



Australian Government

**National Measurement
Institute**

Bradfield Road, West Lindfield NSW 2070

Supplementary Certificate of Approval

No S545

Issued by the Chief Metrologist under Regulation 60
of the
National Measurement Regulations 1999

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

Compac Model C4000 Calculator/Indicator for Liquid-measuring Systems

submitted by Compac Industries Ltd
 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.

This approval has been granted with reference to document NMI R 117-1, *Measuring Systems for Liquids Other than Water*, dated July 2004.

The approval of variant 1 has been granted with reference to document NMI R 81, *Dynamic Measuring Devices and Systems for Cryogenic Liquids*, dated August 2009.

CONDITIONS OF APPROVAL

This approval becomes subject to review on 1 July 2016, and then every 5 years thereafter.

Instruments purporting to comply with this approval shall be marked with approval number 'NSC S545' and only by persons authorised by the submitter.

Instruments incorporating a component purporting to comply with this approval shall be marked 'NSC S545' in addition to the approval number of the instrument.

It is the submitter's responsibility to ensure that all instruments marked with this approval number are constructed as described in the documentation lodged with the National Measurement Institute (NMI) 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 document NMI P 106.

The National Measurement Institute 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: approved 23 June 2011

- A Compac model C4000 controller/indicator for liquid-measuring systems.

Variant: approved 23 June 2011

1. Displaying in kg and kg/min units.

Technical Schedule No S545 describes the pattern and variant 1.

FILING ADVICE

The documentation for this approval comprises:

Supplementary Certificate of Approval No S545 dated 24 June 2011
Technical Schedule No S545 dated 24 June 2011 (incl. Test Procedure)
Figures 1 and 2 dated 24 June 2011

Signed by a person authorised by the Chief Metrologist to exercise his powers under Regulation 60 of the *National Measurement Regulations 1999*.

A handwritten signature in black ink, consisting of stylized cursive letters, positioned to the right of the signature text.

TECHNICAL SCHEDULE No S545

Pattern: Compac Model C4000 Calculator/Indicator for Liquid-measuring Systems

Submitter: Compac Industries Ltd
52 Walls Road
Penrose Auckland New Zealand

1. Description of Pattern

A Compac model C4000 calculator/indicator (Figure 1) interfaced to a Compac model CU-3000-3CH pulse generator or any NMI-approved measurement transducer generating compatible (#) pulse output proportional to volume throughput, for use in an NMI-approved liquid-measuring system.

The pattern uses versions HIA-xx and HIG-xx software.

(#) "Compatible" is defined to mean that no additions/changes to hardware/software are required for satisfactory operation of the complete system.

1.1 Field of Operation

- Input pulse rate less than 125 Hz/channel
- Input voltage 204 V to 264 V AC
- Accuracy class 0.5
- Environmental temperature range -25°C to 55°C
- Liquid temperature range -10°C to 50°C
- Volume conversion to 15°C:
For generalised products density range from 0.654 to 1.000 kg/L
- Linearity correction facility

1.2 Features

The model C4000 calculator/indicator comprises a C4000 power supply in a flameproof enclosure plus a processing circuit board and indicator circuit board enclosed in a separate housing (Figure 1).

The indicator circuit board has four liquid crystal displays (LCD) for displaying volume at metering conditions, pre-set (*) volume, flow rate and operator prompts. The indicators display the following values:

Volume to 9999.99 L
Pre-set to 9999.99 L (*)
Flow rate to 9999 L/min

An electronic totaliser can be viewed via the parameter switch (on the processing circuit board) or the 'Total' button.

The keypad (Figure 1) is used for entering a pre-set (*) value and for authorisation purposes.

(*) The pre-set facility is not approved for trade use.

The instrument is configured via the 'parameter' (SW1) and 'k-factor' (SW2) switches located on the processing circuit board (Figure 2a), which have provision for sealing. It can either be configured to use the base k-factor for converting the input pulses to volume throughput, or use multi k-factors as a function of input frequency (flow rate) to adjust the accuracy of the measurement transducer as a function of flow rate (linearity correction).

The density setting may be changed, and temperature may be viewed, by means of the parameter switch (SW1).

A segment check is initiated by pressing the parameter switch once.

1.3 Volume Conversion for Temperature Facility

The model C4000 may be fitted with a volume conversion for temperature facility to convert the measured volume to volume at 15°C. The conversion is based on ASTM-IP-API Petroleum Measurement Table 54B for Generalised Petroleum Products.

1.4 Checking Facilities

The calculator/indicator has a checking facility, and an error is generated when:

- The indicator is disconnected or faulty
- The pulser is disconnected or out of quadrature
- The liquid temperature is out of range, or
- The density out of range.

1.5 Descriptive Markings and Notices

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

Manufacturer's name or mark	Compac
Model number	C4000
Serial number
Pattern approval mark	NMI S545
Year of manufacture
Accuracy class	0.5
Environmental class	Class C
Liquid temperature range °C to °C (#)

- (#) Required when the volume conversion for temperature facility is activated. Also, the indicator reading face shall be marked 'Litres at 15°C' or 'Volume at 15°C'.

The minimum measured quantity specified for the instrument to which the pattern is fitted is marked or displayed on the face of the indicator in the form "Minimum Delivery 200 L".

1.6 Verification Provision

Provision is made for the application of a verification mark.

1.7 Sealing Provision

Provision is made for the calibration adjustments to be sealed. Figure 2b shows a typical method.

2. Description of Variant 1

The Compac model C4000 calculator/indicator configured to display quantity in kg units and flow rate in kg/min units.

The field of operation applicable to this variant is that for the system to which the controller is connected.

TEST PROCEDURE

Instruments shall be tested in conjunction with any test specified in the approval documentation for the liquid-measuring system to which the pattern is connected, as appropriate, and in accordance with any relevant tests specified in the national instrument test procedures.

Maximum Permissible Errors

The maximum permissible errors applicable are those applicable to the liquid-measuring system to which the pattern is connected as stated in the approval documentation for the system or as specified in Schedule 1 of the *National Trade Measurement Regulations 2009*.

Before and after verification, obtain the configuration settings of the instrument, particularly the density setting, the product type, remote density enabled, the base k-factor or multi k-factors as a function of flow rate if linearity correction is utilised.

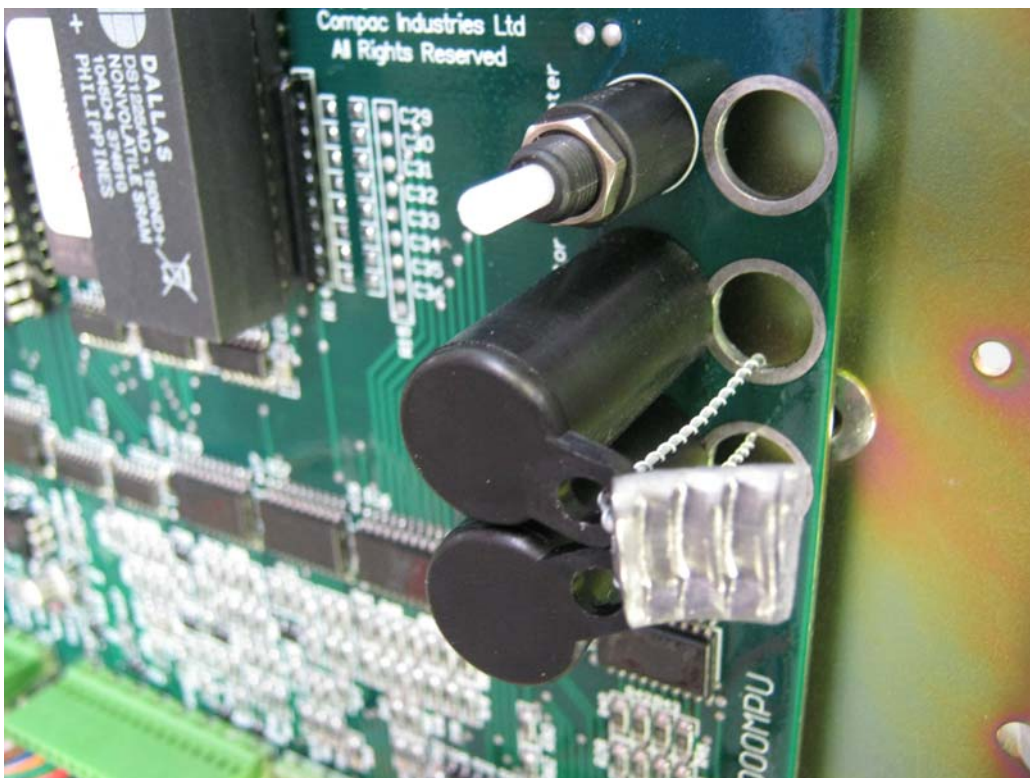
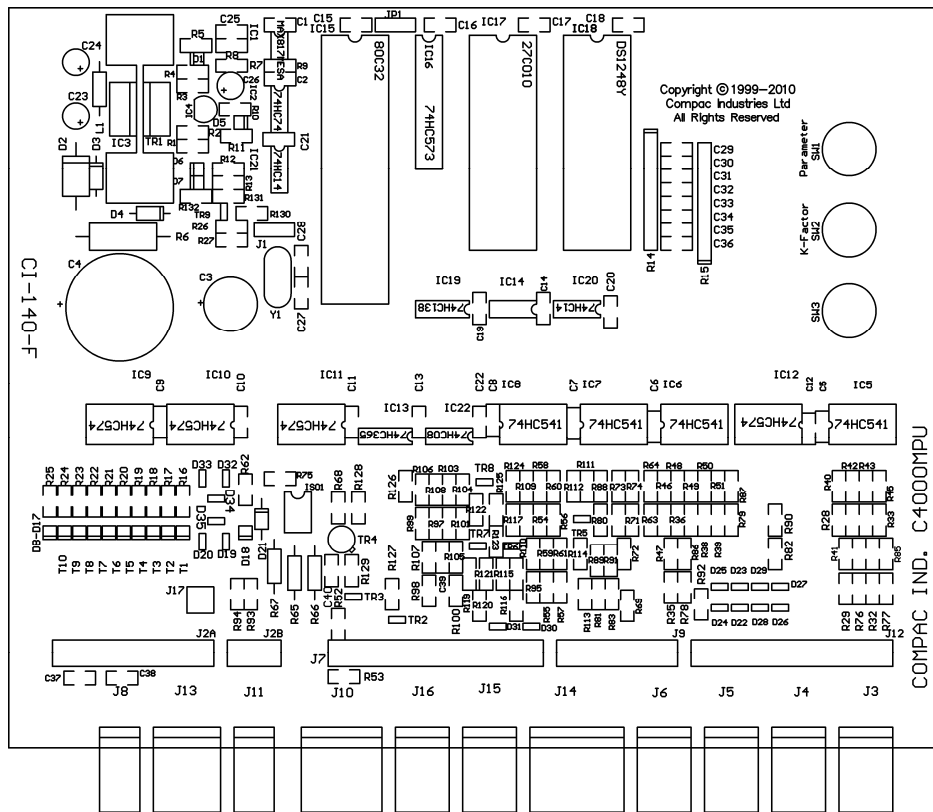
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FIGURE S545 – 1



Compac Model C4000 Calculator/Indicator

FIGURE S545 – 2



Showing Location and Typical Sealing of Configuration Switches on Processing Circuit Board