



Australian Government  
Department of Industry, Science,  
Energy and Resources

## National Measurement Institute

36 Bradfield Road, West Lindfield NSW 2070

# Supplementary Certificate of Approval NMI S783

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 instruments herein described.

Compac Model C5000 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, *Measuring Systems for Liquids Other than Water*, dated June 2011.

This approval becomes subject to review on 1/06/24, and then every 5 years thereafter.

### DOCUMENT HISTORY

Rev	Reason/Details	Date
0	Pattern approved – interim certificate issued	21/05/19
1	Pattern approved – certificate issued	07/02/20

## CONDITIONS OF APPROVAL

### General

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI S783' and only by persons authorised by the submitter.

Instruments incorporating a component purporting to comply with this approval shall be marked 'NMI S783' in addition to the approval number of the instrument, and only by persons authorised by the submitter.

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.

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



**Darryl Hines**  
Manager  
Policy and Regulatory Services

TECHNICAL SCHEDULE No S783

**1. Description of Pattern** **approved on 21/05/19**

A Compac model C5000 calculator/indicator (Figure 1) for use with an NMI-approved Compac model CU-3000-3CH pulse generator or any other NMI approved measurement transducer generating compatible (#) pulse output proportional to volume throughput, for use in an NMI-approved liquid measuring system

The C5000 calculator/indicator can also be interfaced to a Compac Mass flow meter (V50 or KG100) which uses a serial RS485 connection. This data is safeguarded with a CRC checksum over the data package.

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

**1.1 Field of Operation**

The field of operation of the pattern is determined by the following characteristics:

- Maximum Input frequency 125 Hz per channel
- Accuracy class: 0.5
- Environmental temperature range: -25°C to 55°C (class C)
- Power supply input: 110 V AC to 240 V AC
- Volume conversion to 15°C:  
For generalised products density range from 0.654 to 1.000 kg/L
- Volume conversion to 15°C:  
For LPG density range (at 15°C) of 0.505 to 0.570 kg/L
- For use in interruptible metering systems

**1.2 System Description**

The Compac model C5000 calculator/indicator comprises a C5000 power supply and processor board in a flameproof enclosure. A K-Factor board and indicator circuit board enclosed in a separate housing.

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

Price	up to \$99999.99 in \$0.01 increments
Volume	up to 99999.99 L in 0.01 L increments
Unit price	up to 9999.9¢/L in 0.1 ¢ increments
Totaliser	up to 9999999 L in 1 L increments
Pre-set	up to \$9999 in \$1 increments or 9999L in 1 L increments

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

The keypad is used for entering a pre-set value and for authorisation purposes. The pre-set feature is approved for use with liquid measuring systems incorporating compatible (#) flow control devices capable of stopping the flow of liquid when the pre-set value is reached.

The instrument is configured via the 'parameter' and 'K-factor' switches located on the K-Factor circuit board (Figure 2a), which has 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.

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

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

### **1.3 Volume Conversion for Temperature Facility**

The Compac model C5000 may be fitted with a volume conversion for generalised products density range from 0.654 to 1.000 kg/L with 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.

The C5000 may also be fitted with a volume conversion for LPG with a density range from 0.505 to 0.570 kg/L with temperature and density facility to convert the measured volume to volume at 15°C with automatic density correction. The volume conversion is based on Table 54 published by ASTM-IP-API, 'Petroleum Measurement Tables for Light Hydrocarbon Liquids'.

### **1.4 Checking Facilities**

An automatic segment test is performed at the start of each delivery.

The calculator monitors the presence and correct transmission of signal from the measurement transducer, and in the event of detecting a fault the instrument indicates an error and stops the delivery.

In the event of a power failure the displayed value for a delivery is retained.

An error is also generated when:

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

### **1.5 Verification Provision**

Provision is made for the application of a verification mark.

## 1.6 Sealing Provision

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

## 1.7 Descriptive Markings and Notices

Instruments are marked with the following data, together in one location, in the form shown at right:

Manufacturer's mark, or name written in full	Compac
Model number	C5000
Serial number	.....
Pattern approval mark	NMI No S783
Year of manufacture	.....
Accuracy class	0.5
Environmental class	C
Liquid temperature range	.... °C to .... °C (#)

(#) Required when the volume conversion for temperature facility is activated.

For applications when the volume conversion facility is activated, the indicator reading face shall be marked 'Litres at 15°C' or 'Volume at 15°C'.

The minimum measured quantity specified for the system is marked or displayed on the face of the indicator in the form 'Minimum Delivery 2 L'.

### TEST PROCEDURE No S783

Instruments shall be tested in accordance with any relevant tests specified in the National Instrument Test Procedures.

The instrument shall not be adjusted to anything other than as close as practical to zero error, even when these values are within the maximum permissible errors.

### Maximum Permissible Errors

The maximum permissible errors applicable are those applicable to the fuel dispensers to which the instrument approved herein is fitted, as stated in the approval documentation for the fuel dispensers or in Schedule 1 of the *National Trade Measurement Regulations 2009*.

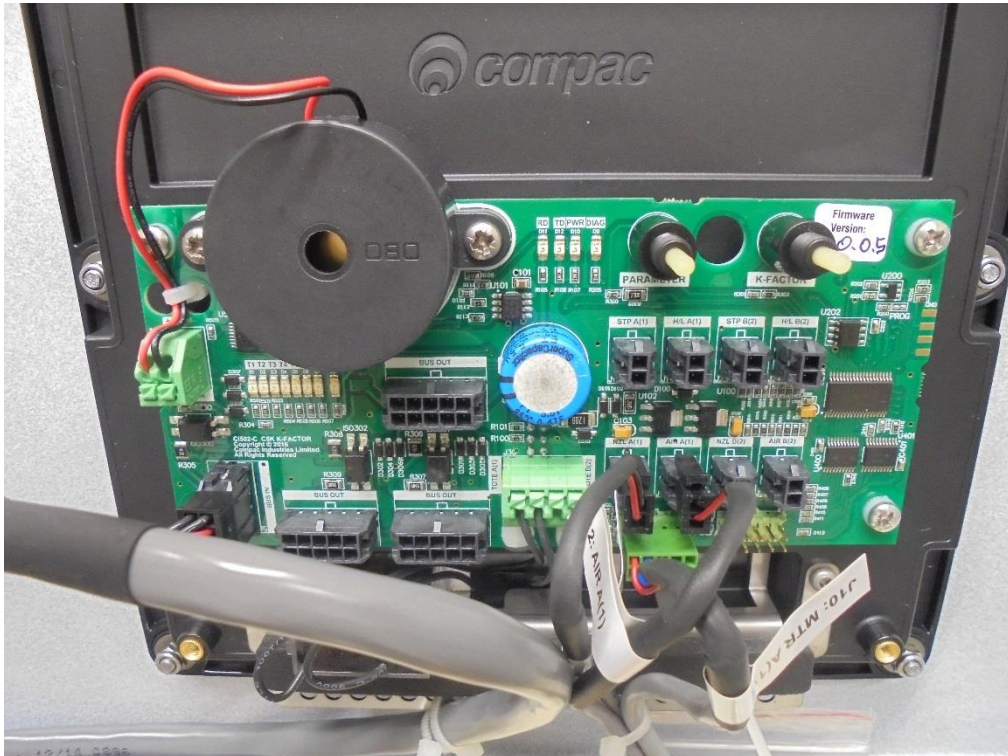
FIGURE S783 – 1



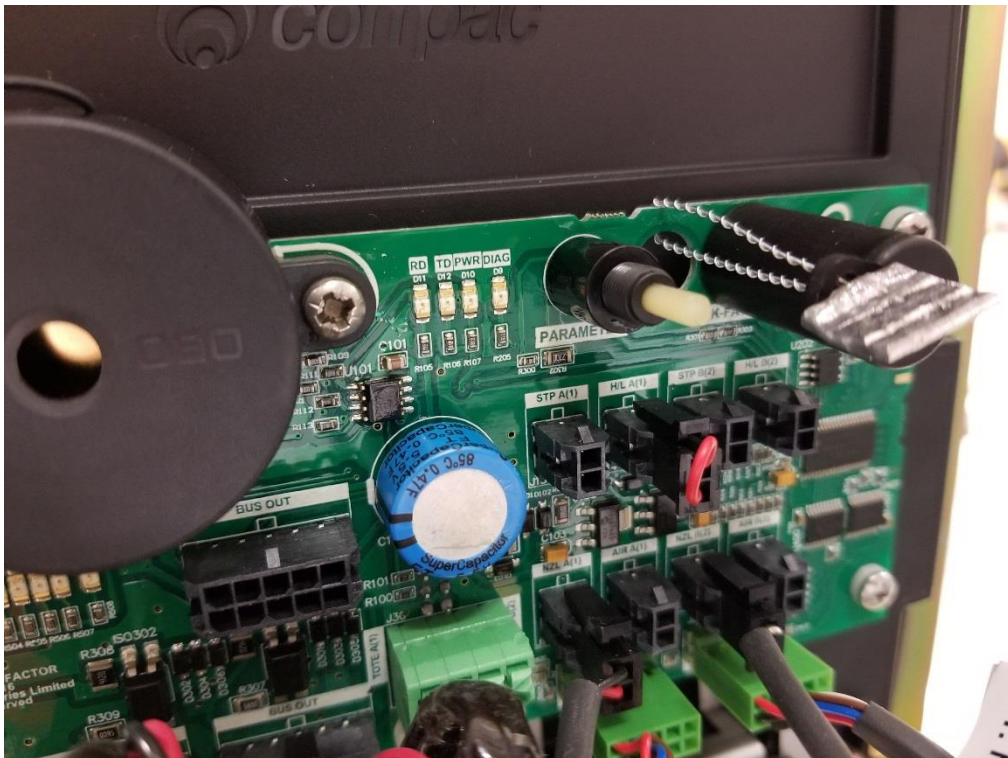
Compac Model C5000 Calculator/Indicator



FIGURE S783 – 2



a) Configuration switches on K-Factor circuit board



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

~ End of Document ~