EC type-examination certificate

Number **T10255** revision 7
Project number 14200115

Issued by

NMi Certin B.V.,
designated and notified by the Netherlands to perform tasks with respect to conformity modules mentioned in article 9 of Directive 2004/22/EC, after having established that the Measuring instrument meets the applicable requirements of Directive 2004/22/EC, to:

Manufacturer

Emerson Process Management Flow B.V.
Neonstraat 1
6718 WX Ede
The Netherlands

Measuring instrument

An interruptible or non interruptible **measuring instrument for liquids other than water**

Manufacturer	:	Emerson
Type	:	MMI-MID 002
Minimum – maximum flow rate (Q_{min} - Q_{max})	:	See § 0 of the description
Accuracy class	:	0.3; 0.5; 1.0; 1.5; 2.5 See § 3 of the description
Environment classes	:	Depending on the composition of the measuring instrument. See § 3 of the description
Temperature range liquid	:	See § 0 of the description
Temperature range ambient	:	See § 0 of the description
Intended for the measurement of	:	Oil and oil products, alcohol, potable liquids, chemicals, liquefied gasses under pressure and cryogenic liquids. See § 0 of the description for the approved density range.

Further properties are described in the annexes:
- Description T10255 revision 7;
- Documentation folder T10255-3.

Valid until

10 June 2020

Remarks

- The measuring instrument is approved for measuring mass, density at metering conditions, density at base conditions, volume at metering conditions and volume at base conditions.
- The measuring instrument can be fixed or movable.
- This revision replaces the previous versions, with exception of the documentation folder.

Issuing Authority

NMi Certin B.V., Notified Body number 0122
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1 General information on the measuring instrument

Properties of the measuring instrument, whether mentioned or not, shall not be in conflict with the Legislation.

1.1 Essential Parts

Producer	Type	Evaluation Certificate / Further details	Remarks
Measurement transducer			
Micro Motion	Various types	TC7056	
	Various types	TC7050	
Core Processor			
Micro Motion	MVD700 MVD800	TC7057	
When a flow transmitter 5700 with integral core processor is used the core processors MVD700 or MVD800 are not applied.			
Flow transmitter			
Micro Motion	Various types	TC7057	
Micro Motion	5700	TC8519	
The flow transmitters that are known from TC7057 and the flow transmitter 5700 with remote core processor are optional when a flow computer is part of the installation. When the flow transmitter 5700 with integral core processor is used a flow computer is optional.			
Flow computer			
A flow computer may be optional.			
Emerson Process Management Flow B.V.	FloBoss S600 and S600+	TC7470	
Emerson Process Management Remote Automation Solutions	FloBoss S600 and S600+	TC8218	
	DL8000	TC7661	
OMNI Flow Computers, Inc.	OMNI 3000 OMNI 6000	TC7375	
Contrec Enraf	Contrec 1010	TC7348	
Meci	CDN12	LNE-15088	
FMC	Accuload III	TC7301	
FMC	microLoad	TC7302	
S.A.M.P.I. s.p.a., Italy	TE550	TC7171	
Spirit IT	Flow-X	TC7570	

Air separator			
Bopp & Reuter Messtechnik GmbH	ZGA	LNE-18071	
Faure Herman	Various types	TC7576	
Faudi	Baureihe 54	TC8168	
Isoil Impianti S.p.A.	DVxx-yy	See §2.1	

1.1.1 Data storage / printer (optional):
- Make Spirit IT, type Virtual Printer Manager, Evaluation Certificate TC7172;
- make Dohmann, type Logbuch
  The data storage stores all measurement data coming from the flow transmitters. In case of dispute, this stored data is decisive.

The Logbuch data storage is a PC based (MS DOS operating system) unit, intended to be placed in a 19-inch rack. The data is securely stored on a hard disk. Data transmission is via serial FDW protocol. Power supply is 230 V AC, consumption 22 VA.

The approved software versions are:
- Version 1.xx[1] with checksums 057F[2] / 082D[3] and 18C7[4].
- Version 2.xx[1] with checksums 057F[2] / 082D[3] and 1B93[4].

With:
[1] xx representing non-custody transfer software modifications.
[2] Custody transfer checksum
[3] Unit HDD checksum
[4] Unit REC checksum

The software version can be verified by switch off the unit, connect a keyboard and switch on the unit. After the start message enter the command version and press enter. The software version and custody transfer CRC number is shown on the screen (along with other information). After pressing enter, the other checksums (HDD and REC) and the position of the Weights and Measures switch are shown.

1.1.2 Temperature transmitter (optional)
- Make Rosemount, type 3144P Series. See Parts certificate number TC7458 for details.

1.1.3 Pressure transmitter (optional)
- Make Rosemount, type 3051S series. See Parts certificate number TC7457 for details.

1.2 **Essential Characteristics**

- Minimum – maximum flow rate (Q_{min} – Q_{max}):
  - The Qmin of the measuring instrument shall not be smaller than the largest Q_{min} of the components making up the measuring instrument.
  - The Q_{max} of the measuring instrument shall not be larger than:
    - The smallest Q_{max} of the components making up the measuring instrument in case a single meter or meters in series are used.
    - The sum of Q_{max} of each meter in case parallel meters is used in a non-blending application.
  - The ratio Q_{max}:Q_{min} shall be:
    - At least 5: 1 when measuring cryogenic liquids
    - Suitable for use when used on a pipeline or for loading ships
    - At least 4: 1 in all other cases
- Minimum measure quantity (MMQ):
  The MMQ is not smaller that the largest value of:
  - The MMQ mentioned in the Evaluation certificate of the measurement sensor;
  - 100 times the additional effect of the pipe work between measurement sensor and transfer point due to variations in temperature, equal to 10°C for exposed pipes and 2°C for insulated or underground pipes.
  - nnn times the largest display scale interval
  - nnn times the printed scale interval

    Where nnn is determined by:

Accuracy Class	nnn	Accuracy Class	nnn
0.3	333	1.5	66
0.5	200	2.5	100
1.0	100		

  - The MMQ value is rounded up to the nearest value of $1{\cdot}10^n$, $2{\cdot}10^n$ or $5{\cdot}10^n$, with n being any integer or 0.

- Product density range
  See the applicable Evaluation certificate of the measurement sensor for the product density range.
- Meters in series (optional)
  Two meters can be installed in series; one meter acts as the “custody transfer” meter (used for the measurement) and the other meter acts as the “check” meter. A plate on the meters defines which meter is used for what purpose.
- Meters in parallel, (optional).
  Two or more meters can be mounted parallel.
  Please note that:
  - It is not mandatory that all meters operate simultaneously.
  - The meter size can be different.
  - Measures shall be taken to ensure that the minimum and maximum flow rate of each individual meter is not exceeded.
  - If the delivered total of the meters is summated and presented by the flow computer mentioned in paragraph 1.1, the whole installation can be considered as one measuring system and only one name plate is present. In all other cases, every individual measurement sensor is to be considered an individual measuring instrument, and the appropriate number of name plates has to be present for each measuring system.

- When measuring the same product through one transfer point, the delivered amount is the total of all meters and therefore this amount can be mass and/or volume at metering and/or base conditions.
- When measuring different products via one transfer point (blending application); only the sum of the delivered masses is Custody Transfer.
- Transfer points:
  The measuring instrument consists of one or more transfer points;
  The use of multiple transfer points simultaneously (without interlocking) is only allowed if the delivered quantity is destined for the same receiver or supplier. If this condition cannot be guaranteed, interlocking is required and only one transfer point can be used at a time.

- Temperature range ambient and liquid:
  Depends on the used parts forming the measuring instrument; See the Evaluation/Parts certificates of each component for the approved temperature range.
- When measuring liquefied gases under pressure, it is ensured that the liquid pressure is at least 1 bar higher than the vapour pressure of the liquid. This to ensure that the gas stays in the liquid state throughout the system.

1.3 Essential Shapes

1.3.1 Inscriptions.

- Name plate
  On the measuring instrument, clearly visible, at least the following is inscribed:
  - The CE marking and the supplementary metrological marking
  - This EC type-examination certificate number: T10255.
  - Manufacturers name or trade mark
  - Designation
  - Year of manufacture and a serial number
  - Accuracy class
  - Minimum and maximum flow rate (Qmax and Qmin)
  - Maximum pressure (Pmax)
  - Liquid(s) to be measured
  - Temperature range ambient
  - Environmental classes (mechanical and electromagnetic)
- Measurement sensor
  For the inscriptions on the measurement sensor, see the applicable Evaluation certificate.
- Flow transmitter
  For the inscriptions on the flow transmitter, see the applicable Evaluation certificate.
- Flow computer
  For the inscriptions on the flow computer, see the applicable Evaluation / Parts certificate.
- Temperature and pressure transmitter
  For the inscription on the temperature and pressure transmitter, see the applicable Part certificates
- Air separator
  For the inscriptions on the air separator, see the applicable Evaluation certificate or paragraph 2.1.

1.3.2 Seals

- Name plate
  The nameplate of the measuring instrument is sealed against removal
- Measurement sensor
  For the sealing of the measurement sensor, see the applicable Evaluation certificate.

- Flow transmitter
  For the sealing of the flow transmitter, see the applicable Evaluation certificate.
- Flow computer
  For the sealing of the flow computer, see the applicable Evaluation certificate.
- Temperature and pressure transmitter
  For the sealing of the temperature and pressure transmitter, see the applicable Parts certificates.
- Air separator
  For the sealing of the air separator, see the applicable Evaluation certificate or paragraph 2.1.
- All connections (tapping's) such as blind flanges, valves, etc. located between meter and transfer point.
  Guidelines for measures to take, such as permanent or temporary seals, are given in NMi procedure CPC–PR–01.

1.3.3 Configuration

- For the typical arrangement of the interruptible measuring instrument, see documentation number 10255/5-01 in the Documentation folder.
- For the typical arrangement of the non-interruptible measuring instrument, see documentation number 10255/5-02 in the Documentation folder.

1.4 **Conditional parts**

The measuring system contains also the following conditional parts:

- Temperature sensor (optional).
- Pressure sensor (optional).
- Sample point (optional).
  Installed upstream or downstream of the measurement sensor. In the latter case, see note on the PI&D drawings in the documentation folder.
- Back-up power supply
  Mandatory for non-interruptible systems. Optional for interruptible systems.

1.5 **Conditional characteristics**

- Before a delivery is started, the system after the air separator shall be free of air.
- By-pass of a sensor (optional)
  See documentation numbers 10255/5-01 and 10255/6-01 in the documentation folder for prescribed conditions for by-passing a sensor.

1.6 **Conditional shapes**

- The construction shall be such that no air pockets remain (after the air separator) after the air is released by the vent-off valves.
- Diameter of the valves and piping.

1.7 **Non essential parts**

- Pump, pipe work and connections.
- Block-in valve(s)
- Vent-off valve(s)
- Filter/strainer

2 Information on the main components of the measuring instrument

2.1 Air separator of make ISOIL Impianti S.p.A., type DV-series

2.1.1 Essential parts of the air separator

- Main body
  The air separator mainly consists of a cylinder with tangential inlet and outlet. The inlet is placed above the outlet, and the volume between inlet and outlet is the effective volume of the air separator. The tangential placement of the inlet and outlet sets the liquid inside the air separator into a rotational movement. The centrifugal movement in conjunction with a decrease is flow velocity and pressure causes the liquid and air/gas to separate. See documentation 10255/5-04 for more details of the air separator;
- Release valve
  An automatic operating release valve is placed on top of the air separator. The float valve allows the separated air/gas to be released. The release valve is operated via a float inside the air separator.

2.1.2 Essential characteristics of the air separator:

Type	Diameter		Effective Volume	Q_{max}	P_{max}
	[mm]	[inch]	[L]	[L/min]	[kPa]
DV80-01	80	3	88	1300	200
DV100-01	100	4	160	2000	
DV100-02	100	4	200	2500	
DV100-03	100	4	290	3000	
DV150-01	150	6		3600	
DV150-02	150	6	730	5000	
DV200-01	200	8		7500	
DV200-02	200	8	1600	10000	
DV250-01	250	10		14000	
DV250-02	250	10	2800	16000	
DV300-01	300	12		20000	
DV350-01	350	14	3500	22000	
DV400-01	400	16	4000	25000	

2.1.3 Essential shapes of the air separator:

- Inscriptions:
  The following information is clearly visible on the nameplate:
  - The type;
  - Serial number.
- Seals:
  The air separator is sealed against unauthorized opening.

2.1.4 Non essential characteristics of the air separator

- The separated air/gas is released into the air or into a vapour recovery line.

3 Conditions for Conformity Assessment

- Verification procedure of the system
  - For putting into use, the NMi procedure C-SP-HW-281 can be applied. The title of the procedure is “Procedure C-SP-HW-281 for the MID conformity assessment for the Micro Motion Flow meter when used for custody transfer gas application (annex MI-002) and liquid applications (annex MI-005)”.
  - Verify that the stated accuracy class on the nameplate is suitable for the conditions in which the installation is used.
  - Verify that the stated environmental class (mechanical and electrical) on the nameplate match with the stated environmental classes of each component.
  - NMi procedure CPC-PR-01 describes how to handle valves and connections that are situated between meter and transfer point. The title of the procedure is “Integrity requirements for valves/connections between meter and transfer point in an industrial liquid metering system, equipped with Micro Motion Coriolis meter(s), to comply with the essential requirements out of the MID, annex MI-005”.
- Verification procedure of the meter
  For the putting into use, the NMi procedure C-SP-HW-280 can be applied. The title of the procedure is “Procedure C-SP-HW-280 for the MID conformity assessment for the Micro Motion Flow meter when used for custody transfer in gas applications (annex MI-002) and liquid applications (annex MI-005)”.

  The initial verification can be based on:
  - a water calibration, which includes:
    - a zero mass flow setting at the water calibration facility
    - mass flow tests
    - if applicable a density test
  - In the field
    - a zero mass flow setting, if needed
    - a zero mass flow verification
    - if applicable a density verification.

  Note: a zero mass flow verification and if applicable a density verification can be used for subsequent verifications.

  If the measurement sensor is used bi-directional, the verification in one direction is sufficient.

  This procedure is justified because of the fact that tests have proven that the mass accuracy on water is representative for mass accuracy on other liquids.