National Standards Commission

Supplementary Certificate of Approval

No S309

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

Compac Model Spectrum Control System for Liquid-measuring Systems

submitted by Compac Industries Limited
52 Walls Road
Penrose Auckland New Zealand.

NOTE: This Certificate relates to the suitability of the pattern of the instrument for use for trade only in respect of its metrological characteristics. This Certificate does not constitute or imply any guarantee of compliance by the manufacturer or any other person with any requirements regarding safety.

CONDITIONS OF APPROVAL

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

Instruments purporting to comply with this approval shall be marked NSC No S309 and only by persons authorised by the submittor.

Instruments incorporating a component purporting to comply with this approval shall be marked NSC No S309 in addition to the approval number of the instrument.

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

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.

DESCRIPTIVE ADVICE

Pattern: approved 13 June 1994

- A Compac model Spectrum control system for use in a Commission-approved liquid-measuring system incorporating any compatible Commission-approved flowmeter.

Variant: approved 13 June 1994

1. In certain other configurations without various features of the pattern and/or with other means of activation.

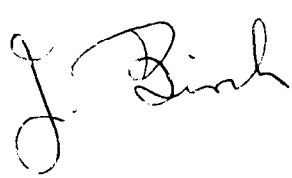
Technical Schedule No S309 describes the pattern and variant 1.

FILING ADVICE

The documentation for this approval comprises:

Supplementary Certificate of Approval No S309 dated 22 December 1994
Technical Schedule No S309 dated 22 December 1994 (incl. Test Procedure)
Figures 1 to 4 dated 22 December 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 S309

Pattern: Compac Model Spectrum Control System for Liquid-measuring Systems.

Submittor: Compac Industries Limited
52 Walls Road
Penrose Auckland New Zealand.

1. Description of Pattern

A Compac model Spectrum control system for use in a Commission-approved liquid-measuring system incorporating any compatible Commission-approved flowmeter.

The pattern (Figure 1) comprises an indicator, a pulse generator, a temperature probe and a controller.

1.1 Indicator

A model DRCPSU or model DRTPS card and/or PIN (personal identification number) activated indicator (Figure 2) is used. The indicator incorporates a multi-point linearisation correction facility and may be equipped with an electronic volume conversion for temperature facility. The indicator may be interfaced with the preset control valve in a Commission-approved liquid-measuring system.

The display facia of the indicator has the following features:

- A resettable volume display;
- A flow rate display (*);
- A preset facility which incorporates a preset display and a keypad for data entry. The keypad features 10 numeric and 6 specific function keys and is also used for data entry functions;
- A dot matrix display to guide the user through data entry functions; and
- A shut-off (emergency stop) button.

(*) With the volume conversion facility enabled, before a delivery is initiated the flow rate indicator displays the density; once a delivery has been initiated the indicator displays the rate of flow.

An automatic segment check is initiated before each delivery and on power up.

The maximum range of the volume display is configurable to display in increments of 0.01, 0.1 or 1 units and, depending on the facia used, the units may be litres (L) or cubic meters (m^3).

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The maximum range of the indicator is:

(a) With the litres (L) facia;

Volume (resettable) or or	9999.99 L in 0.01 L increments 99999.9 L in 0.1 L increments 999999 L in 1 L increments
Totaliser	9999999999 L in 1 L increments
Flow rate/density	99999 L/min or 9999.9 kg/m^3
Preset	99999 L in 1 L increments

(b) With the cubic metre (m^3) facia;

Volume (resettable) or or	9999.99 m^3 in 0.01 m^3 increments 99999.9 m^3 in 0.1 m^3 increments 999999 m^3 in 1 m^3 increments
Totaliser	9999999999 m^3 in 1 m^3 increments
Flow rate/density	99999 m^3/hour or 9999.9 kg/m^3
Preset	99999 m^3 in 1 m^3 increments

1.1.2 Power Supply

The instrument operates with 240 volts AC power supply. If power is disconnected during a delivery, the details up to the time of power failure are retained on the indicator.

1.1.3 Volume Conversion For Temperature Facility

An electronic volume conversion for temperature facility may be incorporated to convert the indication of volume to volume at 15°C, within the following ranges:

NOTE: The volume conversion is based on Table 54B (generalised products) or Table 54 (LPG) of the ASTM-IP *Petroleum Measurement Tables.*

Volume conversion for temperature to 15°C is mandatory for LPG.

(a) When used with generalised petroleum products;

Density	660.0 kg/m^3 to 999.9 kg/m^3
Liquid Temperature	-15°C to 70°C

(b) When used with liquefied petroleum gas (LPG);

Density	500.0 kg/m^3 to 595.0 kg/m^3
Liquid Temperature	-15°C to 50°C

1.1.4 Linearisation Correction Facility

The linearisation correction facility can be used to correct the meter calibration as a function of flow rate.

Up to 7 meter performance correction factors over the flow rate range may be entered using the calibration function. Each factor has a maximum correction range of -10% to +9.999% in increments of 0.001%.

1.2 Pulse Generator

A model CU-ENCODER-3CH pulse generator (Figure 3) is used which produces pulses proportional to volume when connected to a Commission-approved positive displacement flowmeter interfaced with the model DRCPSU or DRTPS indicator.

The pulse generator specifications are:

Maximum pulser shaft speed:	600 revs/min
Maximum pulses per shaft revolution:	150 pulses/rev

The flowmeter connected to the pulse generator shall be used within a flow rate range such that the pulse generator output does not exceed 600 revs/min.

1.3 Controller

A model DC2000 or DC3000 controller (Figure 4) is used for recording of loading operations for management purposes. Up to 99 flowmeters/indicators may be connected to the controller.

1.4 Temperature Probe

A 100Ω platinum resistance temperature probe is used.

1.5 Installation

The pulse generator is mounted directly to the flowmeter, while the indicator may be placed in a remote location.

1.6 Markings and Notices

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

Manufacturer's name or mark
Model number
Serial number
NSC approval number NSC No S309

(b) The preset display is marked 'Preset Indication Not in Use For Trade'.

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(c) When programmed for volume conversion for temperature:

(i) The volume display indicator shall be marked 'Volume Delivered Converted (compensated) to 15°C', or 'Litres (or Cubic Metres) at 15°C', or 'Reference Temperature 15°C'; and

(ii) The instrument nameplate(s) shall include the following;

Liquid temperature range ...°C to ...°C

1.7 Verification/Certification and Sealing Provision

Provision is made for a verification/certification mark to be applied.

Provision is also made for sealing the indicator door to prevent access to the calibration functions.

2. Description of Variant 1

In other configurations, viz. without the card-reader facility, and/or without the PIN facility, and/or without the preset facility, and/or without the central controller, and/or with other means of activation (e.g. wireless ID tags, bar code reader, 'smart card').

TEST PROCEDURE

The maximum permissible shaft revolutions of the pulse generator and the maximum flow rate of the flowmetering system shall be considered in conjunction with any tests specified in the approval documentation for the instrument to which the pattern is connected, and in accordance with any relevant tests specified in the Inspector's Handbook.

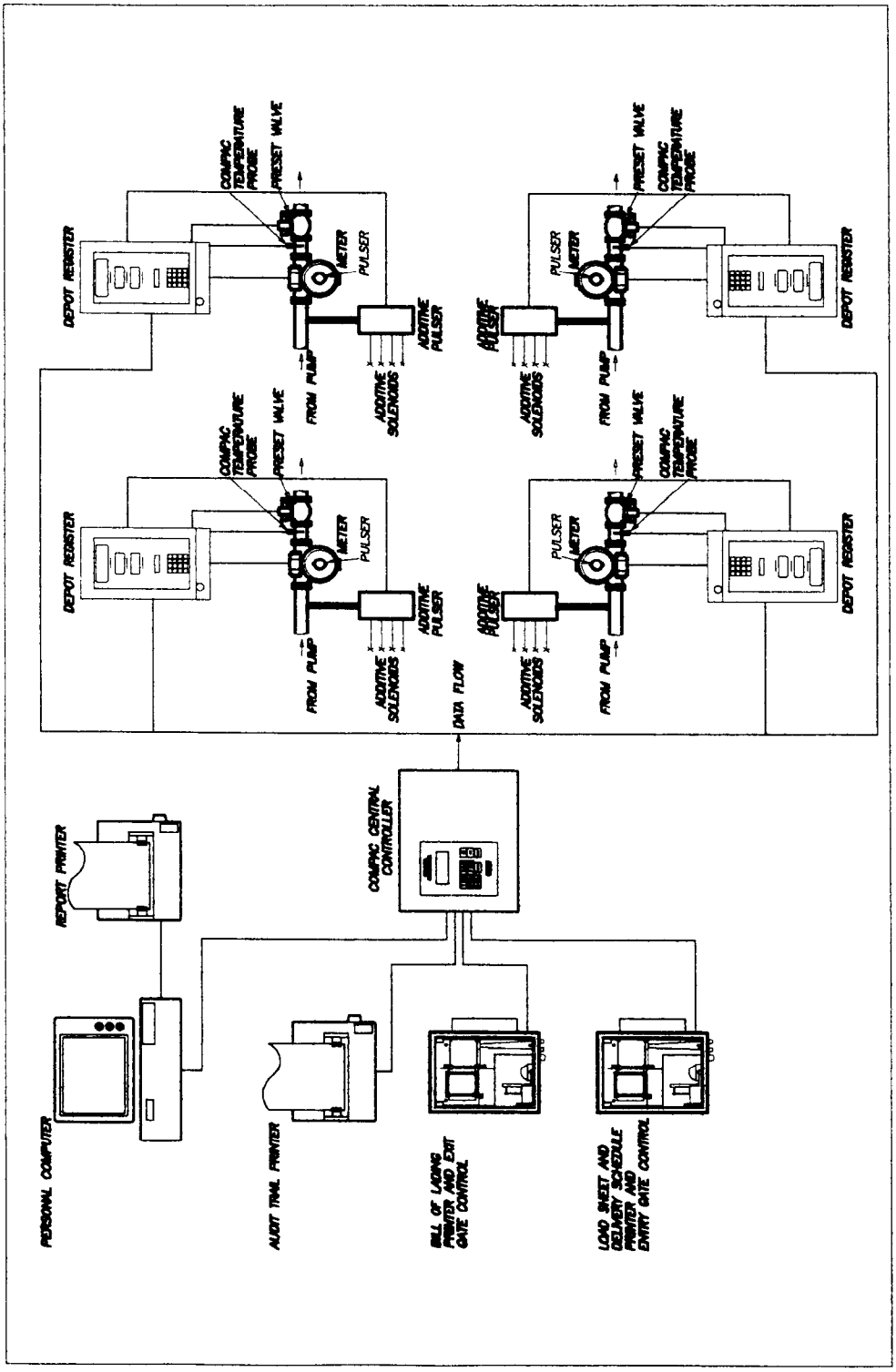
Maximum Permissible Errors at Verification/Certification

The maximum permissible errors applicable are those applicable to the system to which the instrument approved herein is fitted, as stated in the approval documentation for the system.

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% when the volume convertor is activated.

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

FIGURE S309 - 1

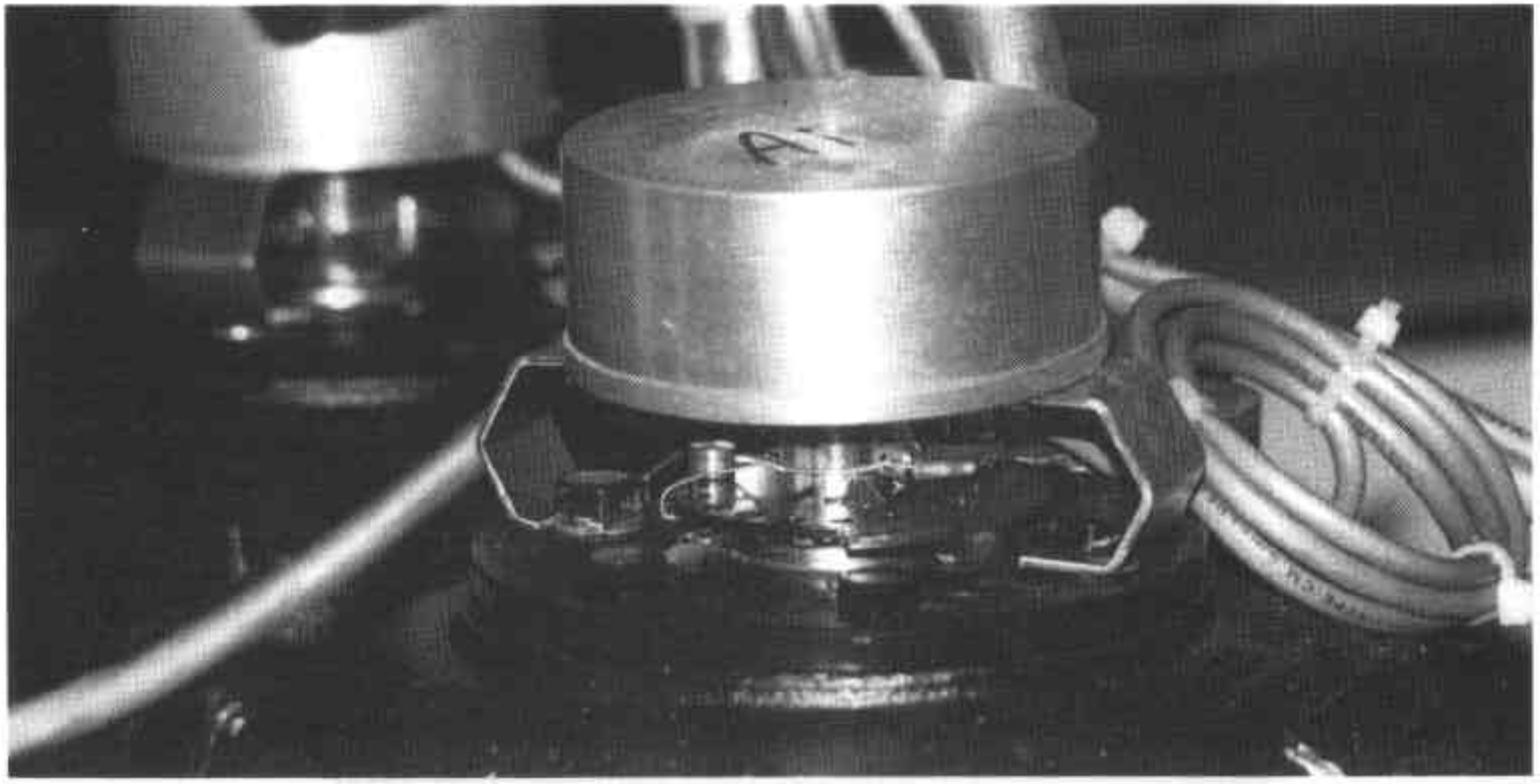


Compac Model Spectrum Control System

FIGURE S309 - 2

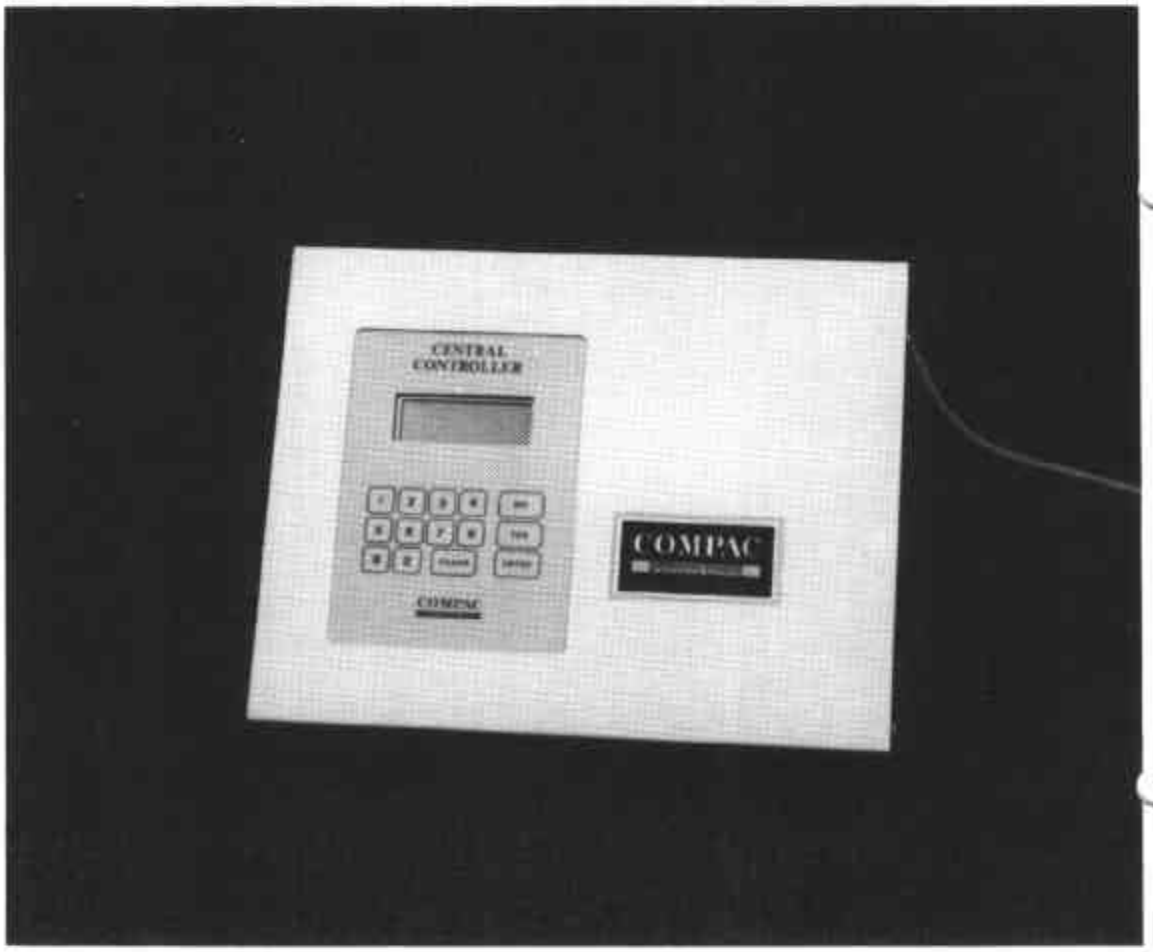
Compac Model DRCPSU/DRTPS Indicator

FIGURE S309 - 3



Compac Model CU-ENCODER-3CH Pulse Generator

FIGURE S309 - 4



Compac Model DC2000/DC3000 Controller