILS

Error messages (optical notification on LC-display in case of error).

3 categories of error:

E - Current errors

A - Continuous errors - if the error is, e.g. present for the default value one hour (configurable) – then the hold time of the continuous error is by default 30 days (configurable)

H - Historical errors - if the error is e.g. present for the default value one hour (configurable) – then the hold time of the continuous error is by default 15 months (configurable).

Checksum error	Event is triggered if base parameter in Flash or RAM is corrupted	E01 / A01 / H01
Hardware temperature	Event is triggered if temperature sensor cable is cut	E02 / A02 / H02
Hardware flow	Event is triggered if flow measuring error occurs	E04 / A04 / H04
Leakage detection	Event is triggered if the continuous consumption over a period of one day (configurable) is higher than a configurable threshold	E05 / A05 / H05
Back flow volume	Event is triggered if the reverse volume is higher than the configurable threshold	E06 / A06 / H06
Air in pipe	Event is triggered if air is detected in the pipe	E07 / A07 / H07
Low battery	Event is triggered if calculated battery life is less than 400 days	E09 / A09 / H09
Undersized meter	Event is triggered if flow is higher than a configurable threshold	E11 / A11 / H11
No consumption	Event is triggered if volume is lower than a configurable threshold for a configurable period of time	E12 / A12 / H12
High medium temperature	Event is triggered if medium temperature is higher than the threshold, which is related to the temperature class	E13 / A13 / H13
Freezing risk	Event is triggered if medium temperature is lower than 3°C	E14 / A14 / H14
Metrological log access	Event is triggered if the metrological log has been accessed	E18 / A18 / H18
Measurement interference	Event is triggered if the measurement is disturbed by influences of cavitation, air water mixture or electromagnetic interference	E22 / A22 / H22
System reset	Event is triggered if the system processor has been reset	E98
Any application error	Event is triggered if the bidirectional communication (M-Bus or optical Interface) has been corrupted	E99 / A99 / A00
Too much communication	Event is triggered if the communication through the optical interface exceeds the threshold	E00 / A00 / H00

The simultaneous appearance of the "Hardware Temperature" Alarm A2 and the "Hardware Flow" Alarm A4 is an indication for tamper activities.

Error and alarm messages can also occur simultaneously,
e.g. E11 - A05 means short-term overload and arising leakage at the same time.

2.4 DATA PRIVACY

The HYDRUS saves 1024 consumption values within an interval of one hour up to one month. This data can be read locally and accessed only by using the IZAR@MOBILE 2. As a second logging, a small amount of 32 consumption values can be stored and some selected data can be sent via Encoder interface.

3 PRECAUTIONS OF USE

3.1 TRANSPORT

Caution: Meter must be protected against impact and vibration.

Caution: We recommend to use only the original packaging for shipment. If shipped in other than the original packaging the factory warranty expires.

3.2 STORAGE

- Meter should be stored in a dry place and protected from frost.

4 INSTALLATION

4.1 LIABILITY

This manual is intended for trained personnel and does not contain any basic working steps.

For the installation, the requirements of EN 14154, ISO 4064 and OIML R49 standards and the EC-type examination certificate must be considered!

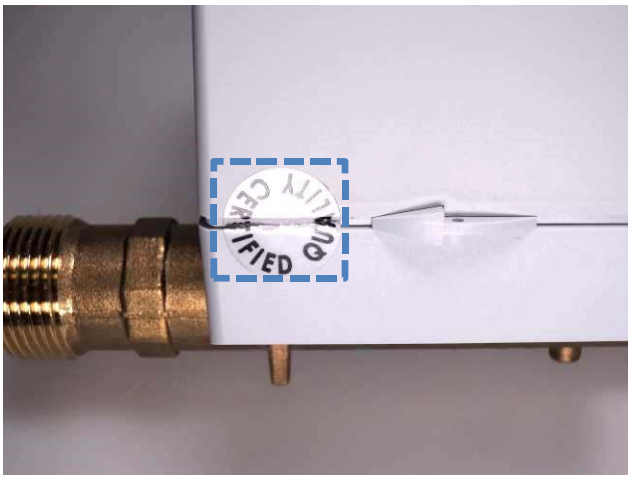
If the installation is not carried out in accordance with good workmanship practices, and if the above-mentioned procedures are not followed, the warranty shall be zero and void.

Protect the meter against any kind of external contamination.

The legally valid set of rules for drinking water installations must be considered!

Ensure a sufficient distance between the meter and possible sources of electromagnetic interferences (switches, electric motors, fluorescent lamps, etc.).

The security seals on the meter must not be broken! A broken seal will immediately lead to an expiration of the factory warranty and verification/conformity.

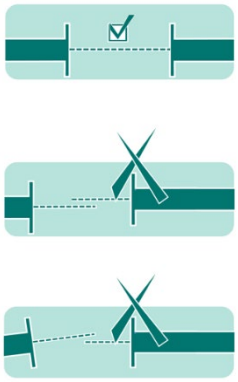


4.2 INSTALLATION PRECAUTIONS

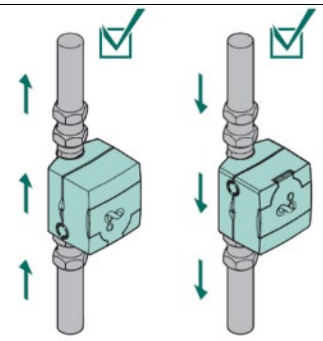
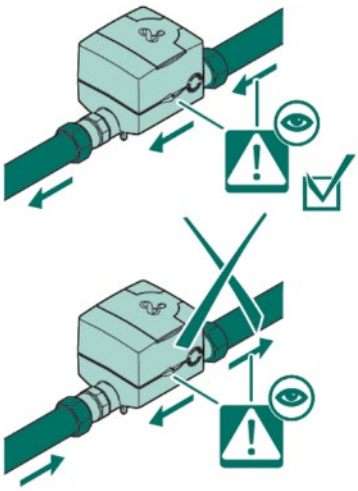
4.2.1 CLEANING THE PIPES

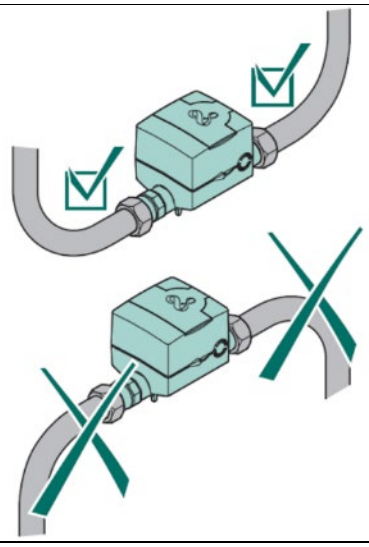
Caution: Clean the pipes thoroughly before installing HYDRUS

4.2.2 PIPES ALIGNEMENT

	**Caution:** The pipes must be perfectly aligned in order to minimize the mechanical stresses on the meter body. Make sure that the pipes support the weight of the meter.

4.2.3 INSTALLATION POSITION

	Installation in horizontal and vertical position.
	**Caution**: Check that the direction of the water flow matches the direction of the arrow located on the casing.

	If possible, install HYDRUS at a low-lying point in a pipeline to prevent the formation of air bubbles. The installation location must not be the highest point in the system. The pipe must be completely filled and back-pressured. No straight length required before or after the meter (U0/D0).

4.2.4 ASSEMBLING/INITIAL OPERATION

The meter is applicable for water temperatures from 33 °F to 122 °F.

The ambient temperature must not exceed the range of 14 to 131°F.

The system pressure must not exceed 300psi.

Remove old flange gaskets and clean sealing surfaces.

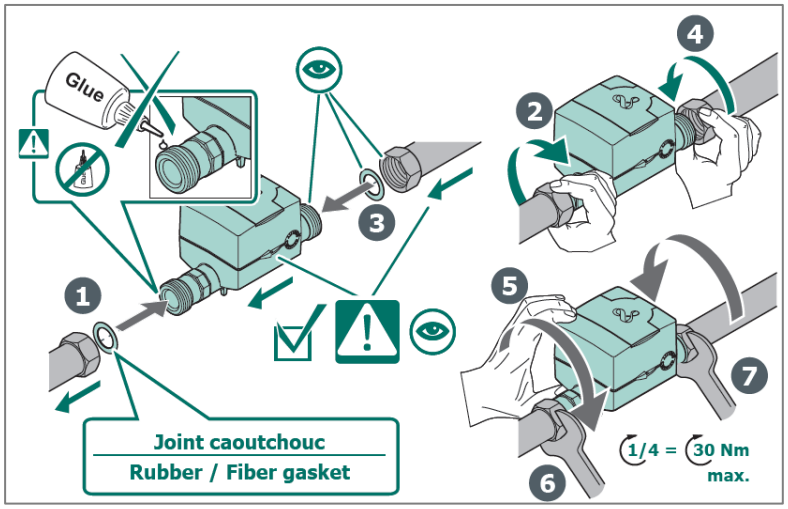
Only the newly seals are allowed to be used for installation (seals must not be extended into the pipeline).

Used seals on site must be suitable for the intended application and comply with local guidelines and regulations. For the consequential damage caused by the use of different seals, e.g. corrosion on sealing surfaces and threads, no liability is accepted.

Screw the meter flange together by hand and then tighten it with suitable tools.

Fill the pipeline slowly after completing the installation.

The meter must always be completely filled with water.



5 REGULATIONS

5.1 SANITARY CONFORMITY

HYDRUS meets the food-grade requirements relating to materials in contact with water.
It is NSF/ANSI/CAN 61 and 372 listed.

5.2 RECYCLING

This product is subject to special collection and disposal. It should be deposited at an appropriate facility to enable recovery and recycling. For further details about recycling this product, please contact your Diehl Metering agency.

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