

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 2250 psig (155.13 barg)
- 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[®] 240S/241S



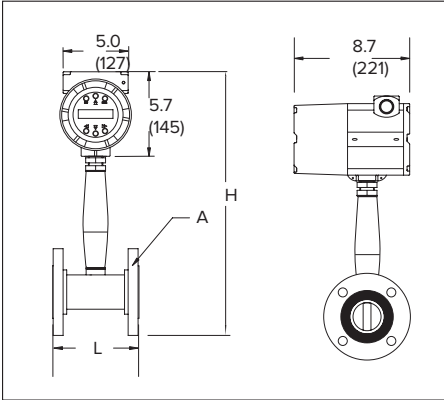
DESCRIPTION

Sierra 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[®] 240S and a unique insertion version, the InnovaMass[®] 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.

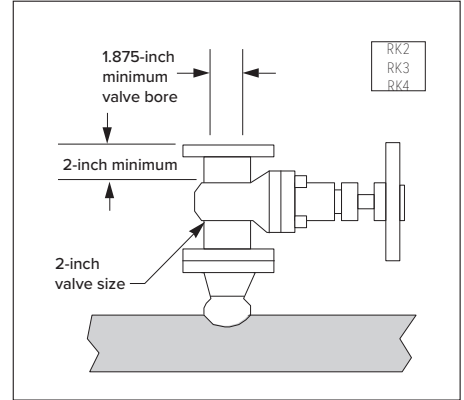
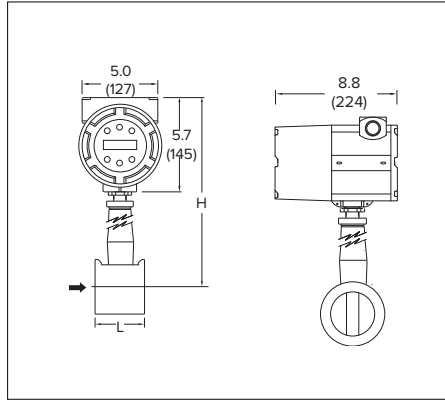
InnovaMass is a true high performance, rugged, and reliable workhorse in the industry. The 240S reduced bore version allows lower flow rate measurement than traditional vortex meters and eliminates the need for field-installed piping reductions. The 240S is widely used for fluids down to -330°F (-200°C). 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.

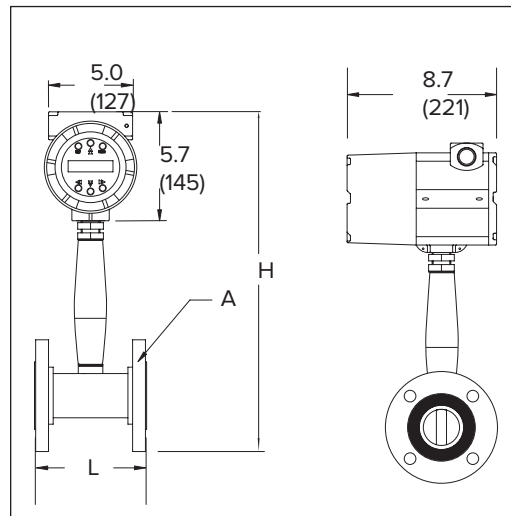
IN-LINE TABLE

InnovaFlo® 240S Sizes				InnovaFlo® 240S Sizes			
Flow Body Size	A	L	H	Flow Body Size	A	L	H
0.5-inch SCH 80	150 lb flange	4.56 (116)	13.5 (343)	3-inch SCH 80	150 lb flange	6.9 (175)	14.6 (371)
	300 lb flange	4.56 (116)	13.5 (343)		300 lb flange	6.9 (175)	14.6 (371)
	600 lb flange	4.56 (116)	13.5 (343)		600 lb flange	7.9 (200)	14.6 (371)
	900 lb flange	7.9 (201)	13.5 (343)		900 lb flange	14.8 (375)	14.6 (371)
	1.4 flange wafer O.D.	4.56 (116)	13.5 (343)		5.0 flange wafer O.D.	4.0 (102)	14.6 (371)
0.75-inch SCH 80	150 lb flange	4.8 (122)	13.5 (343)	4-inch SCH 80	150 lb flange	8.0 (203)	15.1 (384)
	300 lb flange	4.8 (122)	13.5 (343)		300 lb flange	8.0 (203)	15.1 (384)
	600 lb flange	4.8 (122)	13.5 (343)		600 lb flange	8.0 (203)	15.1 (384)
	900 lb flange	9.7 (247)	13.5 (343)		900 lb flange	16.9 (429)	15.1 (384)
	1.7 flange wafer O.D.	4.8 (122)	13.5 (343)		6.2 flange wafer O.D.	4.7 (119)	15.1 (384)
1-inch SCH 80	150 lb flange	4.94 (126)	13.5 (343)	6-inch SCH 80	150 lb flange	9.0 (229)	16.2 (411)
	300 lb flange	4.94 (126)	13.5 (343)		300 lb flange	9.0 (229)	16.2 (411)
	600 lb flange	4.94 (126)	13.5 (343)		600 lb flange	9.0 (229)	16.2 (411)
	900 lb flange	10.8 (274)	13.5 (343)		900 lb flange	19.5 (495)	17.2 (437)
	2.0 flange wafer O.D.	2.8 (71)	13.5 (343)		8-inch SCH 80	150 lb flange	10.5 (267)
1.5-inch SCH 80	150 lb flange	5.5 (140)	13.8 (351)	300 lb flange		10.5 (267)	17.2 (437)
	300 lb flange	5.5 (140)	13.8 (351)	600 lb flange		10.5 (267)	17.2 (437)
	600 lb flange	5.5 (140)	13.8 (351)	900 lb flange		22.8 (579)	17.2 (437)
	900 lb flange	12.0 (305)	13.8 (351)	10-inch SCH 80		150 lb flange	15.0 (381)
	2.9 flange wafer O.D.	2.8 (71)	13.8 (351)		300 lb flange	15.0 (381)	18.2 (462)
2-inch SCH 80	150 lb flange	6.0 (153)	14.0 (356)		600 lb flange	15.0 (381)	18.2 (462)
	300 lb flange	6.0 (153)	14.0 (356)		900 lb flange	29.0 (737)	18.2 (462)
	600 lb flange	6.0 (153)	14.0 (356)		12-inch SCH 80	150 lb flange	17.7 (450)
	900 lb flange	14.1 (357)	14.0 (356)	300 lb flange		17.7 (450)	19.2 (488)
	3.7 flange wafer O.D.	3.0 (76)	14.0 (356)	600 lb flange		17.7 (450)	19.2 (488)
900 lb flange		30.3 (770)	19.2 (488)				

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

240S-R INLINE REDUCED BORE VORTEX FLOW METER DIMENSIONAL SPECIFICATIONS

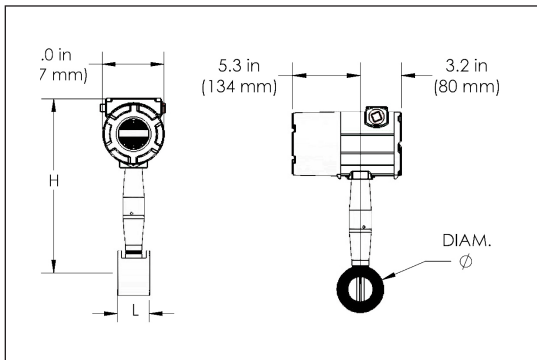
240S-R Inline Reducing Vortex Flow Meter—Side / Outlet View



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)
3/4 inch (20 mm) X 1/2 inch (15mm)	7.9 (200)	8.4 (213)	13.5 (343)	13 (5.9)	14.6 (6.6)	15.6 (7.1)	20.6 (9.3)
1 inch (25 mm) X 1/2 inch (15 mm)	7.9 (200)	8.4 (213)	13.5 (343)	13. (5.9)	16.3 (7.4)	16.4 (7.5)	22.7 (10.3)
1.5 inch (40 mm) X 1 inch (25 mm)	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)
2 inch (50 mm) X 1-1/2 inch (40 mm)	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)
3 inch (80 mm) X 2 inch (50 mm)	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)
4 inch (100 mm) X 3 inch (80 mm)	9.84 (250)	15.3 (389)	15.1 (384)	33 (15.0)	66.8 (30.3)	96.0 (43.6)	116.1 (52.7)
6 inch (150 mm) X 4 inch (100 mm)	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)
8 inch (200 mm) X 6 inch (150 mm)	11.81 (300)	20.1 (511)	17.2 (437)	68.3 (31.0)	168.4 (76.5)	299.0 (136)	365.7 (165.9)
10 inch (250 mm) X 8 inch (200 mm)	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)
12 inch (300 mm) X 10 inch (250 mm)	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



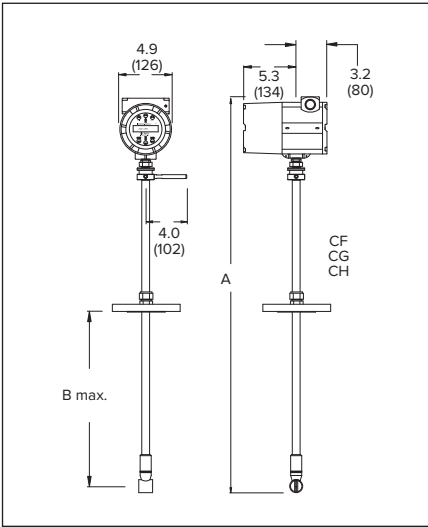
240S-R Inline Reduced Bore Wafer Model				
Flow Body Size, Diameter and Weight				
Flow Meter Nominal Size	L	H	Diameter	Weight
3/4 inch (20 mm) X 1/2 inch (15mm)	2.56 (65)	13.5 (343)	1.85 (35)	9.2 (4.2)
1 inch (25 mm) X 3/4 inch (20 mm)	2.56 (65)	13.5 (343)	1.69 (43)	9.50 (4.3)
1-1/2 inch (40 mm) X 1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

Add 11lb (5KG) for remote electronics

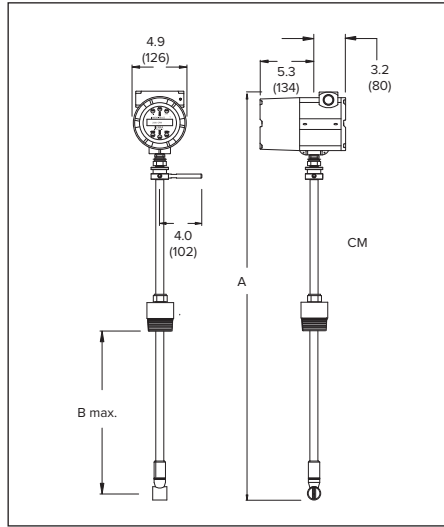
All dimensions are inches (+/- .25-inch significant value). Millimeters are in parentheses. Certified drawings are available on request.

INSERTION DIMENSIONAL SPECIFICATIONS

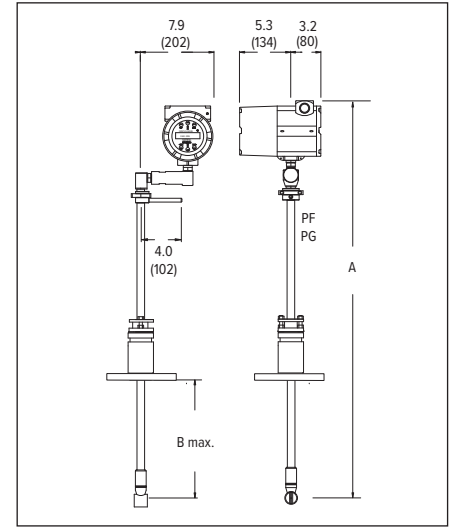
241S Compression, Flange



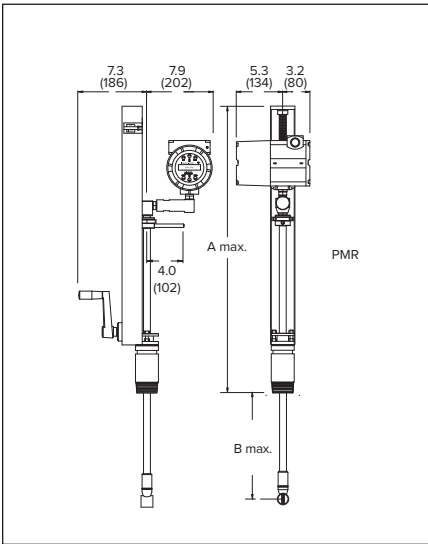
241S Compression, Male NPT



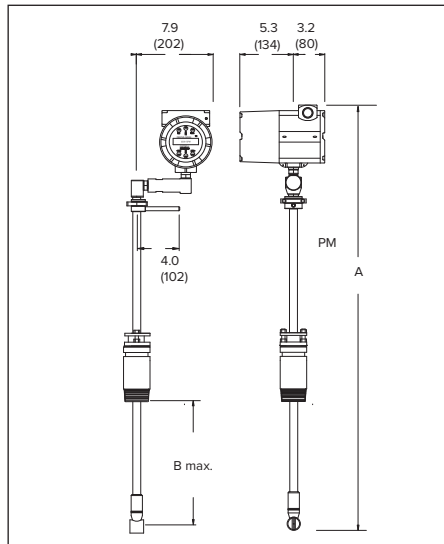
241S Packing Gland, Flange



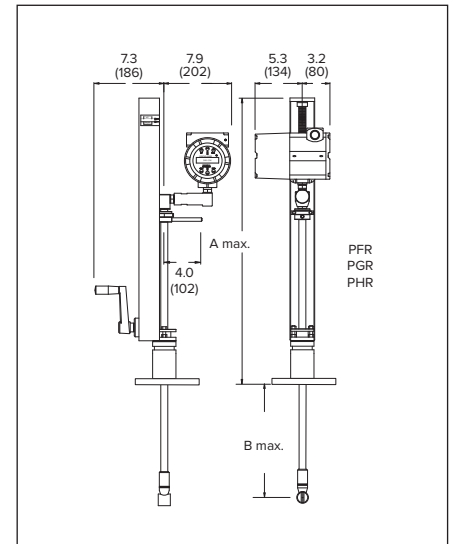
241S Packing Gland, Male NPT, Retractor



241S Packing Gland, Male NPT



241S Packing Gland, Flange, Retractor



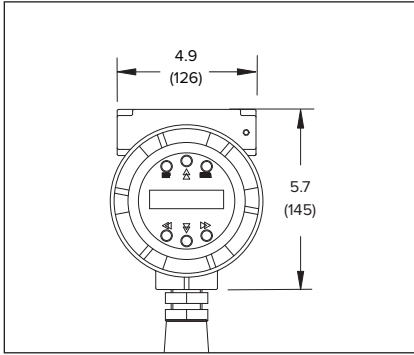
InnovaMass® 241S Sizes

Model Code / Probe Seal / Process Connection	Standard Probe		Compact Probe		Extended Probe	
	A	B	A	B	A	B
CM / Compression / 2-in Male NPT	38.0 (965)**	26.2 (665)	21.6 (549)**	9.8 (249)	50.0 (1270)**	38.2 (970)
CF / Compression / 150 lb. Flange	38.0 (965)**	27.3 (693)	21.6 (549)**	10.9 (277)	50.0 (1270)**	39.3 (998)
CG / Compression / 300 lb. Flange	38.0 (965)**	27.2 (691)	21.6 (549)**	10.8 (274)	50.0 (1270)**	39.2 (996)
CH / Compression / 600 lb. Flange	38.0 (965)**	26.8 (681)	21.6 (549)**	10.4 (264)	50.0 (1270)**	38.8 (986)
CI / Compression / 900 lb. Flange	38.0 (965)**	26.3 (668)	21.6 (549)**	9.9 (251)	50.0 (1270)**	38.3 (973)
PM / Packing Gland / 2-in Male NPT	40.5 (1029)	21.5 (546)	N/A	N/A	52.5 (1334)	33.5 (851)
PMR / Packing Gland / 2-in Male NPT with Retractor	40.5 (1029)	21.5 (546)	N/A	N/A	52.5 (1334)	33.5 (851)
PF / Packing Gland / 150 lb. Flange	40.5 (1029)	21.1 (536)	N/A	N/A	52.5 (1334)	33.1 (841)
PFR / Packing Gland / 150 lb. Flange with Retractor	40.5 (1029)	21.1 (536)	N/A	N/A	52.5 (1334)	33.1 (841)
PG / Packing Gland / 300 lb. Flange	40.5 (1029)	21.1 (536)	N/A	N/A	52.5 (1334)	33.1 (841)
PGR / Packing Gland / 300 lb. Flange w/ Retractor	40.5 (1029)	21.1 (536)	N/A	N/A	52.5 (1334)	33.1 (841)
PHR / Packing Gland / 600 lb flange w/ Heavy-Duty Retractor	40.5 (1029)	21.1 (536)	N/A	N/A	52.5 (1334)	33.1 (841)
PIR / Packing Gland / 900 lb Flange w/ Heavy-Duty Retractor	40.5 (1029)	20.9 (531)	N/A	N/A	52.5 (1334)	32.9 (836)

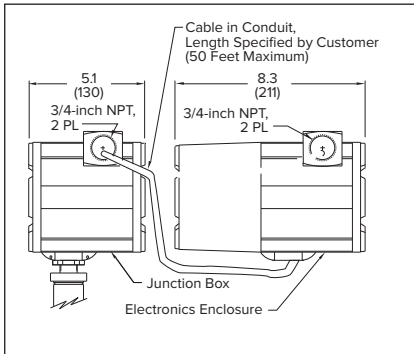
**Note: Add 3 inches (76 mm) for VTP configurations.

ORDERING SPECIFICATIONS

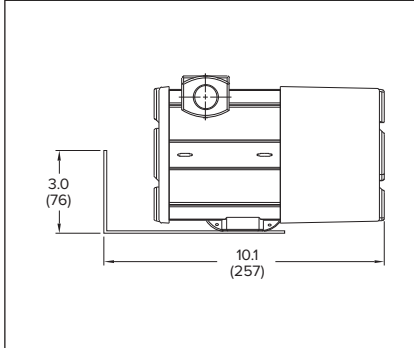
240S/241S Remote—Front View



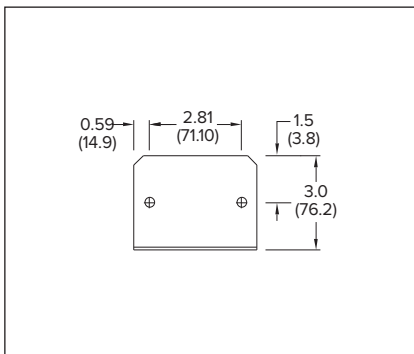
240S/241S Remote—Side View



Remote Rear Bracket Mounted Electronics



Mounting Holes for Remote Rear Bracket



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

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		ANSI 900 lb	
	lb	kg	lb	kg	lb	kg	lb	kg
0.5-inch Flange	12.0	5.5	12.5	5.7	13.4	6.1	17.6	8.0
0.75-inch Flange	13.0	5.9	14.6	6.6	15.6	7.1	21.0	9.5
1-inch Flange	13.4	6.1	16.3	7.4	16.4	7.5	26.3	11.9
1.5-inch Flange	16.3	7.4	23.3	10.6	24.6	11.2	37.2	16.9
2-inch Flange	21.2	9.6	26.8	12.2	33.2	15.1	60.5	27.4
3-inch Flange	33.0	15.0	41.0	18.6	56.1	25.5	76.5	34.7
4-inch Flange	45.8	20.8	66.8	30.3	96.0	43.6	121.2	55.0
6-inch Flange	68.3	31.0	106.3	48.2	194.3	88.2	254.4	115.4
8-inch Flange	112.4	51.0	168.4	76.5	299.0	136	433.0	196.4
10 inch (250 mm)	188.3	85.5	262.3	119.1	462.3	209.9	665.9	302.0
12 inch (300 mm)	298.6	135.6	402.6	182.8	606.6	275.4	926.6	420.3
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	Standard Probe (LS)	Compact Probe (LC)	Extended Probe (LE)
CM / Compression Fitting, Male NPT	14.0 (6.2)	13.0 (5.7)	15.0 (6.7)
CF / Compression Fitting, 150 lb Flange	16.0 (7.3)	15.0 (6.8)	17.0 (7.8)
CG / Compression Fitting, 300 lb Flange	18.0 (8.3)	17.0 (7.8)	19.0 (8.8)
CH / Compression Fitting, 600 lb Flange	19.0 (8.7)	18.0 (7.8)	20.0 (9.2)
CI / Compression Fitting, 900 lb Flange	32.0 (14.5)	31.0 (14.1)	33.0 (15.0)
PM / Packing Gland, Male NPT	16.0 (7.1)	—	17.0 (7.6)
PMR / Packing Gland, Male NPT with Reactor	25.0 (11.5)	—	32.0 (14.5)
PF / Packing Gland, 150 lb Flange	21.0 (9.4)	—	22.0 (9.9)
PFR / Packing Gland, 150 lb Flange with Reactor	30.0 (13.7)	—	37.0 (16.7)
PG / Packing Gland, 300 lb Flange	25.0 (11.3)	—	26.0 (11.8)
PGR / Packing Gland, 300 lb Flange with Reactor	34.0 (15.5)	—	41.0 (18.5)
PHR / Packing Gland, 600 lb Flange with Reactor	35.0 (16.0)	—	42.0 (19.0)
PIR / Packing Gland, 900 lb Flange with Reactor	55 (24.9)	—	61 (27.7)

Add 11lb (5KG) for remote electronics. Note: All weights in pounds lbs with (kg) in brackets.

PERFORMANCE SPECIFICATIONS

Accuracy

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

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.

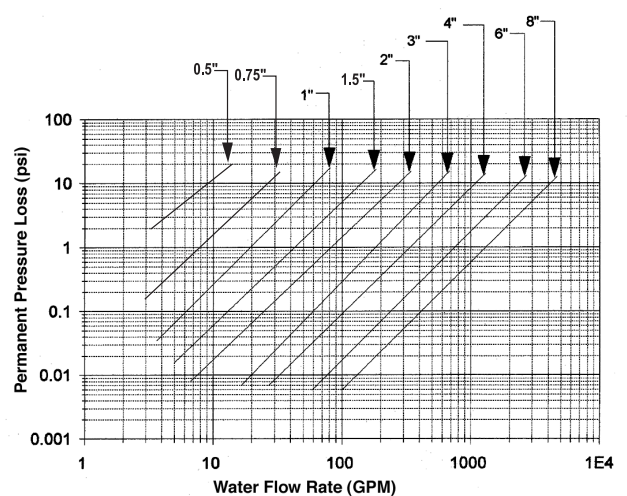
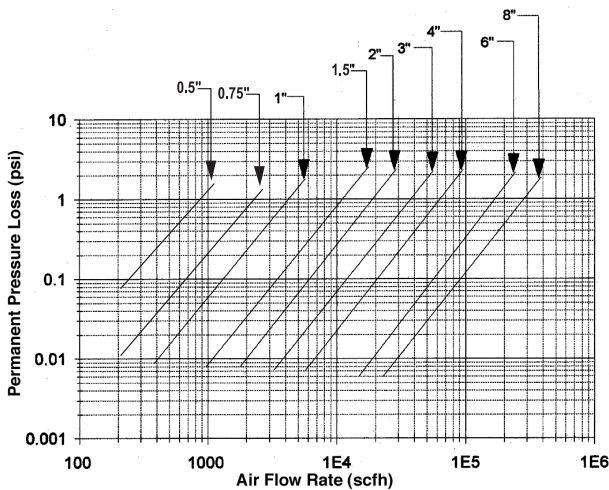
Linear Range

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:

Maximum velocity, liquid: 30 feet/sec (9 meters/second)
 Minimum velocity, liquid: 1 foot/sec (.3 meters/second)

Maximum velocity, gas or steam: see table on page 8
 Minimum velocity, gas or steam feet/sec (meters/second):

$5/\sqrt{\text{density (lb/ft}^3\text{)}}$ $6.1/\sqrt{\text{density (kg/m}^3\text{)}}$



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
gpm	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
m³/hr	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

Gas or Steam Max Velocity											
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
FT/SEC	175	250	250	300	300	300	300	300	300	300	300
M/SEC	53	76	76	90	90	90	90	90	90	90	90

Air Minimum and Maximum Flow Rates (scfm) ⁽¹⁾											
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
0 psig	1.8 18	3 41	5 90	13 221	22 369	50 826	87 1437	198 3258	347 5708	546 8976	772 12701
100 psig	5 138	9 325	15 704	38 1730	63 2890	141 6466	245 11254	555 25515	972 44698	1529 70292	2163 99456
200 psig	7 258	13 609	21 1322	52 3248	86 5427	193 12140	335 21131	761 47911	1332 83931	2095 131895	2965 186752
300 psig	8 380	15 896	25 1944	63 4775	104 7978	234 17847	407 31064	922 70431	1615 123375	2540 194025	3594 274529
400 psig	10 502	18 1183	29 2568	72 6309	120 10542	269 23580	467 41043	1060 93057	1857 163000	2920 256358	4132 362724
500 psig	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
5 psig	6.5 52	12 122	20 265	49 650	82 1087	183 2431	318 4231	722 9594	1264 16806	1988 26429	2813 37395
100 psig	15 271	27 639	46 1386	112 3405	187 5690	419 12729	728 22156	1652 50233	2893 87998	4550 138386	6438 195803
200 psig	20 493	37 1163	62 2525	151 6203	253 10365	565 23184	983 40354	2229 91494	3905 160279	6141 252055	8689 356635
300 psig	24 716	45 1688	74 3664	182 9000	304 15040	680 33642	1184 58556	2685 132763	4704 232575	7397 365747	10466 517499
400 psig	28 941	51 2220	85 4816	209 11831	349 19770	780 44222	1358 76971	3079 174516	5393 305717	8481 480771	12000 680247
500 psig	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 Ratings

InnovaMass 241S Pressure Ratings			
Probe Seal	Process Connection	Rating	Ordering Code
Compression Fitting	2-inch male NPT	ANSI 600 lb	CM
	2-inch 150 lb flange	ANSI 150 lb	CF
	2-inch 300 lb flange	ANSI 300 lb	CG
	2-inch 600 lb flange	ANSI 600 lb	CH
	2-inch 900 lb flange	ANSI 900 lb	CI
Packing Gland	2-inch male NPT	50 psig	PM
	2-inch 150 lb flange	50 psig	PF
	2-inch 300 lb flange	50 psig	PG
Packing Gland & Removable Retractor	2-inch male NPT	ANSI 300 lb	PM, RR
	2-inch 150 lb flange	ANSI 150 lb	PF, RR
	2-inch 300 lb flange	ANSI 300 lb	PG, RR
Packing Gland & Permanent Retractor	2-inch male NPT	ANSI 600 lb	PMR
	2-inch 150 lb flange	ANSI 150 lb	PFR
	2-inch 300 lb flange	ANSI 300 lb	PGR
	2-inch 600 lb flange	ANSI 600 lb	PHR
	2-inch 900 lb flange	ANSI 900 lb	PIR

Process Fluid Pressure

240S Pressure Ratings		
Process Connection	Material	Rating
Flanged	316L SS, A105 carbon steel, C276 Hastalloy®	150, 300, 600, 900 lb, PN16, PN40, PN63, JIS 10K, 20K, 30K
Wafer	316L SS, A105 carbon steel, C276 Hastalloy®	600 lb, PN63, JIS 30K

Process Transducer Pressure

Pressure Sensor Ranges ⁽¹⁾ 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⁽¹⁾

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 RTU

Modbus TCP/IP

BACnet MSTP

BACnet/IP

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 and (IP66), T6

Electrical Ports

Two 3/4-inch female NPT ports

Mounting Connections

240S Wafer or 150, 300, 600, 900 lb ANSI flange

241S Permanent Installation:
Two-inch male NPT; 150, 300, 600, 900 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 See instruction manual

241S Meter must be perpendicular within +/- 5° of the pipe centerline

FM/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

IECEx Approval

Ex d IIB + H2 T6

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

Other Approvals

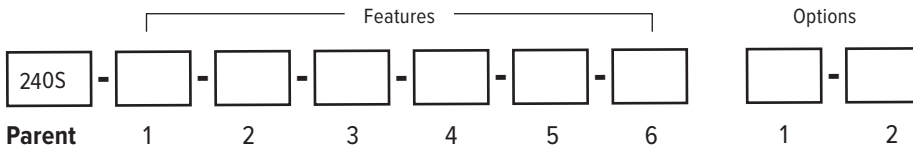
CE Mark, CSA, CRN

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

Feature 1: Multiparameter Options	
V	Volumetric flow meter for liquid, gas and steam
VT	Velocity and Temperature Sensors. Mass measurement with temperature compensation
VTP	Velocity, temperature and pressure sensors. Mass measurement with pressure and temperature compensation
VETEP	Velocity, External RTD Temperature input, External 4-20mA input (T or P)
VETEP-EMS	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
VTEP	Velocity, Temperature and External 4-20mA input (T or P)
VTEP-EMS	Velocity, Temperature and External 4-20mA input (T or P). Energy Monitoring option. Permits real-time calculation of energy consumption.
VT-EMS	Velocity and Temperature Sensors. Energy Monitoring option. Permits real-time calculation of energy consumption.
VTP-EMS	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)							
F2	1/2-inch (15mm) ANSI 150 lb Flanged	G2	1/2-inch (15mm) ANSI 300 lb Flanged	H2	1/2-inch (15mm) ANSI 600 lb Flanged	I2	1/2-inch (15mm) ANSI 900 lb Flanged
F3	3/4-inch (20mm) ANSI 150 lb Flanged	G3	3/4-inch (20mm) ANSI 300 lb Flanged	H3	3/4-inch (20mm) ANSI 600 lb Flanged	I3	3/4-inch (20mm) ANSI 900 lb Flanged
F4	1-inch (25mm) ANSI 150 lb Flanged	G4	1-inch (25mm) ANSI 300 lb Flanged	H4	1-inch (25mm) ANSI 600 lb Flanged	I4	1-inch (25mm) ANSI 900 lb Flanged
F5	1.5-inch (40mm) ANSI 150 lb Flanged	G5	1.5-inch (40mm) ANSI 300 lb Flanged	H5	1.5-inch (40mm) ANSI 600 lb Flanged	I5	1.5-inch (40mm) ANSI 900 lb Flanged
F6	2-inch (50mm) ANSI 150 lb Flanged	G6	2-inch (50mm) ANSI 300 lb Flanged	H6	2-inch (50mm) ANSI 600 lb Flanged	I6	2-inch (50mm) ANSI 900 lb Flanged
F7	3-inch (80mm) ANSI 150 lb Flanged	G7	3-inch (80mm) ANSI 300 lb Flanged	H7	3-inch (80mm) ANSI 600 lb Flanged	I7	3-inch (80mm) ANSI 900 lb Flanged
F8	4-inch (100mm) ANSI 150 lb Flanged	G8	4-inch (100mm) ANSI 300 lb Flanged	H8	4-inch (100mm) ANSI 600 lb Flanged	I8	4-inch (100mm) ANSI 900 lb Flanged
F9	6-inch (150mm) ANSI 150 lb Flanged	G9	6-inch (150mm) ANSI 300 lb Flanged	H9	6-inch (150mm) ANSI 600 lb Flanged	I9	6-inch (150mm) ANSI 900 lb Flanged
F10	8-inch (200mm) ANSI 150 lb Flanged	G10	8-inch (200mm) ANSI 300 lb Flanged	H10	8-inch (200mm) ANSI 600 lb Flanged	I10	8-inch (200mm) ANSI 900 lb Flanged
F11	10-inch (250mm) ANSI 150 lb Flanged	G11	10-inch (250mm) ANSI 300 lb Flanged	H11	10-inch (250mm) ANSI 600 lb Flanged	I11	10-inch (250mm) ANSI 900 lb Flanged
F12	12-inch (300mm) ANSI 150 lb Flanged	G12	12-inch (300mm) ANSI 300 lb Flanged	H12	12-inch (300mm) ANSI 600 lb Flanged	I12	12-inch (300mm) ANSI 900 lb Flanged

Note: For Flow Body 316L

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

Note: For Flow Body Carbon Steel (CS)

ORDERING THE 240S IN-LINE (CONTINUED)

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

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

Feature 2: Flow Body ANSI Wafer, 316L (240S Only)	
W2	1/2-inch (15mm) ANSI 600 316L Wafer
W3	3/4-inch (20mm) ANSI 600 lb 316L Wafer
W4	1-inch (25mm) ANSI 600 lb 316L Wafer
W5	1.5-inch (40mm) ANSI 600 lb 316L Wafer
W6	2-inch (50mm) ANSI 600 lb 316L Wafer
W7	3-inch (80mm) ANSI 600 lb 316L Wafer
W8	4-inch (100mm) ANSI 600 lb 316L 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)			
R-F3	3/4-inch (20mm) ANSI 150 lb Flanged, 316L R-With a 1/2" (15mm) bore reducing meter	R-G3	3/4-inch (20mm) ANSI 300 lb Flanged, 316L R-With a 1/2" (15mm) bore reducing meter
R-F4	1-inch (25mm) ANSI 150 lb Flanged, 316L R-With a 1/2" (15mm) bore reducing meter	R-G4	1-inch (25mm) ANSI 300 lb Flanged, 316L R-With a 1/2" (15mm) bore reducing meter
R-F5	1.5-inch (40mm) ANSI 150 lb Flanged, 316L R-With a 1" (25mm) bore reducing meter	R-G5	1.5-inch (40mm) ANSI 300 lb Flanged, 316L R-With a 1" (25mm) bore reducing meter
R-F6	2-inch (50mm) ANSI 150 lb Flanged, 316L R-With a 1.5" (40mm) bore reducing meter	R-G6	2-inch (50mm) ANSI 300 lb Flanged, 316L R-With a 1.5" (40mm) bore reducing meter
R-F7	3-inch (80mm) ANSI 150 lb Flanged, 316L R-With a 2" (50mm) bore reducing meter	R-G7	3-inch (80mm) ANSI 300 lb Flanged, 316L R-With a 2" (50mm) bore reducing meter
R-F8	4-inch (100mm) ANSI 150 lb Flanged, 316L R-With a 3" (80mm) bore reducing meter	R-G8	4-inch (100mm) ANSI 300 lb Flanged, 316L R-With a 3" (80mm) bore reducing meter
R-F9	6-inch (150mm) ANSI 150 lb Flanged, 316L R-With a 4" (100mm) bore reducing meter	R-G9	6-inch (150mm) ANSI 300 lb Flanged, 316L R-With a 4" (100mm) bore reducing meter
R-F10	8-inch (200mm) ANSI 150 lb Flanged, 316L R-With a 6" (150mm) bore reducing meter	R-G10	8-inch (200mm) ANSI 300 lb Flanged, 316L R-With a 6" (150mm) bore reducing meter
R-F11	10-inch (250mm) ANSI 150 lb Flanged, 316L R-With an 8" (200mm) bore reducing meter	R-G11	10-inch (250mm) ANSI 300 lb Flanged, 316L R-With an 8" (200mm) bore reducing meter
R-F12	12-inch (300mm) ANSI 150 lb Flanged, 316L R-With a 10" (250mm) bore reducing meter	R-G12	12-inch (300mm) ANSI 300 lb Flanged, 316L R-With a 10" (250mm) bore reducing meter

Feature 2: Flow Body (240S-R Only)			
R-H3	3/4-inch (20mm) ANSI 600 lb Flanged, 316L R-With a 1/2" (15mm) bore reducing meter	R-I3	3/4-inch (20mm) ANSI 900 lb Flanged, 316L R-With a 1/2" (15mm) bore reducing meter
R-H4	1-inch (25mm) ANSI 600 lb Flanged, 316L R-With a 1/2" (15mm) bore reducing meter	R-I4	1-inch (25mm) ANSI 900 lb Flanged, 316L R-With a 1/2" (15mm) bore reducing meter
R-H5	1.5-inch (40mm) ANSI 600 lb Flanged, 316L R-With a 1" (25mm) bore reducing meter	R-I5	1.5-inch (40mm) ANSI 900 lb Flanged, 316L R-With a 1" (25mm) bore reducing meter
R-H6	2-inch (50mm) ANSI 600 lb Flanged, 316L R-With a 1.5" (40mm) bore reducing meter	R-I6	2-inch (50mm) ANSI 900 lb Flanged, 316L R-With a 1.5" (40mm) bore reducing meter
R-H7	3-inch (80mm) ANSI 600 lb Flanged, 316L R-With a 2" (50mm) bore reducing meter	R-I7	3-inch (80mm) ANSI 900 lb Flanged, 316L R-With a 2" (50mm) bore reducing meter
R-H8	4-inch (100mm) ANSI 600 lb Flanged, 316L R-With a 3" (80mm) bore reducing meter	R-I8	4-inch (100mm) ANSI 900 lb Flanged, 316L R-With a 3" (80mm) bore reducing meter
R-H9	6-inch (150mm) ANSI 600 lb Flanged, 316L R-With a 4" (100mm) bore reducing meter	R-I9	6-inch (150mm) ANSI 900 lb Flanged, 316L R-With a 4" (100mm) bore reducing meter
R-H10	8-inch (200mm) ANSI 600 lb Flanged, 316L R-With a 6" (150mm) bore reducing meter	R-I10	8-inch (200mm) ANSI 900 lb Flanged, 316L R-With a 6" (150mm) bore reducing meter
R-H11	10-inch (250mm) ANSI 600 lb Flanged, 316L R-With an 8" (200mm) bore reducing meter	R-IG11	10-inch (250mm) ANSI 900 lb Flanged, 316L R-With an 8" (200mm) bore reducing meter
R-H12	12-inch (300mm) ANSI 600 lb Flanged, 316L R-With a 10" (250mm) bore reducing meter	R-I12	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)	
R-W3	3/4-inch (20mm) by 1/2-inch (15mm) Nominal Bore Reducing Wafer Meter, ANSI 600 lb 316L
R-W4	1-inch (25mm) by 3/4" (20mm) Nominal Bore Reducing Wafer Meter, ANSI 600 lb 316L
R-W5	1.5-inch (40mm) by 1-inch (25mm) Nominal Bore Reducing Wafer Meter, ANSI 600 lb 316L
R-W6	2-inch (50mm) by 1.5-inch (40mm) Nominal Bore Reducing Wafer Meter, ANSI 600 lb 316L
R-W7	3-inch (80mm) by 2-inch (50mm) Nominal Bore Reducing Wafer Meter, ANSI 600 lb 316L
R-W8	4-inch (100mm) by 3-inch (80mm) Nominal Bore Reducing Wafer Meter, ANSI 600 lb 316L

ORDERING THE 240S IN-LINE (CONTINUED)

Feature 3: Electronics Enclosure			
E2-DD	Local Electronics NEMA 4X Enclosure Mounted on Meter. Digital Display with pushbuttons included.	E4 ()-DD	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	
PV1L-V4LH	Loop Power Option - One Analog Output (4-20mA), one pulse, one scaled frequency, HART communication protocol -12-36 VDC required on loop powered meters
PV1-V4H	One Analog Output (4-20mA), one alarm, one pulse, one scaled frequency, HART communication protocol - Not Loop Powered 12-36 VDC
PV1-V4M	One analog output (4-20 mA), one alarm, one pulse, one scaled frequency, MODBUS RTU communication protocol - Not Loop Powered 12-36 VDC
PV1-V4B	One Analog Output (4-20mA), one alarm, one pulse, one scaled frequency, BACnet MS/TP communication protocol - Not Loop Powered 12-36 VDC
PV1-V6H	Three analog outputs (4-20 mA), three alarms, one pulse, one scaled frequency, HART communication protocol - Not Loop Powered 12-36 VDC
PV1-V6M	Three analog outputs (4-20 mA), three alarms, one pulse, one scaled frequency, MODBUS RTU communication protocol - Not Loop Powered 12-36 VDC
PV1-V6B	3 Analog Outputs (4-20mA), three alarms, one pulse, one scaled frequency output, BACnet MS/TP communication protocol - Not Loop Powered 12-36 VDC
PV1-V4M-IP	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
PV1-V4B-IP	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
PV1-V6M-IP	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
PV1-V6B-IP	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
PS-V4H	One Analog Output (4-20mA), one alarm, one pulse, one scaled frequency, HART communication protocol - 100-240 VAC, 50/60Hz Linepower, 5 Watts maximum
PS-V4M	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
PS-V4B	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
PS-V6H	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
PS-V6M	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
PS-V6B	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			
ST	Standard Temperatures -330°F to 500°F (-200°C to 260°C)	HT	High Temperatures up to 750°F (400°C)

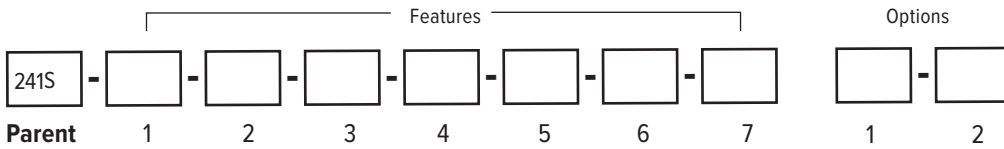
Feature 6: Process Pressure	
MP0	No Pressure Sensor
MP1	Maximum 30 psia (2 bara), Proof 60 psia (4 bara)
MP2	Maximum 100 psia (7 bara), Proof 200 psia (14 bara)
MP3	Maximum 300 psia (20 bara), Proof 600 psia (41 bara)
MP4	Maximum 500 psia (34 bara), Proof 1000 psia (64 bara)
MP5	Maximum 1500 psia (100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

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

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



Parent

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	
241S	InnovaMass Insertion Multiparameter Mass Vortex Meter

Feature 1: Multiparameter Options	
V	Volumetric flow meter for liquid, gas and steam
VT	Velocity and Temperature Sensors. Mass measurement with temperature compensation
VTP	Velocity, temperature and pressure sensors. Mass measurement with pressure and temperature compensation
VETEP	Velocity, External RTD Temperature input, External 4-20mA input (T or P)
VETEP-EMS	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
VTEP	Velocity, Temperature and External 4-20mA input (T or P)
VTEP-EMS	Velocity, Temperature and External 4-20mA input (T or P). Energy Monitoring option. Permits real-time calculation of energy consumption.
VT-EMS	Velocity and Temperature Sensors. Energy Monitoring option. Permits real-time calculation of energy consumption.
VTP-EMS	Velocity, Temperature and Pressure Sensors. Energy Monitoring option. Permits real-time calculation of energy consumption.

Feature 2: Probe Length	
LS	Standard probe
LC	Compact Probe Available only for compression fitting connections CM, CF, CG, CH, CFD, CGD, AND CHD
LE	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	
E2-DD	Local Electronics NEMA 4X Enclosure Mounted on Meter. Digital Display with pushbuttons included.
E4()-DD	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)

Feature 4: Power Inputs and Digital/Analog Output

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

ST	Standard process temperature -330°F to 500°F (-200°C to 260°C)
HT	High Temperatures up to 750°F (400°C)

Feature 6: Process Pressure

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

Feature 7: Process Connection (Compression Fittings ANSI)

CM	Compression Fitting, stem seal 2-inch Male NPT process connection, 600 lb pressure rating.
CF	Compression Fitting, probe seal 2-inch 150 lb Flange process connection
CG	Compression Fitting, stem seal 2-inch 300 lb Flange process connection
CH	Compression Fitting, stem seal 2-inch 600 lb Flange process connection
CI	Compression Fitting, stem seal 2-inch 900 lb Flange process connection

Feature 7: Process Connection (Compression Fittings DN)

CFD	Compression Fitting stem seal, DN50 PN16 process connection
CGD	Compression Fitting, DN50 PN40 process connection
CHD	Compression Fitting stem seal, DN50 PN63 process connection

Feature 7: Process Connection (Compression Fittings JIS)

CMJ	Compression Fitting stem seal, 2-inch Male NPT process connection, JIS 30K pressure rating.
CFJ	Compression Fitting stem seal, 2-inch JIS 10K process connection
CGJ	Compression Fitting, 2-inch JIS 20K process connection
CHJ	Compression Fitting stem seal, 2-inch JIS 30K process connection

ORDERING THE 241S INSERTION (CONTINUED)

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

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

Note: A retractor is recommended for hot tap installations with line pressures above 50psig

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

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

Note: A retractor is recommended for hot tap installations with line pressures above 50psig

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

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

Note: A retractor is recommended for hot tap installations with line pressures above 50psig

Feature 7: Process Connection (Packing Glands Retractor ANSI)

PMR	Packing Gland stem seal, 2-inch NPT process connection with Retractor
PMHR	Packing Gland stem seal 2-inch NPT process connection with Heavy-Duty Retractor
PFR	Packing Gland stem seal, 2-inch 150 lb Flange process connection with Retractor
PGR	Packing Gland stem seal, 2-inch 300 lb Flange process connection with Retractor
PHR	Packing Gland stem seal, 2-inch 600 lb Flange process connection with Heavy-Duty Retractor
PIR	Packing Gland stem seal, 2-inch 900 lb Flange process connection with Heavy-Duty Retractor

Note: A retractor is recommended for hot tap installations with line pressures above 50psig

Feature 7: Process Connection (Packing Glands Retractor DN)

PFDR	Packing Gland stem seal, DN50 PN16 Flange process connection with Retractor
PGDR	Packing Gland stem seal, DN50 PN40 Flange process connection with Retractor
PHDR	Packing Gland stem seal, DN50 PN63 Flange process connection with Heavy-Duty Retractor

Feature 7: Process Connection (Packing Glands Retractor JIS)

PMJR	Packing Gland stem seal, 2-inch NPT. process connection with Retractor
PMJHR	Packing Gland stem seal 2-inch NPT process connection with Heavy-Duty Retractor
PFJR	Packing Gland stem seal, 2-inch JIS 10K Flange process connection with Retractor
PGJR	Packing Gland stem seal, 2-inch JIS 20K Flange process connection with Retractor
PHJR	Packing Gland stem seal, 2-inch JIS 30K Flange process connection with Heavy-Duty Retractor

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

PMR-LE	**EL probe** Packing Gland stem seal, 2-inch NPT process connection with Retractor
PMHR-LE	**E: probe** Packing Gland stem seal 2-inch NPT process connection with Heavy-Duty Retractor
PFR-LE	**EL probe** Packing Gland stem seal, 2-inch 150 lb Flange process connection with Retractor
PGR-LE	**EL probe** Packing Gland stem seal, 2-inch 300 lb Flange process connection with Retractor
PHR-LE	**EL probe** Packing Gland stem seal, 2-inch 600 lb Flange process connection with Retractor
PIR-LE	**EL probe** Packing Gland stem seal, 2-inch 900 lb Flange process connection with Retractor

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

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

ORDERING THE 241S INSERTION (CONTINUED)

Feature 7: Process Connection (Packing Glands Retractor JIS Extended Length Probes)	
PMJR-LE	**EL probe** Packing Gland stem seal, 2-inch NPT JIS 30K pressure rating process connection with Retractor
PMJHR-LE	**EL probe** Packing Gland stem seal 2-inch NPT process connection with Heavy-Duty Retractor
PFJR-LE	**EL probe** Packing Gland stem seal, 2-inch JIS 10K Flange process connection with Retractor
PGJR-LE	**EL probe** Packing Gland stem seal, 2-inch JIS 20K Flange process connection with Retractor
PHJR-LE	**EL probe** Packing Gland stem seal

Option 1: Certification Documents			
MC	Material certificates--US Mill certs on all wetted parts	NC	NACE Certification
PT	Pressure Test Certificate	O2	Oxygen Cleaning
CC	Certificate of Conformance	CO	Certificate of Origin

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



Measurably Different.®

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