Australian Government
Department of Industry, Science and Resources

National Measurement Institute

36 Bradfield Road, West Lindfield NSW

Supplementary Certificate of Approval

NMI S718

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.

Diamond Key International FlexLinc Model FLX-BC Controller for Liquid measuring Systems

submitted by Diamond Key International
110 Henderson Road
Rowville VIC 3178

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 is subject to review at the decision of the Chief Metrologist in accordance with the conditions specified in the document NMI P 106.

DOCUMENT HISTORY

Rev	Reason/Details	Date
0	Pattern & variant 1 provisionally approved – interim certificate issued	22/09/16
1	Pattern & variant 1 approved – certificate issued	2/12/16
2	Variant 2 approved – certificate issued	23/01/26

CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI S718' and only by persons authorised by the submittor.

Instruments incorporating a component purporting to comply with this approval shall be marked 'NMI S718' in addition to the approval number of the instrument, and only by persons authorised by the submittor.

Instruments purporting to comply with this approval and currently marked 'NMI PS718' may be re-marked 'NMI S718' but 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*.

Phillip Mitchell
A/g Manager
Policy and Regulatory Services

TECHNICAL SCHEDULE No S718

1. Description of Pattern provisionally approved on 22/09/16 approved on 2/12/16

A DKI FlexLinc model FLX-BC (*) loading controller for use in liquid-measuring systems incorporating compatible (#) NMI-approved flowmeters (Figure 1).

(*) Abbreviated model number - the full model number for the pattern is FLX-BC-D-1-1-C-0-L-A-A.

1.1 Field of Operation

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

- Environmental class −25 °C to 55 °C
- Power supply 110-240 VAC mains supply
- Maximum input frequency 10 000 pulses/second/channel
- Accuracy applications Class 0.5

For volume conversion for temperature facility:

- Liquid temperature range −10 °C to 50 °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 (to Australian government standard), or Table 54D for Lube Oils.

1.2 Controller

The FLX-BC controller (Figure 2) incorporates a 10” full colour liquid crystal display (LCD) for displaying messages/prompts, and volume display for each flowmeter (loading arm/line).

The instrument can control the delivery of up to 6 separate loading arms/lines. The delivery operation can be authorised by entering user name and password, IC card, iButton or finger print for identifying the user. The data entry/selection is made via the integrated keypad. The volume is displayed in 0.1 L increments.

The FlexLinc FLX-BC controller operates Meterboard version: M2.1.2-P2.1.0 software. (Also refer to Variant 2)

1.3 Pulse Generator

The FlexLinc controller is approved for use with a Veeder-Root Model 767163-305 pulse generator, or any other compatible (#) NMI-approved dual channel measurement transducer.

(#) ‘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.

1.4 Non-Linearity Correction Facility

A multi-point correction facility is available, which allows up to four meter factors in the range 0 to 9.99999 to be programmed as a function of flow rate within the approved range. The FlexLinc controller applies interpolation processes to calculate the meter factor for the current flow rate based on the meter factor programmed for the next highest and the next lowest flow rate.

1.5 Flow Control Valve

Any compatible (#) solenoid-operated digital flow control valve, analogue valve or two-stage valve located downstream of the flowmeter, may be interfaced to the FlexLinc controller for controlling the delivery process and to stop the flow in the event of errors detected by the checking facility.

1.6 Temperature Probe

For temperature measurement applications and for volume conversions, a Rosemount model 15469, PT 100 4-wire RTD with 4-20 mA 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.

1.7 Volume Conversion for Temperature Facility

An electronic volume conversion for temperature facility 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.

1.8 Markings and Notices

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

Pattern approval number	NMI S718
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 (*)

(*) Required when volume conversion for temperature is utilised.

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

Note: The minimum measured quantity specified for the meter shall be programmed into the FlexLinc controller to prevent deliveries less than the specified minimum delivery for the flowmeter to which the controller is interfaced.

1.9 Verification Provision

Provision is made for the application of a verification mark.

1.10 Sealing Provision

Access to calibration parameters requires is sealed using mechanical sealing on the controller enclosure (Figure 3). A jumper switch on the ARM board inside the controller enclosure enables access to calibration related parameters.

To change any of calibration figures, a Calibrator role username and password need to be entered. A data log of the changes with date and operator information is available.

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

With a FlexLinc FLX-DI (Display Interface) and FLX-LC (Load Controller) having the same features as the pattern with internal components separated into two separate enclosures (Figures 4 and 5).

3. Description of Variant 2 approved on 23/01/26

The Pattern DKI FlexLinc model FLX-BC (*) loading controller operates Meterboard version: M2.1.2-PX.X.X (*) software.

(*) X.X.X non-metrological functions.

TEST PROCEDURE

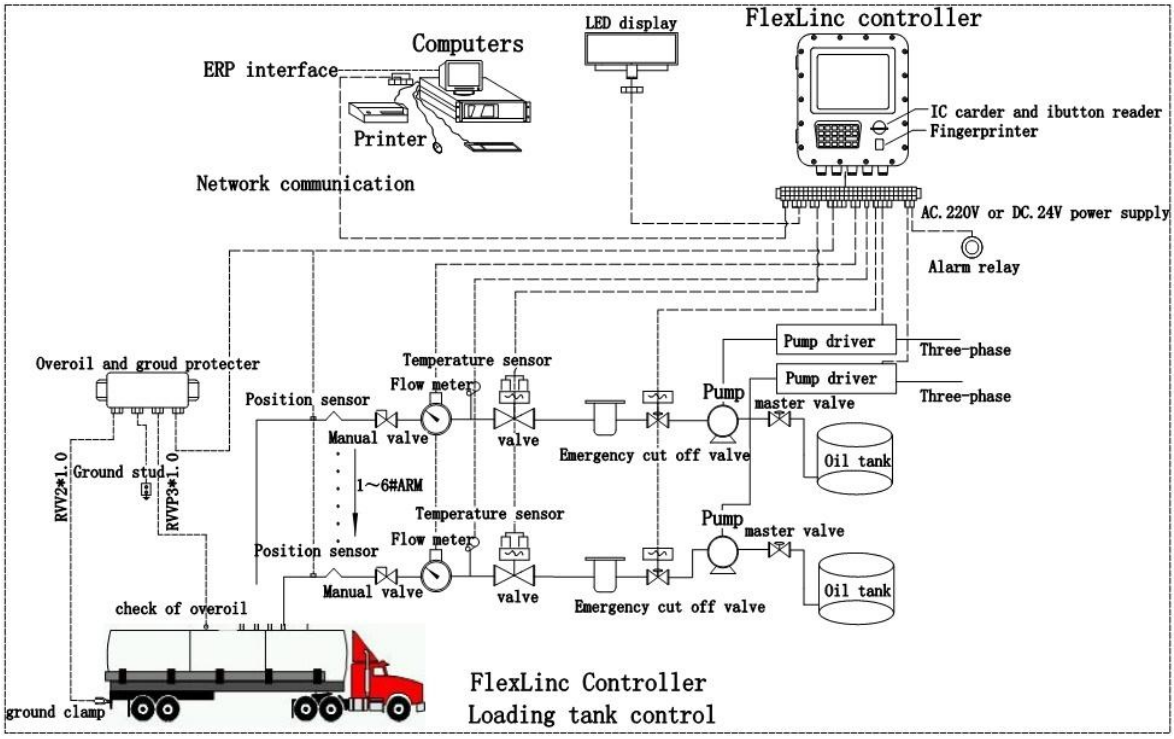
Instruments shall be tested in accordance with any relevant tests specified in the National Instrument Test Procedures.

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 are specified in schedule 1 of the *National Trade Measurement Regulations 2009*.

FIGURE S718 – 1

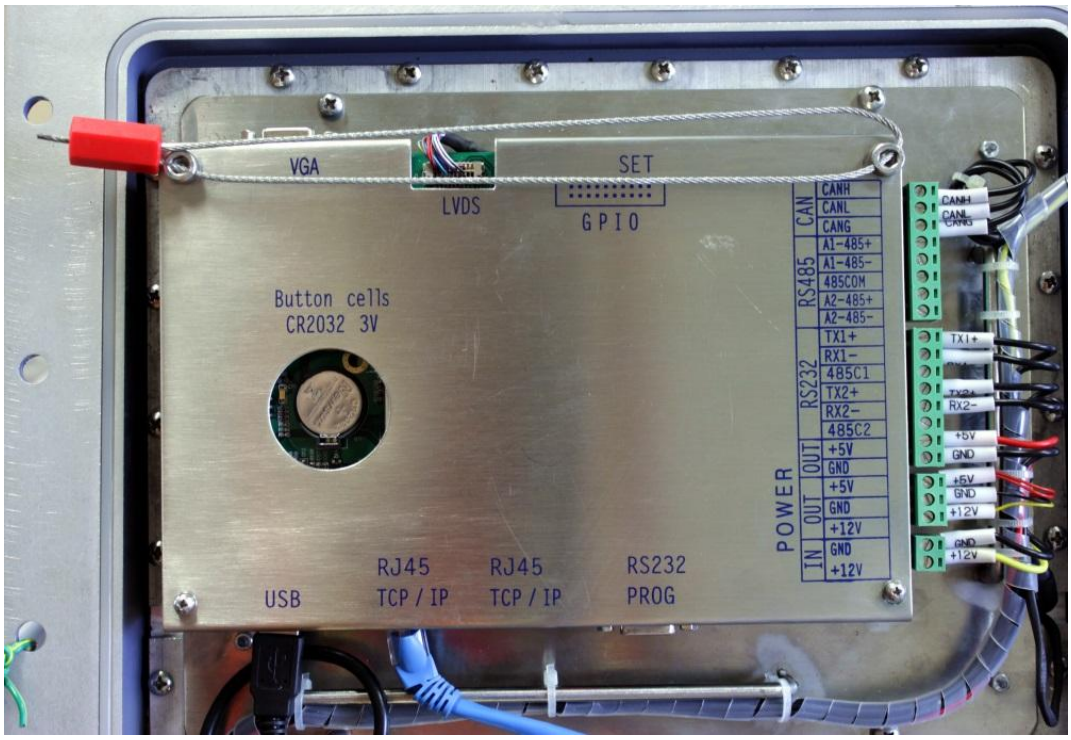


Diamond Key International FlexLinc Liquid measuring System (Pattern)

FIGURE S718 – 2

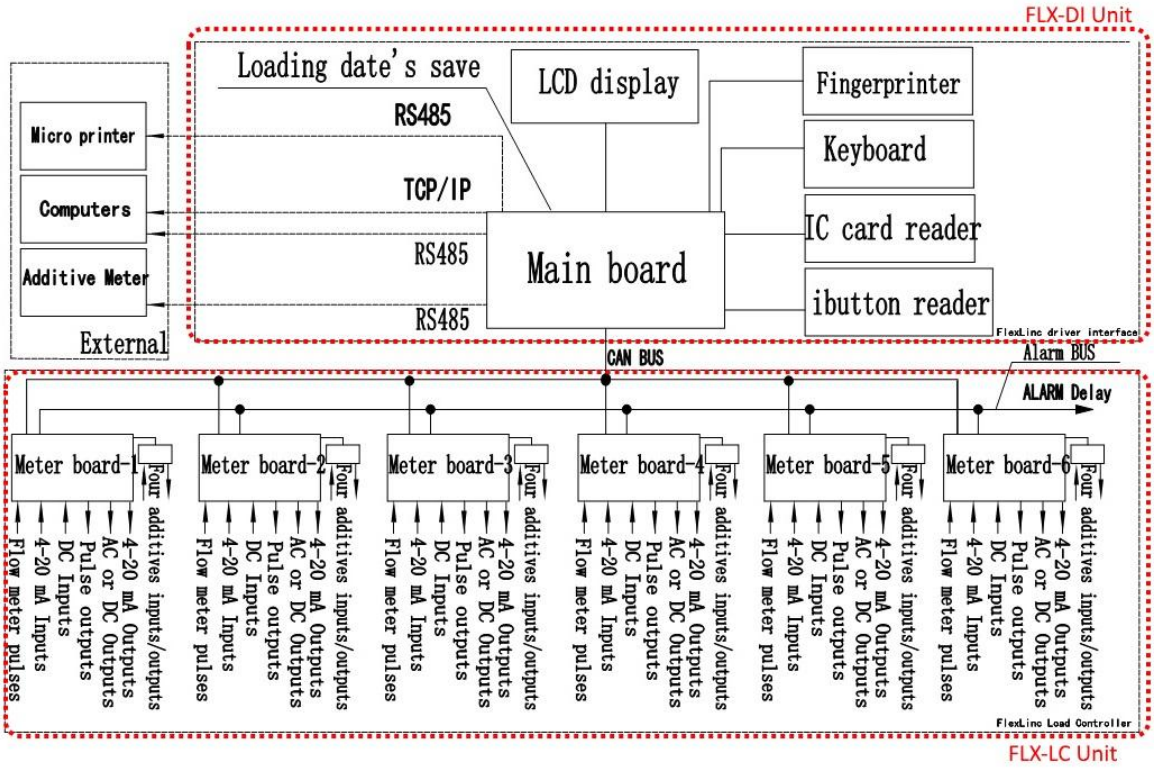
FlexLinc Model FLX-BC Controller (Pattern)

FIGURE S718 – 3



Typical Mechanical Sealing

FIGURE S718 – 4



FlexLinc Model FLX-BC Controller System in Separate Housings (Variant 1)

FIGURE S718 – 5

FlexLinc Model FLX-BC Controller in Separate Housings (Variant 1)

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