

Nederlands Meetinstituut

# Test Certificate

Number **TC3505** Revision 0  
Project number: 204736  
Page 1 of 6

Issued by NMI Certin B.V.  
Hugo de Grootplein 1  
3314 EG Dordrecht  
The Netherlands

By virtue of The Dutch Weights and Measures Regulation: "Ijkregeling vloeistofmeetinstallaties en vloeistofmeters".

Applicant Daniel Europe Ltd.  
Logie Court  
Stirling  
U.K.

Submitted **An electronic calculating and indicating device**

Manufacturer : Emerson Process Management  
Flow computer division  
Designation : FloBoss S600

Characteristics Accuracy class : 0.3  
Environmental class : B (fixed instruments installed indoors)  
Software version : Lyondell Liquid V1.2.

In the Description TC3505 Revision 0 the additional characteristics are given.

Description and Documentation The electronic calculating and indicating device is described in the Description TC3505 revision 0 and documented by the documentation folder TC3505-1.

Remark 1 An overview of the performed tests is given in the Appendix belonging to this Testcertificate.

Remark 2 The S600 did not fulfil the cyclic damp heat test. However, OIML R117, article A2, third paragraph, allows the manufacturer to indicate specific environmental conditions, based on the intended use of the instrument.  
The manufacturer has made the following statement:  
Daniel Europe Ltd considers that the S600 FloBoss is delicate electronic equipment, which must be stored in stable, dry conditions, and therefore the damp heat cyclic test is not applicable and this should be stated in your report.  
The supplied equipment will contain a notice along the following lines  
"Sensitive electronic equipment; must be maintained in temperature stable, dry conditions, both when switched on and when switched off".

Dordrecht, April 4<sup>th</sup>, 2003  
NMI Certin B.V.

  
W.A.C.M. van Leeuwen  
manager Certification Dordrecht

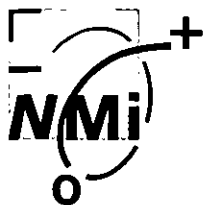
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## 1 General information on the electronic calculating and indicating device

All properties, mentioned or not, of this electronic calculating and indicating device, shall not be in conflict with the Dutch Weights and Measures Regulation "Ijkgeregeling vloeistofmeetinstallaties en vloeistofmeters". This Test certificate describes an electronic calculating and indicating device intended for processing the signals from one to twenty four measurement transducers, depending on the system configuration. The calculating and indicating device is capable of handling pulse-signals representing volume or mass measurement.

### 1.1 Essential Parts

- 1.1.1 Processor board", included an RS232C printer connection with parity check;
- 1.1.2 Intelligent I/O board, including:
  - 1.1.2.1 Resistance input devices for Pt-100 temperature transmitters;
  - 1.1.2.2 4 to 20 mA Current loop signals, for input of temperature and/or pressure;
- 1.1.3 Indication board;
- 1.1.4 Back plane board;
- 1.1.5 Software, characterized as Lyondell Liquid V1.2.  
Remark: The software may be combined with software for gas metering applications.

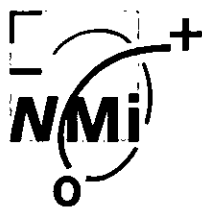
### 1.2 Essential Characteristics

- 1.2.1 The characteristics as described on the front page of this Test certificate.
- 1.2.2 Software functions, as described below
  - 1.2.2.1 Calculation from mass flow to actual volume flow, and integrating the flow values over time to achieve totals for volume and mass.
  - 1.2.2.2 Conversions  
The calculating and indicating device can perform conversion calculations according to the following methods:
    - API Manual of Petroleum Measurements Standards, Chapter 11.1 (August 1999 draft document); table 53A and/or 54A (Crude Oil);
    - API Manual of Petroleum Measurements Standards, Chapter 11.1 (August 1999 draft document); table 53B and/or 54B (Refined Petroleum Products);
    - ASTM-IP-API 1986 (LPG) Table 53 and 54;
    - API Manual of Petroleum Measurements Standards, Chapter 11.2.1M, issued August 1984;
    - API Manual of Petroleum Measurements Standards, Chapter 11.2.2M, issued August 1986.

Conversion is based on the measured actual liquid temperature, actual liquid density and actual liquid pressure. The latter two values are measured with a Coriolis dynamic mass meter, and as digital information input into the FloBoss 600 via a Micro Motion flow computer type RFT 9739.

Actual liquid temperature, actual liquid density and actual liquid pressure may also be input manually.

- 1.2.2.3 Other legal items, such as checking on date integrity and on parameter seals.



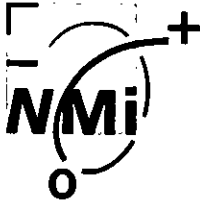
- 1.2.3 Presentation of actual volume and mass, as well as all parameters necessary for the measurement.
- 1.2.4 **Security**  
Various levels of passwords can protect parameter settings. Legal parameters are protected by the highest-level password. So, this highest-level password acts as W&M password, and therefore only is known to the verifying body. The calculating and indicating device comes with a default factory password, which is changed by the verifying body at initial verification. An event log showing all alterations can be printed.
- 1.2.5 **Custody Transfer parameters**  
The Custody Transfer parameters and the mandatory settings are given in paragraph 1.5 of this Test certificate.
- 1.2.6 **Alarm-handling**  
Alarm is signaled by a flashing red LED on the S600 front; as well alarms are logged in a special file.
  - 1.2.6.1 Modbus protocol.
- 1.3 **Essential Shapes**
  - 1.3.1 **Inscriptions.**  
At least the inscription TC3505 is mentioned on the data plate.
  - 1.3.2 The unit of indication is m<sup>3</sup> for volume and ton for mass.
  - 1.3.3 The minimum measured quantity is inscribed on the calculating and indicating device or on a separate plate in the direct vicinity of the display,
  - 1.3.4 In installations where more than one measurement transducer is applied, an identification of the connected measurement transducer shall also be applied onto the calculating and indicating device.
  - 1.3.5 To the flow computer a sticker shall be attached with the following text or a similar text: "Sensitive electronic equipment; must be stored under temperature stable, dry conditions"
  - 1.3.6 **Seals**  
See chapter 3 of this description.
- 1.4 **Conditional Parts**
  - 1.4.1.1 **Digital in- and outputs**  
The calculating and indicating device is equipped with several in- and outputs. As an example, the in- and outputs may be applied for: receiving and/or transmitting alarm conditions, controlling valves, reading valve-positions, receiving/transmitting Batch-start/stop signals, etc.
  - 1.4.2 **Device for securing the software**  
The calculating and indicating device is provided with a software seal with a logging device; this logging device can be found via the menu as "Audit trail log".

## 1.5 Conditional Characteristics

The configuration of Custody Transfer parameters of the calculating and indicating device must comply with what is given below.

At the time of initial verification it shall be clear which parameters must be considered as Weights & Measures parameters. The highest security level, being the Weights & Measures security level, shall protect these parameters.

Display number	Parameter name	Setting
16.4 / 56.5	Base temperature	15,0 °C
16.6	Vapour pressure mode	1)
16.8	LF C/O limit (min. mass flow)	1)
18.1	Pressure source selection	1)
18.2	Temperature source selection	1)
18.3	Density source selection	1)
18.4	KDPF	1)
18.5	Density calibration pressure	1)
18.6	KTPF	1)
19.2	Temperature	1)
19.4	Pressure	1)
19.5	Pressure limits	1)
19.6	Density	1)
19.7	Density limits	1)
20.2 / 57.10	VCF source selection	1)
20.3 / 57.11	VCF limits	1)
21.1	Method	1)
23.8 / 57.16	Standard density source selection	1)
23.9 / 57.17	Standard density limits	1)
24.4	Temperature input scale	1)
33.1	Alarm mode (fixed item)	latched
33.2	Alarm enable (fixed item)	yes
35.1	Totals reset	default = idle
42.2	PC-setup	disable
51.1	Slave address (if applicable)	1)
56.1	Conversion table selection	T53A/T54A with 11.2.1M or T53B/T54B with 11.2.1M or T53/54LPG with 11.2.2M
56.2	Compressibility method	11.2.1M or 11.2.2M; refer to 56.1



Display number	Parameter name	Setting
56.4	Rounding	disabled
57.2	alpha source selection	1)
57.4	beta source selection	1)
57.6	CTL source selection	1)
57.8	CPL source selection	1)

1) This value shall be determined and motivated by the manufacturer or the user.

## 1.6 Conditional Shapes

### 1.6.1 Presentation on the display

Basic delivery display for one meter at a time.

Custom display may give information for more than one meter at a time. In this case meter identification shall be on the display.

### 1.6.2 Printed Ticket

In applications where volume conversion is performed, at least the following is printed on the ticket:

- a unique print-identification ;
- the converted volume, expressed in SI-units;
- an identification of the measured liquid.

### 1.6.3 In applications where no volume conversion is carried out, at least the following is printed:

- a unique print-identification;
- the volume at metering conditions, expressed in SI-units;
- an identification of the measured liquid.

## 2 Conditions for Approval

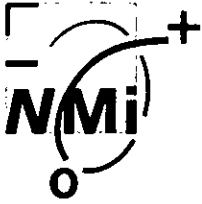
If the electronic calculating and indicating device is applied in a measuring system:

2.1 The electronic calculating and indicating device must be constructed in accordance with the Description and Documentation Folder belonging to this Test certificate.

2.2 The seals shall be applied as described in chapter 3.

## 3 Seals

3.1 The enclosure may be sealed against unauthorized opening.



Performed tests on the electronic calculating and indicating device:

TEST	Part	TYPE	TEST REPORT	TEST HOUSE	REMARKS
Climate and EMC	Calculating and indicating device	FLOBOSS S600	CVN/204736/01	NMi Certin B.V.	Based on OIML R117 requirements
Software (functionality)	Calculating and indicating device	FLOBOSS S600	CVN/204736/01	NMi Certin B.V.	Based on OIML R117 requirements

File: TC\_S600\_r00.doc