

Issued by	NMI Certin B.V.																					
In accordance with	<ul style="list-style-type: none"> - WELMEC guide 8.8 "General and Administrative Aspects of the Voluntary System of Modular Evaluation of Measuring instruments under the MID". - OIML R117-1 Edition 2007 (E) "Dynamic measuring systems for liquids other than water". 																					
Producer	<p>SMAR Equipamentos Ind. Ltda. Rua Dr. Antonio Furlan Jr., 1028 Sertaoziño Brasil</p>																					
Part	<p>An electronic calculating device for use as part of a liquid measuring installation.</p> <table border="0"> <tr> <td>Brand</td> <td>:</td> <td>SMAR Equipamentos Ind. Ltda.</td> </tr> <tr> <td>Designation</td> <td>:</td> <td>AuditFlow V7.2</td> </tr> <tr> <td>Software version</td> <td>:</td> <td>See essential parts.</td> </tr> <tr> <td>Mechanical environmental class</td> <td>:</td> <td>M2 and M3</td> </tr> <tr> <td>Electromagnetic environment class</td> <td>:</td> <td>E2</td> </tr> <tr> <td>Temperature range ambient</td> <td>:</td> <td>-10 °C ... +55 °C</td> </tr> <tr> <td>Humidity environment class</td> <td>:</td> <td>Condensing</td> </tr> </table> <p>Further properties are described in</p> <ul style="list-style-type: none"> - Description number TC8173 revision 0; - Documentation folder number TC8173-1. 	Brand	:	SMAR Equipamentos Ind. Ltda.	Designation	:	AuditFlow V7.2	Software version	:	See essential parts.	Mechanical environmental class	:	M2 and M3	Electromagnetic environment class	:	E2	Temperature range ambient	:	-10 °C ... +55 °C	Humidity environment class	:	Condensing
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Humidity environment class	:	Condensing																				
Remarks	An overview of the performed tests is given in the Appendix that appertains to this Evaluation Certificate.																					
Issuing Authority	<p>NMI Certin B.V. 8 April 2013</p>																					

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1 General information on the electronic calculating device

Properties of this electronic calculating device, mentioned or not, shall not be in conflict with the Legislation.

This Evaluation Certificate is the positive result of the applied voluntary, modular approach, for a component of a measuring instrument, as described in WELMEC guide 8.8. The complete measuring instrument must be covered by an EC type-examination certificate.

This Evaluation Certificate describes an electronic calculating device intended for processing the signals from one up to four volume or mass input signals, depending on the system configuration. The calculating device is capable of handling Foundation Fieldbus signals, double impulse signals representing volume or mass measurements from meters for custody transfer purposes, and MODBUS and Ethernet communication.



example



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1.1 Essential Parts

part	identification	Documentation
Unit HFC302		
Main board	GLL1400 Rev0 E0, also referred to as EDS252	8173-1, -4
H1 and expansion board	GLL1401 Rev0 E0, also referred to as EDS253	8173-2, -4
RS232 driver and filter board	GLL1402 Rev0 E0, also referred to as EDS255	8173-3, -4
Software version	V.2.1.5; checksum 0x765E	-
Unit DF 53-FC		
Power supply impedance for fieldbus (4ports)	GLL1399 Rev0 E0, also referred to as EDS84	8173-5, -6
Unit DF77		
2 x 5 Pulse inputs	GLL1303 Rev4 E0 also referred to as EDS49 R3	8173-7, -8
Software version	v.3.2; checksum 06326207	-
Unit DF11		
2 Groups of 8 24Vdc isolated inputs	GLL1217R1E2	8173-9, -10
Unit DF25		
2 Groups of 4 relay outputs	GLL1179R2E1	8173-11, -12
Unit DF56		
Power Supply for Backplane 20-30VDC	GLL1279R3E1	8173-13, -14
Unit DF60		
Power Supply for fieldbus 20-30VDC	GLL1278R1E5	8173-15, -16

1.2 Essential Characteristics

1.2.1 The characteristics as described on the front page of this Evaluation certificate.

1.2.1 Software specification (refer to WELMEC guide 7.2, issue 5):

- Software type P;
- Risk Class C;
- Extensions L, T, D and I2 apply.
- Extension U and S do not apply



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1.2.2 Calculation of flow rates and flow totals from input impulses, representing Mass or Volume. This may include linearization of the Flow Meter and / or Dual Pulse Integrity to Level A or B to ISO 6551 / IP 252/76.

1.2.3 Conversions

The calculating and indicating device can perform conversion calculations according to the following methods:

- API Manual of Petroleum Measurements Standards, Chapter 11.1, also known as ASTM D-1250-04 incorporating Amendment 2007; methods 53A, 53B, 53D, 59A, 59B, 59D, 54A, 54B, 54C, 54D, 60A, 60B, 60C and 60D.
- ASTM D-1250-80; methods 53A, 53B, 53D, 54A, 54B, 54C, 54D.
- API Manual of Petroleum Measurements Standards, Chapter 11.2.4, Tables 53E, 54E, 59E and 60E; this document is also known as ASTM publication TP27 and as GPA Technical Publication TP-27.
- 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 and reaffirmed December 2007.
- GPA Technical Publication TP-15 (revision 2003). Though this standard uses imperial units, it may be used within a metric environment by converting input values and output values from metric to imperial units and back.

Remark:

The following non metric tables, though not within the scope of this Evaluation Certificate, are also available within the calculating and indicating device.

- API Manual of Petroleum Measurements Standards, Chapter 11.1, also known as ASTM D-1250-04; methods 5A, 5B, 5D, 23A, 23B, 23D, 6A, 6B, 6C, 6D, 24A, 24B, 24C and 24D.
The 1980 methods may also apply; in that case minimum and maximum boundaries should be set up manually.
- API Manual of Petroleum Measurements Standards, Chapter 11.2.4, Tables 23E, 24E; this document is also known as ASTM publication TP27 and as GPA Technical Publication TP-27; also covered by the GPA Technical Publication TP-25.
- API Manual of Petroleum Measurements Standards, Chapter 11.2.1, issued August 1984;
- API Manual of Petroleum Measurements Standards, Chapter 11.2.2, issued August 1986.



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- 1.2.4 Foundation Fieldbus connection to an associated measuring device for measurement of product temperature.
- 1.2.5 Foundation Fieldbus connection to an associated measuring device for measurement of product pressure.
- 1.2.6 Conversion is based on the measured liquid temperature and the measured liquid pressure and manually input liquid density. Liquid temperature and liquid pressure may also be input manually.
- 1.2.7 Other legal items, such as checking on data integrity and on parameter seals.
- 1.2.8 Presentation of actual volume, converted volume (= base volume) and mass, as well as other parameters necessary for the measurement
- 1.2.9 Calculation of batch totals and periodic totals
- 1.2.10 Sealing of the HFC302 module with a sealed switch.
- 1.2.11 Software security
Though the HFC302 can be sealed with a sealed switch, software sealing is possible as well. Other modules have only the possible of software sealing.

The change in the configuration with audit trail and access restriction uses an access level and Password in the FCT block, represented as:

Authorized Person Level (AP): This is the only access level that allows changing the parameter SEALED_CONDITION to "sealed", specifically reserved for the Notified Body responsible for the validation of the measurement system. Another exclusive attribution of this access level is the firmware download. Besides, this level allows unrestricted access to the configuration, including configuration download. Only one login configured for Authorized Person Level is allowed, and only this level of access can configure the corresponding password.

At the moment that other levels get access the status automatically changes from "sealed" to "not sealed".

HFC302 supports 30 login's and associated configuration for each login, as: a string for identification (FCT.USER_NAME_x), access level (FCT.LOGIN_LEVEL) and password (FCT.PASSWORD and FCT.PASSWORD2).

HFC302 supports double password mechanism; it means that it is possible to have two passwords associated to one login. The basic idea is to have two representatives (one representative of supplier and one representative of buyer) to log in. When the user wants to log in, he has to write his password in the FCT.PASSWORD_CODE and FCT.PASSWORD_CODE_2 (if it is configured double password) parameter.

For detailed information about software download see the testreport NMI-10200368-1, issued by NMI Certin b.v., Dordrecht, The Netherlands.

- 1.2.11.1 All Weights & Measures items and parameters shall be secured by the AP level.
- 1.2.11.2 Any changes to Weight & Measures parameters appear in the event log.
- 1.2.12 Custody Transfer parameters
The Custody Transfer parameters and the mandatory settings are given in paragraph 1.5 of this Evaluation certificate.



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1.3 Essential Shapes

- 1.3.1 Connection of the calculating device to one or more viewable screens on external computers, which act as indicating device, using the program SYSCON and/or the program HFC view and/or other dedicated programs.
Only one computer can gather data from the calculating device. The calculating device recognizes that computer by the computer's hard disk number.
The computers and the programs are beyond the scope of this Evaluation Certificate.
- 1.3.2 A printing device can be connected to an external computer, which on its turn is connected to the calculating device via an Ethernet connection.
The computer and the printer are beyond the scope of this report.
- 1.3.3 The flow computer has a flag on a new batch or report. After printing, the flag is removed, resulting in the reprint to be indicated as such.
- 1.3.4 EMC measures.

Volume signal cables and Foundation Fieldbus cables are shielded; the shields are connected to the cabinet ground strips.
The power supply modules DF56 and DF60 inside the cabinet are grounded inside the cabinet to ground strips.
- 1.3.5 Inscriptions.
At least the inscription TC8173 is on the data plate.
- 1.3.6 The unit of indication is liter or m³ for volume and kg or ton for mass. Remark: liters should always be combined with kg's and m³ 's should be combined with tons.
- 1.3.7 The minimum measured quantity is inscribed on the calculating and indicating device or on a separate plate in the direct vicinity of the display.
- 1.3.8 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.
- 1.3.9 Seals
See chapter 3 of this description.

1.4 Conditional Parts

- 1.4.1 Digital in- and outputs
The calculating 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.



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1.5 Conditional Characteristics

1.5.1 Use in a network

AuditFlow communicates using MODBUS client/server implementation. Because of that method, no need for making a distinction between the use within open networks and the use within closed networks exists, because it is always necessary to define the link between a unique pair of master slave addresses. The AuditFlow V7.2 address is protected by a seal.

This is not totally under the control of the AuditFlow V7.2 supplier. However correct design of the network should guarantee that the above described link between the unique pair of master slave address is realized in a proper way.

1.5.2 Custody Transfer parameters

The configuration of Custody Transfer parameters of the calculating 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 Authorized Person (AP) = level, protects these parameters.

The password necessary to change Weights & Measures parameters shall only be known to bodies that are accredited for changing and approving of Weights & Measures parameters.

Each parameter has a specific block reference and name.

parameter block and name	description	setting
HC – IO_TYPE_Rn (n = 1 ... 14)	Select the module type for rack n.	1)
TEMP-MODE BLK	Measured temperature or manually input temperature.	1)
TEMP-CHANNEL	Rack number and slot number.	1)
TEMP-SENSOR CONNECTION_n (n = 0 ... 7)	Temperature sensor connection	1)
TEMP-SENSOR TYPE_N (n = 0 ... 7)	Temperature sensor type	Pt100
AI-MODE BLK	Measured value or manually input value.	1)
AI-SIMULATE	Simulation option	disable
AI-XD_SCALE	Transducer scale values	1)
AI-OUT_SCALE	Output scale values	1)
HI_HI_LIM (various parameters)	Maximum high limit	1)
LO_LO_LIM (various parameters)	Maximum low limit	1)
FCT-authorization and sealed condition	See the manual.	1)
FCT-UNITS	Units for various parameters.	Metric units, depending on the application.



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parameter block and name	description	setting
FCT-LOGIN LEVEL	See the manual.	1)
FCT-PASSWORD	See the manual.	1)
FCT-PASSWORD2	See the manual.	1)
FCT-HFCVIEW_VSN	Serial number of the hard disk where the HFCView is installed. Only the HFCView executed in this computer will communicate with the HFC302.	Correct serial number.
LKD-K-factor	K-factor	Correct K-factor
LKD-volume conversion method	volume conversion method	Applicable product and method.
LKD-Base temperature	volume conversion method base temperature	15 °C or 20 °C, depending on the method
LKD-METERn_FREQ, METERn_LIN and LINn_TYPE (n = 1... 4)	Methods, frequencies and factors for linearization.	Correct values.
PIP-Dual pulse		on
PIP-Phase difference	Phase difference in dual pulses	1)
LCFE-Temperature	Correct settings for temperature measurement.	1)
LCFE-Pressure	Correct settings for pressure measurement.	1)
LCFE-Density	Correct settings for density measurement.	1)
LCFE-Hydrometer correction	ASTM-D80 volume conversion method hydrometer correction.	Applies to ASTM-D80 only; depending on the application ON or OFF.

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

1.6 Conditional Shapes

1.6.1 Presentation on the display

If the ticket gives information for more than one meter at a time the meter identification shall be on the display.

1.6.2 Printed Ticket

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

- a unique print-identification;
- the converted volume, expressed in SI-units;



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- an identification of the measured liquid.
- 1.6.3 In applications where no volume conversion is carried out and a ticket printer is connected, 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

- 2.1 If the electronic calculating device is applied in a measuring system:
- 2.1.1 The electronic calculating device must be constructed in accordance with the Description and Documentation Folder appertaining to this Evaluation certificate.
- 2.1.2 The seals shall be applied as described in chapter 3.
- 2.2 Third parties are not allowed to use this document and the companion documentation folder without written permission of the owner of this document.
- 2.3 The electronic calculating device shall be constructed in accordance to the description and documentation folder that appertains to this Evaluation certificate.

3 Seals

- 3.1 The HFC302 can be sealed with a hardware seal.
- 3.2 After all settings have been set correctly and secured, the cabinet can be sealed with a hardware seal.



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Performed tests on the AuditFlow V7.2:

TEST	Part	TYPE	REFERENCES	TEST HOUSE	REMARKS
EMC, Climate, functionality	Calculating device	AuditFlow 7.2	NMI-10200638-2	NMI Certin B.V.	Based on OIML R117-1, and Welmec 8.8
Software	Calculating device	AuditFlow 7.2	NMI-102006386-1	NMI Certin B.V.	Based on the Welmec guide 7.2, issue 5.

File: TC8173R0.doc