

National Standards Commission



Certificate of Approval

No 5/1/3

Issued under Regulation 9
of the
National Measurement (Patterns of Measuring Instruments) Regulations

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

Varec Model 6500 Liquid Level Measuring Device

submitted by Fisher-Rosemount Pty Ltd
471 Mountain Highway
Bayswater VIC 3153.

CONDITIONS OF APPROVAL

This approval is subject to review on or after 1 March 1999.
This approval expires in respect of new instruments on 1 March 2000.

Instruments purporting to comply with this approval shall be marked NSC No 5/1/3 and only by persons authorised by the submittor.

It is the submittor's responsibility to ensure that all instruments marked with this approval number are constructed as described in the documentation lodged with the Commission and with the relevant Certificate of Approval and Technical Schedule. Failure to comply with this Condition may attract penalties under Section 19B of the National Measurement Act and may result in cancellation or withdrawal of the approval, in accordance with the Commission's Document 106.

The Commission reserves the right to examine any instrument or component of an 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/A.

DESCRIPTIVE ADVICE

Pattern: provisionally approved 6 November 1992
approved 18 February 1994

- A Varec model 6500 automatic level gauge liquid level measuring device for use in fixed tanks up to 20 metres high.

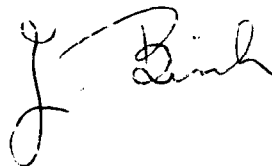
Technical Schedule No 5/1/3 describes the pattern.

FILING ADVICE

The documentation for this approval comprises:

Certificate of Approval No 5/1/3 dated 25 July 1994
Technical Schedule No 5/1/3 dated 25 July 1994 (incl. Test Procedure)
Figures 1 and 2 dated 25 July 1994

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.





National Standards Commission

TECHNICAL SCHEDULE No 5/1/3

Pattern: Varec Model 6500 Liquid Level Measuring Device.

Submittor: Fisher-Rosemount Pty Ltd
471 Mountain Highway
Bayswater VIC 3153.

1. Description of Pattern

A Varec model 6500 automatic level gauge for measuring the liquid level in fixed tanks up to 20 metres high.

1.1 The System (Figures 1 and 2)

- (i) The liquid level sensor is a displacement disc suspended by a stranded stainless steel wire, which is wound around a grooved drum which delivers and collects the wire on demand.
- (ii) Rotation of the drum is controlled by a servo-motor and a level detection device.
- (iii) A mechanical counter to give a local indication of the height of the liquid level is driven by the servo-motor via a positive tooth belt. The indicator displays the measurement in millimetres and is marked with the name or symbol of the unit.
- (iv) The servo-motor also drives an encoder which uses a reflected binary grey code for remote transmission of liquid level data.

A 4-wire Varec 1900 series temperature transmitter with a 100 ohm platinum resistance probe located in the tank, may be fitted to provide measurement of the liquid temperature.

NOTE: The height of the liquid level and the temperature of the liquid measured by the system, may be used to determine a quantity of liquid in the tank. Reference must be made to the Commission's *Document 124, Pattern Approval Specifications for Fixed Storage Tanks for Trade Use*.

1.2 Sealing and Verification/Certification Provision

Provision is made for the application of a verification/certification mark.

Provision is made for the front cover of the servo assembly (Figure 2) to be sealed.

1.3 Markings

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

Manufacturer's name or mark	
Model number	
Serial number	
NSC approval number	NSC No 5/1/3
Maximum height (*) m
Minimum height (*) m
Liquid (*)

(*) - Determined at verification/certification.

TEST PROCEDURE

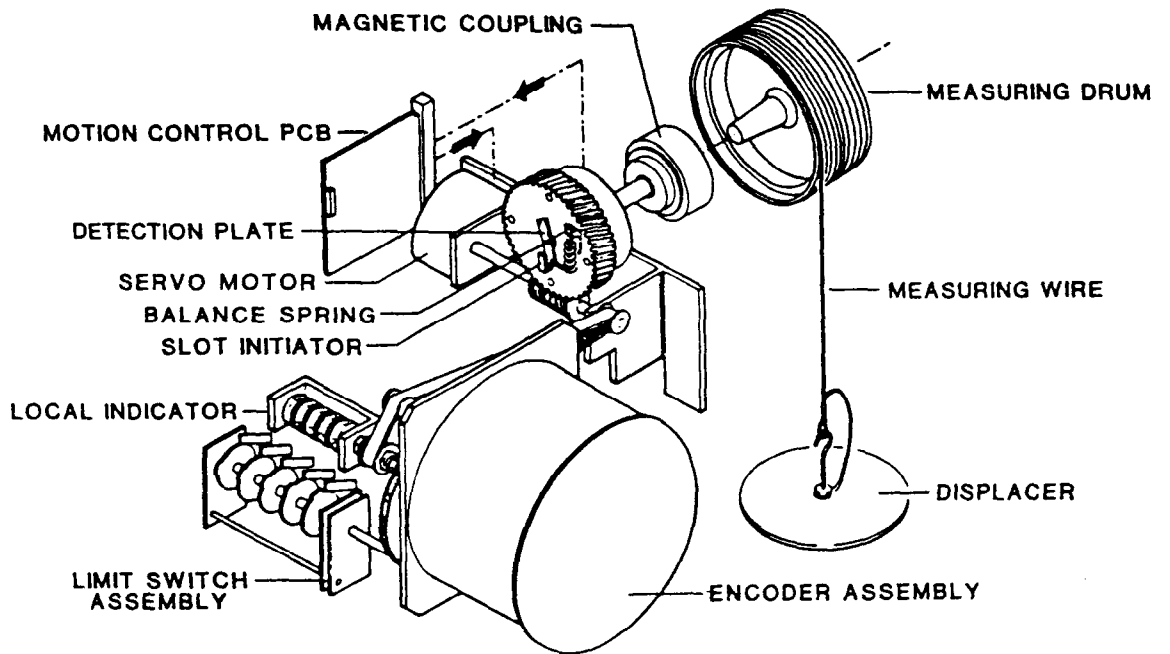
Maximum Permissible Errors at Verification/Certification

The maximum permissible error at verification/certification is $\pm 0.04\%$ of the liquid level measured or ± 2 mm, whichever is the greater, i.e. ± 2 mm up to 5 m of the liquid level measured and $\pm 0.04\%$ over 5 m.

1. Verification should be carried out at static conditions following a period of normal operation at normal filling and discharge rates, using a verified dip-tape as a reference standard.
2. A series of comparative readings should be taken over a number of level changes. Readings should be taken following filling as well as emptying operations in approximately equal number. Mixers and heaters should be switched off in sufficient time to prevent errors arising from turbulence or convection currents when the readings are taken.
3. Three dip-tape readings should be taken at each level, at closely timed intervals by the same person using the same tape. The three dip-tape readings should not differ by more than 1 mm. Simultaneously, three automatic level gauge readings should be taken and the three readings should not differ by more than 1 mm. Failure of either group to be within this limit indicates a procedural error or faulty equipment. The tests should be repeated after corrective action has been taken.
4. For each level, an average of the three dip-tape readings and of the three automatic level gauge readings should be calculated. The difference between these two averages is referred to as the test difference, and should be within the maximum permissible errors.

5. Test differences between dip-tape and automatic level gauge readings at all levels should be randomly distributed. A close check of the trend of readings should be made over the period of tests as any tendency for the test differences to increase is indicative of a faulty gauge or installation, which should be corrected before proceeding. It will be found helpful to use graphical or control chart techniques to detect trends.

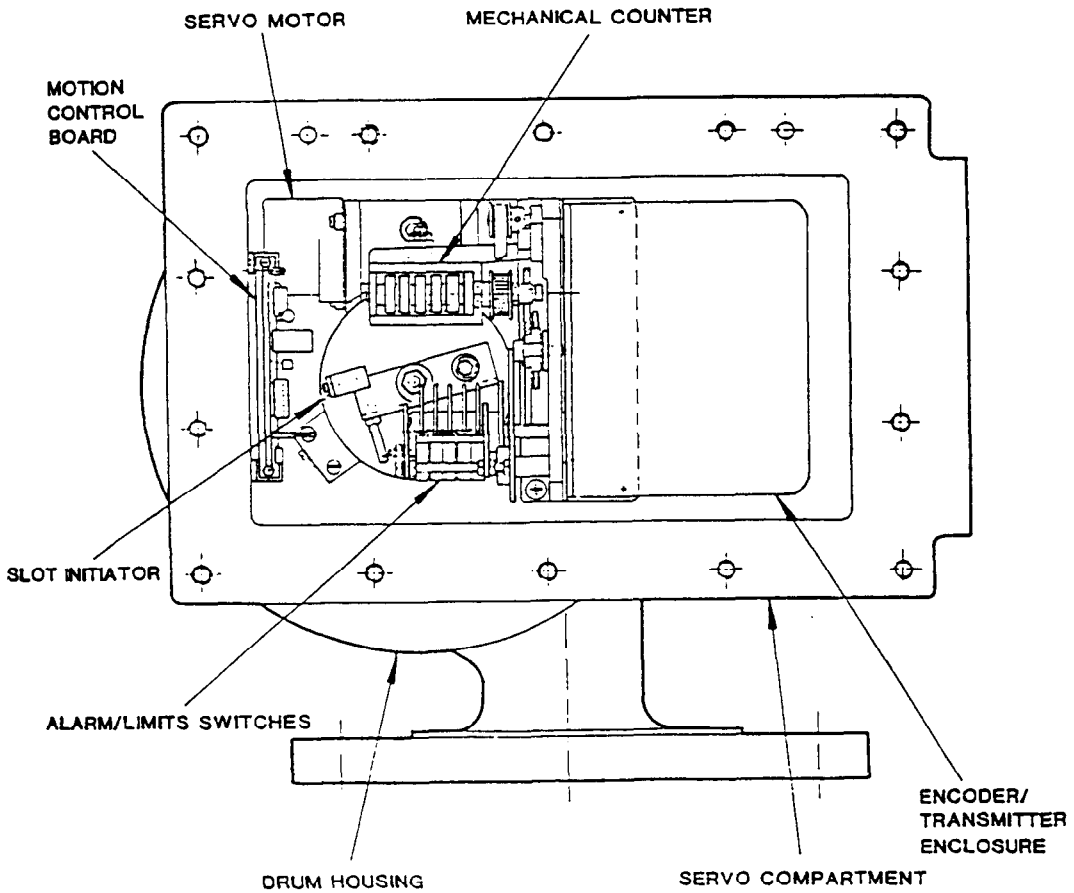
FIGURE 5/1/3 - 1



Varec Model 6500 Liquid Level Measuring Device

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FIGURE 5/1/3 - 2



Varec Model 6500 Servo Assembly