



NATIONAL STANDARDS COMMISSION

WEIGHTS & MEASURES (PATTERNS OF INSTRUMENTS) REGULATIONS

REGULATION 9

PROVISIONAL CERTIFICATE OF APPROVAL No P5/6B/65

This is to certify that an approval has been granted by the Commission that the pattern and variants of the

Petroleum Product Flowmetering System with Avery-Hardoll BM600 Series Flowmeter

submitted by GEC Automation & Control
2 Giffnock Avenue
North Ryde, New South Wales, 2113

are suitable for use for trade.

The approval is subject to review on or after 1/1/85.

Instruments purporting to comply with this approval shall be marked NSC No P5/6B/65.

The approval may be withdrawn if instruments are used other than as described in the drawings and specifications lodged with the Commission.

Conditions of Approval

1. The maximum and minimum permissible flow rates respectively, are:
 - . For the pattern, 3000 L/min and 300 L/min.
 - . For variant 1, 3400 L/min and 340 L/min.
 - . For variant 2, 3850 L/min and 385 L/min.
2. When the range of flow rates in service exceeds $\pm 5\%$ of the maximum flow rate, the maximum and minimum flow rates shall be marked on the data plate.

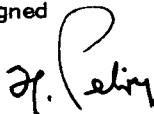
When the flow rate in service remains within $\pm 5\%$ of a nominal flow rate, the nominal flow rate shall be marked on the data plate.
3. The instrument is not used for liquefied gases.
4. The type of liquid for which the instrument is verified is marked on the data plate.
5. The system is designed so that gas cannot enter the meter.
6. Instruments are installed in the manner described in Technical Schedule No 5/6B/65.
7. Each system is tested in a manner approved by the Commission at intervals of approximately three months, or, if the throughput is less than 2 ML per month, at intervals of not less than 6 ML, such tests to be arranged by the submitter and the results sent to the Commission.
8. In the event of unsatisfactory performance or if suitable test results are not received, the approval may be cancelled.

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9. The Commission reserves the right to inspect any installation incorporating a meter covered by this approval.

Signed



Executive Director

Descriptive Advice

Pattern: approved 19/12/83

- . Petroleum product flowmetering system with Avery-Hardoll BM600 series flowmeter.

Variants: approved 19/12/83

1. The meter with a 6" manifold and known as a model BM700.
2. The meter internally modified to suit aviation fuel and known as a model BM800.
3. With a rigid extension between the meter and the indicator.

Technical Schedule No 5/6B/65 dated 25/1/84 describes the pattern and variants 1 to 3.

Filing Advice

The documentation for this approval comprises:

Certificate of Approval No P5/6B/65 dated 25/1/84
Technical Schedule No 5/6B/65 dated 25/1/84
Test Procedure No 5/6B/65 dated 25/1/84
Figures 1 to 5 dated 25/1/84.

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NATIONAL STANDARDS COMMISSION

TECHNICAL SCHEDULE No 5/68/65

Pattern: Petroleum Product Flowmetering System with Avery-Hardoll BM600 Series Flowmeter

Submitter: GEC Automation & Control
2 Giffnock Avenue
North Ryde, New South Wales, 2113.

1. Description of Pattern

1.1 Pipeline Flowmeter

Refer to Figure 1.

The system comprises:

- (a) Supply tank.
 - (b) Pump - 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.
 - (c) A non-return valve between the pump and the meter, or an arrangement of the components and the piping to keep the system full of liquid at all times.
 - (d) Strainer* with air release head.
 - (e) Avery-Hardoll BM600 series flowmeter with either a 4" or 6" manifold (Figure 3).
 - (f) One of the following combinations of assemblies:
 - (i) Indicator model VR1624 or VR7887; or
 - (ii) Ticket printer/indicator model VR7890.
- Note: A preset indicator model VR7889 and preset control valve may also be fitted.
- (g) Flow rate control valve.
 - (h) Outlet control valve located downstream of the meter with no intermediate outlet.

*The strainer with air release head is not a part of the measuring instrument examined and approved by the Commission.

1.2 Loading-rack Flowmeter System

This system is identical to the pipeline system except for the outlet which is replaced by one of the following:

- (a) Top-loading arrangement (Figure 2) - 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 downstream of the weir to ensure complete draining of the pipework downstream of the weir, or
- (b) Bottom-loading arrangement - drybreak coupling located at the delivery point of the piping.

1.3 Vehicle-mounted Flowmeter System

This system is similar to the pipeline system except that the outlet control valve is in the form of either a nozzle at the end of a reeled hose (Figure 5) or a drybreak coupling. A non-return valve is fitted downstream of the meter.

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 Marking

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

Manufacturer's name or mark	
Meter model	
Serial number	
NSC approval number	P5/68/65
Maximum flow rate - (refer to	
Minimum flow rate - Conditions	
Nominal flow rate - of Approval)	
Type of liquid for which the instrument is verified	
Minimum delivery	

1.4.2 Sealing And Verification Provision

- (a) 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.
- (b) The instrument data plate is attached to the instrument or framework by a lead-stamping plug or by threading the indicator sealing wire through a hole in the data plate.

1.5 Minimum Delivery

The following minimum deliveries are applicable:

- 100 L with indicator only;
- 200 L with zero-start printer and indicator;
- 400 L with accumulative-start printer and indicator.

2. Description of Variants

2.1 Variant 1

The meter with a 6" manifold and known as a model BM700 (Figure 4).

2.2 Variant 2

The meter internally modified to suit aviation fuel and known as a model BM800.

2.3 Variant 3

With a rigid extension of up to 4 m between the meter and the indicator.

TEST PROCEDURE No 5/68/65

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

The maximum permissible errors at verification are:

- (a) $\pm 0.3\%$ for any flow rate when operating over a flow rate range of more than 10% of maximum flow rate (but within the marked maximum and minimum flow rates); or
 - (b) $\pm 0.15\%$ when operating at a flow rate within $\pm 5\%$ of nominal as marked on the meter.
2. The maximum permissible variation between indicators is 0.2 scale intervals.
3. If a device is fitted to prevent the level of the liquid in the supply tank falling to the level of the 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 into the proving measure. 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 delivery.

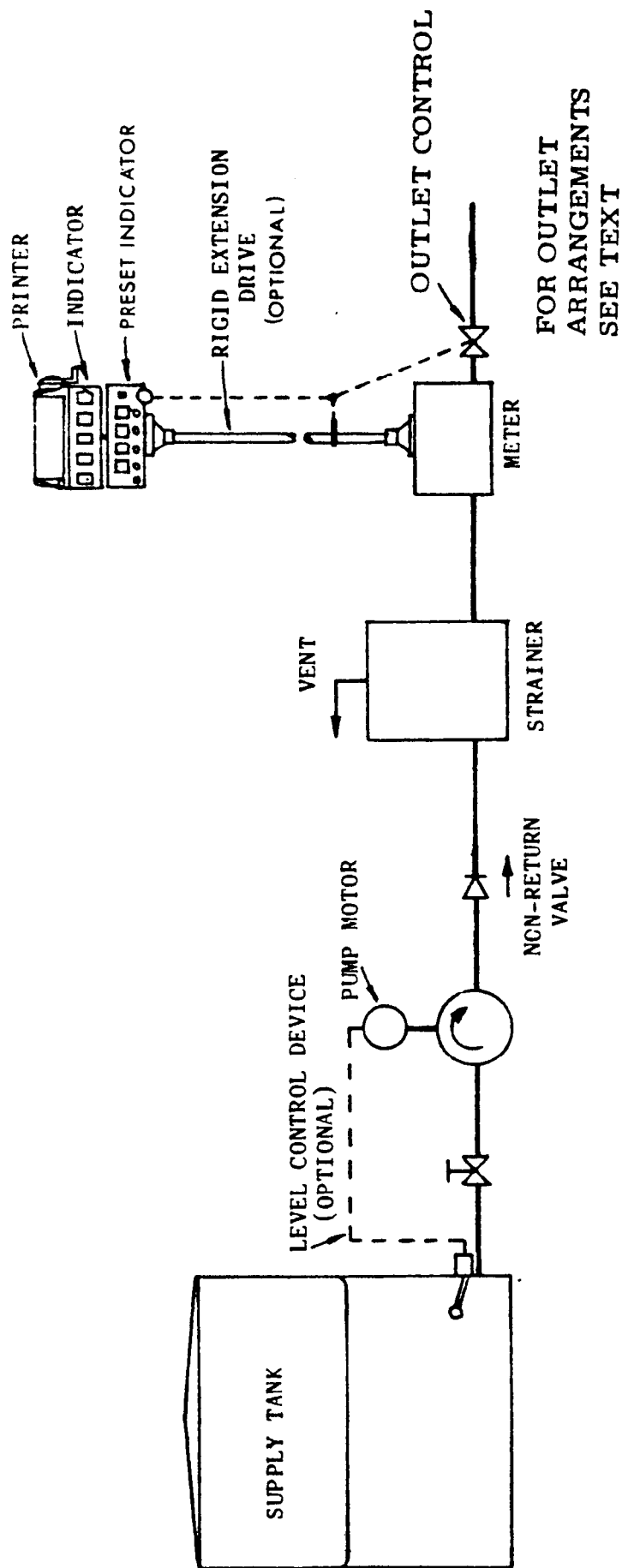
4. Test delivery - if the test delivery is less than ten times the minimum delivery, the reading error of the indicator or the rounding error of the ticket printer is minimised by completing the delivery at a graduation line.

The following information shall be recorded for sending to the Commission, at each periodic test as detailed in the Conditions of Approval:

- (a) NSC approval number
 - (b) Installation address
 - (c) Meter serial number
 - (d) Identification of meter assembly in terms of the pattern and variant described in the Technical Schedule
 - (e) Totaliser reading at beginning of test
 - (f) Type of liquid
 - (g) Temperature of liquid entering the meter
 - (h) Information from the Weights and Measures inspection as to the calibration results recorded in 1. above.

FIGURE 5/68/65 - 1

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Pipeline Flowmeter System

FIGURE 5/6B/65 - 2

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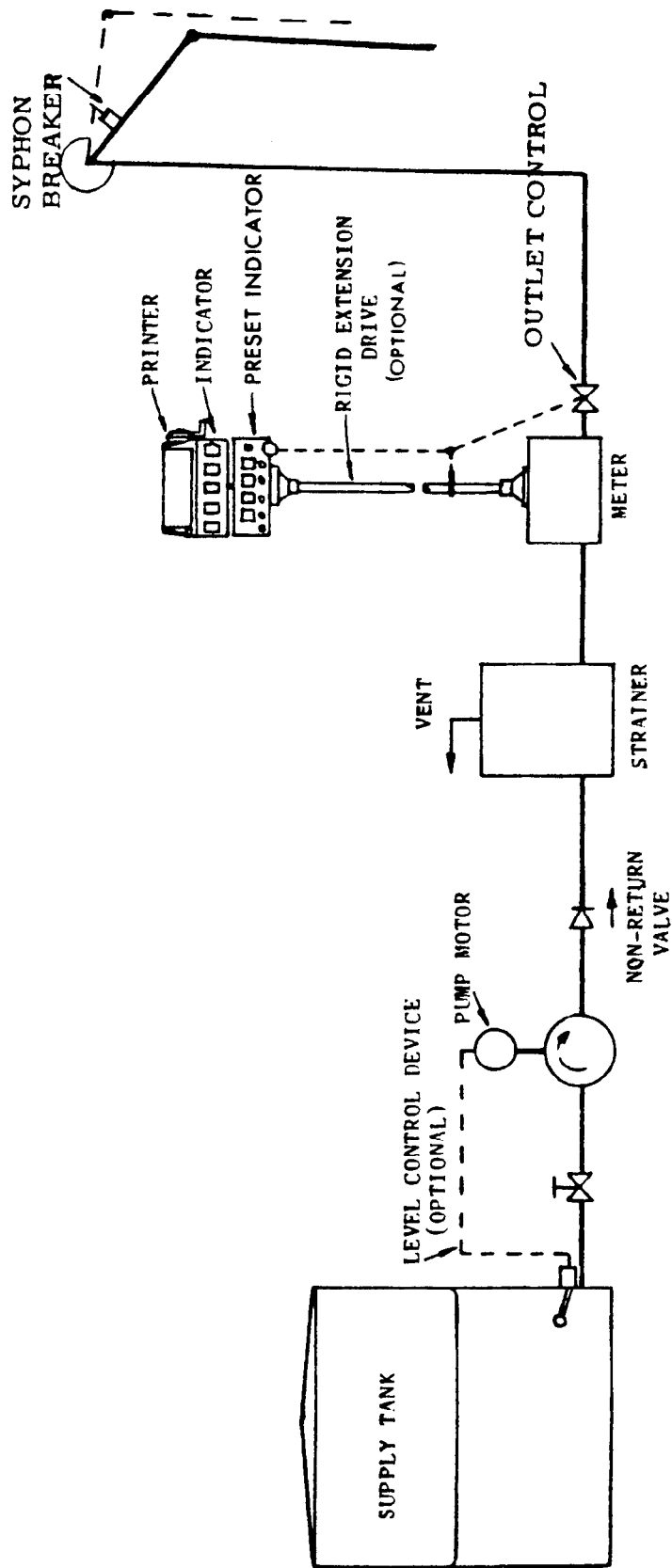
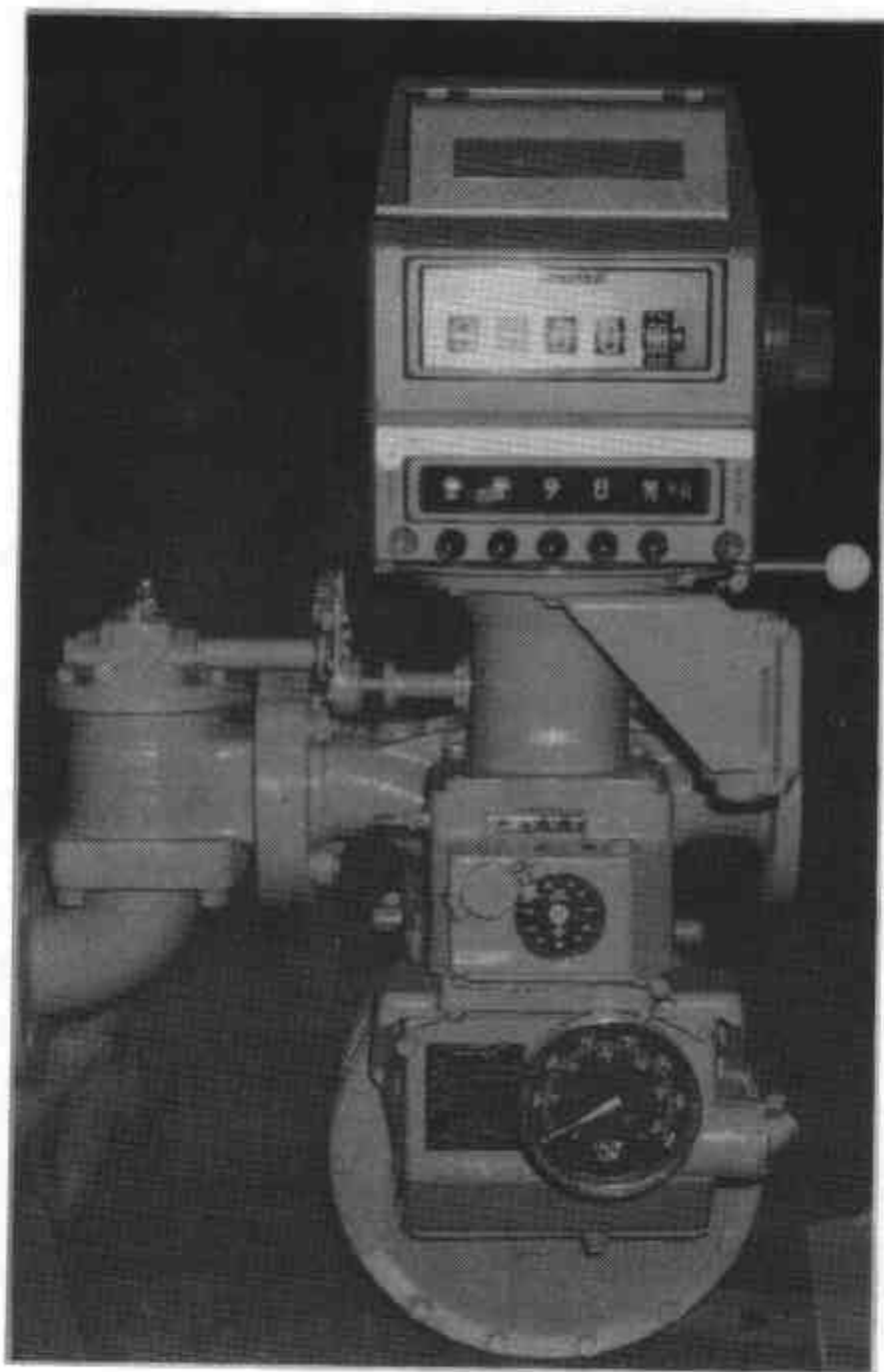


FIGURE 5/6B/65 - 3



Avery-Hardoll BM600 Meter With Preset.

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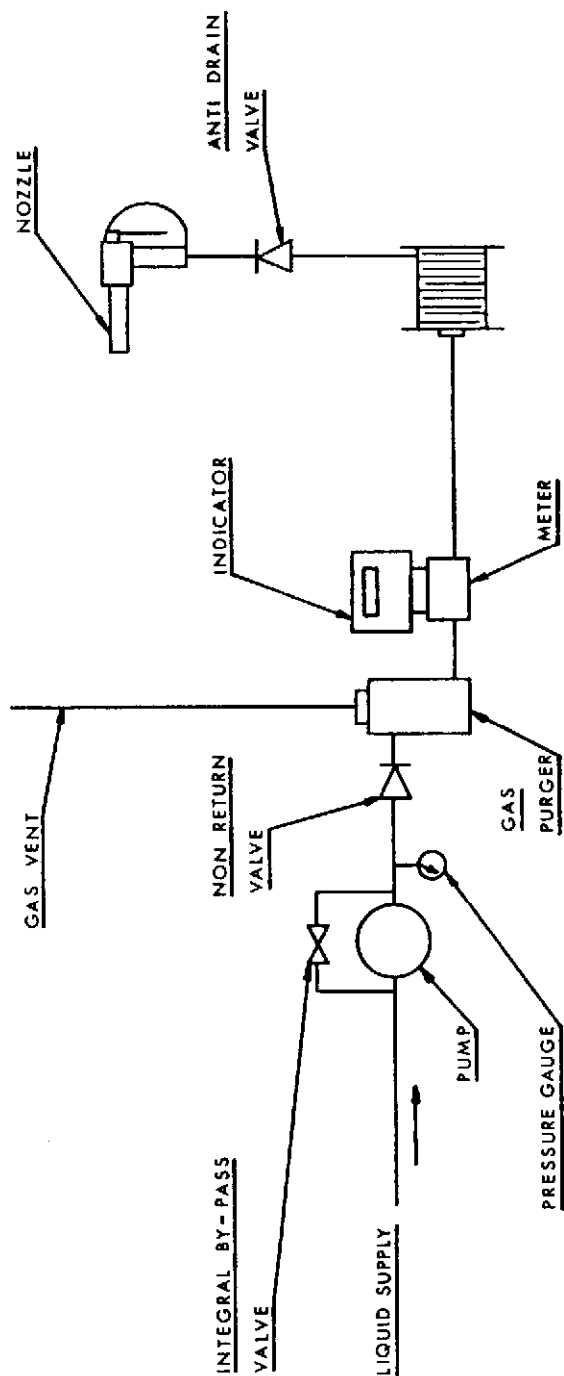
FIGURE 5/6B/65 - 4



Avery-Hardoll BM700 Meter With Strainer

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FIGURE 5/68/65 - 5



Typical Vehicle-mounted Flowmeter System