National Standards Commission

Supplementary Certificate of Approval

No S191A

Issued under Regulation 9
of the
National Measurement (Patterns of Measuring Instruments) Regulations

This is to certify that an approval for use for trade has been granted in respect of the

Email Model BLC80 Flowmeter Controller for Liquid-measuring Systems

submitted by Email Electronics
88-94 Canterbury Road
Kilsyth VIC 3137.

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 Certificate is issued upon completion of a review of NSC approval No S191.

CONDITIONS OF APPROVAL

This approval is subject to review on or after 1 December 1999.
This approval expires in respect of new instruments on 1 December 2000.

Instruments purporting to comply with this approval shall be marked NSC No S191A and only by persons authorised by the submittor.

Instruments incorporating a component purporting to comply with this approval shall be marked NSC No S191A in addition to the approval number of the instrument.

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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 Commission 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 the Commission's Document 106.

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

The Commission reserves the right to examine any instrument or component of an instrument purporting to comply with this approval.

DESCRIPTIVE ADVICE

Pattern: approved 4 November 1994

- An Email model BLC80 flowmeter controller for use in Commission-approved liquid-measuring systems.

Variants: approved 4 November 1994

1. With certain models of the BLC series controllers.

2. With a number of BLC series controllers interfaced with a compatible computer and then known as an Omega system.

Technical Schedule No S191A describes the pattern and variants 1 and 2.

FILING ADVICE

The documentation for this approval comprises:

Supplementary Certificate of Approval No S191A dated 18 August 1995
Technical Schedule No S191A dated 18 August 1995 (incl. Test Procedure)
Figures 1 to 4 dated 18 August 1995

Signed and sealed by a person authorised under Regulation 9 of the National Measurement (Patterns of Measuring Instruments) Regulations to exercise the powers and functions of the Commission under this Regulation.

National Standards Commission

TECHNICAL SCHEDULE No S191A

Pattern: Email Model BLC80 Flowmeter Controller for Liquid-measuring Systems.

Submittor: Email Electronics
88-94 Canterbury Road
Kilsyth VIC 3137.

1. Description of Pattern

An Email model BLC80 controller for use in a Commission-approved liquid-measuring system.

1.1 The Controller (Figure 1)

The model BLC80 controller with firmware Version 1.24 (or later) incorporates a preset facility, a calibration facility, a multi-point linearisation correction facility, and an electronic volume conversion for temperature facility.

The controller may be interfaced with up to four Commission-approved flowmeters fitted with compatible Commission-approved pulse output devices; the flowmeters may be either positive displacement, turbine or mass meters. A 100 Ω platinum resistance temperature probe and a digital flow control valve are required for each flowmeter; the probe is only required for systems that require volume conversion. When interfaced to a mass flowmeter the BLC80 controller is configured to display measurements in mass.

The maximum flow rate (L/min or kg/min) of the flowmeter shall be no greater than the result of 48 000 pulses per minute produced by the pulse generator divided by the meter K-factor in pulses per litre (or kg).

1.2 Calibration Facility

The BLC80 controller incorporates a calibration facility by means of a K-factor setting in the range 5.0000 - 15.0000.

1.3 Volume Conversion For Temperature Facility

An electronic volume conversion for temperature facility is used to convert the measured volume to volume at 15°C of generalised petroleum products of density between 720 kg/m^3 and 860 kg/m^3, at liquid temperatures between 0°C and 45°C. Volume conversion is based on Table 54B (generalised products) of the ASTM-IP *Petroleum Measurement Tables.*

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The converted volume may be viewed on the BLC80 controller by using an authorised magnetic card. In addition, for every transaction the converted volume and flow weighted average temperature are printed on the data logger, together with the density at 15°C for which the volume conversion device is set.

1.4 Linearisation

A linearisation correction facility is incorporated which may be used to linearise the meter calibration curve as a function of flow rate.

A number of field calibration meter factors as a function of flow rate can be entered, limited to a maximum flow rate of 3000 L/min (or kg/min) at which the meter factor must be set to unity. From the entered data, the linearisation facility computes and stores the interpolated meter factors for flow rates of 150, 300, 500, 750, 1500 and 2000 L/min (or kg/min).

1.5 Controls and Indications

(a) Identification, preset and compartment data-entry keypad and display;

(b) A display and keypad(s) for selecting up to 4 loading-arms;

(c) An alphanumeric display unit for driver and manager prompts, system status display and error messages;

(d) Display or markings for each loading-arm showing product, preset mass (in kg) or volume (in litres), compartment number that the selected arm is connected to, and unconverted mass or volume; and

(e) A manual (wipe-through type) magnetic card reader.

1.6 Operating Procedure

The operating procedure for the BLC 80 controller varies depending on the site requirements, however in general the procedure includes the following steps:

(a) Connect the required interlocks;
(b) Authorise the delivery via a magnetic identification card;
(c) Select the loading-arm and compartment number;
(d) Preset the required amount; and
(e) Commence the delivery by pressing the START key.

The delivery is controlled by the BLC80 in accordance to the programmed flow/volume (or flow/mass) characteristic.

When all interlocks are disconnected, the transaction is considered complete. In addition to the normal operating procedure, special cards may be used at the BLC80 controller to allow access to management data or for testing purposes.

1.7 Verification/Certification and Sealing Provision

Provision is made for a verification/certification mark to be applied.

The controller may have its calibration altered by changing the integrated circuits that store the calibration factors; when connected to an Email model Omega 2000 or Omega 3000 system (refer Variant 2) the calibration may be altered remotely. Access to the calibration change mode is via a security system incorporating user identification and password protection. This security system is configured to restrict access to authorised personnel only. Whenever a change is made to any calibration item, the changes are printed on the data logger; this information includes identification of the person making the change.

1.8 Markings and Notices

(a) The following information shall be clearly and permanently marked on one or more permanently attached nameplates:

Manufacturer's name or mark	
Model number	
Serial number	
Approval number	NSC No S191A
Liquid temperature range (*)	0°C to 45°C
Liquid density range (*)	720 to 860 kg/m^3

(*) Mandatory when volume conversion for temperature facility is used.

(b) The preset display is marked 'Preset Indication Not in Use For Trade'.

(c) When displaying the converted volume, the indicator reading face shall be marked 'Volume Delivered Converted to 15°C', or 'Litres at 15°C', or 'Reference Temperature 15°C'.

(d) Whenever the converted volume is reported, the density at 15°C is also reported.

2. Description of Variants

2.1 Variant 1

With certain models of the BLC series of controllers as listed below:

(i) Model BLC88 (Figure 2) for controlling up to four of any eight Commission-approved flowmeters and incorporating eight volume displays, one alphanumeric display, three keypads and one card reader.

(ii) The models BLC80T (Figure 1) and BLC88T (Figure 3) which are similar to the models BLC80 and BLC88 respectively but are designed for applications such as loading of rail tanks where the magnetic cards are required for authorisation of each loading-arm. The model BLC88T is similar to the model BLC88 but has two alphanumeric displays, four data entry keypads and two card readers (resembling a dual model BLC80T in a single enclosure).

2.2 Variant 2

With a number of BLC series controllers connected in parallel and interfaced with a compatible computer (using a UNIX operating system) and a data logger.

Such systems (Figure 4) are known as either model Omega 2000 or model Omega 3000 Release 7.0 (or later) depending on the administrative and management facilities provided.

The Release number is displayed within a window on the top-left-hand side of any standard character-based login.

The computer allows calibration K-factors, meter factors, densities and presets to be downloaded to each controller. The data logger is used for data logging of deliveries made by each controller and for recording the K-factor for each meter and the appropriate meter factor for each flow rate; the date of the last change to the factors is also shown.

The Omega 2000 or Omega 3000 computer system cannot alter the firmware in the BLC controller; it simply passes various parameters such as K-factors, meter factors, density factors and flow profile settings to the controller when necessary. Every time this occurs, the data logger records the event both electronically and by printing to the data logger.

The converted volume may be viewed on the BLC80 controller by using an authorised magnetic card, or it may be printed by the data logger.

TEST PROCEDURE

The maximum permissible shaft revolutions of the pulse output device, or the maximum signal frequency from a volume or mass metering transducer, as well as the maximum flow rate of the flowmetering system shall be considered in conjunction with any tests specified in the approval documentation for the instrument to which the pattern is connected, and in accordance with any relevant tests specified in the Inspector's Handbook.

Maximum Permissible Errors at Verification/Certification

The maximum permissible errors applicable are those applicable to the system to which the instrument approved herein is fitted, as stated in the approval documentation for the system.

Whenever the volume conversion device is used, the maximum permissible error specified above is increased by 0.2%.

Reference conditions for petroleum liquids are specified in AS 2649 - 1983, *Petroleum Liquids and Gases - Measurement - Standard Reference Conditions.*

1. Special magnetic cards are available from the manager which allow authorisation of deliveries and details of the transaction to be obtained.

(i) Using the operating procedure guide given in the Technical Schedule, initiate a delivery by presetting the volume to be delivered.

(ii) For the delivery, measure the average temperature of the product.

(iii) Calculate the temperature converted volume using the appropriate ASTM-IP-API Tables for the set liquid density.

(iv) Compare the displayed volumes (both converted and unconverted) against the actual volume delivered.

2. For Omega systems:

(i) Check that the delivery details on the BLC controller are transmitted and data logged correctly by the computer.

(ii) Check that any changes to the calibration factors are automatically data logged.

3. Where the linearisation correction facility is implemented, check that the meter factors for the corresponding flow rates, as computed by the Omega 2000 or 3000 system, correlate with the meter factors given in the calibration report.

National Standards Commission

Notification of Change

Supplementary Certificate of Approval No S191A

Change No 1

The following change is made to the approval documentation for the

Email Model BLC80 Flowmeter Controller for Liquid-measuring Systems

submitted by Email Electronics
88-94 Canterbury Road
Kilsyth VIC 3137.

In Supplementary Certificate of Approval No S191A and its Technical Schedule, both dated 18 August 1995, all references to the submittor should be amended to read;

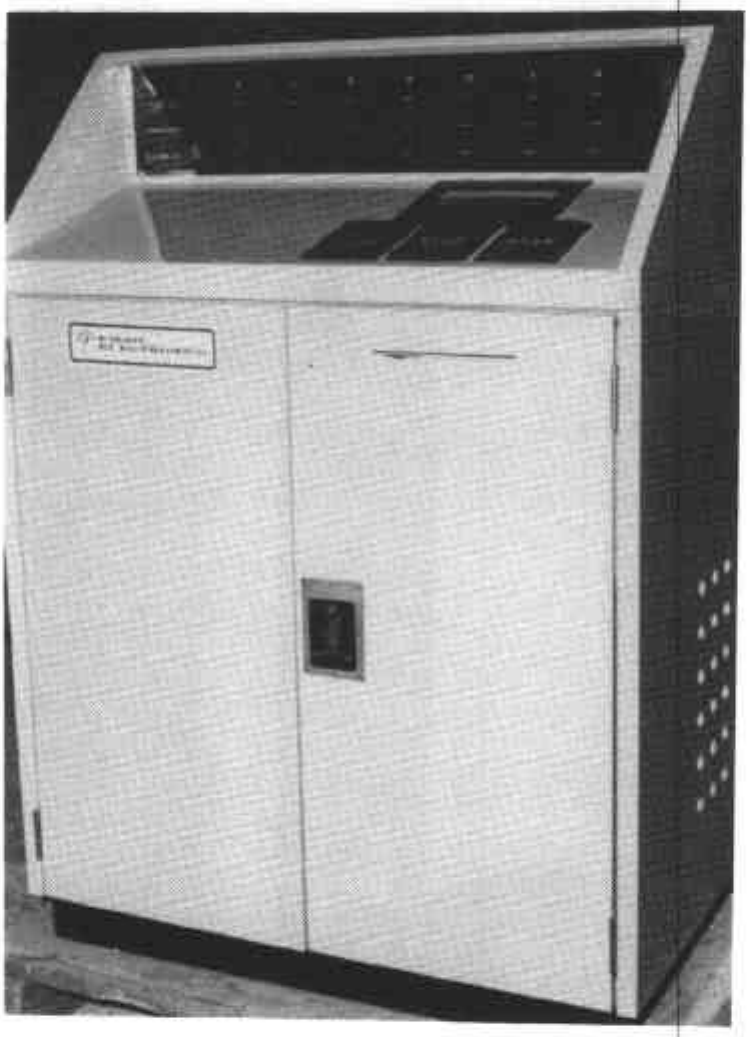
Diamond Key International Pty Limited
110 Henderson Road
Rowville VIC 3178.

Signed and sealed by a person authorised under Regulation 9 of the National Measurement (Patterns of Measuring Instruments) Regulations to exercise the powers and functions of the Commission under this Regulation.

FIGURE S191A - 1

Email Model BLC80 (or BLC80T) Controller

FIGURE S191A - 2

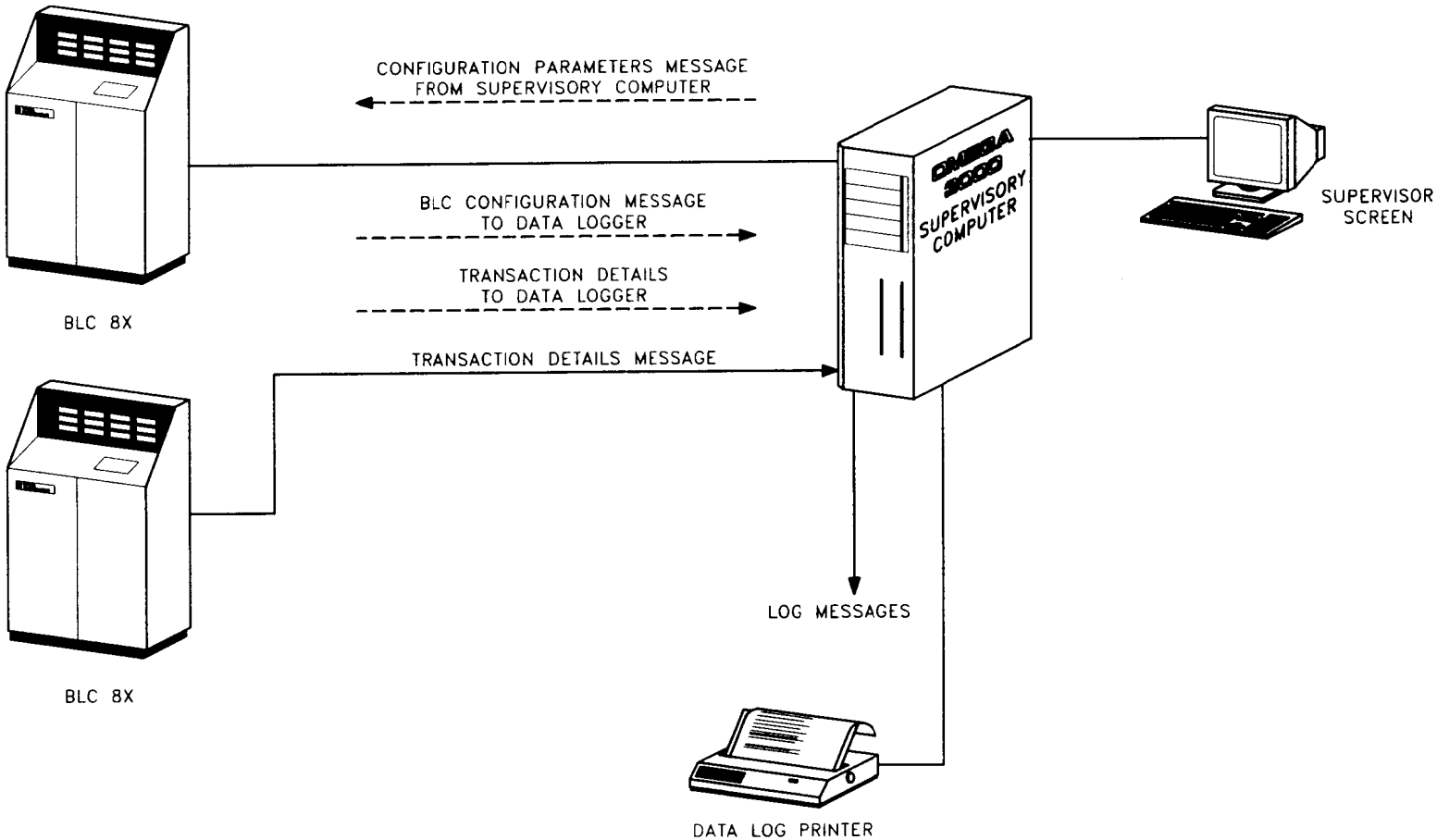


Model BLC88

FIGURE S191A - 3

Model BLC88T

FIGURE S191A - 4



Typical Omega Flowmetering System - Variant 2