![TechnipFMC logo]

Proline Promass O 300 / 500 Abridged Specifications

Bulletin SS0M043 Issue/Rev. 0.2 (11/19)

Coriolis Mass Flowmeters

The Proline Promass Coriolis Mass Flowmeters provided by TechnipFMC brings the industry's best technology in Coriolis meters to the oil and gas industry.

The Proline Promass O sensor offers the premium accuracy and reliability of Coriolis mass flow measurement for applications at the highest process pressures and harshest operating conditions. The measurement tubes are constructed of 25 Cr. Duplex steel for extreme strength and chemical resistance. The Promass O is fully suitable for onshore/offshore oil production applications with resistance to corrosive, high sulfur crude oils.

The 300 and 500 transmitter options provide users with flexibility in communication protocols, I/O capacity and remote/local mounting options. Cutting edge features such as Heartbeat diagnostics, HistoROM data logging and the web server interface provide users simple access to comprehensive process data and diagnostics.

The Proline Promass O is ideal for applications requiring a robust, high pressure Coriolis mass flow meter with a wide variety of transmitter communication, I/O and mounting options.

Note: For complete specifications and dimensions refer to bulletins TI01321O for O 300 and TI01326O for O 500.

Features and Benefits

- Suitable for the highest process pressure applications, up to ASME Class 1500.

- The measuring principle operates independently of physical fluid properties such as viscosity or density.

- Simple and intuitive operation via the 4 line Illuminated touch control display with optional built in WLAN.

- Web server interface makes accessing meter data and configurations as simple as viewing a web page
  Wired:
  – Adjust network settings to fixed IP mode
  – Enter meter IP address into web browser. The meter interface is displayed on the screen.
  – Navigate screens using web browser
  Wireless:
  – Available with the WLAN option. Access the web server interface from a WIFI enabled smartphone, tablet or personal computer.

- Up to four individually configurable I/O slots available. The user configurable I/O option can be field adjusted to either analog or digital, input or output.

- Heartbeat Technology offering truly advanced diagnostic functionality, compliant with ISO 9001 measuring points relevant to quality.
  – Continuous self-monitoring
  – External monitoring through data transfer to Condition Monitoring System
  – in-situ Verification for simple pass/fail report of meter functions. No need for complex interpretation or expert knowledge. Outputs a traceable verification report according to the requirement of ISO 9001: 2008
  – Control of monitoring and measuring equipment

Promass O Sensor Reference Specifications

All 100, 300, and 500 sensors maintain same Modbus register as original 80, 83, and 84 sensors.

Base Volumetric and Mass Flow Accuracy[1]

	PremiumCal.	Standard Calibration
Liquid	+/- 0.05% o.r.	+/- 0.10% o.r.
Gas	+/- 0.35% o.r. (Mass)	

Base Repeatability[2]

Mass/Volume Flow with Premium Cal (Liquid)	+/- 0.025% o.r.
Mass/Volume Flow (Liquid)	+/- 0.05% o.r.
Mass Flow (Gas)	+/- 0.25% o.r.
Density Measurement (Liquid)	+/- 0.00025 g/cc

Base Temperature Accuracy

$$\pm 0.9 \,°F \pm 0.003 \cdot (T - 32) \,°F$$
$$(\pm 0.5 \,°C \pm 0.005 \cdot T \,°C)$$

Flow Ranges[3]

Size	lb/min	kg/h	BPD	m³/h
3"	0 to 6,615	180,000	34,000	225
4"	0 to 12,860	350,000	66,100	438
6"	0 to 29,400	800,000	151,000	1,000

Temperature Range[4]

	Ambient	Fluid Temperature
Promass 300 O	-40 to 122/140°F (-40 to 50/60°C)	338/401°F (170/205°C)
Promass 500 O	-40 to 122/140°F (-40 to 50/60°C)	338/401°F (170/205°C)

Density Accuracy

Under reference conditions	+/- 0.0005 g/cm³

Zero Point Stability

Size	lb/min	Size	lb/min
3"	0.330	6"	1.17
4"	0.514		

Nominal Pressure Rating

Per ASME B16.5 Cl 150, Cl 300, Cl. 600
(-20°F to 100°F)

Sensor Tubes (Primary)

Pressure Class	25Cr Duplex (Super Duplex)
900	2,250 psig
1500	3,750 psig

Flanges also available to EN 1092-1 (DIN 2501) and JIS B2220

Sensor Body (Secondary Containment)

Pressure rating value of 16 bar (232 psi) all sizes per ASM BPVC.

Material Of Construction

Sensor Housing	Stainless steel, 1.4404 (316L)
Measuring Tubes	Stainless steel, 25Cr Duplex (Super Duplex); 1.4410 (UNS S32750)
Process Connection	• Stainless steel, 25Cr Duplex (Super Duplex) • Stainless steel, 1.4410 (F53)

300 and 500 Series Transmitter Features

Summary: The 300 Series is for application requiring custody transfer approvals or the use of the two additional configurable I/O options.

The 500 Series is a remote mounted solution which adds an additional I/O configuration slot. The remote mounted transmitter can be located in a safe or hazardous zone.

1. For flow <= (zero point stability ÷ base accuracy) *100%, max error = ± (zero point stability ÷ measured value) • 100% o.r.
2. For flow < = ½ • (zero point stability ÷ base accuracy) *100%, max repeatability = ± ½ • (zero point stability ÷ measured value) • 100% o.r.
3. Volumetric flow range table values are evaluated for a S.G. of 0.8. For other fluids, multiply the chart value by (0.8/S.G.), at operating conditions, to determine the operating volumetric flow range.
4. Maximum process temperature may require a reduction in ambient temperature rating and vice versa. Consult Technical Information Manuals for details.

300 and 500 Series Transmitter Features (continued)

Approvals

Custody Transfer: NTEP, OIML R117, OIML R137, MID,

Hazardous area: ATEX/ IECEx, CSA C/US, INMETRO, *EAC Ex Approved

CE Mark certifies conformance to all applicable, EU Directives

Local Display

4 Line Illuminated with Touch Control

• 4-line, illuminated, graphic display
• White background lighting; switches to red in event of device errors
• Format for displaying measured variables and status variables can be individually configured
• Permitted ambient temperature for the display: –4 to +140 °F (–20 to +60 °C)

4 Line Illuminated with Touch Control + WLAN

Optional WLAN interface for access to the Web based interface via DHCP.

Integrated Web Server

The device can be operated and configured via a Web browser and via the RJ 45 service interface or the optional WLAN interface.

Supported functions
Data exchange between the operating unit (such as a notebook for example) and the measuring device:
• Uploading the configuration from the measuring device (XML format, configuration backup)
• Save the configuration to the measuring device (XML format, restore configuration)
• Export event list (.csv file)
• Export parameter settings (.csv file, create documentation of the measuring point configuration)
• Export the Heartbeat verification log (PDF file, only available with the "Heartbeat Verification" application package)
• Flash firmware version for device firmware upgrade, for instance

Power

DC 24 V +/-20%

AC 100 to 240 V, -15 to +10%, 50/60 Hz

DC 24 V +/-20% and AC 100 to 240 V, -15 to +10%, 50/60 Hz

Consumption: Max 10 Watts

Communication Options

BA: Current Output 4 to 20 mA HART

Active or passive selectable, Galvanically isolated; Adjustable damping; HART protocol 7. Readout of up to 4 user assignable dynamic variables and 8 device variables.

MA: Modbus RS 485

RS-485 in accordance with EIA/TIA-485 standard. Integrated terminating resistor activated via DIP switches.

Input, Output Options

A: Not assigned

Empty slot

D: User configurable input/output

The output is user assignable to one of the following during commissioning:

1. **Current Output 4 to 20 mA (active)** for indication of mass or volume flow, corrected volume flow, density, ref. density or temperature
2. **Current Output 0/4 to 20 mA (passive)** for indication of mass or volume flow, corrected volume flow, density, ref. density or temperature
3. **Pulse/frequency/Switch Output:** Pulse output active/passive selectable for indication of mass or volume flow, corrected volume flow, density, ref. density or temperature. Switch output selectable to flow direction, diagnostic behavior, PV alarm or flow status
4. **Current input 4 to 20 mA (active)** for input of pressure, temperature or density value
5. **Current input 0/4 to 20 mA (passive)** for input of pressure, temperature or density value
6. **Status Input:** Low signal: DC -3 to +5 V, High signal: DC 12 to 30 V for signal to reset totalizers or flow override

F: Pulse output phase shifted

Pulse outputs are 180 degrees phase shifted, must occupy slots 2 and 3. Selectable for indication of mass or volume flow, corrected volume flow, density, ref. density or temperature.

H: Relay output

Open/closed contact indicating device status. Selectable to flow direction, diagnostic behavior, PV alarm or flow status.
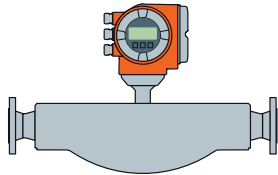
Housing

Material: Coated aluminum or cast stainless steel

Electrical connection: Gland M20, Thread M20, G½, NPT½

300 and 500 Series Transmitter Features (continued)

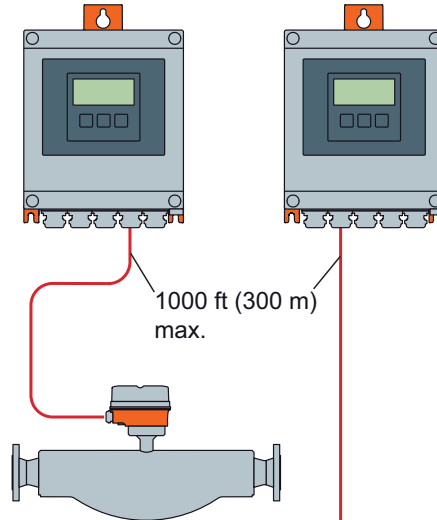|	
Proline 300 **(compact version)**	**Proline 500** **(remote version)**

Non-Ex
Ex: Zone 2, Class I Div. 2

Proline 500 - Digital
Non-Ex
Ex: Zone 2, Class I Div. 2

1000 ft (300 m)
max.

Ex: Zone 1, Class I Div. 1
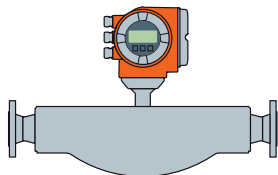
Proline 500
Ex: Zone 1, Class I Div. 1
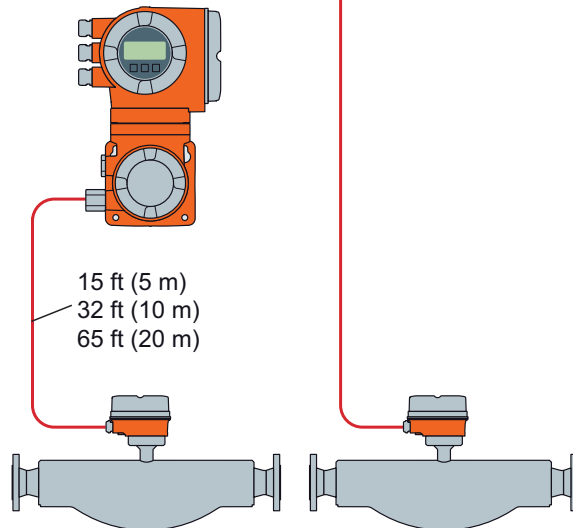
15 ft (5 m)
32 ft (10 m)
65 ft (20 m)

* For complete specifications and dimensions refer to bulletins TI01321O for O 300 and TI01326O for O 500.

Flowmeter Selection

Note: Refer to the Application Data Sheet FM0M027 provided by your TechnipFMC representative for a more in depth list of requirements needed to properly order a meter.

Input, Output Options		
	Promass	
Available Combinations	**300**	**500**
Features		
Backlit Display	4-line	4-line
Communication		
HART®	•	•
Modbus	•	•
Web based interface	•	•
WLAN	•	•
Local display via optical buttons	•	•
Housing		
Ultra Compact		
Compact with expandable I/O	•	
Remote wall mount		•
Outputs		
Communication port	1	1
Selectable I/O port	2	3
HART 4-20	•	•
Ethernet/IP		
Modbus	•	•
Measured Variables		
Mass flow	•	•
Volumetric flow	•	•
Density	•	•
Temperature	•	•
Totalizers	3	3
Sensor Memory Chip (S-DAT)	•	•
Transmitter Memory Chip (T-DAT)	•	•
Application Packages		
Heartbeat Technology	•	•
Concentration Measurement	•	•
Special Density	•	•
HistoROM	•	•
Hazardous Area Approvals		
CSA C/US Class I, II, III, Div. 1	•	•
CSA C/US Class I, Div. 2	•	•
Power Supply		
100-230 VAC	•	•
24 VDC	•	•

1. Not available with Modbus communication option.
2. Includes a pulse/frequency/switch output.

Promass sensor sizing requires the following information:
- Flow Rate (Min., Max., and Nominal)
- Operating Viscosity
- Specific Gravity
- Line Size
- Pressure
- Temperature

The following steps guide flowmeter selection:

1. **Determine the correct sensor model for application**
   E Sensor: Non-custody transfer, 1/2" to 3"
   F Sensor: General purpose high accuracy custody transfer, 1/2" to 10"
   Q Sensor: Highest performance, challenging applications custody transfer.
   O Sensor: High pressure custody transfer, corrosion resistant duplex steel, 3" to 6"
   X Sensor: High capacity custody transfer, 14" with 1" to 16" inlet flange.

2. **Material of construction**
   Verify material of construction is suitable for process application.

3. **Choose the correct meter size. Typical guidelines**
   - The minimum recommended full scale value is approx. 1/20 of the max. full scale value.
   - In most applications, 20 to 50% of the maximum full scale value can be considered ideal.
   - Select a lower full scale value for abrasive substances such as fluids with entrained solids (flow velocity <1 m/s (<3 ft/s)).

   For gas measurement the following rules apply:
   - Flow velocity in the measuring tubes should not be more than half the sonic velocity (0.5 Mach).
   - The maximum mass flow depends on the density of the gas: formula.

4. **Calculate flow measurement accuracy. Use the larger of the zero point stability and base level accuracy:**
   PremiumCal
   ±0.05%, [(zero point stability ÷ measured value) • 100]% o.r.
   Standard
   ±0.10%, [(zero point stability ÷ measured value) • 100]% o.r.
   Gas
   ±0.35%, [(zero point stability ÷ measured value) • 100]% o.r.

Special Application Packages

Heartbeat Technology	
Heartbeat Diagnostics	All Proline measuring devices with Heartbeat Technology come standard with an integrated self-monitoring system that monitors the entire measurement chain from the sensor to the outputs. This integrated self-monitoring system supplies additional information (measured variables) for the direct assessment of the state of the measuring device, and information on process influences that affect the measuring function and performance.
Heartbeat Verification + Monitoring Application Package	**Heartbeat Monitoring** Continuously supplies data, which are characteristic of the measuring principle, to an external condition monitoring system for preventive maintenance or process analysis. These data enable the operator to: • Draw conclusions - using these data and other information - about the impact process influences (such as corrosion, abrasion, buildup etc.) have on the measuring performance over time. • Schedule servicing in time. • Monitor the process or product quality, e.g. gas pockets. **Heartbeat Verification** Meets the requirement for traceable verification to DIN ISO 9001:2008 Chapter 7.6 a) "Control of monitoring and measuring equipment". • Functional testing in the installed state without interrupting the process. • Traceable verification results on request, including a report. • Simple testing process via local operation or other operating interfaces. • Clear measuring point assessment (pass/fail) with high test coverage within the framework of manufacturer specifications. • Extension of calibration intervals according to operator's risk assessment.

Concentration and Special Density	
Density Measurement	Measurement of fluid density is included as standard and is available output to the control system.
Concentration Measurement and Special Density Application Packages	**Special Density** The "Special Density" application package offers high-precision density measurement over a wide density and temperature range particularly for applications subject to varying process conditions. Concentration With the help of the "Concentration Measurement" application package, the measured density is used to calculate other process parameters: • Temperature-compensated density (reference density). • Percentage mass of the individual substances in a two-phase fluid. (Concentration in %). • Fluid concentration is output with special units (°Brix, °Baumé, °API, etc.) for standard applications.

Extended HistoROM	
Event Memory	Memory for the last 20 event message entries stored in chronological order is included as standard
HistoROM Application Package	**HistoROM** Comprises extended functions concerning the event log and the activation of the measured value memory. **Event log:** Event message memory is extended from 20 entries up to 100 entries. Data logging (line recorder): • Memory capacity for up to 1000 measured values is activated. • 250 measured values can be output via each of the 4 memory channels. The recording interval can be defined and configured by the user. • Measured value logs can be accessed via the local display or operating tool e.g. FieldCare, DeviceCare or Web server.

Options and Modeling

Model codes can be configured using either the printed price list or an E+H online store. For the use of online configuration tools the meter base code must be entered first. Additional options are selected from the pull-down menus.

Configuration example: TechnipFMC 3" O Sensor with 300 Series Transmitter

O Sensor Base model codes selection:

Sensor	Transmitter	Nominal Pipe Size
O8O	3	B25
O = O Sensor	3 = 300	B80 = 3" (DN 80)
	5 = 500	B1H = 4" (DN 100)
		B1F = 6" (DN 150)

Base Model Code

O8Q3BXX	010	015	020	021	022	030	040	050	060	070	080	480	490
O8Q3B80	CD	D	MA	D	D	F	A	D	SA	AAS	A	A2	FA

Additional Options

+	500	520	540	570	580	590	620	850	895

Code	Description
O8Q3BXX	Base Model Code
010	Area Classification
015	Power supply
020	Output; Input 1:
021	Output; Input 2:
022	Output; Input 3:
030	Display; Operation:
040	Housing:
050	Electrical Connection:
060	Meas. Tube Mat., Wetted Parts Surface:
070	Process Connection:
080	Calibration Flow:
480	Device Model:
490	Customer:

Code	Description
500	>Operation Language Display:
520	>>Sensor Option:
540	>>Application Package:
570	>>Service:
580	>>Test, Certificate:
590	>>Additional Approval:
620	>>Accessory Enclosed:
850	>Firmware Version:
895	>>Marking:

Dimensions and Weights

For a complete list of sensor (3 to 6 inch) and transmitter dimensions, please refer to specifications bulletins:
Promass 300 O..............................Bulletin TI01321O
Promass 500 O..............................Bulletin TI01326O

Revisions included in SS0M043 Issue/Rev. 0.2 (11/19):
Page 7: Basic Model Code O8Q3B80 480 updated from A1 to A2.
The specifications contained herein are subject to change without notice and any user of said specifications should verify from the manufacturer that the specifications are currently in effect. Otherwise, the manufacturer assumes no responsibility for the use of specifications which may have been changed and are no longer in effect.

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