

UNIVERSAL® Flow Meters

A Medium Vane-Style For Corrosive Fluids

 CSA Certified NRTL/C

 CE Marked (as noted)

NIST Traceable Calibration
Certificate Available



*MX shown with "A"
style control box.*

DESCRIPTION

These flowmeters have plastic bodies, a wide variety of metal internals and optional end fittings. They are ideally suited to monitor flows of such fluids as corrosive liquids, seawater, deionized water, acids, caustics, and plating solutions.

These variable-area flow meters have a spring-loaded swinging vane. Mounting is in-line and in any position. Straight pipe runs, before or after the meter, are not required. The all-mechanical sensing system directly drives the pointer and remote signaling devices. They handle shocks or flow surges beyond their rated capacities.

CALIBRATION

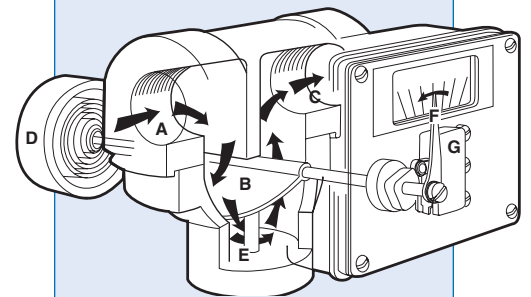
All flow meters are individually calibrated for fluids with the viscosity you specify (up to 3000 SSU/650 centipoise). We also compensate for your fluid's specific gravity. For NIST Traceability please consult factory.

CONSTRUCTION MATERIALS

Housings are corrosion-resistant PVC, Polysulfone or Tefzel. Wetted internal parts are 316 stainless steel, Titanium, Tantalum, Monel, or Hastelloy C. End fittings are generally the same material as internals. Seals are Buna N, EPR, Viton®, Kalrez™, or Kalrez combined with one of the others listed above. Please consult factory for compatibility of materials with your application.

LINE CONNECTION

Connections can be made into a variety of corrosion resistant port adapters, 1 or 1-1/2-inch NPTF, that are screwed into the 2-1/2-12 SAE straight-thread ports, to protect the housing from stress. Schedule 80 PVC ANSI style flanges are available on PVC meters. Connection sizes are from 1" to 3". These are Van Stone flanges.



Fluid enters at **A**, passes around the semi-circular vane **B**, exits at outlet **C**. The vane resists the flow because of the spring **D**. The further the vane is pushed the larger the passageway **E** becomes. This minimizes the increase in pressure drop. The vane shaft turns to operate the pointer **F** and remote signal devices such as the switch **G**.

HOW TO ORDER Select appropriate symbols and build a model code number, as in example shown:

EXAMPLE: **MX** - **V** **I** **B** **30** **GM** - **12I** - **32V1.0** -

SERIES
Medium size
corrosion resistant = **MX**

HOUSING MATERIAL
PVC = **V**
Polysulfone = **P**
Tefzel = **T**

INTERNAL MOVING PARTS
316 Stainless Steel = **I**
Titanium = **T**
Monel = **L**
Tantalum = **R**
Hastelloy C = **C**

SEAL MATERIAL
Buna N = **B**
EPR = **E**
Viton = **F**
Kalrez = **J**
Kalrez (dynamic)/Buna N (static) = **A**
Kalrez (dynamic)/EPR (static) = **H**
Kalrez (dynamic)/Viton (static) = **K**

MAX FLOW RATING LIQUIDS

These may be expressed in various engineering units as shown. Here we are selecting the maximum flow that the meter will see. The minimum reading is about 1/10th of the maximum. There are generally 5 to 7 major increments displayed on the analog scales (traditional mechanical pointer and inscribed scale) with that numbered roughly doubled for the high resolution "R" box which allows more accurate reading. Ultimate resolution is provided by the LCD digital displays standard with some transmitter selections. The following are the most commonly selected options for maximum flow rates for each engineering unit. More are available if you consult with the factory.

GPM	10, 15, 20, 30 , 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160
LPM	40, 50, 60, 70, 80, 90, 100, 150, 200, 250, 300, 350, 400, 500, 600
CMH	2.25, 2.5, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30

SCALE CALIBRATIONS

Calibrated in gallons per hour	= GH
Calibrated in gallons per minute	= GM
Calibrated in liters per minute	= LM
Calibrated in cubic meters per hour	= CMH
Dual scales (GPM and LPM)	= GLM
Dual viscosity on GPM scale	= DGM
Dual viscosity on LPM scale	= DLM

Note: For specific calibrated increments and other scales consult factory

FLUID CHARACTERISTICS

Viscosity number followed by a "V" (for SSU), "C" (for centipoise), or a "CS" (for centistokes), plus the fluid specific gravity. **32V1.0** would mean water.) For dual viscosity give two numbers separated by a slash (example: 320/500V1.0).

PORT CONNECTION

	Inches	MM	Max GPM	
VAN STONE PIPE FLANGE (PVC only)	1	25.40	70	= 8R
	1-1/2	38.10	100	= 12R
	2	50.80	160	= 16R
	2-1/2	63.50	160	= 20R
	3	76.20	160	= 24R
NPT (Female adapters)				
316 stainless steel	1	25.40	70	= 8I
	1-1/2	38.10	100	= 12I
Titanium	1	25.40	70	= 8T
	1-1/2	38.10	100	= 12T
Monel	1	25.40	70	= 8L
	1-1/2	38.10	100	= 12L
*PVC	1	25.40	70	= 8V
	1-1/2	38.10	100	= 12V
*Polysulfone	1	25.40	70	= 8P
	1-1/2	38.10	100	= 12P
Tefzel	1	25.40	70	= 8Z
	1-1/2	38.10	100	= 12Z

*Material will be same as housing;
Adapter O-ring will be same as static seal material.

Consult factory for compatibility of construction materials with the fluid involved.

SWITCH SETTING

No symbol = Lowest possible
 Or, give setting(s) in GPM or LPM. Also a symbol to indicate that accuracy is desired during increasing flow (**U**) or decreasing flow (**D**). (**5D** would mean that switch should actuate when flow rate decreases to 5 GPM.) Settings are field adjustable.

SPECIAL OPTIONS

Standard

- ST** = Stainless steel ID tag for customer supplied information
- PC** = Pin connector (See explanation for special options.)
- FL** = Fault light (See explanation for special options.)
- C** = CSA enclosure / PVC window
- TG** = Tempered glass window
- E** = Manual override
- DS** = Dual spring
- Z86** = Clearance vane for ≥ 16 GPM

A3 **W** **R** - **C** - **ST** - **5D**

FLOW DIRECTION

- R** = Left to right
- L** = Right to left
- U** = Up
- D** = Down

SERVICE

- N** = Oil and dust tight (Type 12)
- W** = Weatherproof (Type 4)
- X** = Weatherproof, corrosion proof (Type 4X)

STANDARD CONTROL BOX & READOUT (switches)

A Box

Simple indication with or without switches

- A0 = Scale & pointer only
- A1 = One SPDT (3wire), CE
- A1B = One high vibration SPDT (3 wire), CE
- A2 = Two SPDT (3 wire), CE
- A2B = Two SPDT (3wire), CE
- A3** = One SPDT (4 wire)
- A4 = Two SPDT (4 wire)
- A71 = One SPDT (3wire) gold contact
- A72 = Two SPDT (3wire) gold contact
- A53 = One SPDT (3 wire) hermetically sealed
- A54 = Two SPDT (3 wire) hermetically sealed
- A11 = Pneumatic

R Box

Hazardous location indication and switches

- R7 = One SPDT hazardous location
- R17 = One DPDT hazardous location
- R30 = One SPST hazardous location proximity
- R31 = Two SPST hazardous location proximity

G Box

Transmitter with digital display and 2 open collectors (standard), or remote display (optional)

- GTL0 = internal 4-20 mA transmitter with two open collector alarms
- GTLZ0 = intrinsically safe 4-20 mA transmitter (no alarms)
- GP0 = G Box with remote transmitter. This requires a remote display and transmitter to be ordered as a separate line item. Model UT-PM-DTLCD.

Note: G Box requires "W" service selection (weatherproof). G Box has a 1/2" conduit port with terminal strip but can be used with pin connectors ordered as Special Options. Select PC5M for GTL and PC3M for GTLZ or GP.

SPECIAL OFFERINGS

R Box

High resolution pointer and scale for more accurate reading, optional switches

- R0 = Scale & pointer only
- R1 = One SPDT (3wire), CE
- R2 = Two SPDT (3 wire), CE
- R3 = One SPDT (4 wire)
- R4 = Two SPDT (4 wire)
- R53 = One SPDT (3 wire) hermetically sealed
- R54 = Two SPDT (3 wire) hermetically sealed
- R61 = One SPDT (3 wire) high temperature
- R62 = Two SPDT (3 wire) high temperature
- R71 = One SPDT (3wire) gold contact
- R72 = Two SPDT (3wire) gold contact

RT Box

High resolution pointer and scale for more accurate reading, 4-20 mA Transmitter, optional high amp mechanical switch

- RT0 = Scale & pointer only
- RT1 = One SPDT (3wire), CE
- RT3 = One SPDT (4 wire)
- RT61 = One SPDT (3 wire) high temperature
- RT71 = One SPDT (3wire) gold contact

TT Box

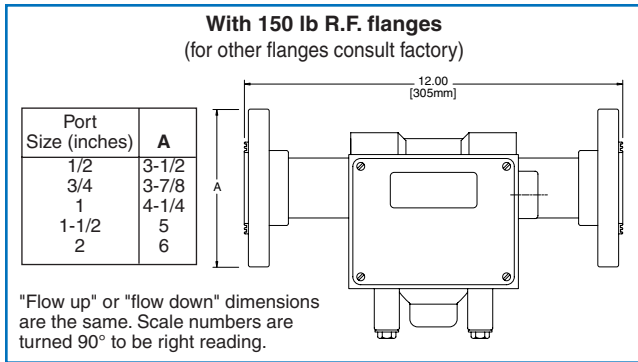
4-20 mA Transmitter with pointer & scale, optional high amp mechanical switch, separate junction boxes for switch & transmitter

- TT0 = Scale & pointer only
- TT1 = One SPDT (3wire), CE
- TT3 = One SPDT (4 wire)
- TT61 = One SPDT (3 wire) high temperature
- TT71 = One SPDT (3wire) gold contact

TTL Box

4-20 mA Transmitter with digital display, optional high amp mechanical switch, separate junction boxes for switch & transmitter

- TTL0 = Scale & pointer only
- TTL1 = One SPDT (3wire), CE
- TTL3 = One SPDT (4 wire)
- TTL71 = One SPDT (3wire) gold contact



ENGINEERING DATA

Maximum operating temperature:

PVC housing: 100°F (38°C)
 Polysulfone housing: 200°F (95°C)
 Tefzel housing: 200°F (95°C)

Maximum ambient temperature:

130°F (UL listed to 105°F (40°C; for hazardous locations -13 to +104°F)

Maximum operating pressures:(3:1 safety factor)

PVC housing: 100 PSI (6.90 BAR)
 Polysulfone housing: 200 PSI (13.79 BAR)
 Tefzel housing: 150 PSI (10.3 BAR)

Readout accuracy, full scale: ±2%

FLOW & PRESSURE DROP

Units with max flows to 80 GPM (300 LPM) impose a pressure drop that increases with flow, from 1.9 to 3.8 PSI. Higher flow-rated models are made possible by having a partial bypass (which raises minimum indicated flow), or dual springs (which raises the pressure drop). The table shows minimum flow rates and pressure drops (PSI) (at max flow rates) for models rated from 100 to 160 GPM.

MAX FLOW RATE GPM/LPM	BYPASS ONLY		DUAL SPRING*	
	Minimum Flow GPM/LPM	Max Pressure Drop PSI	Minimum Flow GPM/LPM	Max Pressure Drop PSI
90/340	20/75	4.5	10/40	6.0
100/380	30/100	4.5	10/50	8.0
110/400	30/100	5.0	20/90	6.8
120/450	40/150	5.8	20/90	6.8
130/500	40/150	5.8	20/90	6.8
140/550	50/190	6.5	20/90	6.8
150/570	50/190	6.5	30/100	6.8
160/600	50/190	6.5	30/100	7.5

*When dual-spring is ordered you must specify special option **DS**. Some dual-spring units also have partial bypass to achieve high flow ranges.

SPECIAL OPTIONS

Identification tag: (option **ST**) customer-supplied information is stamped on a stainless steel tag that is attached to the nameplate.

Multi-pin connector: Pin connectors (option **PC**) are available for rapid field installation. Meters are provided with the male half of either a micro or a mini pin connector. Check the chart below for the number of pins required for your control box selection and current type. Insert the number of pins in the code PC__ for a mini connector or PC__M for a micro connector. For example, a PC5 would be a 5 pin mini and PC5M would be a 5 pin Micro.

Fault light: (option **FL**) a red LED in the nameplate to indicate when a flow limit has been reached by internal switch contact. Helpful with multiple meters. Add to end of symbol: 1 (1 light), 2 (2 lights), A (AC), D (DC), i.e. FL2D. Only available with service option "W" weatherproof enclosures or "X" corrosive service. For optional LED colors, consult factory.

Tempered-glass window: (option **TG**) replaces the standard window. A tempered-glass window is employed where airborne solvents or high-ambient temperatures are common.

Manual override: (option **E**) provides an extended shaft you can manipulate to clear debris, simulate flow, adjust switch settings, etc. Same material as internals specified.

CE marked switches: (option **CE**) SPDT 3-wire switch for general purpose use. Standard on switches 1, 1B, 2 and 2B.

Clearance vane: (option **Z86**) the swing vane is modified to provide extra clearance for liquids that contain particulate. Available for maximum flow range of 16 GPM or greater, this reduces the turndown to a minimum of 4 GPM.

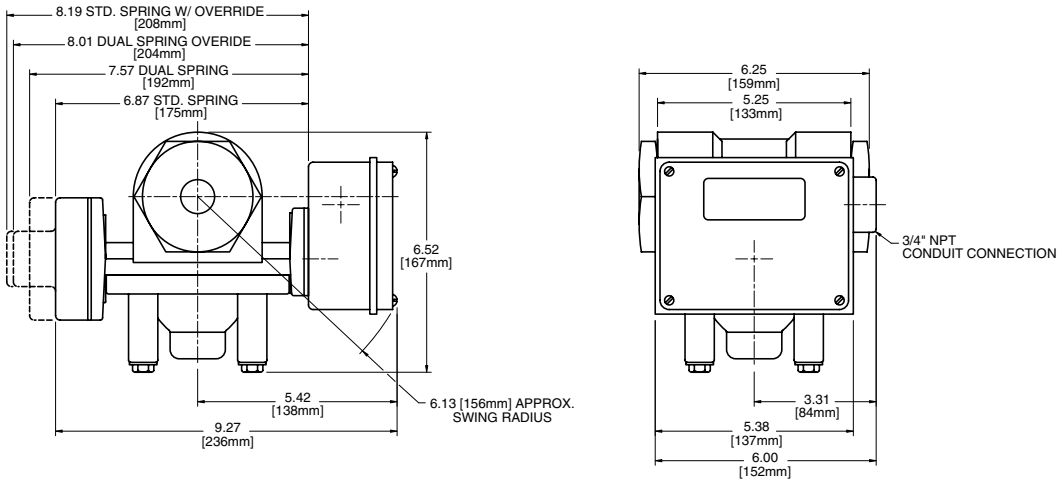
Number of pins required for various combinations of current type, box type and switch option.

	AC switch options			1, 1B, 61, 71		3		53
	DC switch options	0	1, 1B, 61, 71	3	2, 2B, 54, 62, 72		53	
Box	A		3	4	6	5	3	4
	M		3	4		5		
	R		3	4	6	5	3	4
	RT	3						
	TT	3	3	4			3	4
	TTL	3	3	4			3	4
	GTL*	5						
	GTLZ*	3						
	GP*	3						

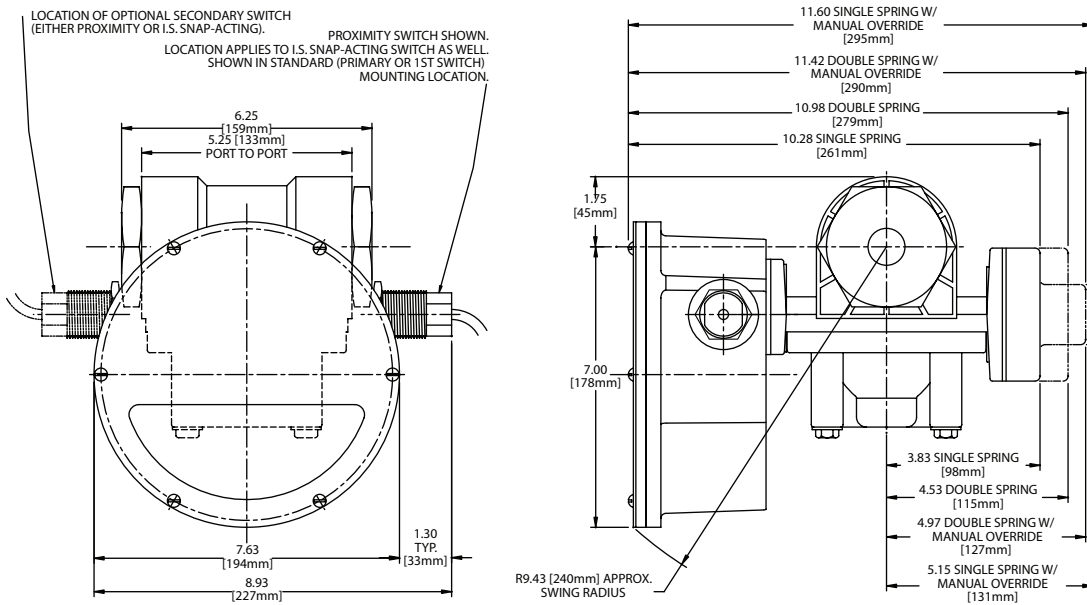
*This box allows micro pin connectors only. Eg. PC3M or PC5M.

DIMENSIONS (approximate) in inches

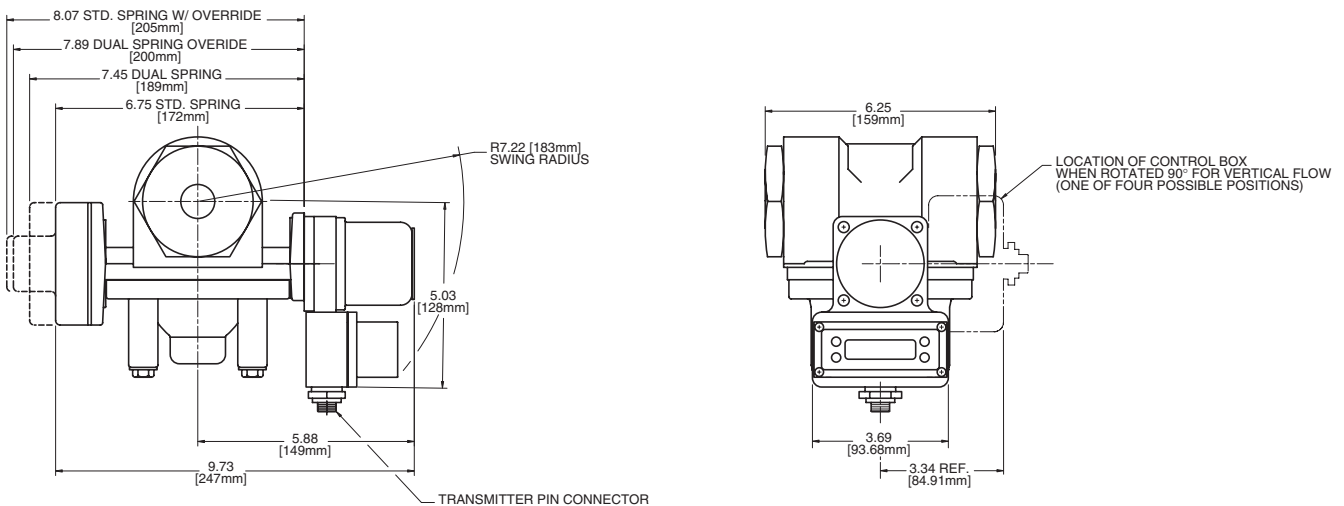
STANDARD OFFERING: Control Box "A"



SPECIAL OFFERING: Control Box "R" for Hazardous Location

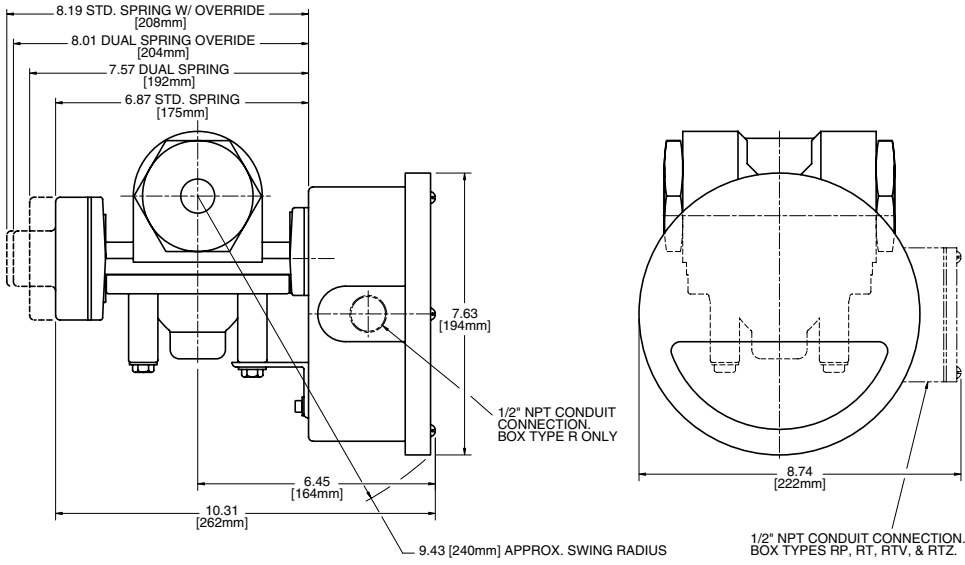


STANDARD OFFERING: Control Box "G"

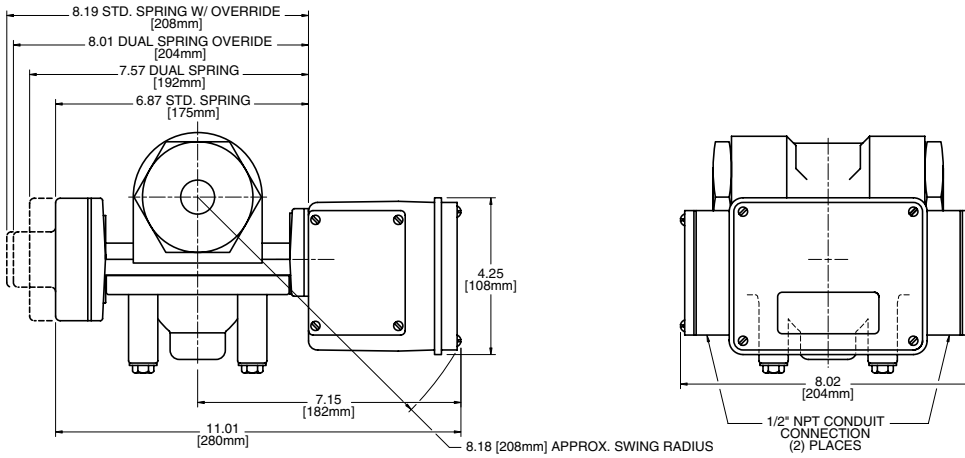


DIMENSIONS (approximate) in inches

SPECIAL OFFERING: Control Box "R"



SPECIAL OFFERING: Control Box "T"



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