



Australian Government

**National Measurement
Institute**

Bradfield Road, West Lindfield NSW 2070

Notification of Change

Certificate of Approval No 5/6M/1

Change No 2

Issued by the Chief Metrologist under Regulation 60
of the
National Measurement Regulations 1999

The following changes are made to the approval documentation for the

PEC Model H8672P Fuel Dispenser for Motor Vehicles

submitted by PEC Fuel Pumps Ltd
 2 Station Road
 Marton 4741 NEW ZEALAND.

- A. In Certificate of Approval 5/6M/1 dated 23 March 2007, the FILING ADVICE should be amended by adding the following:

“Notification of Change No 2 dated 15 September 2011”

- B. In Technical Schedule No 5/6M/1 dated 5 June 2003, clause **1. Description of Pattern**, the 6th bullet point is amended to read, in part:

“... Tatsuno model PDS-0257 **or model FP 1001** pump/...”

Note: Certificate of Approval No 5/6M/1 has been cancelled in respect of new instruments as from 1 September 2008.

Signed by a person authorised by the Chief Metrologist to exercise his powers under Regulation 60 of the *National Measurement Regulations 1999*.

A handwritten signature in black ink that reads 'C Davies'.



Australian Government
**National Measurement
Institute**

Bradfield Road, West Lindfield NSW 2070

Cancellation
Certificate of Approval No 5/6M/1

Issued by the Chief Metrologist under Regulation 60
of the
National Measurement Regulations 1999

This is to certify that the approval for use for trade granted in respect of the

PEC Model H8672P Fuel Dispenser for Motor Vehicles

submitted by PEC Fuel Pumps Ltd
 2 Station Road
 Marton 4741 NEW ZEALAND

has been cancelled in respect of new instruments as from 1 September 2008.

Signed by a person authorised by the Chief Metrologist
to exercise his powers under Regulation 60 of the
National Measurement Regulations 1999.

A handwritten signature in black ink, appearing to be 'J. G. T.', written in a cursive style.



Australian Government

**National Measurement
Institute**

Bradfield Road, West Lindfield NSW 2070

Certificate of Approval

No 5/6M/1

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

PEC Model H8672P Fuel Dispenser for Motor Vehicles

submitted by PEC Fuel Pumps 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 117-1, *Measuring Systems for Liquids Other than Water*, dated July 2004.

CONDITIONS OF APPROVAL

This approval becomes subject to review on 1 December 2007, and then every 5 years thereafter.

Instruments purporting to comply with this approval shall be marked with approval number 'NSC 5/6M/1' and only by persons authorised by the submitter.

Instruments purporting to comply with this approval and currently marked with approval number 'NSC 5/6M/1' should be re-marked NSC No 5/6M/1 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.

The National Measurement Institute reserves the right to examine any instrument or component of an instrument purporting to comply with this approval.

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

DESCRIPTIVE ADVICE

Pattern: provisionally approved 6 November 2002
approved 17 December 2002

- A PEC model H8672P fuel dispenser for motor vehicles approved for use to dispense LPG and various types of liquid hydrocarbons.

Variants: approved 2 June 2003

1. Certain other models and configurations of the H8000 series of fuel dispensers as identified in Table 1.
2. With a submersible turbine pump hydraulic system.

Technical Schedule No 5/6M/1 describes the pattern and variants 1 & 2.

Variant: approved 18 October 2006

3. With an alternative model LPG monitoring device.

Technical Schedule No 5/6M/1 Variation No 1 describes variant 3.

FILING ADVICE

Certificate of Approval No 5/6M/1 dated 5 June 2003 is superseded by this Certificate, and may be destroyed. The documentation for this approval now comprises:

Certificate of Approval No 5/6M/1 dated 23 March 2007
Technical Schedule No 5/6M/1 dated 5 June 2003 (incl. Table 1 and
Test Procedure)
Technical Schedule No 5/6M/1 Variation No 1 dated 23 March 2007
Figures 1 to 3 dated 5 June 2003

Signed by a person authorised by the Chief Metrologist
to exercise his powers under Regulation 60 of the
National Measurement Regulations 1999.



TECHNICAL SCHEDULE No 5/6M/1

Pattern: PEC Model H8672P Fuel Dispenser for Motor Vehicles
Submittor: PEC Fuel Pumps Ltd
3 Station Road
Marton 5460
NEW ZEALAND

1. Description of Pattern

The PEC model H8672P is an attendant-operated fuel dispenser approved to dispense LPG, petrol and diesel for motor vehicles .

The model H8672P dispenser (Figures 1 and 2) includes the following components or features:

- A Batchen model Mk-V constant bleed vapour elimination device.
- Two Batchen model Mk III LPG liquefied petroleum gas (LPG) flowmeters each fitted with a PEC model 07439 pulse generator.
- Two Batchen model Mk VI spring-loaded pressure differential valves.
- Two PEC model MHP price-computing calculator/indicators configured for use with a density detection device enabling the volume conversion to 15°C for LPG.
- Two Gasguard model LG1NDNS LPG or any other Commission-approved LPG nozzles.
- Two PEC Tatsuno model POS-0257 pump/strainer/gas separators.
- Two PEC gas detection systems.
- Four Tatsuno model MP-02515 positive displacement flowmeters each fitted with a PEC model 07434 pulse generator.
- A pre-set facility.
- Four ZVA or any other Commission-approved nozzles.

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

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
- Ambient temperature range -25°C to 55°C

Characteristics specific to LPG metering

- Maximum flow rate, Q_{max} 60 L/min
- Minimum flow rate, Q_{min} 10 L/min
- LPG density detection range 505 kg/m³ to 570 kg/m³ (at 15°C)
- Volume conversion to 15°C over a liquid temperature range of -10°C to 45°C
- Operating pressure is maintained at least 200 kPa above the equilibrium vapour pressure of LPG

Characteristics specific to petrol/diesel metering

- Maximum flow rate, Q_{max} 50 L/min
- Minimum flow rate, Q_{min} 5 L/min
- Range of liquids that can be measured 0.5 to 20 mPa.s (at 20°C)
- Maximum pressure of the liquid, P_{max} 300 kPa
- Minimum pressure of the liquid, P_{min} 100 kPa
- Maximum temperature of the liquid, T_{max} 40°C
- Minimum temperature of the liquid, T_{min} 5°C

1.2 System Description for LPG (Figure 3)

- (i) The supply tank may be located above or below ground.
- (ii) The pump may be positioned above the supply tank, in which case the pump shall be a multi-stage regenerative turbine LPG pump specially designed for use in suction lift installations. Alternatively, the pump shall be positioned below the supply tank so that it is always in a state of flooded suction (suction head installations). There shall be no restrictive fittings within ten pipe diameters of the pump inlet. The inlet pipe to the pump is larger than the outlet pipe from the pump. The external pump by-pass relief valve is installed in a line returning to the vapour space of the supply tank.

A pump supplying LPG to several flowmeters shall be of sufficient capacity rating to ensure that when all flowmeters are in use the flow rate through each flowmeter is greater than Q_{min} .

- (iii) A Batchen model Mk-V constant bleed vapour eliminator with an integral strainer positioned upstream of the flowmeter, in conjunction with a pressure differential valve downstream of each flowmeter, protects the flowmeters from the measurement of vapour. In the event of excessive vapour, the LPG Measurement Technology LPG monitoring device stops the delivery until vapour is eliminated (refer cl. **1.5 Volume Conversion Device**). The thermometer well for checking the temperature measurement is situated at the top of the vapour eliminator.
- (iv) Two Batchen model Mk III two-piston LPG flowmeters are used each fitted with a PEC model 07439 dual channel pulse generator designed to produce 100 pulses per channel per meter revolution. (Both the positive and negative edge of the pulse is counted to give 200 pulses per channel per meter revolution.)
- (v) A Batchen model Mk VI spring-loaded pressure differential valve is fitted to the outlet and is set to maintain LPG pressure (at the meter) at least 200 kPa above vapour pressure. A pressure-equalising pipe is connected from the top of the differential valve to the vapour space of the supply tank. The pressure differential valve is fitted with a bleed valve and a 1/4" NPT extension union which gives provision for a pressure gauge. Any bleed valves in normal operation are sealed to prevent tampering.
- (vi) A Batchen hydraulic accumulator may be fitted downstream of the pressure differential valve.

- (vii) A 1/2" NPT solenoid valve is located downstream of the pressure differential valve and controls the delivery and prevents delivery during the reset cycle.
- (viii) The dispenser is fitted with hoses of 15 or 20 mm nominal bore and incorporates Batchen Sentry 20 hose break-away couplings fitted between the flow solenoid valves and the nozzles. Gasguard model LG1DNS nozzles or any other compatible Commission-approved LPG nozzles are fitted, suitable for the hang-up mechanism.
- (ix) A recirculation line with a double check filler valve is provided at the dispenser for returning the LPG to the supply tank. The recirculation line is used for maintenance checking or calibration of the dispenser.

1.3 System Description For Petrol/Diesel

- (i) A PEC Tatsuno model POS-0257 pump and gas separation system with integral strainer is located upstream of the meter. A PEC gas detection system is fitted when metering diesel.
- (ii) Two sets of Tatsuno model MP-02515 four-piston positive displacement flowmeters are used each fitted with a PEC model 07434 dual channel pulse generator designed to produce 100 pulses per channel per meter revolution. (Both the positive and negative edge of the pulse is counted to give 200 pulses per channel per meter revolution.)
- (iii) A 3/4" two-stage solenoid valve is located downstream of the meter; the valve controls the delivery and prevents delivery during the reset cycle. The pre-set facility uses the two-stage solenoid valves to slow down and cut off the flow.
- (iv) The indicator electronics control the switching of the pump motors. Control of the flow to each nozzle is achieved with a two-stage solenoid valve, which is also under the control of the indicator electronics to communicate the volume of fluid measured to the indicator electronics.
- (v) A 5/8" hose is fitted between the flow solenoid valve and the ZVA Slimline nozzle or any other compatible Commission-approved nozzle, suitable for the hang-up mechanism.

The instrument may be fitted with a purchaser-operated pre-set control or the pre-set facility may be set via the vendor's console. Note: Instruments without pre-set facility cannot be used for PREPAY transactions.

1.4 Calculator/Indicator

The calculator/indicator comprises a PEC model MHP indicator-computing unit and a display unit. A separate display is provided for volume, total price, and unit price. The indicators display the following maximum values:

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

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.

The calculator/indicator can display LPG density at 15°C used for conversion of volume to 15°C, and can display the temperature of LPG flowing through the meter (refer to Test Procedure). The software version numbers for the calculator/indicator are Vx 3.07c (*) (for the main processor) and VI 3.07c (for the input processor). These version numbers may be viewed using the set-up keypad (refer to the Test Procedure).

(*) Vx 3.07c where x may be either G (for Gilbarco) or P (for PEC).

1.5 Volume Conversion Device

The electronic volume conversion for temperature facility is used to convert the measured volume to volume at 15°C using the volume conversion factors as a function of density in accordance with Table 54 of the ASTM-IP-API *Petroleum Measurement Tables for Light Hydrocarbon Liquids*. The calculator/indicator is configured for use with an LPG Measurement Technology model DSS*-98 (#) LPG monitoring device, and to display the delivered volume at 15°C. The monitoring device comprises a probe located in the vapour eliminator interfaced to an integrated circuit board located in a separate unit. The probe senses LPG density, measures the temperature of the LPG, and detects if any vapour is present.

(#) DSS*-98 where * may be either B or P.

1.6 Operation

Removing the nozzle from its receptacle starts the operating cycle of the instrument. The reset cycle clears the display of any previous sale and starts the pump. The instrument will automatically check for meter pulse output and for correct parameter settings. A segment check is also performed and when completed the unit price is displayed and the price and volume displays are reset to zero. At the end of this cycle, the solenoid valve opens and the delivery can start. Replacing the nozzle to its normal hang up position closes the solenoid valve and the delivery is terminated. The details of the delivery are displayed by the instrument until the next reset cycle.

1.7 Verification/Certification Provision

Provision is made for the application of a verification/certification mark on the fuel dispenser.

1.8 Sealing

Provision is made for sealing the mechanical calibration device of the meter.

For LPG

Electronic calibration of the LPG meter is accessible via a calibration (SW1) switched located in a box near the meter. The calibration SW1 switch has provision for sealing.

For Petrol/Diesel

The gas separator test valve has provision for sealing.

1.9 Markings

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

Pattern approval sign	NSC No 5/6M/1
Manufacturer's identification mark or trade mark	.....
Manufacturer's designation (model number)	.....
Serial number	.....
Year of manufacture	.....
Environmental class class	C

For LPG

Maximum flow rate (Q_{max})	..... L/min
Minimum flow rate (Q_{min})	..... L/min
Maximum operating pressure (P_{max})	2450 kPa
Minimum pressure (P_{min})	200 kPa above vapour pressure (*)
Approved for LPG density range	505 kg/m ³ to 570 kg/m ³ (at 15°C)
Maximum liquid temperature (T_{max})	50°C
Minimum liquid temperature (T_{min})	-10°C
Accuracy class class	1.0

For Petrol/Diesel

Maximum flow rate (Q_{max})	..... L/min
Minimum flow rate (Q_{min})	..... L/min
Maximum operating pressure (P_{max})	..... kPa
Minimum operating pressure (P_{min})	..... kPa
Type of liquid	.....
Maximum temperature of the liquid, T_{max}	40°C
Minimum temperature of the liquid, T_{min}	5°C
Accuracy class	0.5

(*) Alternatively, the following wording may be used:

“LPG pressure (at the meter) is maintained at least 200 kPa above vapour pressure.”

Note: The words “at the meter” may be deleted to save space.

Note: The minimum measured quantity (V_{min}) shall be clearly visible on the indicating device of the instrument, in the form ‘Minimum Delivery 2 L’.

2. Description of Variant 1

Certain other models and configurations of the H8000 series of fuel dispensers as identified in Table 1.

Systems may include one or more Commission-approved submersible turbine pump (STP) hydraulic systems. 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 in which case the model number has a 3 or 6 as the third digit. More than one fuel dispenser may be connected to the same submersible turbine pump hydraulic system.

TABLE 1

Meaning of model designations for the fuel dispensers:

Prefix & first digit	Series H8 = 8000; LPG plus petrol and/or diesel
Second digit	Number of hoses, either 4 or 6
Third digit	Petrol/diesel delivery system type, either 3 = internal pump/STP combination 6 = STP 7 = internal pump
Fourth digit	Diesel 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

TEST PROCEDURE

Maximum Permissible Errors at Verification/Certification

The maximum permissible errors applied during a verification test of the fuel dispenser using the liquid for which it is to be verified/certified, and from normal flow rate to the minimum flow rate specified in the Certificate of Approval or Technical Schedule are:

For LPG

- ±0.6% for the calibration/adjustment of the meter (*); and
- ±1.0% for the complete measuring system (In-service tolerance).

Other applicable maximum permissible errors are:

- ±0.5°C for the temperature measuring device;
- ±10 kg/m³ for the density detection device;
- ±0.4% for the volume conversion for temperature device;
- ±40 mL for deliveries equal to the minimum measured quantity; and
- ±0.5% for gas elimination for LPG.

For Petrol/Diesel

- ±0.3% for the calibration/adjustment of the meter (*); and
- ±0.5% for the complete measuring system (In-service tolerance).

Other applicable maximum permissible errors are:

- ±0.5% for gas elimination device for petrol;
- ±1.0% for gas elimination device for liquids having a dynamic viscosity exceeding 1 mPa.s;
- ±20 mL for deliveries equal to the minimum measured quantity; and
- ±20 mL due to hose dilation.

- (*) Adjusting the calibration of the meter to an error other than as close as practical to zero is forbidden.

Calibration Procedure

For detailed configuration and code setting procedures, refer to the manufacturer's service manual.

1. For LPG System

The calibration of the flowmeter shall be carried out using the unconverted volume.

To view temperature, density, unconverted volume, and software version on the calculator/indicator:

- (i) Turn the manager's key 90°.
- (ii) FN-00 will be displayed on the litres display.
- (iii) Enter 08 followed by the 'fill' button from the set-up/pre-set keypad to display the software version.

- (iv) Enter 37 followed by the 'fill' button to display the unconverted volume.
- (v) Enter 82 followed by the 'fill' button to display the density at 15°C.
- (vi) Enter 83 followed by the 'fill' button to display the temperature at metering conditions.
- (vii) Enter 84 followed by the 'fill' button to display the volume correction factor.

2. To perform a unit price change

Enter 31 followed by the 'fill' button and then use the keypad to enter the new unit price.

3. Electronic Calibration Adjustment

a. Only the LPG meter can be calibrated electronically.

(i) Turn the manager's key 90° and enter:

Hose No	Function
E3	74
F3	75

(ii) Then press the calibration switch (SW1); this will allow the typical encoder constant of 2.500 to be changed.

b. The petrol/diesel side of the dispenser can only be calibrated mechanically, the encoder constant of 1.250 can only be viewed, and this value cannot be changed.

To view the encoder constant, turn the manager's key 90° and enter:

Hose No	Function
A1	34
B1	35
C2	54
D2	55

4. Mechanical calibration for the Tatsuno meters

The calibration of the meter is achieved by adjusting the stroke of the pistons.

Turning the calibration adjustment wheel clockwise will increase the error while turning the wheel anti-clockwise will decrease the error. One-pitch-turn varies the flow by 0.04% and the meter can be adjusted up to 0.64%.

TECHNICAL SCHEDULE No 5/6M/1

VARIATION No 1

Pattern: PEC Model H8672P Fuel Dispenser for Motor Vehicles

Submittor: PEC Fuel Pumps Ltd
2 Station Road
Marton 4741 NEW ZEALAND

1. Description of Variant 3

With an LPG Measurement Technology model DSSG-2000 LPG monitoring device replacing the model DSS*-98 (#) device described for the pattern in clause **1.5 Volume Conversion Device**.

NOTE: The software version for the calculator/indicator remains the same whichever monitoring device is used.

(#) DSS*-98 where * may be either B or P.



Australian Government

**National Measurement
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Bradfield Road, West Lindfield NSW 2070

Notification of Change

Certificate of Approval No 5/6M/1

Change No 1

Issued by the Chief Metrologist under Regulation 60
of the
National Measurement Regulations 1999

The following changes are made to the approval documentation for the

PEC Model H8672P Fuel Dispenser for Motor Vehicles

submitted by PEC Fuel Pumps Ltd
 2 Station Road
 Marton 4741 NEW ZEALAND.

- A. In Certificate of Approval 5/6M/1 dated 23 March 2007, the FILING ADVICE should be amended by adding the following:

“Notification of Change No 1 dated 22 October 2010”

- B. In Technical Schedule No 5/6M/1 dated 5 June 2003, clause **1. Description of Pattern**, the 8th bullet point is amended to read, in part:

“... with a PEC model 07434 **or model 2A90930** pulse generator ...”

Note: Certificate of Approval No 5/6M/1 has been cancelled in respect of new instruments as from 1 September 2008.

Signed by a person authorised by the Chief Metrologist to exercise his powers under Regulation 60 of the *National Measurement Regulations 1999*.

A handwritten signature in black ink, consisting of a series of loops and flourishes, positioned to the right of the signature text.

FIGURE 5/6M/1 – 1



PEC Model H8672P Fuel Dispenser for Motor Vehicles

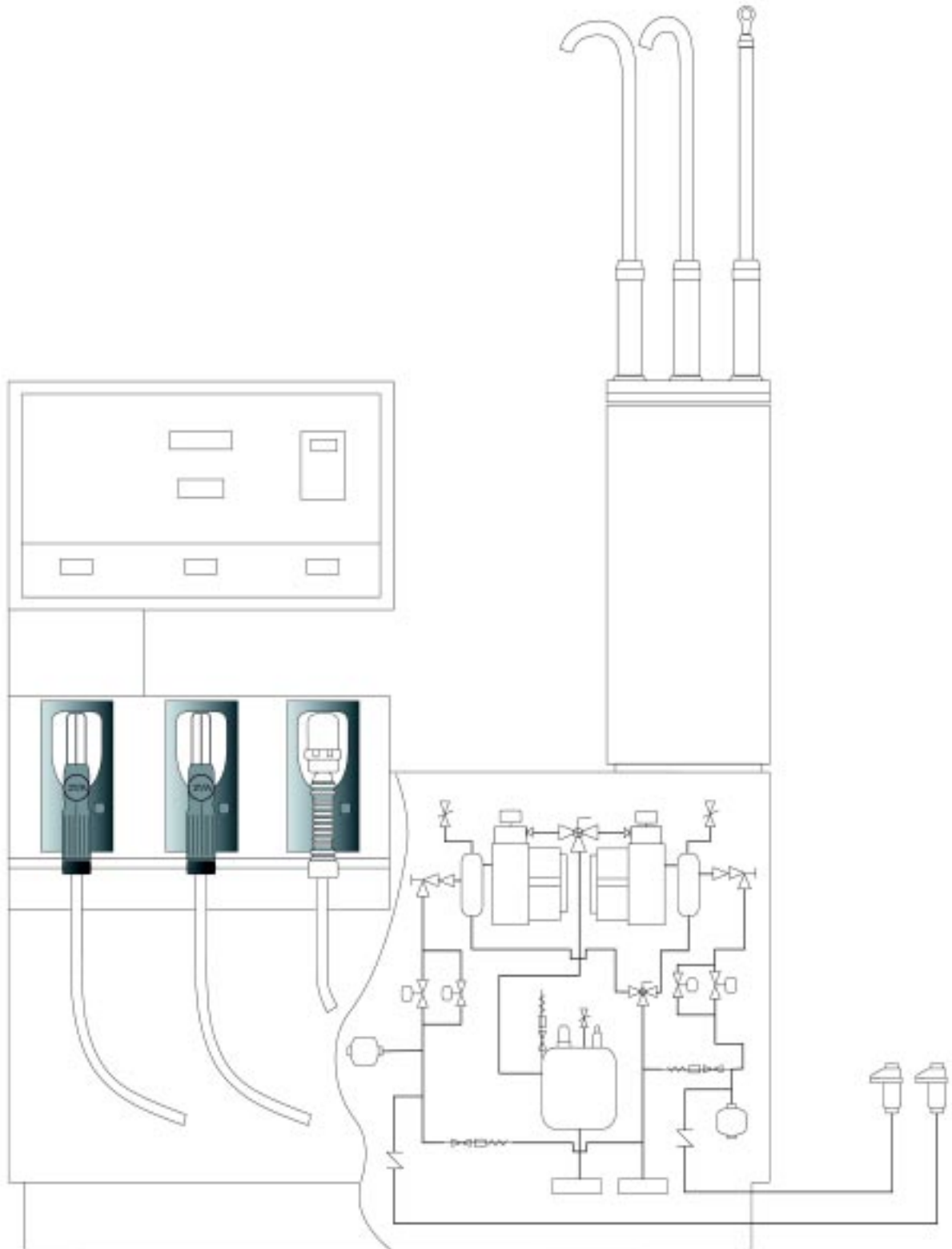
5/6M/1
5 June 2003

FIGURE 5/6M/1 – 2



PEC Model H8672P Fuel Dispenser for Motor Vehicles

FIGURE 5/6M/1 – 3



PEC Model H8672P - Typical LPG Hydraulic System