

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 psig (100 barg)
- High pressure version to 5000 psig (345 barg)
- Ideal 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[®] 240 & 241



DESCRIPTION

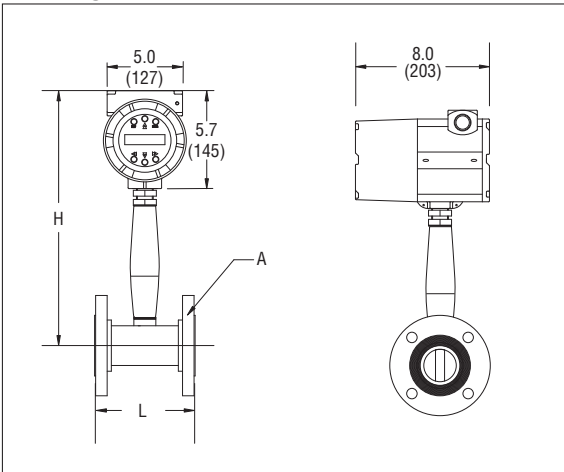
Sierra was the first to introduce a multivariable mass vortex flow meter to the market in the late 1990's. Sierra's multivariable product line features an in-line version, the InnovaMass[®] 240 and a unique insertion version, the InnovaMass[®] 241. The 241 has emerged recently as the proven instrument of choice in geothermal steam applications across the globe. Both the 240 and 241 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 241 is available in high-pressure versions capable of mass flow measurement up to 5000 psig (345 barg), and the 240 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.

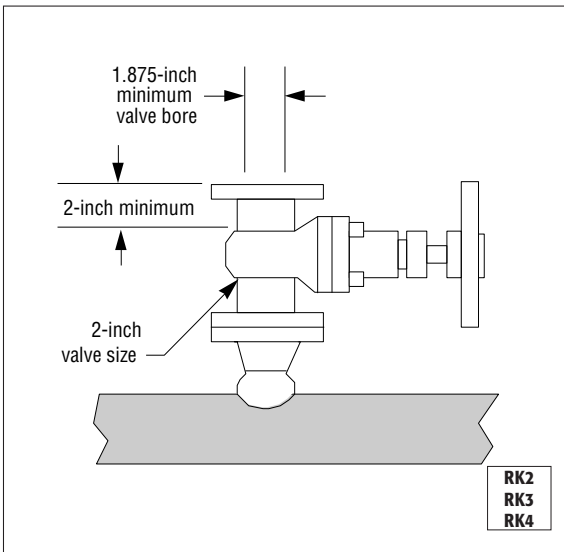
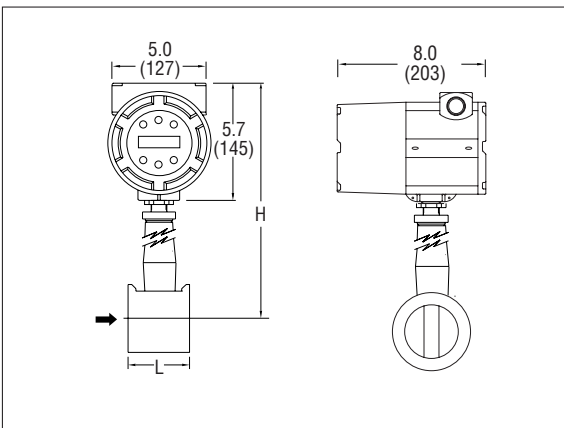


DIMENSIONAL SPECIFICATIONS

240 Flanged In-line—Side / Outlet View



240 Wafer — Side / Outlet View



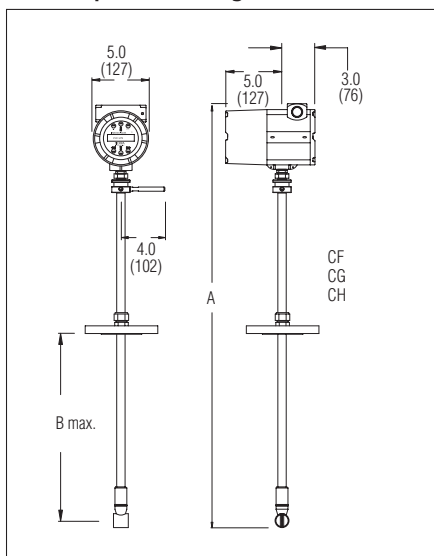
IN-LINE TABLE

InnovaFlo® 240 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)

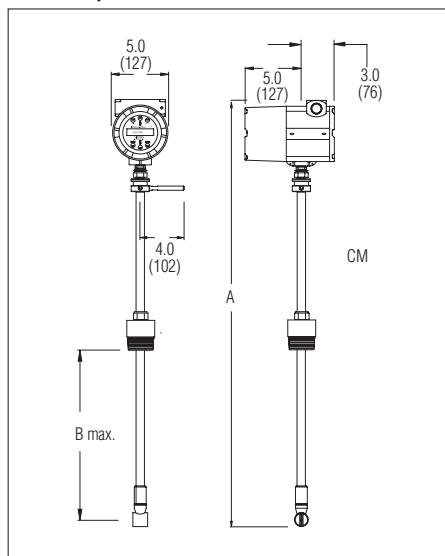
All dimensions are inches (+/- .25-inch significant value). Millimeters are in parentheses. Certified drawings are available on request.

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

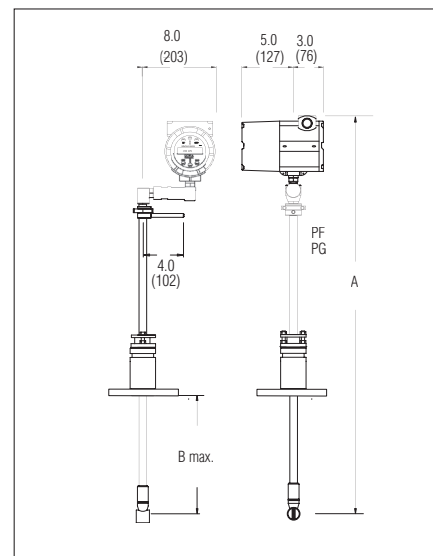
241 Compression, Flange



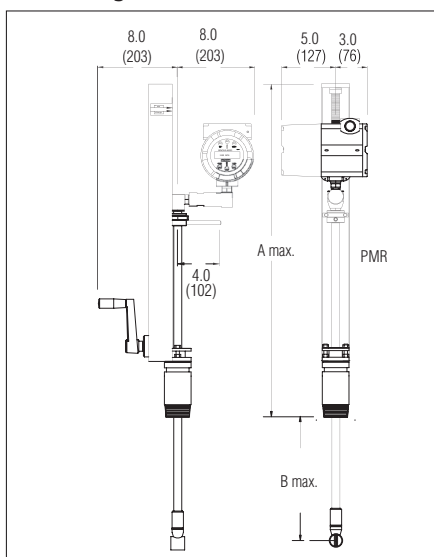
241 Compression, Male NPT



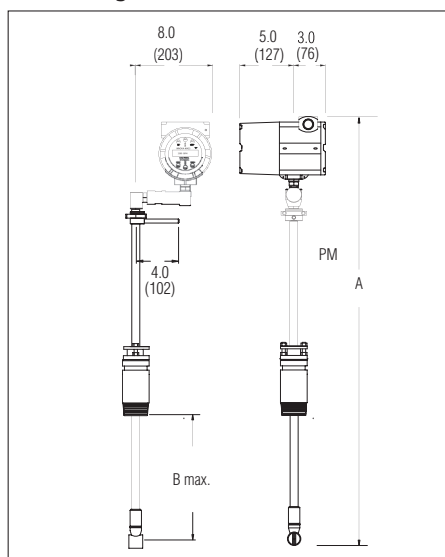
241 Packing Gland, Flange



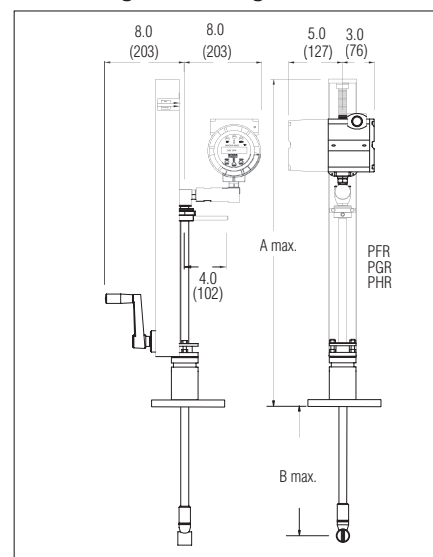
241 Packing Gland, Male NPT, Retractor



241 Packing Gland, Male NPT

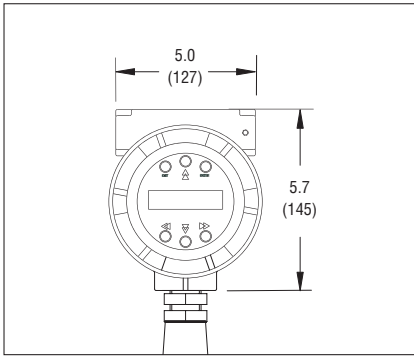


241 Packing Gland, Flange, Retractor

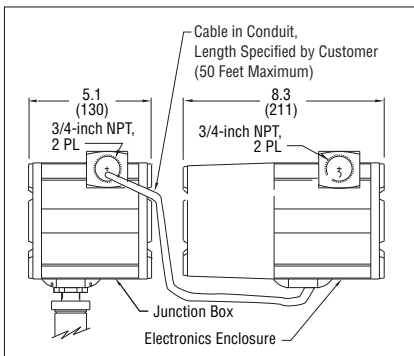


InnovaMass® 241 Sizes						
Model Code / Probe Seal / Process Connection	Standard Probe		Compact Probe		Extended Probe	
	A	B	A	B	A	B
CM / Compression / 2-in Male NPT	41.0 (1041)	26.2 (665)	24.6 (625)	9.8 (249)	53.0 (1346)	38.2 (970)
CF / Compression / 150 lb Flange	41.0 (1041)	27.3 (693)	24.6 (625)	10.9 (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)

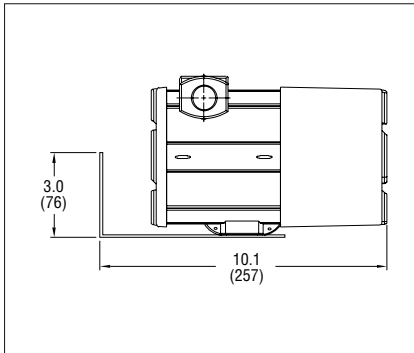
240/241 Remote—Front View



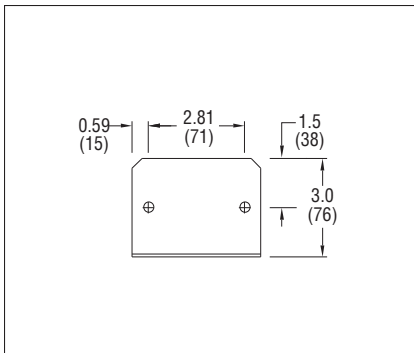
240/241 Remote—Side View



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

Connection Size	240 In-Line Meter					
	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

241 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. 241 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 22	1.4 40	2.2 67	5.5 166	9.2 276	21 618	36 1076	81 2437	142 4270
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

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 18	3 41	5 90	13 221	22 369	50 826	87 1437	198 3258	347 5708
100 psig	5 138	9 325	15 704	38 1730	63 2890	141 6466	245 11254	555 25515	972 44698
200 psig	7 258	13 609	21 1322	52 3248	86 5427	193 12140	335 21131	761 47911	1332 83931
300 psig	8 380	15 896	25 1944	63 4775	104 7978	234 17847	407 31064	922 70431	1615 123375
400 psig	10 502	18 1183	29 2568	72 6309	120 10542	269 23580	467 41043	1060 93057	1857 163000
500 psig	11 624	20 1472	33 3195	80 7849	134 13115	300 28034	521 51063	1182 115775	2071 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 52	12 122	20 265	49 650	82 1087	183 2431	318 4231	722 9594	1264 16806
100 psig	15 271	27 639	46 1386	112 3405	187 5690	419 12729	728 22156	1652 50233	2893 87998
200 psig	20 493	37 1163	62 2525	151 6203	253 10365	565 23184	983 40354	2229 91494	3905 160279
300 psig	24 716	45 1688	74 3664	182 9000	304 15040	680 33642	1184 58556	2685 132763	4704 232575
400 psig	28 941	51 2220	85 4816	209 11831	349 19770	780 44222	1358 76971	3079 174516	5393 305717
500 psig	31 1170	57 2760	95 5988	233 14711	389 24582	870 54987	1514 95710	3433.2 17001	6014 380148

Process Fluid Pressure

240 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

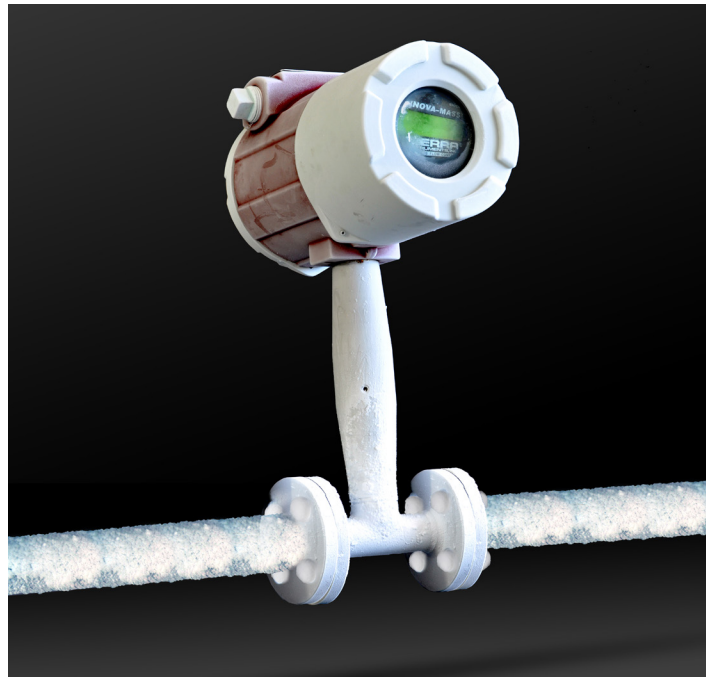
Process Fluid Pressure

240 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.



Cryogenic Version Pictured Above

OPERATING SPECIFICATIONS (continued)

Power Requirements

12 to 36 VDC, 100 mA (add 20mA per output up to 60mA)
100 to 240 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 4, 294, 967, 295; total stored in non-volatile memory.

DIGITAL COMMUNICATION

HART (with DD)
Modbus
BACnet

PERFORMANCE SPECIFICATIONS

Wetted Materials

240. 316L stainless steel standard
C276 Hastalloy® or A105 carbon steel optional
Teflon-based thread sealant on pressure transducer
241. 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

240. Wafer or 150, 300, 600 lb ANSI flange
241. 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

240. No effect
241. 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

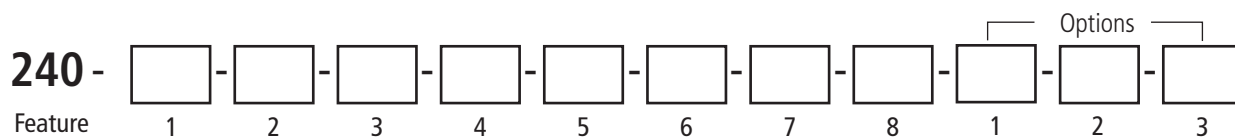
II 2 G Ex d II B + H2 T6
II 2 D Ex t D A 21 IP66 T6
KEMA 08 ATEX 0143

CE Approval

0344

Optional Certifications

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



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

Parent Model Number	
240	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, 316L	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/PN40 flanged, 316L	HD2	DN15/PN64 flanged, 316L
FD3	DN20/PN16 flanged, 316L	GD3	DN20/PN40 flanged, 316L	HD3	DN20/PN64 flanged, 316L
FD4	DN25/PN16 flanged, 316L	GD4	DN25/PN40 flanged, 316L	HD4	DN25/PN64 flanged, 316L
FD5	DN40/PN16 flanged, 316L	GD5	DN40/PN40 flanged, 316L	HD5	DN40/PN64 flanged, 316L
FD6	DN50/PN16 flanged, 316L	GD6	DN50/PN40 flanged, 316L	HD6	DN50/PN64 flanged, 316L
FD7	DN80/PN16 flanged, 316L	GD7	DN80/PN40 flanged, 316L	HD7	DN80/PN64 flanged, 316L
FD8	DN100/PN16 flanged, 316L	GD8	DN100/PN40 flanged, 316L	HD8	DN100/PN64 flanged, 316L
FD9	DN150/PN16 flanged, 316L	GD9	DN150/PN40 flanged, 316L	H9	6-inch ANSI class 600 flanged, 316L
FD10	DN200/PN16 flanged, 316L	GD10	DN200/PN40 flanged, 316L	H10	8-inch ANSI class 600 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 300 flanged, carbon steel	HC4	1-inch ANSI class 600 flanged, carbon steel
FC5	1.5-inch ANSI class 150 flanged, carbon steel	GC5	1.5-inch ANSI class 300 flanged, carbon steel	HC5	1.5-inch ANSI class 600 flanged, carbon steel
FC6	2-inch ANSI class 150 flanged, carbon steel	GC6	2-inch ANSI class 300 flanged, carbon steel	HC6	2-inch ANSI class 600 flanged, carbon steel
FC7	3-inch ANSI class 150 flanged, carbon steel	GC7	3-inch ANSI class 300 flanged, carbon steel	HC7	3-inch ANSI class 600 flanged, carbon steel
FC8	4-inch ANSI class 150 flanged, carbon steel	GC8	4-inch ANSI class 300 flanged, carbon steel	HC8	4-inch ANSI class 600 flanged, carbon steel
FC9	6-inch ANSI class 150 flanged, carbon steel	GC9	6-inch ANSI class 300 flanged, carbon steel	HC9	6-inch ANSI class 600 flanged, carbon steel
FC10	8-inch ANSI class 150 flanged, carbon steel	GC10	8-inch ANSI class 300 flanged, carbon steel	HC10	8-inch ANSI class 600 flanged, carbon steel

Feature 3: Electronics Enclosure	
E2	NEMA 4X Enclosure mounted on probe
E4()	Remote Electronics NEMA 4X includes NEMA 4X on probe. Specify cable length in parentheses, maximum 50 feet (15.24 m). Includes FM, CSA, ATEX, IECEx Cable glands.

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	100-240 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 pulse, HART. Loop powered. One analog output (4-20 mA), one pulse, HART. Loop powered.
V4M	One analog output (4-20 mA), one alarm, one pulse, and MODBUS
V4B	One analog output (4-20 mA), one alarm, 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

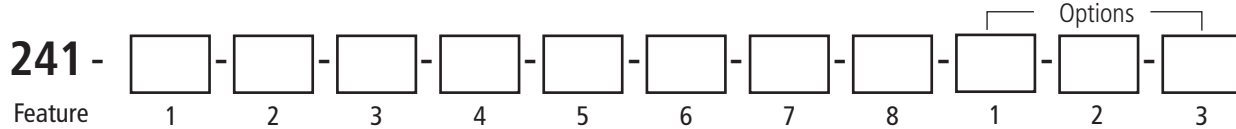
Option 2: Oxygen Cleaning

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

ORDERING THE 241 INSERTION



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

Parent Model Number	
241	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.
VT	Velocity and temperature sensors. Mass measurement with temperature compensation
VTP	Velocity, temperature and pressure sensors. Mass measurement with pressure and temperature compensation and automatic flow profile compensation by calculating the Reynolds number
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	NEMA 4X Enclosure mounted on probe
E4()	Remote electronics NEMA 4X includes NEMA 4X on probe Specify cable length in parentheses, maximum 50 feet. Includes FM, CSA, ATEX, IECEx Cable glands.

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	12-36VDC

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 alarm, one pulse, and MODBUS
V4B	One analog output (4-20 mA), one alarm, 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 (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 150 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)

ORDERING THE 241 INSERTION (continued)

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.
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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 (17 m) armored cable with glands (ATEX, IECEx) V meter only- Adder to remote option
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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)



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