



**Australian Government**

**National Measurement  
Institute**

Bradfield Road, West Lindfield NSW 2070

## **Certificate of Approval**

### **No 5/6A/86A**

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.

PEC Model 8601P Fuel Dispenser for Motor Vehicles

submitted by           Gallagher Fuel Systems Ltd  
                                  2 Station Road  
                                  Marton     4741     New Zealand

**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 July 2004.

This approval becomes subject to review on 1/11/16, and then every 5 years thereafter.

#### **DOCUMENT HISTORY**

<b>Rev</b>	<b>Reason/Details</b>	<b>Date</b>
0	Pattern & variants 1 to 4 approved – interim certificate issued	4/10/99
1	Variant 5 approved – interim certificate issued	11/02/00
2	Pattern & variants 1 to 5 approved – certificate issued	31/05/00
3	Variant 6 approved – interim certificate issued	1/12/01
4	Variant 6 approved – certificate issued	15/03/02
5	Variant 7 approved – interim certificate issued	17/01/03
6	Variant 7 approved – certificate issued	27/02/03
7	Pattern amended (Test Procedure) – notification of change issued	27/06/03
8	Pattern amended (Test Procedure) – notification of change issued	18/02/05

DOCUMENT HISTORY (cont...)

Rev	Reason/Details	Date
9	Variant 7 amended (flow rates) – notification of change issued	21/07/06
10	Pattern & variants 1 to 7 reviewed – pattern amended (software version) – certificate issued	18/10/06
11	Variants 8 to 10 approved – interim certificate issued	30/07/07
12	Variants 8 to 10 approved – certificate issued	15/10/07
13	Variant 11 approved – certificate issued	28/03/08
14	Variant 12 approved – certificate issued	8/03/10
15	Pattern amended (pulse generator & Test Procedure) – notification of change issued	22/10/10
16	Pattern & variants 1 to 12 reviewed – pattern amended (Test Procedure) – notification of change issued	3/08/11
17	Variant 13 approved – pattern (pump) & variant 12 (TÜV approvals) amended – certificate issued	22/09/11
18	Pattern & variants 1 to 13 updated – variant 14 approved – certificate issued	21/06/13
19	Variants 15 approved – certificate issued	07/10/14

CONDITIONS OF APPROVAL

**General**

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI (or NSC) 5/6A/86A' 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.

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*.



**Dr A Rawlinson**

## TECHNICAL SCHEDULE No 5/6A/86A

### 1. Description of Pattern

approved on 4/10/99

A PEC model 8601P fuel dispenser for motor vehicles (Figures 1 to 3, & Table 1) approved to dispense various grades of petrol, in attendant-operated mode. The meter is adjusted to be correct for the liquid for which it is to be verified. May also be known as Gallagher' instruments of the same model.

The model 8601P multi-product dispenser has the following components or features:

- Three Tatsuno model POS-0257 or model FP 1001 pump/strainer/gas separators.
- Six Tatsuno model MP-02515 positive displacement meters each fitted with a PEC model #07434 or model 2A90930 pulse generator.
- Two PEC model MHP price-computing indicators.
- A pre-set facility.
- Six ZVA or any other NMI-approved nozzles.

A compatible NMI-approved control system may also be connected to provide self-service operation.

The hose numbering layout for self service installations is shown in Figure 4.

#### 1.1 Field of Operation

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

- Minimum measured quantity,  $MMQ (V_{min})$  2 L
- Maximum flow rate,  $Q_{max}$  50 L/min
- Minimum flow rate,  $Q_{min}$  5 L/min
- Maximum pressure of the liquid,  $P_{max}$  300 kPa
- Minimum pressure of the liquid,  $P_{min}$  100 kPa (#1)
- Range of liquids viscosity 0.5 to 20 mPa.s (at 20°C) (#2)
- Maximum temperature of the liquid,  $T_{max}$  40°C
- Minimum temperature of the liquid,  $T_{min}$  5°C
- Environmental class class 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 Indicator/Calculator

The model MHP indicator/calculator comprises a computing unit and display units. A single display is provided for volume and total price, while a separate unit price display is provided for each type of liquid.

The indicators display the following maximum values:

Volume	To 999.99 L
Unit price	To 999.9 c/L or 9.999 \$/L
Total price	To \$999.99
Totaliser	To 9999999 L

The pre-set facility uses two-stage solenoid valves to slow down and cut off the flow. The pre-set facility allows pre-set values to be entered in dollar increments up to a maximum of \$99.

To achieve pressurisation of the liquid, the instrument inhibits displaying the volume for the first 100 mL of any delivery.

The indicator/calculator operates with PEC version 2.54A software. Refer to the manufacturer's manual for the procedure to display the software version number.

### 1.3 Sealing and Verification Provision

Provision is made for the application of a verification mark.

The meters (Figure 5) and the gas separator test valve have provision for sealing.

### 1.4 Markings

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

Pattern approval number	NMI (or NSC) No 5/6A/86A
Manufacturer's identification or trade mark	.....
Manufacturer's designation (model number)	.....
Serial number and year of manufacture .	....
Maximum flow rate ( $Q_{max}$ )	..... L/min
Minimum flow rate ( $Q_{min}$ )	..... L/min
Minimum measured quantity (MMQ, $V_{min}$ )	..... L (#1)
Maximum operating pressure ( $P_{max}$ )	..... kPa
Minimum operating pressure ( $P_{min}$ )	..... kPa
Type of liquid	..... (#2)
Maximum temperature of the liquid, $T_{max}$	40°C
Minimum temperature of the liquid, $T_{min}$	5°C
Environmental class	class C

(#1) This may also be marked on the indicator/calculator.

(#2) e.g. 'petrol', 'distillate', 'P' or 'D'.

## 2. Description of Variant 1 approved on 4/10/99

Without the pre-set facility, in which case the model number does not have a 'P' suffix, e.g. the pattern becomes 8601.

## 3. Description of Variant 2 approved on 4/10/99

For use with distillate. A gas detection system (Figure 6) is required for products other than petrol, in which case the model number has a '2' as its fourth digit, e.g. the pattern becomes 8602.

**4. Description of Variant 3** **approved on 4/10/99**

With one or more Commission-approved submersible turbine pump hydraulic systems (Figure 7). These hydraulic systems replace the equivalent components (i.e. motor, pump/strainer/gas separator, and associated pipework) in any fuel dispenser covered by this approval.

Approved systems use either:

- (a) Red Jacket models P75S3-3 or P150S3-3 submersible turbine pumps (STP) with one or more Red Jacket models 116-030-5 PLD or 216-004 leak detectors; or
- (b) Gilbarco models T221X or T122W submersible turbine pumps with one or more Gilbarco model OTO4966 leak detectors.

More than one fuel dispenser may be connected to the same submersible turbine pump hydraulic system.

**5. Description of Variant 4** **approved on 4/10/99**

Certain other models and configurations of the 8000 series of fuel dispensers identified using Table 1.

**6. Description of Variant 5** **approved on 11/02/00**

Certain models of the Apollo 2000 series of fuel dispensers identified using Table 2.

The Apollo 2000 series dispensers (Figure 8) use the same electronic components as described for the pattern, however the hydraulic components have been modified for use with submersible turbine pump hydraulic systems (variant 3) and the hydraulic components including the meters are now located underground (Figure 7).

The field of operation of the measuring system is determined by the characteristics for the pattern as given in clause **1.1 Field of Operation**.

**7. Description of Variant 6** **approved on 15/3/02**

Certain models of the PEC Apollo 3000 series of fuel dispensers similar to the Apollo 2000 series as described for variant 5 in Technical Schedule No 5/6A/86A dated 31 May 2000, however in a housing as shown in Figure 9.

**8. Description of Variant 7** **approved on 27/02/03**

Certain models of the PEC 2000, 3000 and 8000 series of fuel dispensers identified using Table 1, with hydraulics designed for high flow rates using a compatible NMI-approved submersible turbine pump hydraulic system.

**8.1 Field of Operation**

The field of operation of the measuring system includes the following characteristics:

- Minimum measured quantity,  $V_{min}$  2/5 L
- Maximum flow rate,  $Q_{max}$  50/90 L/min
- Minimum flow rate,  $Q_{min}$  5/9 L/min

**9. Description of Variant 8** **approved on 15/10/07**

The pattern and variants for use to dispense various grades of petrol which may include up to 10% ethanol ('E10').

**10. Description of Variant 9** **approved on 15/10/07**

The pattern and variants constructed for use to dispense various grades of pure biodiesel and biodiesel/distillate blends (to Australian government standard).

**11. Description of Variant 10** **approved on 15/10/07**

Without the gas detection system referred to for variant 2.

**12. Description of Variant 11** **approved on 28/03/08**

With a Wix or Fit Safe in-line  $\frac{3}{4}$ " cartridge filter installed downstream of the meter and outside the fuel dispenser housing (Figure 10).

The filter may be installed on any model dispenser of this approval and used with any liquid hydrocarbon for which the dispenser is approved.

The filter unit is sealed to prevent any drainage of the product between the inlet of the filter and the nozzle of the fuel dispenser.

The maximum permissible errors applicable are those applicable to the fuel dispenser to which the instrument approved herein is fitted.

When the filter is changed the system is required to be primed with liquid up to the nozzle, and then the filter is to be sealed.

If a filter is installed after the fuel dispenser has been verified, then the dispenser must be tested and certified again after the filter has been installed.

Similarly if the filter is removed then the dispenser must again be tested and verified.

A destructible adhesive label should be applied after verification.

**13. Description of Variant 12** **approved on 8/03/10**

Any fuel dispenser of this approval now fitted with a PEC model Vapour Recovery Stage 2 (aka VR11) vapour recovery and monitoring system (Figures 11 and 12) and used up to a maximum flow rate of 40 L/min.

The VR11 system controller continuously monitors the underground supply tank pressure, taking inputs from a pressure switch or sensor whilst monitoring the correct operation of the vapour recovery system for hoses on each side of the fuel dispenser.

The site vacuum system uses vacuum pumps housed in enclosures designed to reflect the look of the PEC/Gallagher fuel dispensers. Each enclosure can hold up to three vapour pumps; the VR11 system uses a minimum of two vapour pumps in each enclosure.

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 85-2.169 NSW
- TUV 85-2.169-1 NSW
- TUV 85-2.168 NSW
- TUV 85-2.168-1 NSW
- TUV 85-9.10 NSW
- TÜV 85-11.2 NSW
- TÜV 85-11.3 NSW
- TÜV 85-9.10-1 NSW

and the only approved system components are:

- Vapour recovery nozzles – Elaflex SLIMLINE 2 GR, or OPW 12 VW (\*)
- Coaxial hose – Elaflex model Conti Slimline 2 1/8 Coax, or Goodyear Flexsteel Vapour Assist
- Control valves – Burkert model 2832 NB 5 (^)
- Control board – Burkert model 1094 EV
- Vapour recovery pump(s) – PEC Zephyr 8

(\*) Vapour suction inlet on high position

(^) Nominal bore 5 mm

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

- TÜV M-20.1 NSW,

and the only approved system components are:

- Vaporix model control monitor.
- Vafnir model Vaporix flowmeter.

#### **14. Description of Variant 13**

**approved on 22/09/11**

A PEC Stage II vapour recovery system similar to variant 12 but with a vacuum pump located within the dispenser housing (Figure 13).

The vacuum pumps used may be Dürr models Mex 0831-10 or Mex 0831-11. The pumps are driven by a Dürr model Mex 0544 motor.

The following TÜV Certificates apply:

- TÜV 85-2.67-3
- TÜV 85-2.57-3
- TÜV 85-2.93
- TÜV 85-2.79
- TÜV 85-2.XXX
- TÜV 85-2.23-2
- TÜV 85-2.160

## 15. Description of Variant 14

approved on 21/06/13

Any fuel dispenser of this approval now fitted with a PEC model Vapour Recovery Stage 2 (aka VRII) vapour recovery and monitoring system and used up to a maximum flow rate of 45 L/min.

The VRII system controller continuously monitors the vacuum line pressure, taking inputs from a pressure switch or sensor whilst monitoring the correct operation of the vapour recovery system for hoses on each side of the fuel dispenser.

The site vacuum system uses vacuum pumps housed in enclosures designed to reflect the look of the PEC/Gallagher fuel dispensers. Each enclosure holds two vapour pumps.

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 approvals (and the approved components) are:

(i) For collection of vapour:

- TÜV 85-2.176 NSW
- TÜV 85-2.176-1 NSW
- TÜV 85-2.175 NSW
- TÜV 85-2.175-1 NSW;
- TÜV 85-11.5 NSW
- TÜV 85-11.5-1 NSW
- TÜV 85-11.6 NSW
- TÜV 85-11.6-1 NSW
- TÜV 85-15.24 NSW
- TÜV 85-15.24-1 NSW
- TÜV 85-15.25 NSW
- TÜV 85-15.25-1 NSW

and the only approved system components are:

- Vapour recovery nozzles – Elaflex SLIMLINE 2 GR, or OPW 12 VW (\*), HUSKY V34/V34I/V34IS, AVANCE by OPW series AVN-V
- Coaxial hose – Elaflex model Conti Slimline 2 1/8 Coax, or Goodyear Flexsteel Vapour Assist, Good year listed Flexsteel vapour assist
- Control valves – Burkert model 2832
- Control board – Burkert model 1094 EV
- Vapour recovery pump(s) – PEC Zephyr 24 with constant under pressure

(\*) Vapour suction inlet on high position

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

- TÜV M-20.1 NSW

and the only approved system components are:

- Fafnir model Vaporix-Control monitor
- Fafnir model Vaporix-Flow flowmeter



**16. Description of Variant 15**

**approved on 07/10/14**

Any fuel dispenser of this approval may be fitted with a Pulse Calculator/indicator described in Certificate of Approval S624.

TABLE 1

Meaning of model designations for the fuel dispensers:

First digit	Series, either 2 = 2000 Apollo 3 = 3000 Apollo 8 = 8000 Multipec
Second digit	Number of hoses, either 2 to 6
Third digit	Delivery system type, either 0 = all products suction 3 = pressure/suction mix 4 = suction/pressure mix 5 = dispenser 8 = Hex or Quad dispenser 9 = Hex or Quad pump
Fourth digit	Gas detection system, either 1 = no gas detection fitted 2 = gas detection is fitted
First suffix	Pre-set, either N or no suffix = no pre-set fitted P = pre-set is fitted
Second suffix	Maximum flow rate, either Blank = < 50 L/min M = < 90 L/min

TEST PROCEDURE No 5/6A/86A

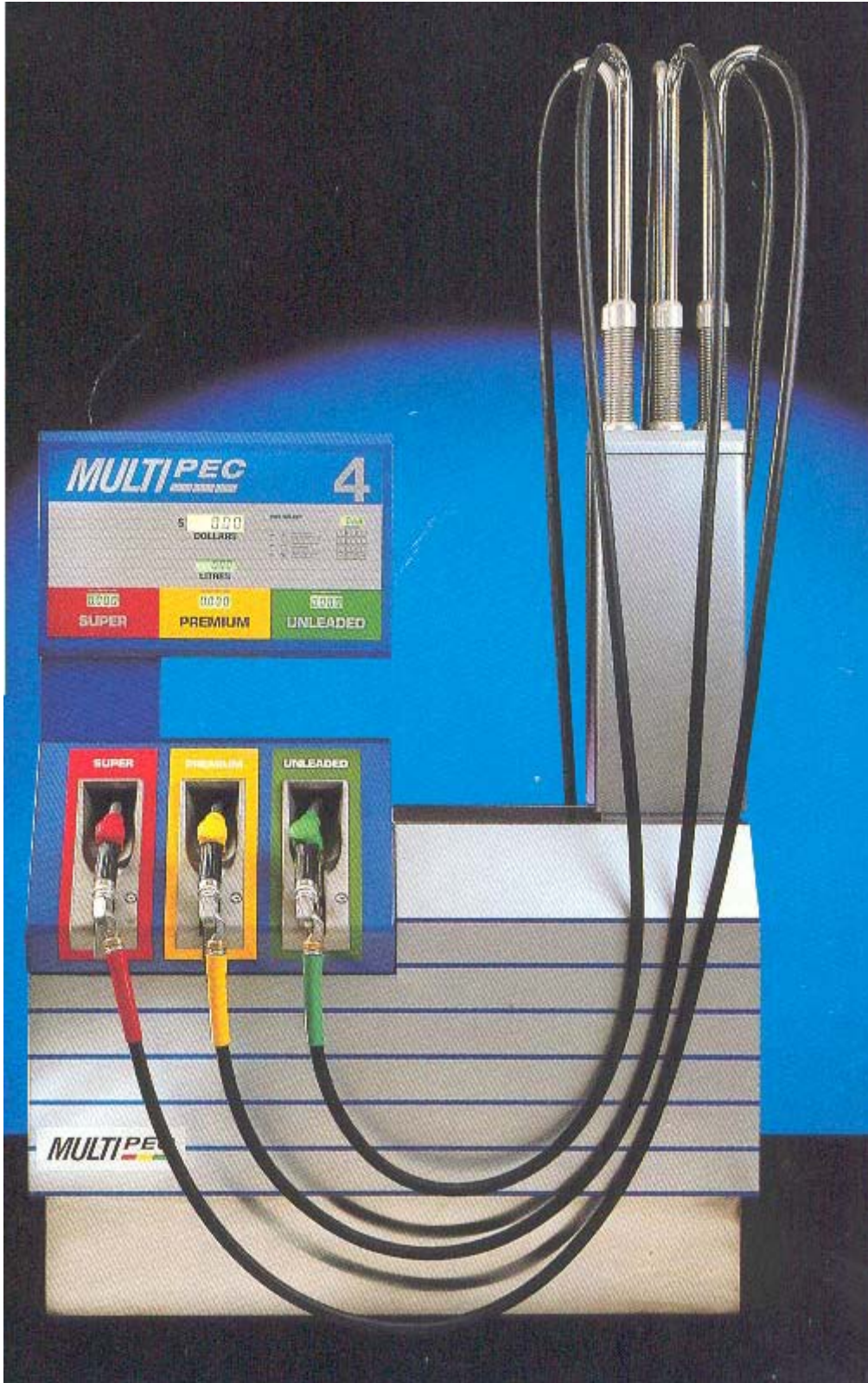
Instruments shall be tested in accordance with any relevant tests specified in the National Instrument Test Procedures.

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/86A – 1



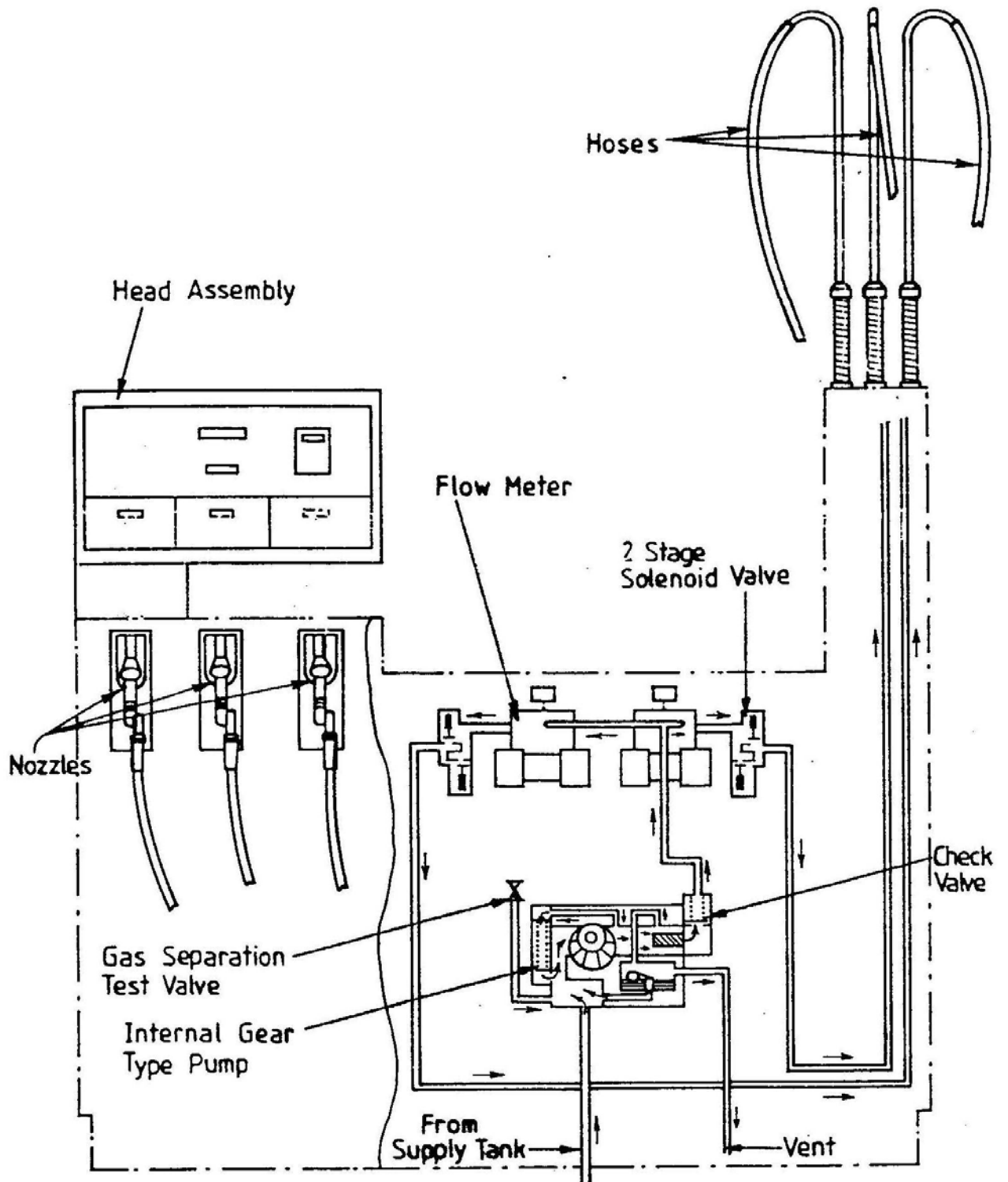
PEC Model 8601P Fuel Dispenser for Motor Vehicles – The Pattern

FIGURE 5/6A/86A – 2



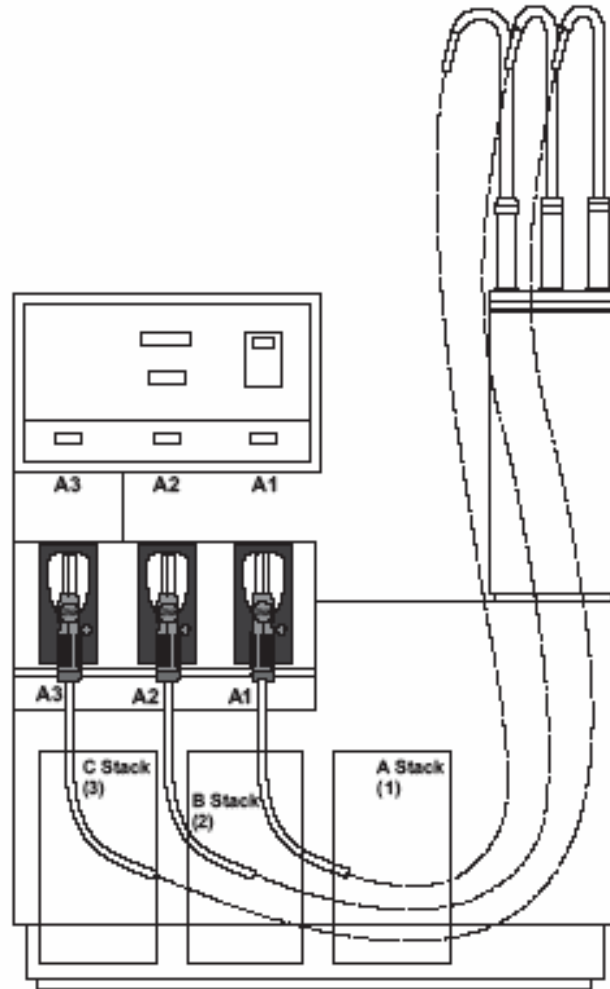
PEC Model 8601P Fuel Dispenser for Motor Vehicles – The Pattern

FIGURE 5/6A/86A - 3



PEC Model 8601P Fuel Dispenser for Motor Vehicles - The Pattern

FIGURE 5/6A/86A – 4



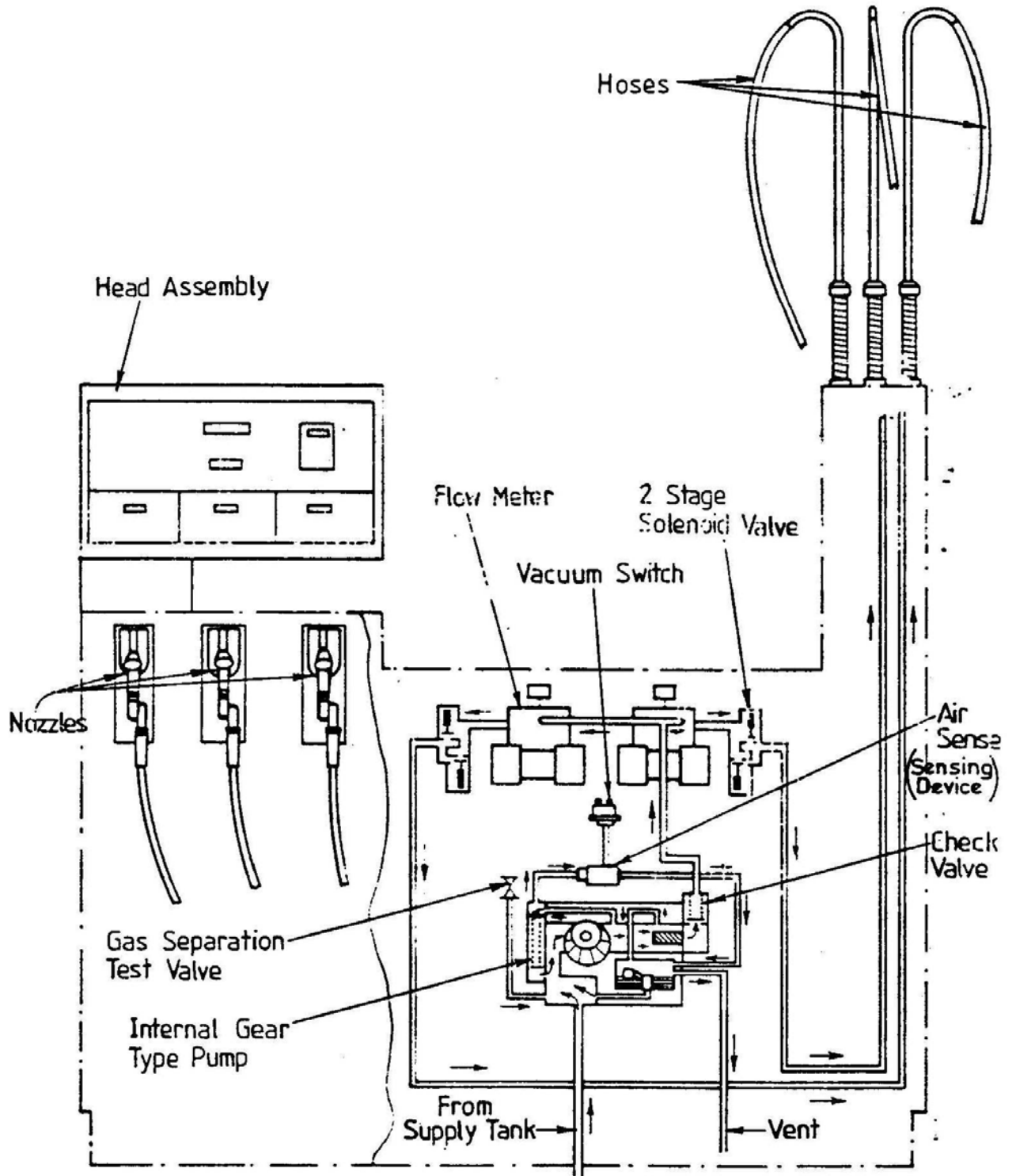
8000 Series Hose Numbering Layout For Self Service Installations

FIGURE 5/6A/86A – 5



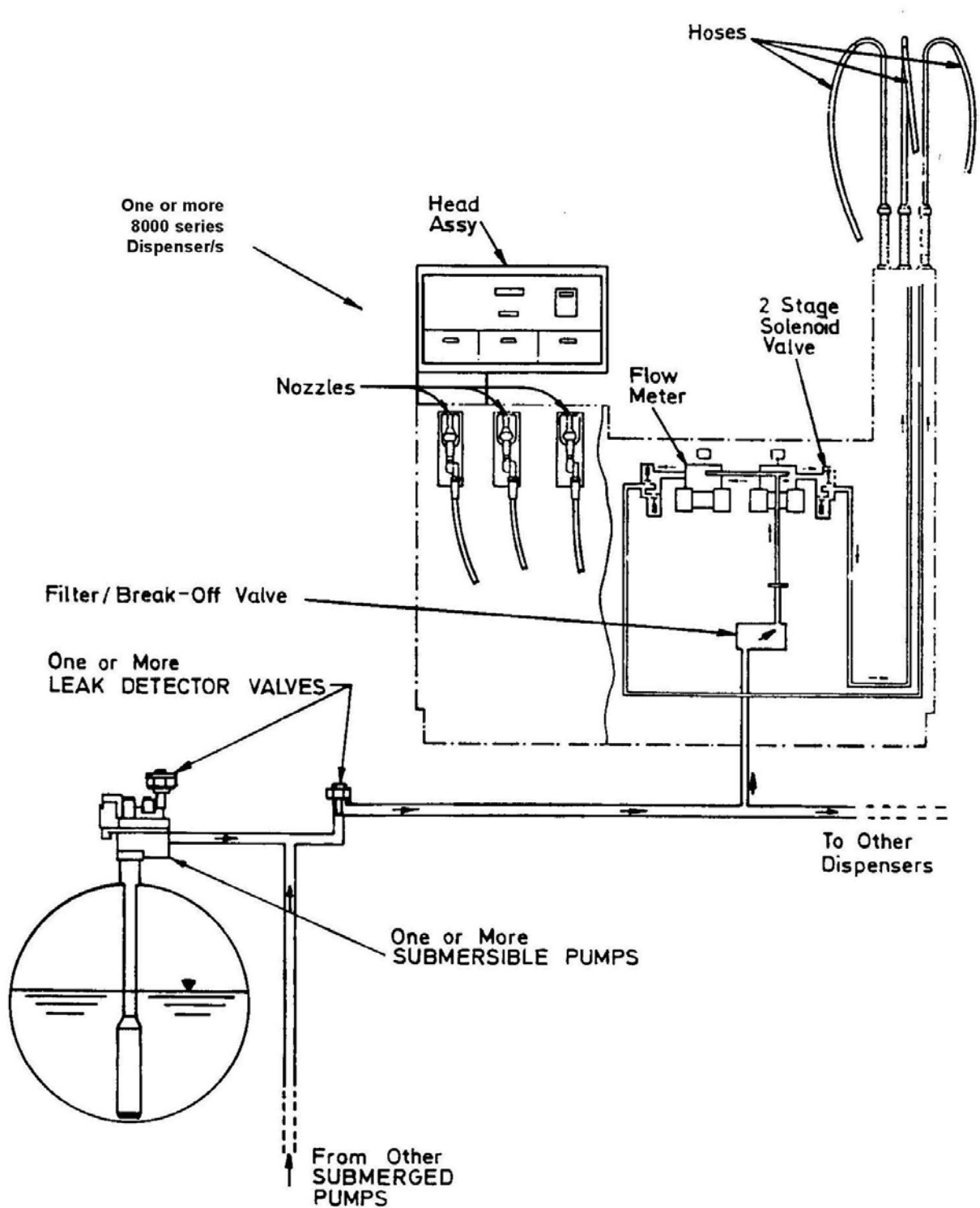
Typical Mechanical Sealing

FIGURE 5/6A/86A - 6



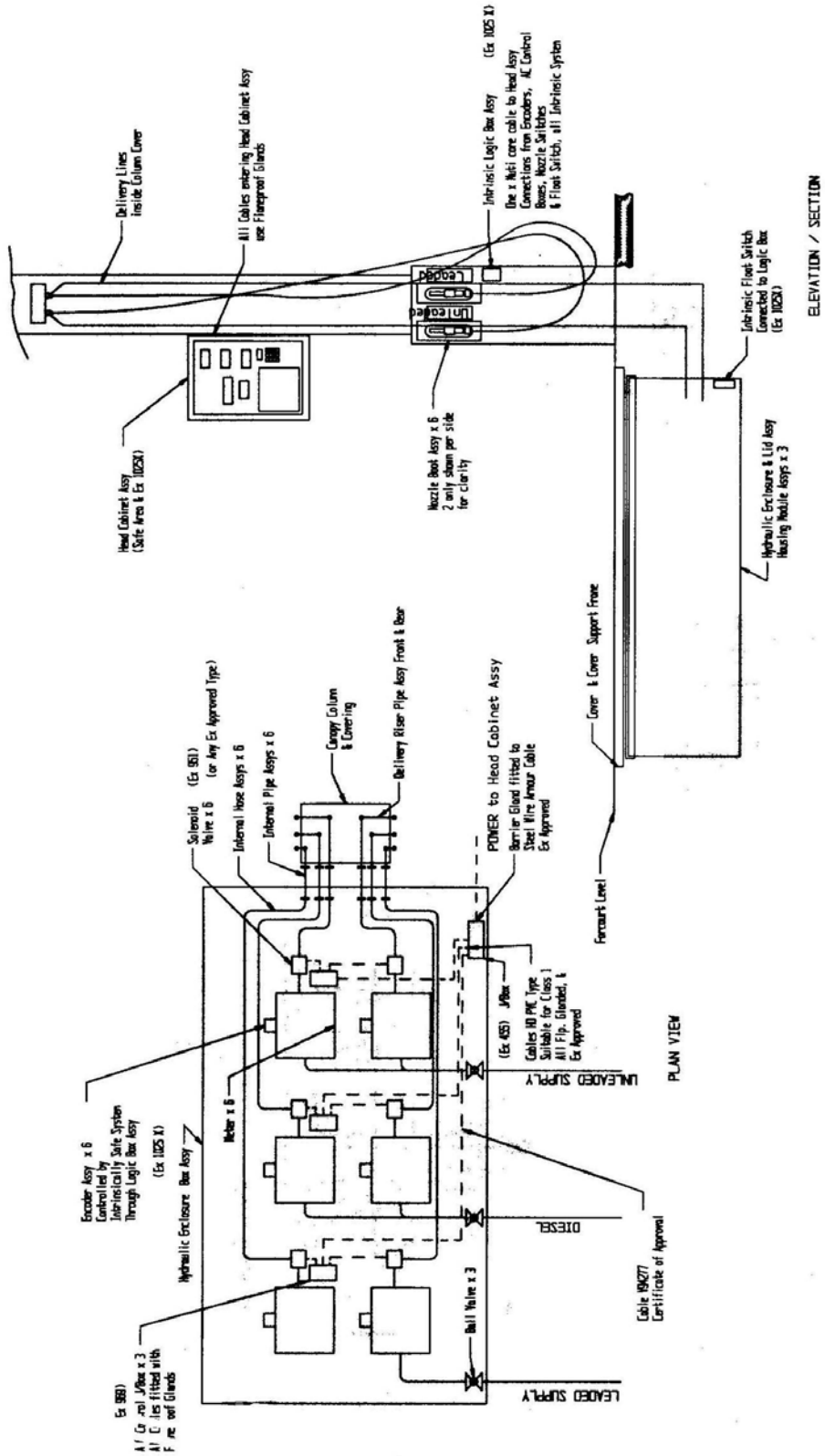
Typical Dispenser for use With Distillate- Variant 2

FIGURE 5/6A/86A - 7



Typical Submersible Turbine System- Variant 3

FIGURE 5/6A/86A - 8



Typical Apollo 2000 Series System - Variant 5



FIGURE 5/6A/86A – 9



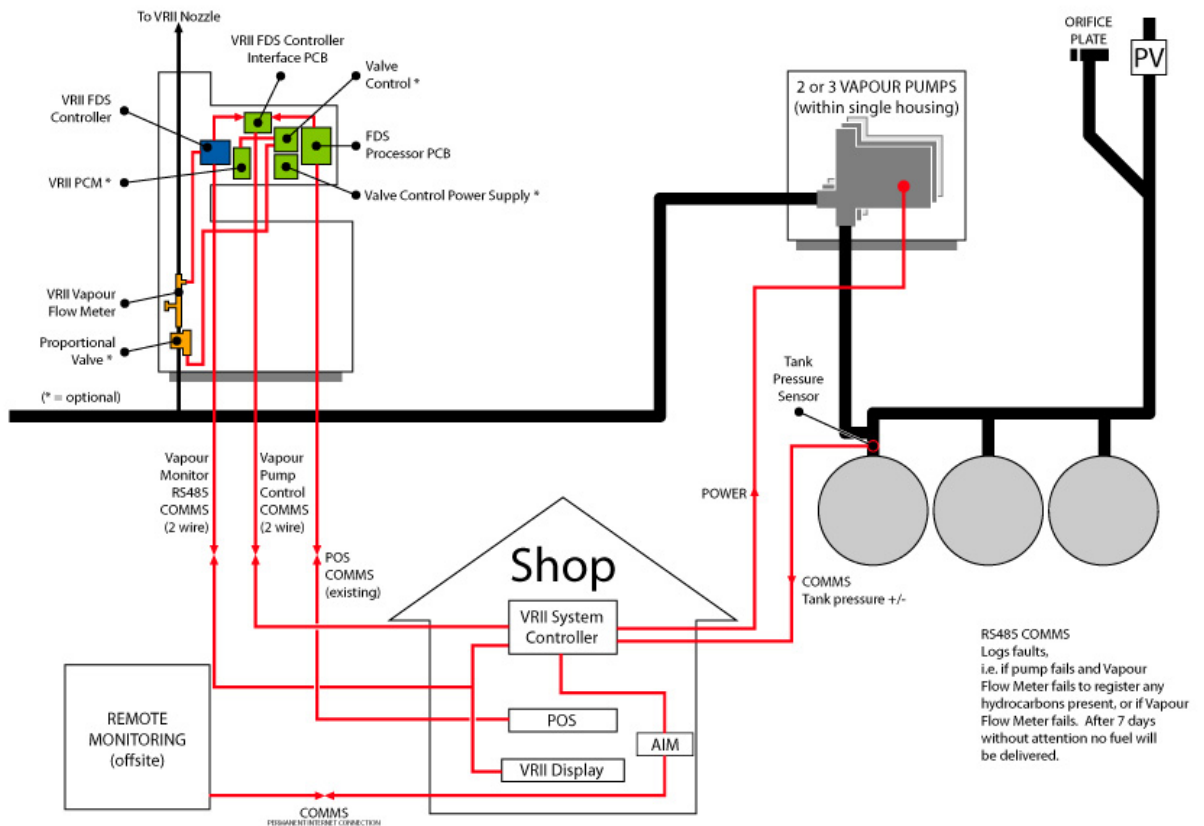
Typical PEC Apollo 3000 Series Dispenser – Variant 6

FIGURE 5/6A/86A – 10



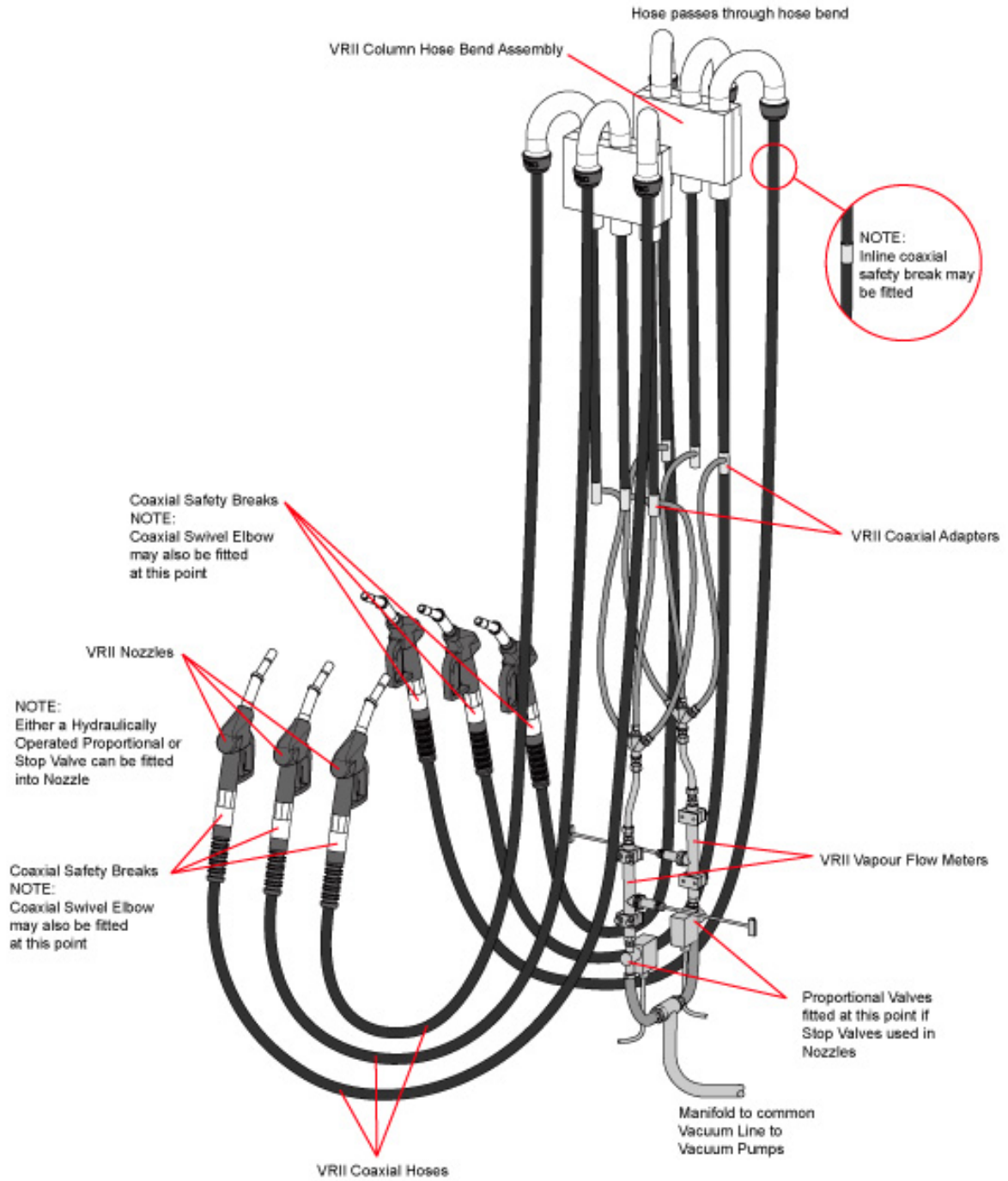
Typical External Filter Installation – Variant 11

FIGURE 5/6A/86A – 11



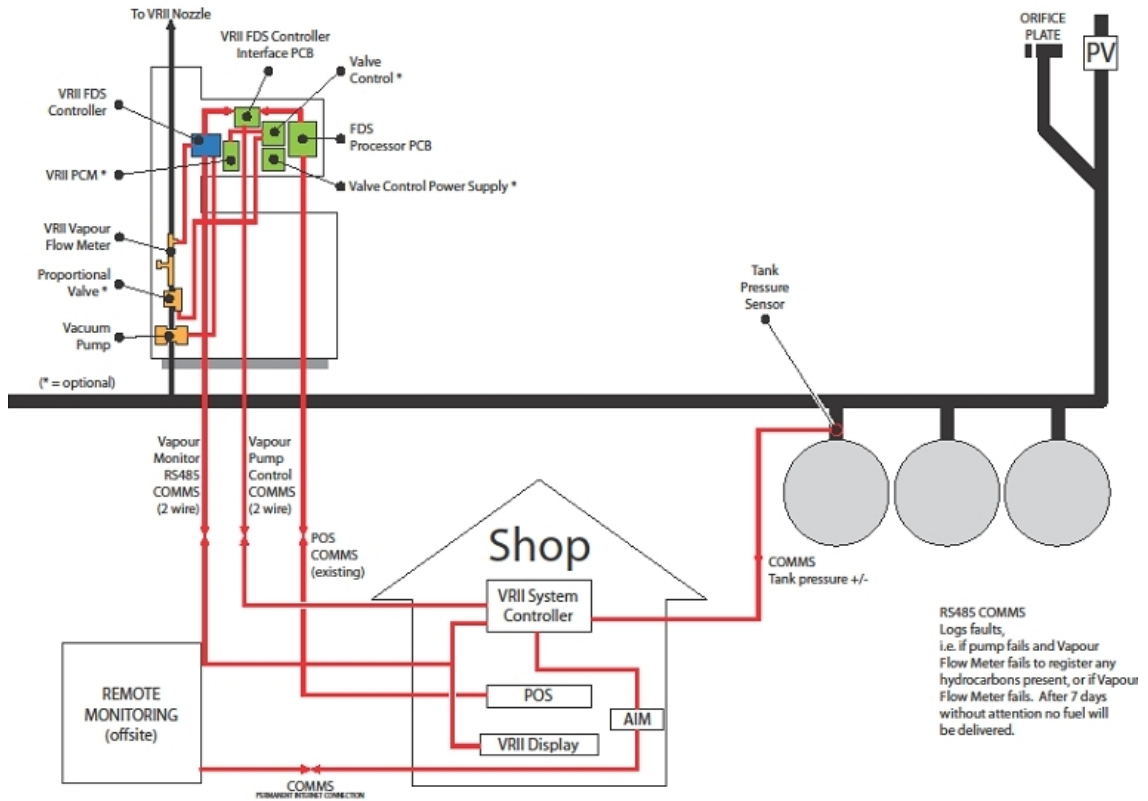
A Typical PEC Model Vapour Recovery Stage 2 (aka VRII)  
Vapour Recovery System – Variant 12

FIGURE 5/6A/86A – 12



A PEC Model VR11 Vapour Recovery System  
Showing the Typical Components for a 9000 Series Dispenser – Variant 12

FIGURE 5/6A/86A – 13



A Typical PEC Stage II Vapour Recovery System  
With The Vacuum Pump Located Within The Dispenser Housing – Variant 13

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