

Positive Displacement Flowmeter



measuring
•
monitoring
•
analyzing

DOM



- Threaded, Flanged, and High Pressure Series
- Aluminum or Stainless Steel 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



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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 or 4-20mA 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 centipoise. The appropriate meter must be sized to accommodate the pressure drop across the primary measuring elements (oval rotors) and to not exceed the maximum pressure capability of the meter.

Specifications

Wetted Material

DOM-A05..DOM-A15

Body: Aluminum
Gear/Bearing: Sintered 316 Stainless Steel/Carbon Ceramic or PPS/No Bearing*

DOM-A20..DOM-A60

Body: Aluminum
Gear/Bearing: Aluminum/Hardened Steel Rollers (Lubricating Fuels and Oils only) or PPS/No Bearing*

Specifications

DOM-S, DOM-H

Body: 316L Stainless Steel
Gear/Bearing: Sintered 316 SS/Carbon Ceramic or PPS/No Bearing*
O-Rings: FKM (Standard): 5...250 °F; EPDM (Ethylene Propylene Rubber): -4...250 °F (for Ketones only); PTFE Encapsulated FKM: -4...250 °F; NBR: -4...210 °F
Cover: Glass Reinforced Polyamide
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, L0, M4: -4...176 °F
Pulse Output: -4...250 °F
Electrical Connection: 1/2" NPT

*PPS Rotors not available on some models

Maximum Pressure

Max. Pressure (PSI)		
Standard Threaded - Pulse Output*	Aluminum	Stainless
DOM-x05.. - DOM-x15..	220	495
DOM-x20.. - DOM-x25..	990	990
DOM-x30..	435	435
DOM-x35..	285	550
DOM-A40..	285	x
DOM-x45..	175	175
DOM-A50..	175	x
DOM-A55.. - DOM-A60..	145	x
150lb ANSI Flanged - Pulse Output*	Aluminum	Stainless
DOM-x20.. - DOM-x45..	175	175
DOM-A50..	175	x
DOM-A55.. - DOM-A60..	145	x
Mechanical Meter - Option ..M4	Aluminum	Stainless
DOM-x20..M4 - DOM-x25..M4	580	580
DOM-x30..M4	435	435
DOM-x35..M4 - DOM-x40...M4	285	285
DOM-x45..M4	175	175
DOM-A50..M4	175	x
DOM-A55..M4 - DOM-A60..M4	145	x
High Pressure Threaded - Pulse Output*	Aluminum	Stainless
DOM-H05.. - DOM-H30..	x	5800
DOM-H35..	x	4350



Pulse Output

Reed/Hall Effect Sensor Pulse Output (..H0)

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).

For the Reed Switch technical description, see the R0 details below.

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

Dual Reed Switch Pulse Output (..R0)

The dual reed switch output are two wire normally open SPST voltage free contacts 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

Quadrature Hall Effect Pulse Output (..D0)

Two Hall Effect sensors arranged to give separate outputs 90° 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 (..M4)

The flowmeters type DOM-x20.. up to DOM-x60.. are available with a mechanical totalizer with a 4-digit resettable totalizer and indication of accumulated total value. The motion of the rotors is transmitted to the mechanical register totalizer via an interfacing reduction gear train and dynamic seal assembly. For models DOM-x20.. & DOM-x25.. the resettable totalizer and accumulated totalizer read in x1 gallons. For models DOM-x30.. to DOM-x60.. the resettable totalizer and accumulated totalizer read in x10 gallons.

Signal Converter (..L0)

The L0 signal converter option may be set to function as either a frequency to current converter (2-wire 4-20mA output), a pulse divider, or a single point flow rate alarm. The signal board also has an NPN pulse output which mirrors the input pulse frequency, this signal may be used for remote rate and/or total indication.

Power Supply: 24 V_{DC}

ATEX - Approval (..Z4)

II 2G EEx ia IIB T4 (-4°F ≤ Ta ≤ 140°F)

Electronic with LCD Display

Type	..Z1	..Z3/..Z4	..Z7	..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	yes	yes	yes	no
Linearization	no	yes	no	no
Rate Display	no	yes	yes	no
Backlighting	no	no	yes	no
Input Type				
Un-powered 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	no	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...176 °F (Option: -4...250 °F)			



Positive Displacement Flowmeter Model DOM

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 0.33 = 13.2 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	10,598	10,598	10,598
DOM-x10..	0.5...27 GPH	3,975	3,975	3,975
DOM-x15..	4...145 GPH	1,345	2,690	2,690
DOM-x20..	0.26...10.6	318	636	636
DOM-x25..	2.6...40	102	405	204
DOM-x30..	4...66	53	212	106
DOM-x35..	8...120	25	99	49
DOM-x40..	9...150	18	73	36
DOM-x45..	10...200	10	40.5	20
DOM-x50..	13...260	5.68	22.7	11.36
DOM-x55..	20...400	4.15	16.6	8.3
DOM-x60..	40...660	2.1	8.5	4.24

Recommended Filter

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

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

Measuring Range	Fitting (NPT)	Housing/Gear Set Material				O-Ring Material	Output and/or Display	Options
		AL/SS	AL/PPS	SS/SS	SS/PPS			
0.13...9.5 GPH	1/8"	DOM-A05G N1..	-	DOM-S05G N1..	-	..1.. = FKM (standard)	..H0.. = Dual pulse, reed and NPN ..RO.. = Pulse output (reed switch) ..L0.. = 2-wire, 4-20mA	..0 = None
0.5...27 GPH	1/4"	DOM-A10G N2..	-	DOM-S10G N2..	-			
4...145 GPH	3/8"	DOM-A15G N3..	DOM-715G N3..	DOM-S15G N3..	DOM-815G N3..			
		AL/AL				..2.. = EPDM ..3.. = PTFE coated FKM ..4.. = NBR	..D0.. = Quadrature NPN ..Z1.. = Dual LCD totalizer ..Z3.. = Dual LCD totalizer/rate, 4-20mA	..A** = coupled with air eliminator-strainer ZAL ..S*** = special cut rotors for higher viscosities
0.26...10.6 GPM	1/2"	DOM-A20G N4..	DOM-720G N4..	DOM-S20G N4..	DOM-820G N4..			
2.6...40 GPM	1"	DOM-A25G N6..	DOM-725G N6..	DOM-S25G N6..	DOM-825G N6..			
4...66 GPM	1-1/2"	DOM-A30G N8..	DOM-730G N8..	DOM-S30G N8..	DOM-830G N8..	..1.. = FKM (standard) ..2.. = EPDM ..4.. = NBR	..Z4.. = ATEX Approved Dual LCD totalizer/rate, 4-20mA ..Z7.. = Dual LCD totalizer/rate	..C = Cooling fin for LCD displays, 250°F Max
8...120 GPM	2"	DOM-A35G N9..	DOM-735G N9..	DOM-S35G N9..	DOM-835G N9..			
9...150 GPM	2"	DOM-A40G N9..	-	-	-			
10...200 GPM	3"	DOM-A45G NB..	DOM-745G NB..	DOM-S45G NB..	DOM-845G NB..	..1.. = FKM (standard) ..2.. = EPDM ..4.. = NBR	..B1.. = Batcher ..M4*.. = 4-digit mech. totalizer	
13...260 GPM	3"	DOM-A50G NB..	DOM-750G NB..	-	-			
20...400 GPM	4"	DOM-A55G NC..	DOM-755G NC..	-	-			
40...660 GPM	4"	DOM-A60G NC..	-	-	-			

* not for DOM-x05.., -x10.., -x15..; for DOM-x20.. to DOM-x60.., see M4 option description for details on minimum incremental volume unit per model number
 ** not available for DOM-x05.., -x10.., -x15.., -x20.., only available for DOM-A..
 *** not available for DOM-x05.., -x10..



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

Measuring Range [GPM]	Fitting [ANSI]	Housing/Gear Set Material				O-ring Material	Output and/or Display	Options
		AL/AL	AL/PPS	SS/SS	SS/PPS			
0.26...10.6	1/2" 150lb	DOM-A20G A4..	DOM-720G A4..	DOM-S20G A4..	DOM-820G A4..	..1.. = FKM (standard) ..2.. = EPDM ..3.. = PTFE coated FKM ..4.. = NBR	..H0.. = Dual pulse, reed and NPN ..R0.. = Pulse output (reed switch) ..L0.. = 2-wire, 4-20mA ..D0.. = Quadrature NPN ..Z1.. = Dual LCD totalizer ..Z3.. = Dual LCD totalizer/rate, 4-20mA	..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
2.6...40	1" 150lb	DOM-A25G A6..	DOM-725G A6..	DOM-S25G A6..	DOM-825G A6..		..Z4.. = ATEX Approved Dual LCD totalizer/rate, 4-20mA ..Z7.. = Dual LCD totalizer/rate	
4...66	1.5" 150lb	DOM-A30G A8..	DOM-730G A8..	DOM-S30G A8..	DOM-830G A8..		..B1.. = Batcher ..M4*.. = 4-digit mech. totalizer	
8...120	2" 150lb	DOM-A35G A9..	DOM-735G A9..	DOM-S35G A9..	DOM-835G A9..			
9...150	2" 150lb	DOM-A40G A9..	-	-	-			
10...200	3" 150lb	DOM-A45G AB..	DOM-745G AB..	DOM-S45G AB..	DOM-845G AB..	..1.. = FKM (standard) ..2.. = EPDM ..4.. = NBR		
13...260	3" 150lb	DOM-A50G AB..	DOM-750G AB..	-	-			
20...400	4" 150lb	DOM-A55G AC..	DOM-755G AC..	-	-			
40...660	4" 150lb	DOM-A60G AC..	-	-	-			

* see M4 option description for details on minimum incremental volume unit per model number
 ** only available for DOM-A...
 300lb Flanges are available for most models upon request

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

Measuring Range	Fitting [NPT]	Housing/Gear Set Material		O-ring Material	Output and/or Display	Options
		SS/SS	SS/PPS			
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) ..L0.. = 2-wire, 4-20mA ..D0.. = Quadrature NPN ..Z1.. = Dual LCD totalizer ..Z3.. = Dual LCD totalizer/rate, 4-20mA ..Z4.. = ATEX Approved Dual LCD totalizer/rate, 4-20mA ..Z7.. = Dual LCD totalizer/rate	..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	1/4"	DOM-H15G N2..	DOM-915G N2..			
0.26...10.6 GPM	1/2"	DOM-H20G N4..	DOM-920G N4..			
2.6...40 GPM	1"	DOM-H25G N6..	DOM-925G N6..			
4...66 GPM	1 1/2"	DOM-H30G N8..	DOM-930G N8..			
8...120 GPM	2"	DOM-H35G N9..	DOM-935G N9..			

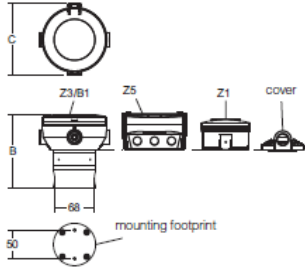
* only available for DOM-H15.. to DOM-H35...



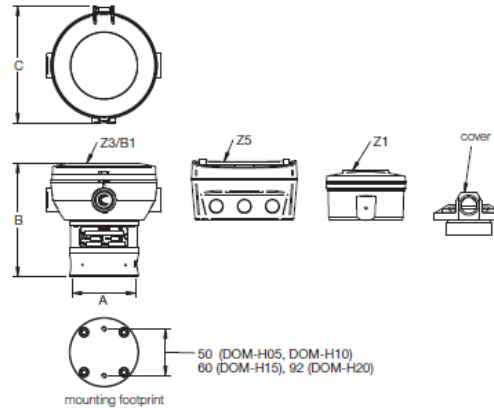
Positive Displacement Flowmeter Model DOM

Dimensions

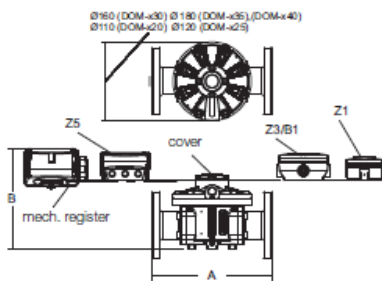
DOM-x05...DOM-x15



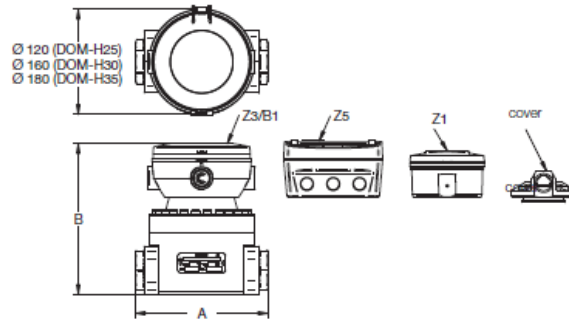
DOM-H05...DOM-H20



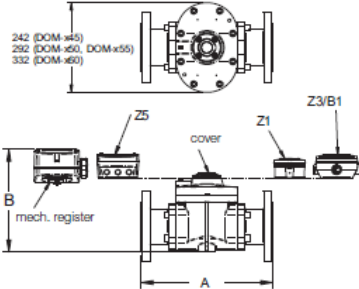
DOM-x20...DOM-x40



DOM-H25...DOM-H35



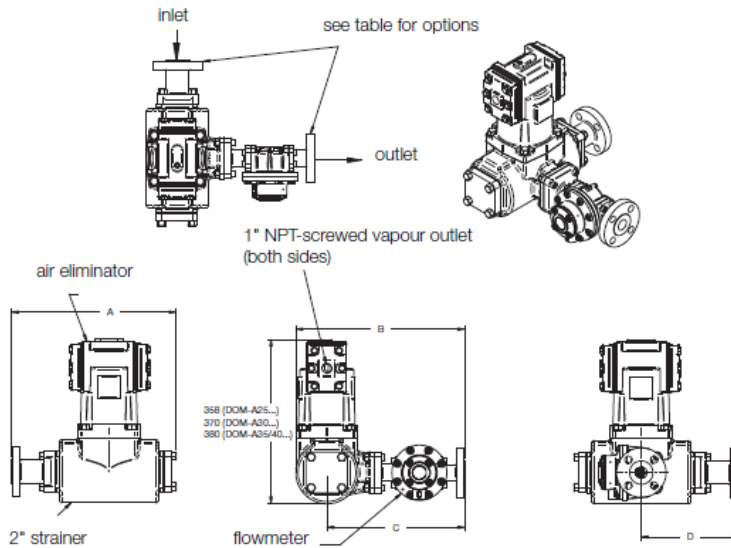
DOM-x45...DOM-x60



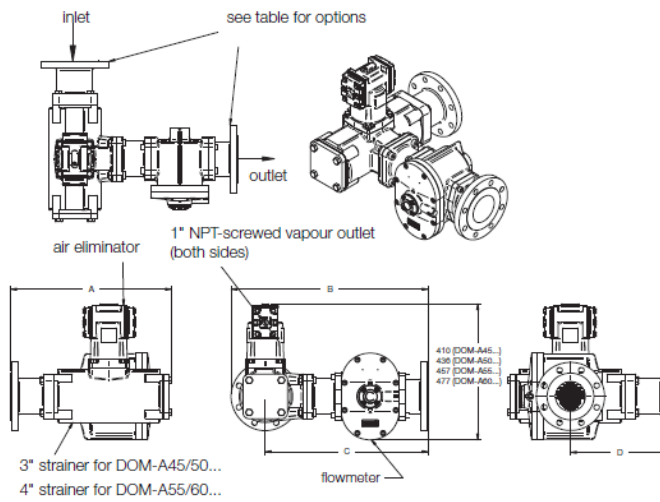
Model	A (inch)		B (inch)					C (inch)			
	Thread Connection	Flange Connection	Cover	..Z1	..Z3/..Z4 ..B1	..Z7	..M4	Cover	..Z1	..Z3/..Z4 ..B1	..Z7
DOM-x05..	- [2.67]	-	3.62 [3.54]	4.45 [4.45]	4.80 [4.76]	4.92 [4.92]	-	2.83 [2.91]	3.70 [3.70]	4.88 [4.88]	3.77 [3.77]
DOM-x10..	- [2.67]	-	3.62 [3.54]	4.45 [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]	7.44	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 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



Positive Displacement Flowmeter Model DOM

DOM Series Flowmeters Application Guide

Rev 09/2013

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

Customer Name: _____

Company Name: _____

Phone: _____

Fax: _____

E-mail: _____

Design Conditions

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

Note:

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

Process Conditions

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

Body Material

- Aluminum 316L SS Hi-Pressure 316L SS

O-ring Material

- FKM (standard) EPDM PTFE coated FKM NBR

Rotor Material

- Aluminum 316L SS PPS (not available on all models)

Fittings

- NPT Thread 150LB Flange Other (Specify) _____

Output/Display Options

- H0 = Dual Pulse, Reed & NPN Z4 = LCD Ratemeter/Totalizer ATEX Approved
R0 = Reed Switch Z7 = LCD Dual Line Ratemeter/Totalizer
D0 = Quadrature NPN B1 = LCD Batch Controller
L0 = Signal Converter 4-20 mA 2-wire Output M3 = 4-digit Mechanical Totalizer (LPM)
Z1 = LCD Dual Line Totalizer M4 = 4-digit Mechanical Totalizer (GPM)
Z3 = LCD Ratemeter/Totalizer

Other Options

- S = High-viscosity Rotors (not available on all models) C = Cooling Fin for LCD Displays (250 °F rating) A = Coupled with Air Eliminator-strainer: Model ZAL
Special requirement, specify below: _____