

DOM POSITIVE DISPLACEMENT FLOWMETERS



Flow
Pressure
Level
Temperature
Measurement
Monitoring
Control



- Threaded, Flanged, and High Pressure Series
- Aluminum, Stainless Steel, and Ductile Iron Bodies
- Measures Liquids with Viscosities to 1,000 cPs (higher with special cut rotors)
- Operating Pressures to 5,800 PSIG
- Electronics Packages Include Analog and Frequency Outputs, Mechanical or LCD Totalizers, and Batch Controllers
- Bi-directional Flow Capability and Optional Quadrature Output



S4



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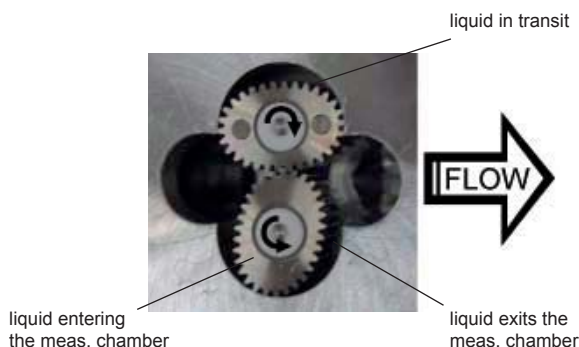
Model:
DOM

Description

The DOM series positive displacement flowmeter is the preferred choice for measuring viscous liquids such as lubricating/hydraulic oils, diesel fuels, chemicals, solvents, resins, and pastes.

The Oval Gear meters are positive displacement flowmeters where the passage of liquid causes two oval gears to rotate within a precision measuring chamber and with each rotation a fixed volume of liquid passes through the meter. Magnets embedded within the gears initiate a high resolution pulse train output. The pulse output can be wired directly to process control and monitoring equipment or can be used as an input to instruments supplied with or fitted directly onto the meter.

The flowmeter is available as a blind transmitter with pulse output capable of interfacing to most monitoring and control instrumentation or the meter can be fitted with or supplied with instruments such as totalizers, rate totalizers or batch controllers. These instruments also have monitoring and control output options including 4-20 mA, scaled pulse, flowrate alarms and batch control logic (preset metering).



This technology allows precise flow measurement and dispensing of most clean liquids regardless of their conductivity with other liquid characteristics having no or minimal effect on meter performance. This metering technology does not require flow profile conditioning or straightline runs as required with alternative flow technologies making the installation relatively compact and low cost.

Positive displacement flowmeters are an inexpensive means to accurately meter high viscosity clean liquids as high as 1 million centipoises however, the appropriate meter must be sized so that the pressure drop across the primary measuring elements (oval rotor), does not exceed the maximum capability of either.

Specifications

Wetted Material

DOM-A05...DOM-A15

- Body:** Aluminum
- Gears:** 316L Stainless Steel
- Bearing:** Ceramic

DOM-A20...DOM-A60

- Body:** Aluminum
- Gears:** Aluminum
- Bearing:** Hardened Steel Rollers (only for lubricating fuels and oil)

DOM-S, DOM-H

- Body:** 316L Stainless Steel
- Gears:** 316L Stainless Steel
- Bearing:** Ceramic

DOM-D

- Body:** Ductile Iron
- Gears:** Aluminum
- Bearing:** Hardened Steel Rollers (only for lubricating fuels and oil)

O-Rings:

- FKM (standard): 5°F to 250°F;
- EPDM (ethylene propylene rubber): -4°F to +250°F (for ketones only);
- PTFE encapsulated FKM: -4°F to +250°F;
- NBR: -4°F to +210°F
- Glass Reinforced Nylon

Cover:

Accuracy

- DOM-x05...DOM-x15:** ±1.0% of reading
- DOM-x20...DOM-x35:** ±0.5% of reading
- DOM-x40...DOM-x60:** ±0.2% of reading

Repeatability:

±0.03% of reading

Protection:

NEMA 4X/IP66

Temperature Range

- Options Z & B:** -4°F to +176°F
- Pulse Output:** -4°F to +250°F

Electrical Connection: 1/2" NPT

Maximum Pressure (threaded version)

Type	Max. Pressure [PSI]			
	DOM-A...	DOM-S...	DOM-H...	DOM-D...
DOM-x05..	218	493	5800	-
DOM-x10..	218	493	5800	-
DOM-x15..	218	493	5800	-
DOM-x20..	986	986	5800	-
DOM-x25..	986	986	5800	-
DOM-x30..	435	435	5800	-
DOM-x35..	290	551	4350	-
DOM-x40..	174	-	-	-
DOM-x45..	174	174	-	174
DOM-x50..	174	-	-	-
DOM-x55..	145	-	-	174
DOM-x60..	145	-	-	-



Recommended Filter

- DOM-x05 ... DOM-x15: 75 micron
- DOM-x20 ... DOM-x35: 150 micron
- DOM-x40 ... DOM-x60: 350 micron

Pulse Output

Reed switch pulse output

The reed switch output is a two wire normally open SPST voltage free contact ideal for installations without power or for use in hazardous area locations when Intrinsically Safe (I.S.) philosophy is adopted.

Note: When using the reed switch output the liquid temperature must not change at a rate greater than 50 °F per minute. In general the reed switch life will exceed 2 billion actuations when switching less than 5 V_{DC}/10 mA. Power supply: max. 30 V_{DC}, max. 200 mA

Hall Effect sensor pulse output

The Hall Effect sensor is a high resolution solid state 3 wire device providing an unsourced, open collector, NPN transistor output. The term “un-sourced” means that no voltage is applied to the output from within the flowmeter, it must be pulled to a “high” or “on” state by between 5 - 24 V_{DC} supplied from an external source, typically the receiving instrument.

The pulse output between signal and -0 V is a voltage square wave with the high level being the DC voltage available at the open collector and the low level being -0 V.

The receiving instrument must incorporate a pull up resistor (typically greater than 10 kΩ in most instruments) which ties the open collector to the available DC voltage level when the Hall sensor is not energized. When energized the open collector output is pulled to ground through the emitter (-0 V).

Power Supply: max. 5-24 V_{DC}, max. 20 mA

Quadrature Hall Effect pulse output (...D0)

Two Hall Effect sensors arranged to give separate outputs out of phase with one another. The quadrature output is typically suited to custody transfer applications where signal integrity verification is required, it is also used for metering bi-directional flow.

Power Supply: max. 8 - 24 V_{DC}, max. 20 mA

Mechanical totalizer (...M2 and ...M4)

The flowmeters type DOM-x20 up to DOM-x60 are available with a mechanical totalizer with either 3- or 4-digit resettable totalizer and indication of accumulated total value. The motion of the rotors is transmitted to the mechanical register totaliser via an interfacing reduction gear train and dynamic seal assembly. Please check availability, some mechanical totalizers are still in development.

Electronic with LCD Display

Type	...Z1	...Z3	...Z5	...B1
Function	Dual totalizer	Rate totalizer	Rate totalizer	Batch controller
Power Source				
Battery-powered	yes	yes	yes	no
External (drives output, backlighting)	8-24 V _{DC}	8-24 V _{DC}	8-24 V _{DC}	12-24 V _{DC}
LCD Display				
-line 1/no. of digits	7.5 mm/5	9 mm/8	17 mm/6	9 mm/6
-line 2/no. of digits	3.6 mm/8	-	7 mm/8	-
selectable units	yes	yes	yes	yes
decimal point	yes	yes	yes	yes
subscripts displayed	yes	yes	yes	yes
accumulative total	yes	yes	yes	yes
resettable total	no	yes	no	no
linearization	no	yes	no	no
rate display	no	yes	yes	no
backlighting	no	no	yes	no
Input Type				
un-power sensors	see ZOD datasheet			
powered sensors	see ZOD datasheet			
Outputs				
4-20 mA (750 Ω)	no	yes	no	no
high/low flow alarm	no	NPN/PNP	NPN	no
batch end & control	no	no	no	NPN/PNP
pulse outputs	NPN/PNP	NPN/PNP	NPN	NPN/PNP
2 x SPDT relays	no	optional	no	optional
Installation				
NEMA 4X/IP66	yes	yes	yes	yes
cable entries	2 x gland	3 x M20	3 x M16	3 x M20
intrinsic safe (option)	yes	yes	no	no
mounting	meter mount, pipe, wall, or panel mounting			
temperature range	-4°F to +176°F (Option: -4°F to +250°F)			

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Maximum Flowrate Multiplier (for higher viscosities)

Viscosity [cPs]	Standard Rotor	Special Cut Rotor
≤ 1,000	1	1
≤ 2,000	0.5	1
≤ 4,000	0.42	0.84
≤ 6,000	0.33	0.66
≤ 8,000	0.25	0.5
≤ 30,000	0.15	0.3
≤ 60,000	0.12	0.25
≤ 150,000	0.1	0.2
≤ 250,000	0.05	0.1
≤ 1,000,000	0.025	0.05

Special Cut Rotors for higher viscosities

For viscosity > 1000 cP, special cut rotors option "S" should be used to reduce pressure drop. This applies to DOM-x15 and larger sizes. For higher viscosities, the flowmeter max. flowrate is de-rated according to the table above. Example: DOM-x25 measuring oil at 6000 cP, max. flow 40 GPM x 0.5 = 20 GPM new maximum flow rate.

Output Pulse Resolution

Model	Flow Range [GPM]	Pulse per gallon		
		Reed Switch	Hall Sensor	Quadr. Hall Sensor
DOM-x05..	0.13 - 9.5 GPH	10,938	10,938	10,938
DOM-x10..	0.5 - 27 GPH	3,975	3,975	3,975
DOM-x15..	4 - 145 GPH	1,343	2,687	2,687
DOM-x20..	0.26 - 10.6	314	628	628
DOM-x25..	2.6 - 40	102	404	202
DOM-x30..	4 - 66	49	199	99
DOM-x35..	8 - 120	24	98	49
DOM-x40..	9 - 150	18	74	37
DOM-x45..	10 - 200	8.8	35	17
DOM-x50..	13 - 260	5.8	23	11.7
DOM-x55..	20 - 400	4.1	16.6	8.3
DOM-x60..	40 - 660	2.1	8.4	4.2

Order Details Thread Connection (Example: DOM-A05G N8 2 H0 0)

Measuring Range [GPM]	Fitting [NPT]	Model Number			O-ring Material	Output or Display	Options
		Aluminum	Stainless Steel	Ductile Iron			
0.13 - 9.5 GPH	1/8"	DOM-A05G N1...	DOM-S05G N1...	-	..1.. = FKM (standard) ..2.. = EPDM ..3.. = PTFE coated FKM ..4.. = NBR ..1.. = FKM (standard) ..2.. = EPDM ..4.. = NBR	..H0.. = Dual pulse, reed and NPN ..D0.. = Quadrature NPN ..Z1.. = Dual total ..Z3.. = Rate/total ..Z5.. = Dual LCD Totalizer/Rate ..B1.. = Batcher ..M2*.. = 3-digit Mech. totalizer ..M4*.. = 4-digit Mech. totalizer	...0 = None ...A** = coupled with air eliminator-strainer ZAL ...S*** = special cut rotors for higher viscosities ...C = Cooling fin for LCD displays, 250°F Max
0.5 - 27 GPH	1/4"	DOM-A10G N2...	DOM-S10G N2...	-			
4 - 145 GPH	3/8"	DOM-A15G N3...	DOM-S15G N3...	-			
0.26 - 10.6	1/2"	DOM-A20G N4...	DOM-S20G N4...	-			
2.6 - 40	1"	DOM-A25G N6...	DOM-S25G N6...	-			
4 - 66	1 1/2"	DOM-A30G N8...	DOM-S-30G N8...	-			
8 - 120	2"	DOM-A35G N9...	DOM-S35G N9...	-			
9 - 150	2"	DOM-A40G N9...	-	-			
10 - 200	3"	DOM-A45G NB...	DOM-S45G NB...	DOM-D45G NB...			
13 - 260	3"	DOM-A50G NB...	-	-			
20 - 400	4"	DOM-A55G NC...	-	DOM-D55G NC...			
40 - 660	4"	DOM-A60G NC...	-	-			

* not for DOM-x05, -x10, -x15, 3-digit recommended for DOM-x20, -x25, 4-digit recommended for DOM-x30 and larger

** not available for DOM-x05, -x10, -x15, -x20, only available for DOM-A...

*** only available for DOM-A20... to DOM-A60..., DOM-S15... to DOM-S35... and DOM-D...



Order Details Flange Connection (Example: DOM-A45G AB 2 H0 0)

Measuring Range [GPM]	Fitting [ANSI]	Model Number			O-ring Material	Output or Display	Options
		Aluminum	Stainless Steel	Ductile Iron			
2.6 - 40	1" 150lb	DOM-A25G A6...	DOM-S25G A6...	-	..1.. = FKM (standard)	..H0.. = Dual pulse, reed and NPN	...0 = None
4 - 66	1 1/2" 150lb	DOM-A30G A8...	DOM-S-30G A8...	-	..2.. = EPDM	..D0.. = Quadrature NPN	...A** = coupled with air eliminator-strainer ZAL
8 - 120	2" 150lb	DOM-A35G A9...	DOM-S35G A9...	-	..3.. = PTFE coated FKM	..Z1.. = Dual total	...S*** = special cut rotors for higher viscosities
9 - 150	2" 150lb	DOM-A40G A9...	-	-	..4.. = NBR	..Z3.. = Rate/total	...C = Cooling fin for LCD displays, 250°F Max
10 - 200	3" 150lb	DOM-A45G AB...	DOM-S45G AB...	DOM-D45G AB...	..1.. = FKM (standard)	..Z5.. = Dual LCD Totalizer/Rate	
13 - 260	3" 150lb	DOM-A50G AB...	-	-	..2.. = EPDM	..B1.. = Batcher	
20 - 400	4" 150lb	DOM-A55G AC...	-	DOM-D55G AC...	..4.. = NBR	..M2*.. = 3-digit Mech. totalizer*	
40 - 660	4" 150lb	DOM-A60G AC...	-	-		..M4*.. = 4-digit Mech. totalizer*	

*3-digit recommended for DOM-x25, 4-digit recommended for DOM-x30 and larger
 ** only available for DOM-A...
 *** only available for DOM-A..., DOM-S25... to DOM-S35... and DOM-D
 300lb Flanges are available for most models upon request

Order Details High Pressure (Example: DOM-H35G N9 2 H0 0)

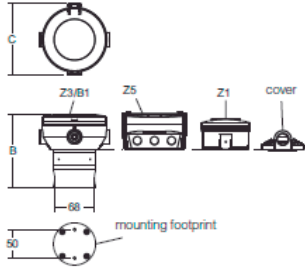
Measuring Range [GPM]	Fitting [NPT]	Model Number	O-ring Material	Output or Display	Options
		Stainless Steel			
0.13 - 9.5 GPH	1/8"	DOM-H05G N1...	..1.. = FKM (standard) ..2.. = EPDM ..3.. = PTFE coated FKM ..4.. = NBR	..H0.. = Dual pulse, reed and NPN ..R0.. = Pulse output (reed switch) ..Z1.. = Dual total ..Z3.. = Rate/total ..Z5.. = Dual LCD Totalizer/Rate ..B1.. = Batcher	...0 = None ...S* = special cut rotors for higher viscosities ...C = Cooling fin for LCD displays, 250°F Max
0.5 - 27 GPH	1/4"	DOM-H10G N2...			
4 - 145 GPH	3/8"	DOM-H15G N3...			
0.26 - 10.6	1/2"	DOM-H20G N4...			
2.6 - 40	1"	DOM-H25G N6...			
4 - 66	1 1/2"	DOM-H30G N8...			
8 - 120	2"	DOM-H35G N9...			

* only available for DOM-H15... to DOM-H35...

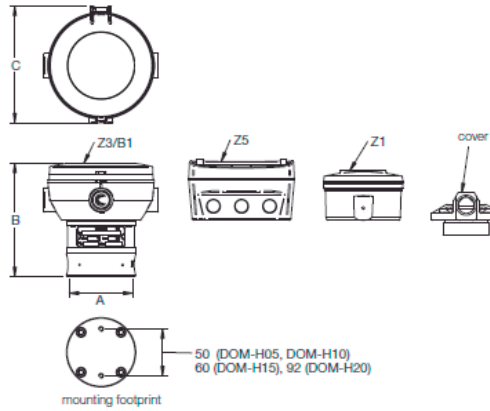
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Dimensions

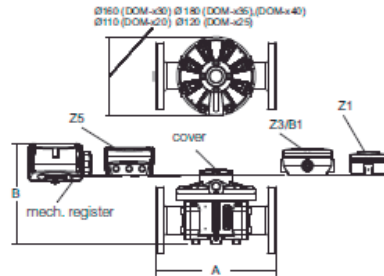
DOM-x05...DOM-x15



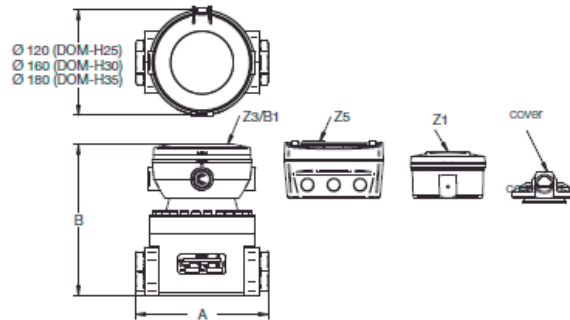
DOM-H05...DOM-H20



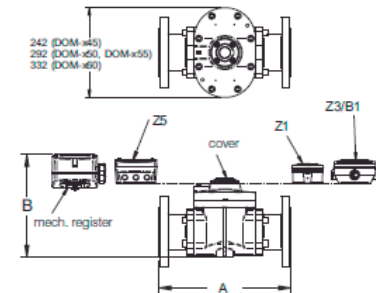
DOM-x20...DOM-x40



DOM-H25...DOM-H35



DOM-x45...DOM-x60

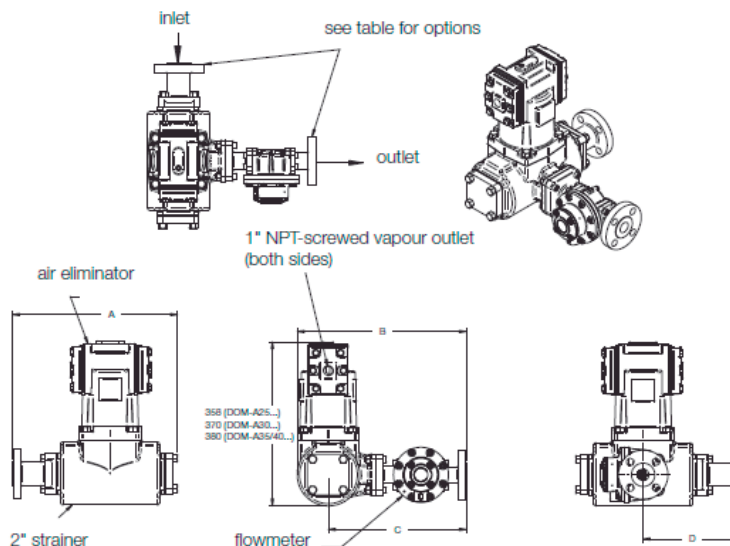


Model	A [inch]		B [inch]					C [inch]			
	Thread Connection	Flange Connection	Cover	...Z1	...Z3 ...B1	...Z5	...M2 ...M4	Cover	...Z1	...Z3 ...B1	...Z5
DOM-x05..	- [2.67]	-	3.62 [3.54]	4.45 [4.45]	4.80 [4.76]	4.92 [4.92]	-	2.83 [2.91]	3.70 [3.70]	4.88 [4.88]	3.77 [3.77]
DOM-x10..	- [2.67]	-	3.62 [3.54]	4.45 [4.45]	4.80 [4.76]	4.92 [4.92]	-	2.83 [2.91]	3.70 [3.70]	4.88 [4.88]	3.77 [3.77]
DOM-x15..	- [3.74]	-	3.89 [4.60]	4.72 [5.51]	5.08 [5.83]	5.19 [5.98]	-	2.83 [3.94]	3.70 [3.94]	4.88 [4.88]	3.77 [3.94]
DOM-x20..	4.33 [4.41]	-	4.17 [4.80]	5.70 [5.70]	6.06 [6.02]	6.18 [6.18]	7.00	[4.72]	[4.72]	[4.88]	[4.72]
DOM-x25..	5.39 (6.93) [5.98]	7.79 (9.33)	4.72 [5.55]	6.29 [6.46]	6.61 [6.77]	6.77 [6.93]	7.40	[4.72]	[4.72]	[4.72]	[4.72]
DOM-x30..	7.4 [9.21]	9.92	6.10 [6.49]	7.67 [7.40]	7.99 [7.71]	8.15 [7.87]	8.94	[6.29]	[6.29]	[6.29]	[6.29]
DOM-x35..	8.34	10.8* (10.9)	6.69 [7.36]	8.27 [8.27]	8.58 [8.58]	8.74 [8.74]	9.33	[7.09]	[7.09]	[7.09]	[7.09]
DOM-x40..	8.34	10.8*	8.66	10.2	10.6	10.7	11.3	-	-	-	-
DOM-x45..	10.5	13.9	8.38 (8.11)	9.92 (9.80)	10.2 (10.1)	10.4 (10.2)	10.6	-	-	-	-
DOM-x50..	11.6	15.0	9.02	10.6	10.9	11.1	11.3	-	-	-	-
DOM-x55..	11.6	15.3	10.8	12.4	12.7	12.8	13.1	-	-	-	-
DOM-x60..	12.6	16.3	13.9	15.4	15.8	15.9	16.3	-	-	-	-

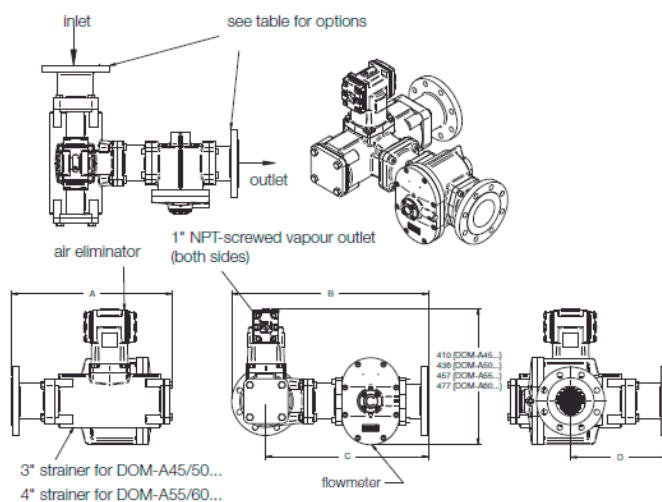
Note: Dimensions of DOM-D-45/55 are same as those of DOM-A45/55, Dimensions for DOM-S... are specified in () only when they are different from DOM-A, Dimensions of DOM-H... are specified in [].

* Dimensions for DIN flanges, 10.7" for ANSI flanges

Dimensions for DOM-A25... DOM-A40 with option "A"



Dimensions for DOM-A45... DOM-A60 with option "A"



Model	Thread Connection (G or NPT) [inch]				Flanged Connection (DIN or ANSI) [inch]			
	A	B	C	D	A	B	C	D
DOM-A25	11.7	13.3	10.6	5.94	14.2	14.5	11.8	8.39
DOM-A30	11.3	15.7	11.5	5.55	14.2	17.0	14.3	8.39
DOM-A35	11.8	16.9	13.9	5.55	14.2*	18.1*	15.1*	8.39*
DOM-A40	11.8	16.9	13.9	5.55	14.2*	18.1*	15.1*	8.39*
DOM-A45	12.8	19.9	17.3	6.33	16.6	22.8	19.0	10.4
DOM-A50	12.8	21.1	18.4	6.33	16.6	23.9	20.1	10.4
DOM-A55	17.3	23.1	19.6	8.62	21.3	25.9	21.5	13.0
DOM-A60	17.3	24.1	20.7	8.62	21.3	27.0	22.5	13.0

* +0.04" for DIN flanges



**DOM Series Flowmeters
Application Guide
Rev 06/2010**

FAX to:
KOBOLD Instruments Inc.
412-788-4890 (USA)
514-428-8899 (Canada)

Customer Name: _____
Company Name: _____
Phone: _____
Fax: _____
E-mail: _____

Design Conditions

Accurate design pressure and temperature are essential to ensure the flowmeter will be built to operate without damage. Please fill out accurately and completely.

List Design Conditions

- 1. Pressure: Maximum _____ PSIG
- 2. Temperature: Maximum _____ °F

Process Conditions

- 1. Type of Liquid: _____
- 2. Normal Operating Temperature: _____ °F
- 3. Line Size: _____
- 4. Desired Measuring Range: _____ GPM
- 5. Maximum Liquid Viscosity: _____

Body Material

- Aluminum
- 316L SS
- Hi-Pressure 316L SS
- Ductile Iron

O-ring Material

- FKM (standard)
- EPDM
- PTFE coated FKM
- NBR

Fittings

- NPT Thread
- 150LB Flange
- Other (Specify) _____

Output/Display Options

- H0** = Dual Pulse, reed & NPN
- Z1** = Dual totalizer
- Z3** = Ratemeter/Totalizer
- Z5** = Dual LCD Totalizer/Rate
- B1** = Batch Controller
- D0** = Quadrature NPN
- M2** = 3-digit Mechanical Totalizer (GPM)
- M4** = 4-digit Mechanical Totalizer (GPM)

Other Options

- S** = High-viscosity rotors (not available on all models)
- C** = Cooling fin for LCD displays (250 °F rating)
- Special requirement Specify below: