



Australian Government
Department of Industry,
Innovation and Science

National Measurement Institute

36 Bradfield Road, West Lindfield NSW 2070

Certificate of Approval NMI 5/6A/228

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.

Petrotec Model EURO 1000 VI R Fuel Dispenser for Motor Vehicles

submitted by Petrotec, Inovação e Industria S.A
Parque Industrial de Guimarães - Pav. C2- S.João de Ponte
4805-661 Guimarães
Portugal

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 1/10/24, and then every 5 years thereafter.

DOCUMENT HISTORY

Rev	Reason/Details	Date
0	Pattern & variants 1 to 7 approved – certificate issued	24/01/13
1	Variant 8 approved – certificate issued	14/10/16
2	Variant 9 approved – certificate issued	13/12/16
3	Pattern and variants reviewed – variant 2 to 4 amended – variant 10 to 11 approved – certificate issued	09/10/19

CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI 5/6A/228' 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.

Auxiliary devices used with this instrument shall comply with the requirements of General Supplementary Certificates No S1/0/A or 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 5/6A/228

1. Description of Pattern **approved on 24/01/13**

A Petrotec model EURO 1000 VI R fuel dispenser for motor vehicles approved to dispense various grades of fuels (*), in attendant-operated mode, or in attended self-service mode using any compatible (#) approved control console. The meter is adjusted to be correct for the liquid for which it is to be verified.

- (*) Including up to 10% ethanol (E10) and various grades of pure biodiesel and biodiesel/distillate blends (to Australian government standard).
- (#) 'Compatible' is defined to mean that no additions/changes to the hardware/software specified in this approval are required for satisfactory operation of the complete system.

1.1 Field of Operation

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

- Minimum measured quantity, V_{min} 2 L
 - Maximum flow rate, Q_{max} 50 L/min
 - Minimum flow rate, Q_{min} 5 L/min
 - Maximum pressure of the liquid, P_{max} 350 kPa
 - Minimum pressure of the liquid, P_{min} 140 kPa (#1)
 - Range of liquids viscosity 0.5 to 20 mPa.s (at 20°C) (#2)
 - Maximum temperature of the liquid, T_{max} 50°C
 - Minimum temperature of the liquid, T_{min} -10°C
 - Ambient temperature range -25 to 55°C
 - Accuracy class 0.5
- (#1) Minimum pressure required for effective operation of the gas elimination device.
- (#2) The flowmeter is adjusted for use with one product viscosity. Fuels include kerosene, distillate and various grades of petrol (which may include up to 10% ethanol). The pattern and variants constructed for use to dispense various grades of pure biodiesel and biodiesel/distillate blends (to Australian government standard).

1.2 Description of the Metering System

The instrument is in a lane oriented configuration (Figure 1) and incorporates the following components:

- (i) A Petrotec model RTF pumping unit (Figure 2).
 - (ii) A measurement transducer comprising of a Petrotec model PTF-25-80 four piston positive displacement flow meter (Figure 3) fitted with an Eltomatic 01-08 (Figure 3a) or 01-09 (Figure 3b) pulse generator.
 - (iii) A hose/nozzle mounted on the side of the dispenser housing. The hose used has 16 mm inner diameter and is fitted with an Elaflex or OPW nozzle. (**)
- (**) Note that the submitor must be consulted regarding the acceptability of any alternative nozzles.

1.3 Calculator/Indicator

The calculator/indicator comprises three parts;

- a Petrotec model CEM-03 processor (CPU) (Figure 4),
- a Petrotec model DISP-1 indicator (Figure 4) which has a display for indicating volume, price and unit price; and
- a Petrotec model EURO 2 (Figure 5a) or EURO 5 (Figure 5b) power supply.

An emergency stop button may be provided in the vicinity of the indicating head.

The display limits and increments are:

Price	9999, 99 in 0.01 \$ increments
Volume	9999, 99 in 0.01 L increments
Unit price	9,999 in 0.1 \$/L increments

The instrument is approved with the following software versions: 20.43; 21.43; 22.43; 23.43; 20.44; 21.44; 22.44 or 23.44, which can be viewed at power up or by rotating the key switch on the electronic head.

A pre-set device may also be fitted to allow pre-set to be selected by means of volume (litres) or price (dollars).

1.4 Descriptive Markings and Notices

Instruments are marked with the following data, together in one location on a data plate:

Pattern approval number	NMI 5/6A/228	
Manufacturer's identification mark or trade mark	.....
Manufacturer's designation (model number)	.....
Serial number	.....
Year of manufacture	.....
Maximum flow rate (Q_{max})	..... L/min	
Minimum flow rate (Q_{min})	..... L/min	
Minimum measured quantity (V_{min})	..... L	(#1)
Maximum operating pressure (P_{max})	..... kPa	
Minimum operating pressure (P_{min})	..... kPa	
Nature of liquids to be measured	.....	(#2)
Maximum temperature of the liquid, T_{max}	.....°C	(#3)
Minimum temperature of the liquid, T_{min}	.....°C	(#3)
Environmental class	class C	

(#1) In addition, the minimum measured quantity (V_{min}) shall be clearly visible on any indicating device visible to the user during measurement, in the form 'Minimum delivery 2 L'.

(#2) e.g. distillate or D.

(#3) Required if liquid temperature range differs from -10°C to 50°C.

1.5 Sealing Provision

The gas separator test valve, calculator, pulse generators, meter and meter calibration wheel have provision for sealing, as shown in Figures 6 to 9.

1.6 Verification Provision

Provision is made for the application of a verification mark.

1.7 Checking Facilities

An automatic segment test is performed at the start of each delivery.

The calculator monitors the presence and correct transmission of signal from the measurement transducer, and in the event of detecting a fault the instrument indicates an error code and has provision for controlling electrically-operated valves to stop the delivery.

2. Description of Variant 1

approved on 24/01/13

Certain other models and configurations of the EURO series of fuel dispensers (Figure 10) identified using Table 1 below.

TABLE 1 – Approved Models of the EURO Series

Model	Type (##)	Products	Hoses
EURO 1000 VI R	xP/yH	1	1
EURO 2000 VI	xP/yH	1 to 2	1 to 2
EURO 4000B VI	xP/yH	1 to 4	1 to 8
EURO 4000C VI	xP/yH	1 to 4	1 to 8
EURO 4500 VI	xP/yH	1 to 4	1 to 8
EURO 5000 VI	xP/yH	1 to 5	1 to 10

(##) 'x' refers to the number of products

'y' refers to the number of hoses

3. Description of Variant 2

approved on 24/01/13

With Petrotec model RTF pumping units, 19 mm or 22 mm inner diameter piping, 19 mm hoses, and ZVA/OPW nozzles (*), and with the following field of operation:

- For use with distillate/diesel/biodiesel
- Maximum flow rate (Q_{max}) 80 L/min
- Minimum flow rate (Q_{min}) 8 L/min
- Minimum measured quantity (V_{min}) 2 L

(*) Note that the submitter must be consulted regarding the acceptability of any alternative nozzles.

This variant may be fitted with a switch to change from 40 to 80 L/min maximum flowrate.

4. Description of Variant 3 **approved on 24/01/13**

With Petrotec model RTF pumping units with 19 mm or 22 mm inner diameter mm piping, 21 or 25 mm hoses, and ZVA/OPW nozzles (*), with the following field of operation:

- For use with distillate/Diesel/Biodiesel
- Maximum flow rate (Q_{max}) 130 L/min
- Minimum flow rate (Q_{min}) 13 L/min
- Minimum measured quantity (V_{min}) 5 L

(*) Note that the submitter must be consulted regarding the acceptability of any alternative nozzles.

This variant may be fitted with a switch to change from 40 to 130 L/min maximum flowrate.

5. Description of Variant 4 **approved on 24/01/13**

With Petrotec model RTF pumping units with 19 mm or 22 mm inner diameter mm piping, 21, 25, 32 or 38 mm hoses, and ZVA/OPW nozzles (*), with the following field of operation:

- For use with distillate/Diesel/Biodiesel
- Maximum flow rate (Q_{max}) 160 or 200 L/min
- Minimum flow rate (Q_{min}) 16 or 20 L/min
- Minimum measured quantity (V_{min}) 5 L

(*) Note that the submitter must be consulted regarding the acceptability of any alternative nozzles.

On this case this configuration uses two pump unit (gas separators) and two meter assembled and working in parallel.

6. Description of Variant 5 **approved on 24/01/13**

For use with AdBlue in which case the measurement transducer is a Petrotec four piston model PTF AdBlue flowmeter. Figures 11 and 12 show some alternative housings.

The field of operation of the AdBlue measuring systems are determined by the following characteristics:

- Minimum measured quantity, V_{min} 2 L
- Maximum flow rate, Q_{max} 40 L/min
- Minimum flow rate, Q_{min} 4 L/min
- Maximum pressure of the liquid, P_{max} 320 kPa
- Minimum pressure of the liquid, P_{min} 50 kPa
- Dynamic viscosity (at 25°C) 1.4 mPa.s (#)
- Maximum temperature of the liquid, T_{max} 30°C
- Minimum temperature of the liquid, T_{min} 0°C
- Ambient temperature range -25 to 55°C
- Accuracy class 0.5

(#) The AdBlue flowmeter is adjusted to be correct for AdBlue fluid AUS32 (Aqueous urea solution 32.5%) for which it is to be verified.

7. Description of Variant 6 **approved on 24/01/13**

With one or more compatible submersible turbine pumps (STPs) incorporating a leak detection system. The STP replaces the equivalent components (i.e. motor, pump/strainer/gas separator, and associated pipework) in certain fuel dispensers covered by this approval.

Dispensers may operate with the standard maximum flow rate, Q_{max} of 50 L/min, or dispensers for use with distillate may be used with the ultra-high maximum flow rate, Q_{max} of 160 or 200 L/min, in this case they shall use two meters in parallel.

8. Description of Variant 7 **approved on 24/01/13**

Instruments may be fitted with a Petrotec model eMC-VR vapour recovery and monitoring system and are used up to a maximum flow rate of 40 L/min. A typical instrument is shown in Figure 13.

The vapour recovery and monitoring system is approved by the German TÜV SÜD Industrie Service GmbH authority.

Only vapour recovery components and systems as listed below and included in the relevant TÜV approval certificates may be used.

The relevant TÜV approvals (and the approved components) are:

- (i) For collection of vapour:
- TÜV 85-2.167; or
 - TÜV 85-2.170 GER; or
 - TÜV 85-15.5 GER; or
 - TÜV 85-15.6 GER; or
 - TÜV 85-15.18 GER

and the only approved system components are:

- Vapour recovery nozzles –
 - ELAFLEX models ZVA 200GR or ZVA Slimline 2GR or
 - OPW model Avance by OPW Series AVN.-V.
- Coaxial hoses –
 - ELAFLEX model model Conti Slimline 21/8 Coax,
 - Goodyear model Listed Flexsteel Vapor Assist; or
 - OPW model AVANCE By OPW series AVH-V
- Control valves – Burket models 6022 or 2832.
- Control & monitor board – Petrotec model eMC-VR control board.
- Vapour recovery pump(s) – Durr models Mex 0831-10, MEX 0831-11 or MEX 0544.

- (ii) For automatic monitoring of the vapour to fuel ratio:

The relevant TÜV approval is :

- TÜV Ü-12.16GER,

and the only approved system components are:

- Petrotec model eMC-VR control Board monitor.
- Petrotec model PflowS flowmeter.

9. Description of Variant 8 **approved on 17/10/16**

Variant 5 instruments may be used with one or more compatible submersible turbine pumps (STPs) and its installation shall comprise of at least a minimum tank level detection system or similar, that stops the pump when air is introduced into the system.

10. Description of Variant 9 **approved on 13/12/16**

With the Petrotec model CEM-03 calculator of the pattern as described in **Clause 1.3** now with version 24.43 software which provides communication with a self-service control system using the Gilbarco Australia protocol.

11. Description of Variant 10 **approved on 09/10/19**

The models and configurations fuel dispensers (Figure 14) are similar to the pattern identified using Table 2 below.

TABLE 2

Model	Type (##)	Products	Hoses
P2000	xP/yH	1 to 2	1 to 2
P4000C	xP/yH	1 to 4	1 to 8
P5000 HH	xP/yH	1 to 4	1 to 8
P5000	xP/yH	1 to 5	1 to 10
P1000 HR AdBlue	xP/yH	1	1 to 2

11.1 Description of the Metering System

The above models incorporate the following components:

- (i) The pumping unit as described in the pattern or variants.
- (ii) The measurement transducer for the dispensers comprises either the Petrotec model PTF 25-80 flowmeter for fuels as described in the pattern, or the Petrotec model PTF AdBlue flowmeter as described in variant 5. The measurement transducer is fitted with the Petrotec model ED-03 Pulse Generator.
- (iii) A Petrotec model eMC Calculator/Indicator

11.2 Calculator/Indicator

The eMC calculator is built around a central micro-controller that controls several peripherals named modules like hydraulics, displays, voice synthesizer. The hydraulics modules (DISCO-HIM) are responsible for counting the pulses from one or two volume meters simultaneously and transmitting the information to the central unit by a serial bus with a security stamp (MAC byte).

An emergency stop button may be provided in the vicinity of the indicating head.

The display limits and increments are:

Price	9999, 99 in 0.01 \$ increments
Volume	9999, 99 in 0.01 L increments
Unit price	9,999 in 0.1 \$/L increments

The instrument is approved with the following software versions: 1000, 1001, 1002, 1005, 1006, 1007, 1008, 1009 and 1010, which can be viewed at power up or by rotating the key switch on the electronic head.

A pre-set device may also be fitted to allow pre-set to be selected by means of volume (litres) or price (dollars).

11.3 Pulse Generator

The Petrotec model ED-03 Pulse Generator (Figure 15) is based on an opto-coupler that provides the light emitting diode and a lens to produce an infrared beam and the photo transistors receiver. It is used in conjunction with a 50 slit stainless steel disc. It will be assembled directly on top of the positive displacement meter and is coupled to volume meter shaft that drives the encoder disc.

This pulse generator has electronic calibration.

The encoder has the following electrical characteristics:

- Power Supply: 4.75 to 5 VDC
- Number of channels: 2
- Output signal: Square wave with open collector
- Phase shift: $90^\circ \pm 10\%$
- Maximum pulse frequency: 300 Hz
- Pulses per litre: 100 pulses/litre (2 channels)

NOTE: when it is used this pulse generator the PTF 25-80 flow meter can be use with or without mechanical calibration (Figure 16).

11.4 Field of Operation

The field of operation of the measuring system using Petrotec model PTF 25-80 flowmeters is as described in the Pattern and Variants.

The field of operation of the measuring system using Petrotec model PTF AdBlue flowmeters is as described in Variant 5 with the following variation:

- Minimum flow rate, Q_{min} 2 L/min

11.5 Sealing Provision

The Petrotec PTF flowmeter with or without mechanical calibration, eMC calculator, hydraulics modules (DISCO-HIM) and Petrotec model ED-03 Pulse generator have provision for sealing, as shown in Figures 17 to 20.

12. Description of Variant 11

approved on 09/10/19

The vapour recovery system of variant 7 may also comprise the components and systems as listed below and included in the relevant TÜV approval certificates may be used.

The relevant TÜV approvals (and the approved components) are:

(i) For collection of vapour:

- VR2-1506-124 EU
- VR2-1506-142 EU
- VR2-1506-144 EU
- VR2-1506-145 EU

and the only approved system components are:

- Vapour recovery nozzles –
 - ELAFLEX models ZVA / ELAFLEX ZVA 200GR or
- Coaxial hoses –
 - ELAFLEX Slimline 21/8, ELAFLEX Conti Slimline
- Control valves –
 - Burket models 6022 or 2832.
 - ASCO
- Control & monitor board
 - Petrotec model eMC-VR control board.
- Vapour recovery pump(s)
 - Durr models Mex 0831-10, MEX 0831-11 or MEX 0544.

(ii) For automatic monitoring of the vapour to fuel ratio:

The relevant TÜV approval is :

- AM VR2 1506 140 EU,

and the only approved system components are:

- Petrotec model eMC-VR control Board monitor.
- TST – VFS gas flow sensor.

TEST PROCEDURE No 5/6A/228

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.

Maximum Permissible Errors

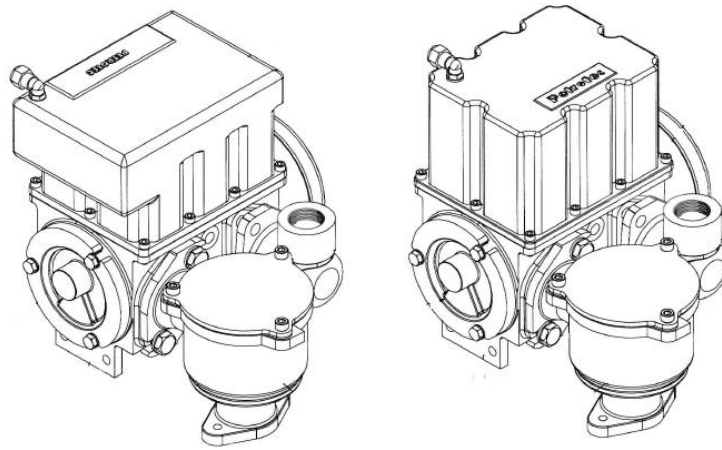
The maximum permissible errors are specified in Schedule 1 of the *National Trade Measurement Regulations 2009*.

FIGURE 5/6A/228 – 1



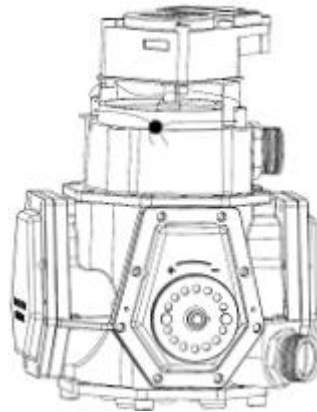
Petrotec Model EURO 1000 VI R / EURO 1000 VI R AdBlue Fuel Dispenser

FIGURE 5/6A/228 – 2

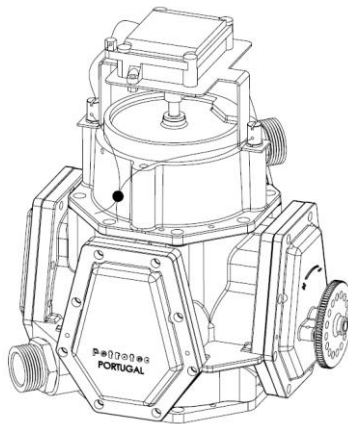


Petrotec Model RTF Pumping Units

FIGURE 5/6A/228 – 3

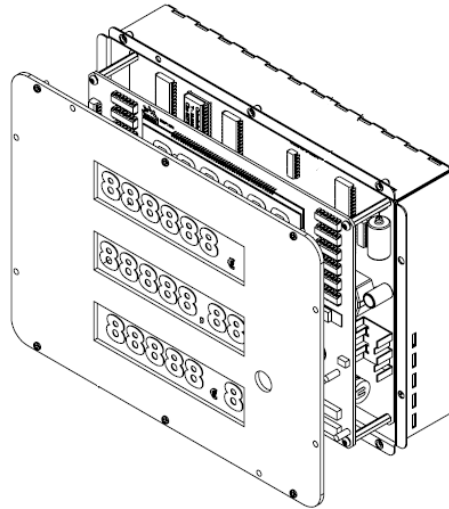


(a) Petrotec Model PTF 25-80 Meter with Eltomatic 01-08 Pulse Generator



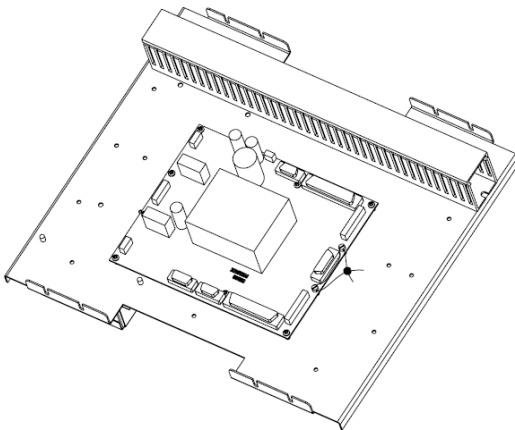
(b) Petrotec Model PTF 25-80 with Eltomatic 01-09 Pulse Generator

FIGURE 5/6A/228 – 4

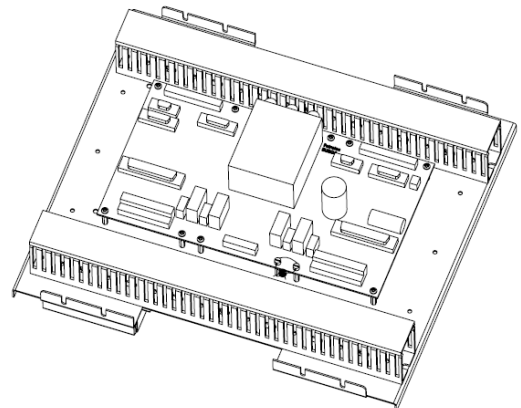


Calculator CEM 03 (with CPU board and Display board)

FIGURE 5/6A/228 – 5

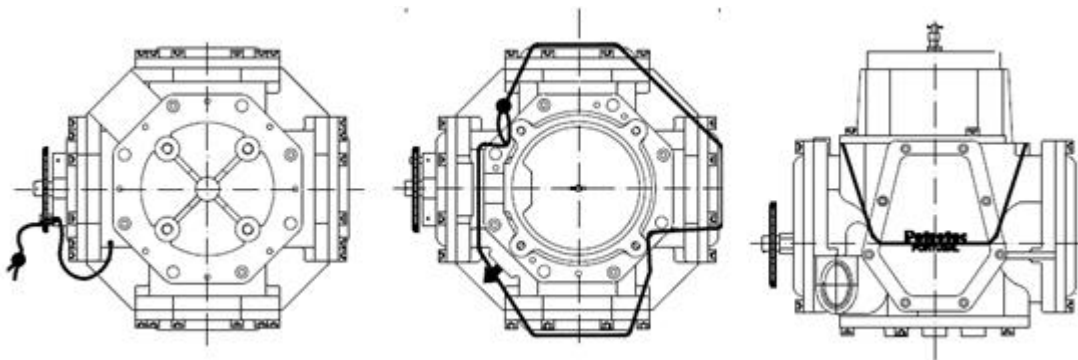


(a) Model EURO 2 Power Supply



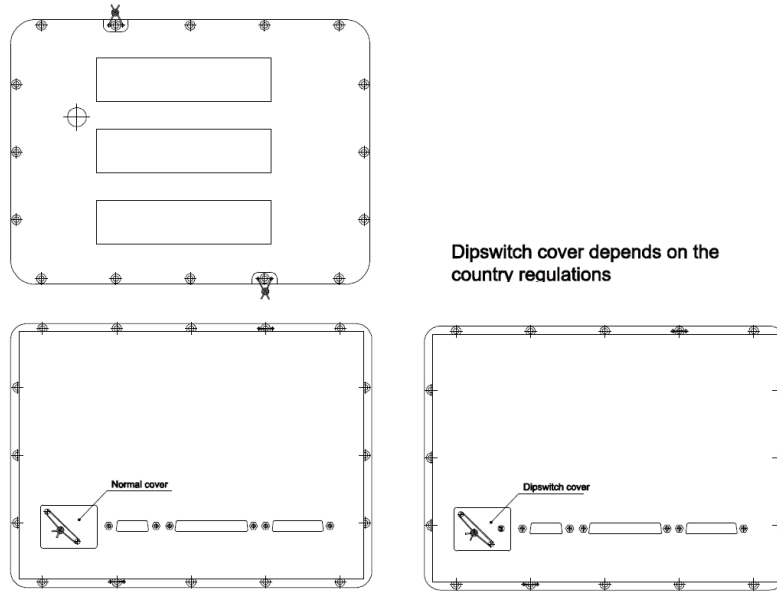
(b) Model EURO 5 Power Supply

FIGURE 5/6A/228 – 6



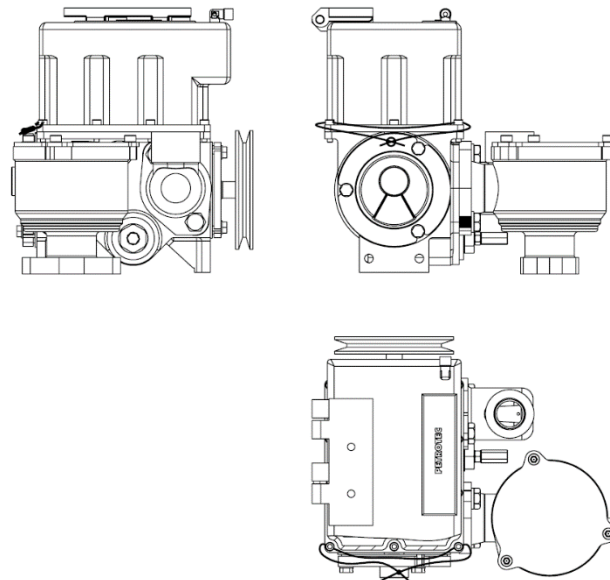
Typical Mechanical Sealing of Petrotec Flowmeter

FIGURE 5/6A/228 – 7



Typical Mechanical Sealing of Calculator

FIGURE 5/6A/228 – 8



Typical Mechanical Sealing of gas separator

FIGURE 5/6A/228 – 9



Typical Mechanical Sealing of Pulse Generators

FIGURE 5/6A/228 – 10



EURO 2000 VI / EURO 2000 VI AdBlue



EURO 4000B VI / EURO 4000B VI AdBlue



EURO 4000C VI / EURO 4000C VI AdBlue



EURO 4500 VI / EURO 4500 VI AdBlue



EURO 5000 VI / EURO 5000 VI AdBlue

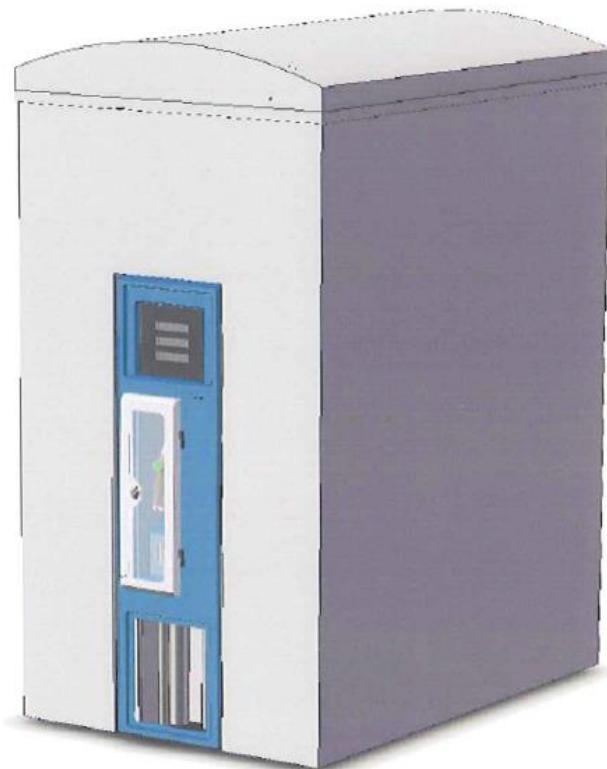
Various Approved Models of the EURO Series – Variant 1

FIGURE 5/6A/228 – 11



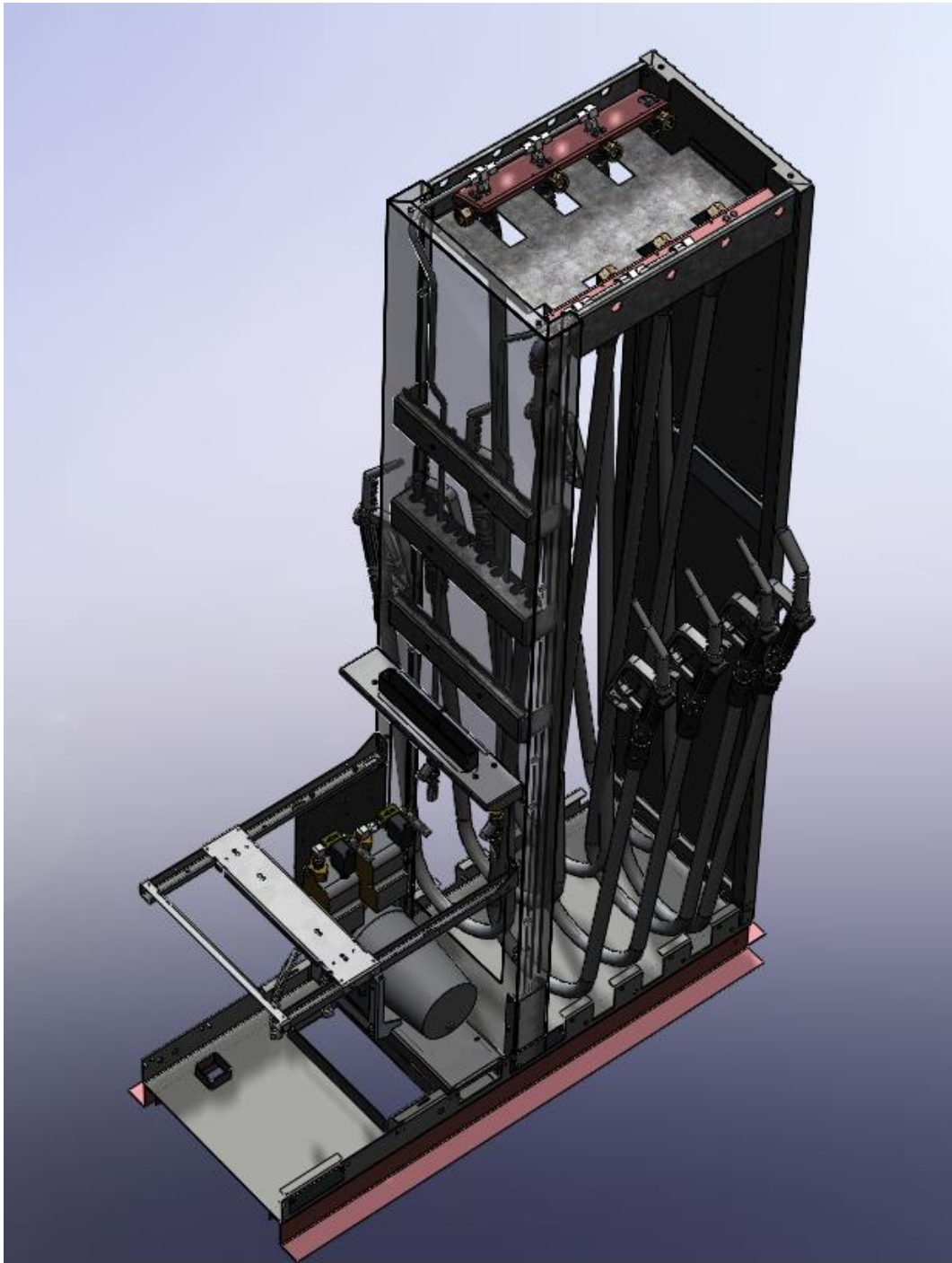
Alternative EURO 1000 VI R AdBlue – Variant 5

FIGURE 5/6A/228 – 12



2nd Alternative EURO 1000 VI R AdBlue – Variant 5

FIGURE 5/6A/228 – 13



Typical Petrotec Model eMC-VR Vapour Recovery System – Variant 7

FIGURE 5/6A/228 – 14



P2000



P4000C



P5000 HH



P5000



P1000 HR AdBlue

Various Approved Models– Variant 10

FIGURE 5/6A/228 – 15

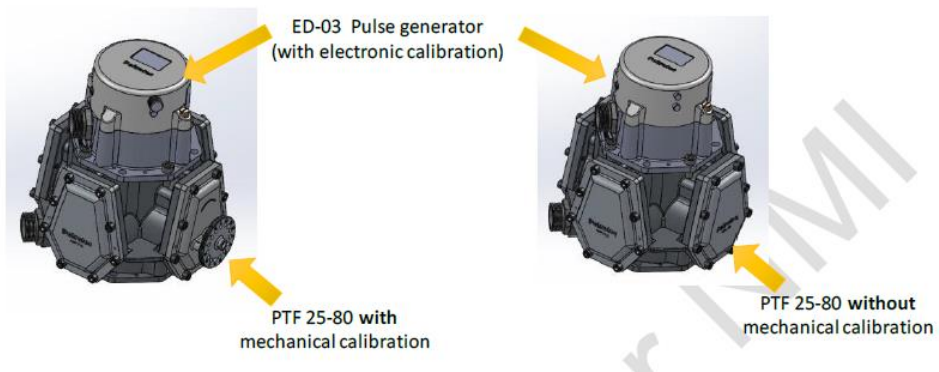


Petrotec model ED-03 Pulse Generator – Variant 10

FIGURE 5/6A/228 – 16

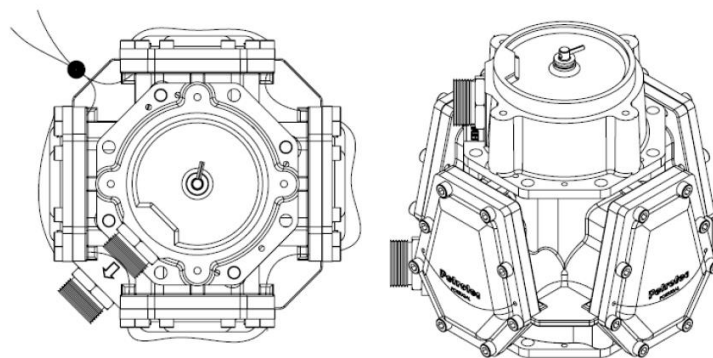
PTF 25-80 with mechanical calibration (Option 1)

PTF 25-80 without mechanical calibration (Option 2)



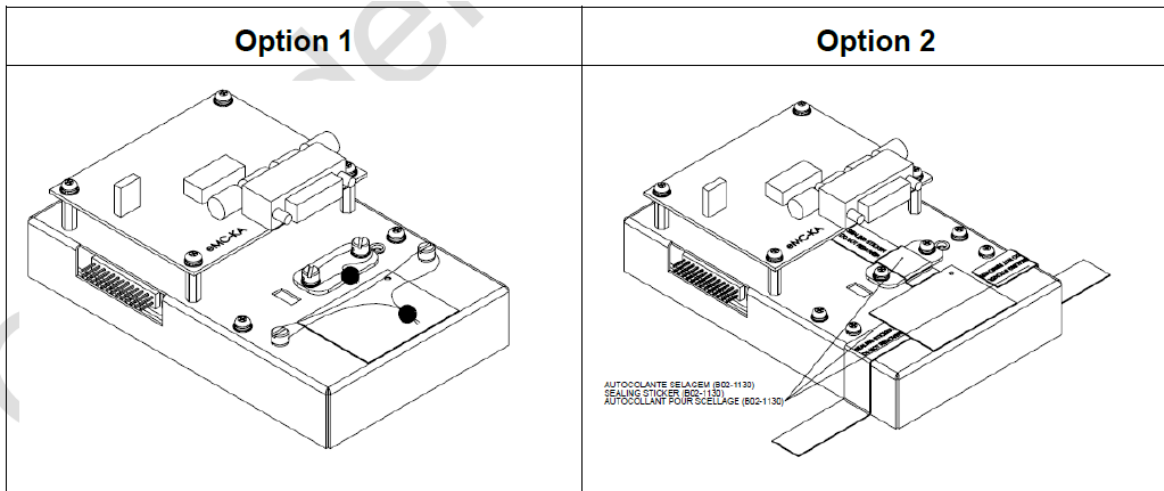
Petrotec model PTF 25-80 Flowmeter sealing – Variant 10

FIGURE 5/6A/228 – 17



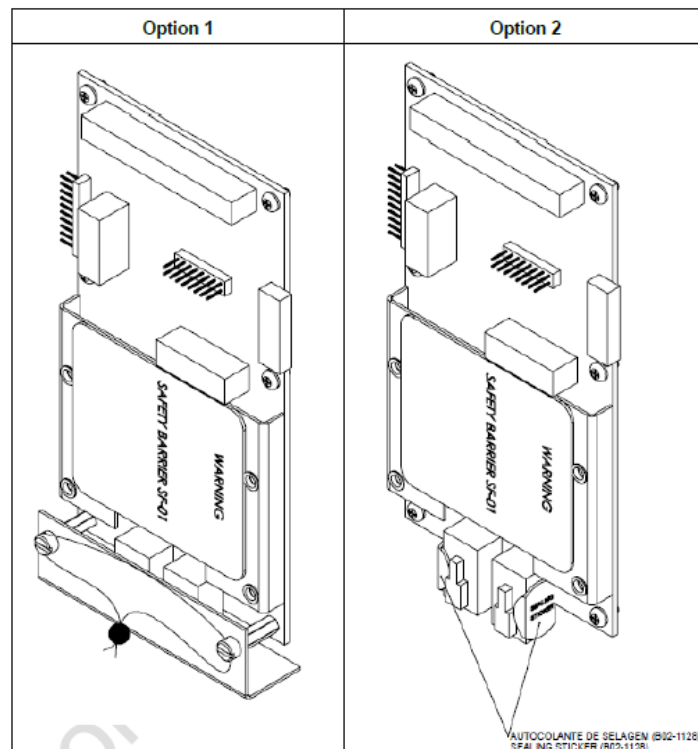
Petrotec model PTF 25-80 Flowmeter sealing (without mechanical calibration) – Variant 10

FIGURE 5/6A/228 – 18



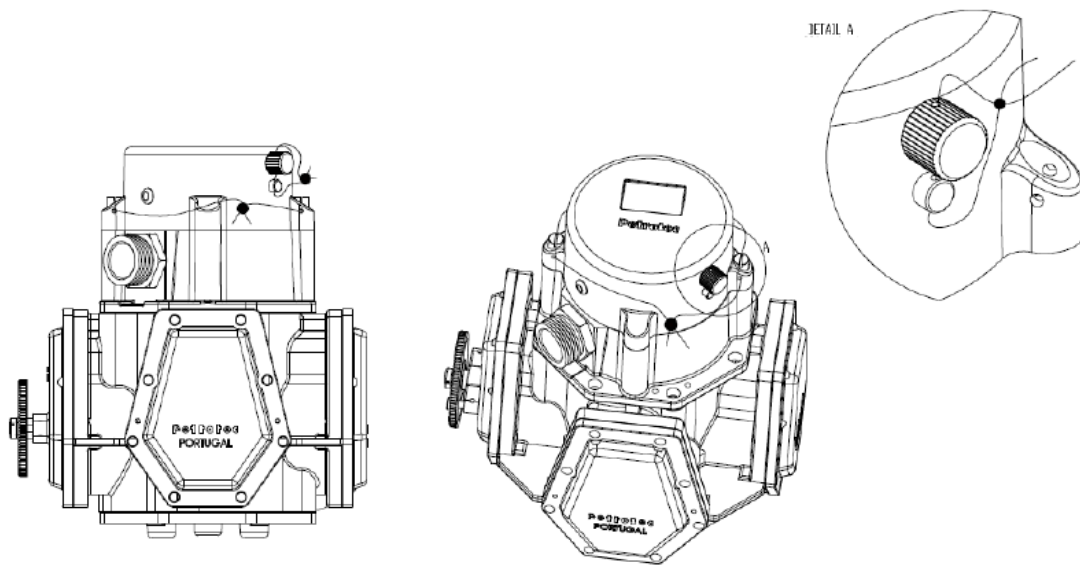
Petrotec model eMC Calculator CPU board sealing options – Variant 10

FIGURE 5/6A/228 – 19



Petrotec hydraulics modules (DISCO-HIM) sealing options – Variant 10

FIGURE 5/6A/228 – 20



Petrotec model ED-03 pulse generator sealing – Variant 10

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