



Australian Government

National Measurement
Institute

Bradfield Road, West Lindfield NSW 2070

Supplementary Certificate of Approval

NMI S684

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.

Toptech Systems Model MultiLoad II Calculator/Indicator for Liquid-measuring Systems

submitted by Toptech Systems NV
Nieuwe Weg 1 - Haven 1053
B2070 Zwijndrecht, Antwerp
Belgium

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.

This approval becomes subject to review on 1/03/20, and then every 5 years thereafter.

DOCUMENT HISTORY

Rev	Reason/Details	Date
0	Pattern & variants 1 & 2 approved – certificate issued	26/02/15

CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with approval number 'NMI S684' and only by persons authorised by the submitter.

Instruments incorporating a component purporting to comply with this approval shall be marked 'NMI S684' 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.

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.

A handwritten signature in black ink, appearing to be 'Dr A Rawlinson', with a horizontal line underneath.

Dr A Rawlinson

TECHNICAL SCHEDULE No S684

1. Description of Pattern approved on 26/02/15

A Toptech Systems model MultiLoad II calculator/indicator for use in a compatible (#) NMI-approved liquid-measuring system.

1.1 Field of Operation

The field of operation of the measuring system is determined by the following characteristics:

- Input pulse rate (dual channel) less than 5 kHz/channel
- Input voltage ranges:
 - for the calculator/indicator 18-36 V DC or 85-250 VAC
 - for the pulse generator 5 V DC to 30 V DC
 - for the printer 18-36 V DC or 85-250 V AC
- Environment temperature range -25°C to 55°C
- Non-linearity correction facility
- Density range for volume conversion to 15°C:
 - for generalised products 0.653 to 1.075 kg/L
 - for LPG 0.500 to 0.600 kg/L

1.2 Calculator/Indicator

The Toptech Systems model Multiload II calculator/indicator has a dot-matrix alphanumeric liquid crystal display with LED backlight. The pattern is housed in an explosion-proof model EXL enclosure (Figure 1) and may also be known as a model MultiLoad II ExL.

The calculator/indicator can be configured to display quantity in kg or L and flow rate in kg/min or L/min respectively. The calculator/indicator operates with software version 4.31.xx (*); the version number is displayed when powered up or when exiting the program mode. The calculator/indicator set-up functions are accessible by a sealable 'W& M' switch and/or by entering a password.

(*) 'xx' represents non-metrological functions

1.3 External Flow Control Module (FCM)

The pattern and variants may work with or without the Toptech Systems Flow Control Module (FCM) (Figure 2) depending on the applications required. The FCM contains its own microprocessor for digital/analogue valve control, meter pulse counts and factoring, additive injection, pump and meter permissions, DC & AC general purpose I/O, RTD Input, 4-20 mA input/output, etc.

The Flow Control Module is generally housed in its own enclosure.

1.4 Pulse Generator

An Eltomatic model 01-08 or 01-09 dual channel 100 pulses per shaft revolution pulse generator (Figure 3), or any other compatible (#) NMI-approved pulse generator.

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

1.5 Volume Conversion for Temperature Facility

An electronic volume conversion for temperature facility is used to convert the measured volume to volume at 15°C. The conversion is based on the manually-entered density (or measured density, if there is a density measurement linked to the MultiLoad) in kg/m³ at base conditions (15°C) of that liquid. The conversion is based on ASTMIP- API Petroleum Measurement Table 54 for LPG, Table 54B for Generalised Petroleum Products or Table 53B for density correction.

1.6 Temperature Transducer

The temperature transducer is a PT100-Thermometer (100 ohms @ 0°C) connected as 4-wire, or any other compatible (#) temperature probe with similar characteristics.

Alternatively, a temperature transducer with a 4 to 20 mA output may be used. The temperature transducer is fitted in the vicinity of the meter.

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

1.7 Printer

An Epson model LQ-580 printer (Figure 4) or equivalent (*) is interfaced to the calculator/indicator. If a ticket needs to be reprinted, the words "Duplicate ticket" will be printed at the top.

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 software for satisfactory operation of the complete system.

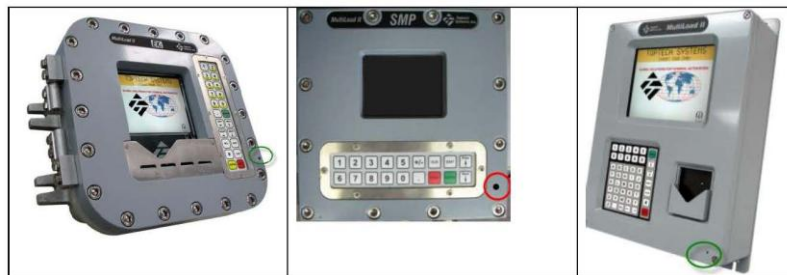
1.8 Verification Provision

Provision is made for the application of a verification mark.

1.9 Sealing Provision

1.9.1 Enclosure Sealing

- The pattern (EXL enclosure) can be sealed by sealing one or more of the bolts or with a wire through a hole drilled in one the corners (image below, left).
- Variant 1 (Div2, zone 2 enclosure) can be sealed with a wire through a hole drilled in one the corners (image below, centre).
- Variant 2 (SMP, small enclosure) can be sealed by sealing one or more of the bolts or with a wire through a hole drilled in one the corners (image below, right).



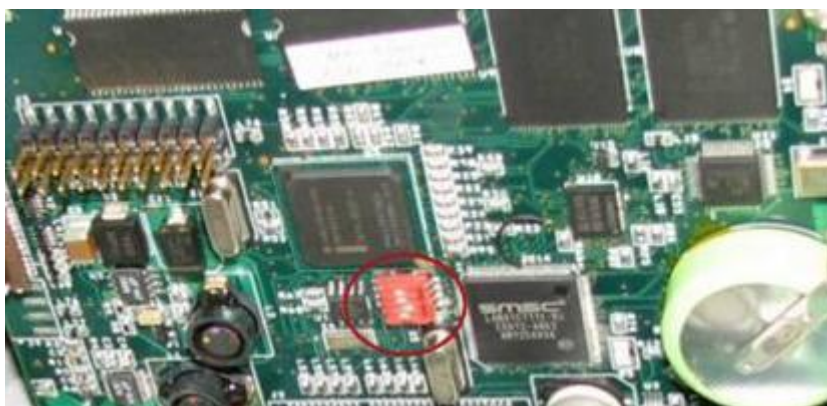
1.9.2 Protecting Parameters

MultiLoad has multiple options to protect the W&M parameters. There is an internal W&M switch and optional external program/W&M switches.

For securing the parameters, there are two steps to follow:

Step 1: DIP-switches inside the enclosure

Two DIP-switches on the CPU board (see below) provide the closure of the Program Mode/W&M (Weights and Measures) switch contacts. When the MultiLoad II does not have the external Program Mode/W&M switch installed, it is necessary to use these DIP-switches on the CPU board to enable program mode and W&M access.



The switches are numbered 1 through 4 with 1 being closest to the front of the enclosure (top of the picture), and 4 being towards to the back of the enclosure (bottom of the picture). When the switch is in the ON position, the switch is in the active state. A switch is ON when it moved to the right, and OFF when moved to the left. Switch #3 is the program mode switch. Switch #4 is the W&M access switch.

Step 2: External program/W&M switch

Optionally the MultiLoad II supports an external access control switch, electrically wired in parallel with the DIP-switch. This external switch limits access to Program Mode and changes to W&M controlled parameters. The external switch can be sealed to prevent access to W&M and/or Program mode.

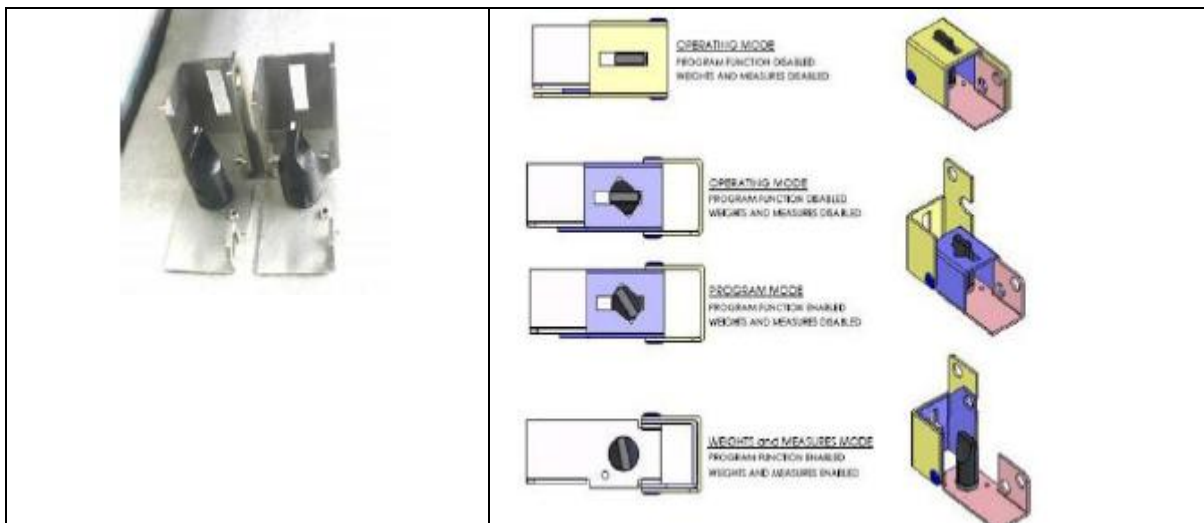
A switch input is active (parameters can be changed) when either the Dip-switch OR external switch is active (ON). If the external access control switch is present, DIP switches 3 and 4 (bottom switch) must be in the off position (moved left) prior to sealing the MultiLoad II enclosure to ensure that programs and W&M parameters can be secured via the external access control switch. If the external control switch is not present, Dip-switch 4 must be in the off position prior to sealing the MultiLoad II enclosure; Dip-switch 3 may be placed in the off position.

Access to the W&M parameters is via a sealed switch located on the side or top of the instrument.

Write access to W&M parameters is denied unless the program / W&M switch is in the W&M position.

This switch also has a program position; when in this position changing of the W&M parameters is not possible.

Version 1 uses rotary switches:



Version 2 uses two magnetic bolts. Each bolt can be individually sealed and/or the cover of the bolts can be sealed. The magnetic sensible circuitry inside the MultiLoad II, is designed in such a way that it is not possible the place a switch in the ON position without removing the corresponding magnetic bolt.



1.10 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	
Model number	
Serial number	
Pattern approval mark	NMI No S684	
Year of manufacture	
Accuracy class	0.5 or 1.0	
Environmental class	C	(#1)
Liquid temperature range°C to°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 instrument to which the calculator/indicator is fitted is marked or displayed on the face of the indicator in the form 'Minimum Delivery 100 L' or 'Minimum Delivery 100 kg'.

2. Description of Variant 1

approved on 26/02/15

The pattern housed in a zone 2 enclosure and now known as a model MultiLoad II Div2 (Figure 5).

3. Description of Variant 2

approved on 26/02/15

The pattern is housed in a small explosion-proof enclosure and now known as a model MultiLoad II SMP (Figure 6).

TEST PROCEDURE No S684

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

Maximum Permissible Errors

The maximum permissible errors are specified in Schedule 1 of the *National Trade Measurement Regulations 2009*.

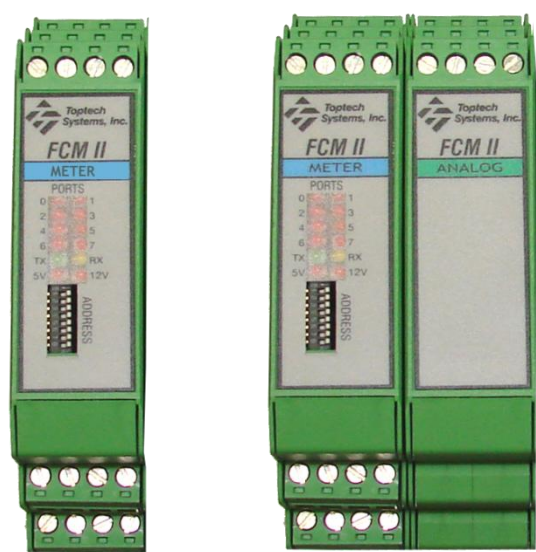
The maximum permissible errors applicable are those applicable to the liquid-measuring system to which the instrument approved herein is fitted, as stated in the approval documentation for the liquid-measuring system or in Schedule 1 of the *National Trade Measurement Regulations 2009*.

FIGURE S684 – 1



Totech Systems Model MultiLoad II Calculator/Indicator
(EXL Enclosure, the Pattern)

FIGURE S684 – 2



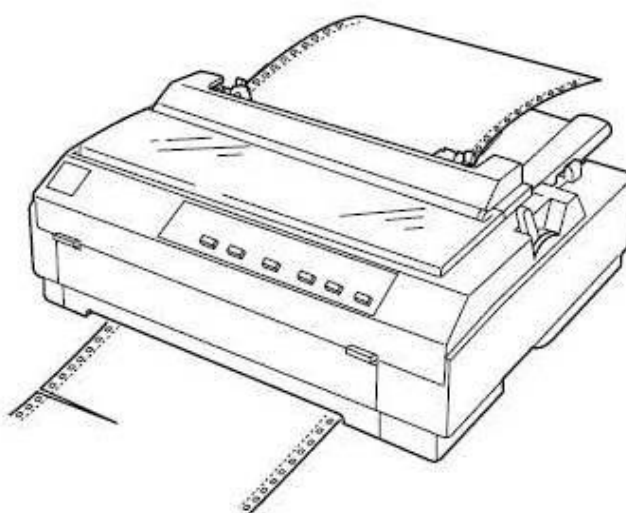
Typical Totech Systems Flow Control Modules (FCM)

FIGURE S684 – 3



Eltomatic Model 01-08 or Model 01-09 Pulse Generator (in optional cover kit)

FIGURE S684 – 4



Epson model LQ-580 printer

FIGURE S684 – 5



Model MultiLoad II Div2 enclosure – Variant 1

FIGURE S684 – 6



Model MultiLoad II SMP (small enclosure) – Variant 2

~ End of Document ~