



**Australian Government**  
**Department of Industry, Science,  
Energy and Resources**

## **National Measurement Institute**

36 Bradfield Road, West Lindfield NSW 2070

### **Certificate of Approval** **NMI 14/3/28**

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.

Sensus Model iPERL DN20 Water Meter

submitted by           Sensus GmbH Ludwigshafen  
                                  Industriestr 16  
                                  67063   Ludwigshafen  
                                  Rhineland-Palatinate   GERMANY

**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

<b>Rev</b>	<b>Reason/Details</b>	<b>Date</b>
0	Pattern & Variants 1 to 3 approved – interim certificate issued	2/04/15
1	Pattern & Variants 1 to 3 approved – certificate issued	4/06/15
2	Pattern & Variant 1 amended – Variant 4 approved – certificate issued	24/11/16
3	Pattern & Variants 1 to 4 reviewed and amended (various) – certificate issued	04/12/20
4	Variant 5 approved – certificate issued	09/05/23

## CONDITIONS OF APPROVAL

### General

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI 14/3/28' and only by persons authorised by the submitter.

It is the submitter'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 14/3/28

**1. Description of Pattern** **approved on 02/04/15**

A Sensus model iPERL DN20 water meter intended for the metering of cold potable water supplies for trade.

**1.1 Field of Operation**

The field of operation of the measuring system using the Sensus model iPERL DN20 meter is determined by the following characteristics:

Minimum flow rate, Q <sub>1</sub> :	0.005 m <sup>3</sup> /h
Transition flow rate, Q <sub>2</sub> :	0.008 m <sup>3</sup> /h
Maximum continuous flow rate, Q <sub>3</sub> :	4.0 m <sup>3</sup> /h
Overload flow rate, Q <sub>4</sub> :	5.0 m <sup>3</sup> /h
Flow rate ratio, Q <sub>3</sub> /Q <sub>1</sub> :	800
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:	E1 (residential, commercial & light industrial) E2 (industrial)
Environmental class:	B (indoors) O (outdoors)
Orientation:	All positions
Flow Direction:	Forward and reverse
Power supply:	Non-replaceable lithium battery 3.70 V

## 1.2 Features/Functions

The pattern (Figures 1, 2 & 3) consists of an electromagnetic flow sensor, a flow computer and electronic indicating device with the features/functions listed below:

Connection type:	Threaded end connections type standard G1B.
Display:	A digital, electronic, liquid crystal display (Figure 2) allowing for a maximum indication range of 999,999 m <sup>3</sup> in 0.001 m <sup>3</sup> increments
Communications:	The meter is equipped with a low power 868 MHz or 433 Mhz integrated radio module with consumption and diagnostic outputs
Materials:	Composite material
Meter length:	105 mm

Non-return device(s): A non-return device may be fitted.

An optional non-return device may be fitted.

## 1.3 Conditions

### 1.3.1 Installation Conditions:

No flow straightener or flow conditioner is required.

For Accuracy Class 2 (NMI R 49-1) the flow profile sensitivity class is U0/D0.

### 1.3.2 Water Quality

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

## 1.4 Software Version

The meter is approved with iPERL firmware version 5.

## 1.5 Verification Provision

Provision is made for the application of a verification mark.

## 1.6 Sealing Provision

The meter is electronically sealed following calibration via a defined bit pattern, preventing changes to calibration values.

The meter is mechanically sealed via the snap-fitting of the two housing shells (Figure 4), such that attempts to mechanically access the meter will result in evidence of tampering.

## 1.7 Descriptive Markings and Notices

Instruments are marked with the following data, either grouped or distributed on the casing, the indicating device dial or an identification plate (Figure 5):

Manufacturer's name or mark	...
Serial number	...
Pattern approval number	NMI 14/3/28
Numerical value of maximum continuous flow rate, $Q_3$	...
Flow rate ratio, $Q_3/Q_1$	...
Unit of measurement	$m^3$
Temperature class <sup>(1)</sup>	T50
Maximum admissible pressure <sup>(2)</sup>	1600 kPa
Pressure loss class <sup>(3)</sup>	40 kPa or $\Delta p$ 40
Orientation <sup>(4)</sup>	...
Flow profile sensitive class <sup>(5)</sup>	U0/D0
Direction of flow	→ or similar
Accuracy class <sup>(6)</sup>	2

<sup>(1)</sup> Optional for temperature class T30 meters

<sup>(2)</sup> Optional for meters with MAP = 1400 kPa

<sup>(3)</sup> Optional for pressure loss class  $\Delta p$  63

<sup>(4)</sup> Optional for meters approved for all orientations

<sup>(5)</sup> Optional for U0/D0 class meters

<sup>(6)</sup> Optional for accuracy 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	O or B
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 02/04/15  
amended on 04/12/20**

The Pattern and Variants are approved with a range of different sizes (Figures 6, 7, 8 and 9), flowrates and associated characteristics as specified in Table 1 below. The Pattern is shown in **Bold** for completeness.

**Table 1 Meter sizes, flowrates and related information**

<b>Meter size</b>	<b>DN15</b>	<b>DN20</b>	<b>DN25</b>	<b>DN32</b>	<b>DN40</b>
Minimum flowrate Q <sub>1</sub> (m <sup>3</sup> /h)	0.003	<b>0.005</b>	0.008	0.013	0.020
Transitional flowrate Q <sub>2</sub> (m <sup>3</sup> /h)	0.005	<b>0.008</b>	0.013	0.020	0.032
Maximum continuous flowrate Q <sub>3</sub> (m <sup>3</sup> /h)	2.5	<b>4.0</b>	6.3	10	16
Overload flowrate Q <sub>4</sub> (m <sup>3</sup> /h)	3.125	<b>5.0</b>	7.875	12.5	20
Ratio Q <sub>3</sub> /Q <sub>1</sub>	800	<b>800</b>	800	800	800
Meter Length (mm)	≥134	<b>≥154</b>	≥178	≥190	≥232
Threaded end connection	≥G <sup>3</sup> / <sub>4</sub> B	<b>≥G<sup>1</sup>/<sub>2</sub>B</b>	≥G <sup>1</sup> / <sub>4</sub> B	≥G <sup>1</sup> / <sub>4</sub> B	≥G <sup>2</sup> / <sub>B</sub>

The Pattern and Variants are approved with the alternative Q<sub>3</sub>/Q<sub>1</sub> ratios: 630, 500, 400, 315, 250 and 200.

**3. Description of Variant 2**

**approved on 02/04/15**

The DN20 sized Sensus model iPERL water meter, approved with the following meter lengths: 115 mm, 154 mm, 165 mm and 190 mm

**4. Description of Variant 3**

**approved on 02/04/15  
amended on 04/12/20**

The Pattern and Variants are approved with end connections normally used in QLD, NSW, ACT, VIC, TAS, WA, SA and NT.

The DN40 sized Sensus model iPERL water meter is approved with flanged end connections.

**5. Description of Variant 4** **approved on 04/12/20**

The Pattern and Variants are approved with the model designation iPERL169, an alternative housing design (Figures 10 and 11) and with the following alternative characteristics, features and functions:

Power Supply: 2 batteries (3.7 V)

Communications: The meter is equipped with a 169 MHz integrated radio module

Software version: Metrology Communication Interface v2.10  
Metrology Firmware source code V2.112

**6. Description of Variant 5** **approved on 09/05/23**

The Pattern and Variants are approved with the following software:

Software version: Metrology Firmware source code V2.114

## TEST PROCEDURE No 14/3/28

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 14/3/28 – 1



Sensus Model iPERL DN20 Water Meter (The Pattern)

FIGURE 14/3/28 – 2



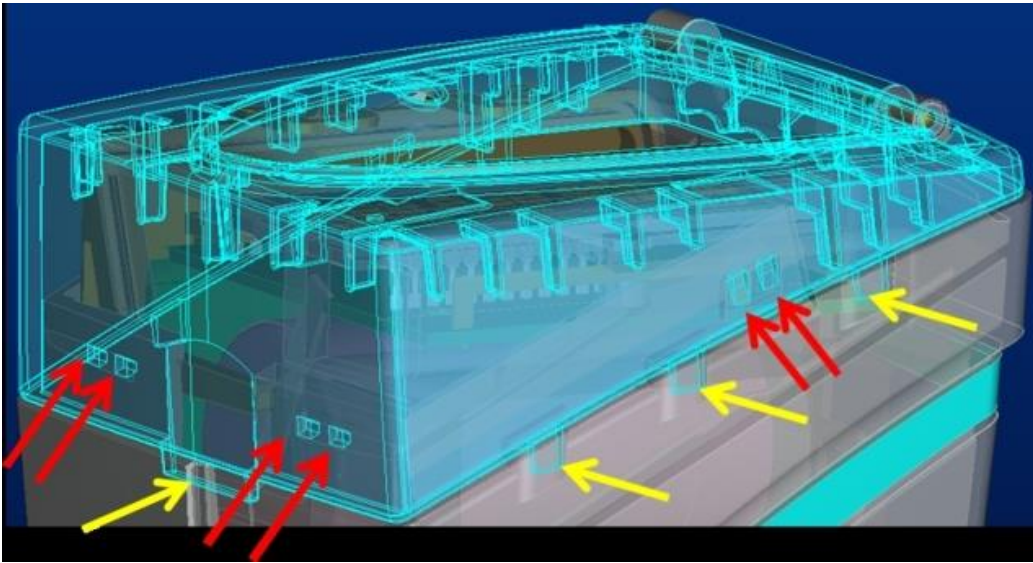
Sensus Model iPERL DN20 Water Meter (The Pattern – End View)

FIGURE 14/3/28 – 3



Sensus Model iPERL DN20 Water Meter (The Pattern – Side View)

FIGURE 14/3/28 – 4



Typical Sealing Arrangement (During Manufacture)

FIGURE 14/3/28 – 5



Indicating Device and Markings

FIGURE 14/3/28 – 6



Sensus Model iPERL DN15 Water Meter

FIGURE 14/3/28 – 7



Sensus Model iPERL DN25 Water Meter

FIGURE 14/3/28 – 8



Sensus Model iPERL DN32 Water Meter

FIGURE 14/3/28 – 9



Sensus Model iPERL DN40 Water Meter

FIGURE 14/3/28 – 10



Sensus iPERL169 DN20 – Variant 4

FIGURE 14/3/28 – 11



Sensus iPERL169 DN40 – Variant 4

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