

# Multivariable Mass Vortex Flow Meter

## FEATURES

- Mass and volumetric flow measurement of gas, liquid, and steam
- Multivariable outputs for five process parameters:
  - Mass flow rate
  - Volumetric flow rate
  - Temperature
  - Pressure
  - Density
- Single process connection
- In-line (1/2 inch to 12 inch) and insertion (into pipes > 2 inch) configurations
- Field-configurable ranges, alarms, outputs and displays
- Field configurable via six push buttons or magnet through explosion-proof window
- Smart DSP electronics extends low flow range down to a Reynolds number of 5000
- Rangeability up to 100:1
- Temperature up to 750°F (400°C)
- Pressure up to 1500 psia (100 bara)
- Mass flow equations- real gas, ideal gas, and AGA-8 equations for natural gas
- Supports HART, Modbus and BACnet digital communication protocols
- Ideal for steam applications
  - Energy (BTU) Monitoring for real-time monitoring of energy consumption; compute and output energy use
  - Easy Installation & Commission; hot tappable- no process shutdown
  - Loop powered - saves on energy costs
- FM, FMC, ATEX, IECEx Approval



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# InnovaMass<sup>®</sup> 240S/241S



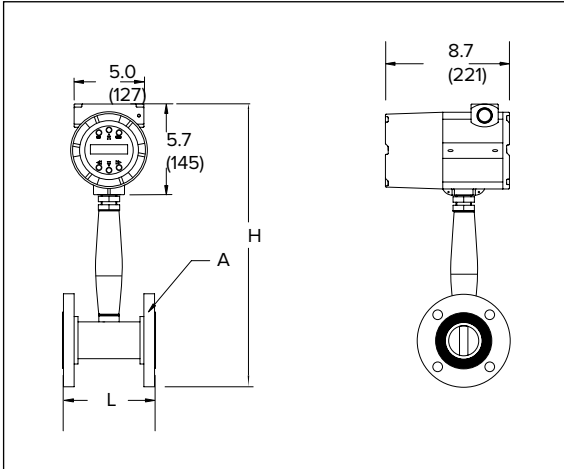
## DESCRIPTION

**S**ierra was the first to introduce a multivariable mass vortex flow meter to the market in the late 1990's. Sierra's multivariable product line features an in-line version, the InnovaMass<sup>®</sup> 240 and a unique insertion version, the InnovaMass<sup>®</sup> 241S. The 241S has emerged recently as the proven instrument of choice in geothermal steam applications across the globe. Both the 240S and 241S measure the mass flow rate of any gas or liquid and are ideally suited for saturated or superheated steam. The InnovaMass offers customers one instrument and one process connection, measuring five process parameters simultaneously: mass flow rate, temperature, pressure, volumetric flow rate, and fluid density.

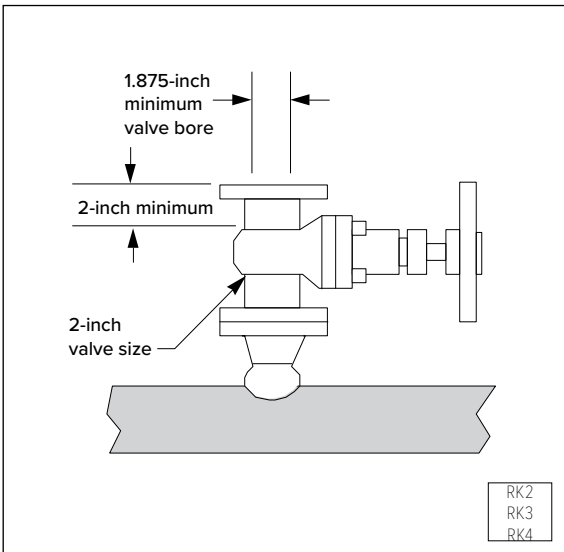
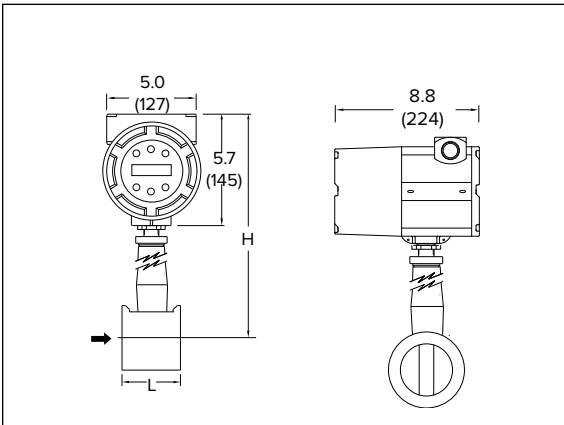
InnovaMass is a true high performance, rugged, and reliable workhorse in the industry. The 240S Reducer version allows lower flow rate measurement than traditional vortex meters and eliminates the need for field-installed piping reductions. The 240S is widely used for fluids down to -330°F (-200°C). The 241S offers an optional hot tap version for easy install with no process shutdown. All models are fully field-programmable, configurable, and feature RS-485, Modbus, HART, and BACnet protocols.

## DIMENSIONAL SPECIFICATIONS

240S Flanged In-line—Side / Outlet View



240S Wafer — Side / Outlet View



All dimensions are inches (+/- .25-inch significant value). Millimeters are in parentheses. Certified drawings are available on request.

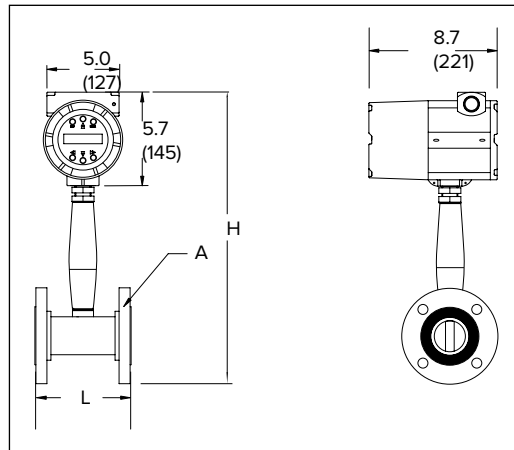
## IN-LINE TABLE

InnovaFlo® 240S Sizes			
Flow Body Size	A	L	H
0.5-inch SCH 80	150 lb flange	4.56 (116)	13.5 (343)
	300 lb flange	4.56 (116)	13.5 (343)
	600 lb flange	4.56 (116)	13.5 (343)
	1.4 flange wafer O.D.	4.56 (116)	13.5 (343)
0.75-inch SCH 80	150 lb flange	4.8 (122)	13.5 (343)
	300 lb flange	4.8 (122)	13.5 (343)
	600 lb flange	4.8 (122)	13.5 (343)
	1.7 flange wafer O.D.	4.8 (122)	13.5 (343)
1-inch SCH 80	150 lb flange	4.94 (126)	13.5 (343)
	300 lb flange	4.94 (126)	13.5 (343)
	600 lb flange	4.94 (126)	13.5 (343)
	2.0 flange wafer O.D.	2.8 (71)	13.5 (343)
1.5-inch SCH 80	150 lb flange	5.5 (140)	13.8 (351)
	300 lb flange	5.5 (140)	13.8 (351)
	600 lb flange	5.5 (140)	13.8 (351)
	2.9 flange wafer O.D.	2.8 (71)	13.8 (351)
2-inch SCH 80	150 lb flange	6.0 (153)	14.0 (356)
	300 lb flange	6.0 (153)	14.0 (356)
	600 lb flange	6.0 (153)	14.0 (356)
	3.7 flange wafer O.D.	3.0 (76)	14.0 (356)
3-inch SCH 80	150 lb flange	6.9 (175)	14.6 (371)
	300 lb flange	6.9 (175)	14.6 (371)
	600 lb flange	6.9 (175)	14.6 (371)
	5.0 flange wafer O.D.	4.0 (102)	14.6 (371)
4-inch SCH 80	150 lb flange	8.0 (203)	15.1 (384)
	300 lb flange	8.0 (203)	15.1 (384)
	600 lb flange	8.0 (203)	15.1 (384)
	6.2 flange wafer O.D.	4.7 (119)	15.1 (384)
6-inch SCH 80	150 lb flange	9.0 (229)	16.2 (411)
	300 lb flange	9.0 (229)	16.2 (411)
	600 lb flange	9.0 (229)	16.2 (411)
	8-inch SCH 80	150 lb flange	10.5 (267)
8-inch SCH 80	300 lb flange	10.5 (267)	17.2 (437)
	600 lb flange	10.5 (267)	17.2 (437)
	10-inch SCH 80	150 lb flange	15.0 (381)
10-inch SCH 80	300 lb flange	15.0 (381)	18.2 (462)
	600 lb flange	15.0 (381)	18.2 (462)
	12-inch SCH 80	150 lb flange	17.7 (450)
12-inch SCH 80	300 lb flange	17.7 (450)	19.2 (488)
	600 lb flange	17.7 (450)	19.2 (488)

Notes: (1) Can be used with removable retractor.  
(2) Retractor is permanently mounted to meter.

## 240S-R INLINE REDUCING VORTEX FLOW METER DIMENSIONAL SPECIFICATIONS

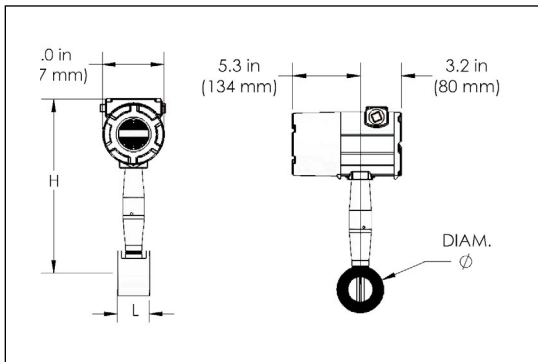
**240S-R Inline Reducing Vortex Flow Meter—Side / Outlet View**



Flow Meter Nominal Size	Flow Body Size			Weight			
	L	L (ANSI 900)	H	ANSI 150 (PN 16)	ANSI 300 (PN 40)	ANSI 600 (PN 63)	ANSI 900 (PN 160)
<b>3/4 inch (20 mm) X 1/2 inch (15mm)</b>	7.9 (200)	8.4 (213)	13.5 (343)	13 (5.9)	14.6 (6.6)	15.6 (7.1)	20.6 (9.3)
<b>1 inch (25 mm) X 1/2 inch (15 mm)</b>	7.9 (200)	8.4 (213)	13.5 (343)	13. (5.9)	16.3 (7.4)	16.4 (7.5)	22.7 (10.3)
<b>1.5 inch (40 mm) X 1 inch (25 mm)</b>	7.9 (200)	11.1 (282)	13.8 (351)	13.4 (6.1)	23.3 (10.6)	24.6 (11.2)	36.3 (16.5)
<b>2 inch (50 mm) X 1-1/2 inch (40 mm)</b>	7.9 (200)	12.5 (318)	14.0 (356)	16.3 (7.4)	26.8 (12.2)	33.2 (15.1)	58.1 (26.4)
<b>3 inch (80 mm) X 2 inch (50 mm)</b>	7.9 (200)	14.1 (357)	14.6 (371)	21.2 (9.6)	41.0 (18.6)	56.1 (25.5)	73.7 (33.4)
<b>4 inch (100 mm) X 3 inch (80 mm)</b>	9.84 (250)	15.3 (389)	15.1 (384)	33 (15.0)	66.8 (30.3)	96.0 (43.6)	116.1 (52.7)
<b>6 inch (150 mm) X 4 inch (100 mm)</b>	11.81 (300)	17.8 (452)	16.2 (411)	45.8 (20.8)	106.3 (48.2)	194.3 (88.2)	220.5 (100.0)
<b>8 inch (200 mm) X 6 inch (150 mm)</b>	11.81 (300)	20.1 (511)	17.2 (437)	68.3 (31.0)	168.4 (76.5)	299.0 (136)	365.7 (165.9)
<b>10 inch (250 mm) X 8 inch (200 mm)</b>	15.0 (381)	23.3 (592)	18.2 (462)	188.3 (85.5)	262.3 (119.1)	462.3 (209.9)	562.8 (255.3)
<b>12 inch (300 mm) X 10 inch (250 mm)</b>	17.7 (450)	29.7 (754)	19.2 (488)	298.6 (135.6)	402.6 (182.8)	606.6 (275.4)	792.3 (359.4)

Add 11lb (5KG) for remote electronics

**240S - Inline Reducing Vortex Flow Meter Wafer—Side / Outlet View**



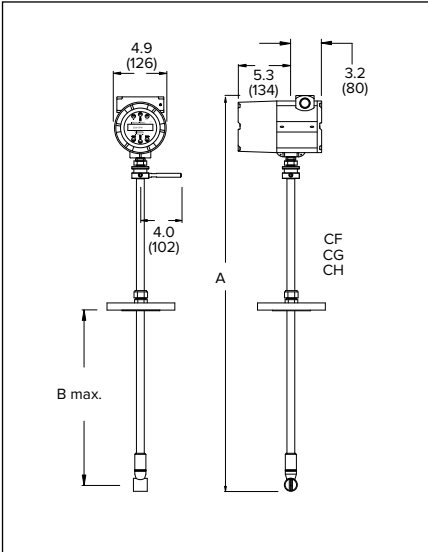
240S-R Inline Reducing Wafer Model				
Flow Body Size, Diameter and Weight				
Flow Meter Nominal Size	L	H	Diameter	Weight
<b>3/4 inch (20 mm) X 1/2 inch (15mm)</b>	2.56 (65)	13.5 (343)	1.85 (35)	9.2 (4.2)
<b>1 inch (25 mm) X 3/4 inch (20 mm)</b>	2.56 (65)	13.5 (343)	1.69 (43)	9.50 (4.3)
<b>1-1/2 inch (40 mm) X 1 inch (25 mm)</b>	2.56 (65)	13.8 (351)	2.0 (51)	10.3 (4.7)
<b>2 inch (50 mm) X 1-1/2 inch (40 mm)</b>	2.56 (65)	13.8 (351)	2.88 (73)	12.1 (5.5)
<b>3 inch (80 mm) X 2 inch (50 mm)</b>	3.94 (100)	14.6 (371)	5.0 (127)	23.9 (8.5)
<b>4 inch (100 mm) X 3 inch (80 mm)</b>	4.72 (120)	15.1 (384)	6.19 (157)	35.2 (10.6)

Add 11lb (5KG) for remote electronics

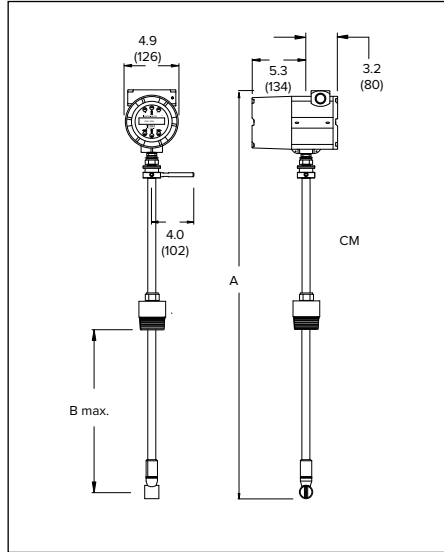
All dimensions are inches (+/- .25-inch significant value). Millimeters are in parentheses. Certified drawings are available on request.

## INSERTION DIMENSIONAL SPECIFICATIONS

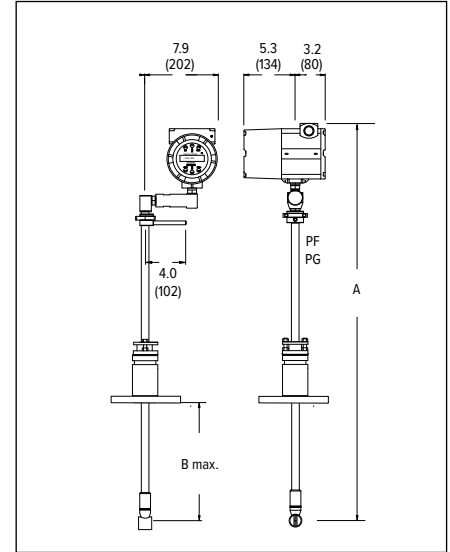
**241S Compression, Flange**



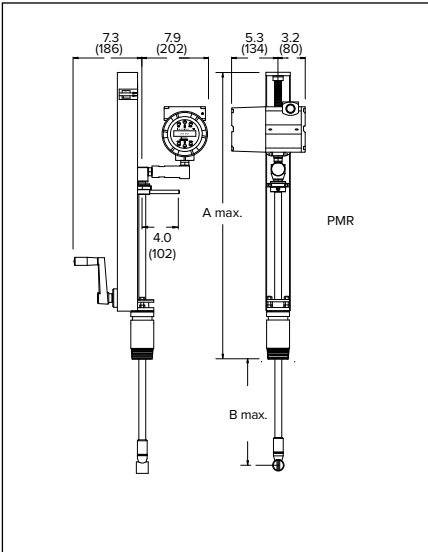
**241S Compression, Male NPT**



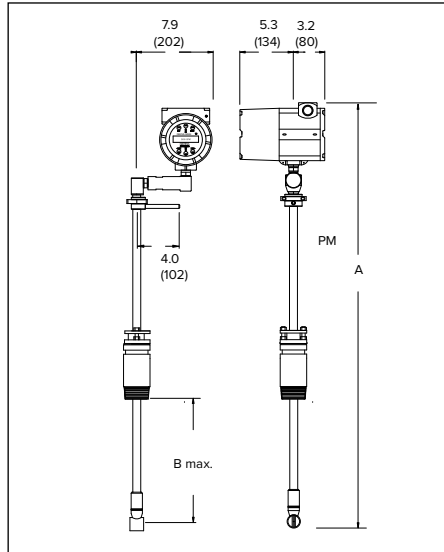
**241S Packing Gland, Flange**



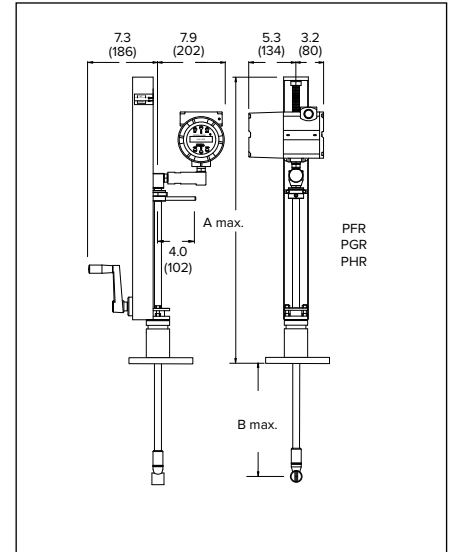
**241S Packing Gland, Male NPT, Retractor**



**241S Packing Gland, Male NPT**



**241S Packing Gland, Flange, Retractor**

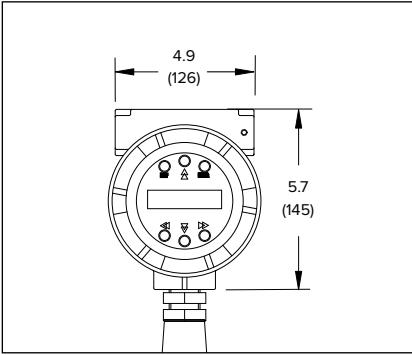


### InnovaMass® 241S Sizes

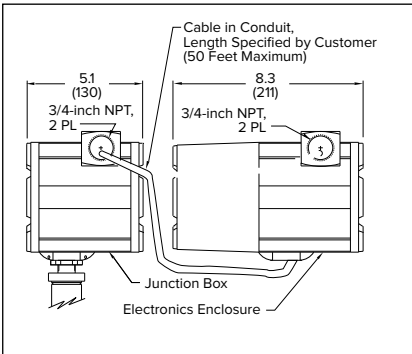
Model Code / Probe Seal / Process Connection	Standard Probe		Compact Probe		Extended Probe	
	A	B	A	B	A	B
<b>CM / Compression / 2-in Male NPT</b>	41.0 (1041)	26.2 (665)	24.6 (625)	9.8 (249)	53.0 (1346)	38.2 (970)
<b>CF / Compression / 150 lb. Flange</b>	41.0 (1041)	27.3 (693)	24.6 (625)	10.9 (277)	53.0 (1346)	39.3 (998)
<b>CG / Compression / 300 lb. Flange</b>	41.0 (1041)	27.2 (691)	24.6 (625)	10.8 (274)	53.0 (1346)	39.2 (996)
<b>CH / Compression / 600 lb. Flange</b>	41.0 (1041)	26.8 (681)	24.6 (625)	10.4 (264)	53.0 (1346)	38.8 (986)
<b>CI / Compression / 900 lb. Flange</b>	24.6 (625)	9.9 (251)	41 (1041)	26.3 (668)	53 (1348)	38.3 (973)
<b>PM / Packing Gland / 2-in Male NPT</b>	40.5 (1029)	21.5 (546)	N/A	N/A	52.5 (1334)	33.5 (851)
<b>PMR / Packing Gland / 2-in Male NPT with Retractor</b>	40.5 (1029)	21.5 (546)	N/A	N/A	52.5 (1334)	33.5 (851)
<b>PF / Packing Gland / 150 lb. Flange</b>	40.5 (1029)	21.1 (536)	N/A	N/A	52.5 (1334)	33.1 (841)
<b>PFR / Packing Gland / 150 lb. Flange with Retractor</b>	40.5 (1029)	21.1 (536)	N/A	N/A	52.5 (1334)	33.1 (841)
<b>PG / Packing Gland / 300 lb. Flange</b>	40.5 (1029)	21.1 (536)	N/A	N/A	52.5 (1334)	33.1 (841)
<b>PGR / Packing Gland / 300 lb. Flange w/ Retractor</b>	40.5 (1029)	21.1 (536)	N/A	N/A	52.5 (1334)	33.1 (841)
<b>PHR / Packing Gland / 600 lb flange w/ Retractor</b>	40.5 (1029)	21.1 (536)	N/A	N/A	52.5 (1334)	33.1 (841)

## ORDERING SPECIFICATIONS

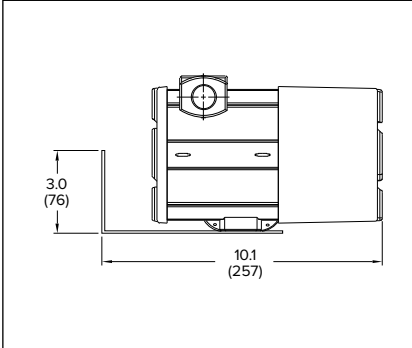
**240S/241S Remote—Front View**



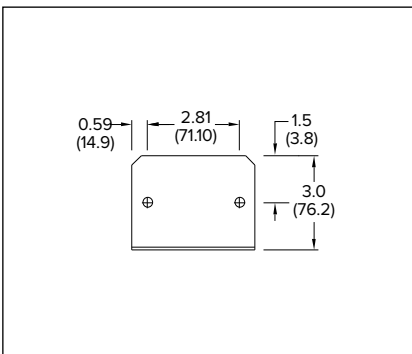
**240S/241S Remote—Side View**



**Remote Rear Bracket Mounted Electronics**



**Mounting Holes for Remote Rear Bracket**



### Straight Pipe Length Requirements (in number of internal diameters, D)

	Upstream	Downstream
One 90° elbow before meter	10 D	5 D
Two 90° elbows before meter	15 D	5 D
Two 90° elbows before meter out of plane (If three 90° bends present, double recommend length)	30 D	10 D
Reduction before meter	10 D	5 D
Expansion before meter	20 D	5 D
Regulator or valve partially closed before meter (If valve wide open, base length requirements on fitting directly preceding it.)	30 D	10 D

**Weight**

240S In-Line Meter						
Connection Size	ANSI 150 lb		ANSI 300 lb		ANSI 600 lb	
	lb	kg	lb	kg	lb	kg
0.5-inch Flange	12.0	5.5	12.5	5.7	13.4	6.1
0.75-inch Flange	13.0	5.9	14.6	6.6	15.6	7.1
1-inch Flange	13.4	6.1	16.3	7.4	16.4	7.5
1.5-inch Flange	16.3	7.4	23.3	10.6	24.6	11.2
2-inch Flange	21.2	9.6	26.8	12.2	33.2	15.1
3-inch Flange	33.0	15.0	41.0	18.6	56.1	25.5
4-inch Flange	45.8	20.8	66.8	30.3	96.0	43.6
6-inch Flange	68.3	31.0	106.3	48.2	194.3	88.2
8-inch Flange	112.4	51.0	168.4	76.5	299.0	136
10 inch (250 mm)	188.3	85.5	262.3	119.1	462.3	209.9
12 inch (300 mm)	298.6	135.6	402.6	182.8	606.6	275.4
1-inch Wafer	—	—	—	—	10.4	4.7
1.5-inch Wafer	—	—	—	—	12.4	5.6
2-inch Wafer	—	—	—	—	14.9	6.8
3-inch Flange	—	—	—	—	23.9	10.8
4-inch Flange	—	—	—	—	35.2	16.0

Add 11lb (5KG) for remote electronics

241S Insertion Meter		
Connection Size	lb	kg
CM / Compression Fitting, Male NPT	14.0	6.2
CF / Compression Fitting, 150 lb Flange	16.0	7.3
CG / Compression Fitting, 300 lb Flange	18.0	8.3
CH / Compression Fitting, 600 lb Flange	19.0	8.6
CI / Compression Fitting, 900 lb Flange	32.0	14.5
PM / Packing Gland, Male NPT	16.0	7.3
PMR / Packing Gland, Male NPT with Reactor	25.0	11.3
PF / Packing Gland, 150 lb Flange	21.0	9.5
PFR / Packing Gland, 150 lb Flange with Reactor	30.0	13.6
PG / Packing Gland, 300 lb Flange	25.0	11.3
PGR / Packing Gland, 300 lb Flange with Reactor	34.0	15.4
PHR / Packing Gland, 600 lb Flange with Reactor	35.0	15.9

Add 11lb (5KG) for remote electronics

All dimensions are inches (+/- .25-inch significant value). Millimeters are in parentheses. Certified drawings are available on request.

**PERFORMANCE SPECIFICATIONS**

Accuracy

240S In-Line Meter				
Process Variables	240S Series In-Line Meters		241S Insertion Meters <sup>(1)</sup>	
	Liquids	Gas and Steam	Liquids	Gas and Steam
<b>Mass Flow Rate</b>	+/- 1.0% of rate over a 30:1 range <sup>(3)</sup>	+/- 1.5% of rate <sup>(2)</sup> over a 30:1 range <sup>(3)</sup>	+/- 1.5% of rate over a 30:1 range <sup>(3)</sup>	+/- 2.0% of rate <sup>(2)</sup> over a 30:1 range <sup>(3)</sup>
<b>Volumetric Flow Rate</b>	+/- 0.7% of rate over a 30:1 range <sup>(3)</sup>	+/- 1.0% of rate over a 30:1 range <sup>(3)</sup>	+/- 1.2% of rate over a 30:1 range <sup>(3)</sup>	+/- 1.5% of rate over a 30:1 range <sup>(3)</sup>
<b>Temperature</b>	+/- 2°F (+/- 1°C)	+/- 2°F (+/- 1°C)	+/- 2°F (+/- 1°C)	+/- 2°F (+/- 1°C)
<b>Pressure</b>	+/- 0.3% of transducer full scale	+/- 0.3% of transducer full scale	+/- 0.3% of transducer full scale	+/- 0.3% of transducer full scale
<b>Density</b>	0.3% of reading	0.5% of reading <sup>(2)</sup>	0.3% of reading	0.5% of reading <sup>(2)</sup>

Notes: (1) Accuracies stated are for the total mass flow through the pipe. (2) Over 50 to 100% of the pressure transducer's full scale. (3) Nominal rangeability is stated. Precise rangeability depends on fluid and pipe size.

**Repeatability**

Mass Flow Rate . . . . . +/- 0.2% of reading  
 Volumetric Flow Rate . +/- 0.1% of reading  
 Temperature . . . . . +/- 0.2° F (+/- 0.1° C)  
 Pressure. . . . . +/- 0.05% of full scale  
 Density. . . . . +/- 0.1% of reading

**Stability Over 12 Months**

Mass Flow Rate . . . . . +/- 0.2% of reading maximum  
 Volumetric Flow Rate . Negligible error  
 Temperature . . . . . +/- 0.9° F (+/- 0.5° C) maximum  
 Pressure. . . . . +/- 0.1% of full scale maximum  
 Density. . . . . +/- 0.1% of reading maximum

**Response Time**

Adjustable from 1 to 100 seconds

**Differential Pressure Requirements, Δ P**

Permanent pressure loss of in-line meters for air at 68°F (20°C) and 14.70 psi (1.104 bara).  
 Permanent pressure loss of in-line meters for water at 68°F (20°C)

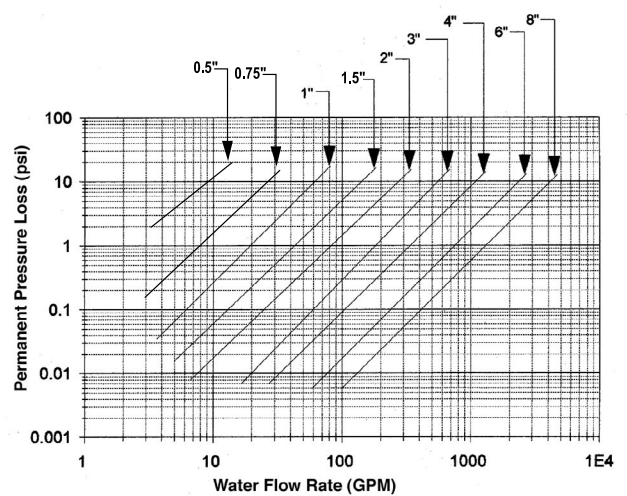
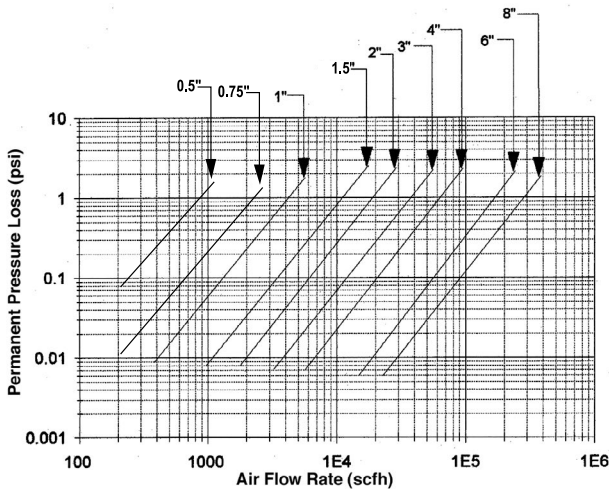
**Material Compatibility**

240S. . . . . Any gas, liquid or steam compatible with 316L stainless steel, C276 Hastalloy® or A105 carbon steel. Not recommended for multi-phase fluids.  
 241S . . . . . Any gas, liquid or steam compatible with 316L stainless steel. Not recommended for multi-phase fluids.

**Linear Range**

Smart electronics corrects for lower flow down to a Reynolds number of 5,000. The Reynolds number is calculated using the fluid's actual temperature and pressure monitored by the meter. Rangeability depends on the fluid, process connections and pipe size. Consult factory for your application. Velocity rangeability under ideal conditions is as follows:

Liquids 30:1 . . . . . 1 foot per second velocity minimum  
 30 feet per second velocity maximum  
 Gases 30:1. . . . . 10 feet per second velocity minimum  
 300 feet per second velocity maximum



## OPERATING SPECIFICATIONS

### Flow Rates

Typical mass flow ranges are given in the following table. Precise flow ranges depend on the fluid and pipe size. 241S insertion meters are applicable to pipe sizes from 2 inches and greater. Consult factory for sizing program.

Water Minimum and Maximum Flow Rates											
Pressure	0.5-inch	0.75-inch	1-inch	1.5-inch	2-inch	3-inch	4-inch	6-inch	8-inch	10-inch	12-inch
<b>gpm</b>	0.9 22	1.4 40	2.2 67	5.5 166	9.2 276	21 618	36 1076	81 2437	142 4270	224 6715	317 9501
<b>m<sup>3</sup>/hr</b>	0.2 5	0.3 9	0.5 15	1.3 38	2.1 63	4.7 140	8.1 244	18 554	32 970	51 1525	72 2158

Air Minimum and Maximum Flow Rates (scfm) <sup>(1)</sup>											
Pressure	0.5-inch	0.75-inch	1-inch	1.5-inch	2-inch	3-inch	4-inch	6-inch	8-inch	10-inch	12-inch
<b>0 psig</b>	1.8 18	3 41	5 90	13 221	22 369	50 826	87 1437	198 3258	347 5708	546 8976	772 12701
<b>100 psig</b>	5 138	9 325	15 704	38 1730	63 2890	141 6466	245 11254	555 25515	972 44698	1529 70292	2163 99456
<b>200 psig</b>	7 258	13 609	21 1322	52 3248	86 5427	193 12140	335 21131	761 47911	1332 83931	2095 131895	2965 186752
<b>300 psig</b>	8 380	15 896	25 1944	63 4775	104 7978	234 17847	407 31064	922 70431	1615 123375	2540 194025	3594 274529
<b>400 psig</b>	10 502	18 1183	29 2568	72 6309	120 10542	269 23580	467 41043	1060 93057	1857 163000	2920 256358	4132 362724
<b>500 psig</b>	11 624	20 1472	33 3195	80 7849	134 13115	300 28034	521 51063	1182 115775	2071 203000	3257 318941	4608 451272

Note: (1) Standard conditions are 70° F and 1 atmosphere.

Saturated Steam Minimum and Maximum Flow Rates (lb/hr)											
Pressure	0.5-inch	0.75-inch	1-inch	1.5-inch	2-inch	3-inch	4-inch	6-inch	8-inch	10-inch	12-inch
<b>5 psig</b>	6.5 52	12 122	20 265	49 650	82 1087	183 2431	318 4231	722 9594	1264 16806	1988 26429	2813 37395
<b>100 psig</b>	15 271	27 639	46 1386	112 3405	187 5690	419 12729	728 22156	1652 50233	2893 87998	4550 138386	6438 195803
<b>200 psig</b>	20 493	37 1163	62 2525	151 6203	253 10365	565 23184	983 40354	2229 91494	3905 160279	6141 252055	8689 356635
<b>300 psig</b>	24 716	45 1688	74 3664	182 9000	304 15040	680 33642	1184 58556	2685 132763	4704 232575	7397 365747	10466 517499
<b>400 psig</b>	28 941	51 2220	85 4816	209 11831	349 19770	780 44222	1358 76971	3079 174516	5393 305717	8481 480771	12000 680247
<b>500 psig</b>	31 1170	57 2760	95 5988	233 14711	389 24582	870 54987	1514 95710	3433 217001	6014 380148	9457 597812	13381 845850

## OPERATING SPECIFICATIONS

### Process Fluid Pressure

InnovaFlo® 240S Sizes				
Probe Seal	Process Connection	Material	Rating	Ordering Code
<b>Compression Fitting</b>	2-inch male NPT	316L SS	ANSI 600 lb	CM
	2-inch 150 lb flange	316L SS	ANSI 150 lb	CF
	2-inch 300 lb flange	316L SS	ANSI 300 lb	CG
	2-inch 600 lb flange	316L SS	ANSI 600 lb	CH
	2-inch 900 lb flange	316L SS	ANSI 900 lb	CI
<b>Packing Gland</b>	2-inch male NPT	316L SS	50 psig	PM
	2-inch 150 lb flange	316L SS	50 psig	PF
	2-inch 300 lb flange	316L SS	50 psig	PG
<b>Packing Gland &amp; Removable Retractor</b>	2-inch male NPT	316L SS	ANSI 300 lb	PM, RR
	2-inch 150 lb flange	316L SS	ANSI 150 lb	PF, RR
	2-inch 300 lb flange	316L SS	ANSI 300 lb	PG, RR
<b>Packing Gland &amp; Permanent Retractor</b>	2-inch male NPT	316L SS	ANSI 600 lb	PMR
	2-inch 150 lb flange	316L SS	ANSI 150 lb	PFR
	2-inch 300 lb flange	316L SS	ANSI 300 lb	PGR
	2-inch 600 lb flange	316L SS	ANSI 600 lb	PHR

### Process Fluid Pressure

240S Pressure Ratings		
Process Connection	Material	Rating
<b>Flanged</b>	316L SS, A105 carbon steel, C276 Hastalloy®	150, 300, 600 lb
<b>Wafer</b>	316L SS, A105 carbon steel, C276 Hastalloy®	600 lb

### Process Transducer Pressure

Pressure Sensor Ranges <sup>(1)</sup> psia (bara)			
Full Scale Operating Pressure		Maximum Over-Range Pressure	
psia	(bara)	psia	(bara)
30	2	60	4
100	7	200	14
300	20	600	40
500	35	1000	70
1500	100	2750	175

Note: (1) To maximize accuracy, specify the lowest full scale operating pressure range for the application. To avoid damage, the flow meter must never be subjected to pressure above the over-range pressure shown above.



Teflon is a registered trademark of DuPont.



## OPERATING SPECIFICATIONS (CONTINUED)

### Power Requirements

12 to 36 VDC, 25 mA, 1 W max.

Loop Powered Volumetric or Mass 12 to 36 VDC, 300 mA, 9 W max.

Multiparameter Mass options 100 to 240 VAC, 50/60 Hz, 5 W max.

Multiparameter Mass options:

Use a Class 2 isolated power supply that is grounded, provides DC output, and has no more than 10% output ripple.

Installation (Over-voltage) Category II for transient over-voltages

AC & DC Mains supply voltage fluctuations are not to exceed +/-10% of the rated supply voltage range.

User is responsible for the provision of an external disconnect means, disconnect line 1 and line 2 when 220 / 240 VAC power is used, also provide over-current protection for the equipment (both AC and DC models).

### Display

Alphanumeric 2x16 LCD digital display

Six push buttons switches (up, down, right, left, enter, exit) operable through the display glass of the explosion-proof enclosure viewing at 90° mounting intervals

### Process Fluid & Ambient Temperature

Process Fluid . . . . . Standard Temperature Sensor:  
-330°F to 500°F (-200°C to 260°C)  
High Temperature Sensor:  
Up to 750°F (400°C)

Ambient . . . . . Operating:  
-40°F to 140°F (-40° to 60°C)  
Storage:  
-40°F to 185°F (-40° to 85°C)  
0-98% relative humidity, noncondensing conditions

### Output Signals<sup>(1)</sup>

Analog . . . . . One to three field rangeable, simultaneous linear 4-20 mA output signals (1000 ohms maximum loop resistance) selected by user from the five parameters—mass flow rate, volumetric flow rate, temperature, pressure and density

Pulse . . . . . Pulse output for totalization is a 50-millisecond duration pulse operating a solid-state relay capable of switching 40 VDC, 40 mA maximum HART standard, optional MODBUS RTU

Note: (1) All outputs are optically isolated and require external power for operation.

### Alarms

Up to three programmable solid-state relays for high, low or window alarms capable of switching to 40 VDC, 40 mA maximum

### Totalizer

Based on user-determined flow units, nine full digits, with rollover at 999,999,999; total stored in non-volatile memory.

### Volumetric or Loop Powered Mass

One analog, one totalizer pulse, HART

## OPERATING SPECIFICATIONS (CONTINUED)

HART (with DD)

Modbus

BACnet

## PERFORMANCE SPECIFICATIONS

### Wetted Materials

240S . . . . . 316L stainless steel standard  
C276 Hastalloy® or A105 carbon steel optional  
Teflon-based thread sealant on pressure transducer  
241S . . . . . 316L stainless steel  
Teflon® packing gland below 500°F (260°C)  
Graphite packing gland above 500°F (260°C)  
Teflon-based thread sealant on pressure transducer

### Enclosure

NEMA 4x/7 (IP66) cast enclosure

### Electrical Ports

Two 3/4-inch female NPT ports

### Mounting Connections

240S . . . . . Wafer or 150, 300, 600 lb ANSI flange  
241S . . . . . Permanent Installation:  
Two-inch male NPT; 150, 300, 600 lb ANSI flange  
with compression fitting probe seal  
Hot Tap(1) Installation:  
Two-inch male NPT; 150, 300, 600, 900 lb ANSI flange;  
and optional retractor with packing gland probe seal

Note: (1) Removable under line pressure.

### Mounting Position

240S . . . . . No effect  
241S . . . . . Meter must be perpendicular within +/- 5° of the pipe centerline

### FMC Approval

Explosion proof for Class I, Division 1, Groups B, C & D.

Dust-ignition proof for Class II/III, Division 1, Groups E, F & G.

NEMA Type 4x and IP66

T6 at Tamb = -40°F to 60°C

### ATEX Approval

II 2 G Ex d IIB + H2 T6

II 2 D EX tD A21 IP66 T85°C, Ta = -40°F to 60°C

### CE Approval

Ex d IIB + H2 T6

Ex tD A21 IP66 T85°C, Ta = -40°F to 60°C

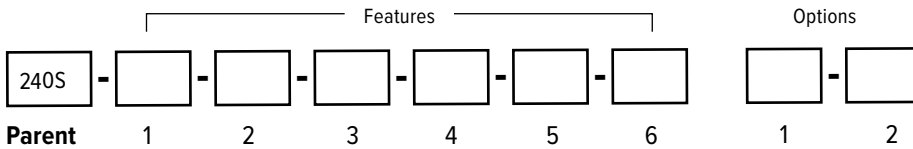
IECEX

### Optional Certifications

Construction and inspection (ANSI/ASME B31.3)

Materials (NACE MR-01-75(90))

## ORDERING THE 240 IN-LINE



**Parent**

Instructions: To order a 240S please fill in each number block by selecting the codes from the corresponding features below and following pages.

Parent Number	
<b>240S</b>	InnovaMass Inline Multiparameter Mass Vortex Flow Meter
<b>240S-R-XX</b>	InnovaMass Inline Reducing Vortex Flow Meter (XX= Feature 2, FloR-W body ; example 240S-R-F2)

Feature 1: Multiparameter Options	
<b>V</b>	Volumetric flow meter for liquid, gas and steam
<b>VT</b>	Velocity and Temperature Sensors. Mass measurement with temperature compensation
<b>VTP</b>	Velocity, temperature and pressure sensors. Mass measurement with pressure and temperature compensation
<b>VETEP</b>	Velocity, External RTD Temperature input, External 4-20mA input (T or P)
<b>VETEP-EM</b>	Velocity, External RTD Temperature input, External 4-20mA input (T or P). Energy Monitoring option. Permits real-time calculation of energy consumption. Not loop powered. Requires DC or AC power
<b>VTEP</b>	Velocity, Temperature and External 4-20mA input (T or P)
<b>VTEP-EM</b>	Velocity, Temperature and External 4-20mA input (T or P). Energy Monitoring option. Permits real-time calculation of energy consumption.
<b>VT-EM</b>	Velocity and Temperature Sensors. Energy Monitoring option. Permits real-time calculation of energy consumption.
<b>VTP-EM</b>	Velocity, Temperature and Pressure Sensors. Energy Monitoring option. Permits real-time calculation of energy consumption.

**Feature 2 Codes For 240s Only. Go To Page 11 To See Codes For Flow Bodies Used With Reducer Vortex 240s-R.**

Feature 2: Flow Body ANSI 316L (240S Only)							
<b>F2</b>	1/2-inch (15mm) ANSI 150 lb Flanged	<b>G2</b>	1/2-inch (15mm) ANSI 300 lb Flanged	<b>H2</b>	1/2-inch (15mm) ANSI 600 lb Flanged	<b>I2</b>	1/2-inch (15mm) ANSI 900 lb Flanged
<b>F3</b>	3/4-inch (20mm) ANSI 150 lb Flanged	<b>G3</b>	3/4-inch (20mm) ANSI 300 lb Flanged	<b>H3</b>	3/4-inch (20mm) ANSI 600 lb Flanged	<b>I3</b>	3/4-inch (20mm) ANSI 900 lb Flanged
<b>F4</b>	1-inch (25mm) ANSI 150 lb Flanged	<b>G4</b>	1-inch (25mm) ANSI 300 lb Flanged	<b>H4</b>	1-inch (25mm) ANSI 600 lb Flanged	<b>I4</b>	1-inch (25mm) ANSI 900 lb Flanged
<b>F5</b>	1.5-inch (40mm) ANSI 150 lb Flanged	<b>G5</b>	1.5-inch (40mm) ANSI 300 lb Flanged	<b>H5</b>	1.5-inch (40mm) ANSI 600 lb Flanged	<b>I5</b>	1.5-inch (40mm) ANSI 900 lb Flanged
<b>F6</b>	2-inch (50mm) ANSI 150 lb Flanged	<b>G6</b>	2-inch (50mm) ANSI 300 lb Flanged	<b>H6</b>	2-inch (50mm) ANSI 600 lb Flanged	<b>I6</b>	2-inch (50mm) ANSI 900 lb Flanged
<b>F7</b>	3-inch (80mm) ANSI 150 lb Flanged	<b>G7</b>	3-inch (80mm) ANSI 300 lb Flanged	<b>H7</b>	3-inch (80mm) ANSI 600 lb Flanged	<b>I7</b>	3-inch (80mm) ANSI 900 lb Flanged
<b>F8</b>	4-inch (100mm) ANSI 150 lb Flanged	<b>G8</b>	4-inch (100mm) ANSI 300 lb Flanged	<b>H8</b>	4-inch (100mm) ANSI 600 lb Flanged	<b>I8</b>	4-inch (100mm) ANSI 900 lb Flanged
<b>F9</b>	6-inch (150mm) ANSI 150 lb Flanged	<b>G9</b>	6-inch (150mm) ANSI 300 lb Flanged	<b>H9</b>	6-inch (150mm) ANSI 600 lb Flanged	<b>I9</b>	6-inch (150mm) ANSI 900 lb Flanged
<b>F10</b>	8-inch (200mm) ANSI 150 lb Flanged	<b>G10</b>	8-inch (200mm) ANSI 300 lb Flanged	<b>H10</b>	8-inch (200mm) ANSI 600 lb Flanged	<b>I10</b>	8-inch (200mm) ANSI 900 lb Flanged
<b>F11</b>	10-inch (250mm) ANSI 150 lb Flanged	<b>G11</b>	10-inch (250mm) ANSI 300 lb Flanged	<b>H11</b>	10-inch (250mm) ANSI 600 lb Flanged	<b>I11</b>	10-inch (250mm) ANSI 900 lb Flanged
<b>F12</b>	12-inch (300mm) ANSI 150 lb Flanged	<b>G12</b>	12-inch (300mm) ANSI 300 lb Flanged	<b>H12</b>	12-inch (300mm) ANSI 600 lb Flanged	<b>I12</b>	12-inch (300mm) ANSI 900 lb Flanged

NOTE: For Flow Body 316L

Feature 2: Flow Body Carbon Steel (240S Only)							
<b>FC5</b>	1.5-inch (40mm) ANSI 150 lb Flanged	<b>GC5</b>	1.5-inch (40mm) ANSI 300 lb Flanged	<b>HC5</b>	1.5-inch (40mm) ANSI 600 lb Flanged	<b>IC5</b>	1.5-inch (40mm) ANSI 900 lb Flanged
<b>FC6</b>	2-inch (50mm) ANSI 150 lb Flanged	<b>GC6</b>	2-inch (50mm) ANSI 300 lb Flanged	<b>HC6</b>	2-inch (50mm) ANSI 600 lb Flanged	<b>IC6</b>	2-inch (50mm) ANSI 900 lb Flanged
<b>FC7</b>	3-inch (80mm) ANSI 150 lb Flanged	<b>GC7</b>	3-inch (80mm) ANSI 300 lb Flanged,	<b>HC7</b>	3-inch (80mm) ANSI 600 lb Flanged	<b>IC7</b>	3-inch (80mm) ANSI 900 lb Flanged
<b>FC8</b>	4-inch (100mm) ANSI 150 lb Flanged	<b>GC8</b>	4-inch (100mm) ANSI 300 lb Flanged,	<b>HC8</b>	4-inch (100mm) ANSI 600 lb Flanged,	<b>IC8</b>	4-inch (100mm) ANSI 900 lb Flanged
<b>FC9</b>	6-inch (150mm) ANSI 150 lb Flanged	<b>GC9</b>	6-inch (150mm) ANSI 300 lb Flanged	<b>HC9</b>	6-inch (150mm) ANSI 600 lb Flanged,	<b>IC9</b>	6-inch (150mm) ANSI 900 lb Flanged
<b>FC10</b>	8-inch (200mm) ANSI 150 lb Flanged	<b>GC10</b>	8-inch (200mm) ANSI 300 lb Flanged	<b>HC10</b>	8-inch (200mm) ANSI 600 lb Flanged	<b>IC10</b>	8-inch (200mm) ANSI 900 lb Flanged,
<b>FC11</b>	10-inch (250mm) ANSI 150 lb Flanged	<b>GC11</b>	10-inch (250mm) ANSI 300 lb Flanged	<b>HC11</b>	10-inch (250mm) ANSI 600 lb Flanged	<b>IC11</b>	10-inch (250mm) ANSI 900 lb Flanged
<b>FC12</b>	12-inch (300mm) ANSI 150 lb Flanged	<b>GC12</b>	12-inch (300mm) ANSI 300 lb Flanged	<b>HC12</b>	12-inch (300mm) ANSI 600 lb Flanged	<b>IC12</b>	12-inch (300mm) ANSI 900 lb Flanged

NOTE: For Flow Body Carbon Steel (CS)

**ORDERING THE 240S IN-LINE (CONTINUED)**

<b>Feature 2: Flow Body DN, PN #, 316L (240S Only)</b>					
<b>FD2</b>	1/2-inch (15mm) PN16 Flanged, 316L	<b>GD2</b>	1/2-inch (15mm) PN40 Flanged, 316L	<b>HD2</b>	1/2-inch (15mm) PN63 Flanged, 316L
<b>FD3</b>	3/4-inch (20mm) PN16 Flanged, 316L	<b>GD3</b>	3/4-inch (20mm) PN40 Flanged, 316L	<b>HD3</b>	3/4-inch (20mm) PN63 Flanged, 316L
<b>FD4</b>	1-inch (25mm) PN16 Flanged, 316L	<b>GD4</b>	1-inch (25mm) PN40 Flanged, 316L	<b>HD4</b>	1-inch (25mm) PN63 Flanged, 316L
<b>FD5</b>	1.5-inch (40mm) PN16 Flanged, 316L	<b>GD5</b>	1.5-inch (40mm) PN40 Flanged, 316L	<b>HD5</b>	1.5-inch (40mm) PN63 Flanged, 316L
<b>FD6</b>	2-inch (50mm) PN16 Flanged, 316L	<b>GD6</b>	2-inch (50mm) PN40 Flanged, 316L	<b>HD6</b>	2-inch (50mm) PN63 Flanged, 316L
<b>FD7</b>	3-inch (80mm) PN16 Flanged, 316L	<b>GD7</b>	3-inch (80mm) PN40 Flanged, 316L	<b>HD7</b>	3-inch (80mm) PN63 Flanged, 316L
<b>FD8</b>	4-inch (100mm) PN16 Flanged, 316L	<b>GD8</b>	4-inch (100mm) PN40 Flanged, 316L	<b>HD8</b>	4-inch (100mm) PN63 Flanged, 316L
<b>FD9</b>	6-inch (150mm) PN16 Flanged, 316L	<b>GD9</b>	6-inch (150mm) PN40 Flanged, 316L	<b>HD9</b>	6-inch (150mm) PN63 Flanged, 316L
<b>FD10</b>	8-inch (200mm) PN16 Flanged, 316L	<b>GD10</b>	8-inch (200mm) PN40 Flanged, 316L	<b>HD10</b>	8-inch (200mm) PN63 Flanged, 316L
<b>FD11</b>	10-inch (250mm) PN16 Flanged, 316L	<b>GD11</b>	10-inch (250mm) PN40 Flanged, 316L	<b>HD11</b>	10-inch (250mm) PN63 Flanged, 316L
<b>FD12</b>	12-inch (300mm) PN16 Flanged, 316L	<b>GD12</b>	12-inch (300mm) PN40 Flanged, 316L	<b>HD12</b>	12-inch (300mm) PN63 Flanged, 316L

<b>Feature 2: Flow Body JIS, 316L (240S Only)</b>					
<b>FJ2</b>	1/2-inch (15mm) JIS 10k Flanged, 316L	<b>GJ2</b>	1/2-inch (15mm) JIS 20k Flanged, 316L	<b>HJ2</b>	1/2-inch (15mm) JIS 30k Flanged, 316L
<b>FJ3</b>	3/4-inch (20mm) JIS 10k Flanged, 316L	<b>GJ3</b>	3/4-inch (20mm) JIS 20k Flanged, 316L	<b>HJ3</b>	3/4-inch (20mm) JIS 30k Flanged, 316L
<b>FJ4</b>	1-inch (25mm) JIS 10k Flanged, 316L	<b>GJ4</b>	1-inch (25mm) JIS 20k Flanged, 316L	<b>HJ4</b>	1-inch (25mm) JIS 30k Flanged, 316L
<b>FJ5</b>	1.5-inch (40mm) JIS 10k Flanged, 316L	<b>GJ5</b>	1.5-inch (40mm) JIS 20k Flanged, 316L	<b>HJ5</b>	1.5-inch (40mm) JIS 30k Flanged, 316L
<b>FJ6</b>	2-inch (50mm) JIS 10k Flanged, 316L	<b>GJ6</b>	2-inch (50mm) JIS 20k Flanged, 316L	<b>HJ6</b>	2-inch (50mm) JIS 30k Flanged, 316L
<b>FJ7</b>	3-inch (80mm) JIS 10k Flanged, 316L	<b>GJ7</b>	3-inch (80mm) JIS 20k Flanged, 316L	<b>HJ7</b>	3-inch (80mm) JIS 30k Flanged, 316L
<b>FJ8</b>	4-inch (100mm) JIS 10k Flanged, 316L	<b>GJ8</b>	4-inch (100mm) JIS 20k Flanged, 316L	<b>HJ8</b>	4-inch (100mm) JIS 30k Flanged, 316L
<b>FJ9</b>	6-inch (150mm) JIS 10k Flanged, 316L	<b>GJ9</b>	6-inch (150mm) JIS 20k Flanged, 316L	<b>HJ9</b>	6-inch (150mm) JIS 30k Flanged, 316L
<b>FJ10</b>	8-inch (200mm) JIS 10k Flanged, 316L	<b>GJ10</b>	8-inch (200mm) JIS 20k Flanged, 316L	<b>HJ10</b>	8-inch (200mm) JIS 30k Flanged, 316L
<b>FJ11</b>	10-inch (250mm) JIS 10k Flanged, 316L	<b>GJ11</b>	10-inch (250mm) JIS 20k Flanged, 316L	<b>HJ11</b>	10-inch (250mm) JIS 30k Flanged, 316L
<b>FJ12</b>	12-inch (300mm) JIS 10k Flanged, 316L	<b>GJ12</b>	12-inch (300mm) JIS 20k Flanged, 316L	<b>HJ12</b>	12-inch (300mm) JIS 30k Flanged, 316L

<b>Feature 2: Flow Body ANSI Wafer, 316L (240S Only)</b>	
<b>W2</b>	1/2-inch (15mm) ANSI 600 316L R-Wafer
<b>W3</b>	3/4-inch (20mm) ANSI 600 lb 316L R-Wafer
<b>W4</b>	1-inch (25mm) ANSI 600 lb 316L R-Wafer
<b>W5</b>	1.5-inch (40mm) ANSI 600 lb 316L R-Wafer
<b>W6</b>	2-inch (50mm) ANSI 600 lb 316L R-Wafer
<b>W7</b>	3-inch (80mm) ANSI 600 lb 316L R-Wafer
<b>W8</b>	4-inch (100mm) ANSI 600 lb 316L R-Wafer

**ORDERING THE 240S IN-LINE (CONTINUED)**

Feature 2 Codes on this page for Flow Bodies used with REDUCER VORTEX 240S-R only.

Feature 2: Flow Body (240S-R Only)			
<b>R-F2</b>	1/2-inch (15mm) ANSI 150 lb Flanged	<b>R-G2</b>	1/2-inch (15mm) ANSI 300 lb Flanged
<b>R-F3</b>	3/4-inch (20mm) ANSI 150 lb Flanged, 316L R-With a 1/2" (15mm) bore reducing meter	<b>R-G3</b>	3/4-inch (20mm) ANSI 300 lb Flanged, 316L R-With a 1/2" (15mm) bore reducing meter
<b>R-F4</b>	1-inch (25mm) ANSI 150 lb Flanged, 316L R-With a 1/2" (15mm) bore reducing meter	<b>R-G4</b>	1-inch (25mm) ANSI 300 lb Flanged, 316L R-With a 1/2" (15mm) bore reducing meter
<b>R-F5</b>	1.5-inch (40mm) ANSI 150 lb Flanged, 316L R-With a 1" (25mm) bore reducing meter	<b>R-G5</b>	1.5-inch (40mm) ANSI 300 lb Flanged, 316L R-With a 1" (25mm) bore reducing meter
<b>R-F6</b>	2-inch (50mm) ANSI 150 lb Flanged, 316L R-With a 1.5" (40mm) bore reducing meter	<b>R-G6</b>	2-inch (50mm) ANSI 300 lb Flanged, 316L R-With a 1.5" (40mm) bore reducing meter
<b>R-F7</b>	3-inch (80mm) ANSI 150 lb Flanged, 316L R-With a 2" (50mm) bore reducing meter	<b>R-G7</b>	3-inch (80mm) ANSI 300 lb Flanged, 316L R-With a 2" (50mm) bore reducing meter
<b>R-F8</b>	4-inch (100mm) ANSI 150 lb Flanged, 316L R-With a 3" (80mm) bore reducing meter	<b>R-G8</b>	4-inch (100mm) ANSI 300 lb Flanged, 316L R-With a 3" (80mm) bore reducing meter
<b>R-F9</b>	6-inch (150mm) ANSI 150 lb Flanged, 316L R-With a 4" (100mm) bore reducing meter	<b>R-G9</b>	6-inch (150mm) ANSI 300 lb Flanged, 316L R-With a 4" (100mm) bore reducing meter
<b>R-F10</b>	8-inch (200mm) ANSI 150 lb Flanged, 316L R-With a 6" (150mm) bore reducing meter	<b>R-G10</b>	8-inch (200mm) ANSI 300 lb Flanged, 316L R-With a 6" (150mm) bore reducing meter
<b>R-F11</b>	10-inch (250mm) ANSI 150 lb Flanged, 316L R-With an 8" (200mm) bore reducing meter	<b>R-G11</b>	10-inch (250mm) ANSI 300 lb Flanged, 316L R-With an 8" (200mm) bore reducing meter
<b>R-F12</b>	12-inch (300mm) ANSI 150 lb Flanged, 316L R-With a 10" (250mm) bore reducing meter	<b>R-G12</b>	12-inch (300mm) ANSI 300 lb Flanged, 316L R-With a 10" (250mm) bore reducing meter

Feature 2: Flow Body (240S-R Only)			
<b>R-H2</b>	1/2-inch (15mm) ANSI 600 lb Flanged	<b>R-I2</b>	1/2-inch (15mm) ANSI 900 lb Flanged
<b>R-H3</b>	3/4-inch (20mm) ANSI 600 lb Flanged, 316L R-With a 1/2" (15mm) bore reducing meter	<b>R-I3</b>	3/4-inch (20mm) ANSI 900 lb Flanged, 316L R-With a 1/2" (15mm) bore reducing meter
<b>R-H4</b>	1-inch (25mm) ANSI 600 lb Flanged, 316L R-With a 1/2" (15mm) bore reducing meter	<b>R-I4</b>	1-inch (25mm) ANSI 900 lb Flanged, 316L R-With a 1/2" (15mm) bore reducing meter
<b>R-H5</b>	1.5-inch (40mm) ANSI 600 lb Flanged, 316L R-With a 1" (25mm) bore reducing meter	<b>R-I5</b>	1.5-inch (40mm) ANSI 900 lb Flanged, 316L R-With a 1" (25mm) bore reducing meter
<b>R-H6</b>	2-inch (50mm) ANSI 600 lb Flanged, 316L R-With a 1.5" (40mm) bore reducing meter	<b>R-I6</b>	2-inch (50mm) ANSI 900 lb Flanged, 316L R-With a 1.5" (40mm) bore reducing meter
<b>R-H7</b>	3-inch (80mm) ANSI 600 lb Flanged, 316L R-With a 2" (50mm) bore reducing meter	<b>R-I7</b>	3-inch (80mm) ANSI 900 lb Flanged, 316L R-With a 2" (50mm) bore reducing meter
<b>R-H8</b>	4-inch (100mm) ANSI 600 lb Flanged, 316L R-With a 3" (80mm) bore reducing meter	<b>R-I8</b>	4-inch (100mm) ANSI 900 lb Flanged, 316L R-With a 3" (80mm) bore reducing meter
<b>R-H9</b>	6-inch (150mm) ANSI 600 lb Flanged, 316L R-With a 4" (100mm) bore reducing meter	<b>R-I9</b>	6-inch (150mm) ANSI 900 lb Flanged, 316L R-With a 4" (100mm) bore reducing meter
<b>R-H10</b>	8-inch (200mm) ANSI 600 lb Flanged, 316L R-With a 6" (150mm) bore reducing meter	<b>R-I10</b>	8-inch (200mm) ANSI 900 lb Flanged, 316L R-With a 6" (150mm) bore reducing meter
<b>R-H11</b>	10-inch (250mm) ANSI 600 lb Flanged, 316L R-With an 8" (200mm) bore reducing meter	<b>R-IG11</b>	10-inch (250mm) ANSI 900 lb Flanged, 316L R-With an 8" (200mm) bore reducing meter
<b>R-H12</b>	12-inch (300mm) ANSI 600 lb Flanged, 316L R-With a 10" (250mm) bore reducing meter	<b>R-I12</b>	12-inch (300mm) ANSI 900 lb Flanged, 316L R-With a 10" (250mm) bore reducing meter

Feature 2: Flow Body Wafer 316L (240S-R Only)	
<b>R-W2</b>	1/2-inch (15mm) ANSI 600 316L R-Wafer
<b>R-W3</b>	3/4-inch (20mm) ANSI 600 lb 316L R-Wafer
<b>R-W4</b>	1-inch (25mm) by 1/2-inch (15mm) Nominal Bore Reducing R-Wafer Meter, ANSI 600 lb 316L
<b>R-W5</b>	1.5-inch (40mm) by 1-inch (25mm) Nominal Bore Reducing R-Wafer Meter, ANSI 600 lb 316L
<b>R-W6</b>	2-inch (50mm) by 1.5-inch (40mm) Nominal Bore Reducing R-Wafer Meter, ANSI 600 lb 316L
<b>R-W7</b>	3-inch (80mm) by 2-inch (50mm) Nominal Bore Reducing R-Wafer Meter, ANSI 600 lb 316L
<b>R-W8</b>	4-inch (100mm) by 3-inch (80mm) Nominal Bore Reducing R-Wafer Meter, ANSI 600 lb 316L

**ORDERING THE 240S IN-LINE (CONTINUED)**

Feature 3: Electronics Enclosure			
<b>E2-DD</b>	Local Electronics NEMA 4X Enclosure Mounted on Meter. Digital Display with pushbuttons included.	<b>E4 ( )-DD</b>	Remote Electronics NEMA 4X. Specify Cable Length in Parenthesis, 50 ft max (15.24 m). Digital display with pushbuttons included.

Note : No charge for extra cable length.

Feature 4: Power Inputs and Digital/Analog Output	
<b>PV1L-V4LH</b>	Loop Power Option - One Analog Output (4-20mA), one pulse, one scaled frequency, HART communication protocol -12-36 VDC required on loop powered meters
<b>PV1-V4H</b>	One Analog Output (4-20mA), one alarm, one pulse, one scaled frequency, HART communication protocol - Not Loop Powered 12-36 VDC
<b>PV1-V4M</b>	One analog output (4-20 mA), one alarm, one pulse, one scaled frequency, MODBUS RTU communication protocol - Not Loop Powered 12-36 VDC
<b>PV1-V4B</b>	One Analog Output (4-20mA), one alarm, one pulse, one scaled frequency, BACnet MS/TP communication protocol - Not Loop Powered 12-36 VDC
<b>PV1-V6H</b>	Three analog outputs (4-20 mA), three alarms, one pulse, one scaled frequency, HART communication protocol - Not Loop Powered 12-36 VDC
<b>PV1-V6M</b>	Three analog outputs (4-20 mA), three alarms, one pulse, one scaled frequency, MODBUS RTU communication protocol - Not Loop Powered 12-36 VDC
<b>PV1-V6B</b>	3 Analog Outputs (4-20mA), three alarms, one pulse, one scaled frequency output, BACnet MS/TP communication protocol - Not Loop Powered 12-36 VDC
<b>PV1-V4M-IP</b>	One analog output (4-20 mA), one alarm, one pulse, one scaled frequency, MODBUS TCP/IP communication protocol - Not Loop Powered 12-28 VDC powered over Ethernet, 5 Watts maximum
<b>PV1-V4B-IP</b>	One Analog Output (4-20mA), one alarm, one pulse, one scaled frequency, BACnet /IP communication protocol - Not Loop Powered 12-28 VDC powered over Ethernet, 5 Watts maximum
<b>PV1-V6M-IP</b>	Three analog outputs (4-20 mA), three alarms, one pulse, one scaled frequency, Ethernet, MODBUS TCP/IP communication protocol - Not Loop Powered 12-28 VDC powered over Ethernet, 5 Watts maximum
<b>PV1-V6B-IP</b>	3 Analog Outputs (4-20mA), three alarms, one pulse, one scaled frequency output, Ethernet, BACnet /IP communication protocol - Not Loop Powered, 2-28 VDC powered over Ethernet, 5 Watts maximum
<b>PS-V4H</b>	One Analog Output (4-20mA), one alarm, one pulse, one scaled frequency, HART communication protocol - 100-240 VAC, 50/60Hz Linepower, 5 Watts maximum
<b>PS-V4M</b>	One analog output (4-20 mA), one alarm, one pulse, one scaled frequency, MODBUS RTU communication protocol - 100-240 VAC, 50/60Hz Linepower, 5 Watts maximum
<b>PS-V4B</b>	One Analog Output (4-20mA), one alarm, one pulse, one scaled frequency, BACnet MS/TP communication protocol - 100-240 VAC, 50/60Hz Linepower, 5 Watts maximum
<b>PS-V6H</b>	Three analog outputs (4-20 mA), three alarms, one pulse, one scaled frequency, HART communication protocol - 100-240 VAC, 50/60Hz Linepower, 5 Watts maximum
<b>PS-V6M</b>	Three analog outputs (4-20 mA), three alarms, one pulse, one scaled frequency, MODBUS RTU communication protocol - 100-240 VAC, 50/60Hz Linepower, 5 Watts maximum
<b>PS-V6B</b>	3 Analog Outputs (4-20mA), three alarms, one pulse, one scaled frequency output, BACnet MS/TP communication protocol - 100-240 VAC, 50/60Hz Linepower, 5 Watts maximum

Feature 5: Process Temperature			
<b>ST</b>	Standard Temperatures -330°F to 500°F (-200°C to 260°C)	<b>HT</b>	High Temperatures up to 750°F (400°C)

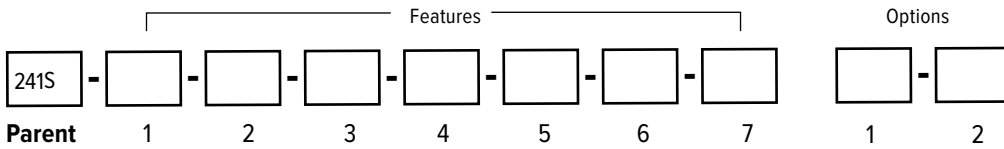
Feature 6: Process Pressure	
<b>MP0</b>	No Pressure Sensor
<b>MP1</b>	Maximum 30 psia (2 bara), Proof 60 psia (4 bara)
<b>MP2</b>	Maximum 100 psia (7 bara), Proof 200 psia (14 bara)
<b>MP3</b>	Maximum 300 psia (20 bara), Proof 600 psia (41 bara)
<b>MP4</b>	Maximum 500 psia (34 bara), Proof 1000 psia (64 bara)
<b>MP5</b>	Maximum 1500 psia (100 bara), Proof 2500 psia (175 bara)

Option 1: Certification and Cleaning	
<b>MC</b>	Material Certificates--US Mill certs on all R-Wetted parts
<b>MT</b>	Pressure Test Certificate
<b>CC</b>	Certificate of Conformance
<b>NC</b>	NACE Certification
<b>O2</b>	Oxygen Cleaning
<b>PED</b>	PED certified bodies (Stainless steel meters only)

Option 2: Remote Cables	
<b>ARM25V</b>	25' Armored Cable R-With Glands (ATEX, IECEX) V meter only - Adder to Remote option
<b>ARM50V</b>	50' Armored Cable R-With Glands (ATEX, IECEX) V meter only - Adder to Remote option
<b>ARM25VTP</b>	25' Armored Cable R-With Glands (ATEX, IECEX) VT, VTP meter only - Adder to Remote option
<b>ARM50VTP</b>	50' Armored Cable R-With Glands (ATEX, IECEX) VT, VTP meter only - Adder to Remote option

Note: An Application Data Sheet (ADS) must be completely filled in for each item ordered. Non-compliance will delay delivery.

## ORDERING THE 241S INSERTION



Instructions: To order a 241S please fill in each number block by selecting the codes from the corresponding features below and following pages.

Parent Number	
<b>241S</b>	InnovaMass Insertion Multiparameter Mass Vortex Meter

Feature 1: Multiparameter Options	
<b>V</b>	Volumetric flow meter for liquid, gas and steam
<b>VT</b>	Velocity and Temperature Sensors. Mass measurement with temperature compensation
<b>VTP</b>	Velocity, temperature and pressure sensors. Mass measurement with pressure and temperature compensation
<b>VETEP</b>	Velocity, External RTD Temperature input, External 4-20mA input (T or P)
<b>VETEP-EM</b>	Velocity, External RTD Temperature input, External 4-20mA input (T or P). Energy Monitoring option. Permits real-time calculation of energy consumption. Not loop powered. Requires DC or AC power
<b>VTEP</b>	Velocity, Temperature and External 4-20mA input (T or P)
<b>VTEP-EM</b>	Velocity, Temperature and External 4-20mA input (T or P). Energy Monitoring option. Permits real-time calculation of energy consumption.
<b>VT-EM</b>	Velocity and Temperature Sensors. Energy Monitoring option. Permits real-time calculation of energy consumption.
<b>VTP-EM</b>	Velocity, Temperature and Pressure Sensors. Energy Monitoring option. Permits real-time calculation of energy consumption.

Feature 2: Probe Length	
<b>LS</b>	Standard probe
<b>LC</b>	Compact Probe Available only for compression fitting connections CM, CF, CG, CH, CFD, CGD, AND CHD
<b>LE</b>	Extended Probe: Ensure the extended length (xxx-LE) probe is selected if using a retractor

Note : See Feature 7 to select the proper process connection.

Feature 3: Electronics Enclosure	
<b>E2-DD</b>	Local Electronics NEMA 4X Enclosure Mounted on Meter. Digital Display with pushbuttons included.
<b>E4(-)DD</b>	Remote Electronics NEMA 4X. Specify Cable Length in Parenthesis, 50 ft max (15.24 m). Digital display with pushbuttons included

Note: No charge for extra cable length.

**ORDERING THE 241S INSERTION (CONTINUED)**

<b>Feature 4: Power Inputs and Digital/Analog Output</b>	
<b>PV1L-V4LH</b>	Loop Power Option - One Analog Output (4-20mA), one pulse, one scaled frequency, HART communication protocol -12-36 VDC required on loop powered meters
<b>PV1-V4H</b>	One Analog Output (4-20mA), one alarm, one pulse, one scaled frequency, HART communication protocol - Not Loop Powered 12-36 VDC
<b>PV1-V4M</b>	One analog output (4-20 mA), one alarm, one pulse, one scaled frequency, MODBUS RTU communication protocol - Not Loop Powered 12-36 VDC
<b>PV1-V4B</b>	One Analog Output (4-20mA), one alarm, one pulse, one scaled frequency, BACnet MS/TP communication protocol - Not Loop Powered 12-36 VDC
<b>PV1-V6H</b>	Three analog outputs (4-20 mA), three alarms, one pulse, one scaled frequency, HART communication protocol - Not Loop Powered 12-36 VDC
<b>PV1-V6M</b>	Three analog outputs (4-20 mA), three alarms, one pulse, one scaled frequency, MODBUS RTU communication protocol - Not Loop Powered 12-36 VDC
<b>PV1-V6B</b>	3 Analog Outputs (4-20mA), three alarms, one pulse, one scaled frequency output, BACnet MS/TP communication protocol - Not Loop Powered 12-36 VDC
<b>PV1-V4M-IP</b>	One analog output (4-20 mA), one alarm, one pulse, one scaled frequency, MODBUS TCP/IP communication protocol - Not Loop Powered 12-28 VDC powered over Ethernet, 5 Watts maximum
<b>PV1-V4B-IP</b>	One Analog Output (4-20mA), one alarm, one pulse, one scaled frequency, BACnet /IP communication protocol - Not Loop Powered 12-28 VDC powered over Ethernet, 5 Watts maximum
<b>PV1-V6M-IP</b>	Three analog outputs (4-20 mA), three alarms, one pulse, one scaled frequency, Ethernet, MODBUS TCP/IP communication protocol - Not Loop Powered 12-28 VDC powered over Ethernet, 5 Watts maximum
<b>PV1-V6B-IP</b>	3 Analog Outputs (4-20mA), three alarms, one pulse, one scaled frequency output, Ethernet, BACnet /IP communication protocol - Not Loop Powered, 12-28 VDC powered over Ethernet, 5 Watts maximum
<b>PS-V4H</b>	One Analog Output (4-20mA), one alarm, one pulse, one scaled frequency, HART communication protocol - 100-240 VAC, 50/60Hz Linepower, 5 Watts maximum
<b>PS-V4M</b>	One analog output (4-20 mA), one alarm, one pulse, one scaled frequency, MODBUS RTU communication protocol - 100-240 VAC, 50/60Hz Linepower, 5 Watts maximum
<b>PS-V4B</b>	One Analog Output (4-20mA), one alarm, one pulse, one scaled frequency, BACnet MS/TP communication protocol - 100-240 VAC, 50/60Hz Linepower, 5 Watts maximum
<b>PS-V6H</b>	Three analog outputs (4-20 mA), three alarms, one pulse, one scaled frequency, HART communication protocol - 100-240 VAC, 50/60Hz Linepower, 5 Watts maximum
<b>PS-V6M</b>	Three analog outputs (4-20 mA), three alarms, one pulse, one scaled frequency, MODBUS RTU communication protocol - 100-240 VAC, 50/60Hz Linepower, 5 Watts maximum
<b>PS-V6B</b>	3 Analog Outputs (4-20mA), three alarms, one pulse, one scaled frequency output, BACnet MS/TP communication protocol - 100-240 VAC, 50/60Hz Linepower, 5 Watts maximum

<b>Feature 5: Process Temperature</b>	
<b>ST</b>	Standard process temperature -330°F to 500°F (-200°C to 260°C)
<b>HT</b>	High Temperatures up to 750°F (400°C)

<b>Feature 6: Process Pressure</b>	
<b>MP0</b>	No Pressure Sensor
<b>MP1</b>	Maximum 30 psia (2 bara), Proof 60 psia (4 bara)
<b>MP2</b>	Maximum 100 psia (7 bara), Proof 200 psia (14 bara)
<b>MP3</b>	Maximum 300 psia (20 bara), Proof 600 psia (41 bara)
<b>MP4</b>	Maximum 500 psia (34 bara), Proof 1000 psia (64 bara)
<b>MP5</b>	Maximum 1500 psia (100 bara), Proof 2500 psia (175 bara)

<b>Feature 7: Process Connection (Compression Fittings ANSI)</b>	
<b>CM</b>	Compression Fitting, stem seal 2-inch Male NPT process connection, 600 lb pressure rating.
<b>CF</b>	Compression Fitting, probe seal 2-inch 150 lb Flange process connection
<b>CG</b>	Compression Fitting, stem seal 2-inch 300 lb Flange process connection
<b>CH</b>	Compression Fitting, stem seal 2-inch 600 lb Flange process connection
<b>CI</b>	Compression Fitting, stem seal 2-inch 900 lb Flange process connection

<b>Feature 7: Process Connection (Compression Fittings DN)</b>	
<b>CFD</b>	Compression Fitting stem seal, DN50 PN16 process connection
<b>CGD</b>	Compression Fitting, DN50 PN40 process connection
<b>CHD</b>	Compression Fitting stem seal, DN50 PN63 process connection

<b>Feature 7: Process Connection (Compression Fittings JIS)</b>	
<b>CMJ</b>	Compression Fitting stem seal, 2-inch Male NPT process connection, JIS 30K pressure rating.
<b>CFJ</b>	Compression Fitting stem seal, 2-inch JIS 10K process connection
<b>CGJ</b>	Compression Fitting, 2-inch JIS 20K process connection
<b>CHJ</b>	Compression Fitting stem seal, 2-inch JIS 30K process connection

**ORDERING THE 241S INSERTION (CONTINUED)**

**Feature 7: Process Connection (Packing Glands No Retractor ANSI)**

<b>PM</b>	Packing Gland* stem seal, 2-inch Male NPT process connection, 50 psig (3.5 barg) maximum process pressure without removable retractor.
<b>PF</b>	Packing Gland* stem seal, 2-inch 150 lb Flange process connection, 50 psig (3.5 barg) maximum process pressure without removable retractor.
<b>PG</b>	Packing Gland* stem seal, 2-inch 300 lb Flange process connection, 50 psig (3.5 barg) maximum process pressure without removable retractor.

**Feature 7: Process Connection (Packing Glands No Retractor DN)**

<b>PFD</b>	Packing Gland* stem seal, DN50 PN16 Flange process connection, 50 psig (3.5 barg) maximum process pressure without removable retractor.
<b>PGD</b>	Packing Gland* stem seal, DN50 PN40 Flange process connection, 50 psig (3.5 barg) maximum process pressure without removable retractor.

**Feature 7: Process Connection (Packing Glands No Retractor JIS)**

<b>PMJ</b>	Packing Gland* stem seal, 2-inch Male NPT process connection, JIS 30K pressure rating maximum process pressure without removable retractor.
<b>PFJ</b>	Packing Gland* stem seal, 2-inch JIS 10K Flange process connection, 50 psig (3.5 barg) maximum process pressure without removable retractor.
<b>PGJ</b>	Packing Gland* stem seal, 2-inch JIS 20K Flange process connection, 50 psig (3.5 barg) maximum process pressure without removable retractor.

**Feature 7: Process Connection (Packing Glands Retractor ANSI)**

<b>PMR</b>	Packing Gland stem seal, 2-inch NPT process connection with Retractor
<b>PFR</b>	Packing Gland stem seal, 2-inch 150 lb Flange process connection with Retractor
<b>PGR</b>	Packing Gland stem seal, 2-inch 300 lb Flange process connection with Retractor
<b>PHR</b>	Packing Gland stem seal, 2-inch 600 lb Flange process connection with Retractor

**Feature 7: Process Connection (Packing Glands Retractor DN)**

<b>PFDR</b>	Packing Gland stem seal, DN50 PN16 Flange process connection with Retractor
<b>PGDR</b>	Packing Gland stem seal, DN50 PN40 Flange process connection with Retractor
<b>PHDR</b>	Packing Gland stem seal, DN50 PN63 Flange process connection with Retractor

**Feature 7: Process Connection (Packing Glands Retractor JIS)**

<b>PMJR</b>	Packing Gland stem seal, 2-inch NPT, process connection with Retractor
<b>PFJR</b>	Packing Gland stem seal, 2-inch JIS 10K Flange process connection with Retractor
<b>PGJR</b>	Packing Gland stem seal, 2-inch JIS 20K Flange process connection with Retractor
<b>PHJR</b>	Packing Gland stem seal, 2-inch JIS 30K Flange process connection with Retractor

**Feature 7: Process Connection (Packing Glands Retractor ANSI Extended Length Probes)**

<b>PMR-LE</b>	**EL probe** Packing Gland stem seal, 2-inch NPT process connection with Retractor
<b>PFR-LE</b>	**EL probe** Packing Gland stem seal, 2-inch 150 lb Flange process connection with Retractor
<b>PGR-LE</b>	**EL probe** Packing Gland stem seal, 2-inch 300 lb Flange process connection with Retractor
<b>PHR-LE</b>	**EL probe** Packing Gland stem seal, 2-inch 600 lb Flange process connection with Retractor

**Feature 7: Process Connection (Packing Glands Retractor DN Extended Length Probes)**

<b>PFDR-LE</b>	**EL probe** Packing Gland stem seal, DN50 PN16 Flange process connection with Retractor
<b>PGDR-LE</b>	**EL probe** Packing Gland stem seal, DN50 PN40 Flange process connection with Retractor
<b>PHDR-LE</b>	**EL probe** Packing Gland stem seal, DN50 PN63 Flange process connection with Retractor

**Feature 7: Process Connection (Packing Glands Retractor JIS Extended Length Probes)**

<b>PMJR-LE</b>	**EL probe** Packing Gland stem seal, 2-inch NPT JIS 30K pressure rating process connection with Retractor
<b>PFJR-LE</b>	**EL probe** Packing Gland stem seal, 2-inch JIS 10K Flange process connection with Retractor
<b>PGJR-LE</b>	**EL probe** Packing Gland stem seal, 2-inch JIS 20K Flange process connection with Retractor
<b>PHJR-LE</b>	**EL probe** Packing Gland stem seal



**ORDERING THE 241S INSERTION (CONTINUED)**

Option 1: Certification Documents			
<b>MC</b>	Material certificates--US Mill certs on all wetted parts	<b>NC</b>	NACE Certification
<b>PT</b>	Pressure Test Certificate	<b>O2</b>	Oxygen Cleaning
<b>CC</b>	Certificate of Conformance	<b>PED</b>	PED Certified Bodies (Stainless steel meters only)

Option 2: Remote Cable	
<b>ARM25V</b>	25 feet (7.6 m) Armored Cable R-With Glands (ATEX, IECEX) V meter only - Adder to Remote option
<b>ARM50V</b>	50 feet (17 m) Armored Cable R-With Glands (ATEX, IECEX) V meter only - Adder to Remote option
<b>ARM25VTP</b>	25 feet (7.6 m) Armored Cable R-With Glands (ATEX, IECEX) VT, VTP meter only - Adder to Remote option
<b>ARM50VTP</b>	50' (17 m) Armored Cable R-With Glands (ATEX, IECEX) VT, VTP meter only - Adder to Remote option



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