NATIONAL STANDARDS COMMISSION

NATIONAL MEASUREMENT (PATTERNS OF INSTRUMENTS) REGULATIONS

REGULATION 9

CERTIFICATE OF APPROVAL No 5/6B/69

This is to certify that an approval has been granted that the pattern and variant of the

Satam Model ZC17-20/20 Bulk Flowmetering System

submitted by National Valve & Engineering Co Pty Ltd
31 Manton Road
Huntingdale Vic 3167

are suitable for use for trade.

CONDITIONS OF APPROVAL

General:

The approval of the pattern is subject to review on or after 1/1/90.

Instruments purporting to comply with this approval shall be marked NSC No 5/6B/69.

This approval may be withdrawn if instruments are constructed and used other than as described in the drawings and specifications lodged with the Commission.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

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

For Provisional Variant 1:

The approval of variant 1 is subject to review on or after 17/1/86.

The submittor shall notify the Commission of each instrument prior to submission to Weights and Measures authorities for verification.

Instruments shall be used at a flow rate within ± 5% of a nominal flow rate and within the flow rate range specified in Table 1.

Signed

Executive Director

Descriptive Advice

Pattern: approved 12/11/84

. Satam model ZC17-20/20 bulk flowmetering system.

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Variant: provisionally approved 17/1/85

1. Various models and capacities as listed in Table 1.

Technical Schedule No 5/6B/69 describes the pattern and variant 1.

Filing Advice

The documentation for this approval comprises:

Certificate of Approval No 5/6B/69 dated 9/7/85
Technical Schedule No 5/6B/69 dated 9/7/85 including Table 1
Test Procedure No 5/6B/69 dated 9/7/85
Figures 1 to 8 dated 9/7/85

NATIONAL STANDARDS COMMISSION

TECHNICAL SCHEDULE No 5/6B/69

Pattern: Satam Model ZC17-20/20 Bulk Flowmetering System

Submittor: National Valve & Engineering Co Pty Ltd
31 Manton Road
Huntingdale Vic 3167

1. Description of Pattern

A bulk flowmetering system using a Satam model ZC17-20/20 flowmeter (Figure 1) which is approved for use with liquids having a viscosity in the range 0.4 to 10 mPa.s at maximum and minimum flow rates of either 400 L/min and 160 L/min respectively or 200 L/min and 40 L/min respectively.

1.1 Pipeline Flowmetering System (Figure 2)

The system comprises:

(i) A supply tank.

(ii) A pump of either positive displacement or centrifugal type - in the latter case, the pump is mounted lower than the minimum height of the liquid in the supply tank. The supply pipe from the tank has a continuous fall to the pump. Provision is made for a pressure gauge to be connected to the suction side of the pump.

If the pump is not for the exclusive use of the flowmeter, the flow rate through the meter must stay within the appropriate flow rate range for all combinations of alternative uses of the pump.

(iii) A non-return valve between the pump and the meter, or an arrangement of the components and piping to keep the system full of liquid at all times.

(iv) A Satam model ZC17-20/20 flowmeter.

(v) Any of the following assemblies:

(a) Veeder-Root model VR7887 indicator, with or without (c)

(b) Veeder-Root model VR7890 ticket printer/indicator, with or without (c)

(c) Veeder-Root model VR7889 preset indicator (which is not for trade use) and a Satam model XAD.44 preset control valve.

(vi) An outlet control valve located downstream of the meter with no intermediate outlet.

A strainer with air release head and a flow rate control valve may be fitted.

1.2 Loading Rack Flowmeter System (Figure 3)

This system is similar to the pipeline system except that the outlet control valve is replaced by one of the following:

(i) Top-loading arrangement - the highest point of the pipework forms a weir at a fixed level from which the delivery pipe drains to the outlet for all configurations of the loading arm whilst in operation. The outlet control valve is installed at or upstream of the highest point and a syphon breaker is installed to ensure complete draining of the pipework downstream of the weir; or

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(ii) Bottom-loading arrangement - a dry-break coupling located at the delivery point of the pipework.

1.3 Vehicle-mounted Flowmeter System (Figure 4)

This system is similar to the pipeline and loading rack systems except that the outlet control valve is in the form of either a nozzle or a dry-break coupling at the end of a flexible hose. The pump is located lower than the minimum height of liquid in the supply tank.

1.3.1 Nozzle

Any nozzle with integral outlet control valve. If fitted with an integral anti-drain valve, the valve shall be immediately before the outlet control valve.

1.3.2 Anti-drain Valve

If the nozzle anti-drain valve retaining pressure is less than 55 kPa, a separate anti-drain valve must be fitted to the nozzle end of the hose.

1.4 Features Common to All Systems

1.4.1 Markings

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

Manufacturer's name or mark
Meter model
Serial number
NSC approval number 5/6B/69
Maximum flow rate
Minimum flow rate
Nominal flow rate (when flow rate is within ± 5% of nominal)
Minimum delivery
Type of liquid for which the meter is verified

Note: The minimum delivery for each model is determined at verification, but shall not be less than 100 L.

1.4.2 Sealing and Verification Provision

The indicator or ticket printer/indicator may be sealed by passing a sealing wire through the attachment-mounting bolts terminating in a lead seal. The calibrator is sealed by the lead stamping plug provided for verification.

2. Description of Provisional Variant 1

Various model flowmeters (Figures 5 to 8) approved for use at a nominal flow rate and within the flow rate range listed in Table 1.

The minimum delivery for each model is to be determined at verification.

TABLE 1

Model	Maximum Flow Rate L/min	Minimum Flow Rate L/min
ZC.17-20/40	700	70
ZC.17-80/80	1335	130
ZC.17-80/150	2500	250
ZC.17-80/250	4165	400

TEST PROCEDURE No 5/6B/69

The instrument should be tested with the liquid with which it will be used and which is marked on the data plate.

The maximum permissible errors at verification are given in Document 118.

1. Test Delivery

If the test delivery is less than ten times the minimum delivery, the reading error of the indicator or the rounding error of the ticket printer is minimised by completing the delivery at a graduation line.

2. Low-level Test

If a device is fitted to prevent the level of liquid in the supply tank falling to the level of the centrifugal pump, at least one delivery should occur during which the device stops the delivery; it will be necessary to refill the supply tank to finish the delivery.

The effect on the measurement of the quantity delivered should not exceed 1% of the minimum delivery.

NOTE: This test should only be done where it could be expected that the low-level device may operate during a normal day's operation.

3. Minimum Delivery

The minimum delivery is 100 times the largest non-flow error plus hose dilation and gas purging error.

(a) The non-flow errors are as follows:

With a digital indicator the error is ± 0.2 L.

With an analogue indicator the error is ± 1 L.

With a zero start indicator/printer the error is ± 1 L.

With an accumulative printer or indicator the error is ± 2 L.

Note: If more than one indicator and/or printer (analogue or digital) is used, the larger of the above is the non-flow error.

(b) Hose dilation may be found as follows:

With the pump stopped and the hose fully wound onto its reel or in its normal hang-up position, open the nozzle to reduce the hose pressure. Then fully unwind the hose from the reel or its hang-up position, zero the indicator or printer, start the pump and, after allowing the hose to fully dilate, the quantity on the indicator or printer is equal to the hose dilation.

(c) Where there is a possibility of the supply tank emptying, the gas purging error should be determined for inclusion in the non-flow errors.

Additionally, for Provisional Variant 1, the following information shall be recorded and sent to the Commission along with the results of all tests carried out at verification:

(a) NSC approval number
(b) Installation address
(c) Meter model and serial numbers
(d) Identification of the meter assembly in terms of the pattern and variant described in the Technical Schedule
(e) Totaliser reading at the beginning of testing
(f) Type of liquid
(g) Temperature of liquid entering the meter
(h) Flow rate

NATIONAL STANDARDS COMMISSION

NOTIFICATION OF CHANGE

CERTIFICATE OF APPROVAL No 5/6B/69

CHANGE No 1

The following changes are made to the approval documentation for the

Satam Model ZC17-20/20 Bulk Flowmetering System

submitted by National Valve & Engineering Co Pty Ltd
31 Manton Road
Huntingdale Vic 3167.

1) In Technical Schedule No 5/6B/69 dated 9/7/85, amend clause 1.1 (ii) by altering the first paragraph to read, in part:

" Provision is made for a pressure gauge to be connected downstream of the meter."

2) In Test Procedure No 5/6B/69 dated 9/7/85, amend Test 3 to read:

" 3. Minimum Delivery

(a) The minimum quantity to be delivered is the sum of:

(i) 20 times the scale interval, if fitted with an analogue indicator, or

100 times the scale interval, if fitted with a digital indicator, or

100 times the scale interval, if fitted with a zero start indicator/ printer, or

200 times the scale interval, if fitted with an accumulative printer or indicator, or

The largest of the appropriate minimum quantities as listed above, if more than one indicator and/or printer (analogue or digital) is fitted.

PLUS

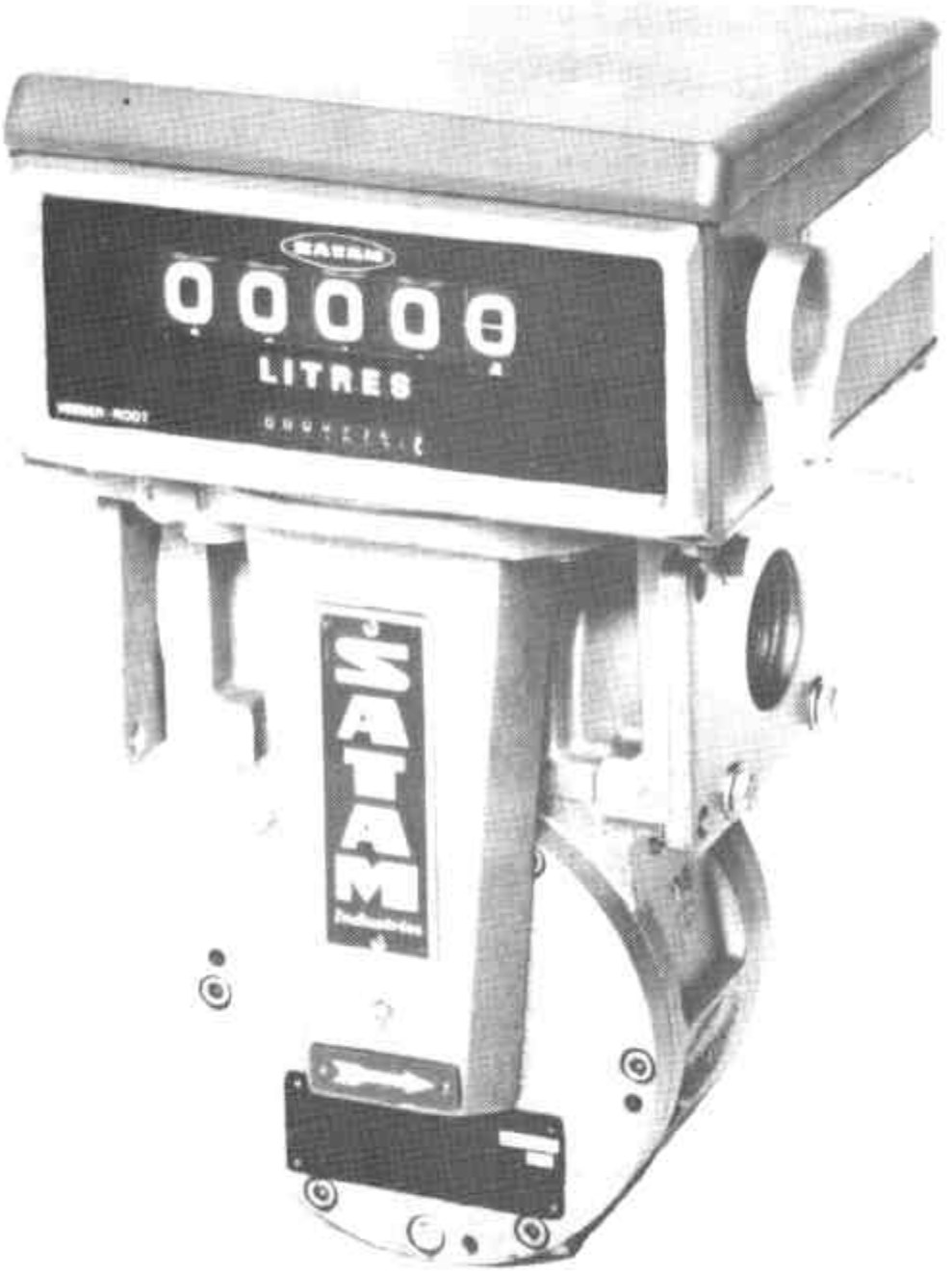
(ii) 100 times the sum of the hose dilation and the gas purging error. The latter should be determined where there is a possibility of a supply tank emptying."

Signed

J. Burch.

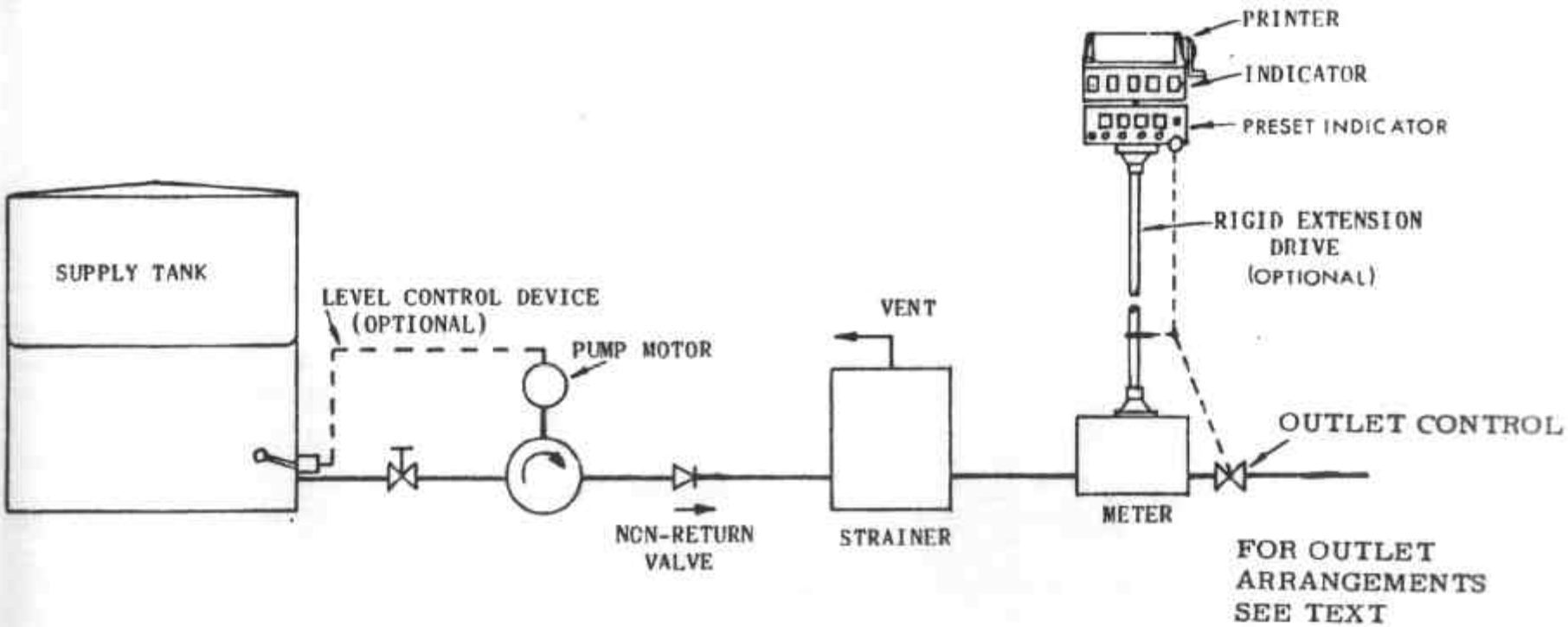
Executive Director

FIGURE 5/68/69 - 1



Satam ZC17-20/20 Meter

FIGURE 5/68/69 - 2



Pipeline Flowmeter System

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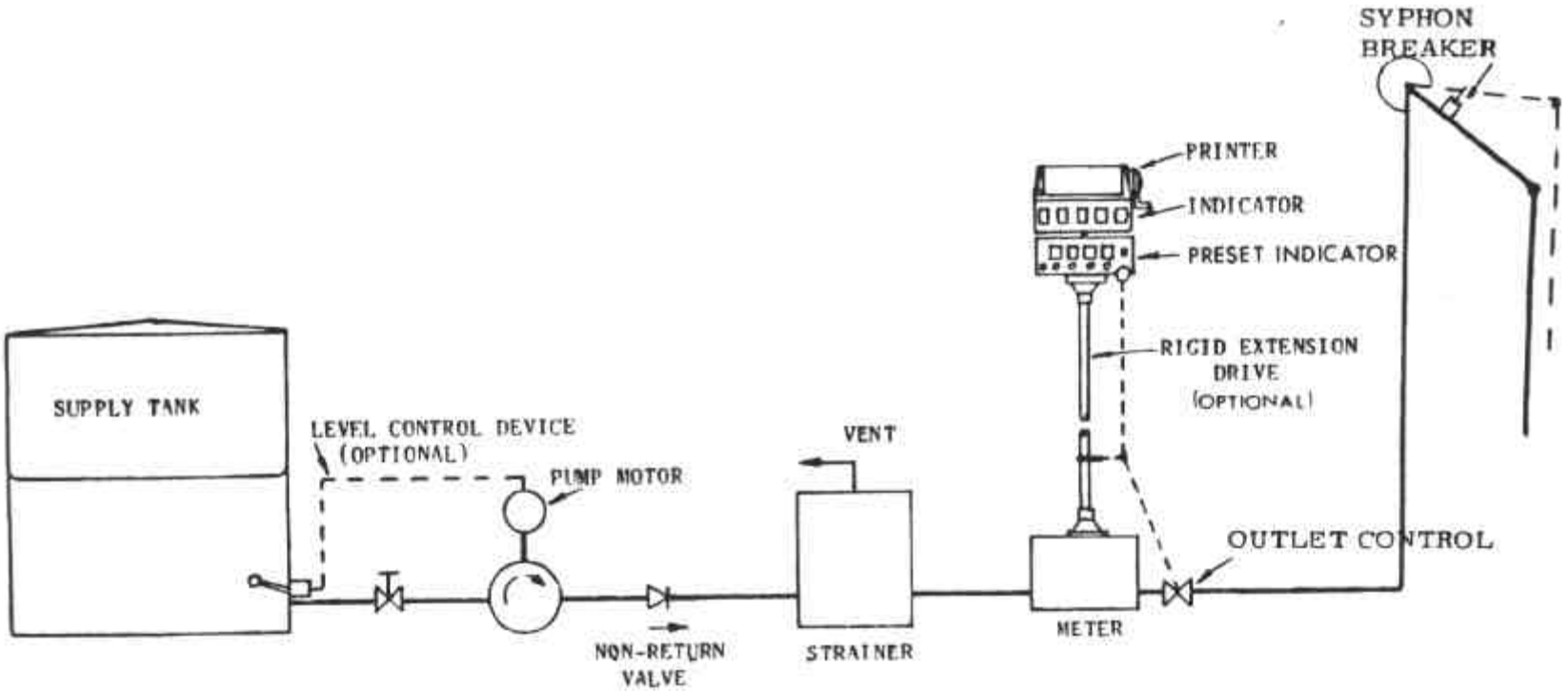
FIGURE 5/68/69 - 3



Loading-rack Flowmeter System

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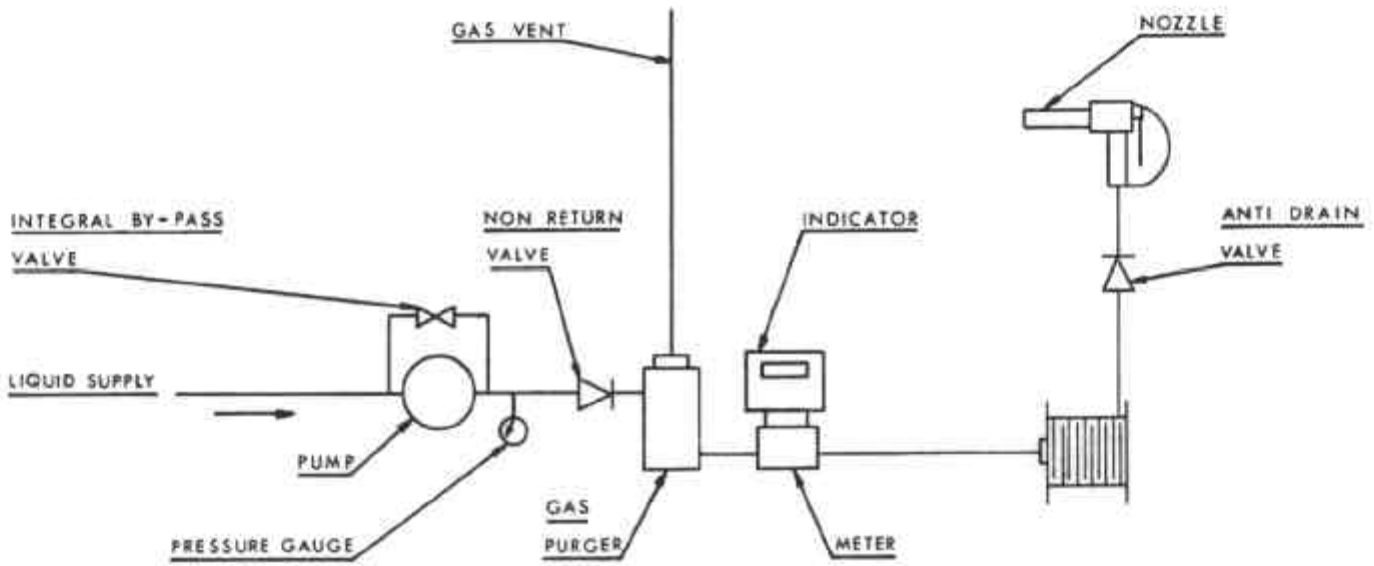
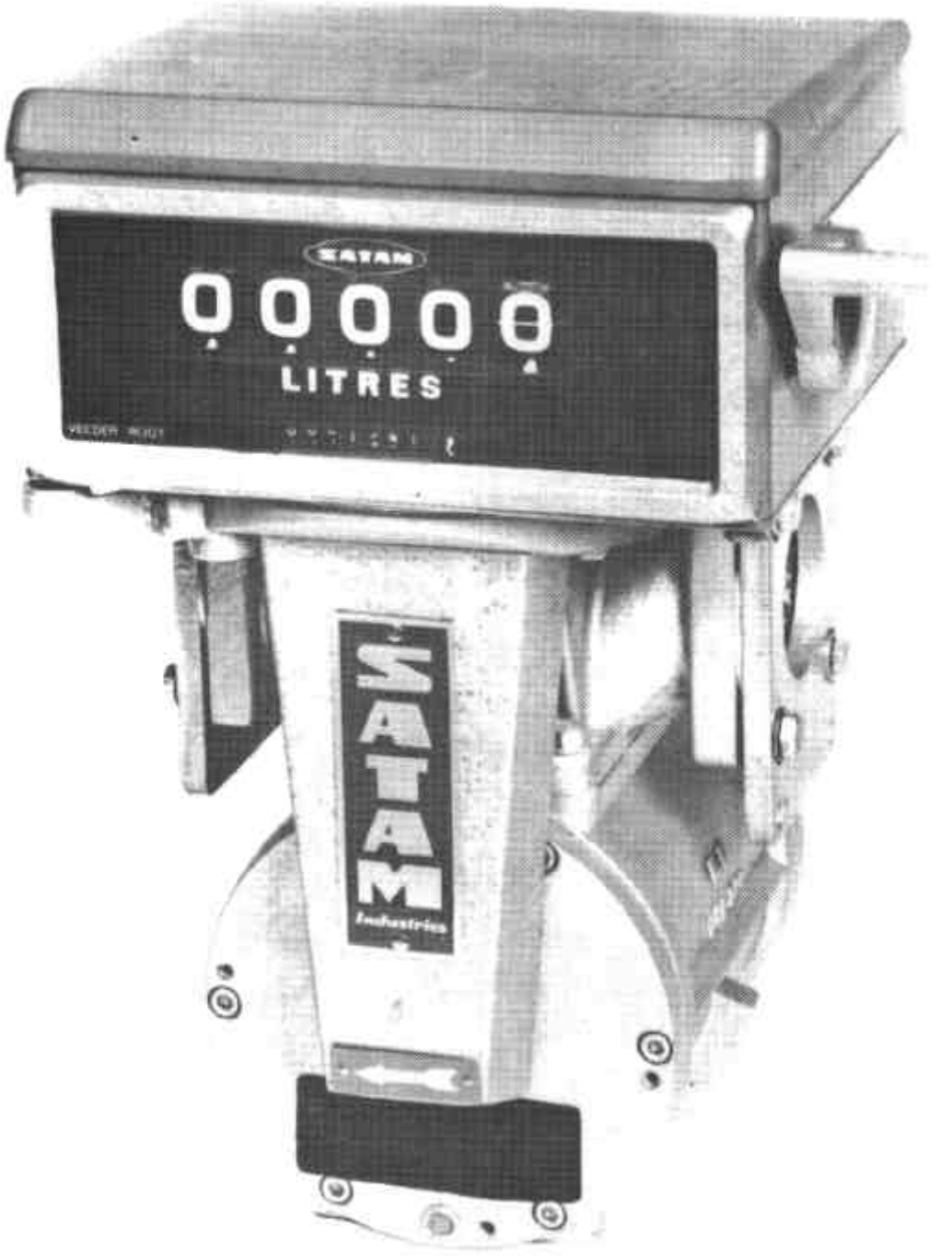
FIGURE 5/6B/69 - 4



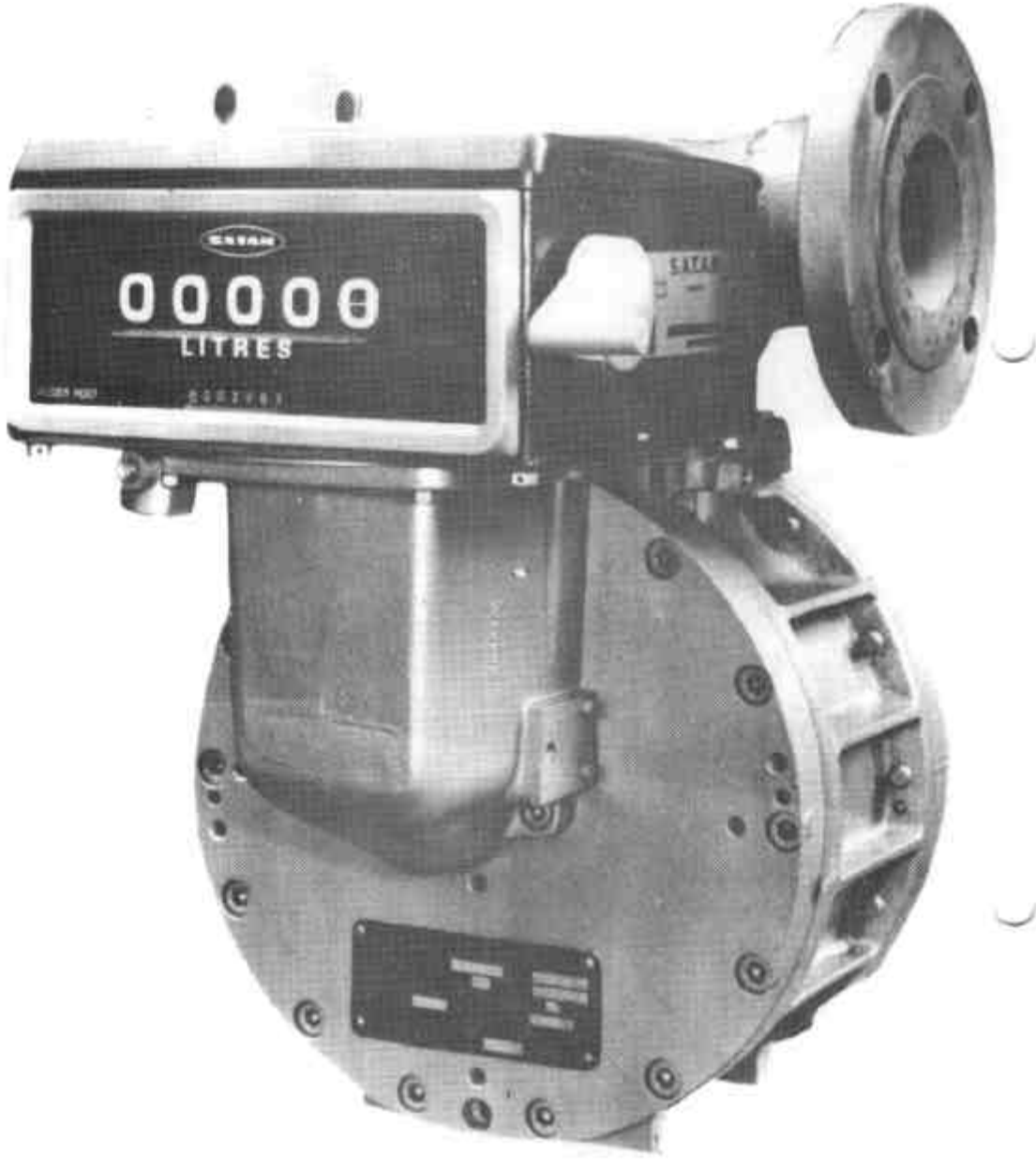
Typical Vehicle-mounted Flowmeter System

FIGURE 5/68/69 - 5



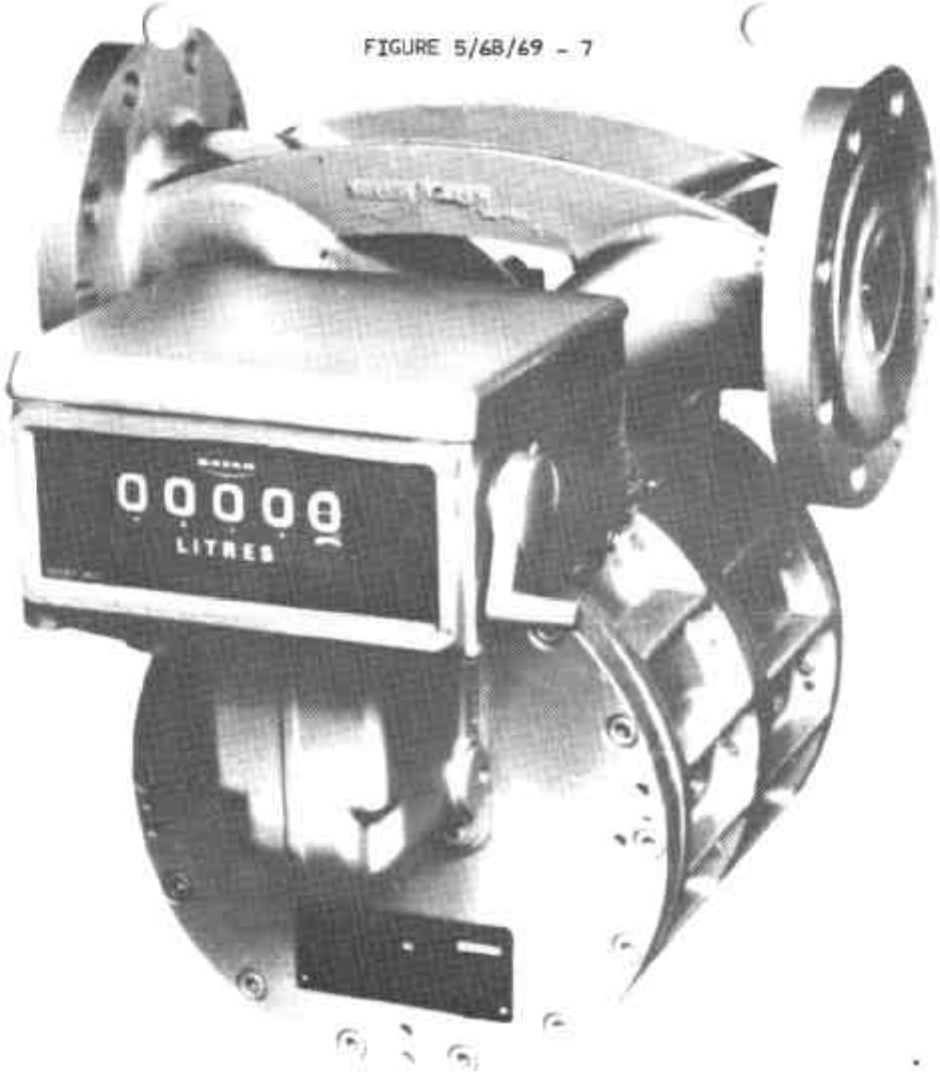
Satam ZC17-20/40 Meter

FIGURE 5/6B/69 - 6



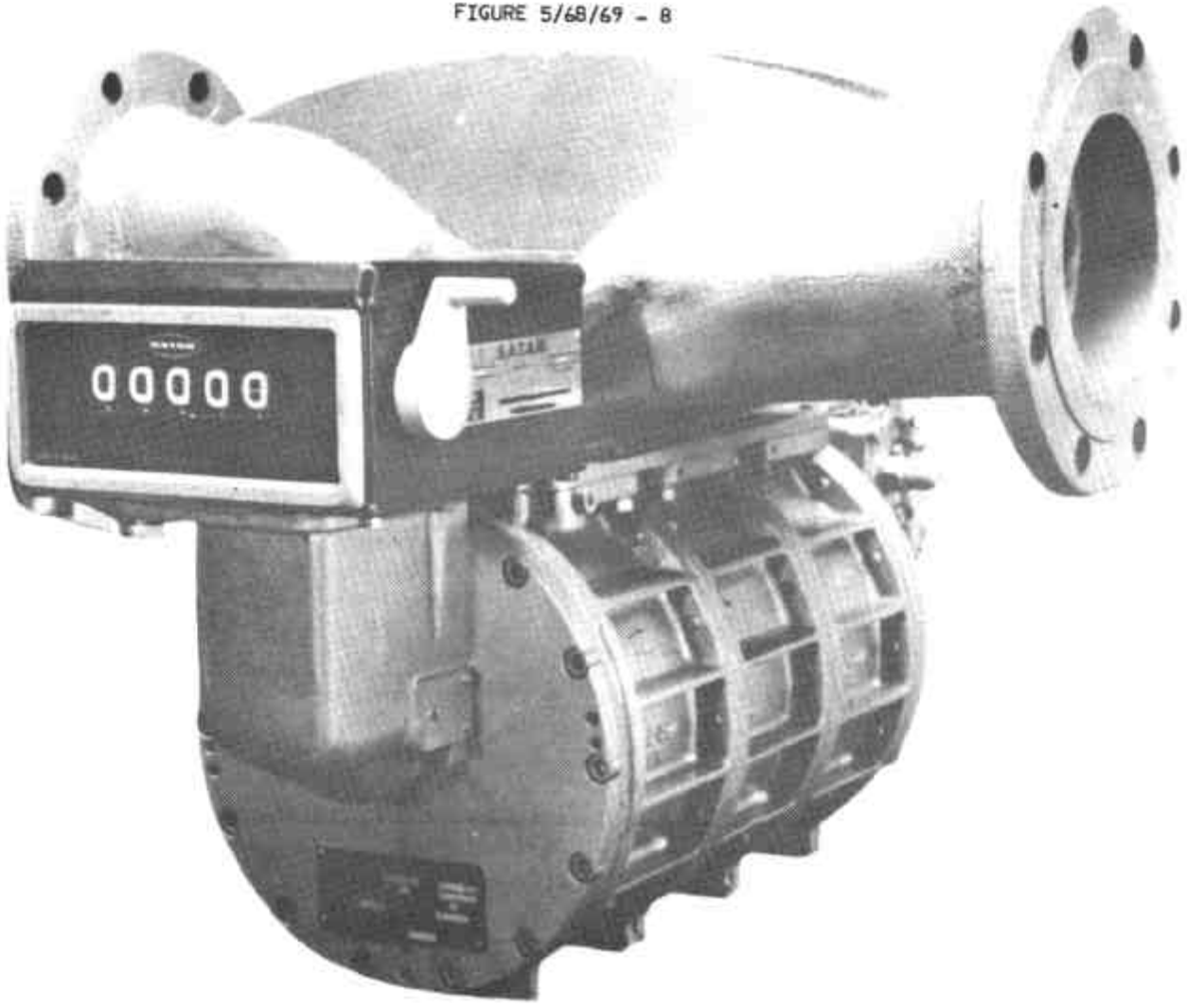
Satam ZC17-80/80 Meter

FIGURE 5/68/69 - 7



Satam ZC17-80/150 Meter

FIGURE 5/68/69 - 8



Satam ZC17-80/250 Meter