



NATIONAL STANDARDS COMMISSION

10/2/3
31/7/87

NATIONAL MEASUREMENT (PATTERNS OF INSTRUMENTS) REGULATIONS

REGULATION 9

CERTIFICATE OF APPROVAL No 10/2/3

This is to certify that an approval for use for trade has been granted in respect of the pattern and variants of the

Neptune Model 4D 32 mm Bulk LPG Flowmetering System

submitted by Norman J Hurl & Company (Australia) Pty Ltd
14 Aristoc Road
Glen Waverley Vic 3150.

CONDITIONS OF APPROVAL

General:

This approval is subject to review on or after 1/5/92.
This approval expires in respect of new instruments on 1/5/93.

Instruments purporting to comply with this approval shall be marked NSC No 10/2/3.

This approval may be withdrawn if instruments are constructed other than in accordance with the drawings and specifications lodged with the Commission.

The Commission reserves the right to examine any instrument purporting to comply with this approval.

Special:

Instruments installed under this approval are to be calibrated at six-monthly intervals after the initial verification test.

Note: This approval relates to the metrological performance of the metering system; inspectors are advised that the system must comply with the requirements of other statutory authorities relating to safety, handling, storage and transportation of liquefied petroleum gas.

Signed

Executive Director

Descriptive Advice

Pattern: approved 6/4/87

- Neptune model 4D 32 mm bulk LPG flowmetering system.

...../2

10/2/3
31/7/87

Certificate of Approval No 10/2/3

Page 2

Variants: approved 6/4/87

1. Various models and capacities as listed in Table 1.
2. A model 4D 38 mm flowmeter with an Acme 502 series electronic indicator.

Technical Schedule 10/2/3 describes the pattern and variants 1 and 2.

Filing Advice

The documentation for this approval comprises:

Certificate of Approval No 10/2/3 dated 31/7/87
Technical Schedule No 10/2/3 dated 31/7/87
Test Procedure No 10/2/3 dated 31/7/87
Figures 1 to 10 dated 31/7/87



NATIONAL STANDARDS COMMISSION

10/2/3
31/7/87

TECHNICAL SCHEDULE No 10/2/3

Pattern: Neptune Model 4D 32 mm Bulk LPG Flowmetering System

Submittor: Norman J Hurlll & Company (Australia) Pty Ltd
14 Aristoc Road
Glen Waverley Vic 2147

1. Description of Pattern

The pattern is a bulk flowmetering system for the delivery of liquefied petroleum gas of a density set between 0.500 and 0.515 kg/L at 15°C, at temperatures between 0 and 45°C. The maximum and minimum flow rates are 114 and 18 L/min respectively. A typical system is shown in Figure 1 or, when vehicle-mounted, as shown in Figure 2.

1.1 Component Structure

(i) Supply Tank

The supply tank is located above the pump.

(ii) Pump

The pump is positioned as close as possible to the supply tank. The inlet pipe to the pump is no smaller than the outlet from the pump.

(iii) Flowmeter and Indicator

A Neptune model 4D 32mm LPG flowmeter and a model 443 zero-start indicator/ticket printer, both with 1 litre increments (Figure 3). The calibration is performed by removing the indicator cover and adjusting the internal gears.

(iv) Gas Purger

The meter is protected from the measurement of vapour by correct installation and by a Neptune 38 mm float-operated gas purger with integral strainer (Figure 4) which is vented through a non-return valve, via a vapour return line not less than 20 mm in diameter to the vapour space of the supply tank.

A thermometer well is situated in the strainer cover.

(v) Temperature Compensator

A Neptune type 1 style 22 mechanical temperature compensator with inbuilt temperature sensor. The compensation adjustment is performed by turning the calibration dial shown in Figures 5 and 6.

A thermometer well is provided in the compensator body.

...../2

(vi) Differential Valve

A Neptune 38 mm spring-loaded diaphragm valve maintains pressure in the metering chamber to prevent the formation of vapour. A pressure-equalising pipe is connected from the differential valve to the supply tank, through the vapour return line from the vapour-eliminator vent.

(vii) Outlet Piping

The pipe from the meter/pressure differential valve to the outlet is fitted with a non-return valve, a flow control valve and has provision for a pressure gauge.

(viii) Hose

If fitted with a hose it shall comply with the SAA code for hoses in use with liquefied petroleum gases, with a bore not exceeding 45 mm. A stop valve is fitted on the end of the delivery hose.

1.2 Markings

Instruments are marked with the following data, together in the one location.

Manufacturer's name or mark	
Year of manufacture	
Meter model	
Serial number	
NSC approval number	10/2/3
Maximum flow rate L/min
Minimum flow rate L/min
Liquid temperature range	* 0°C to 45°C
Approved for LPG, of density	* ... to kg/L
Density for which temperature compensator is set	# *
Maximum operating pressure	

Where the density for which the compensator is set is not readily visible, either shown on a dial or displayed on an indicator, the density of the product used to calibrate the instrument shall be marked on a metal label attached to the instrument by the calibrator sealing wire.

* May be marked on a metal label attached to the instrument by the calibrator sealing wire.

1.3 Sealing

The meter and temperature compensator calibrating adjustments are sealed.

1.4 Verification Mark

Provision is made on the meter for a verification mark to be applied.

2. Description of Variants

2.1 Variant 1

Various models and capacities, and in the configurations listed in Table 1.

2.2 Variant 2

A model 4D 38 mm flowmeter with an Acme 502 series indicator with integral electronic temperature compensation (Figure 8 and Table 1) and an Acme EPU-100 pulse generator, and approved for the delivery of LPG of a density set between 0.500 and 0.600 kg/L. The indicator has a linearisation correction facility which may or may not be used, so that the minimum flow rate is either 22 or 45 L/min respectively.

TABLE 1

Flowmeter	32 mm (*)	38 mm (*)	38 mm (*)	50 mm
Indicator	443	443	Acme 502	443
Pulse generator	N/A	N/A	Acme EPU-100	N/A
Temp. compensator (#)	Mechanical	Mechanical	Electronic	Mechanical
Maximum flow rate	114 L/min	227 L/min	227 L/min	380 L/min
Minimum flow rate	18 L/min	45 L/min	** L/min	75 L/min
Maximum density	0.515 kg/L	0.515 kg/L	0.600 kg/L	0.515 kg/L
Minimum density	0.500 kg/L	0.500 kg/L	0.500 Kg/L	0.500 kg/L
Figures -				
Flowmeter	3	7	8	9
Gas purger	4	4	4	10
Temp. compensator	5,6	5,6	8	5,6

Approved Models and Configurations

* Gas purger and differential valve are 38 mm for both these sizes of flowmeters.

Temperature compensator:
- Mechanical - Neptune type 1 style 22
- Electronic - Integral with Acme 502 indicator.

** The Acme 502 indicator has a linearisation correction facility which may or may not be used, in which case the minimum flow rate is either 22 L/min or 45 L/min respectively.



10/2/3
31/7/87

NATIONAL STANDARDS COMMISSION

TEST PROCEDURE No 10/2/3

The following test procedure is to be used at each reverification test. One test should also be arranged when there is a low liquid level in the supply tank.

The maximum permissible error applied during a verification test from normal flow rate to the minimum flow rate specified in the Technical Schedule is:

$\pm 1.0\%$ with temperature compensator deactivated, and

$\pm (1.2\% + 0.02\% \text{ per } ^\circ\text{C difference from } 15^\circ\text{C})$ with temperature compensator activated.

1. Meter Test With Temperature Compensator Deactivated

- (i) Carry out at least three runs at the normal flow rate at which the meter is used.
- (ii) Repeat (i) at the minimum flow rate.

2. Meter Test With Temperature Compensator Activated

Repeat the above tests and calculate the equivalent volume that would have been delivered at 15°C using the temperature indicated at the meter and the ASTM-IP Petroleum Measurement Tables, for the density of the liquid for which the temperature compensator is set.

In addition, for instruments fitted with the Acme 502 indicator:

3. Meter Test For Linearisation Facility

Complete 3 runs at the minimum flow rate to establish that the correct linearisation factors have been entered.

Note: When linearisation facility is used, the minimum flow rate is 22 L/min.

National Standards Commission



NOTIFICATION OF CHANGE
CERTIFICATE OF APPROVAL No 10/2/3
CHANGE No 1

The following change is made to the approval documentation for the

Neptune Model 4D 32 mm Bulk LPG Flowmetering System

submitted by Norman J Hurl & Company (Australia) Pty Ltd
14 Aristoc Road
Glen Waverley VIC 3150.

In Certificate of Approval No 10/2/3, and its Technical Schedule, both dated 31/7/87, all references to 'Neptune' should be amended by adding "(may also be known as 'Schlumberger Industries')".

Signed and sealed by a person authorised under Regulation 9 of the National Measurement (Patterns of Instruments) Regulations to exercise the powers and functions of the Commission under this Regulation.

National Standards Commission



NOTIFICATION OF CHANGE

VARIOUS CERTIFICATES OF APPROVAL

The following changes are made to the approval documentation for various LPG flowmeter approvals as listed below:

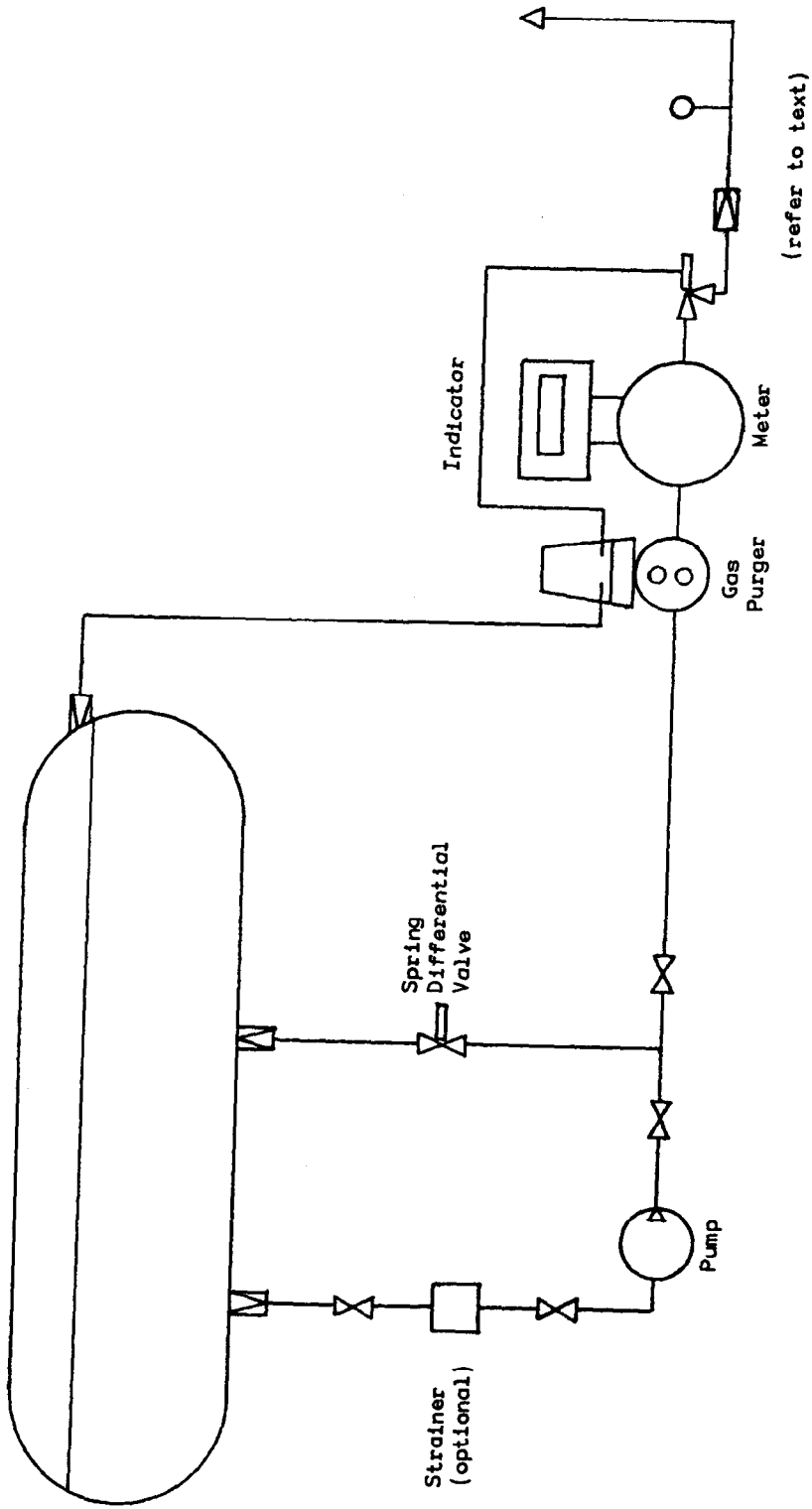
In the approvals listed below, remove from the Certificate, Technical Schedule and Test Procedure, any Condition of Approval or clause that refers to instruments being verified, re-verified or calibrated at specific intervals. (Note that the re-verification period is determined by the Trade Measurement Authority in the State or Territory in which the instrument is located.)

APPROVAL NUMBER	PATTERN
10/1/2	Halco Neptune 32/38 mm LPG Flowmeter
P10/1/3	Acme Model LGD 100 LPG Driveway Flowmeter
10/1/3A	Acme Model LGD 105S LPG Driveway Flowmeter
P10/1/5	Batchen Model Mk II LPG Driveway Flowmeter
P10/1/6	Wayne Model ELC1 LPG Driveway Flowmeter
10/1/6A	Email Model ELC1 LPG Driveway Flowmeter
P10/1/7	Indeng Model MKO LPG Driveway Flowmeter
10/1/8	Gilbarco Model T093D LPG Driveway Flowmeter
10/1/8A	Gilbarco Model T093D LPG Driveway Flowmeter
10/1/9	Batchen Model Commander LPG Driveway Flowmeter
P10/1/10	LPG Engineering Model Stargas LPG Driveway Flowmeter
10/1/10A	LPG Engineering Model Stargas LPG Driveway Flowmeter
10/1/11	LPG Engineering Model Stargas EPSN LPG Driveway Flowmeter
10/1/12	CleverHead Model 93 LPG Driveway Flowmeter
10/1/13	Batchen Model SCB Commander LPG Driveway Flowmeter
P10/2/2	Liquid Controls Model MA-7-GY-10 Bulk LPG Flowmeter
10/2/3	Neptune Model 4D 32 mm Bulk LPG Flowmeter
P10/2/4	Euromatic Model FL 11/2-125 Turbine Bulk LPG Flowmeter

Signed and sealed by a person authorised under Regulation 9 of the National Measurement (Patterns of Measuring Instruments) Regulations to exercise the powers and functions of the Commission under this Regulation.

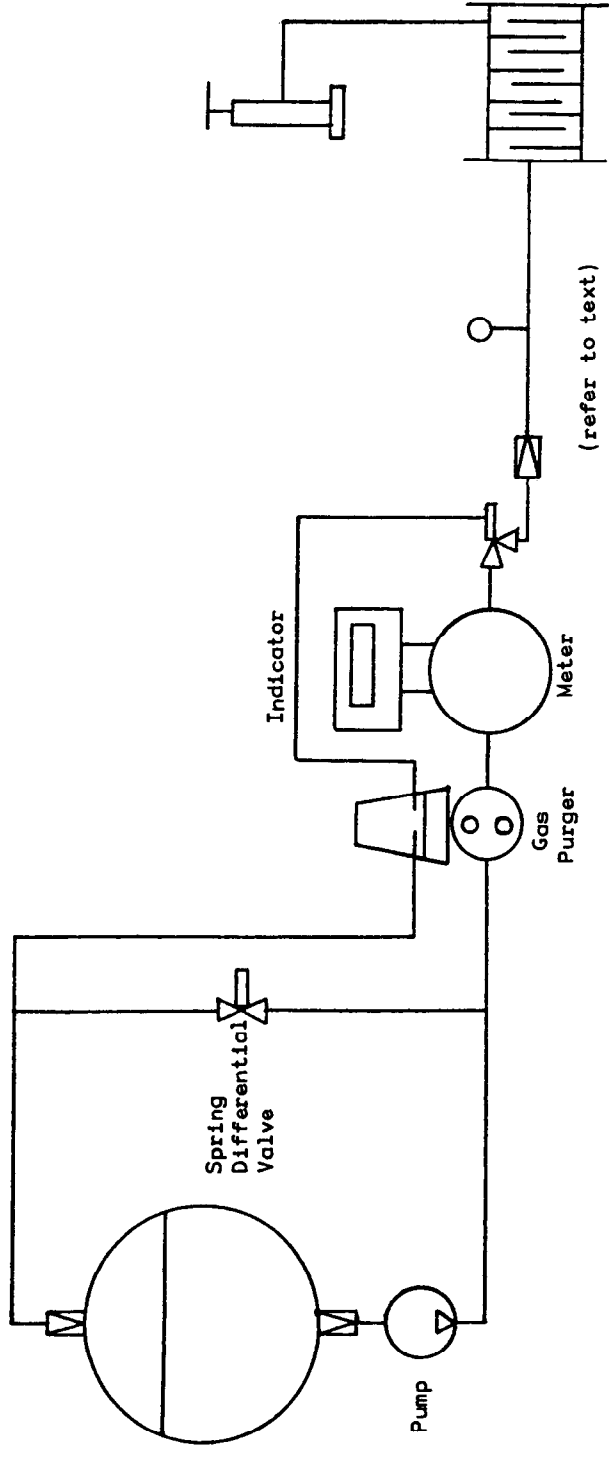


FIGURE 10/2/3 - 1

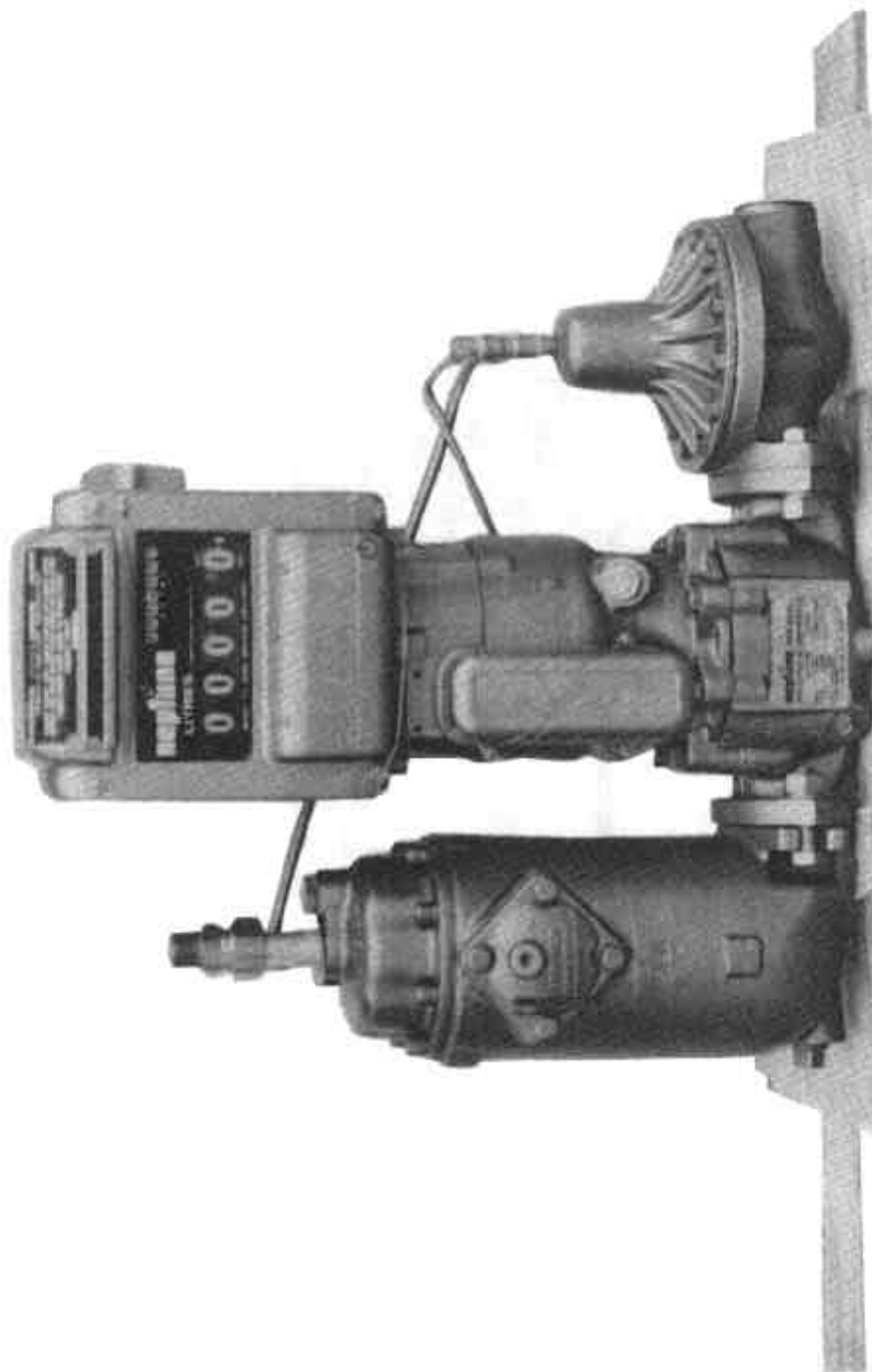


Typical Bulk LPG System

FIGURE 10/2/3 - 2

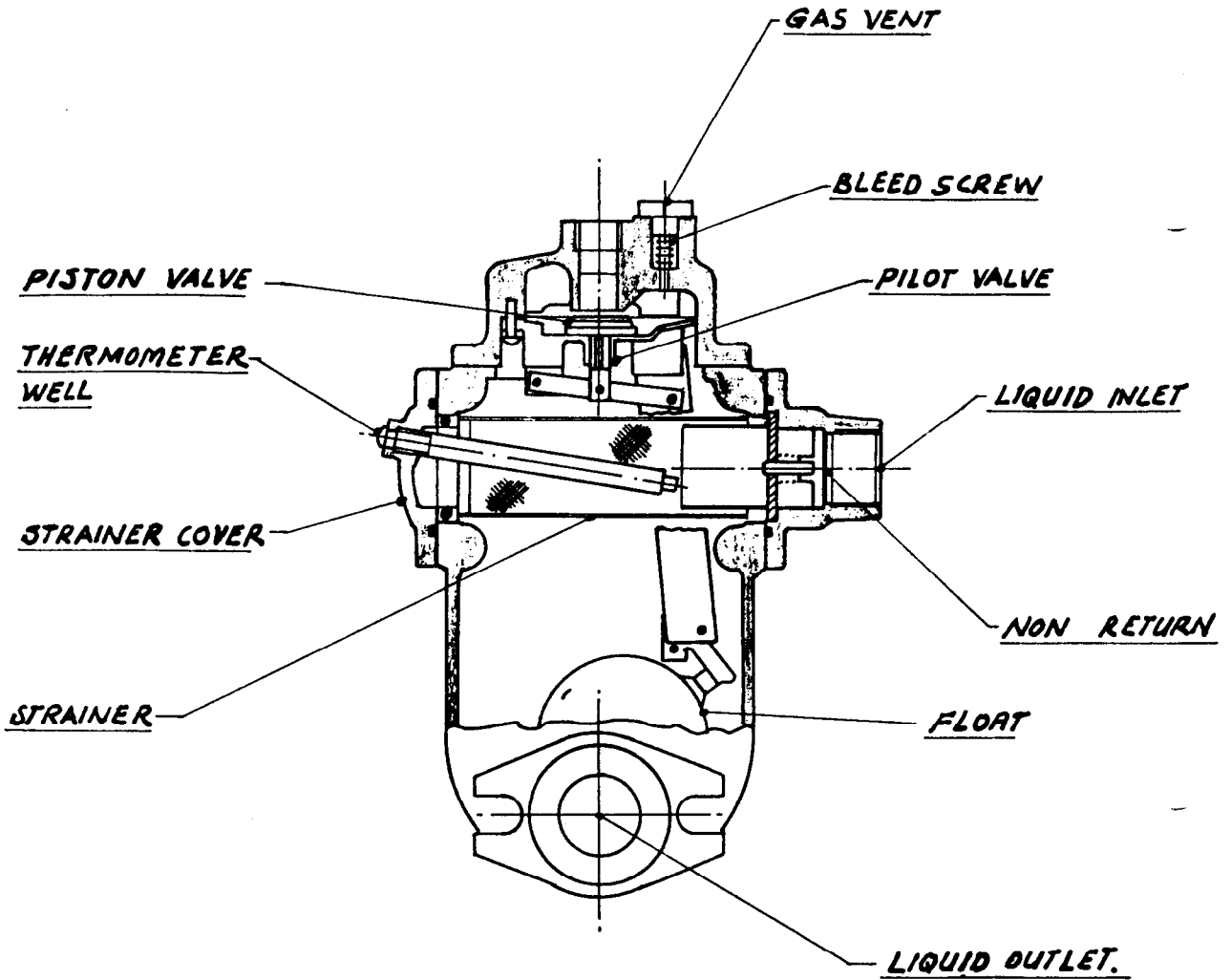


Typical Vehicle-mounted LPG System



Neptune 40 32 mm LPG Flowmeter

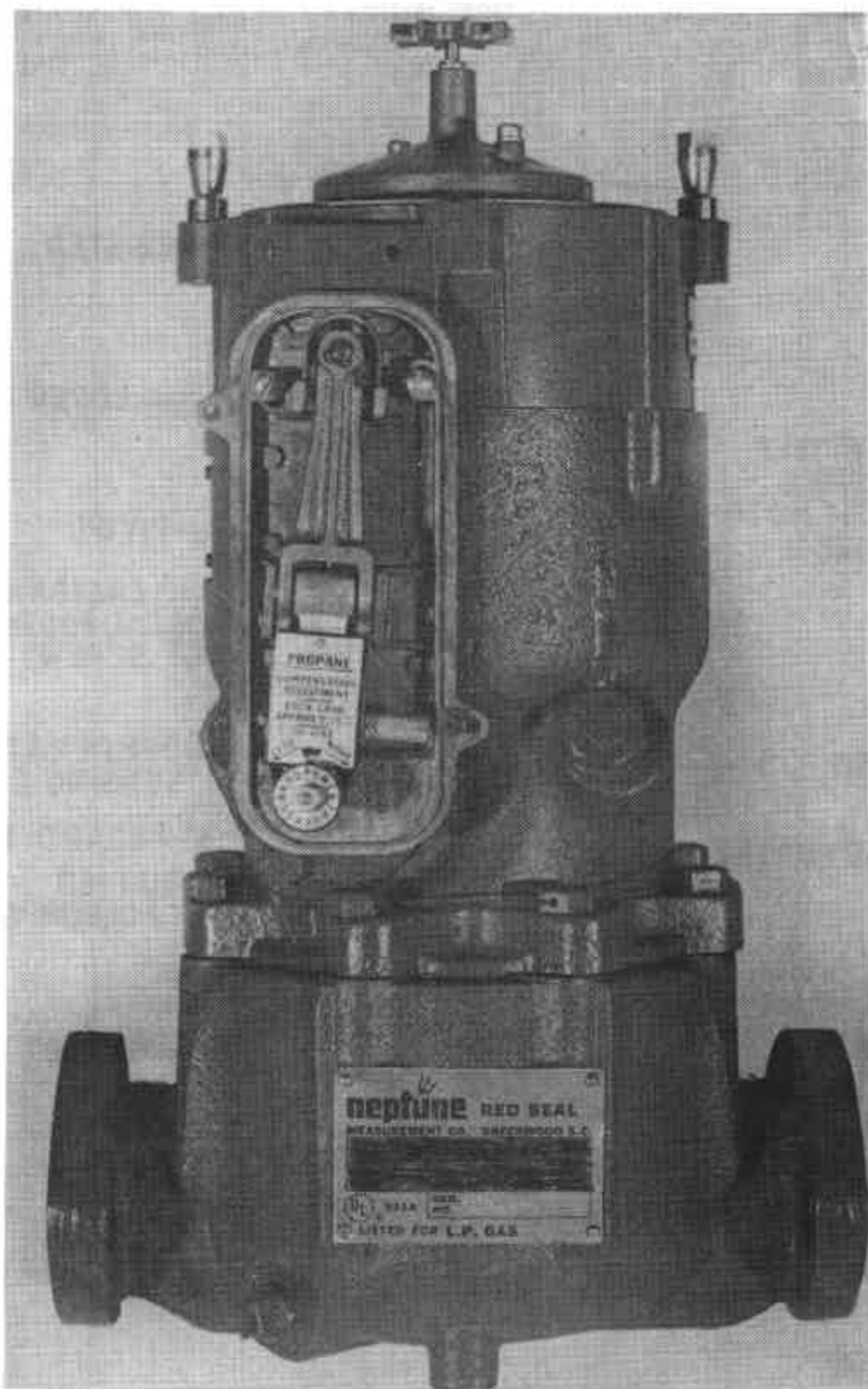
FIGURE 10/2/3 - 4



38 mm Gas Purger

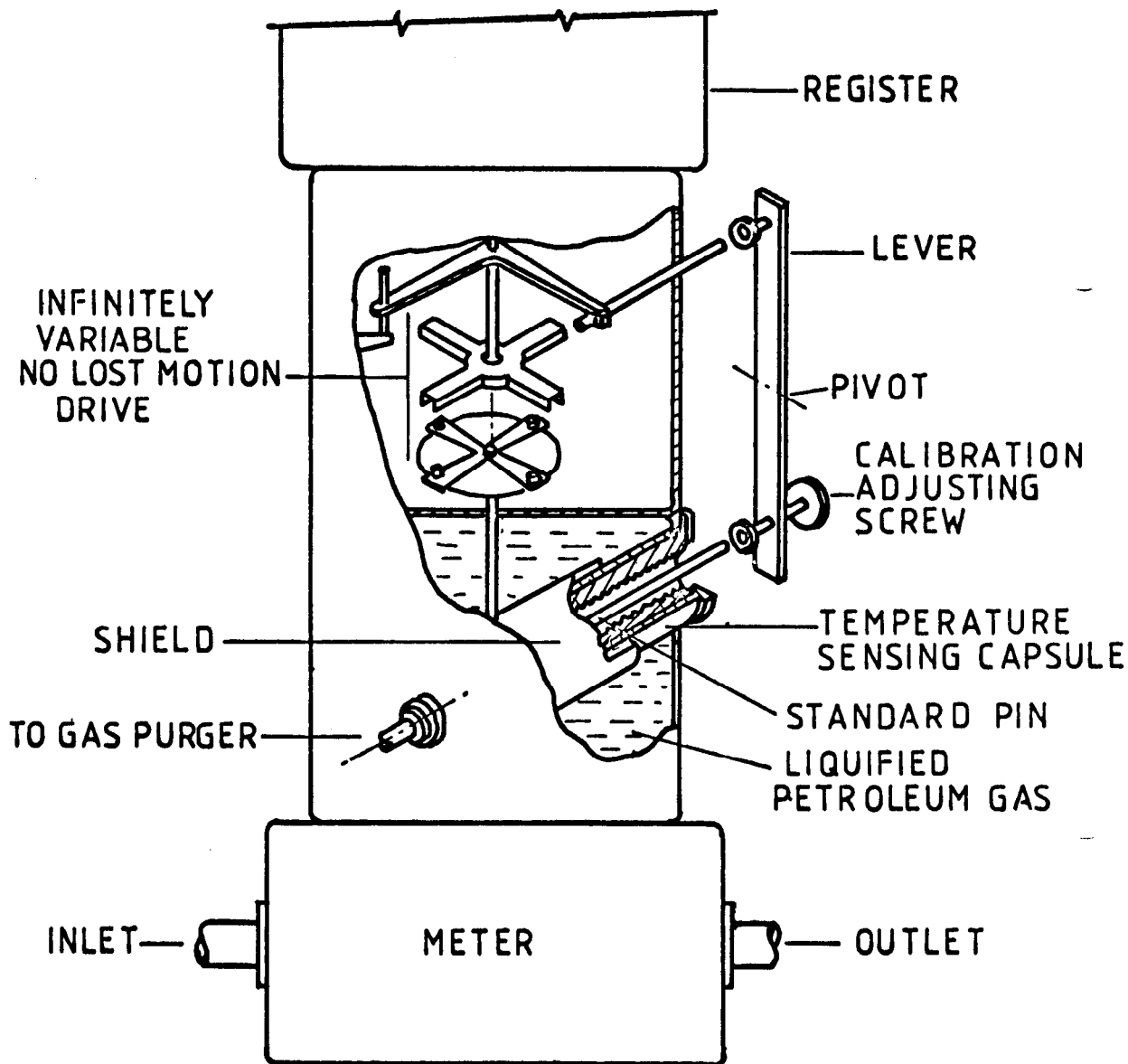
10/2/3
31/7/87

FIGURE 10/2/3 - 5



Temperature Compensator With Cover Of Calibration Adjuster Removed

FIGURE 10/2/3 - 6



Temperature Compensator - Schematic Diagram

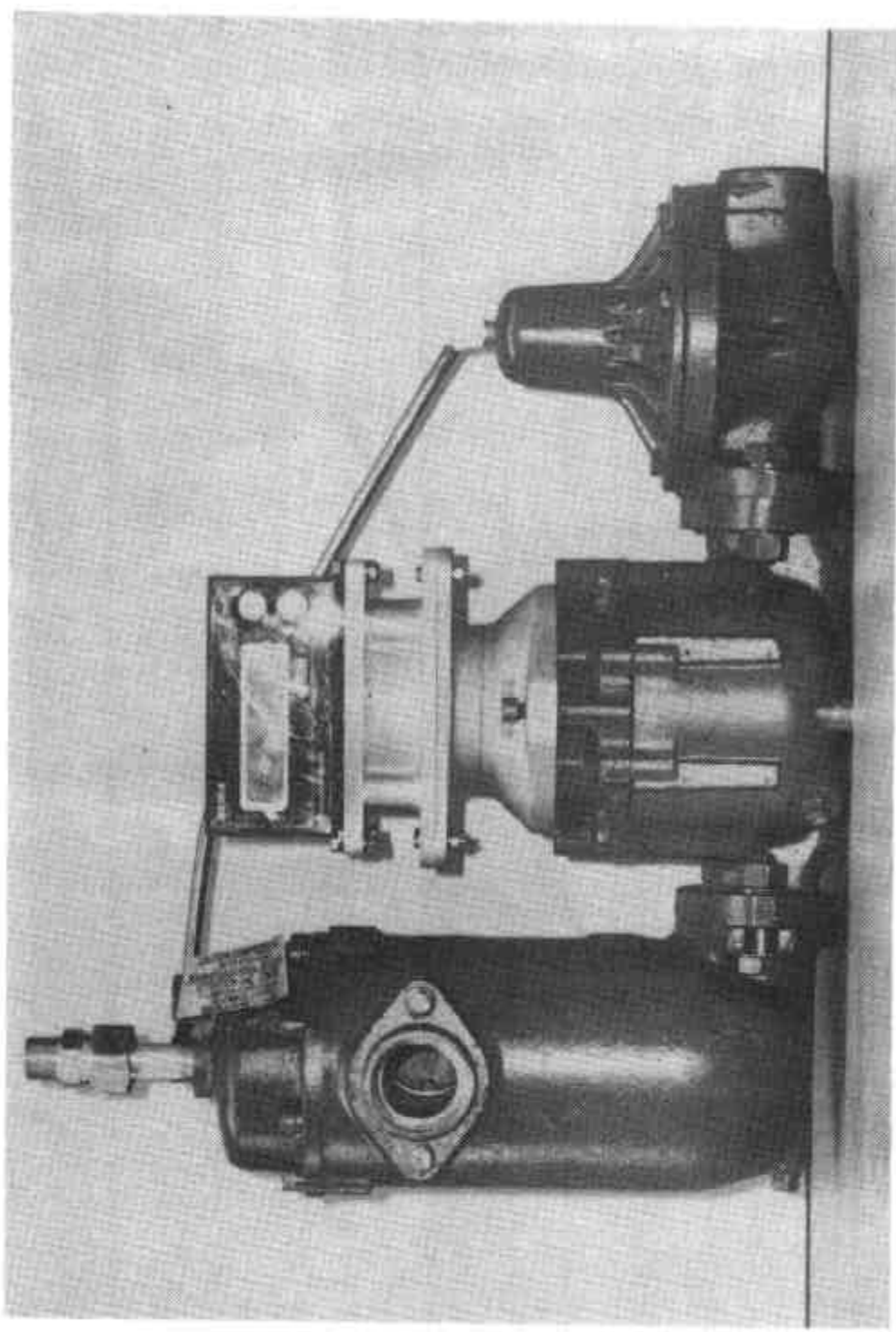
FIGURE 10/2/3 - 7



38 mm LPG Flowmeter

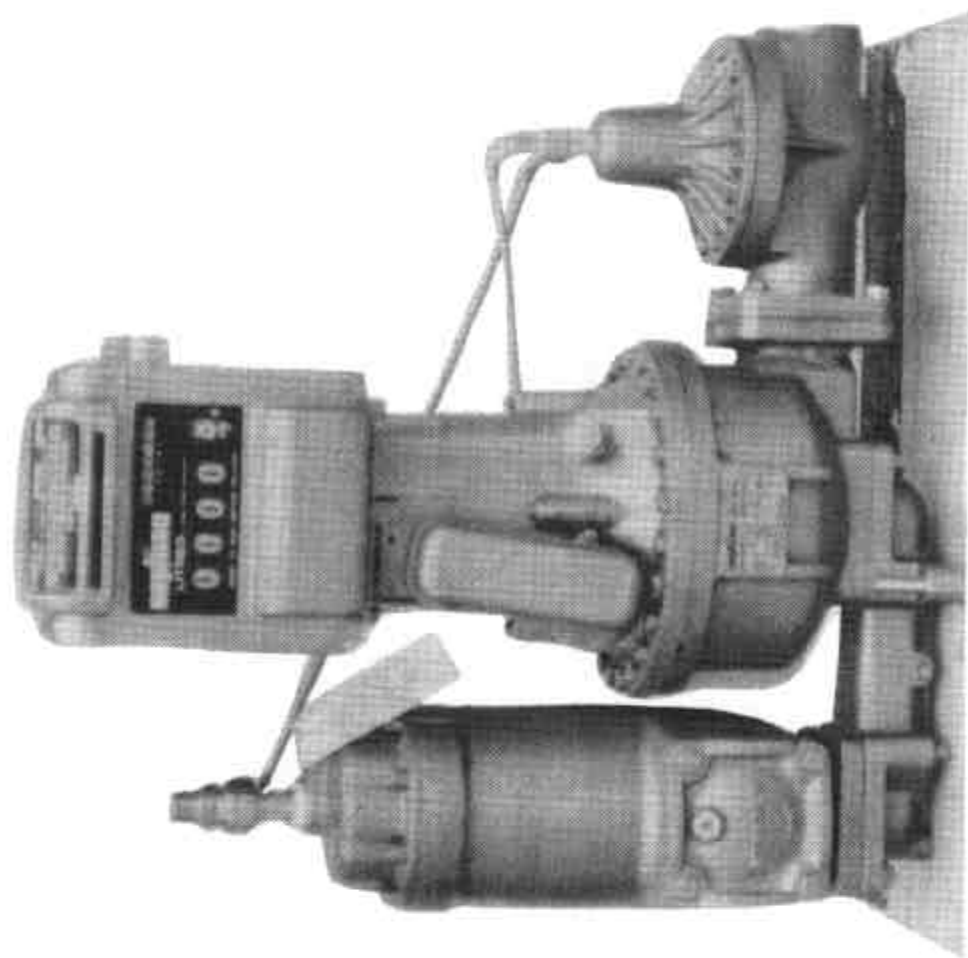
10/2/3
31/7/87

FIGURE 10/2/3 - 8



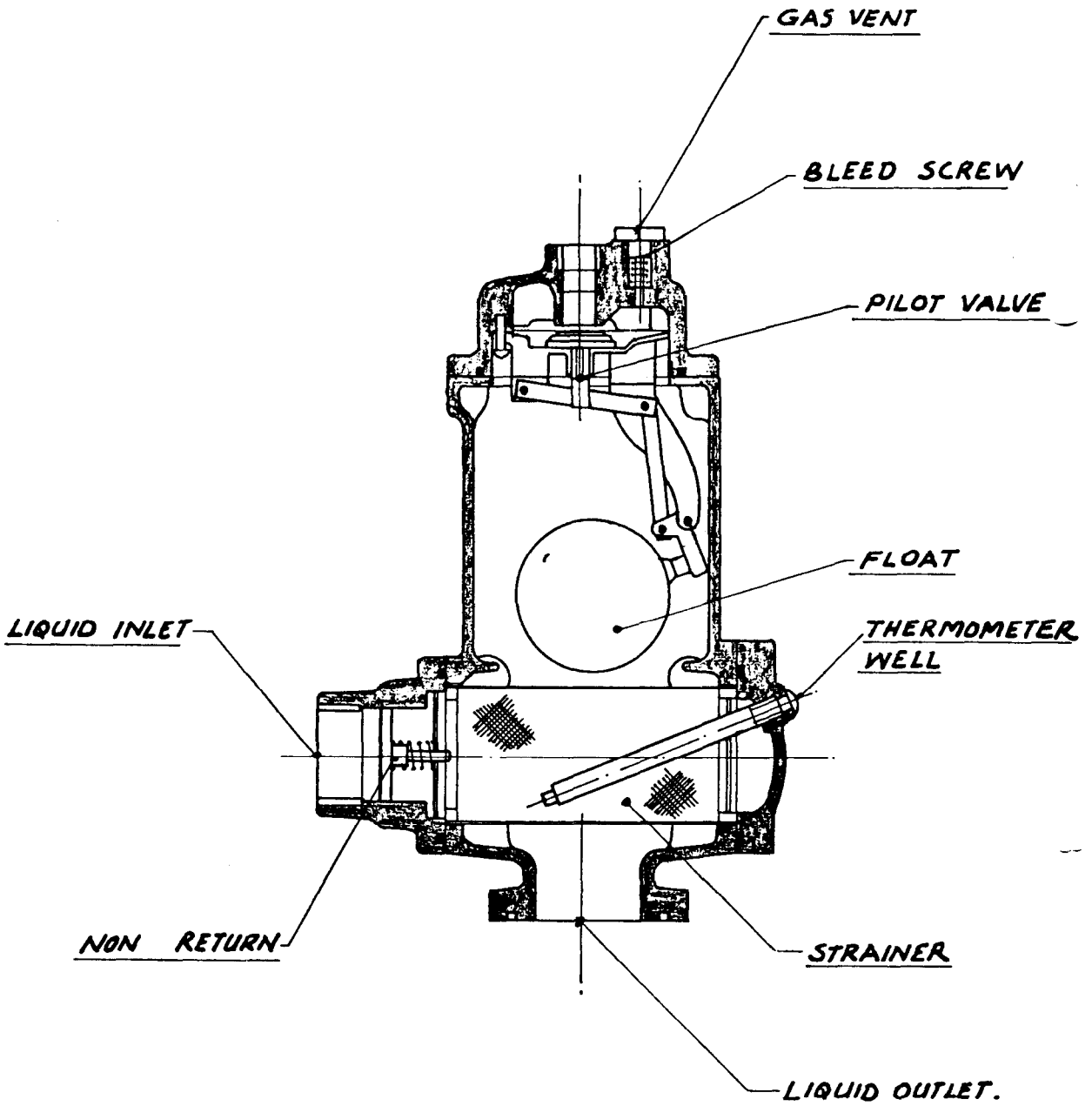
38" LPG Flowmeter With Acme 502 Indicator

FIGURE 10/2/3 - 9



Neptune 4D 50 mm LPG Flowmeter

FIGURE 10/2/3 - 10



50 mm Gas Purger - Schematic Diagram