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CERTIFICATE OF APPROVAL No 10/1/2

CANCELLED

This is to certify that the patterns of the

Halco Neptune 32/38-mm Flowmeter

0/3

submitted by Halco Engineering Pty Ltd,
Cochrane's Road,
Moorabbin, Victoria, 3189,

have been approved under the Weights and Measures (Patterns of Instruments) Regulations as being suitable for use for trade.

Date of Approval: 31 March 1976

The patterns are described in Technical Schedule No 10/1/2 and in drawings and specifications lodged with the Commission.

The approval is subject to review on or after 1 February 1981.

All instruments conforming to this approval shall be marked with the approval number "NSC No 10/1/2".

Approval* is granted on condition that:

1. The flow rate is limited to a maximum of 230 litres per minute.
2. The liquids measured are commercial propanes of density between 500 and 515 kg/m^3 at 15°C.
3. The liquids measured are at temperatures in the range 0°C to 45°C.
4. The pump motor is started before the hose is connected to the purchaser's supply tank.

Signed

Acting Executive Officer

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* The approval relates only to the metrological performance of the metering system; the system must comply with the requirements of other statutory authorities relating to safety, handling, storage and transportation of liquefied petroleum gas.

5/10/76

CANCELLED 0/3 31-12-90

NATIONAL STANDARDS COMMISSION

TECHNICAL SCHEDULE No 10/1/2

Pattern: Halco Neptune 32/38-mm Flowmeter

Submittor: Halco Engineering Pty Ltd,
Cochrane's Road,
Moorabbin, Victoria, 3189.

Date of Approval: 31 March 1976

Conditions of Approval:*

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All instruments conforming to this approval shall be marked "NSC No 10/1/2".

Description:

The pattern (see Figures 1, 2 and 3) is a vehicle-mounted flowmeter for the delivery of liquefied petroleum gas (propane) of density 500 to 515 kg/m^3 at 15°C at temperatures between 0 and 45°C, at a maximum flow rate of 230 litres per minute. The flowmeter comprises:

1. Pump — positive displacement pump with its by-pass connected to the supply tank in order to minimise vapour formation.

2. Gas separator — Neptune "32 mm" or "38 mm" — incorporating an inlet non-return valve, strainer and float chamber (see Figure 4). The gas separator is vented through a non-return valve and

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a pipe of bore not less than 20 mm to the supply tank. If a stop valve (y) is fitted to the vent pipe, it shall be interlocked with a second stop valve (x) so that when a delivery is taking place the vent line is open (see Figure 2). A thermometer pocket is situated in the strainer cover.

3. Meter — Neptune LPG "32 mm" or "38 mm" Type 4D (see Figure 3). An internal by-pass allows a portion of the incoming liquid to pass through the meter to the temperature compensator without being included in the measurement.

4. Temperature compensator — Neptune Type 1 Style 22 — attached to the top of the meter (see Figures 3, 5 and 6). Liquid flowing through the internal meter by-pass flows into the chamber between the temperature compensator and meter, along the temperature-sensing capsule in the space between the capsule and a surrounding shield, and returns through a pipe to the supply tank.

   The expansion and contraction of the temperature-sensing capsule with changes in the temperature of the liquid are transmitted by means of a pin-and-lever system to a variable-ratio drive which changes the coupling ratio between the meter and indicator so that the indicated volume is the equivalent volume at a temperature of 15°C. An adjustment screw fitted to the bottom of the lever permits calibration of the compensator.

   Provision is made for a Veeder-Root VR 1141 non-resettable counter to be fitted to the compensator (see Figure 5), to indicate the uncompensated meter output; that is, it records the number of revolutions of the input shaft of the variable-ratio drive.

   A thermometer pocket is situated in the side of the compensator housing.

5. Indicator — Neptune Type 443 (see Figure 3) — a zero-start ticket-printing register. The ticket printer has 1-litre increments and the indicator first element has ten scale marks numbered from 0 to 9. The aperture through which the first element is viewed is widened in the direction of the travel.

6. Differential valve — Neptune 32 or 38 mm (see Figures 1, 2 and 3). A spring-loaded diaphragm-operated valve maintains pressure in the metering chamber to prevent the formation of gas. A pressure-equalising pipe is connected from the differential valve through an excess-flow valve (which has no bleed hole) to the supply tank, either directly or through the gas-discharge pipe from the gas-separator vent.

7. Pipe connection from the differential valve to the hose reel. This pipe is fitted with an excess-flow valve, a stop valve, a pressure gauge, and two relief valves (see Figures 1 and 2).

8. Hose reel — incorporating up to 20 metres of high-pressure hose of bore not exceeding 25 mm.

9. Swivel hose coupling — between the hose and the stop valve.

10. Stop valve — fitted on the end of the delivery hose.

11. Marking — an instrument data plate sealed to the instrument by a lead-plug seal is marked:

"approved for propane — density x kg/m^3 ± 3 kg/m^3 only"

x being the density of the liquid for which the instrument has been verified.

12. Sealing — a sealing wire, the ends of which terminate in a plug seal over a set screw, passes through a drilled set screw retaining the top cover on the register, a drilled lug on the face of the register, and drilled set screws securing the register to the temperature compensator, securing the cover over the compensator adjustment, and securing the compensator to the meter.

The approval includes the flowmeter with a zero-start Neptune Type 441 indicator with a scale interval of 1 litre; the first element has ten scale marks numbered from 0 to 9. The aperture through which the first element is viewed is widened in the direction of travel (see Figure 7).

Special Tests:

Verification Procedures

The acceptable verification methods for this instrument are:

1. A two-stage verification involving at each verification:

   (a) the replacement of the metering assembly, that is, the meter, temperature compensator and indicator, with a metering assembly that has been checked by the Weights and Measures Authority either at the manufacturer's premises or in a laboratory; and

   (b) an overall test of the combined meter and temperature-compensator error at the temperature of the LPG. The

overall test should include not less than two tests at full flow rate and two tests at 20% of full flow rate; or

2. a winter-summer six-monthly verification period with one verification in the hotter period of each year and a second verification in the cooler period of each year. The tests to be applied at each verification would include not less than two tests of the delivered volume at full flow rate and two tests at 20% of full flow rate; or

3. a complete determination of the overall system performance by separate determinations of the meter and temperature-compensator errors at an LPG temperature of less than 10°C or more than 20°C. The meter and the temperature-compensator error may be determined directly by isolating the temperature compensator (select 1 : 1 ratio) while determining the meter error, and then checking that the ratio of the variable-ratio drive in the temperature compensator is correct for the temperature of the LPG. As an alternative, either of these separate errors may be determined indirectly by an overall check of the system errors, a determination of either separate error, and a simple subtraction.

   The meter-errors check should include not less than three tests of the delivered volume at full flow rate and three tests at 20% of full flow rate.

   The temperature-compensator error check should include not less than two tests at any flow rate with the LPG being circulated back to the supply tank. It will necessitate fitting a Veeder-Root 1141 counter to record the number of revolutions of the input shaft of the temperature compensator, and setting the gear ratio in the indicator to 1 : 1 so that the indicator records the number of revolutions of the output shaft of the temperature compensator.

   The overall system performance tests as for 2, except that not less than three tests should be done at each flow rate.

The above tests may be either gravimetric, volumetric or by master meter, and the LPG density may be measured or a density may be obtained from the supplier.

Minimum Delivery

1. The non-flow-dependent errors are:

   (a) 1-litre rounding error for the meter printer with 1-litre increments; and

   (b) 0,2-litre reading error for the indicator which has the first element indicating by 1-litre graduations.

2. For a delivery other than that which empties the supply tank, the minimum delivery for which the relative error from all sources is estimated not to exceed 2,5% is 100 litres when a ticket printer is fitted, and 20 litres when only an indicator is fitted.

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.

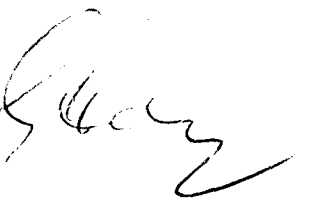
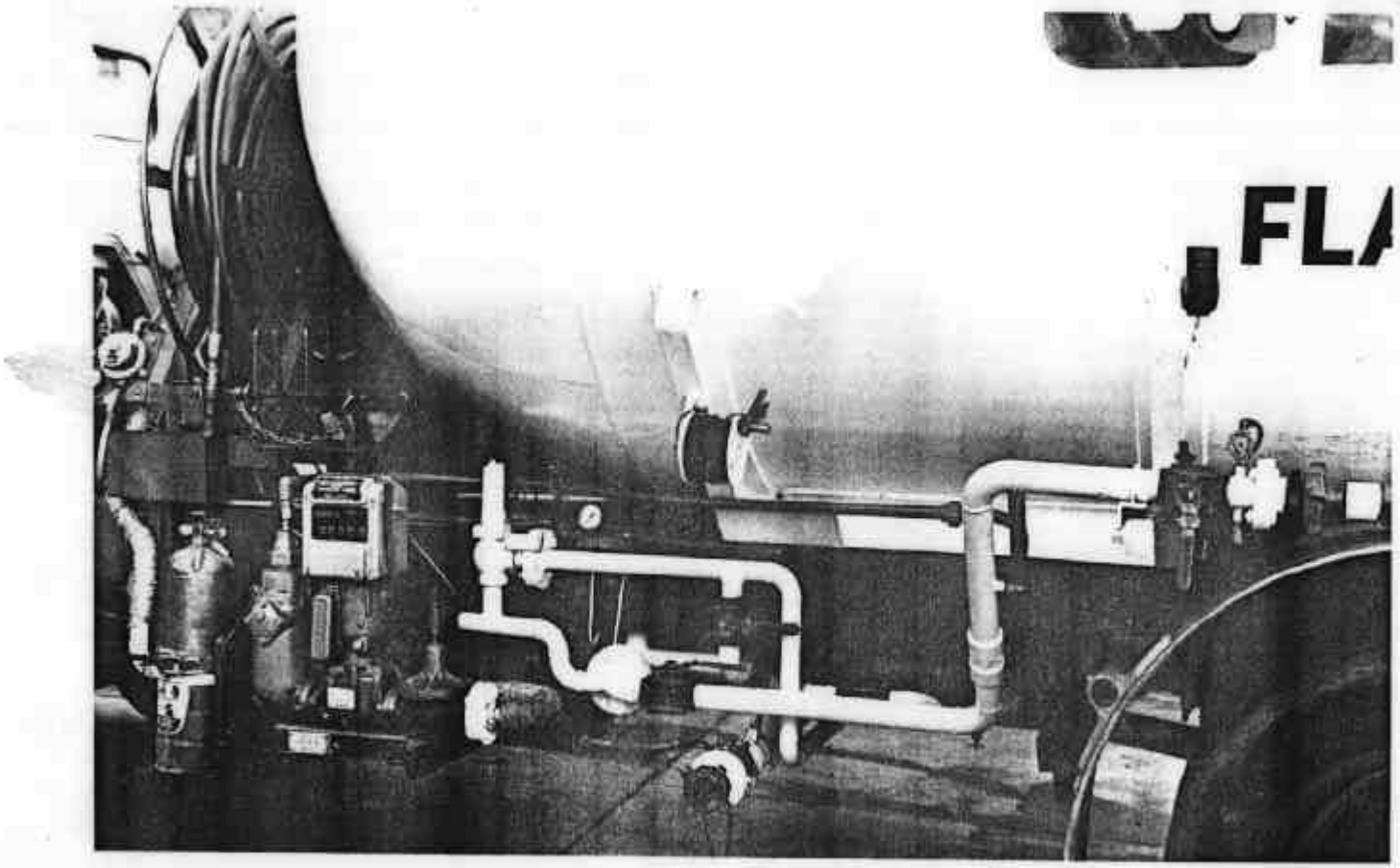
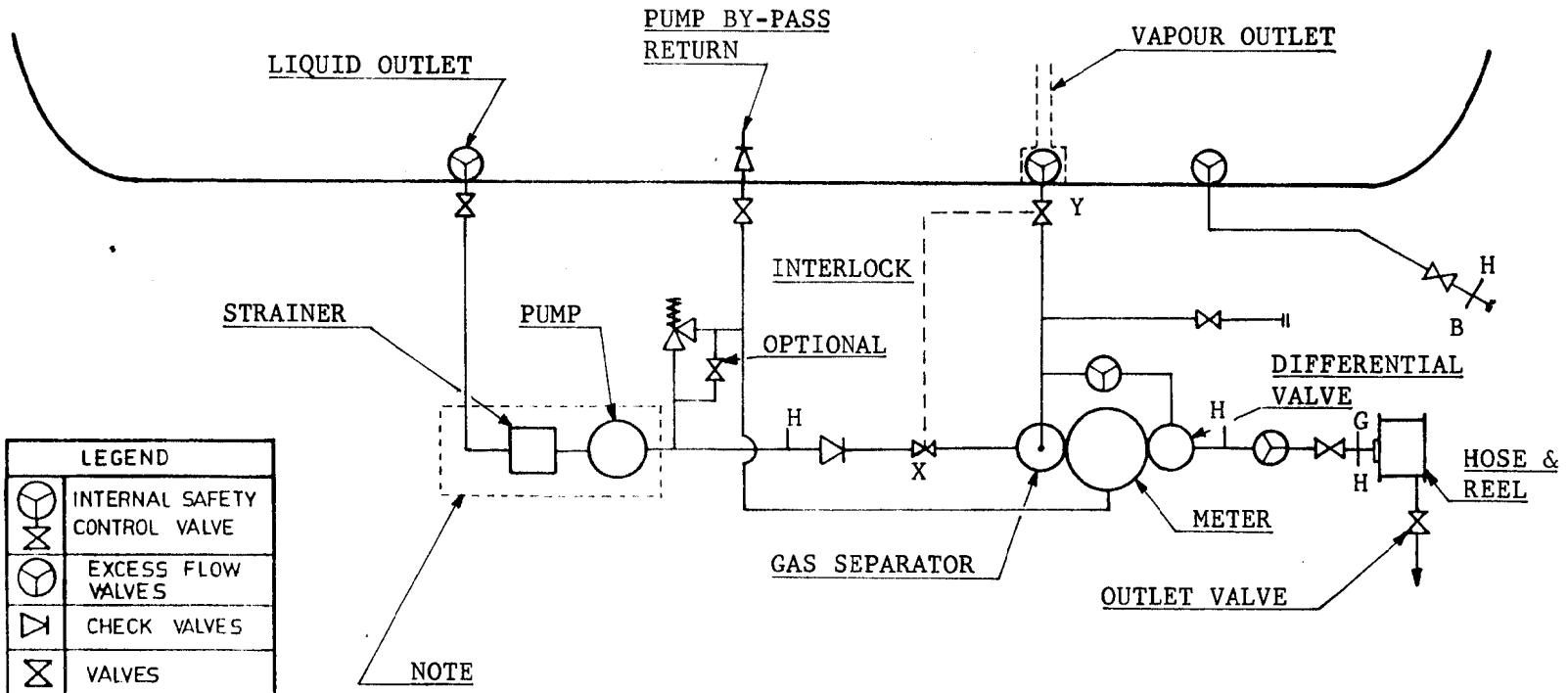


FIGURE 10/1/2 - 1



Neptune Flowmeter

FIGURE 10/1/2 - 2



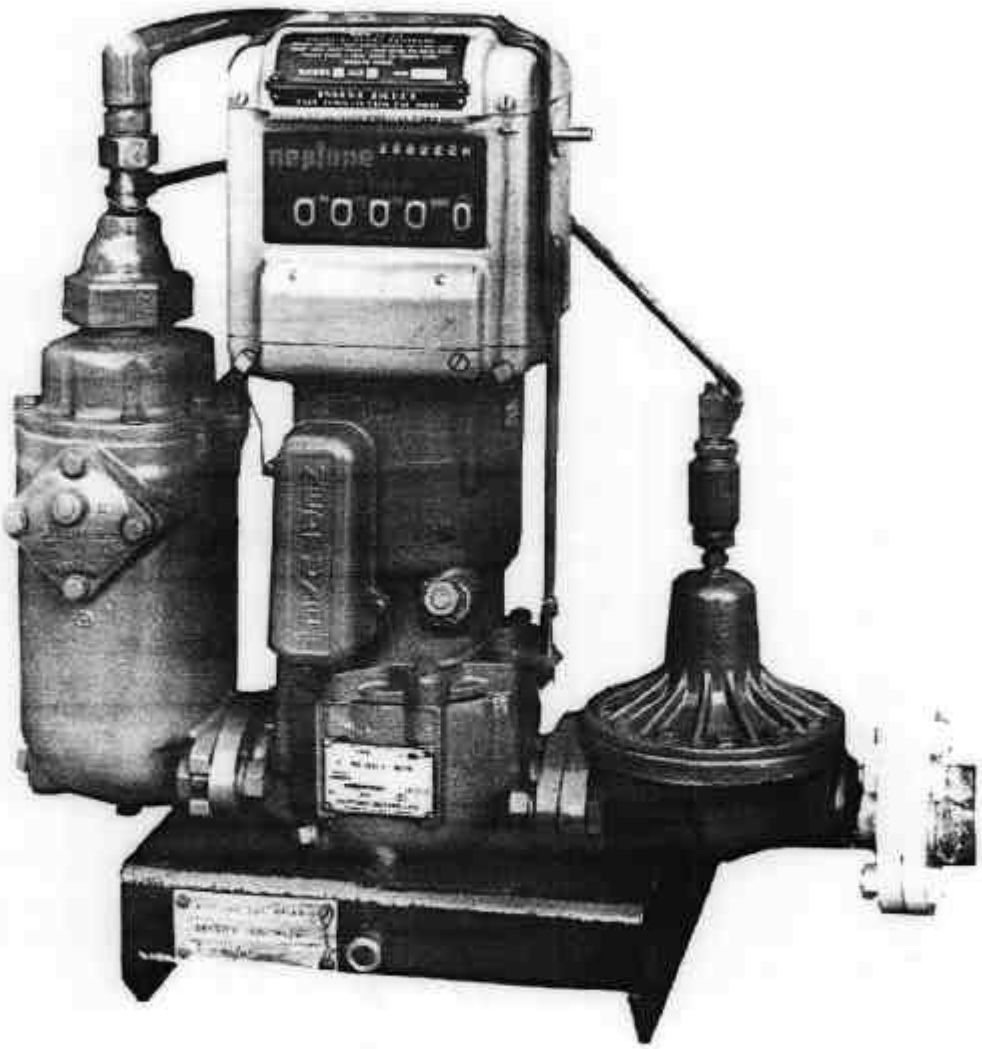
LEGEND	
	INTERNAL SAFETY CONTROL VALVE
	EXCESS FLOW VALVES
	CHECK VALVES
	VALVES
B	BLEEDERS
G	PRESSURE GAUGES
H	HYDROSTATIC RELIEF VALVES

ADDITIONAL VALVES MAY MAKE PROVISION FOR:

1. GRAVITY FEED OR PUMPED UNMETERED DELIVERIES
2. FILLING OF THE SUPPLY TANK
3. SUPPLY OF L.P.G. FROM OTHER TANKS

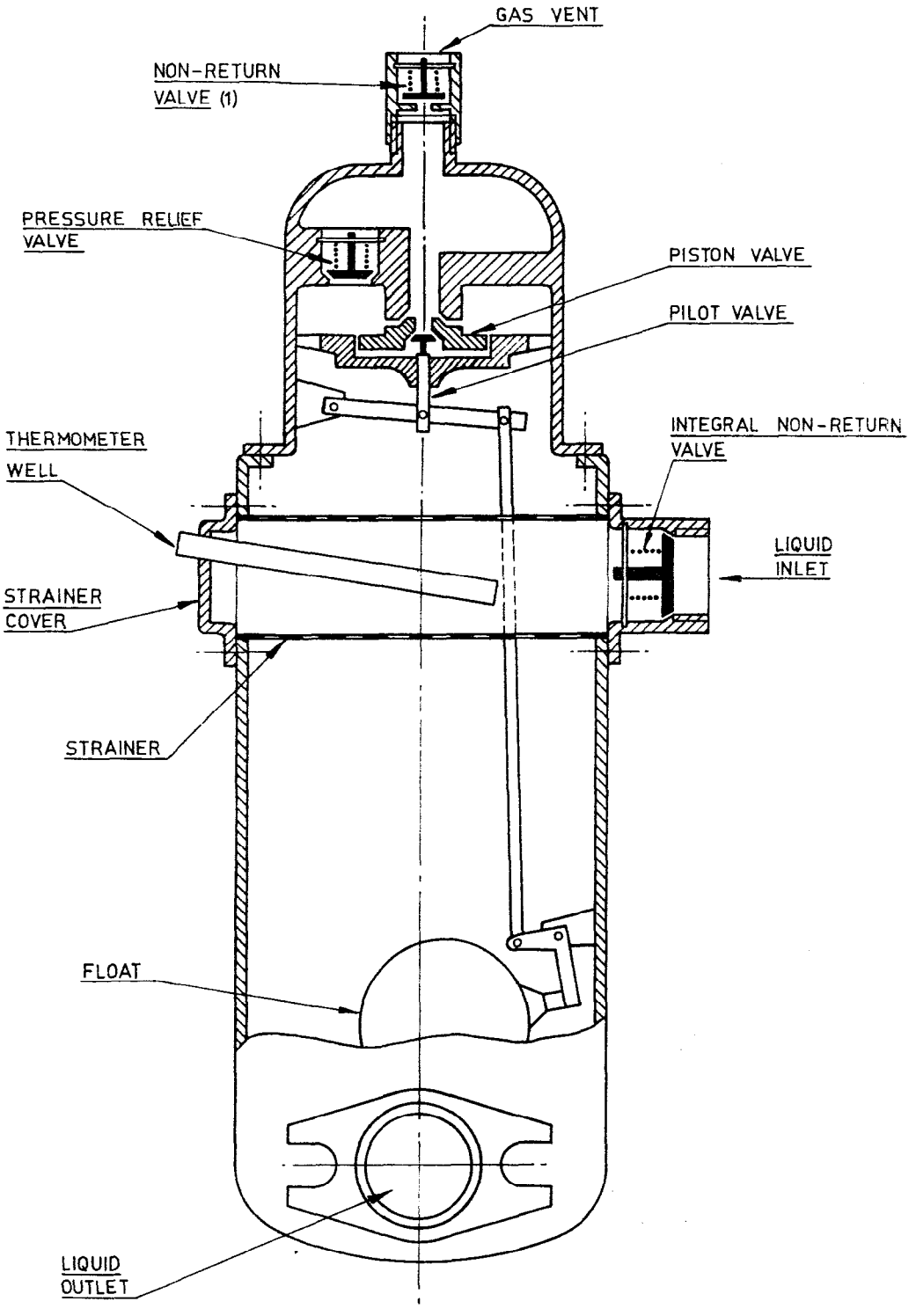
Neptune Flowmeter — Hydraulic Diagram

FIGURE 10/1/2 - 3



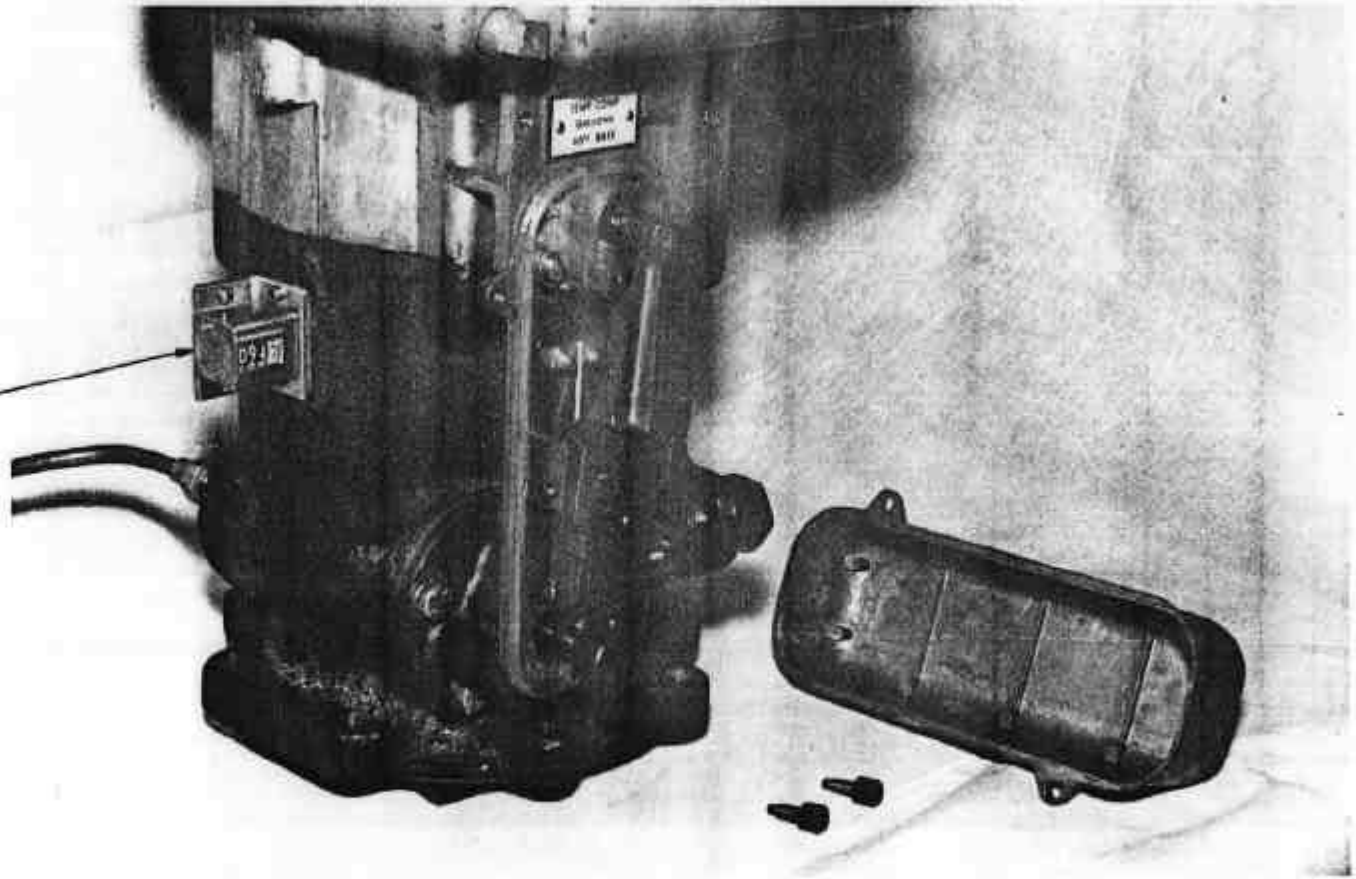
Neptune Flowmeter with Ticket Printer

FIGURE 10/1/2 - 4



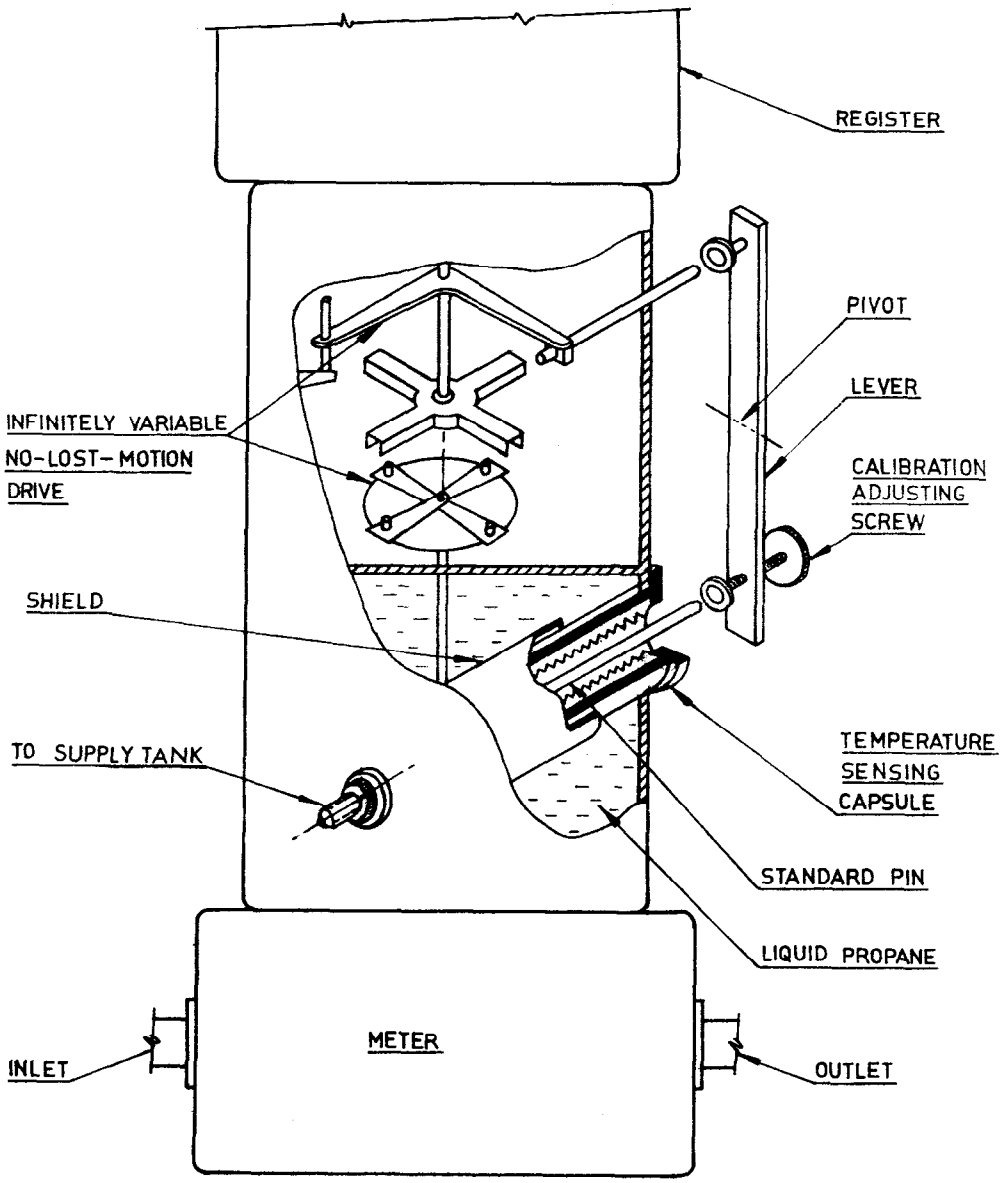
Neptune Gas Separator

FIGURE 10/1/2 - 5

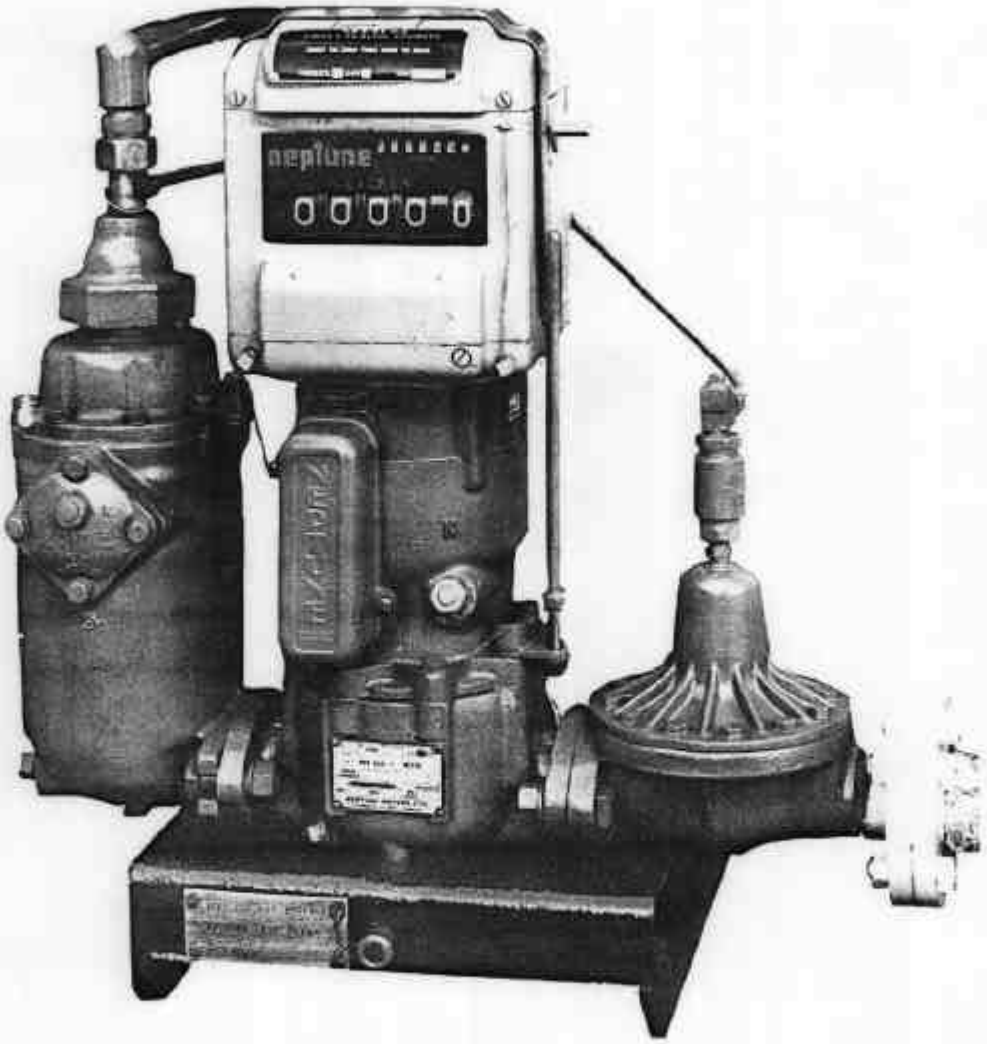


Temperature Compensator Type 1 Style 22
(fitted with Veeder-Root Counter Type VR 1141)

FIGURE 10/1/2 - 6



Principle of Operation — Temperature Compensator



Neptune Flowmeter with Indicator Only