TYPE APPROVAL CERTIFICATE

N. ELE360915CS002

This is to certify that the product below is found to be in compliance with the applicable requirements of the RINA type approval system.

Description	**Coriolis Mass Flow measuring system**
Type	**Proline Promass 40 E** **Proline Promass 80 E, and 83 E**
Applicant	**Endress + Hauser Italia S.p.A.** **Via Fratelli di Dio, 7** **20063 Cernusco s/N (MI)** **Italy**
Manufacturer	**Endress + Hauser Flowtec AG** **Kaegenstrasse, 7** **CH-4153 Reinach BL1** **Switzerland**
Testing Standard	**Rules for the Classification of Ships - Part C - Machinery, Systems and Fire protection - Ch.3, Sect.6, Tab.1.**

Issued in **Genova, December 3rd 2015.** This certificate is valid until **December 3rd 2020**

RINA Services S.p.A.

Valerio Bonanni

Genova, December 03, 2015

RINA Services S.p.A.
Via Corsica, 12 – 16128 Genova

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Main Features:

Application:
• Measuring principle operates independently of physical fluid properties such as viscosity or density
• Measurement of liquids and gases

Flow measuring system based on Coriolis consists of transmitter type **Promass 40, 80 & 83,** and Sensor type **E**

Devices properties
• Process connection: flanges: DN 8, 15, 25, 40, 50, 80
Sensor E materials: Stainless Steel (304L), Measuring tubes (904L), Process connection (316 / 316L)
Transmitter Housing: Powder coated die-cast aluminum

• Compact dual-tube system
• Medium temperature: -40°C up to +140°C
• Medium density: 0 to 5000 kg / m3
• Process pressure: up to 100 bar (1450 psi)
• 2 line backlit display with 16 characters per line, without local operation – **Promass 40**
• 2 line backlit display with 16 characters per line, with push button — **Promass 80**
• 4 line backlit display with 16 characters per line, with touch control – **Promass 83**

Measured variable
• Mass flow (proportional to the phase difference between two sensors mounted on the measuring tube to register a phase shift in the oscillation)
• Volume flow (calculated from mass flow and fluid density. The density is proportional to the resonance frequency of the measuring tubes).
• Measuring tube temperature (by temperature sensors) for calculatory compensation of temperature effects

Power supply: 24V AC/DC (15W); 230V AC 50/60 Hz (15VA)

Output signals:

***Current output,* Hart:**
Active/passive selectable, galvanically isolated, time constant selectable (0.05 to 100 s), full scale value selectable, temperature coefficient: typically 0.005% o.r./°C, resolution: 0.5 µA
• Active: 0/4 to 20 mA, RL < 700 Ω (for HART: RL ≥ 250 Ω)
• Passive: 4 to 20 mA; supply voltage 18 to 30 Vdc; Ri ≥ 150 Ω

Pulse/frequency output:
Passive, open collector, 30 Vdc, 250 mA, galvanically isolated.
Promass 40 E & 80 E
• Frequency output: f.s. scale frequency 2 to 1.000 Hz (fmax = 1.250 Hz), on/off ratio 1:1, pulse width max. 10 s-
Promass 83 E
• Frequency output: f.s. scale frequency 2 to 10.000 Hz (fmax = 12.500 Hz), on/off ratio 1:1, pulse width max. 2 s.
• Pulse output: pulse value and pulse polarity selectable, pulse width configurable (0.5 to 2000 ms)

Interfaces: HART, - **Promass 40E**
HART, PROFIBUS PA, - **Promass 80**
HART, PROFIBUS PA / DP, Modbus RS 485, Foundation Fieldbus – **Promass 83**

Signal on alarm:

Current output: Failsafe mode selectable (e.g. in accordance with NAMUR Recommendation NE 43)

Pulse/frequency output: Failsafe mode selectable

Status output
Non conductive in the event of a fault or if the power supply fails (open collector, galvanically isol.) **Promass 40E , 80E, 83E**
(EEPROM saves measuring system data if the power supply fails)

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Relay output - Promass 83,
De-energised by fault or power supply failure.

Galvanic isolation: All circuits for inputs, outputs, and power supply are galvanically isolated from each other.

Low flow cutoff: Switch points for low flow are selectable.

Switching output : **Status output – Promass 40 E ; 80 E**
- Open collector • max. 30 V DC, 250 mA; galvanically isolated

Configurable for: error messages, Empty Pipe Detection (EPD), flow direction, limit values

Relay output – Promass 83 E
- max. 30 V / 0.5 A (ac); 60 V / 0.1 A (dc); galvanically isolated ; • Normally closed (NC or break) or normally open (NO or make) contacts available ; (factory setting: relay 1 = NO, relay 2 = NC)

Base accuracy:
Mass flow and volume flow (liquids): **Promass 40 E** ± 0.5% o.r.
Promass 80 E ± 0.2% o.r.; **Promass 83 E** ± 0.15%

Mass flow (gases): ± 1% o.r : **Promass 40 E**

± 0,75% o.r. : **Promass 80 E & 83 E**
(See manufacturer description about detailed conditions affecting accuracy.)

Degree of protection Standard: IP 67 (NEMA 4X) for transmitter and sensor

Software ver.: 3.xx.yy

Equipment and protective systems intended for use in potentially explosive atmospheres – Directive 94/9/EC

Model: Measuring system type Promass ** * **- * ** * * * * * * * + #**#**
Certification Authority: DEKRA EXAM GmbH
EC-Type Examination Certificate: DMT 00 ATEX E 074 , 3rd Edition , 26 August 2011

Safety standard complied with:

IEC 60079-0: 2011	**General requirements**
EN 60079-1:2007	**Flameproof enclosure "d"**
EN 60079-7:2007	**Increased safety "e"**
IEC 60079-11:2011	**Intrinsic safety "i"**
EN 60079-26:2007	**Level of protection EPL Ga**
EN 60079-31:2009	**Protection by enclosures "t"**

Test reports:

Paconsult n. 118-03 (14/02/2003) ; TESTLAB n. E102258E 3 (08/09/2010) ; Endress+Hauser n. PTC_E_03_038 (09/10/2003)

Technical description:

E + H doc. n. TI00055D/06/EN/13.15, TI00061D/06/ EN/15.15

General remarks:

Installation and use to be in accordance with manufacturer instructions.

For each equipment, before delivery on board, accuracy test Certificate to be provided, based on accredited calibration rigs that are traced to ISO 17025.

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