National Standards Commission

Certificate of Approval

No 5/1/2

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

Petrosonics Model PIII L1/P1 Liquid Measuring System

submitted by Control Automation Pty Ltd
24 Berry Street
Granville NSW 2142.

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.

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CONDITIONS OF APPROVAL

This approval is subject to review on or after 1/1/97.
This approval expires in respect of new instruments on 1/1/98.

Instruments purporting to comply with this approval shall be marked NSC No 5/1/2 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.

Special: for Provisional Variant 2

This approval is subject to review on or after 1/1/93.
This approval expires in respect of new instruments on 1/1/94.

Instruments purporting to comply with this approval shall be marked NSC No P5/1/2 and only by persons authorised by the submittor.

This approval may be withdrawn if suitable test results are not received.

DESCRIPTIVE ADVICE

Pattern: approved 19/12/91

. A Petrosonics model PIII L1/P1 liquid measuring system for use in certain fixed tanks containing alcohols or liquid petroleum products.

Variant: approved 19/12/91

1. Model PIII L2/P2 with 2 level detectors.

Variant: provisionally approved 19/12/91

2. For use with certain alternative tanks.

Technical Schedule No 5/1/2 describes the pattern and variants 1 and 2.

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FILING ADVICE

The documentation for this approval comprises:

Certificate of Approval No 5/1/2 dated 5/5/92
Technical Schedule No 5/1/2 dated 5/5/92(incl. Test Procedure)
Figures 1 to 3 dated 5/5/92

National Standards Commission

TECHNICAL SCHEDULE No 5/1/2

Pattern: Petrosonics Model PIII L1/P1 Liquid Measuring System.

Submittor: Control Automation Pty Ltd
24 Berry Street
Granville NSW 2142.

1. Description of Pattern

The pattern is a Petrosonics model PIII L1/P1 liquid measuring system for use in certain fixed tanks containing alcohols or liquid petroleum products.

1.1 The PIII L1/P1 System

(i) A tank of up to 160 000 L capacity, in a fixed location and of either vertical cylindrical or rectangular design.

(ii) A Petrosonics depth probe incorporating a magnetostrictive position transducer, positioned through the centroid of the tank (Figure 1). The probe used is either a type 16, 17, or 18, which differ in their fittings and housings.

The probe consists of a vertical sealed metal rod (PIII L1 made of stainless steel for alcohol, PIII P1 made of brass, stainless steel or teflon/kynar for petroleum products) on which is mounted a float (level detector). The float is of either stainless steel (for alcohol) or nitrophyl (for petroleum products).

The position of the float and the temperature of the product are detected electronically and relayed to the control unit/indicator.

(iii) A Petrosonics model SP III microprocessor-based controller/indicator (Figure 2) uses the liquid level and temperature data, and processes this in conjunction with the calibration profile of the probe/tank combination, to indicate the volume of contents.

The control unit/indicator is capable of interpreting data from up to 8 probes/tanks.

The alphanumeric liquid-crystal display indicates the level (height) of liquid, the volume as calculated but unconverted for temperature, and the equivalent volume (at 20°C for alcohol and at 15°C for petroleum products). The display is used with the keypad for programming and data retrieval.

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(iv) An integral printer is used to produce receipts, reports and the calibration table for the probe/tank.

1.2 Sealing and Verification/Certification Provision

Provision is made for the application of a verification/certification mark. The calibration adjustments are 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 5/1/2
Maximum capacity	 L
Minimum capacity	 L
Liquid temperature range	0°C to +40°C
Liquid for which the instrument is verified	.....
Location of the temperature sensors on the probe	.....
Reference temperature: (20°C for alcohol) (15°C for petroleum products)	

2. Description of Variants

2.1 Variant 1

With two floats (level detectors) fitted to the probe (Figure 3) and known as model PIII L2 (for alcohol) or model PIII P2 (for petroleum). The upper level detector floats on top of the liquid being measured, while the additional (lower) detector may be used to detect the presence of another (immiscible) liquid of higher density, e.g. water. The controller/indicator uses the data from the two detectors to calculate the difference in volume.

2.2 Variant 2

For use with rectangular tanks having dished ends, and of up to 48 000 L capacity.

TEST PROCEDURE

Instruments should be tested in conjunction with any relevant tests specified in the Inspector's Handbook.

Calibration and verification/certification are to be carried out by a volumetric method.

Maximum Permissible Errors at Verification/Certification

The maximum permissible error at verification/certification is 0.3% of the indicated volume.

Where an instrument is fitted with a device to convert the indication of volume to volume at reference conditions, the maximum permissible error specified above is increased by 0.2%.

The maximum permissible error for the temperature as indicated by the instrument is ±0.2°C of the temperature of the product.

Reference conditions for alcohols are specified in International Organisation of Legal Metrology (OIML) International Recommendation No 22, *International alcoholometric tables.*

Reference conditions for petroleum liquids are specified in Australian Standard 2649 - 1983, *Petroleum Liquids and Gases - Measurement - Standard Reference Conditions.*

Tests

From the controller/indicator obtain a printout of the calibration table for the probe/tank and note the values of height to volume.

Tests should be conducted at not less than:

- The minimum capacity;
- At least 3 approximately evenly-spaced intermediate capacities; and
- The maximum capacity.

Compare the measured volume delivered into the tank with the volume indicated and printed by the control unit/indicator and the calibration table.

Convert the measured volume to reference conditions when the temperature of the product in the tank differs from the temperature of the product at the verifying instrument.

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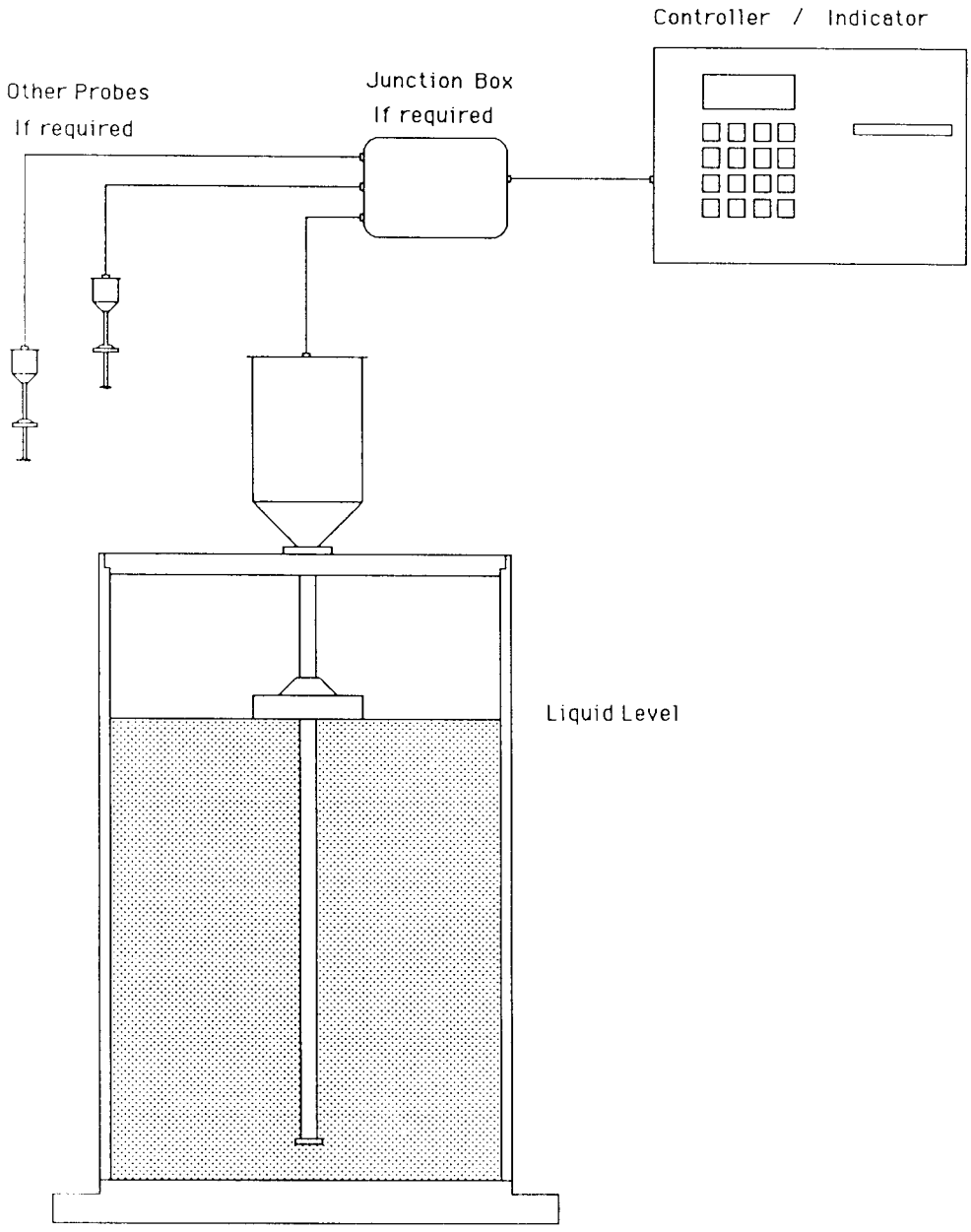
For instruments indicating the volume at reference conditions the following additional tests should be carried out:

(i) For the above tests, measure the temperature of the product and compare with the temperature indicated by the controller. The maximum permissible error shall not exceed ±0.2°C.

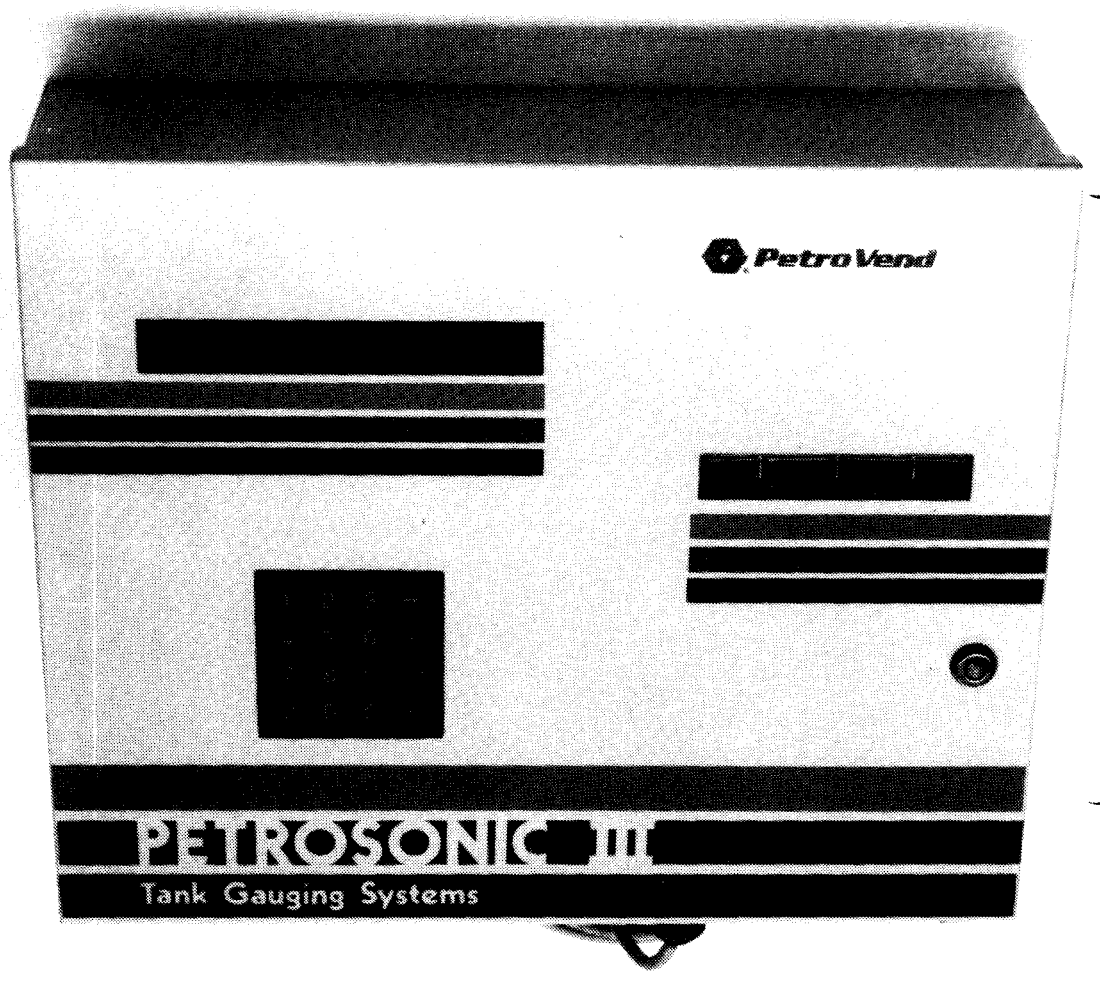
(ii) At random, check that the instrument converts the measured volume to volume at reference conditions within the maximum permissible error, by converting the indicated unconverted volume to volume at reference conditions using the measured temperature and the appropriate volume conversion tables for the product.

FIGURE 5/1/2 - 1



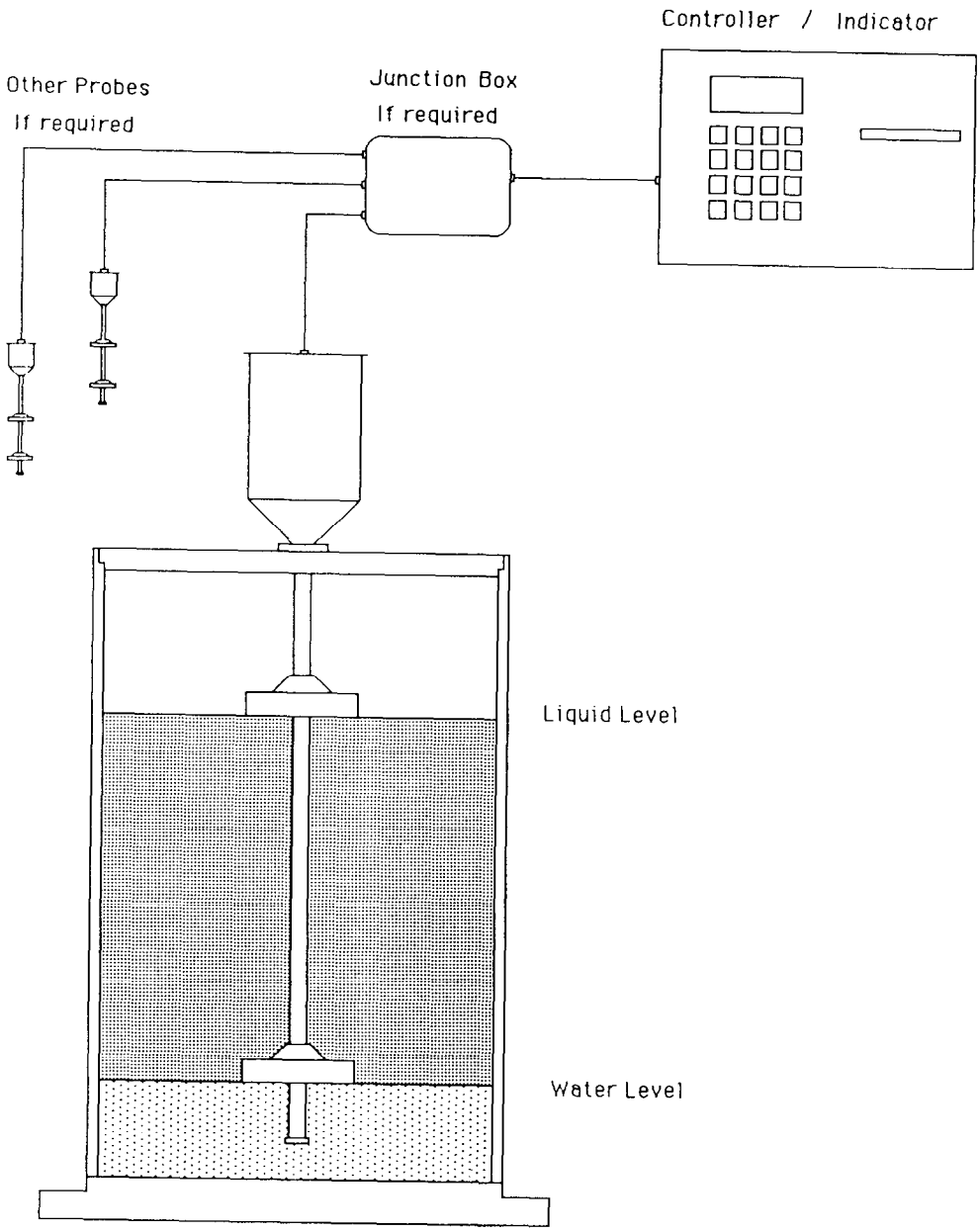
Petrosonics Model PIII L1/P1 Liquid Measuring System

FIGURE 5/1/2 - 2



Petrosonics Model SP III Controller/Indicator

FIGURE 5/1/2 - 3



Model PIII L2/P2 System