



Australian Government
Department of Industry and Science

National Measurement Institute

Certificate of Approval No 10/1/21

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.

Gallagher Model 3261N LPG 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 June 2011.

This approval becomes subject to review on **1/12/19**, and then every 5 years thereafter.

DOCUMENT HISTORY

Rev	Reason/Details	Date
0	Pattern & variant 1 approved – interim certificate issued	28/11/01
1	Pattern & variant 1 approved – certificate issued	8/03/02
2	Variant 2 approved – interim certificate issued	18/10/06
3	Variant 2 approved – certificate issued	23/03/07
4	Pattern & variants 1 & 2 reviewed– notification of change issued	11/02/08
5	Pattern & variants 1 & 2 amended, reviewed & updated – certificate issued	13/02/14
6	Test Procedure amended (procedure to view temperature, etc.) – certificate issued	12/08/15

CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI (or NSC) 10/1/21' 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 10/1/21

1. Description of Pattern **approved on 28/11/01**

A Gallagher model 3261N LPG fuel dispenser (Figures 1 and 2) for refuelling motor vehicles using liquefied petroleum gas (LPG). The dispenser is approved for use) in attendant-operated mode, or in self-service mode when interfaced to a compatible (#) approved self-service device. May also be known as PEC Apollo instruments of the same models.

(#) 'Compatible' is defined to mean that no additions/changes to hardware/software are required for satisfactory operation of the complete system.

1.1 Field of Operation

The following specifies the field of operation for which the metering system is approved:

- Minimum measured quantity, V_{min} 2 L
- Maximum flow rate, Q_{max} 60 L/min
- Minimum flow rate, Q_{min} 10 L/min
- LPG density range (at 15°C) 505 kg/m³ to 570 kg/m³
- Volume conversion to 15°C over a liquid temperature range of -10°C to 40°C
- Maximum operating pressure, P_{max} 2450 kPa
- Operating pressure is maintained at least 200 kPa above the equilibrium vapour pressure of LPG
- Ambient temperature range of -25°C to 55°C
- Accuracy Class 1.0

1.2 LPG Metering System

The model 3261N LPG 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.
 - A calculator/indicator configured for use with a density detection device enabling the volume conversion to 15°C.
- (i) An LPG supply tank may be located either above or below the ground level.
- (ii) The pump is positioned either below the supply tank in which case the pump is designed for use in a state of flooded suction, or the pump is positioned above the supply tank in which case the pump shall be a multistage regenerative turbine LPG pump designed for use in suction lift. There shall be no restrictive fittings within ten pipe diameters of the pump inlet and the diameter of the inlet pipe is not less than the diameter of the pump inlet. The external pump by-pass relief valve is installed in a line returning to the vapour space of the supply tank. A single 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 (Figure 2), protect the flowmeters from the measurement of vapour. 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 (Figure 3) each fitted with a PEC model 07439 pulse generator producing 100 pulses per channel (x2 channels) per meter revolution.
- (v) A Batchen model Mk VI spring-loaded pressure differential valve (Figures 2 and 3) is fitted to the outlet. 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 ¼”NPT extension union which gives provision for a pressure gauge. Any bleed valves in normal operation are sealed with to prevent leakage.
- (vi) A Batchen hydraulic accumulator may be fitted downstream of the pressure differential valve.
- (vii) A ½” NPT solenoid valve is located downstream of the pressure differential valve. The valve 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.
- (ix) Gasguard model LG1DNS nozzles or any other NMI-approved compatible (#) LPG nozzles (*) may be used that are suitable for the Gallagher/PEC nozzle hang-up mechanism.
- (*) Note that the submitter must be consulted regarding the acceptability of any alternative nozzles.
- (x) A recirculation line with a double check filler valve is provided at the dispenser for returning the LPG back to the supply tank. The recirculation line is used for maintenance checking or calibration of the dispenser.
- (xi) 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 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 Test Procedure).

The software version numbers for the calculator/indicator are VA 3.06P (for the main processor) and VI 3.05S (for the input processor). These version numbers may be viewed using the set-up keypad (refer to the Test Procedure).

- (#) ‘Compatible’ is defined to mean that no additions/changes to hardware/software are required for satisfactory operation of the complete system.

1.3 Operation

Removal of the nozzle from its receptacle starts the operating cycle. The display will be cleared of any previous sale and the remote pump will start. The systems electronics will automatically check for pulser rotation and correct electronic parameters.

A segment check is initiated; when completed, the unit price is displayed, and the price and volume displays show zeroes. At the end of this cycle the solenoid valve opens allowing a delivery. Replacing the nozzle to its normal hang up position closes the solenoid valve. The delivery details are displayed until the next reset cycle.

1.4 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 model DSS*-98 (##) density detector probe to display the delivered volume at 15°C.

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

1.5 Markings and Notices

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

Pattern approval number	NMI No 10/1/21
Manufacturer's identification mark or trade mark
Manufacturer's designation (model number)
Serial number
Year of manufacture
Environmental class	class N
Maximum flow rate (Q_{max}) L/min
Minimum flow rate (Q_{min}) L/min
Maximum operating pressure (P_{max})	1800 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

Note: 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'.

Volume indicated for LPG shall be clearly identified as 'Litres at 15°C' or similar wording.

1.6 Sealing Provision

A plate covering the calibration switch situated inside the calculator/indicator, and the mechanical calibration device on the flowmeter, have provision for sealing. (Figures 4 & 5).

The flowmeter bleed valve has provision for sealing.

1.7 Verification Provision

Provision is made for the application of a verification mark.

2. Description of Variant 1

approved on 28/11/01

The PEC Apollo model 3261P (Figure 6) which is similar to the pattern and is fitted with a pre-setting device. The system will also include a ¼" NPT solenoid valve.

TEST PROCEDURE No 10/1/21

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*.

Calibration Procedure

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

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

1. Open the display unit.
2. Take out the keypad overlay and place it over the white keypad area.
3. Flick the switch to put the dispenser into diagnostics mode.
4. Press the button to enter manager mode.
5. FN-00 will be displayed on the litres display.
6. Enter 08 followed by the 'fill' button from the set-up/pre-set keypad to display the software version.
7. Enter 37 followed by the 'fill' button to display the unconverted volume.
8. Enter 82 followed by the 'fill' button to display the density at 15°C.
9. Enter 83 followed by the 'fill' button to display the temperature at metering conditions.
10. Enter 84 followed by the 'fill' button to display the volume correction factor.

To perform a unit price change

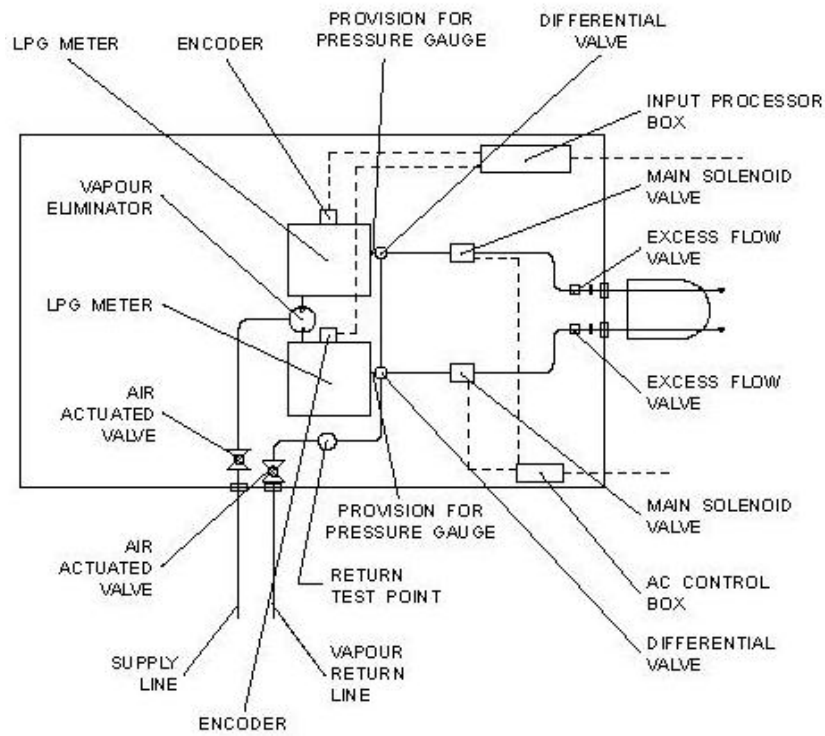
Enter 31 followed by the 'fill' button and then use the keypad to enter the new unit price.

FIGURE 10/1/21 – 1



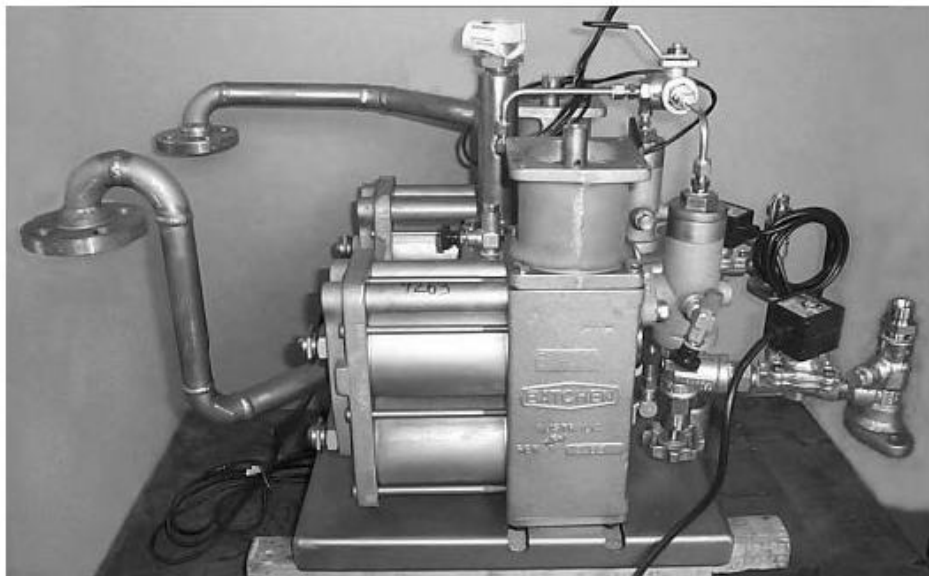
Gallagher (PEC Apollo) Model 3261N LPG Fuel Dispenser for Motor Vehicles –
The Pattern

FIGURE 10/1/21 – 2



Model 3261N LPG Hydraulics – The Pattern

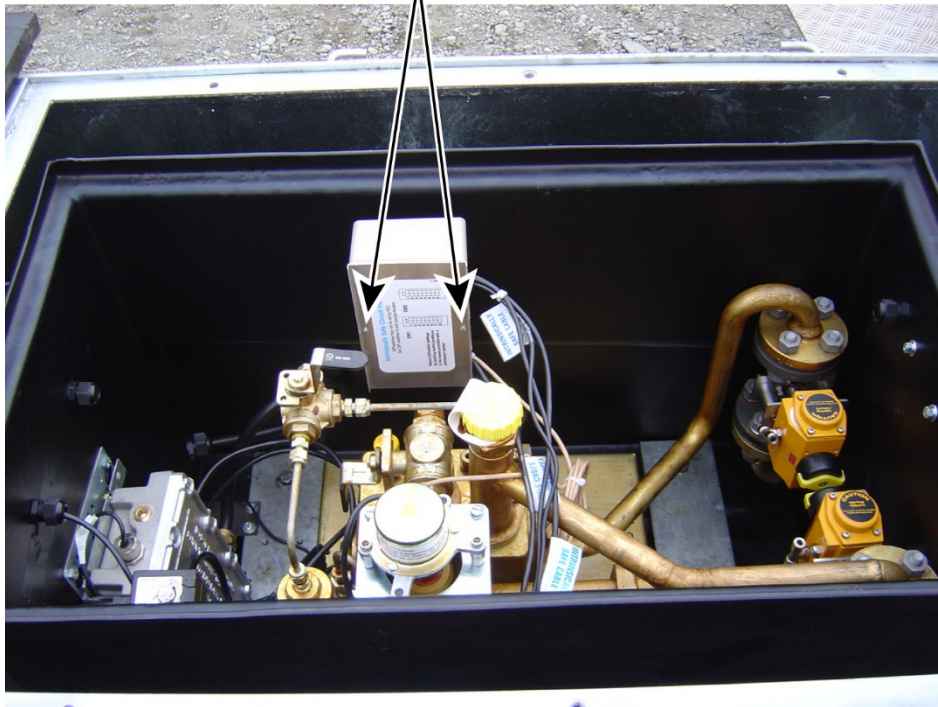
FIGURE 10/1/21 – 3



Batchen Model Mk III LPG Meter and
Batchen Model Mk VI Pressure Differential Valve

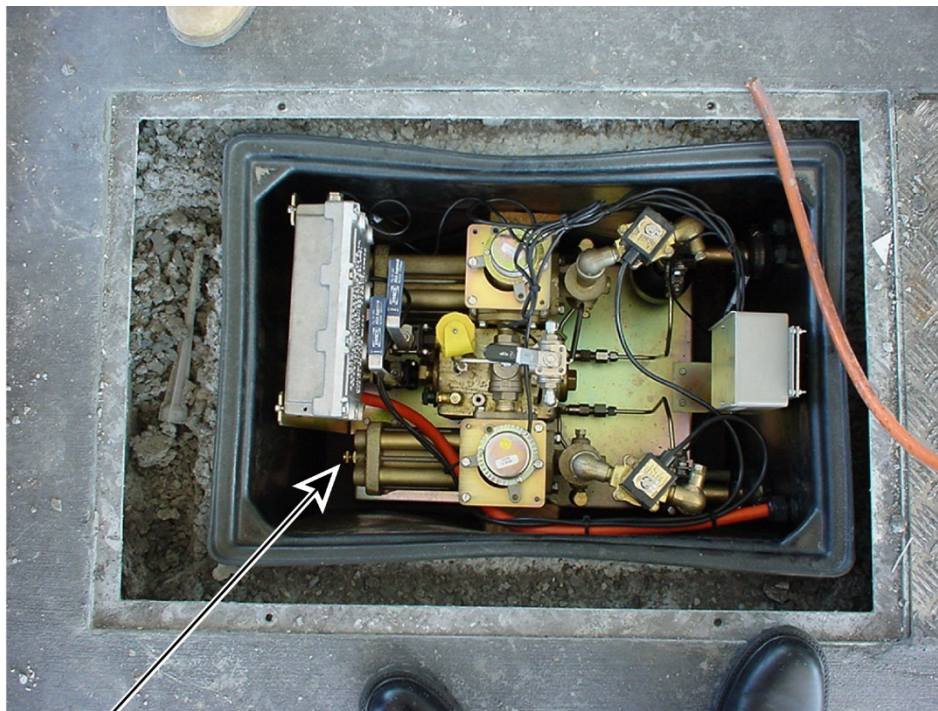
FIGURE 10/1/21 – 4

Location of seal



A Typical Sealing Method – The Pattern

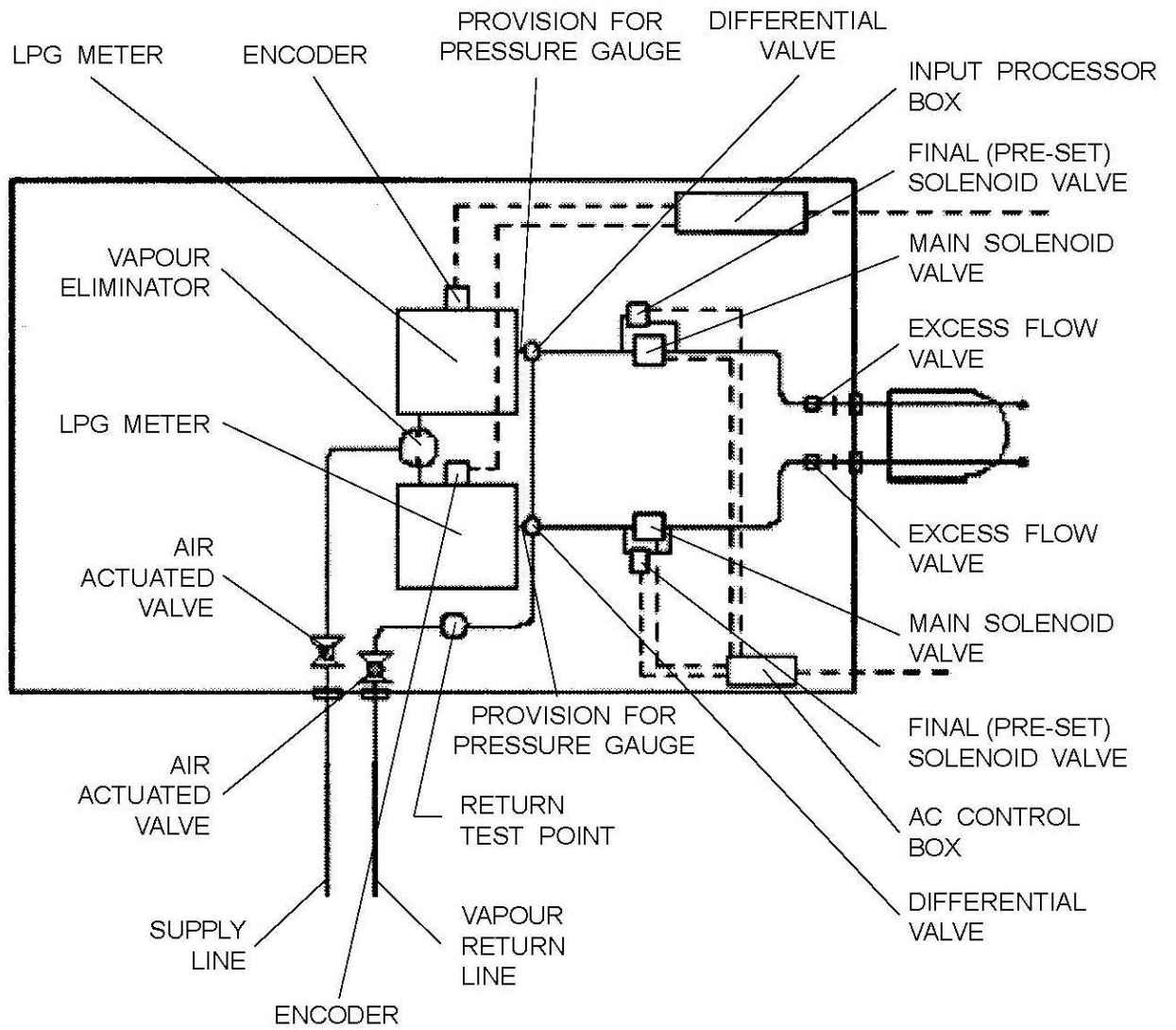
FIGURES 10/1/21 – 5



Location of seal

A Typical Sealing Method – The Pattern

FIGURES 10/1/21 – 6



Model 3261P Hydraulics – Variant 1

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