Australian Government
Department of Industry, Innovation and Science

National Measurement Institute

36 Bradfield Road, West Lindfield NSW 2070

Certificate of Approval

NMI 10/2/20

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.

Alfons Haar Model PreciGas C400 Bulk LPG Flow-metering System

submitted by HAAR Australia Pty Ltd
U1, 2 East Circuit
Sunshine West VIC 3020

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 117, *Measuring Systems for Liquids Other than Water*, dated June 2011.

This approval becomes subject to review on 1/08/24, and then every 5 years thereafter.

DOCUMENT HISTORY

Rev	Reason/Details	Date
0	Pattern provisionally approved – interim certificate issued	4/05/16
1	Pattern amended (Minimum measured quantity, minimum flowrate & validity date) – interim certificate issued	21/03/19

Document History (cont…)

Rev	Reason/Details	Date
2	Pattern amended (submitted by address) – interim certificate issued	28/03/19
3	Pattern approved – certificate issued	17/07/19

CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI 10/2/20' and only by persons authorised by the submittor.

Instruments purporting to comply with this approval and currently marked 'NMI P10/2/20' may be re-marked 'NMI 10/2/20' 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.

Auxiliary devices used with this instrument shall comply with the requirements of General Supplementary Certificate No S1/0B.

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 10/2/20

1. Description of Pattern **provisionally approved on 4/05/16 approved on 15/07/19**

An Alfons Haar model PreciGas C 400 Bulk LPG flowmetering System (Figure 1) incorporating an Alfons Haar model 2355380 venturi injector with differential pressure transmitter and an Alfons Haar model X-Master 4 calculator/indicator.

1.1 Field of Operation

The field of operation of the measuring system is determined by the following characteristics:

- Minimum measured quantity, V_{min} 50 L
- Maximum flow rate, Q_{max} 400 L/min
- Minimum flow rate, Q_{min} 50 L/min
- Maximum pressure of the liquid, P_{max} 1000 kPa
- LPG density range (at 15°C) 505 to 580 kg/m³ (#)
- LPG liquid temperature range -10°C to 50°C
- Ambient temperature range -25°C to 55°C
- Accuracy class Class 1.0
- Maximum operating pressure (P_{max}) 1900 kPa
- Minimum operating pressure (P_{min}) at least 100 kPa above vapour pressure

(#) Within the density range specified, the calculator/indicator is required to be manually set for the density of LPG being metered.

1.2 Components of Measuring System

(i) Supply Tank

The supply tank has a bottom outlet larger than the pump outlet and has at least one return line fitted to the vapour space of the tank.

(ii) Pump

Either a positive displacement or centrifugal pump, with integral or external pump bypass valve, is positioned as close as possible to the outlet of the supply tank. The pipe from the supply tank has a continuous fall to the pump inlet and has a diameter not smaller than that of the pump outlet pipe.

(iii) Vapour Detecting Device

Systems are fitted with an Alfons Haar LMS 1D 2289048 (Figure 2) sensor for detecting vapour in the system.

(iv) Temperature Transducer

An Alfons-Haar Model TWE 60 RTD probe or equivalent (*) is fitted to measured temperature of LPG

(*) ‘Equivalent’ is defined to mean other proprietary equipment of the same or better specifications requiring no changes to software for satisfactory operation of the complete system.

(v) Measurement Transducer

The PreciGas C 400 measurement transducer (Figure 3) is constructed using an Alfons Haar model 2355380 venturi injector and the Differential Pressure Transmitter.

(vi) Differential Pressure Transmitter

Systems are fitted with a Rosemount model 3051S (Figure 4) Differential pressure Transmitter which determines the differential pressure between the inlet and outlet of the measuring section.

(vii) Calculator/Indicator

For use with an Alfons Haar model X-Master 4 calculator/indicator (Figure 5) which has a graphics display and numerical/function soft keys housed in an aluminium enclosure, incorporates electronic volume conversion for temperature facility to indicate the delivered volume of LPG at 15ºC. The density of LPG is preconfigured during initial programming, with various LPG blends able to be configured. The operator may choose which blend is being dispensed, and the applicable density will automatically be applied.

Alternatively, an Alfons Haar model DIS1A density sensor may be fitted, which will automatically apply the correct density calculation to the delivery. If fitted, the density sensor must be calibrated during the calibration process.

(viii) Printer

An Epson model TM-295 or equivalent (*) printer is required to be interfaced to the calculator/indicator for systems with the temperature compensation facility enabled for indicating the delivered volume at 15ºC and where the density is operator selectable.

(*) "Equivalent" is defined to mean other proprietary equipment of the same or better specifications requiring no changes to software for satisfactory operation of the complete system.

(ix) Transfer Device

The transfer point that defines the start and stop of measurement is either a valve or an LPG nozzle fitted to a pipe/hose connected to the outlet of the differential pressure valve with no intermediate connections that may divert the delivery (Figure 1). However, two delivery outlets may be installed provided an isolation valve is fitted before each delivery outlet (Figure 6) and that one or more notices are fitted near each isolation valve/delivery outlet indicating that only one outlet is to be in use at any one time.

The bulk LPG metering system is considered a non-interruptible system where the valve/nozzle is latched in the open position for the duration of the delivery; in addition, an operator monitors the entire delivery process and responds to any alarms given by the metering system.

(x) Checking Facilities

The instrument incorporates the following checking facilities:

- A continuous system wide segment check is performed whenever the Countmaster is powered on.
- A check of the presence and of the correct signal output from the measurement transducer.
- Outputs are provided to control the delivery process and if necessary prevent measurements when errors are detected.
- When configured for use with a printer, the series calculator/indicator checks for the presence and correct operation of the printer.

1.3 Verification Provision

Provision is made for the application of a verification mark.

1.4 Sealing Provision

The flowmetering system and calculator/indicator has provision for sealing access to the calibration parameters as shown in Figure 6.

1.5 Descriptive Markings and Notices

Instruments are marked with the following data, placed together either on the indicating device or on a data plate or some information on either, in the form shown at right:

Manufacturer's mark, or name written in full	……
Meter model	……
Serial number	……
NMI approval number	NMI 10/2/20
Year of manufacture	……
Minimum flow rate	…… L/min
Maximum flow rate	…… L/min
Density range at 15°C	…… kg/m³
Environmental classes	Class C, I (#)
Accuracy class	1.0
Maximum operating pressure	…… kPa
Minimum operating pressure	at least 100 kPa above vapour pressure

(#) Both these classes represent the same ambient temperature range of -25°C to 55°C but class I is for mobile systems.

In addition, the indicator is marked with the minimum delivery (V_{min}) specified for the metering system.

Instruments fitted with more than one delivery outlet must have one or more notices fitted near each isolation valve/delivery outlet indicating that only one outlet is to be in use at any one time.

2. Description of Variant 1 approved on 15/07/19

The PreciGas C 1000 Bulk LPG Flowmetering System which has the PreciGAS C 1000 measurement transducer with the following the following characteristics:

- Minimum measured quantity, V_{min} 200 L
- Maximum flow rate, Q_{max} 1000 L/min
- Minimum flow rate, Q_{min} 200 L/min

Certain other models and configurations of the Pulse series of LPG fuel dispensers as identified in Table 1 below.

- TABLE 1 – Approved Models of the Pulse LPG Series

Models numbers are in the form 'PreciGAS C 400 DE' (the pattern), where:

Type codes and labels

Type code

PreciGAS C 400 DE
1 2 3 4

Item	Model	Meaning	
1	PreciGAS	Measuring system type	
2	C	Design with PreciCONTROL and EC type examination certificate	
3	400	Approved max. flow in l/min	
4	DE	Not specified:	One outlet
		DE:	Two outlets
		DE-E:	Direction of the second outlet parallel above
		DE-M:	Direction of the second outlet in front, with dry-coupling
		DE-N:	Direction of the second outlet in front
		DE-S:	Alternative direction of the second outlet

Articles for sale	Part no.	Pressure equipment category	Volume (cm^3)
PreciGAS C 400	2318273	-	810
PreciGAS C 400 DE	2381581	-	980
PreciGAS C 400 DE-E	2453170	I	1070
PreciGAS C 1000	2357844	II	2650
PreciGAS C 1000 DE	2381280	II	3320
PreciGAS C 1000 DE-M	2454633	II	3070
PreciGAS C 1000 DE-N	2461374	II	3070
PreciGAS C 1000 DE-S	2404744	II	3070

Instruments shall be tested in accordance with any relevant tests specified in the National Instrument Test Procedures.

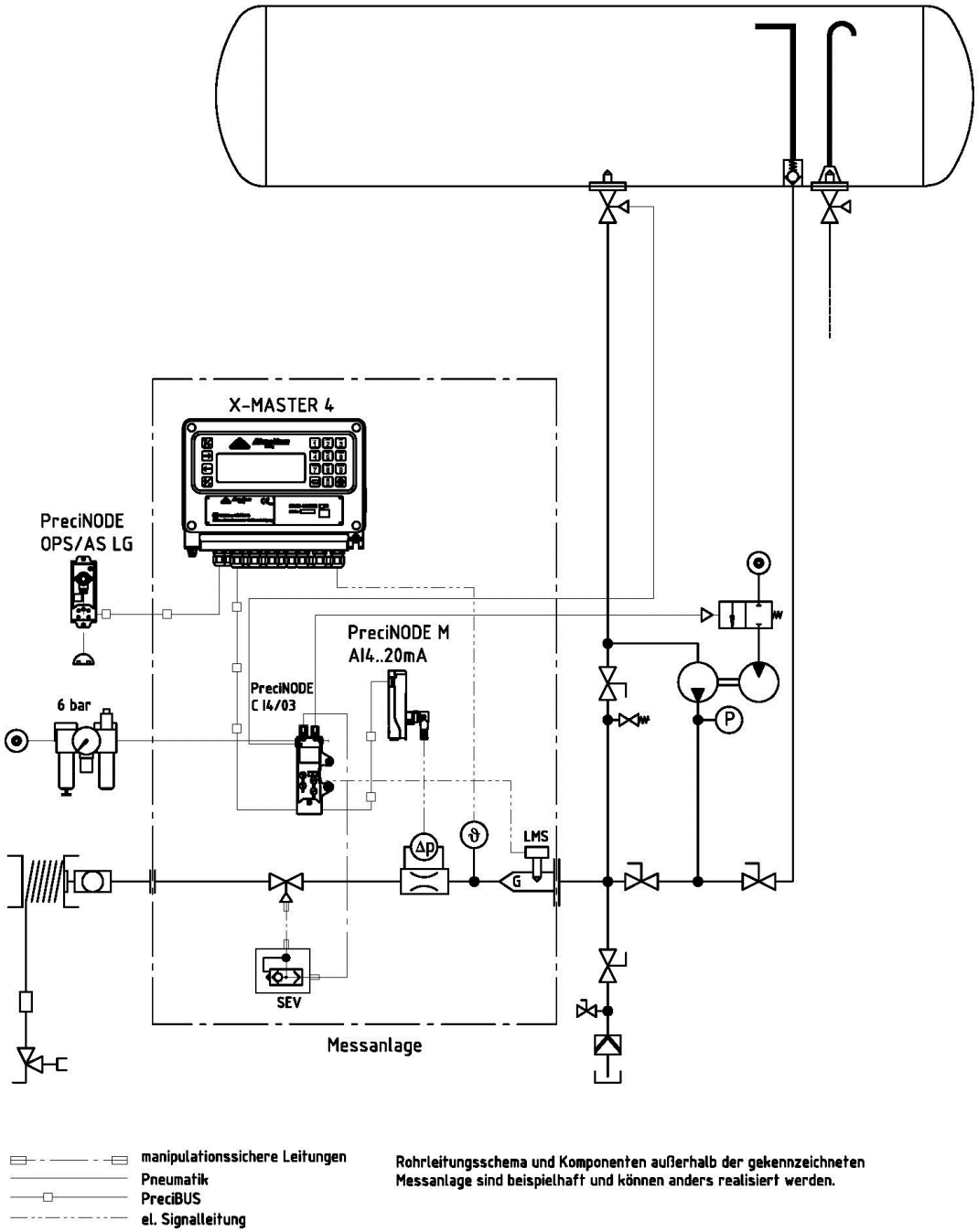
The instrument shall not be adjusted to anything other than as close as practical to zero error, even when these values are within the maximum permissible errors.

The tests should be conducted in conjunction with any test specified in the approval documentation for any devices used with this metering system.

Maximum Permissible Errors

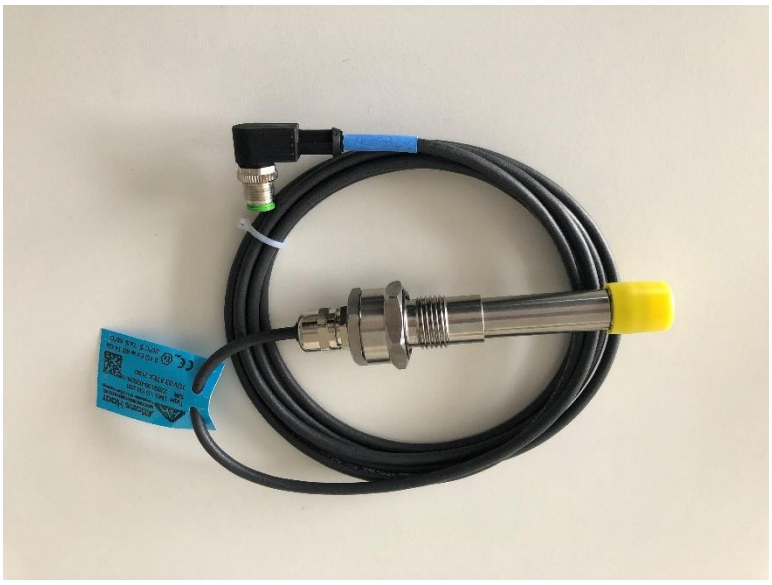
The maximum permissible errors are specified in Schedule 1 of the *National Trade Measurement Regulations 2009*.

FIGURE 10/2/20 – 1



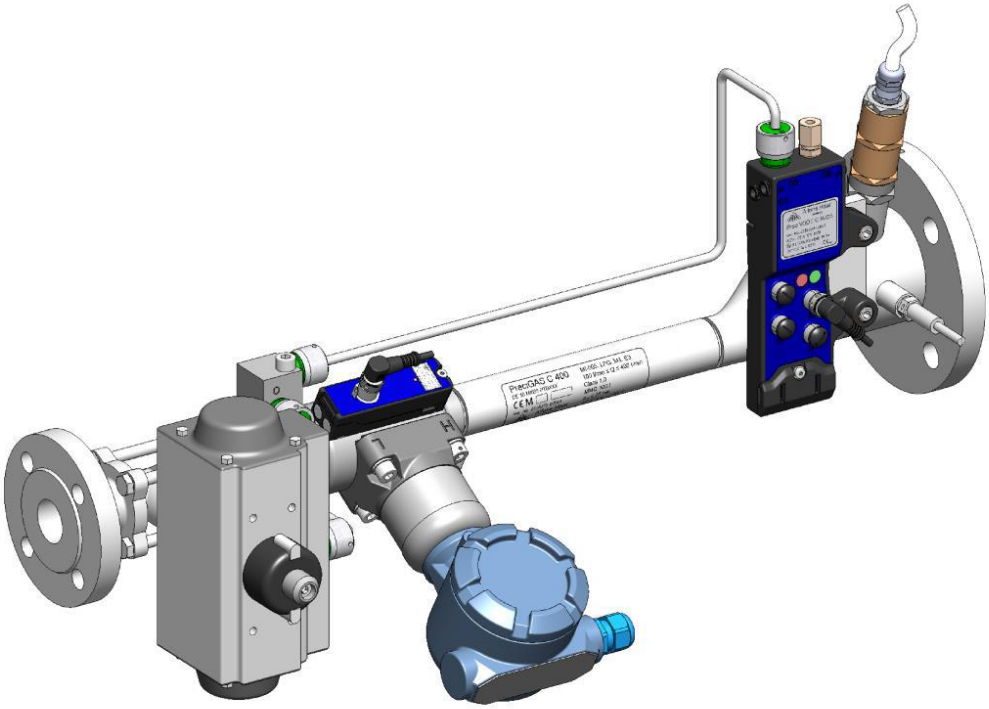
Typical PreciGAS C 400 LPG Flowmetering System

FIGURE 10/2/20 – 2



Alfons Haar LMS 1D 2289048 sensor

FIGURE 10/2/18 – 3

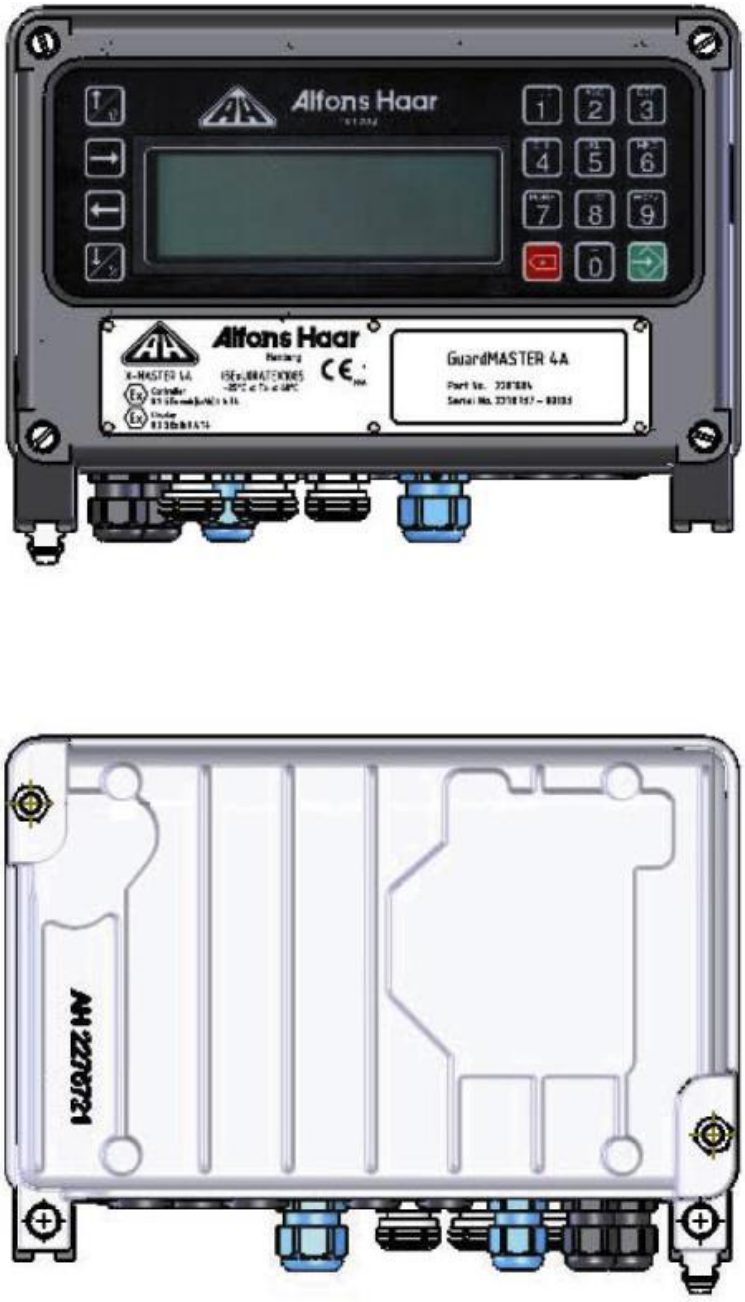


PreciGas C 400 measurement transducer

FIGURE 10/2/18 – 4

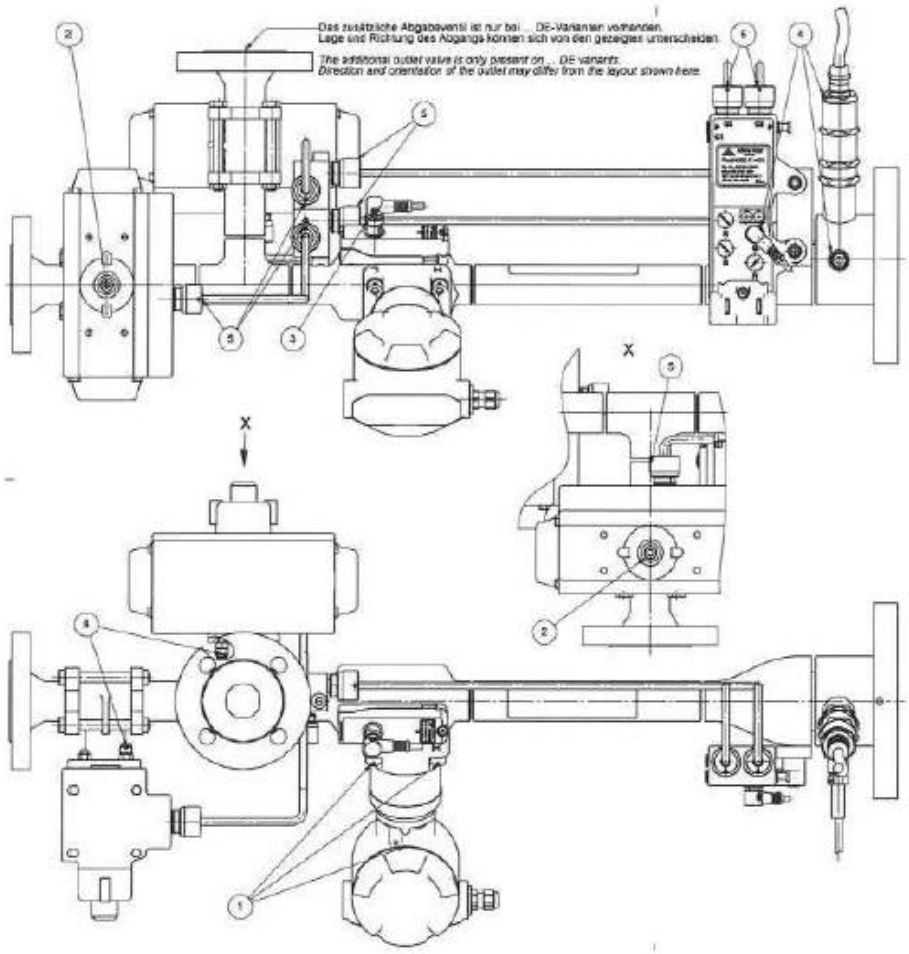
Rosemount model 3051S Differential Pressure Transmitter

FIGURE 10/2/20 – 5



Alfons Haar model X-Master 4 calculator/indicator

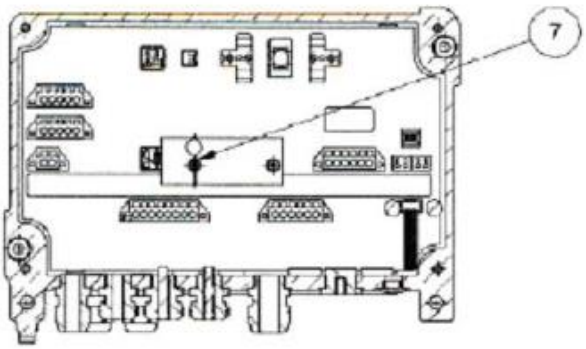
FIGURE 10/2/20 – 6



1: Seal of differential pressure transducer against el. and mech. uninstalling
2: Seal of delivery valve against manual operation
3: Seal of differential pressure output signal against loosen of plug
4: Seal of gas bubble detector and resistive thermometer against uninstalling
5: Seal of pneumatic control pipe for delivery valve against manipulation
6: Seal of actuator for delivery valve against uninstalling
7: Seal of electronic counter head against manipulation

a) Typical Sealing of Flowmetering System

Sealed protection cap above DIP-switch, C1A, C1B and T1



Sealing X-MASTER 4

b) Sealing of Calculator/indicator

~ End of Document ~