Australian Government
Department of Industry, Science, Energy and Resources

National Measurement Institute

36 Bradfield Road, West Lindfield NSW 2070

Certificate of Approval
No 14/3/15

Issued by the Chief Metrologist under Regulation 60
of the
National Measurement Regulations 1999

This is to certify that an approval for use for trade has been granted in respect of the instruments herein described.

Hydrus Model 171 DN20 Water Meter

submitted by Enware Australia Pty Ltd
9 Endeavour Road
Caringbah NSW 2229

NOTE: This Certificate relates to the suitability of the pattern of the instrument for use for trade only in respect of its metrological characteristics. This Certificate does not constitute or imply any guarantee of compliance by the manufacturer or any other person with any requirements regarding safety.

This approval has been granted with reference to document NMI R 49-1 Water Meters Intended for the Metering of Cold Potable Water and Hot Water*, Part 1 Metrological and Technical Requirements*, dated September 2015.

This approval is subject to review at the decision of the Chief Metrologist in accordance with the conditions specified in the document NMI P 106.

DOCUMENT HISTORY

Rev	Reason/Details	Date
0	Pattern approved – interim certificate issued	19/11/09
1	Pattern & variants 1 to 4 approved – certificate issued	15/01/10
2	Pattern and variants 1 to 4 updated & reviewed – variant 5 approved – certificate issued	10/12/14
3	Variants 6 & 7 approved – interim certificate issued	22/05/15

DOCUMENT HISTORY (CONTINUED)

Rev	Reason/Details	Date
4	Variants 6 (**Table 1**) & 7 (**DN25 meter**) amended – interim certificate issued	8/09/15
5	Variants 6 & 7 approved – certificate issued	10/12/15
6	Variants 8 & 9 approved – interim certificate issued	21/12/15
7	Variants 8 & 9 approved – certificate issued	16/05/16
8	Variant 10 approved – certificate issued	16/08/17
9	Pattern and Variants reviewed – certificate issued	29/10/19
10	Variant 11 approved – certificate issued	08/06/21
11	Variant 4 (Table 1 & Table 2) amended – certificate issued	23/11/21

CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI 14/3/15' and only by persons authorised by the submittor.

It is the submittor's responsibility to ensure that all instruments marked with this approval number are constructed as described in the documentation lodged with the National Measurement Institute (NMI) and with the relevant Certificate of Approval and Technical Schedule. Failure to comply with this Condition may attract penalties under Section 19B of the National Measurement Act and may result in cancellation or withdrawal of the approval, in accordance with document NMI P 106.

Signed by a person authorised by the Chief Metrologist to exercise their powers under Regulation 60 of the *National Measurement Regulations 1999*.

Darryl Hines
Manager
Policy and Regulatory Services

TECHNICAL SCHEDULE No 14/3/15

1. Description of Pattern approved on 19/11/09

The Hydrus model 171 DN20 class 2 ultrasonic meter (Figures 1 and 2) used to measure cold potable water supplies for trade.

1.1 Field of Operation

The field of operation of the measuring system using the Hydrus Model 171 DN20 Water Meter is determined by the following characteristics:

Minimum flow rate, Q_1	0.010 kL/h
Transition flow rate, Q_2	0.016 kL/h
Maximum continuous flow rate, Q_3:	4.0 kL/h
Overload flow rate, Q_4	5.0 kL/h
Flow rate ratio, Q_3/Q_1:	400
Temperature Class:	T50
Maximum admissible temperature:	50 °C
Maximum admissible pressure:	1600 kPa
Pressure loss class:	Δp 40
Accuracy class:	2
Flow profile sensitivity class:	U0/D0
Electromagnetic class:	E2 (commercial & light industrial)
Environmental class:	O (outdoors)
Orientation:	All positions
Flow Direction:	Forward only
Power supply:	Non-replaceable battery

1.2 Features/Functions

The pattern (Figure 1) consists of an ultrasonic flow sensor, a flow computer electronic indicating device and has features/functions as listed below:

Connection type:	Threaded end connections as normally used in QLD, VIC, TAS, WA and NT
Display:	A digital, electronic, liquid crystal display allowing for a maximum indication range of 99999.999 kL in 1 L increments. The meter may be placed into a test mode allowing for a resolution of 0.00001 kL.
Communications:	Optical + 434 MHz radio output.
Materials:	Inlet/Outlet connections: brass
	Transducer housing: stainless steel
	Meter housing: Composite material
Meter length:	154 mm
Software version:	See 1.4 below
Non-return device(s):	Dual check valves; in which case the meter has a pressure loss of 87.5 kPa at Q_3 of 4.0 kL/h.

1.3 Conditions

1.3.1 Installation conditions:

No flow straightener or flow conditioner is required.

The flow profile sensitivity class is U0/D0 (Accuracy Class 2).

1.3.2 Use conditions:

The meter is approved for use in the metering of potable water supplies.

1.4 Software Versions

The meter is approved for use with software version(s):

- F01-001;
- F02-002;
- F02-003;
- F03-003;
- F04-005;
- F05-005; or
- F06-006.

1.5 Verification Provision

Provision is made for the application of a verification mark.

1.6 Sealing Provision

The meter is mechanically sealed via the use of tamper-evident covers for the screws that connect the upper and lower components of the meter housing, such that attempts to mechanically access the meter will result in evidence of tampering.

1.7 Descriptive Markings

Instruments are marked with the following data, either grouped or distributed on the casing, the indicating device dial or an identification plate (Figure 3):

Manufacturer's name or mark	...
Serial number	...
Pattern approval number	NMI 14/3/15
Numerical value of maximum continuous flow rate, Q_3	...
Flow rate ratio, Q_3/Q_1	...
Unit of measurement	m^3
Maximum admissible pressure (1)	1600 kPa
Maximum pressure loss (2)	40 kPa or Δp 40
Temperature class (3)	T50
Orientation (4)	…
Flow profile sensitive class (5)	U0/D0
Direction of flow	→ or similar
Accuracy class (6)	2

(1) Optional for meters with MAP = 1400 kPa

(2) Optional for class Δp 63

(3) Optional for T30 meters

(4) Optional for meters approved for all orientations

(5) Optional for U0/D0 class meters

(6) Optional for class 2 meters

For instruments that incorporate electronic devices, the following information can either be physically marked on the instrument or provided electronically via the indicating device or similar means:

Electromagnetic class	E1 or E2
Environmental class	B or O
For meters with an external power supply	the voltage and frequency
For battery powered meters	a replacement date or similar indication of expected battery life

2. Description of Variant 1 **approved on 19/11/09**

The Pattern and Variants may be fitted with alternative end connections as listed below:

- Threaded end connections as normally used in NSW and ACT (ball seat).
- Threaded end connections type G1B.

3. Description of Variant 2 **approved on 19/11/09**

The Pattern and Variants may be fitted with a single check valve.

4. Description of Variant 3 **approved on 19/11/09**

The Pattern and Variants may be fitted with alternative communications options, including optical output combined with one of the following:

- L-Bus + pulse output;
- 434 MHz radio + L-Bus + pulse output;
- M-Bus output; or
- Pulse output.

5. Description of Variant 4 **approved on 19/11/09**

amended on 23/11/21

The Hydrus model 171 Water Meter and Variants are approved with a range of different sizes, flowrates and associated characteristics as specified in Table 1 and Table 2 below. The Pattern is shown in **Bold** for completeness.

Table 1 – Meter sizes, flowrates and related information

Meter size	**DN20**			
Minimum flowrate Q_1 (m^3/h)	0.020	0.016	0.0127	**0.010**
Transitional flowrate Q_2 (m^3/h)	0.032	0.0256	0.0203	**0.016**
Maximum continuous flowrate Q_3 (m^3/h)	**4.0**			
Overload flowrate Q_4 (m^3/h)	**5.0**			
Ratio Q_3/Q_1	200	250	315	**400**
Meter Length (mm)	**154** or 190			
Pressure Loss Class	**Δp 40** or Δp 63			
Verification scale interval (m^3)	**0.00001**			

Table 2 – Meter sizes, flowrates and related information

Meter size	**DN15**	
Minimum flowrate Q_1 (m^3/h)	0.0125	0.010
Transitional flowrate Q_2 (m^3/h)	0.020	0.016
Maximum continuous flowrate Q_3 (m^3/h)	2.5	
Overload flowrate Q_4 (m^3/h)	3.125	
Ratio Q_3/Q_1	200	250
Meter Length (mm)	110 or 134	
End connections	G3/4B	
Pressure Loss Class	Δp 63	
Verification scale interval (m^3)	0.00001	

6. Description of Variant 5 approved on 10/12/14

The Pattern and Variants may be fitted with an alternative face plate design as indicated in Figure 3.

7. Description of Variant 6 approved on 22/05/15

The Hydrus model 171B water meter (Figures 4 to 7) is approved with the same technical characteristics as the Pattern and Variants except with the meter sizes and flow rates as specified in Table 3, Table 4 and Table 5 below.

Table 3 – Specifications for Model 171B Meters DN25 & DN32

Meter size	**DN25**	**DN32**	**DN32**
Minimum flowrate Q_1 (m^3/h)	0.0315	0.05	0.04
Transitional flowrate Q_2 (m^3/h)	0.0504	0.08	0.064
Maximum continuous flowrate Q_3 (m^3/h)	6.30	10.00	10.00
Overload flowrate Q_4 (m^3/h)	7.875	12.50	12.50
Ratio Q_3/Q_1	200	200	250
Meter Length (mm)	178	190 or 260	
Pressure Loss Class	Δp 63		
Verification scale interval (m^3)	0.00001		

Table 4 – Specifications for Model 171B Meters DN40

Meter size	**DN40**		
Minimum flowrate Q_1 (m^3/h)	0.08	0.064	0.05
Transitional flowrate Q_2 (m^3/h)	0.128	0.102	0.08
Maximum continuous flowrate Q_3 (m^3/h)	16.00	16.00	16.00
Overload flowrate Q_4 (m^3/h)	20	20	20
Ratio Q_3/Q_1	200	250	315
Meter Length (mm)	232		
Pressure Loss Class	Δp 63		
Verification scale interval (m^3)	0.00001		

Table 5 – Specifications for Model 171B Meters DN50

Meter size	**DN50**		
Minimum flowrate Q_1 (m^3/h)	0.125	0.1	0.079
Transitional flowrate Q_2 (m^3/h)	0.20	0.16	0.127
Maximum continuous flowrate Q_3 (m^3/h)	25.00	25.00	25.00
Overload flowrate Q_4 (m^3/h)	31.25	31.25	31.25
Ratio Q_3/Q_1	200	250	315
Meter Length (mm)	270, 300 or 311		
Pressure Loss Class	Δp 63		
Verification scale interval (m^3)	0.00001		

8. Description of Variant 7 approved on 22/05/15

The Hydrus model 171B water meters (variant 6) may be fitted with threaded end connections commonly used in QLD, VIC, WA and NT, or may be fitted with ball joint end-connections.

Alternatively, the model 171B water meters of sizes DN32, DN40 and DN50 may be fitted with flanged end connections.

9. Description of Variant 8 approved on 21/12/15

The Pattern and Variants having the same technical characteristics as the pattern except that the transducer housings (which are not externally visible) are made with a composite material rather than stainless steel.

10. Description of Variant 9 approved on 21/12/15

The Pattern and Variants are approved for use with software version F05-005.

11. Description of Variant 10 approved on 16/08/17

The Hydrus model 171 water meter (designated as version 1.3), and Variants, is approved with software version F06-006 which includes the following additional functionality:

- Extension of the address range;
- Test mode in field 64Hz;
- Adaption of event log. Number of entries limited to 15 for:

  A1 – Reverse volume

  A3 – No usage

  A5 – Leakage

  A6 – Low temperature

  E7 – Air the pipe
- Support of OMS v.4.0.2 security profile B
- Additional EEPROM for storage of 1024 daily values of date, volume, forward volume, error state, medium maximum temperature and environmental maximum temperature.

12. Description of Variant 11 approved on 08/06/21

The Hydrus Model 171A water meter is approved with the same technical characteristics as the Pattern and applicable Variants except with a maximum admissible temperature of 90 °C.

Instruments are marked as Temperature Class “T90” with respect to clause 1.7 – Descriptive Markings.

TEST PROCEDURE No 14/3/15

Water meters tested for initial verification shall comply with the Certificate of Approval, Technical Schedule, and the maximum permissible errors for initial and subsequent verifications at the operating conditions in effect at the time of verification. Maximum permissible errors for the initial and subsequent verification of water meters are given in the *National Trade Measurement Regulations 2009* (Cth).

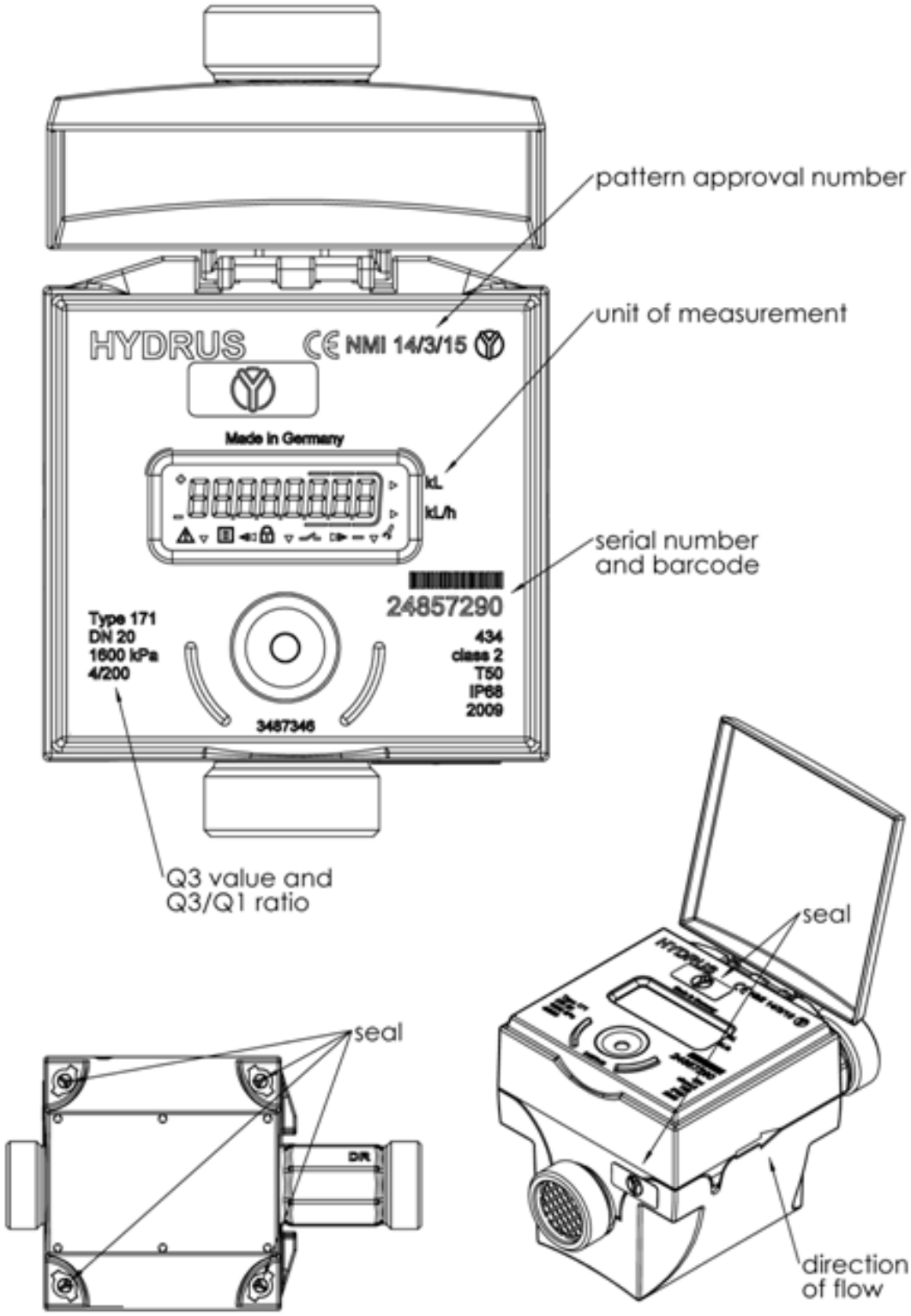
Water meters shall be verified in accordance with NITP 14 *National Instrument Test Procedures for Utility Meters*.

NOTE: NMI reserves the right to vary this procedure. Any such variation shall be notified in writing by NMI.

FIGURE 14/3/15 – 1

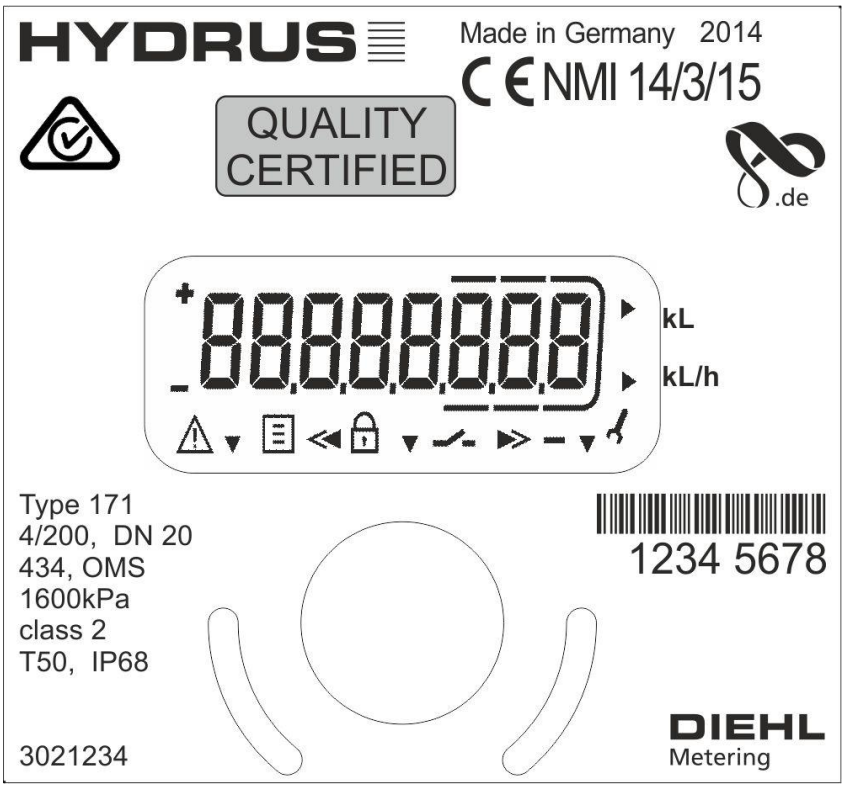
Hydrus Model 171 DN20 Water Meter (Pattern)

FIGURE 14/3/15 – 2



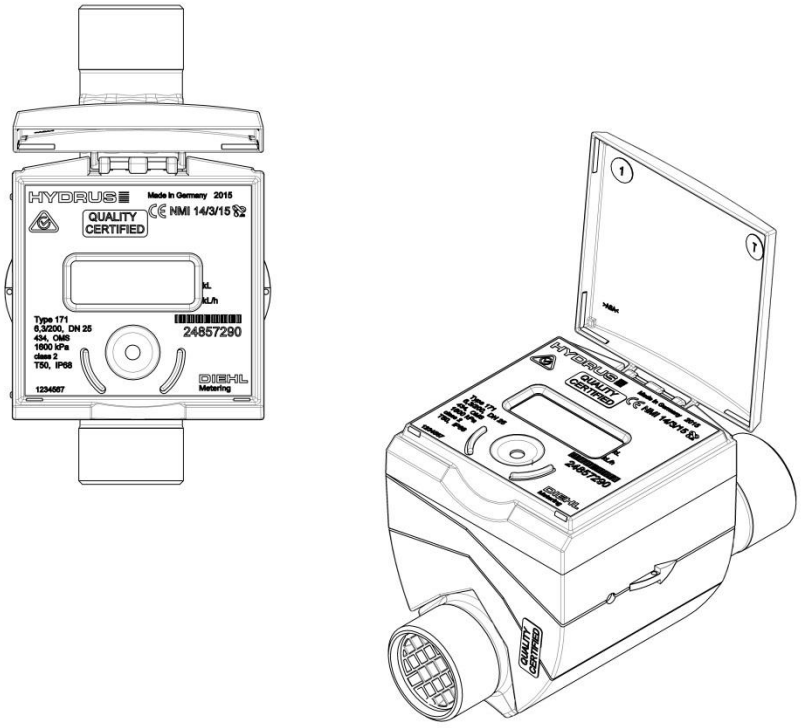
Hydrus Model 171 DN20 Water Meter (Pattern)

FIGURE 14/3/15 – 3



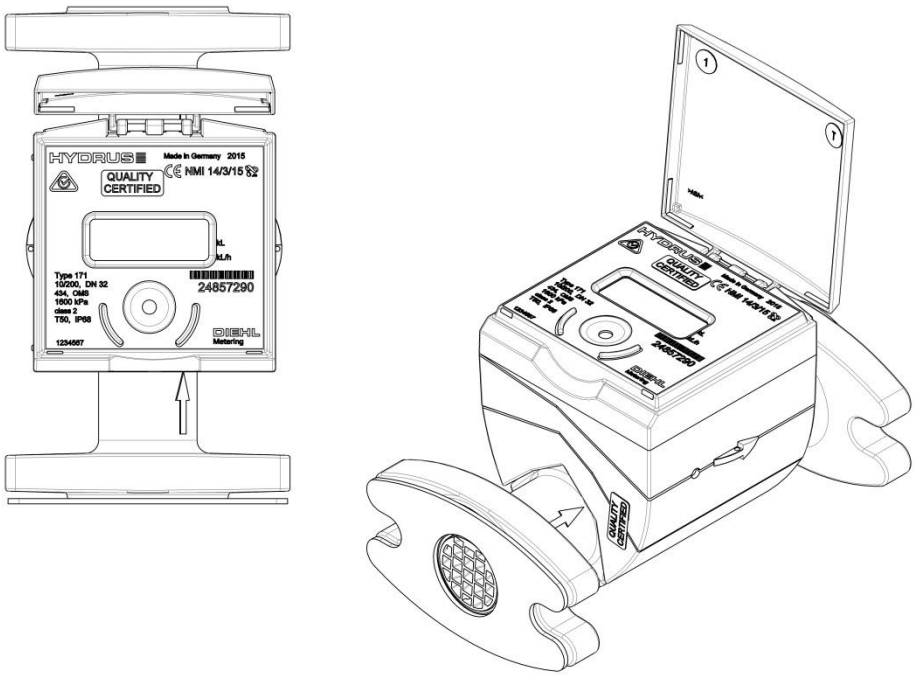
Alternative Face Plate Design (Variant 5)

FIGURE 14/3/15 – 4



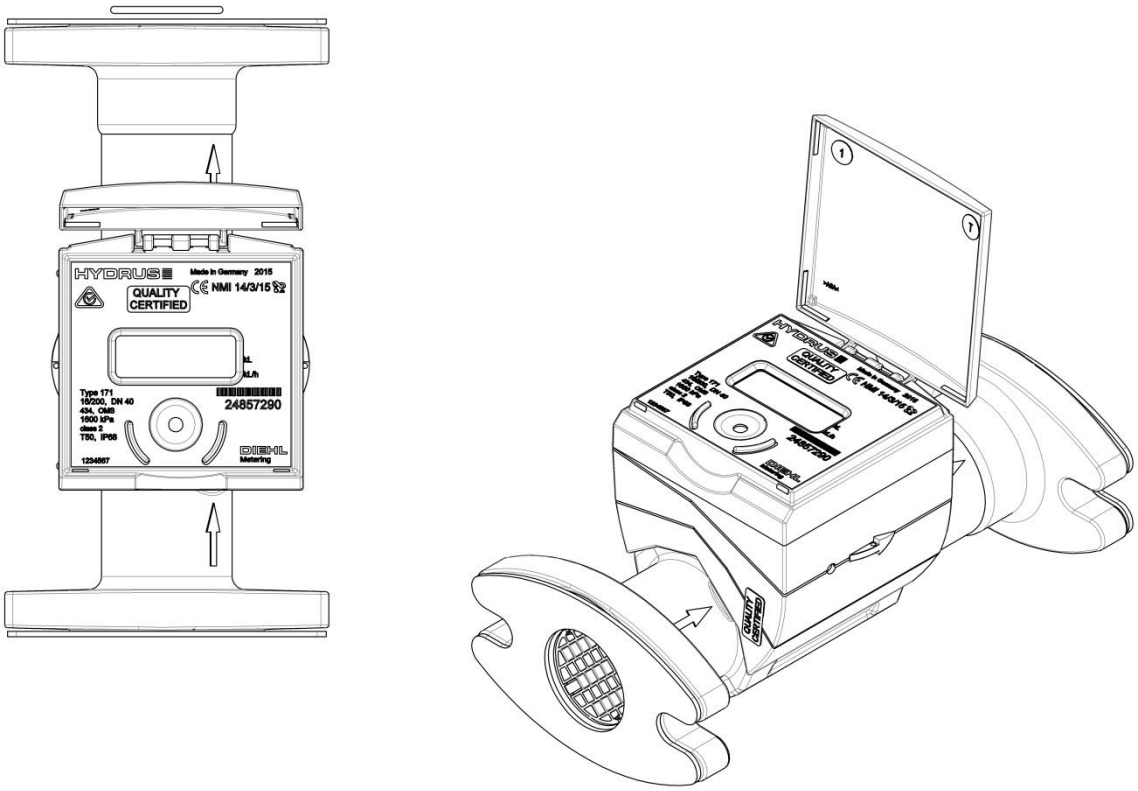
Hydrus Model 171B DN25 Water Meter (Variant 6)

FIGURE 14/3/15 – 5



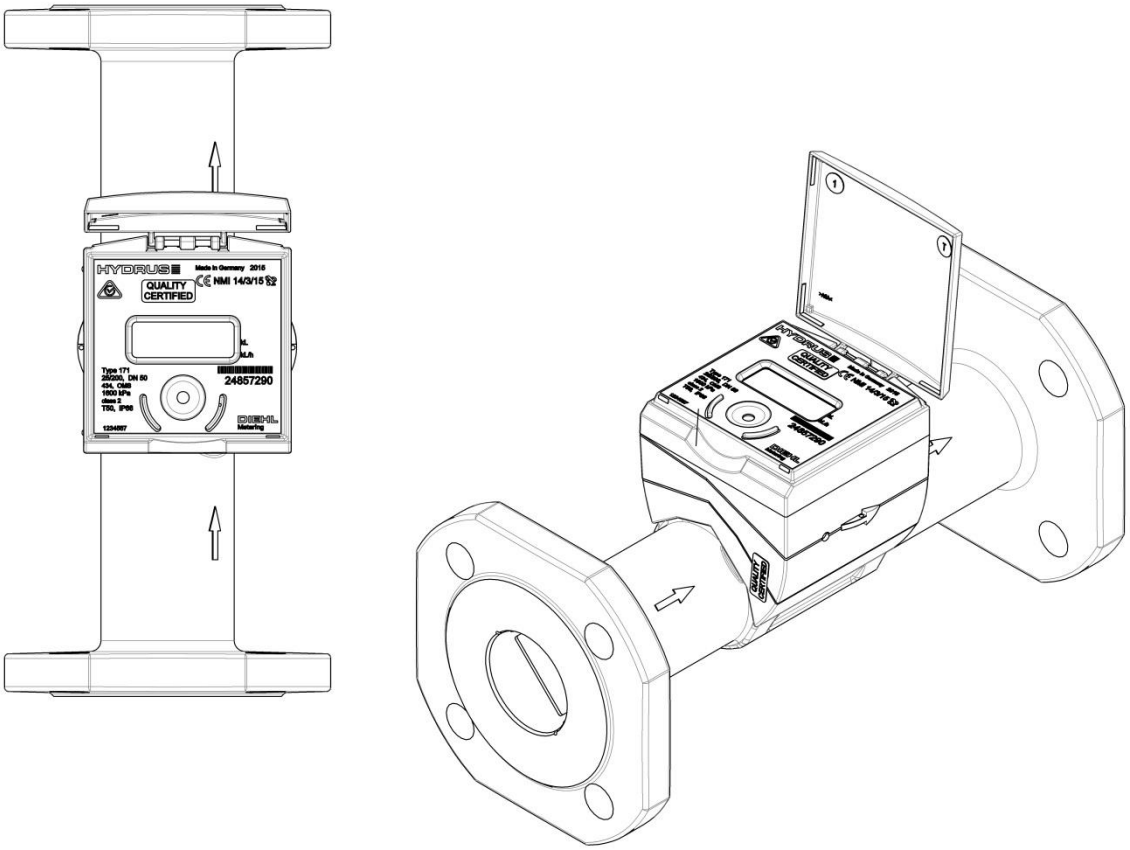
Hydrus Model 171B DN32 Water Meter (Variant 6)

FIGURE 14/3/15 – 6



Hydrus Model 171B DN40 Water Meter (Variant 6)

FIGURE 14/3/15 – 7



Hydrus Model 171B DN50 Water Meter (Variant 6)

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