

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 8 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 30:1
- Temperature -330°F (-200°C) up to 750°F (400°C)
- Cryogenic version measures liquid O₂, N₂, Ar, and CO₂ down to -330°F (-200°C)
- Pressure up to 1500 psia (100 bara)
- High pressure version to 5000 psig (345 barg)
- Deal for steam applications
- Flow computer integrates AGA-8 equations for natural gas
- Supports HART, Modbus and BACnet digital communication protocols
- FMC and ATEX approval



www.sierrainstruments.com



InnovaMass[®] 240S / 241S



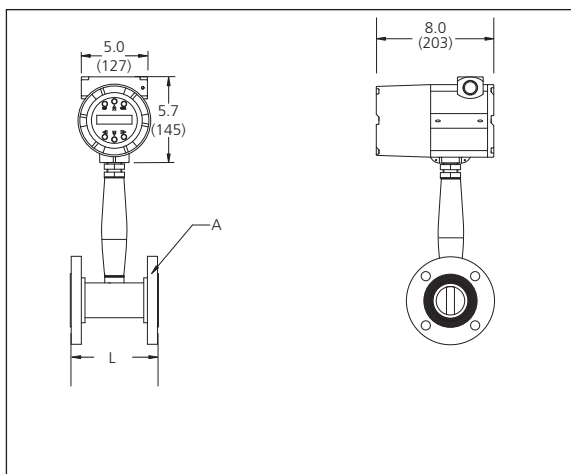
DESCRIPTION

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[®] 240 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.

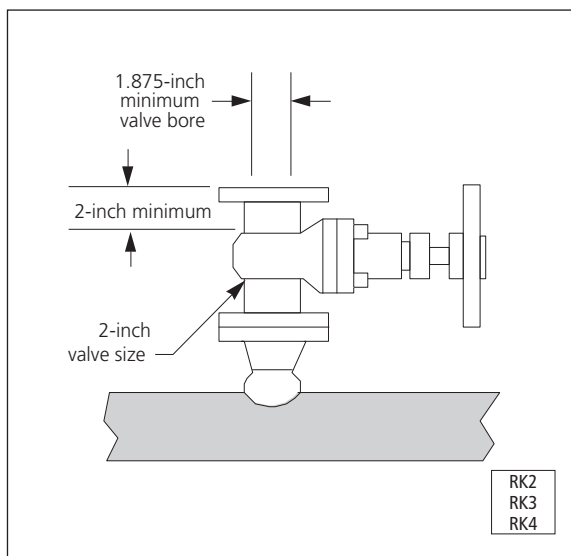
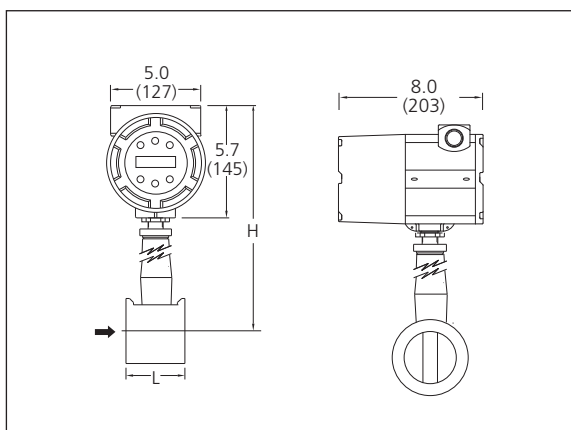
The 241S is available in high-pressure versions capable of mass flow measurement up to 5000 psig (345 barg), and the 240S cryogenic version is widely used for fluids down to -330°F (-200°C). All models are fully field-programmable, configurable and feature RS-485, Modbus, HART and BACnet protocols. InnovaMass is a true high performance, rugged, and reliable workhorse in industry.

DIMENSIONAL SPECIFICATIONS

240S Flanged In-line—Side / Outlet View



240S Wafer — Side / Outlet View



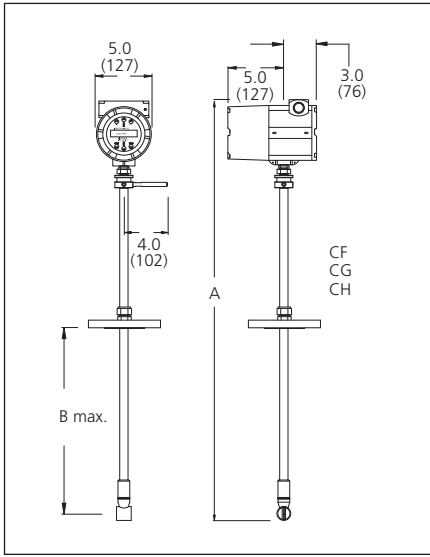
IN-LINE TABLE

InnovaFlo® 240S Sizes			
Flow Body Size	A	L	H
0.5-inch SCH 80	150 lb flange	4.56 (116)	14.8 (376)
	300 lb flange	4.56 (116)	14.8 (376)
	600 lb flange	4.56 (116)	14.8 (376)
	1.4 flange wafer O.D.	4.56 (116)	14.8 (376)
0.75-inch SCH 80	150 lb flange	4.8 (122)	14.8 (376)
	300 lb flange	4.8 (122)	15.0 (381)
	600 lb flange	4.8 (122)	15.0 (381)
	1.7 flange wafer O.D.	4.8 (122)	15.0 (381)
1-inch SCH 80	150 lb flange	4.94 (125)	15.0 (381)
	300 lb flange	4.94 (125)	15.0 (381)
	600 lb flange	4.94 (125)	15.0 (381)
	2.0 flange wafer O.D.	2.8 (71)	14.8 (376)
1.5-inch SCH 80	150 lb flange	5.5 (140)	15.1 (384)
	300 lb flange	5.5 (140)	15.1 (384)
	600 lb flange	5.5 (140)	15.1 (384)
	2.9 flange wafer O.D.	2.8 (71)	15.1 (384)
2-inch SCH 80	150 lb flange	6.0 (152)	15.3 (389)
	300 lb flange	6.0 (152)	15.3 (389)
	600 lb flange	6.0 (152)	15.3 (389)
	3.7 flange wafer O.D.	3.0 (76)	15.3 (389)
3-inch SCH 80	150 lb flange	6.9 (175)	15.8 (401)
	300 lb flange	6.9 (175)	15.8 (401)
	600 lb flange	6.9 (175)	15.8 (401)
	5.0 flange wafer O.D.	4.0 (102)	15.8 (401)
4-inch SCH 80	150 lb flange	8.0 (203)	16.2 (411)
	300 lb flange	8.0 (203)	16.2 (411)
	600 lb flange	8.0 (203)	16.2 (411)
	6.2 flange wafer O.D.	4.7 (119)	16.2 (411)
6-inch SCH 80	150 lb flange	9.0 (229)	17.3 (439)
	300 lb flange	9.0 (229)	17.3 (439)
	600 lb flange	9.0 (229)	17.3 (439)
8-inch SCH 80	150 lb flange	10.5 (267)	18.2 (462)
	300 lb flange	10.5 (267)	18.2 (462)
	600 lb flange	10.5 (267)	18.2 (462)

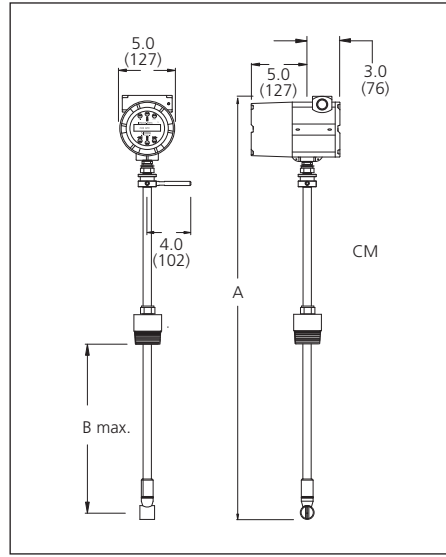
All dimensions are inches (+/- .25-inch significant value). Millimeters are in parentheses. Certified drawings are available on request.

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

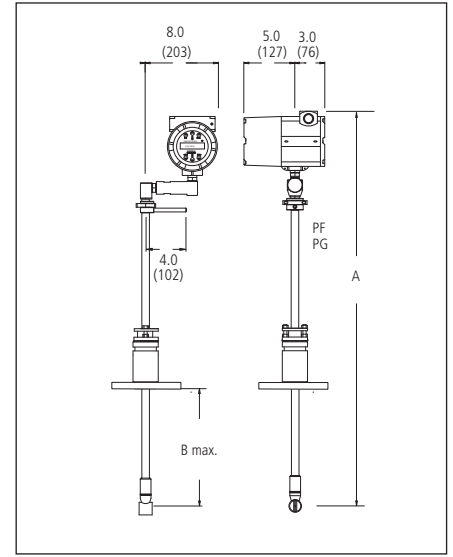
241S Compression, Flange



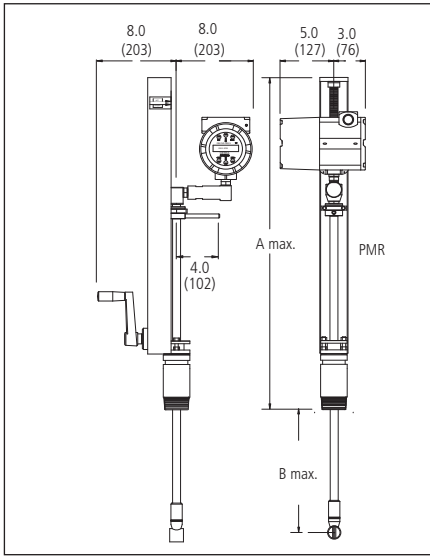
241S Compression, Male NPT



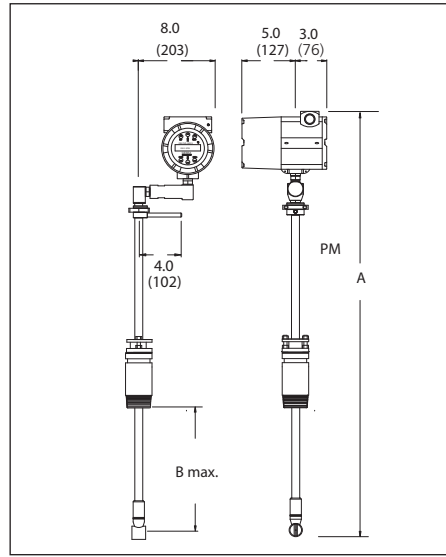
241S Packing Gland, Flange



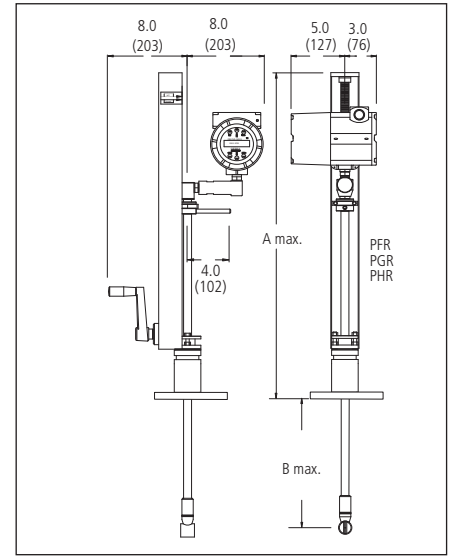
241S Packing Gland, Male NPT, Retractor



241S Packing Gland, Male NPT



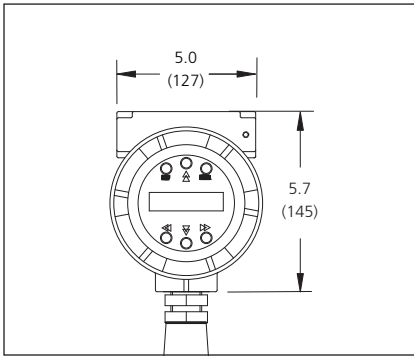
241S Packing Gland, Flange, Retractor



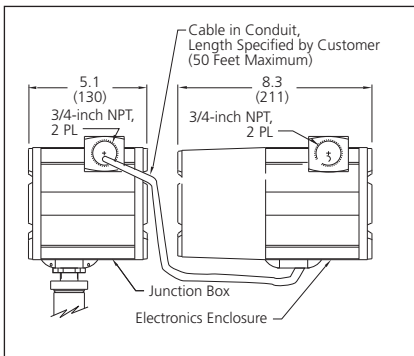
InnovaMass® 241S Sizes

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

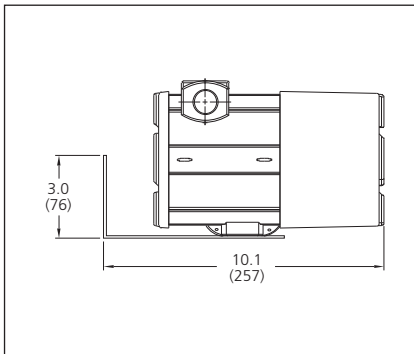
240S/241S Remote—Front View



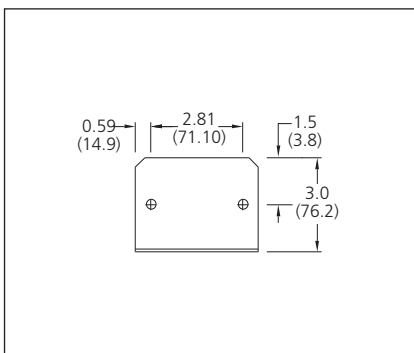
240S/241S Remote—Side View



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)	25 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.)	25 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	5.9
0.75-inch Flange	13.0	5.9	14	6.4	14.5	6.6
1-inch Flange	13.5	6.1	16.4	7.4	16.4	7.4
1.5-inch Flange	14.6	6.6	22.7	10.3	24.8	11.2
2-inch Flange	19.5	8.8	26.9	12.2	33.2	15.1
3-inch Flange	27.5	12.5	39.5	17.9	56.3	25.5
4-inch Flange	43.5	19.7	60.5	27.4	96.2	43.6
6-inch Flange	48.4	22.0	96.2	43.6	178	80.8
8-inch Flange	71.0	32.2	149	67.4	300	136
1-inch Wafer	—	—	—	—	10.1	4.6
1.5-inch Wafer	—	—	—	—	11.8	5.4
2-inch Wafer	—	—	—	—	14.2	6.4
3-inch Flange	—	—	—	—	22.7	10.3
4-inch Flange	—	—	—	—	33.0	15.0

241S Insertion Meter

Connection Size	lb	kg
Compression Fitting, Male NPT	13.8	6.2
Compression Fitting, 150 lb Flange	16.3	7.3
Compression Fitting, 300 lb Flange	18.3	8.3
Compression Fitting, 600 lb Flange	19.3	8.7
Packing Gland, Male NPT	15.8	7.1
Packing Gland, Male NPT with Reactor	25.3	11.5
Packing Gland, 150 lb Flange	20.8	9.4
Packing Gland, 150 lb Flange with Reactor	30.3	13.7
Packing Gland, 300 lb Flange	24.8	11.3
Packing Gland, 300 lb Flange with Reactor	34.3	15.5
Packing Gland, 600 lb Flange with Reactor	35.3	16.0

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

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
gpm	0.9	1.4	2.2	5.5	9.2	21	36	81	142
	22	40	67	166	276	618	1076	2437	4270
m ³ /hr	0.2	0.3	0.5	1.3	2.1	4.7	8.1	18	32
	5	9	15	38	63	140	244	554	970

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
0 psig	1.8	3	5	13	22	50	87	198	347
	18	41	90	221	369	826	1437	3258	5708
100 psig	5	9	15	38	63	141	245	555	972
	138	325	704	1730	2890	6466	11254	25515	44698
200 psig	7	13	21	52	86	193	335	761	1332
	258	609	1322	3248	5427	12140	21131	47911	83931
300 psig	8	15	25	63	104	234	407	922	1615
	380	896	1944	4775	7978	17847	31064	70431	123375
400 psig	10	18	29	72	120	269	467	1060	1857
	502	1183	2568	6309	10542	23580	41043	93057	163000
500 psig	11	20	33	80	134	300	521	1182	2071
	624	1472	3195	7849	13115	28034	51063	115775	203000

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
5 psig	6.5	12	20	49	82	183	318	722	1264
	52	122	265	650	1087	2431	4231	9594	16806
100 psig	15	27	46	112	187	419	728	1652	2893
	271	639	1386	3405	5690	12729	22156	50233	87998
200 psig	20	37	62	151	253	565	983	2229	3905
	493	1163	2525	6203	10365	23184	40354	91494	160279
300 psig	24	45	74	182	304	680	1184	2685	4704
	716	1688	3664	9000	15040	33642	58556	132763	232575
400 psig	28	51	85	209	349	780	1358	3079	5393
	941	2220	4816	11831	19770	44222	76971	174516	305717
500 psig	31	57	95	233	389	870	1514	3433 2	6014
	1170	2760	5988	14711	24582	54987	95710	17001	380148

Process Fluid Pressure

240S Pressure Ratings				
Probe Seal	Process Connection	Material	Rating	Ordering Code
Compression Fitting	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
Packing Gland	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
Packing Gland w/ Removable Retractor	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
Packing Gland w/ Permanent Retractor	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
Flanged	316L SS, A105 carbon steel, C276 Hastalloy®	150, 300, 600 lb
Wafer	316L SS, A105 carbon steel, C276 Hastalloy®	600 lb

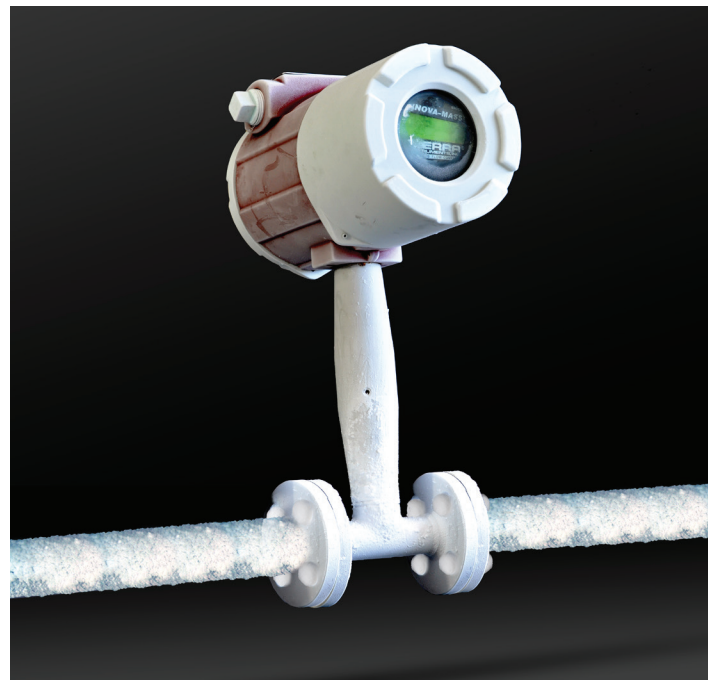
Pressure Transducer Ranges

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	41
500	34	1000	69
1500	100	1500	100

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.

Cryogenic Version



OPERATING SPECIFICATIONS (continued)

Power Requirements

12 to 36 VDC, 100 mA (add 20mA per output up to 60mA)
100 to 240S VAC, 50/60 Hz, 25 watts

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 Cryogenic Temperature Sensor:
-330°F to -40°F (-200°C to -40°C)
Standard Temperature Sensor:
-40°F to 500°F (-40°C to 260°C)
High Temperature Sensor:
-40°F to 750°F (40°C to 400°C)

Ambient Operating:
-5°F to 140°F (-20° to 60°C)
Storage:
-40°F to 150°F (-40° to 65°C)
0-98% relative humidity, non-condensing 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.

DIGITAL COMMUNICATION

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 (IP65) 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 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/7 and IP66
T6 at Tamb=60°C

ATEX Approval

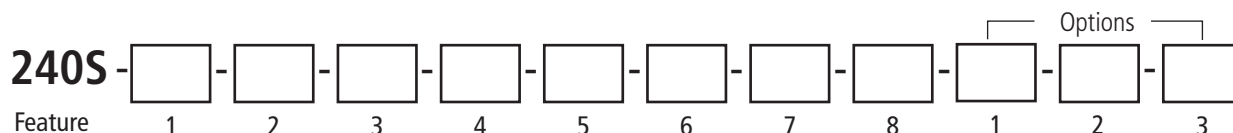
II 2 G Ex d II B + H2 T6
II 2 D Ex t D A 21 IP66 T6
KEMA 08 ATEX 0143

CE Approval

0344

Optional Certifications

Construction and inspection (ANSI/ASME B31.3)
Materials (NACE MR-01-75(90))



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

Parent Model Number	
240S	In-line Multiparameter Mass Vortex Flow Meter. FMC and ATEX approval (Ex-d). Two or four wire system

Feature 1: Process Fluid	
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
VTEP	Velocity, temperature and pressure sensors. Mass measurement with pressure temperature compensation. Pressure sensor is not included. (select MPO), but unit has a 4-20 mA input for an external pressure sensor
VT EMS	VT meter plus energy meter package. Calculates energy in BTU or kjoules. Based on flow and temperature measurement (class A RTD) from meter and secondary RTD to provide delta temperature. Remote RTD not included
VTP EMS	VTP meter plus energy meter package. Calculates energy in BTU or kjoules. Based on flow and temperature measurement (class A RTD) from meter and secondary RTD to provide delta temperature. Remote RTD not included

Feature 2: Flow Body (ANSI 316L)					
F2	1/2-inch ANSI class 150 flanged, 316L	G2	1/2-inch ANSI class 300 flanged, 316L	H2	1/2-inch ANSI class 600 flanged, 316L
F3	3/4-inch ANSI class 150 flanged, 316L	G3	3/4-inch ANSI class 300 flanged, 316L	H3	3/4-inch ANSI class 600 flanged, 316L
F4	1-inch ANSI class 150 flanged, 316L	G4	1-inch ANSI class 300 flanged, 316	H4	1-inch ANSI class 600 flanged, 316L
F5	1.5-inch ANSI class 150 flanged, 316L	G5	1.5-inch ANSI class 300 flanged, 316L	H5	1.5-inch ANSI class 600 flanged, 316L
F6	2-inch ANSI class 150 flanged, 316L	G6	2-inch ANSI class 300 flanged, 316L	H6	2-inch ANSI class 600 flanged, 316L
F7	3-inch ANSI class 150 flanged, 316L	G7	3-inch ANSI class 300 flanged, 316L	H7	3-inch ANSI class 600 flanged, 316L
F8	4-inch ANSI class 150 flanged, 316L	G8	4-inch ANSI class 300 flanged, 316L	H8	4-inch ANSI class 600 flanged, 316L
F9	6-inch ANSI class 150 flanged, 316L	G9	6-inch ANSI class 300 flanged, 316L	H9	6-inch ANSI class 600 flanged, 316L
F10	8-inch ANSI class 150 flanged, 316L	G10	8-inch ANSI class 300 flanged, 316L	H10	8-inch ANSI class 600 flanged, 316L

Also available in C276 Hastalloy®. Consult factory for pricing/delivery

Feature 2: Flow Body (DN 316L)					
FD2	DN15/PN16 flanged, 316L	GD2	DN15/PN16 flanged, 316L	HD2	DN15/PN40 flanged, 316L
FD3	DN20/PN16 flanged, 316L	GD3	DN20/PN16 flanged, 316L	HD3	DN20/PN40 flanged, 316L
FD4	DN25PN16 flanged, 316L	GD4	DN25PN16 flanged, 316L	HD4	DN25PN40 flanged, 316L
FD5	DN40/PN16 flanged, 316L	GD5	DN40/PN16 flanged, 316L	HD5	DN40/PN40 flanged, 316L
FD6	DN50/PN16 flanged, 316L	GD6	DN50/PN16 flanged, 316L	HD6	DN50/PN40 flanged, 316L
FD7	DN80/PN16 flanged, 316L	GD7	DN80/PN16 flanged, 316L	HD7	DN80/PN40 flanged, 316L
FD8	DN100/PN16 flanged, 316L	GD8	DN100/PN16 flanged, 316L	HD8	DN100/PN40 flanged, 316L
FD9	DN150/PN16 flanged, 316L	GD9	DN150/PN16 flanged, 316L	H9	DN150/PN40 flanged, 316L
FD10	DN200/PN16 flanged, 316L	GD10	DN200/PN16 flanged, 316L	H10	DN200/PN40 flanged, 316L

Also available in C276 Hastalloy®. Consult factory for pricing/delivery

Feature 2: Flow Body (Wafer 316L)	
W2	1/2-inch wafer connection, 316L
W3	3/4-inch wafer connection, 316L
W4	1-inch wafer connection, 316L
W5	1.5-inch wafer connection, 316L
W6	2-inch wafer connection, 316L
W7	3-inch wafer connection, 316L
W8	4-inch wafer connection, 316L

Also Available in carbon steel and C276 Hastalloy. Consult Factory for pricing/delivery

Feature 2: Feature 2: Flow Body (ANSI CS)					
FC4	1-inch ANSI class 150 flanged, carbon steel	GC4	1-inch ANSI class 150 flanged, carbon steel	HC4	1-inch ANSI class 300 flanged, carbon steel
FC5	1.5-inch ANSI class 150 flanged, carbon steel	GC5	1.5-inch ANSI class 150 flanged, carbon steel	HC5	1.5-inch ANSI class 300 flanged, carbon steel
FC6	2-inch ANSI class 150 flanged, carbon steel	GC6	2-inch ANSI class 150 flanged, carbon steel	HC6	2-inch ANSI class 300 flanged, carbon steel
FC7	3-inch ANSI class 150 flanged, carbon steel	GC7	3-inch ANSI class 150 flanged, carbon steel	HC7	3-inch ANSI class 300 flanged, carbon steel
FC8	4-inch ANSI class 150 flanged, carbon steel	GC8	4-inch ANSI class 150 flanged, carbon steel	HC8	4-inch ANSI class 300 flanged, carbon steel
FC9	6-inch ANSI class 150 flanged, carbon steel	GC9	6-inch ANSI class 150 flanged, carbon steel	HC9	6-inch ANSI class 300 flanged, carbon steel
FC10	8-inch ANSI class 150 flanged, carbon steel	GC10	8-inch ANSI class 150 flanged, carbon steel	HC10	8-inch ANSI class 300 flanged, carbon steel

Feature 3: Electronics Enclosure	
E2	Ex Proof Enclosure mounted on probe; includes FMC, IECEx and ATEX, CL 1 Division 1
E4()	Remote Electronics Ex Proof. Specify cable length in parentheses, maximum 50 feet (15.24 m). Includes FMC, ATEX, IECEx and Cable glands. CL 1 Division 1

Feature 4: Display Option	
DD	Digital display with push buttons
NR	No readout (display highly recommended for setup/diagnostics)

Feature 5: Input Power	
PV1L	12-36 VDC loop powered (only available with V4LH)
PV1	12-36 VDC
PS	100-240S VAC, 50/60 Hz line power, 25 Watts

Feature 6: Output	
V4LH	One analog output (4-20 mA), one pulse, HART. Loop powered.
V4H	One analog output (4-20 mA), one alarm, one pulse and HART Communication; not loop powered
V4M	One analog output (4-20 mA), one alarms, one pulse, and MODBUS
V4B	One analog output (4-20 mA), one alarms, one pulse, and BACNet
V6H	Three analog outputs (4-20 mA), three alarms, one pulse, HART
V6M	Three analog outputs (4-20 mA), three alarms, one pulse, MODBUS
V6B	Three analog outputs (4-20 mA), three alarms, one pulse, BACNet

Feature 7: Process Temperature	
CT	Cryogenic process temperature -330°F to -40°F (-200°C to -40°C). NOTE: CT temperature option can only be used with V or VT versions of the InnovaMass. Not available in carbon steel.
ST	Standard process temperature -40°F to 500°F (-40°C to 260°C)
HT	High process temperature -40°F to 750°F (-40° to 400°C)

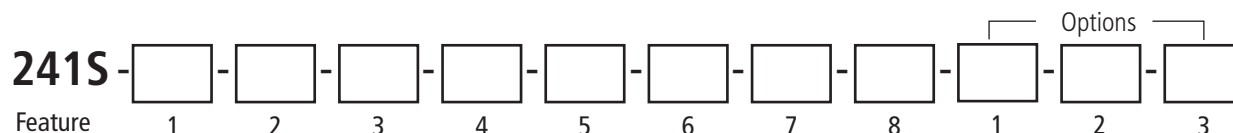
Feature 8: Process Pressure	
MP0	No pressure sensor. Used with VT option
MP1	Maximum 30 psig (2.1 barg), Proof 60 psig (4.1 barg)
MP2	Maximum 100 psig (6.9 barg), Proof 200 psig (13.8 barg)
MP3	Maximum 300 psig (20.7 barg), Proof 600 psig (41.4 barg)
MP4	Maximum 500 psig (34.5 barg), Proof 1000 psig (69.0 barg)
MP5	Maximum 1500 psig (103.4 barg), Proof 2500 psig (172.4 barg)

Option 1: Certificates	
MC	Material certificates--US Mill certs on all wetted parts
PT	Pressure test certificate
CC	Certificate of conformance
NC	NACE certification

Option 2: Oxygen Cleaning	
O2C	Cleaned for O2 service (includes certification). Meter must include O2C (oxygen cleaning) if meter to be used for oxygen service.

Option 3: Cables and Glands	
ARM25V	Maximum 500 psig (34.5 barg), Proof 1000 psig (69.0 barg)
ARM50V	50 feet (17 m) armored cable with glands (ATEX, IECEx) V meter only- Adder to remote option
ARM25VTP	25 feet (7.6 m) armored cable with glands (ATEX, IECEx) V meter only- Adder to remote option
ARM50VTP	50' (17 m) armored cable with glands (ATEX, IECEx) V meter only- Adder to remote option
M20L	3/4-inch NPT to M20 conversion kit - local electronics (E2)
M20R	3/4-inch NPT to M20 conversion kit - remote electronics (E4)

ACCESSORIES (Consult Factory) removable retractors, isolated gate valves, mounting kits, material certificates, pressure certificates, certificate of conformance, NACE certification



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

Parent Model Number	
241S	Insertion Multiparameter Mass Vortex Flow Meter. FMC, ATEX Approved (Ex-d). Two or four wire system

Feature 1 : Multiparameter Options	
V	Volumetric flow meter for liquid, gas and steam. See 241i price tab for more economical options.
VT	Velocity and temperature sensors. Mass measurement with temperature compensation. See 241i price tab for more economical options.
VTP	Velocity, temperature and pressure sensors. Mass measurement with pressure and temperature compensation and automatic flow profile compensation by calculating the Reynolds number. See 241i price tab for more economical options.
VTEP	Velocity, temperature and pressure sensors. Mass measurement with pressure temperature compensation. Pressure sensor is not included. (select MPO), but unit has a 4-20 mA input for an external pressure sensor
VT EMS	VT Meter plus energy meter package. Calculates energy in BTU or kjoules. Based on flow and temperature measurement (class A RTD) from meter and secondary RTD to provide delta temperature. Remote RTD not included
VTP EMS	VTP meter plus energy meter package. Calculates energy in BTU or kjoules. Based on flow and temperature measurement (class A RTD) from meter and secondary RTD to provide delta temperature. Remote RTD not included

Feature 2: Probe Length	
LS	Standard probe
LC	Compact probe available only for connections CM, CF, CG and CH
LE	Extended probe (consult factory if for PMR, PFR, PGR or PHR)

Feature 3: Electronics Enclosure	
E2	Ex Proof Enclosure mounted on probe; includes FMC, IECEx and ATEX, CL 1 Division 1
E4()	Remote Electronics Ex Proof. Specify cable length in parentheses, maximum 50 feet (15.24 m). Includes FMC, ATEX, IECEx and Cable glands. CL 1 Division 1

Feature 4: Display Option	
DD	Digital display with pushbuttons
NR	No readout (display highly recommended for setup/diagnostics)

Feature 5: Input Power	
PV1L	12-36 VDC loop powered (only available with V4LH)
PV1	12-36VDC
PS	100-240S VAC, 50/60 Hz line power, 25 Watts

Feature 6: Output	
V4LH	One analog output (4-20 mA), one pulse, HART. Loop powered.
V4H	One analog output (4-20 mA), one alarm, one pulse and HART Communication; not loop powered
V4M	One analog output (4-20 mA), one alarms, one pulse, and MODBUS
V4B	One analog output (4-20 mA), one alarms, one pulse, and BACNet
V6H	Three analog outputs (4-20 mA), three alarms, one pulse, HART
V6M	Three analog outputs (4-20 mA), three alarms, one pulse, MODBUS
V6B	Three analog outputs (4-20 mA), three alarms, one pulse, BACNet
V6DP1	Three analog outputs (4-20 mA), one alarm, one pulse, PROFIBUS DP with external M12 connection. Not available with AC power
V6DP2	Three analog outputs (4-20 mA), one alarm, one pulse, PROFIBUS DP with terminal block connection. Not available with AC power
V6FF	Three analog outputs (4-20 mA), one alarm, one pulse, FOUNDATION FIELDBUS with terminal block connections

Feature 7: Process Temperature	
CT	Cryogenic process temperature -330°F to -40°F (-200°C to -40°C). NOTE: CT temperature option can only be used with V or VT versions of the InnovaMass. Not available in carbon steel.
ST	Standard process temperature -40°F to 500°F (-40°C to 260°C)
HT	High process temperature -40°F to 750°F (120°C to 400°C)

Feature 8: Process Pressure	
MP0	No pressure sensor. Used with VT option
MP1	Maximum 30 psig (2.1 barg), Proof 60 psig (4.1 barg)
MP2	Maximum 100 psig (6.9 barg), Proof 200 psig (13.8 barg)
MP3	Maximum 300 psig (20.7 barg), Proof 600 psig (41.4 barg)
MP4	Maximum 500 psig (34.5 barg), Proof 1000 psig (69.0 barg)
MP5	Maximum 1500 psig (103.4 barg), Proof 2500 psig (172.4 barg)

Feature 9: Process Connection ANSI	
CM	Compression fitting 2-inch Male NPT, class 600 pressure rating
CF	Compression fitting on 2-inch class 150 flange
CG	Compression fitting on 2-inch class 300 flange
CH	Compression fitting on 2-inch class 600 flange
PM	Packing gland* on 2-inch Male NPT, 50 psig (3.4 barg) maximum process pressure for live insertion/removal without a retractor. Packing gland itself rated to 600 psig process pressure. Packing gland live insertion/removal up to 600 psig (41.4 barg) must use a retractor (removable or welded on).
PMR	Packing gland on 2-inch Male NPT with welded on retractor. Must be used for process pressures 600 psig (41.4 barg) or greater but can be used for lower process pressures.
PMR-LE	Packing gland. 2-inch Male NPT with retractor, class 600 psig (41.4 barg) pressure rating. (for LE)
PF	Packing gland* on 2-inch class 150 flange, 50 psig (3.4 barg) maximum process pressure without removable retractor. Packing gland itself rated to 600 psig (41.4 barg) process pressure. Packing gland live insertion/removal up to 600 psig (41.4 barg) must use a retractor (removable or welded on).
PFR	Packing gland 2-inch class 150 flange with retractor
PFR-LE	Packing gland 2-inch class 150 flange with retractor for use with extended probe length (see LE option)
PG	Packing gland* on 2-inch class 300 flange, 50 psig (3.4 barg) maximum process pressure without removable retractor. Packing gland itself rated to 600 psig (41.4 barg) process pressure. Packing gland live insertion/removal up to 600 psig (41.4 barg) must use a retractor (removable or welded on).
PGR	Packing gland 2-inch class 300 flange with retractor
PGR-LE	Packing gland 2-inch class 300 flange with retractor. For use with extended probe length (see LE option)
PHR	Packing gland. 2-inch class 600 flange with retractor
PHR-LE	Packing gland 2-inch class 600 flange with retractor. For use with extended probe length (see LE option)

Feature 9: Process Connection DN	
CFD	Compression fitting on DN50/PN16 flange
CGD	Compression fitting on DN50/PN40 flange
CHD	Compression fitting on DN50/PN64 flange
PFD	Packing gland* on DN50/PN16 flange, 50 psig (3.4 barg) maximum process pressure without removable retractor
PFDR	Packing gland, DN50/PN16 flange with retractor
PFDR-LE	Packing gland DN50/PN16 flange with retractor. For use with extended probe length (see LE option)
PGD	Packing gland* on DN50/PN40 flange, 50 psig (3.4 barg) maximum process pressure without removable retractor
PGDR	Packing gland DN50/PN40 flange with retractor
PGDR_LE	Packing gland DN50/PN40 flange with retractor. For use with extended probe length (see LE option)
PHDR	Packing gland DN50/PN64 flange with retractor
PHDR-LE	Packing gland DN50/PN64 flange with retractor. For use with extended probe length (see LE option)

Option 1: Certification Documents	
MC	Material certificates--US Mill certs on all wetted parts
PT	Pressure test certificate
CC	Certificate of conformance
NC	NACE certification

Option 2: Oxygen Cleaning	
O2C	Cleaned for O2 service (includes certification). Meter must include O2C (oxygen cleaning) if meter to be used for oxygen service.

Option 3: Cables and Glands	
ARM25V	25 feet (7.6 m) armored cable with glands (ATEX, IECEx) V meter only- Adder to remote option
ARM50V	50 feet (15.2 m) armored cable with glands (ATEX, IECEx) V meter only- Adder to remote option
ARM25VTP	25 feet (7.6 m) armored cable with glands (ATEX, IECEx) V meter only- Adder to remote option
ARM50VTP	50 feet (15.2 m) armored cable with glands (ATEX, IECEx) V meter only- Adder to remote option
M20L	3/4-inch NPT to M20 conversion kit - local electronics (E2)
M20R	3/4-inch NPT to M20 conversion kit - remote electronics (E4)



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