

Proline Promass F 80, 83, 84 Abridged Specifications

Bulletin SS0M027 Issue/Rev. 0.5 (5/14)

Coriolis Mass Flowmeters

TechnipFMC **Coriolis Mass Flowmeters** bring advanced Coriolis sensor technology and digital signal processing to liquid measurement. TechnipFMC Coriolis product offering sets a new standard for Coriolis mass flowmeters.

Exceptional flow sensitivity and performance result from its unique design geometry and rugged construction. High speed sampling and optimum zero stability ensure ultimate measurement stability and performance for a wide variety of products and markets. When high accuracy and custody transfer superiority is demanded, TechnipFMC Coriolis Flowmeters are the first choice.

Note: These specifications are an abridged version. For complete specifications refer to Bulletin SS0M024 for the Promass 80/83F and Bulletin SS0M025 for the Promass 84F.



Features and Benefits

TechnipFMC Coriolis metering technology offers the following advanced features and benefits:

- Perfectly balanced dual tube design to make true “fit and forget” meters, thus eliminating the need for expensive pipe supports and long runs of straight pipe
 - No supports or braces are needed for installation
 - Installation envelope is compact and space saving
- Highly sophisticated manufacturing techniques have solved “zeroing” the meter or drifting which ensures the highest accuracy and lowest impact on meter stability
 - Immune to pipeline noise / vibration as well as temperature changes
- Cutting edge DSP (digital signal processing) for the 80, 83, and 84 transmitters optimize the signal to noise ratio and ensure high speed and accuracy – the fastest on the market - 20 ms response time
- The secondary containment is standard for increased safety so there is limited concern for spills or leaks
- Universal sensor design handles most applications from 3/8 to 10 inch diameter pipe and flow rates ranging from 73.5 lb/min to 80,840 lb/min
- Fully traceable calibration for highest accuracy
- Sensor material available in both stainless steel and Alloy material with temp. ranges up to 660° degrees F
- MODBUS communications are available to transmit live flow data to the Smith Meter® AccuLoad® and microLoad™ preset controllers
- Available with ASME B16.5 150, 300 and 600 carbon steel flanges

Specifications

Accuracy		
Model	Flow Accuracy ¹ (of rate)	
	Mass Flow & Volume Flow (Liquid)	
Promass 83F, 84F	Standard Cal.	Premium Cal.
	+/- 0.10%	+/- 0.05%
Promass 80F	Standard Cal.	Optional Cal.
	+/- 0.15%	+/- 0.10%
Promass 83F, 84F, 80F	Mass Flow (Gas)	
	+/- 0.35%	

Density Accuracy

Field/Reference +/- 0.0005 g/cc

Flow Ranges			
Size Range ²	lb/min	BPH	GPM
3/8"	0 to 73.5	13	9
1/2"	0 to 238	41	29
1"	0 to 660	113	78
1-1/2"	0 to 1,650	283	198
2"	0 to 2,570	441	309
3"	0 to 6,600	1,132	792
4"	0 to 12,860	2,201	1,541
6"	0 to 29,400	5,032	3,522
10"	0 to 80,840	13,836	9,685

Product Temperature Range

Promass F -50 to +200 °C

Promass F (High Temperature Version) -50 to +350 °C

Ambient Temperature Range Sensor and Transmitter

Standard -20 to +60 °C

Promass F (High Temperature Version) -40 to +60 °C

Repeatability	
Mass Flow/Volume Flow (Liquid)	.05% in 5 runs*
Mass Flow (Gas)	+/- 0.25% +/- [1/2 • (zero point stability ÷ measured value) • 100] % o.r.
Density Measurement (Liquid)	1 g/cc = 1 kg/l Promass F: +/- 0.00025% g/cc

*Per API Chapter 5.6 Table 1

Nominal Pressure Rating		
Process Connection		
Pressure Class	Stainless Steel	Carbon Steel
150	275 psig	285 psig
300	720 psig	740 psig
600	1,440 psig	1,480 psig
Sensor Tubes (Primary)		
Promass F: According to DIN PN 16 to 100 / according to ASME B16.5 Cl 150, Cl 300, Cl. 600 / JIS 10K, 20K, 40K, 63K		
Sensor Body (Secondary Containment)		
DN 8 to 50: 40 bar		
DN 80: 25 bar		
DN 100 to 150: 16 bar		
DN 250: 10 bar		

Note: Pressure Range based on temperatures from -20°F to 100°F. If temperature is greater than 100°F consult factory for flange limitations.

Material Of Construction	
Sensor Measuring Tubes	
Promass F	DN 8 to 100: Stainless Steel 1.4539 / 904L DN 150: Stainless Steel 1.4404 / 316L DN 250: Stainless Steel 1.4404 / 316L; manifold: CF3M DN 8 to 150: Alloy C-22 2.4602 / N 06022
Promass F (High Temperature Version)	DN 8, 50, 80: Alloy C-22 2.4602 / N 06022
Transmitter Housing	Compact housing: Powder coated die-cast aluminum Remote field housing: Powder coated die-cast aluminum Connection housing, sensor (remote version): Powder coated die-cast aluminum (high-temperature version and version for heating)

1 ± [(zero point stability + measured value). 100%] o.r., PremiumCal (optional).

2 Flow rates based on process water.

3 Pressure rating is according to ASME B16.5 material group 2.2.

Approvals

Custody Transfer
PTB, NMI, METAS, BEV, NTEP, MC
Approvals for hazardous area:
ATEX, FM, CSA, TIIS, IECEx, NEPSI
Ex Approved
CE Tested
Meets the EMC requirements

For a complete listing of approvals please see Bulletin [SS0M025](#).

Outputs
Current Output
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; $R_L < 700\Omega$ (for HART: $R_L \geq 250\Omega$)
Passive: 4 to 20 mA; supply voltage V_s 18 to 30 V DC; $R_L \geq 150\Omega$
Pulse/Frequency Output, HART
For custody transfer measurement, two pulse outputs can be operated.
Passive, galvanically isolated, open collector, 30 V DC, 250 mA
Frequency Output
Full scale frequency 2 to 10000 Hz ($f_{max} = 12500$ Hz), on/off ratio 1:1, pulse width max. 2 s
In "Phase-shifted pulse outputs" operating mode, the end frequency is limited to a maximum of 5000 Hz.
Pulse Output
Pulse value and pulse polarity selectable, pulse width configuration (0.05 to 2000 ms)
Pulse/frequency Output, MODBUS RS485
Active/passive selectable, galvanically isolated
Active: 24 V DC, 25 mA (max. 250 mA during 20 ms), $R_L > 100\Omega$
Passive: Open Collector, 30 V DC, 250 mA
Frequency output: Full scale frequency 2 to 10000 Hz ($f_{max} = 12500$ Hz), on/off ratio 1:1, pulse width max. 2 s.
MODBUS RS485
MODBUS device type: Slave
Address range: 1 to 247
Functions codes supported: 03, 04, 06, 08, 16, 23
Broadcast: supported with the function codes 06, 16, 23
Physical interface: RS485 in accordance with standard EIA/TIA-485
Baud rate supported: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 Baud
Transmission mode: RTU order ASCII
Response time: Direct data access = typically 25 to 50 ms

Relay Output

Normally closed (NC or break) or normally open (NO or make) contacts available max. 30 V/0.5 A AC; 60 V/0.1 A DC, galvanically isolated

Signal on Alarm

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

Pulse/frequency output: Failsafe mode selectable

Relay output: De-energized by fault or power supply failure

MODBUS RS485: If an error occurs, the value NaN (not a number) is output for the process variables

Display Interface
Promass 80
<ul style="list-style-type: none"> • Push-button operation for easy programming • Two-line backlit display so two measuring variables can be freely assigned on the display • Setup is guided with simple prompts on the display • Self-diagnostic function with clear text messages on the display to help with troubleshooting
Promass 83
<ul style="list-style-type: none"> • Quick setup for fast and easy commissioning • Touch control operation allows programming without opening electronics • 4-line back lit display • Advanced diagnostics, batching and concentration measurement
Promass 84
<ul style="list-style-type: none"> • NTEP approved to NIST Handbook 44, Section 3.37 for liquid and gases • Analog and MODBUS communications • Digital information available, even when sealed for custody transfer • Dual, phase-shifted pulse outputs

Additional Functions Of The Transmitters		
	Promass	
Available Combinations	80	83-84
F-Sensor	•	•
Features		
Backlit Display	2-line	4-line
Programming		
HART®	•	•
FieldTool	•	•
Push-button	•	
Touch Control		•
Housing		
Compact aluminum	•	•
Compact stainless steel	•	•
Remote aluminum wall mount	•	•
Maximum Remote Distance	65 ft.	65 ft.
Outputs		
Fixed modules	6	11
Flexible modules	0	8
Max number of I/O combinations ²	4	4
Profibus	PA	PA, PD
FOUNDATION™ Fieldbus		•
Modbus		•
Measured Variables		
Mass flow	•	•
Volumetric flow	•	•
Density	•	•
Temperature	•	•
Totalizers	1	3
Sensor Memory Chip (S-DAT)	•	•
Transmitter Memory Chip (T-DAT)		•
Special Functions (F-CHIP)		
Advanced Diagnostics		•
Concentration Measurement		•
Batching		•
Pulsating Flow Setting		•
Quick Setup (◇ = application specific)	•	◇
Hazardous Area Approvals		
XP; FM Cl. Div. 1 / CSA Cl. I Div. 2	•	•
Power Supply		
85-260 VAC	•	•
20-55 VAC / 16-62 VDC	•	•

Max number of:	Promass 80	Promass 83-84
Current outputs	2	3
Frequency outputs	1	2
Status / relay outputs	1	2
Status inputs	1	1

Power Supply

Supply voltage – User selectable upon ordering
 85 to 260 V AC, 45 to 65 Hz
 20 to 55 V AC, 45 to 65 Hz
 16 to 62 V DC

Power Consumption

AC: < 15 VA (including sensor)
 DC: < 15 W (including sensor)
 Switch-on current:
 • max. 13.5 (<50ms) at 24 VDC
 • min. 3 A (<5ms) at 260 VAC

Flowmeter Selection

Note: Refer to the Application Data Sheet FM0M025 provided by your TechnipFMC representative for a more in depth list of requirements needed to properly order a meter.

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 normal flow rate for the application.

Select the sensor such that this rate is as high in the range of the sensor as possible, pressure drop permitting.

2. Calculate accuracy and repeatability. Use the corresponding equations to properly calculate the following:

Accuracy (Promass F)

Mass Flow (Liquid)
 $\pm 0.05\% \pm [\frac{1}{2} \cdot (\text{zero point stability} \div \text{measured value})$
 • 100] % o.r., Premium Cal (optional)

Mass Flow (Gas)
 $\pm 0.35\% \pm [\frac{1}{2} \cdot (\text{zero point stability} \div \text{measured value})$
 • 100] % o.r.

Volume Flow (Liquid)
 $\pm 0.15\% \pm [\frac{1}{2} \cdot (\text{zero point stability} \div \text{measured value})$
 • 100] % o.r.

Repeatability (Promass F)

Mass Flow (Liquid)

$\pm 0.05\% \pm [\frac{1}{2} \cdot (\text{zero point stability} \div \text{measured value})]$
 • 100] % o.r., Premium Cal (optional)

Mass Flow (Gas)

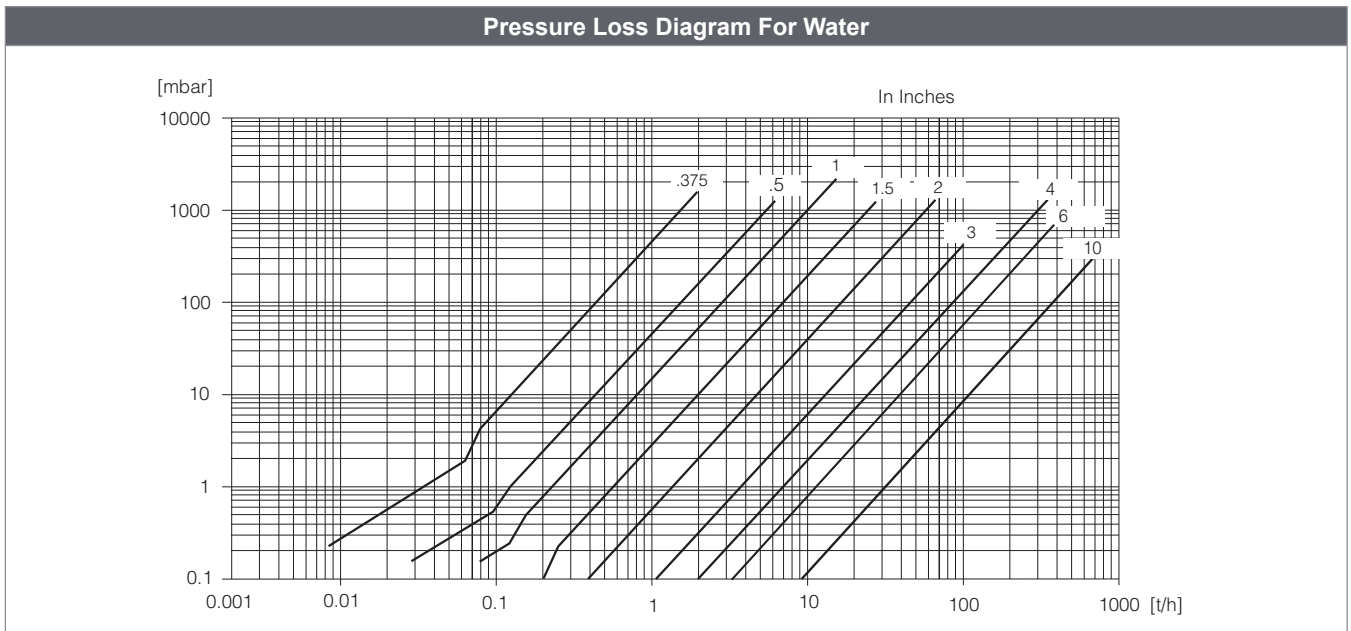
$\pm 0.25\% \pm [\frac{1}{2} \cdot (\text{zero point stability} \div \text{measured value})]$
 • 100] % o.r.

Volume Flow (Liquid)

$\pm 0.05\% \pm [\frac{1}{2} \cdot (\text{zero point stability} \div \text{measured value})]$
 • 100] % o.r.

3. Estimate actual pressure drop. The chart on the following page represents the apparent pressure drop at various mass flow rates and line sizes. Each curve represents a different meter size. Locate the normal flow rate on the horizontal axis. Use the curves to identify the associated apparent pressure drop on the vertical axis.

Pressure Loss Coefficient For Promass F					
DN	Inches	d [m]	K	K1	K2
8	.375	$5.35 \cdot 10^3$	$5.35 \cdot 10^7$	$9.60 \cdot 10^7$	$1.90 \cdot 10^7$
15	.5	$8.30 \cdot 10^3$	$5.35 \cdot 10^6$	$1.90 \cdot 10^7$	$10.60 \cdot 10^5$
25	1	$12.00 \cdot 10^3$	$5.35 \cdot 10^6$	$6.40 \cdot 10^6$	$4.50 \cdot 10^5$
40	1.5	$17.60 \cdot 10^3$	$5.35 \cdot 10^5$	$1.30 \cdot 10^6$	$1.30 \cdot 10^5$
50	2	$26.00 \cdot 10^3$	$5.35 \cdot 10^4$	$5.00 \cdot 10^5$	$1.40 \cdot 10^4$
80	3	$40.50 \cdot 10^3$	$5.35 \cdot 10^4$	$7.71 \cdot 10^4$	$1.42 \cdot 10^4$
100	4	$51.20 \cdot 10^3$	$5.35 \cdot 10^3$	$3.54 \cdot 10^4$	$5.40 \cdot 10^3$
150	6	$68.90 \cdot 10^3$	$5.35 \cdot 10^3$	$2.04 \cdot 10^4$	$6.46 \cdot 10^2$
250	10	$102.26 \cdot 10^3$	$5.35 \cdot 10^2$	$6.10 \cdot 10^3$	$1.33 \cdot 10^2$



Options And Modeling

For options and modeling codes refer to bulletin **SS0M027A1**.

1 Inch Promass 80 Transmitter, F Sensor

Example:

80F25	A	AAS	A	9	N	1	B	A	A	D
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8XFX - 010 - 020 - 030 - 040 - 050 - 060 - 070 - 080 - 090 - 100

000 Transmitter and
Nominal Diameters

010 Measuring Tube Material

020 Process Connection

030 Additional Test, Certificate

040 FMC (US, Canada, and Mexico)
Calibration Mass Flow, Density

050 Approval

060 Housing

070 Cable Entry

080 Power Supply, Display

090 Adjustment, Software Feature

100 Output, Input

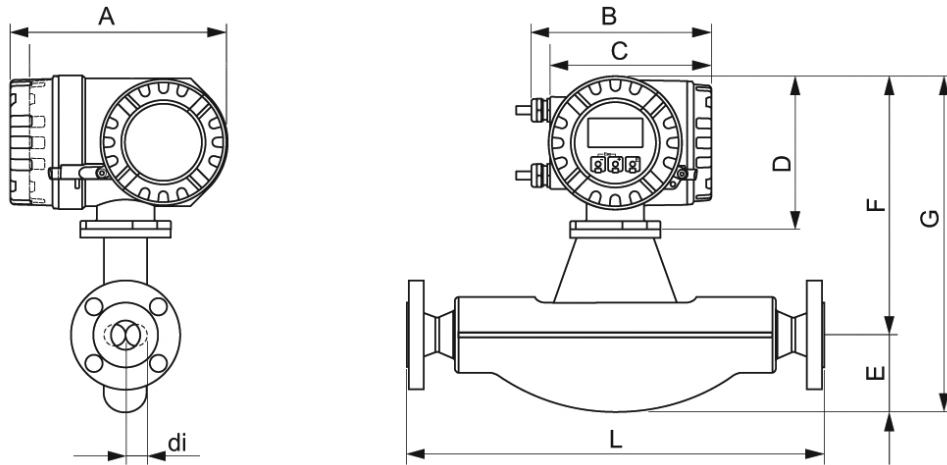
Dimensions and Weights

For a complete list of sensor (3/8 to 10 inch) and transmitter dimensions, please refer to specifications bulletins:

Promass 80/83F.....Bulletin [SS0M024](#)

Promass 84F.....Bulletin [SS0M025](#)

Compact field housing and ASME B16.5 Cl. 150 flanges



A	B	C	D
8.94	7.68	6.61	6.30

All dimensions in inches.

Promass F						
DN	E	F	G	L	di	Weight
3/8"	2.95	10.5	13.4	14.6	0.21	24
1/2"	2.95	10.5	13.4	15.9	0.33	26
1"	2.95	10.5	13.4	17.3	0.47	31
1 1/2"	4.13	10.7	14.8	21.7	0.69	42
2"	5.55	11.1	16.7	28.1	1.02	66
3"	7.87	12.0	19.9	33.1	1.59	121
4"	9.72	12.8	22.5	44.4	2.01	212
6"	14.9	14.3	29.1	55.0	2.71	339
10"	21.6	15.4	36.9	72.3	4.03	882*

All dimensions in inches.
*Weights includes Cl. 300 flanges.

Revisions included in SS0M027 Issue/Rev. 0.5 (5/14):

Page 1: Density Accuracy updated; Flow Ranges updated for 4", 6" and 10".

Page 2: Nominal Pressure Range - Stainless Steel updated; Transmitter Housing - Compact housing information removed.

Page 3: Display Interface - Promass 84 - last bullet added.

Page 6: Dimensions and Weights section added.

March 2019 - Branding, contact information, etc. updated.

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.