G.H

10/1/3A
24/7/89

NATIONAL STANDARDS COMMISSION

NATIONAL MEASUREMENT (PATTERNS OF INSTRUMENTS) REGULATIONS

REGULATION 9

CERTIFICATE OF APPROVAL No 10/1/3A

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

Acme Model LGD 105S LPG Driveway Flowmeter

submitted by Acme Oil Equipment Services Pty Ltd
Greens Road
Dandenong VIC 3175.

This Certificate is issued upon completion of a review of NSC approval No P10/1/3.

CONDITIONS OF APPROVAL
General:

This approval is subject to review on or after 1/4/94.
This approval expires in respect of new instruments on 1/4/95.

Instruments purporting to comply with this approval shall be marked NSC No 10/1/3A.

This approval may be withdrawn if instruments are constructed other than as described in the drawings and specifications lodged with the Commission.

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

Special:

The initial verification of each driveway flowmeter shall be carried out under the supervision of a government-licensed LPG installer or a person experienced in the design and installation of LPG systems.

Instruments installed under this approval are to be calibrated at intervals not exceeding 6 months.

Signed

J. Birch

Executive Director

Descriptive Advice

Pattern: approved 10/3/89

- Acme model LGD 105S locally-authorised driveway flowmeter for the dispensing of liquefied petroleum gas.

...../2

Variants: approved 10/3/89

1. Acme model LGD 105D dual driveway flowmeter.

2. With an Epitronic MKI or MKII self-serve control console for remotely authorised operation.

Filing Advice

The documentation for this approval comprises:

Certificate of Approval No 10/1/3A dated 24/7/89
Technical Schedule No 10/1/3A dated 24/7/89
Test Procedure No 10/1/3A dated 24/7/89
Figures 1 to 6 dated 24/7/89

NATIONAL STANDARDS COMMISSION

TECHNICAL SCHEDULE No 10/1/3A

Pattern: Acme Model LGD 105S LPG Driveway Flowmeter.

Submittor: Acme Oil Equipment Services Pty Ltd
Greens Road
Dandenong VIC 3175.

1. Description of Pattern

The pattern is an Acme model LGD 105S driveway flowmeter for the delivery of liquefied petroleum gas of density 0.500 to 0.540 kg/L (at 15°C), at temperatures between −5°C and +45°C.

The instrument is approved for locally-authorised operation with maximum and minimum flow rates of 60 L/min and 15 L/min respectively, and may be as shown in Figures 1 and 2 or in alternative housings.

1.1 Component Structure

The component parts of each driveway flowmeter are detailed below. The hydraulics of the flowmeter are shown schematically in Figures 3 and 4.

(I) Supply Tank

The supply tank is located above the pump and where suitable pumping equipment is provided, the tank may be below ground.

(II) Pump

The pump is positioned as close as possible to the supply tank and must always be in a state of flooded suction. 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 from the pump. The external pump by-pass relief valve is installed in a line returning to the supply tank.

(III) Meter

A Neptune type 4D style N series 100 20 mm liquefied petroleum gas meter is used.

(iv) Gas Purger

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

A thermometer pocket is situated in the gas purger housing.

...../2

(v) Driveway Flowmeter Indicator

An Eclipse MVR79 series electronic driveway flowmeter indicator is used. The pulse transmitter is mounted on top of the meter and is driven directly by the output shaft of the meter.

Volume	999.99 L in 0.01 L increments
Unit Price	999.9 c/L in 0.1 c increments
Price	$999.99 in 1 c increments
Totaliser Volume	99999 L in L increments

The operating cycle is started by removing the nozzle from its receptacle.

The display will clear the previous sale and after a short delay of 2 seconds the remote pump motor will start. After another delay of 8 seconds to allow the hose to pressurise, the display blanks, displays all 8's and then all 0's, leaving only the unit price displayed.

During this time the nozzle may be attached to the purchaser's tank. At the end of this cycle a solenoid valve opens allowing filling to commence.

Replacement of the nozzle stops the remote pump motor but allows the display to remain until the next cycle.

(vi) Electronic Temperature Compensation

Temperature compensation is achieved by means of an electronic compensator built into the Eclipse MVR79 indicator.

The probe for the compensator is located in the stream of liquid in the the meter's inlet flange. The electronic probe circuitry senses changes of temperature in the liquid, and the MVR79 adjusts the indicated volume to the equivalent volume at 15°C. For testing purposes a switch is provided to deactivate the temperature compensating function.

Fifteen seconds after the nozzle has been returned into its receptacle, pressing the TOTALS (or TOTES) button in the middle of the indicator will display the following:

Cumulative Dollars Sold in Whole Dollars
Cumulative Volume Sold in Whole Litres
Temperature Display

On release of the button the display will revert to the previous sale information.

The temperature display is an indirect display of the temperature that the probe is reading. The display can be converted into degrees celsius by the following:

$$\frac{\text{Temperature Display} - 20}{2} = \text{Liquid Temperature in °C}$$

Note: When the electronic temperature compensator is deactivated the temperature display will show "50".

...../3

(vii) Differential Valve

A Neptune 20 mm spring-loaded piston valve which is integral with the meter 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 gas purger vent (Figures 3 and 4).

(viii) Vapour Indicator

A sight glass flow indicator and a pressure gauge are fitted in the outlet of the meter, so that it may be seen if vapour is being metered. (Figures 3 and 5).

(ix) Outlet Pipe

The pipe connection from the meter to the hose is fitted with a bleed screw to enable the pressure in the hose to be lowered for reassembly of the hose break coupling.

(x) Hose

The dispenser is fitted with a hose of 20 mm bore, complying with the SAA code for hoses in use with liquefied petroleum gases.

The hose, which may be supported on a hose mast, is fitted with a hose break coupling which will break with a loss of no more than 15 ml of liquid in the event of an excessive pull on the nozzle.

(xi) Nozzle

The nozzle used is a Gilbarco model 102-ZVG 1.3, also known as an Elaflex, as described in the documentation of NSC approval No S158.

The nozzle cannot be removed from the purchaser's tank if the trigger is not released. A small loss of liquid is evident whenever the trigger is released.

1.2 Markings

The instrument data plate permanently fixed to the external housing of the driveway flowmeter is marked with the following:

Manufacturer's name or mark	
Year of manufacture	
Serial number	
NSC approval number	NSC No 10/1/3A
Maximum flow rate	..... L/min
Minimum flow rate	..... L/min
Liquid temperature range	-5°C to +45°C
Approved for LPG of density range	0.500 to 0.540 kg/L
Density for which temperature compensator is set	..... kg/L
Maximum operating pressure	2450 kPa

...../4

1.3 Sealing

The MVR79 indicator and the meter calibration adjustments are sealed.

Alternatively, the computer calibration adjustments may be sealed. Only one side of the computer is sealed.

The temperature compensator switch (Figures 3 and 5), the drain valve downstream of the meter, and the vapour return line provided for pressure equalisation during testing with a pressure prover, are also sealed.

2. Description of Variants

2.1 Variant 1

Acme model LGD 105D dual driveway flowmeter with two flowmetering systems in one housing with a common liquid inlet connection and a common vapour return connection (Figures 4 and 6).

2.2 Variant 2

The Acme model LGD 105S and LGD 105D LPG driveway flowmeters in which the computer has been modified to facilitate connection to an Epitronic MKI or MKII control console for remotely-authorised operation.

The operating sequence is similar to that for the pattern; lifting the nozzle signals the console for authorisation, after which the cycle is the same as in the locally-authorised operation.

NATIONAL STANDARDS COMMISSION

TEST PROCEDURE No 10/1/3A

The following test procedure is to be used at each six-monthly calibration test, in addition to any tests specified in the Inspector's Handbook. One test per year should be arranged when there is a low liquid level in the supply tank to ensure that there is still sufficient pressure at the inlet to the pump to avoid vapour being generated.

The maximum permissible errors are specified in Document 118, Second Edition, October 1986.

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 the above test with the flow rate set at 15 L/min.

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 appropriate ASTM-IP Petroleum Measurement Tables, for the density of the liquid for which the temperature compensator is set.

3. Price-computation

(i) Note the price per litre set on each driveway flowmeter. Wait at least 15 seconds after termination of a sale, then press and release the TEST button on the Eclipse indicator. The indicator will then display TEST on all displays.

(ii) Remove the nozzle from its receptacle.

(iii) Change the unit price to 30.0 cents per litre (the price may be changed by simultaneously pressing the PRICE and the UP or DOWN buttons).

(iv) Replace the nozzle in its receptacle. The indicator will then enter a reset cycle followed by a simulated fuel delivery mode.

(v) Press the UP/FAST or DOWN/SLOW TEST button to display a volume of between 7.49 litres and 7.54 litres. The price will be $2.25 for 7.49, 7.50 or 7.51 litres, or $2.26 for 7.52, 7.53 or 7.54 litres.

(vi) Remove the nozzle from its receptacle and wait three seconds. Repeat sequences from step (iv) if further simulated sales are to be performed. Alternatively, change the unit price to 30.9 cents per litre, when ERROR 2 will flash indicating a multiplication error.

(vii) Change the unit price back to the original value noted in (i).

(viii) Press the TEST button once to abandon TEST mode.

(ix) Replace the nozzle in its receptacle.

...../2

4. System with Epitronic MKI or MKII Consoles - MVR79 Eclipse (self-serve post-pay model)

The following test procedure will check whether the system is operating in accordance with the approved design.

Note: In order to allow the service station to continue to function while these tests are carried out, a number of the driveway flowmeters may be isolated by switching to ATTENDED (MANUAL) mode at the flowmeter while the remainder are left in CONSOLE mode.

(i) Ensure that the CONSOLE mode is selected at those flowmeters to be tested.

(ii) At the control console select CONSOLE (POST-PAY) mode of operation by use of the keyswitch.

(iii) In turn, press each STATUS button and check that all 8's are displayed.

For one flowmeter (or more if thought to be necessary):

(iv) Operate the keyswitch and release - the AUTHORISATION light should flash at the console; authorise the flowmeter by pressing the AUTHORISATION button for that flowmeter.

(v) Deliver sufficient liquid to cause the price and quantity indicators on the flowmeter to move significantly off zero.

(vi) Stop the pump motor by returning the nozzle to its receptacle.

(vii) Record the flowmeter number and the price indicated on the flowmeter.

(viii) Operate the keyswitch and release, and check that the price-computing indicator does not reset to zero and that the pump motor does not start (AUTHORISATION and STATUS lights will be illuminated).

(ix) At the control console, press the STATUS button for the flowmeter and check the display price against the price recorded at the flowmeter (refer (vii)).

(x) Authorise the flowmeter by pressing the AUTHORISATION button.

(xi) After a minimum of 20 seconds the STATUS light for that flowmeter will flash. Press the STATUS button; the price and volume indicators, on both the console and the flowmeter, should zero.

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.

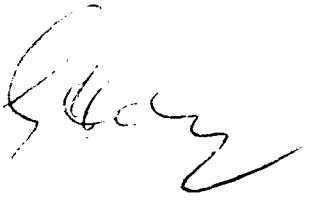
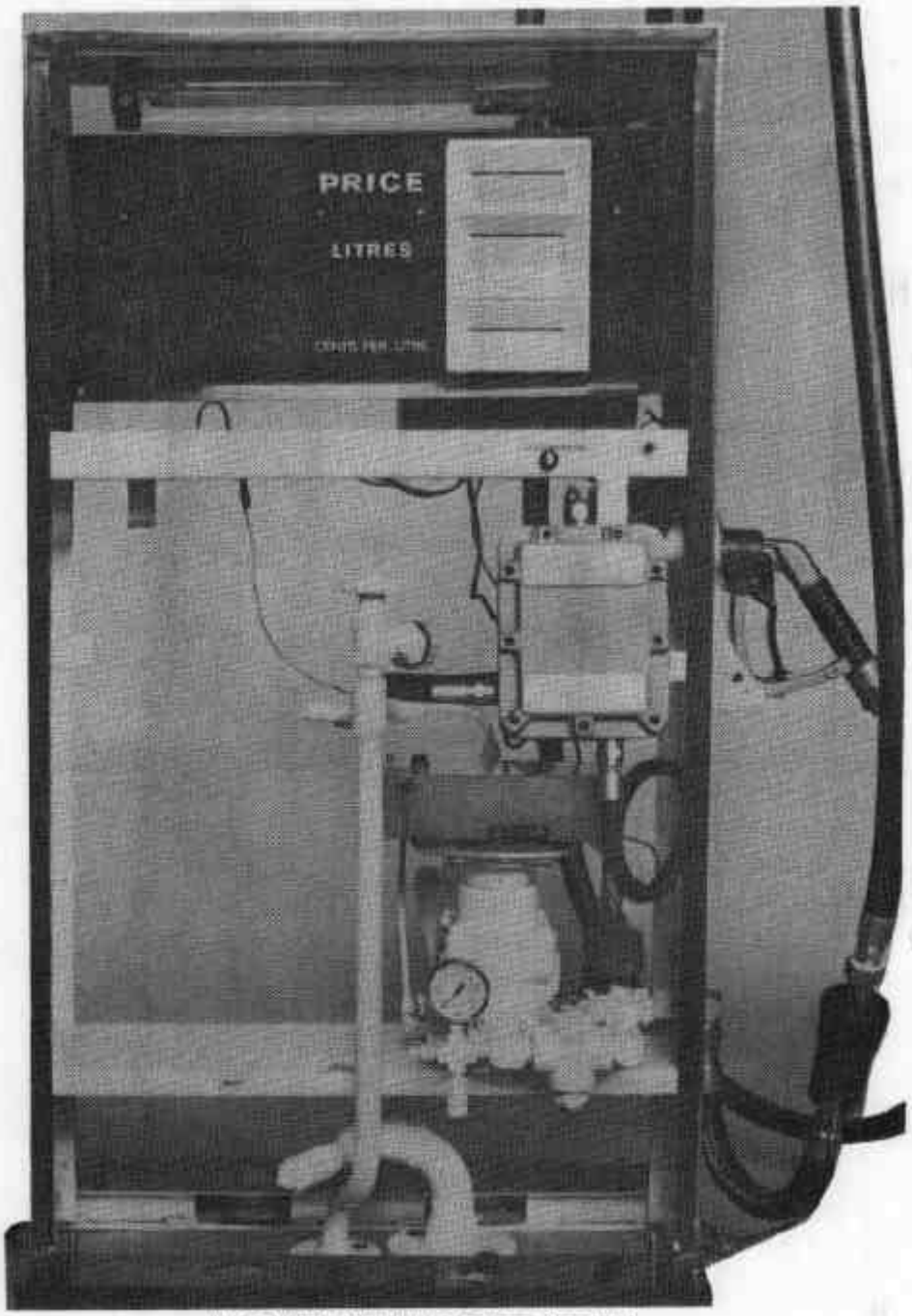


Figure 10/1/3A - 1

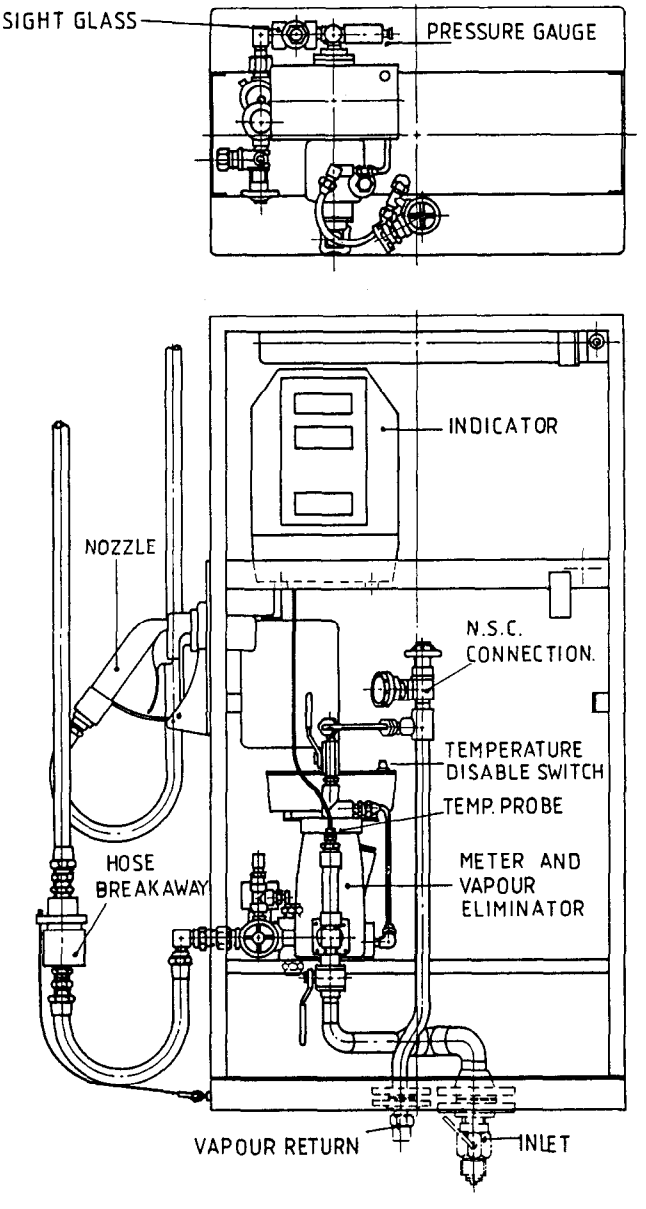
Acme Model LGD 1055

Figure 10/1/3A - ?



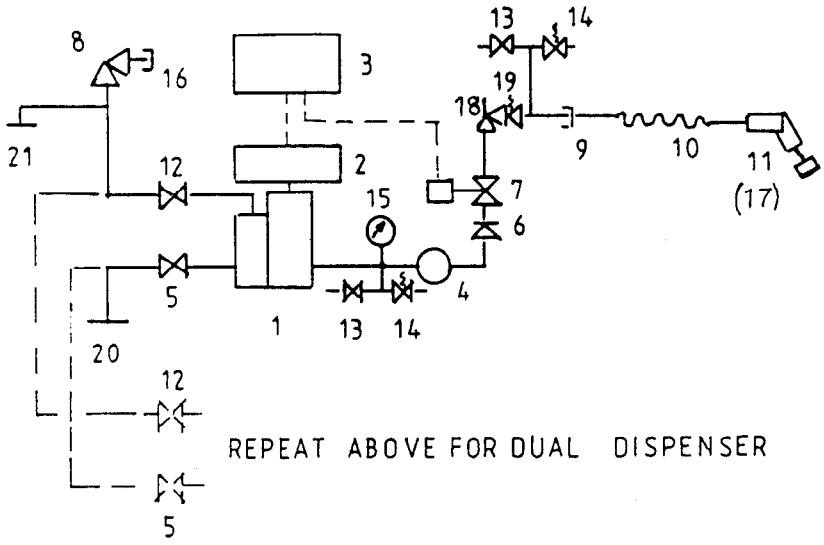
Model LGD 1055 With Covers Removed

Figure 10/1/3A - 3



Typical Hydraulic Diagram

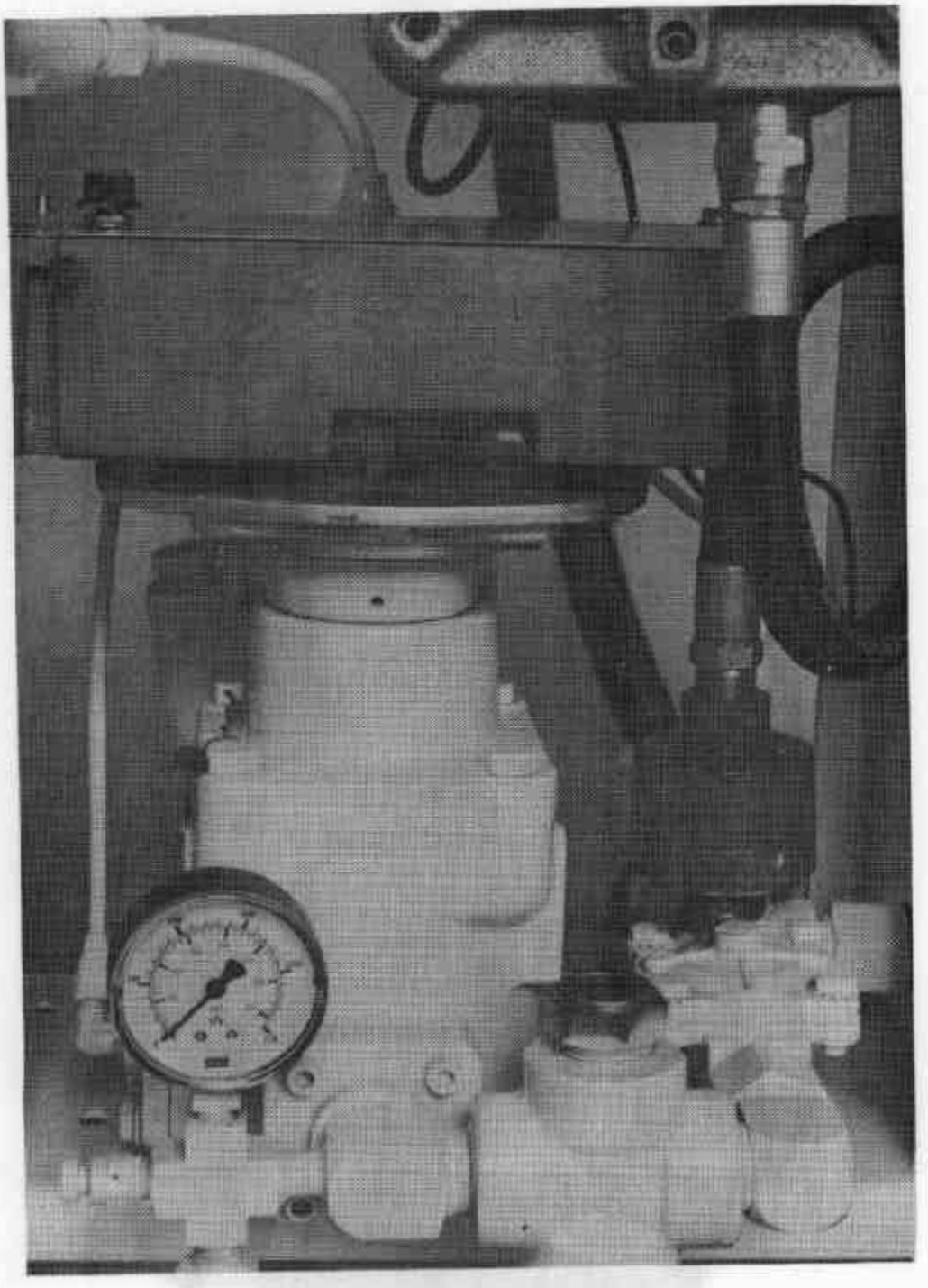
Figure 10/1/3A - 4



1. Flowmeter
2. Remote Pulser
3. Indicator
4. Sight Glass
5. Ball Valve
6. Backcheck Valve
7. Solenoid Valve
8. Angle Valve (with excess Flow)
9. Breakaway
10. Hose
11. Nozzle
12. Ball Valve
13. Vent Valve
14. Hydrostatic Valve
15. Pressure Gauge
16. N.S.C. Connection
17. Nozzle Holder
18. Angle Valve
19. Excess Flow Valve
20. Inlet Connection
21. Vapour Connection

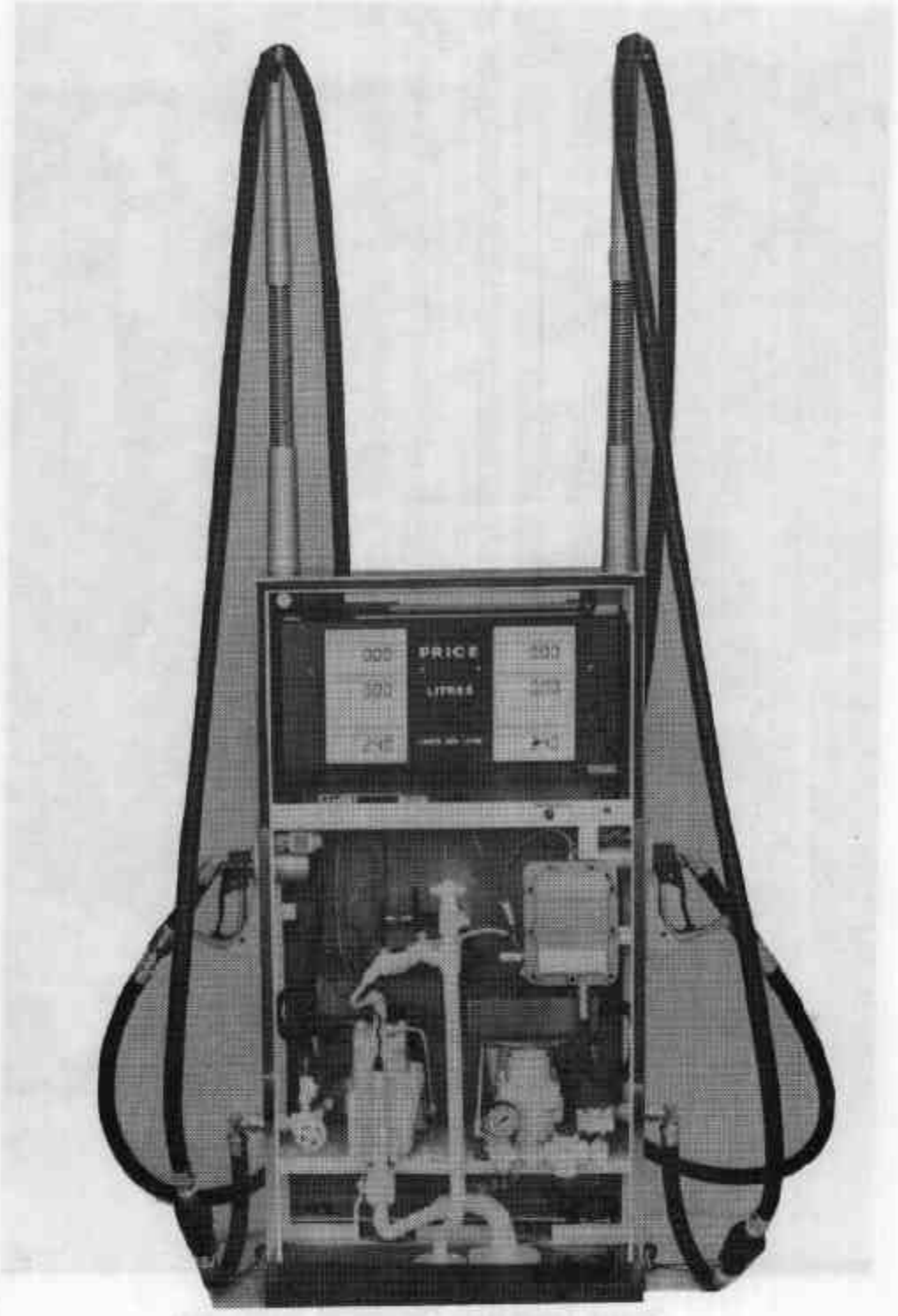
Schematic Hydraulic Diagram

Figure 10/1/3A - 5



Showing Temperature Compensator Switch, etc.

Figure 10/1/3A - 6



Acme Model LGD 1050