Australian Government
Department of Industry, Innovation and Science

National Measurement Institute

Supplementary Certificate of Approval

NMI S732

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.

Micro Motion Model 5700C12A Calculator/indicator for Use in Liquid-measuring Systems

submitted by Emerson Process Management Australia Pty Ltd
471 Mountain Highway
Bayswater VIC 3153

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 1/01/22, and then every 5 years thereafter.

DOCUMENT HISTORY

Rev	Reason/Details	Date
0	Pattern & variants 1 & 2 approved – certificate issued	2/12/16
1	Pattern & variants 1 & 2 **amended** (incl. sealing) – certificate issued	8/12/16

CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with pattern approval number ‘NMI S732’ and only by persons authorised by the submittor.

Instruments incorporating a component purporting to comply with this approval shall be marked ‘NMI S732’ in addition to the approval number of the instrument, and only by persons authorised by the submittor.

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

Mario Zamora

TECHNICAL SCHEDULE No S732

1. Description of Pattern approved on 2/12/16

A Micro Motion model 5700C12A (*) calculator/indicator with integral core processor (Figure 1) for use in liquid mass flow measuring system incorporating compatible (#) NMI-approved remote-mounted 9-wire coriolis flowmeter.

(*) Abbreviated model number - the full model number for the pattern is 5700C12A***ZZZ*OL where '*' represents product features which do not affect the meteorological performance of the measuring system

(#) '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 measuring system is determined by the following characteristics:

•	Ambient temperature range	-25°C to 55°C
•	Accuracy Class	0.3
•	Power supply (nominal)	240 VAC (85-265 VAC) 24 VDC (18-100 VDC) (**)
•	Applications	Static, pipeline, or mobile

(**) For uninterruptible applications, an uninterruptible power supply is required

1.2 Calculator/Indicator

The Micro Motion model 5700C12A***ZZZ*OL calculator/indicator incorporates a Local Operator Interface (LOI) that is a 32 mm backlit liquid crystal display (LCD) with 4-button optical controls and flow meter status LED for displaying messages/prompts. The display is a scalable to a 2, 3, or 4-line display for configuration and display of totals, flow rate and other process variable. When displaying flow only, the numeric digits are 7 mm high.

The calculator/indicator provides flow rate output(s) of frequency (dual pulse) and/or Modbus. When in secure mode, the MODbus output is read only except that process totalisers may be reset at no flow. Additional inputs (analog, digital and HART multi-drop) and outputs (analog and digital) may also be configured depending on the application requirements.

When used without the display as a calculating only device, the model number is revised to model 5700C13A***ZZZ*OL and used in conjunction with an Enraf Contrec model Trac-40 calculator/indicator (as described in the documentation of approval S367A) or any other compatible NMI-approved calculator/indicator or controller/indicator.

When mounted directly to a coriolis flowmeter, the model is revised to a model 5700I12A***ZZZ*OL when used as a calculator/indicator or a model 5700I13A***ZZZ*OL as a calculator only.

The Micro Motion 5700-series calculator/indicator operates with the following software versions and checksums:

Firmware	Software version	Checksum
Transmitter Software (Weights & Measures)*	1.20 (1.0)	2DF0D8E9
	1.30 (1.1)	ADE631BB
Internal Core Software	4.02	8D61C368
	4.14	40860C63
	4.20	2983A9BE
PIC Firmware	8.0	0000DE9C
LCD PIC Firmware	3.0	000081D5 (Transmitter Software V 1.20) 00007442 (Transmitter Software V (1.30)

(*) The Transmitter Software and the Weights & Measures software form a matched set. W&M software version is shown in brackets) does not have a checksum and means W&M is licensed.

Software version numbers and checksums may be displayed on the 5700C calculator/indicator LOI by performing the following:

- To verify the various devices software, use the LOI and follow the menu path below.

Software/Firmware	Path
• Transmitter	• Menu > About > Versions > Transmitter Software
• Weights and Measures	• Menu > About > Versions > W&M Application
• Internal core processor	• Menu > About > Versions > Core Software
• PIC	• Menu > About > Versions > PIC Firmware
• LCD PIC	• Menu > About > Versions > LCD PIC Firmware

- To verify the various devices checksum, use the LOI and follow the menu path below.

Software/Firmware	Path
• Transmitter checksum	• Menu > Configuration > Weights and Measures > Transmitter Checksum
• Internal core processor	• Menu > Configuration > Weights and Measures > Core Checksum
• PIC checksum	• Menu > Configuration > Weights and Measures > PIC Checksum
• LCD PIC checksum	• Menu > Configuration > Weights and Measures > LCD Checksum

When used without a display, the software version numbers and checksums may be verified using ProLink III software or the data registers in a Modbus Digital Communications host. Refer to manufacturer's documentation.

1.3 Flow Control Valve

Any compatible (#) solenoid-operated flow control valve, located downstream of the flowmeter, may be interfaced to a Micro Motion 5700-series calculator/indicator for controlling the delivery process and to stop measurements in the event of errors detected by the checking facility.

1.4 Temperature Probe

For temperature measurement applications and for volume conversions, a Rosemount model 3144P, PT 100 4-wire RTD with 4-20mA current transmitter or any other compatible (#) temperature transducer may be used.

(#) '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.

1.5 Volume Conversion for Temperature Facility

An electronic volume conversion for temperature facility (API Referral software) can be enabled to convert the measured volume to volume at 15°C. The conversion is based on *ASTM-IP- API Petroleum Measurement* Table 54A for Crude Oils, or Table 54B for Generalised Petroleum Products, or Table 54C for pure biodiesel, or Table 54D for Lube Oils, where the density is set for the product for which the instrument is verified. (This conversion method not approved for Transmitter Software Version 1.20)

1.6 Descriptive Markings and Notices

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

Pattern approval number	NMI S732	
Manufacturer's identification mark or trade mark	…..	
Model number	…..	
Serial number of the instrument	…..	
Year of manufacture	…..	
Environmental class	class C	
Type of liquid for which the system is verified	…..	(*)
Maximum temperature of the liquid (T_{max})	50°C	(*)
Minimum temperature of the liquid (T_{min})	-10°C	(*)

(*) Only required when volume conversion for temperature is utilised.

B. For applications (other than LPG) when the delivered volume is at 15ºC the indicator is marked, 'Volume at 15°C' or 'Litres at 15°C'.

The minimum measured quantity (M_{min}) is to be clearly visible in the vicinity of the indicating device, e.g. "Minimum Delivery 20 kg", or alternatively or the calculator/indicator is programmed for deliveries equal to or greater than the stated minimum delivery.

1.7 Verification Provision

Provision is made for the application of a verification mark.

1.8 Sealing Provision

To prevent access to calibration parameters, the calculator/indicator is placed into custody transfer mode and the housing of the calculator/indicator enclosure sealed (Figure 2). The custody transfer mode is selected with the security switch on the display. Sealing the housing requires the display window to be sealed against opening and wiring compartment cover to be sealed to avoid unauthorised wiring changes.

Additionally, the sensor wiring junction box on the calculator/indicator and junction box on the sensor are also sealed to prevent opening and/or wiring changes. When mounted directly to the sensor, the calculator/indicator is sealed against removal from the measurement sensor. This is done either by physically sealing the transmitter to the measurement sensor or by mentioning the measurement sensor's serial number on the type plate of the transmitter.

2. Description of Variant 1 approved on 2/12/16

A Micro Motion 5700-series calculator/indicator may also be used with a remote core processor interfacing the coriolis flowmeter to the calculator/indicator (Figure 3).

When this is the case, the core processor integral to the model 5700-series calculator/indicator as defined in the pattern is not provided. Instead a remote core processor model 700 or model 800 as described in the NMI approval for coriolis flowmeter is located in either the flowmeter or in its own enclosure and provides raw signal measurements and basic sensor diagnostics to the calculator/indicator.

When used with the model 5700-series calculator/indicator, **the** advanced capability of the model 700 and 800 core processors such **as** storage of the calibration and density factors, units of measurement and automatic corrections is not used.

3. Description of Variant 2 approved on 2/12/16

A Micro Motion 5700-series calculator/indicator may also be used for Concentration Measurement utilising manually configured tables that cannot be modified when the device is in Custody Transfer Secure Mode.

When performing Concentration Measurement, a temperature input is required using an external temperature probe. Concentration measurement is used for measuring alcohol, alcohol percentage and alcohol at 20^{o}C (100% alcohol), based on OIML R22 for alcohol percentages from 50% up to and including 100%.

It is a requirement to determine the FT and DT values of the individual sensor.

Before putting into use, it is a requirement that the correctness of the configured table must be verified in order to be sure that the conversion does not exceed the limits as defined for the calculations.

TEST PROCEDURE

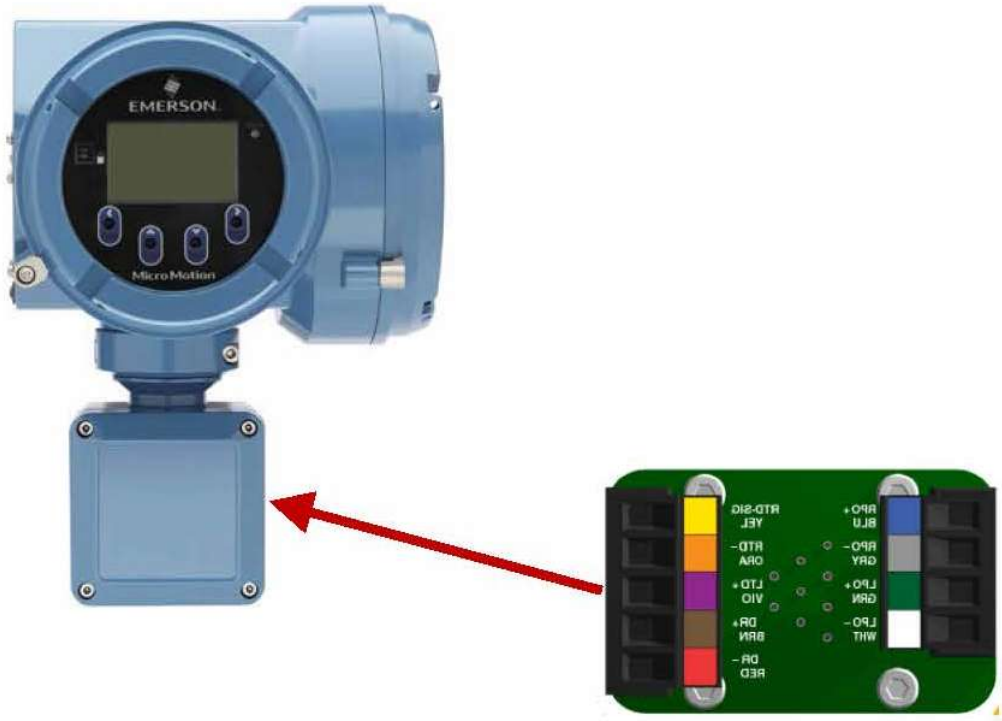
Instruments shall be tested in accordance with any relevant tests specified in the National Instrument Test Procedures.

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

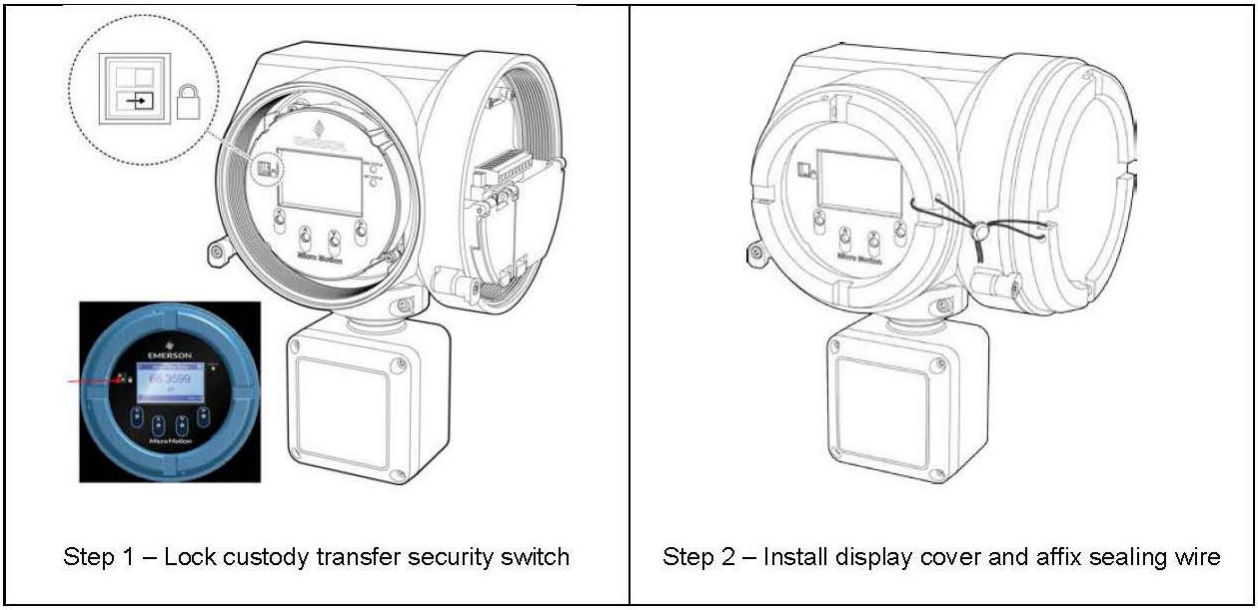
The maximum permissible errors those applicable to the fuel dispensers to which the instrument approved herein is fitted, as stated in the approval documentation for the coriolis flowmeter or in the *National Trade Measurement Regulations 2009*.

FIGURE S732 – 1



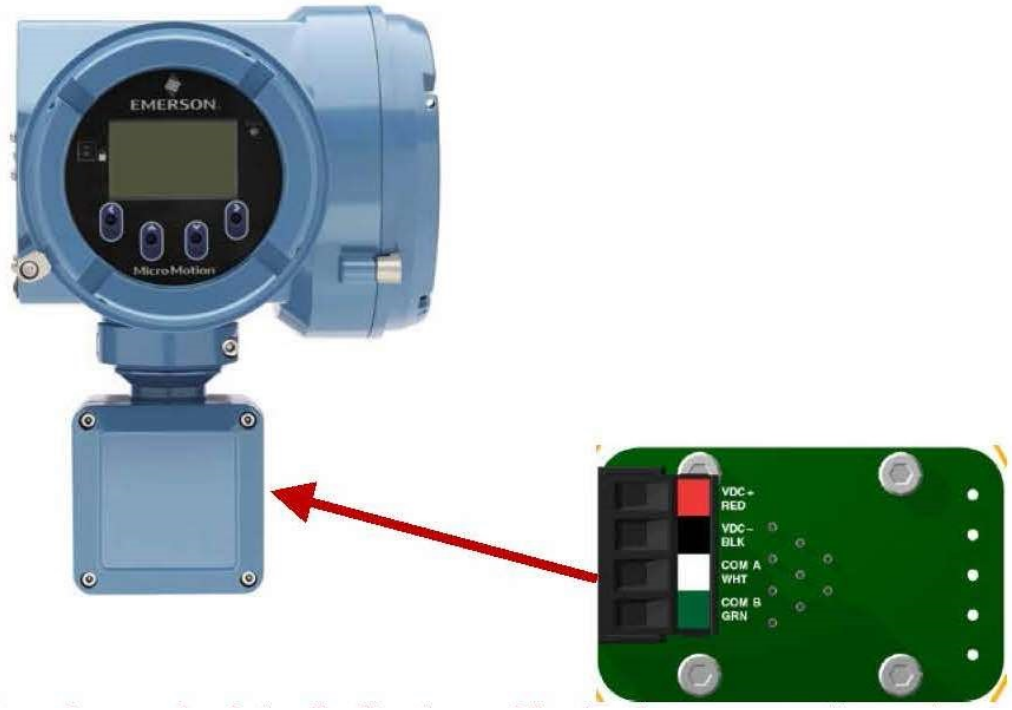
Micro Motion 5700 Series Calculator/Indicator with 9-wire Connections (Pattern)

FIGURE S732 – 2



Sealing Arrangement for Micro Motion 5700 Series Calculator/Indicator

FIGURE S732 – 3



Micro Motion 5700 Series Calculator/Indicator with 4-wire Connections to Remote Core Processor (Variant 1)

~ End of Document ~