



Australian Government
Department of Industry, Science,
Energy and Resources

**National
Measurement
Institute**

36 Bradfield Road, West Lindfield NSW 2070

Certificate of Approval
NMI 14/3/53

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.

Endress+Hauser Promag W400 model Water Meter

submitted by Endress+Hauser Australia Pty Ltd
Level 1, 16 Giffnock Ave
Macquarie Park NSW 2113

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 and NMI M 10-1 Meters Intended for the Metering of Water in Full Flowing Pipes, *Part 1: Metrological and Technical Requirements*, dated July 2010.

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, Variants 1 & 2 provisionally approved – certificate issued	2/11/20
1	Pattern, Variants 1 & 2 approved – certificate issued	23/11/20

CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI 14/3/53' and only by persons authorised by the submittor.

Instruments purporting to comply with this approval and currently marked 'NMI P14/3/53' may be re-marked 'NMI 14/3/53' but 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 14/3/53

1. Description of Pattern **approved on 2/11/20**

A DN50 sized Endress+Hauser Promag W400 model water meter used to measure water supplies for trade.

1.1 Field of Operation

The field of operation of the measuring system using the DN50 Endress+Hauser Promag W400 model water meter is determined by the following characteristics:

Minimum flow rate, Q ₁ :	0.39 m ³ /h
Transition flow rate, Q ₂ :	0.63 m ³ /h
Maximum continuous flow rate, Q ₃ :	63.00 m ³ /h
Overload flow rate, Q ₄ :	78.75 m ³ /h
Flow rate ratio, Q ₃ /Q ₁ :	160
Temperature class:	T50
Maximum admissible temperature:	50 °C
Maximum admissible pressure:	1600 kPa
Pressure loss class:	Δp 10
Accuracy class:	2
Flow profile sensitivity class:	U5/D2 – see table 1
Electromagnetic class:	E2 (industrial)
Environmental class:	B (indoor) and O (outdoor)
Orientation:	All positions
Flow Direction:	Forward and reverse
Power supply:	<u>Mains AC</u> : 100...240V AC, 50...60 Hz 24 V AC, 50...60 HZ <u>Mains DC</u> : 24 V DC

1.2 Features/Functions

The pattern (Figure 1) consists of an electromagnetic flow sensor (model designation: W) and an indicating transmitter (model designation: 400) in a compact arrangement and has features/functions as listed below:

- Connection type: Flanged
- Display: A digital, electronic, liquid crystal display (Figure 2) allowing for a maximum indication range of 999.999 m³ in 0.001 m³ increments
- Communications: Via digital communication:
- HART protocol
 - Profibus DP
 - Modbus RS485
 - EtherNet/IP
- Via service interface:
- CDI-RJ45 service interface
 - WLAN interface
- Input and output signals:
- 0/4 ... 20 mA HART – current output
 - two frequency/pulse outputs
 - status input
- Materials:
- Flow sensor: fully welded housing made of carbon steel
- Flow converter:
- Compact version: compact housing
- Polycarbonate plastic
 - Aluminum, AlSi10Mg, coated
- Remote version: wall-mount housing
- Polycarbonate plastic
 - Aluminum, AlSi10Mg, coated
- Meter length: 200 mm
- Power supply: Instances of power loss are recorded in the event log of the meter and measurement results are timestamped.

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 U5/D2.

For Accuracy Class 2.5 (NMI M 10-1), the installation conditions are specified in Table 1.

Table 1 minimum pipe lengths required by flow disturbance type

Disturbance Type (*)	Minimum upstream pipe length (DN)	Minimum downstream pipe length (DN)
1	5	2
2	5	2
3	5	2

(*) For information on the different types of flow disturbances which are examined as part of pattern approval, refer to NMI M 10-2.

1.3.2 Water quality:

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

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

1.4 Software Version

The pattern is approved for use with software/firmware versions:

- 02.00.zz
- 02.01.zz
- 01.00.zz
- 01.01.zz
- 01.05.zz

The software version is divided into a measurement relevant part (xx.yy) and a measurement irrelevant part (zz) according to the following scheme: Vxx.yy.zz.

1.5 Verification Provision

Provision is made for the application of a verification mark.

1.6 Sealing Provision

The meter shall be placed into 'custody transfer mode' in accordance with manufacturer specifications and mechanically sealed as described in Figure 3.

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 4):

Manufacturer's name or mark	...
Serial number	...
Pattern approval number	NMI 14/3/53
Numerical value of maximum continuous flow rate, Q3	...
Flow rate ratio, Q3/Q1	...
Unit of measurement	m ³
Temperature class ⁽¹⁾	T50
Maximum admissible pressure ⁽²⁾	1600 kPa
Pressure loss class ⁽³⁾	10 kPa or Δp 10
Orientation ⁽⁴⁾	...
Flow profile sensitive class ⁽⁵⁾	U5/D2
Direction of flow	→ or similar
Accuracy class ⁽⁶⁾	2 or 2.5

⁽¹⁾ Optional for temperature class T30

⁽²⁾ Optional for meters with MAP of 1400 kPa or 600 kPa for DN \geq 500

⁽³⁾ Optional for pressure loss class Δp 63

⁽⁴⁾ Optional for meters approved for all orientations

⁽⁵⁾ Optional for U0/D0 meters and accuracy class 2.5 meters

⁽⁶⁾ 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	E2
Environmental class	B and 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 2/11/20**

The Pattern and Variants may be supplied in either compact or remote arrangements (Figure 5).

3. Description of Variant 2 **approved on 2/11/20**

The Pattern and Variants are approved with a range of different sizes (Figure 6), flowrates and associated characteristics as specified in Tables 2 to 7 below. The Pattern is shown in **Bold** for completeness.

Table 2 Meter sizes, flowrates and related information

Meter size	DN25	DN32	DN40
Minimum flowrate Q ₁ (m ³ /h)	0.10	0.16	0.25
Transitional flowrate Q ₂ (m ³ /h)	0.16	0.25	0.40
Maximum continuous flowrate Q ₃ (m ³ /h)	16	25	40
Overload flowrate Q ₄ (m ³ /h)	20	31.25	50
Ratio Q ₃ /Q ₁	160	160	160
Meter Length (mm)	200	200	200
Verification scale interval (m ³)	0.0001	0.0001	0.001

Table 3 Meter sizes, flowrates and related information

Meter size	DN50	DN65	DN80	DN100
Minimum flowrate Q ₁ (m ³ /h)	0.39	0.50	0.80	1.25
Transitional flowrate Q ₂ (m ³ /h)	0.63	0.80	1.28	2.00
Maximum continuous flowrate Q ₃ (m ³ /h)	63	100	160	250
Overload flowrate Q ₄ (m ³ /h)	78.75	125	200	312.5
Ratio Q ₃ /Q ₁	160	200	200	200
Meter Length (mm)	200	200	200	250
Verification scale interval (m ³)	0.001	0.001	0.001	0.001

Table 4 Meter sizes, flowrates and related information

Meter size	DN125	DN150	DN200	DN250
Minimum flowrate Q ₁ (m ³ /h)	1.60	2.52	4.00	6.40
Transitional flowrate Q ₂ (m ³ /h)	2.56	4.03	6.40	10.24
Maximum continuous flowrate Q ₃ (m ³ /h)	400	630	1000	1600
Overload flowrate Q ₄ (m ³ /h)	500	787.5	1250	2000
Ratio Q ₃ /Q ₁	250			
Meter Length (mm)	250	300	350	450
Verification scale interval (m ³)	0.001	0.001	0.001	0.001

Table 5 Meter sizes, flowrates and related information

Meter size	DN300	DN350	DN375	DN400
Minimum flowrate Q ₁ (m ³ /h)	10	10	16	16
Transitional flowrate Q ₂ (m ³ /h)	16	16	25.6	25.6
Maximum continuous flowrate Q ₃ (m ³ /h)	2500	2500	4000	4000
Overload flowrate Q ₄ (m ³ /h)	3125	3125	5000	5000
Ratio Q ₃ /Q ₁	250			
Meter Length (mm)	500	550	550	600
Verification scale interval (m ³)	0.001	0.001	0.001	0.001

Table 6 Meter sizes, flowrates and related information

Meter size	DN450	DN500	DN600	DN700
Minimum flowrate Q ₁ (m ³ /h)	16	25.20	39.38	50.40
Transitional flowrate Q ₂ (m ³ /h)	25.6	40.32	63	80.64
Maximum continuous flowrate Q ₃ (m ³ /h)	4000	6300	6300	6300
Overload flowrate Q ₄ (m ³ /h)	5000	7875	7875	7875
Ratio Q ₃ /Q ₁	250	250	160	125
Meter Length (mm)	600 ¹⁾ /650 ²⁾	600 ¹⁾ /650 ²⁾	600 ¹⁾ /780 ²⁾	700 ¹⁾ /900 ²⁾
Verification scale interval (m ³)	0.001	0.001	0.001	0.001

Table 7 Meter sizes, flowrates and related information

Meter size	DN750	DN800
Minimum flowrate Q ₁ (m ³ /h)	63	63
Transitional flowrate Q ₂ (m ³ /h)	100.8	100.8
Maximum continuous flowrate Q ₃ (m ³ /h)	6300	6300
Overload flowrate Q ₄ (m ³ /h)	7875	7875
Ratio Q ₃ /Q ₁	100	100
Meter Length (mm)	700 ¹⁾ /900 ²⁾	800 ¹⁾ /1040 ²⁾
Verification scale interval (m ³)	0.001	0.001

1) Order code for "Design", option F "Fixed flange, short installation length"

2) Order code for "Design", option G "Fixed flange, long installation length"

TEST PROCEDURE No 14/3/53

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*.

The following exceptions apply for accuracy class 2.5 meters:

- The maximum permissible errors shall be:
 $\pm 2.5\%$ within the flowrate range Q_1 to Q_4 .
- The flow rates specified for initial verification in NMI M 10-2 may replace the flow rates specified in NITP 14.

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

FIGURE 14/3/53 – 1



Promag W 400 Compact – The Pattern

FIGURE 14/3/53 – 2

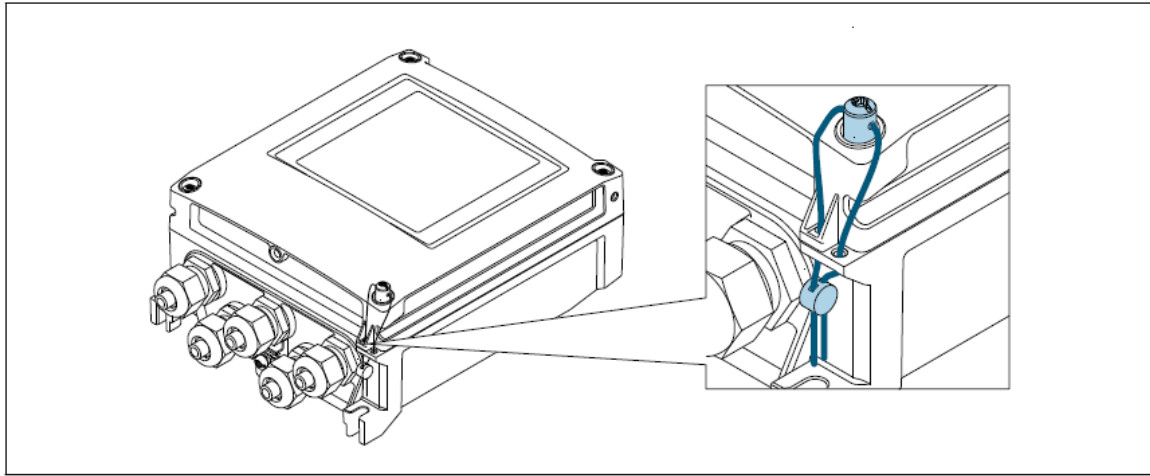


The indicating device

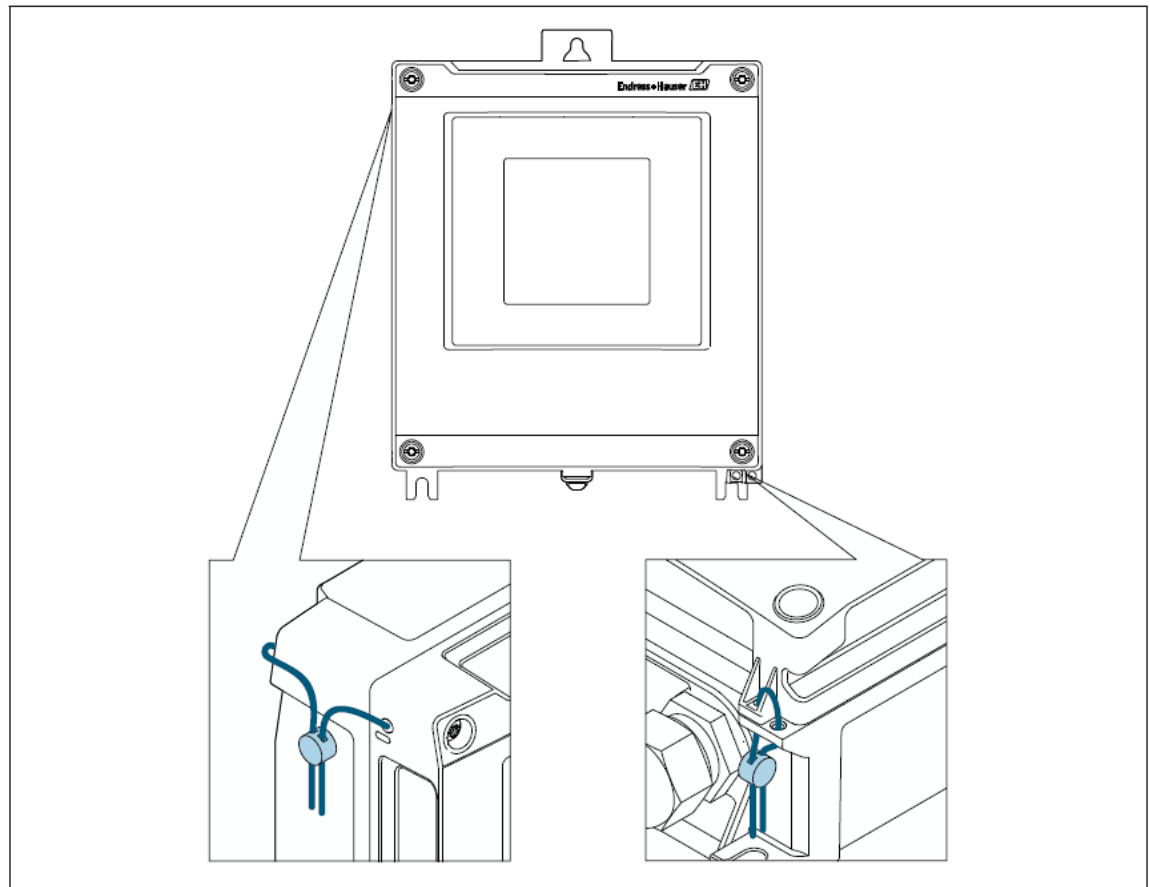
FIGURE 14/3/53 – 3

Sealing the transmitter

Aluminum transmitter

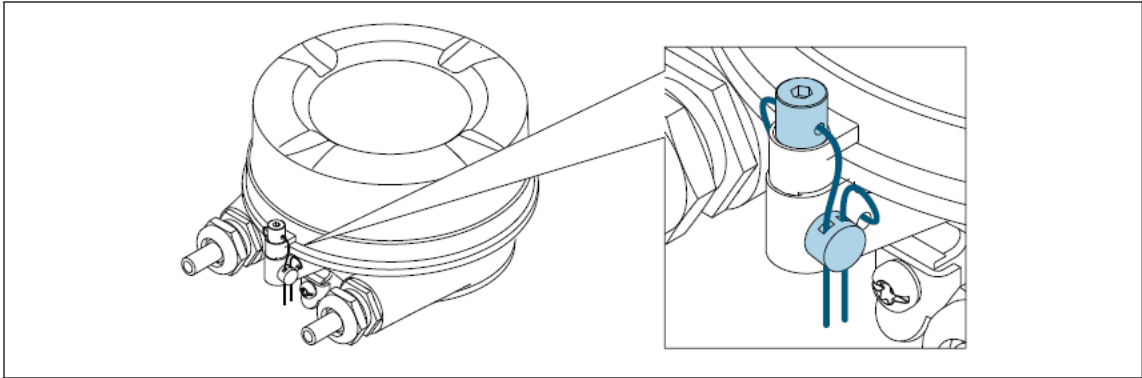


Polycarbonate transmitter

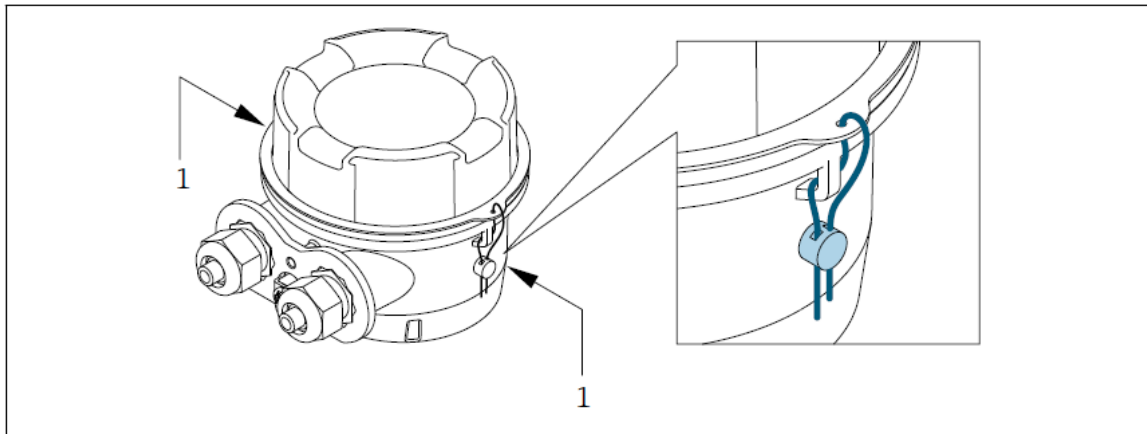


Sealing the connection housing

Connection housing remote version

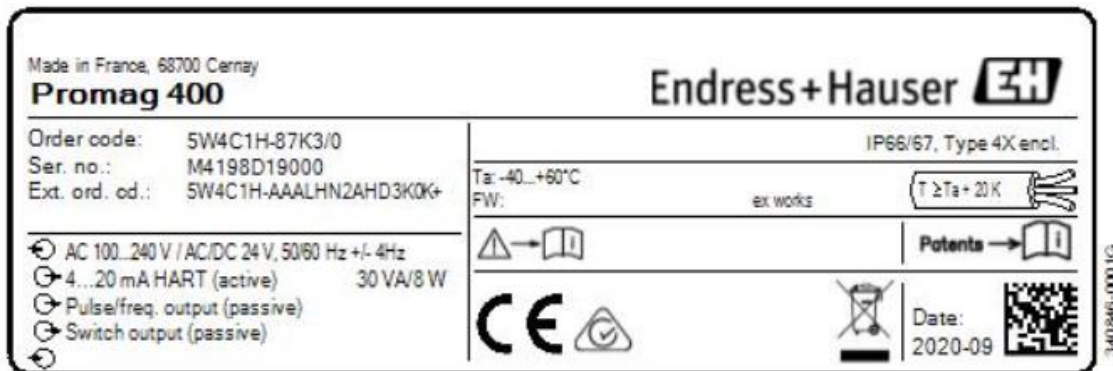


Connection housing remote version, IP68



Sealing provisions

FIGURE 14/3/53 – 4



Nameplate Transmitter Promag 400



Nameplate Sensor W

Promag W 400 DN100	
K-factor:	1.3872/00
Q3:	250 m ³ /h
Q3 / Q1:	160
Accuracy Class	2
Temperature Class	T50
Pressure Loss Class	Δp 10 MPA 16 bar
Sensitivity Class	U5 / D2
Environmental Class	B, 0 / E2
Tamb:	-40...+55 °C
Unit	m ³

NMI 14/3/53

Additional label Promag W 400 acc. NMI 14/3/53

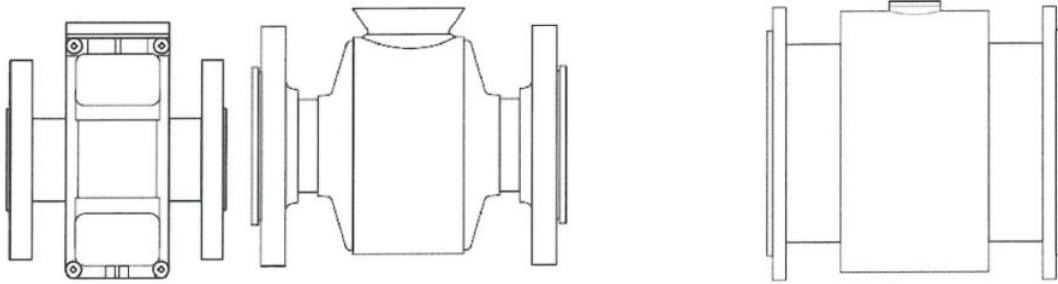
FIGURE 14/3/53 – 5



Compact and remote arrangements – Variant 1

FIGURE 14/3/53 – 6





Sensor Promag W

DN25 ... DN300

DN350 ... DN800



Transmitter Promag 400 remote

Various sizes in both compact and remote arrangements – Variant 2

~ End of Document ~