Evaluation Certificate No 511-02064-02

Applicant:	**Endress+Hauser Flowtec AG** Kägenstrasse 7 4153 Reinach BL Schweiz
Requirements:	Dynamic measuring systems for liquids other than water - Part 1: Metrological and technical requirements OIML R117-1:2007 Dynamic measuring systems for liquids other than water - Part 2: Metrological controls and performance tests OIML R117-2:2014 WELMEC Guide 8.8 “General and Administrative Aspects of the Voluntary System of Modular Evaluation of Measuring instruments” Issue 2
Type of instrument:	**Electromagnetic flowmeter**
Type designation:	**Dosimag**
Accuracy class:	0.5
Characteristics:	Q_{max}: 10 l/min … 160 l/min Q_{min}: 2 l/min … 8 l/min Pressure range: 0.1 mbar … 6 bar Nominal diameter: DN 8, DN 15K, DN15 and DN 25 Liquid temperature: -10 °C… +55 °C Ambient temperature: -40 °C… +60 °C Environmental class: M2, E2, H3
Certificate valid until:	14 December 2025
Certification body:	Conformity Evaluation Body METAS-Cert

3003 Berne-Wabern, 23 August 2018

Approved by Gulian Couvreur, Head of sector
METAS-Cert

METAS
Lindenweg 50, 3003 Bern-Wabern, Switzerland, phone +41 58 387 01 11, www.metas.ch

1 Name and type of instrument

Electromagnetic flowmeter intended for dynamic measuring systems for liquids other than water.

Type designation: Dosimag

2 Type description

The device is an Electromagnetic flowmeter based on the measurement principle, where a conductive medium flows through a magnetic field in order to induce a voltage. The induced voltage is proportional to the flow velocity, which is used to calculate the volume flow rate by multiplying with the cross section of the pipe.

2.1 Construction

The device consists of a transmitter and a sensor and is only available as a compact version, where the transmitter and the sensor form a mechanical unit.

2.2 Measurement unit

The family of flow meters covers the nominal diameters from DN08, DN15K, DN15 and DN25, which covers the flow rate range from 2 l/min to 160 l/min. The sensor housing and the measuring tube are made of stainless steel, where the measuring tube is lined with PFA.

2.3 Indicating devices

The transmitter has no display as the flow meter is part of a measuring system that converts the output signal in volume or volume flow rate. The output signals are double pulse or Modbus (the measured volume flow or totalized volume).

2.4 Measurement value processing

The electromagnetic measuring principle consists of measuring the voltage induced by the flow of a conductive medium through a magnetic field, which is created through a switched direct current of alternating polarity. The induced voltage is proportional to the flow velocity and the volume flow rate is the flow velocity times the cross section of the pipe. The volume flow rate as well as the delivered volume can be processed.

2.5 Software / Firmware

The approved software version and the corresponding checksums are:

Type	FW-Number	Checksum	Validity	Revision certificate[1]
Dosimag	V03.00.04	0x7C3A5530	Yes	00
Dosimag	V03.00.05	0xA8B8CF3E	Yes	01
Dosimag	V03.00.06	0x4D5A589F	Yes	02

Software has a version number “Vxx.yy.zz”:

- xx: Main index
- yy: Sub index, changes if software function changes
- zz: Bug fix index

The checksum is a fixed constant (not writeable) string in the software. Besides software version number there is a unique CRC32 checksum which is calculated over the whole machine code. It is a fixed part of the hex code in the serial flash memory. Every time the flowmeter is started the CRC32 checksum is calculated and compared with the reference. Also it is periodically calculated and compared during operation. The Software version and CRC32 checksum are readable string parameters via Modbus. For Double Pulse Output (passive) the software version and CRC32 checksum are printed on the nameplate of the device.

2.6 Optional equipment and functions subjected to OIML requirements

N/a

[1] Revision number of the evaluation certificate

3 Technical data

3.1 Rated operating conditions

Accuracy Class	0.5 (OIML R117)
Ambient temperature	-40 °C … 60 °C
Liquid temperature	-10 °C … 55 °C
Liquid conductivity	≥ 500 μS/cm
Liquid pressure	0.1 mbar … 6 bar
Environmental class	M2, E2, H3
Installation conditions	Upstream straight length 10 x DN Downstream straight length 5 x DN
Liquid density	800 kg/m^3 … 1200 kg/m^3
Liquid dynamic viscosity	0.5 mPa·s … 5.0 mPa·s

3.2 Technical data

Nominal Diameter Threaded connector		DN08 5/16”	DN15K 1/2”K	DN15 1/2”	DN25 1”
Q_{max}	l/min	10	40	80	160
Q_{min}	l/min	2	2	4	8
Minimum measured quantity	l	2	2	2	4

3.3 Technical documents

All of the documents and drawings used for the conformity assessment have been submitted to METAS-Cert and are listed in the document named *511-02064_CH_ENDRESS_HAUSER_FLOWTEC_Doc_List_TEC.docx*.

4 Equipment and functions not subjected to OIML requirements

N/a

5 Conditions for the market introduction

The flow meter shall be clearly and indelibly marked with the following information:

- Brand or name of the manufacturer
- Year of manufacture, serial number
- Evaluation certificate number (511-02064)
- Accuracy class
- Minimum measured quantity, MMQ

6 Requirements for manufacturing, putting into use and utilisation

6.1 Requirements for the manufacturing

The metrological examination must be performed using a traceable volume, a mass reference or a master meter and can be based on a water calibration.

The tested flow rates have to cover the flow rate range requested by the measuring system for the intended application.

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

6.1.1 Information accompanying the meter

The manufacturer undertakes to provide information and instructions for use (operating instructions) with the devices placed on the market as this allows the users to connect the measurement device safely and according to the intended purpose.

6.2 Requirements for the putting into use

See the assembly and operating instructions

Other parties may use this Evaluation Certificate only with written permission of Endress + Hauser Flowtec AG, Kägenstrasse 7, 4153 Reinach, Switzerland.

6.3 User instructions

See the assembly and operating instructions.

7 Control of devices in operation

7.1 Test documents

See the assembly and operating instructions

7.2 Testing equipment

The metrological examination must be performed using a traceable volume, a mass reference or a master meter. The used test equipment must cover the flow rates mentioned in chapter 6.1.

7.3 Identification

The type designation should be taken from the type plate.

7.4 Metrological test

The metrological tests must be carried out according to national applicable regulations.

8 Security measures

8.1 Securing the meter casing

Activation of the custody transfer mode

Modbus: To activate custody transfer mode set the parameter “Assign status input” to “Flow override” (factory setting) and put the Dongle on the batching output. The dongle has to be secured with an unlocking protector which has to be sealed mechanical.

Double pulse: To activate custody transfer mode put the cable converter on the Double Pulse output. The cable converter has to be secured with an unlocking protector which has to be sealed mechanical.

9 Certificate history

Version	Date	Description
511-02064	30 November 2015	Initial Evaluation Certificate
511-02064-01	25 February 2016	New FW Version
511-02064-02	23 August 2018	New FW Version

10 Pictures and drawings

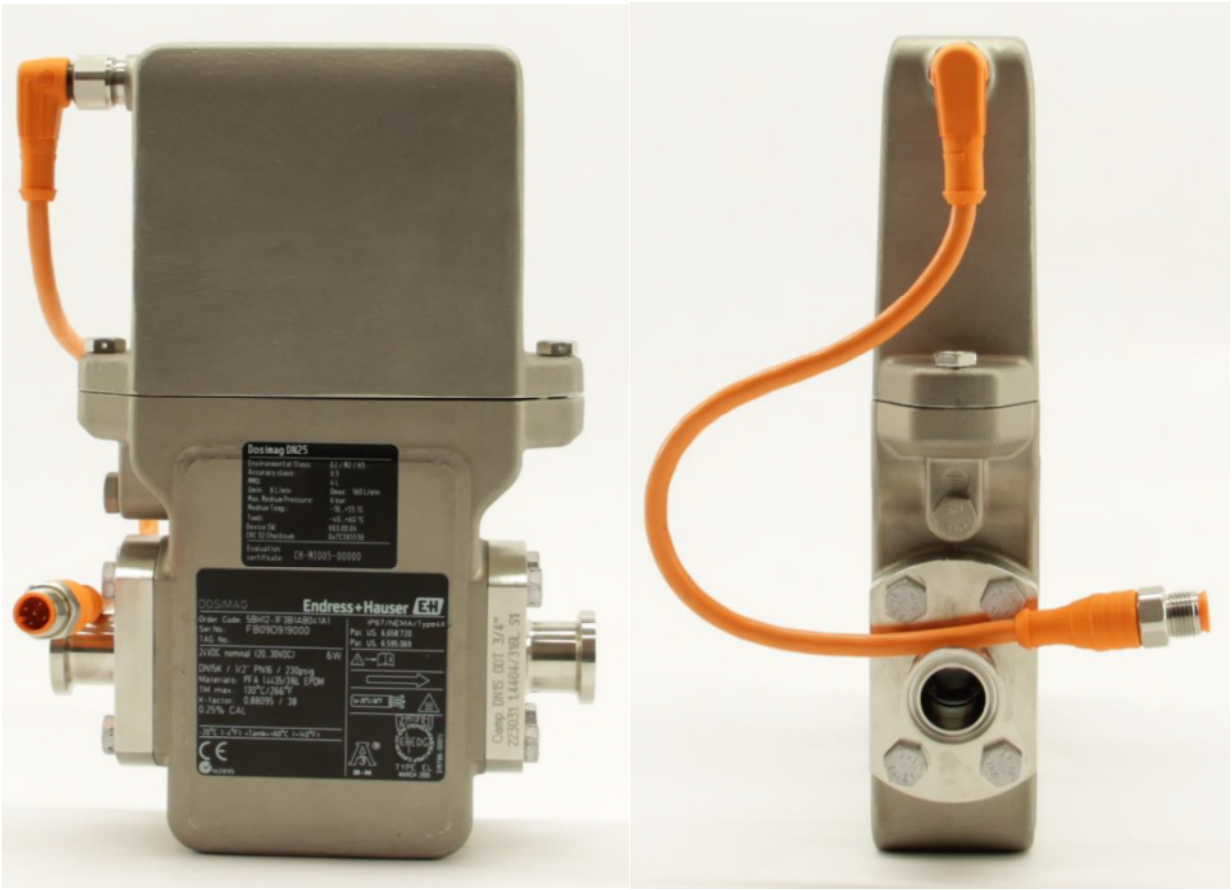

Figure 1 – Flow meter type (Dosimag with double pulse)

Figure 2 – Flow meter type (Dosimag with Modbus)