



Australian Government
Department of Industry and Science

National Measurement Institute

Supplementary Certificate of Approval

NMI S671

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.

FMC F.A. Sening Model MultiFlow Calculator/Indicator for Liquid-measuring Systems

submitted by John Bean Technologies
61D Marple Avenue
Villawood NSW 2163

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 1/09/19, and then every 5 years thereafter.

DOCUMENT HISTORY

Rev	Reason/Details	Date
0	Pattern approved – interim certificate issued	12/08/14
1	Pattern amended (validity) – interim certificate issued	29/01/15
2	Pattern approved – certificate issued	26/08/15

CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI S671' and only by persons authorised by the submittor.

Instruments incorporating a component purporting to comply with this approval shall be marked 'NMI S671' in addition to the approval number of the instrument, 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 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.

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

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



Dr A Rawlinson

TECHNICAL SCHEDULE No S671

1. Description of Pattern **approved on 12/08/14**

An FMC F.A. Sensing model MultiFlow calculator/indicator with an Eltomatic model 1-08 or 1-09 remote pulse transmitter or any NMI-approved measurement transducer generating compatible (#) pulse output proportional to volume throughput, for use in liquid-measuring systems incorporating compatible (#) NMI-approved vehicle-mounted flowmeters. Figure 1 shows a MultiFlow calculator/indicator with an optional chip card reader.

(#) '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

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

- Input pulse rate Dual pulse,
less than 10 kHz
- Input voltage ranges:
 - for the calculator/indicator 15 V DC to 30 V DC
 - for the pulse generator 12V DC
 - for the printer 20.4 V DC to 28.6 V DC
- Liquid temperature range -10°C to 50°C
- Environment temperature ranges:
 - for the calculator/indicator -25°C to 55°C
 - for printers -10°C to 40°C
- Non-linearity correction facility 4 point error curve
correction
- Density range for volume conversion to 15°C:
 - for generalised products 0.653 kg/L to 1.075 kg/L
 - for LPG 0.500 kg/L to 0.600 kg/L

1.2 Indicator

The model MultiFlow calculator/indicator (Figure 1) includes an alphanumeric liquid crystal display with the following maximum volume displays:

- XX XXX.X L when the resolution is set to 0.1
- XXX XXX L when the resolution is set to 1
- XXX XXX L when the resolution is set to 10 for displaying in dekalitres (*)

(*) This setting may only be selected for non-trade applications.

The model MultiFlow calculator/indicator operates with software version 5.03 [x.xx] where x.xx is the metrological non-relevant software version. The version number may be displayed by pressing F3 and selecting menu 4.1.1.

The accumulated total is displayed up to 999 999 L before rolling over to 0. The total can be reset to zero via the calibration mode.

1.3 Features

The instrument is configured via the Mode and Cal switches, where Cal has provision for sealing. The instrument can display the temperature of the liquid, the set density, and the volume at 15°C. It can also store up to 4 separate k-factors for different products. Selection of different products (k-factors) cannot be used simultaneously with flow rate correction mentioned above.

The instrument features the following functions:

- The F3 button and selecting 2 “Grand totals” displays the accumulative total.
- The Print button prints a delivery report and resets the register to zero. Pressing the F3 button during delivery will display the flow rate.
- When interfaced to a flow control valve, the STOP/START button will begin a delivery or restart a delivery from the point at which it was stopped.
- If remote density setting is enabled, pressing the F2 button will display the density which can be changed using the F2 buttons and can be saved by pressing the ENTER button.
- In the same mode the operator can print a configuration report.

Note that the displayed density can only be changed when the delivery has been reset to zero.

1.4 Pulse Generator

The Eltomatic models 1-08 and 1-09 pulse transmitters have a dual-channel pulse output. The calculator uses a combination of high/low states from each channel to obtain a total count of 100 pulses per shaft revolution of the pulse generator. The maximum shaft speed for the pulse generator is 3000 revolutions per minute.

1.5 Checking Facilities

The instrument incorporates the following checking facilities:

- A segment check is performed on the display only at power up. An easily accessible power switch is located on the vehicle to enable the checking of the segments before each delivery, should this be required.
- A check of the presence and of the correct signal output from the measurement transducer.
- Outputs are provided to control the delivery process and if necessary prevent measurements when errors are detected.
- When configured for use with a printer, the MultiFlow checks for the presence of the printer, presence of paper and correct data transmission to the printer.

1.6 Volume Conversion for Temperature Facility

An optional electronic volume conversion for temperature facility may be used to convert the measured volume to volume at 15°C. Activation of the volume conversion feature is indicated by 'compensated to 15°C' appearing on the display and is activated via the parameter 3.5.n.n.7 mode for the approved products. The conversion is based on ASTM-IP-API Petroleum Measurement Table 54B for Generalised Petroleum Products.

The density is either fixed via the calibration mode or is available for adjustment using the parameter 3.1.5.2.1. The density has to be entered prior to measurements taking place. In such applications, temperature measurement is required which can be displayed by the MultiFlow.

For temperature measurement, the model Pt100SG4, Pt100 4-wire RTD probe, which has a resistance of 100 ohms at 0°C, or any other compatible (#) temperature probe with similar characteristics, can be used.

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

1.7 Printer

The MultiFlow may be connected to an Epson model TM-295 printer or to any other equivalent (*) printer (##). Note that the printer is mandatory when the optional electronic volume conversion for temperature facility is used.

If the nature of the measured volume is entered into the calculator/indicator at the beginning of the measurement operation, then a printer is mandatory for printing the delivery details and the manually-entered density for which the volume conversion is set.

(*) 'Equivalent' is defined to mean other proprietary equipment of the same or better specifications requiring no changes to the software specified in this approval for satisfactory operation of the complete system.

(##) The printer must be situated in a location that will satisfy the temperature requirements of -10°C to 40°C.

Note: Where the vehicle battery supply is 12 V, a voltage doubler is required.

1.8 Flow Control Valve

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

1.9 Sealing Provision

Access to the calibration parameters in read mode is via the F3 button, which can be put into the editing mode by a jumper inside the MultiFlow housing. One of the four screws affixing the cover of the housing has provision to be protected with wire and a seal.

1.10 Verification Provision

Provision is made for the application of a verification mark.

1.11 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	F.A. Sening
Model number	MultiFlow
Serial number
Pattern approval number	NMI S671
Year of manufacture
Accuracy class	0.5
Environmental class	C, I (#1)
Liquid temperature range	-10°C to 50°C (#2)

(#1) Environmental class for printers is Class B

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

For applications other than LPG, 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 fuel dispenser is marked or displayed on the face of the indicator in the form 'Minimum Delivery 200 L'.

TEST PROCEDURE

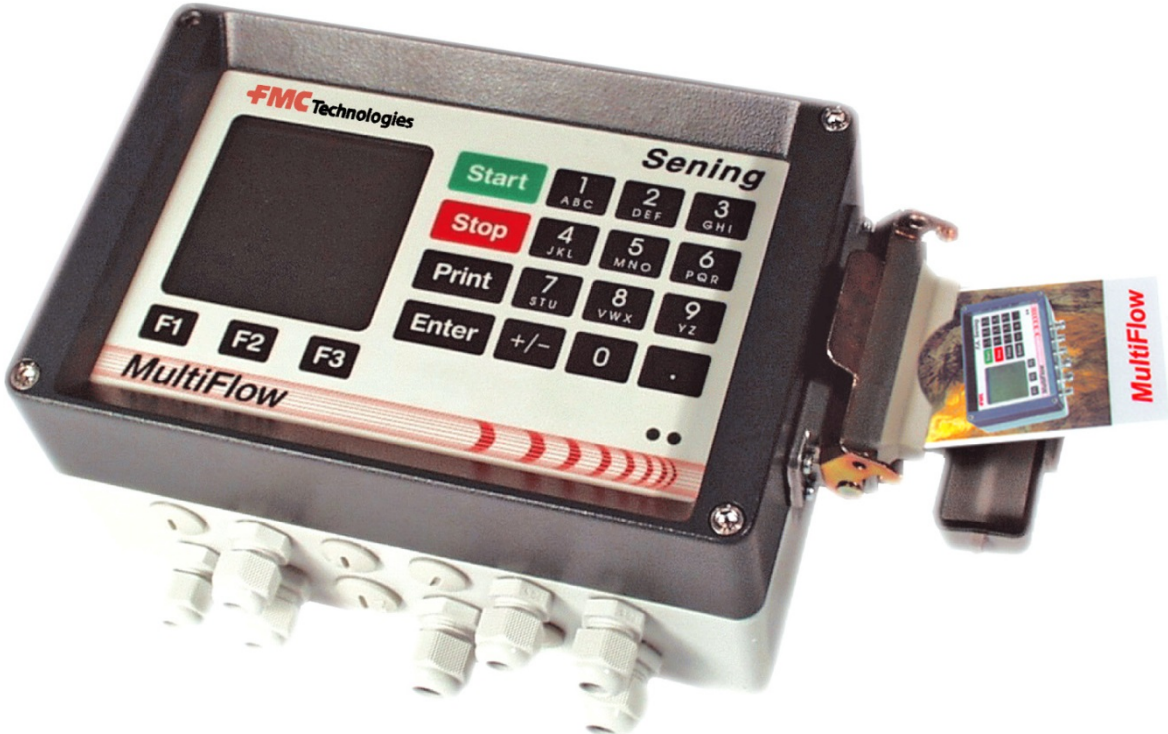
Instruments shall be tested in accordance with any relevant tests specified in the National Instrument Test Procedures.

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 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 S671 – 1



FMC F.A. Sening Model MultiFlow Calculator/Indicator

~ End of Document ~