



**neptune**

# TYPE S Flowmeter

3/4", 1", & 2"

MODEL 157, 600 & 800 REGISTERS



## DESCRIPTION

The Type S flowmeters utilize the nutating disc principle positive displacement measuring chamber technology. This design results in an extremely accurate flowmeter that is insensitive to small changes in viscosity and flow profile disturbances. Each flowmeter includes a base unit that houses and protects the measuring chamber and a gear train. Registers provide reset of delivery and totalization. A wide variety of digital pulse transmitters permit remote operation and monitoring.

## DESIGN FEATURES

### SUSTAINED ACCURACY

The Red Seal design nutating disc measuring chamber is both accurate and dependable. The double case feature reduces the effect of higher pressure losses in measuring viscous liquids. In addition, the disc design permits accurate measurement of liquids with suspended solid particles (up to 0.22 mm/0.009 in) without major damage or erosion to the measuring element for intermittent (i.e., batching) operations.

### FLEXIBILITY

The rugged bronze outer body components are compatible with hundreds of nonacidic liquids. Threaded end connections allow rapid conversion from right to left hand flow with provided coupling sets. Pulse transmitters, when used the BATCHMATE 1500 electronic batch controller and a solenoid valve, provide an economical and dependable local or remote batching

system.

### LONG SERVICE LIFE

Rugged construction of Type S flowmeters, along with continual design improvements, assure a system that is simple to operate and economical to use. The overall design of the Type S yields a meter with the ability to measure a wide variety of mild corrosive and erosive liquids. Furthermore, Type S flowmeters have been proven through more than 100 years of manufacturing experience.

### EASE OF MAINTENANCE

The Type S flowmeters do not require elaborate timing gears or difficult adjustment procedures to ensure proper functioning of the measuring element. Replacement of a worn or damaged measuring chamber, gear train, or register is both simple to accomplish and requires very little time.

### POSITIVE AND ACCURATE REGISTRATION

Time proven positive adjustment through Red Seal calibration change gears allows changes in increments as small as 0.15% and reduces errors caused by mechanical wear or changes in process fluid.

### ASSEMBLY OPTIONS

Normally assembled as a right hand flow: inlet on left, with outlet on right. Optional left hand flow: inlet on right, with outlet on left requires rotating the register by 180°.

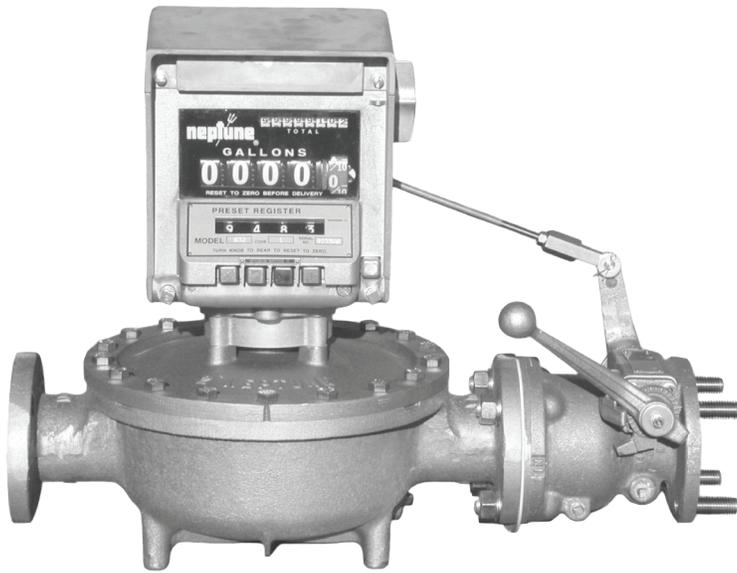
## MECHANICAL PRESET VALVES

Single and double-stage mechanical auto-stop valves are available for all 1" and 2" Type S Flowmeters. They must accompany an appropriate 800 Series mechanical preset register.

Single Trip preset valves are either fully open or fully closed. They may be specified for flow rates up to 190 LPM (50 GPM) where hydraulic shock is not a factor. Single trip valves are also used with larger flowmeters to measure liquids that have viscosities over 10,000 SSU/1400 cPs.

Double Trip preset valves permit controlled valve closing. Controlled valve closing reduces the potential for hydraulic shock on both the dispensing lines and the meter itself. Double trip valves are recommended when measuring liquids with viscosities less than 10,000 SSU/1400 cPs that have either high operating pressures or flow rates exceeding 190 LPM (50 GPM).

Preset Valves should be mounted on the meter outlet in order to keep the flowmeter full and to maintain accuracy. A fine mesh line strainer should be installed upstream of the flowmeter and valve combination. The purpose of the strainer is to prevent foreign particles from damaging both the measuring chamber in the flowmeter and the piston/cylinder assembly in the preset valve.



Type 2" Type S with 800 Series Register and Auto-Stop Valve

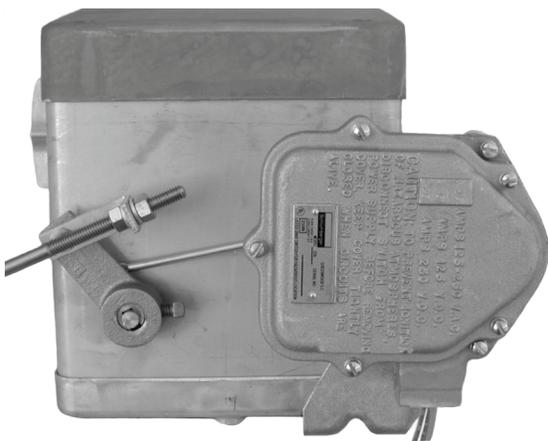
## MECHANICAL REGISTER SWITCHES

Model 23 Auto-Switches are micro switch devices that attach to 800 Series Preset Registers. They control pump and/or solenoid valves that are used in place of mechanical auto-stop valves. Upon completion of delivery, the auto-switch provides contact closures to close the valve stages and finally de-energize the pump. This orderly system shutdown reduces wear, saves energy, and alleviates hydraulic shock on the system.

Model 23A switches are Double-Pole Double-Throw (DPDT). They provide two (2) switch closures for 2-stage valve shut down, with the final closure de-energizing.

Model 23B switches are Single-Pole Double-Throw. They provide one (1) switch closure for single stage valve shut down and pump de-energizing.

Both Models 23A and 23B switches are U.L. listed for hazardous location usage Class I, Group D; at 15 amps at 125 to 250 VAC; 0.5 amps at 125 VDC; and 0.25 amps at 250 VDC.



Model 23 Auto-Switch on Back of 800 Series Preset Register

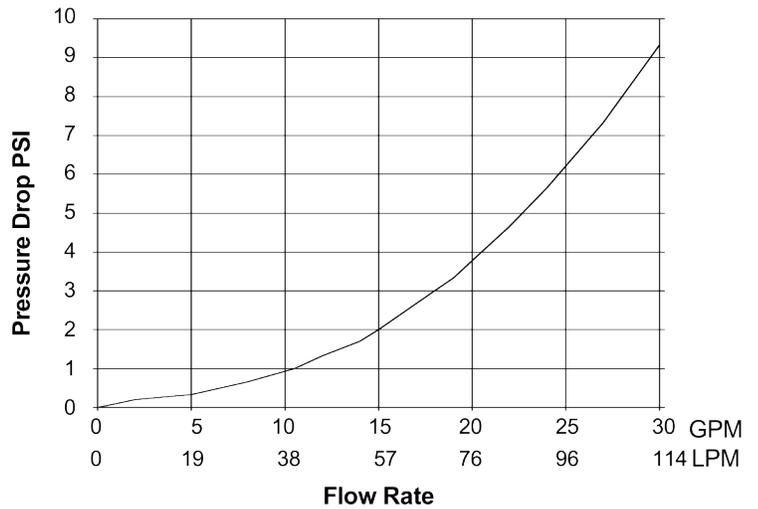
## ACCURACY

All Red Seal Type S nutating disc flowmeters are functionally tested for proper operation, verified for accuracy and calibrated to an approved unit of measure.

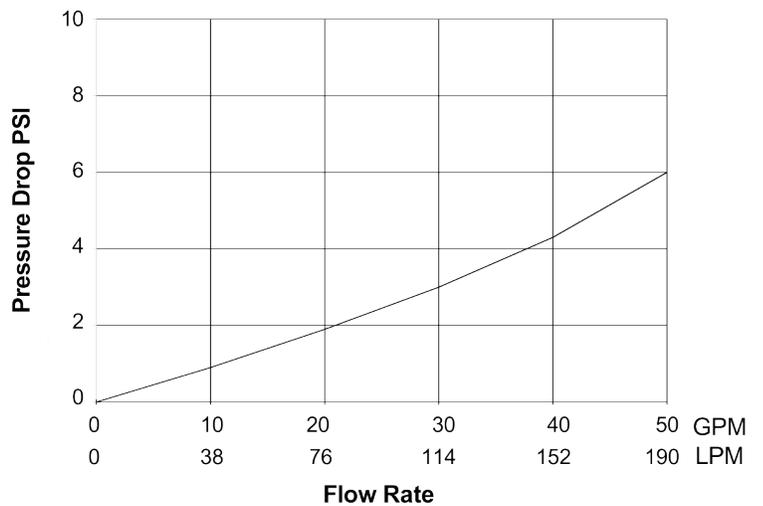
- Maximum error, based on a 10:1 turndown, shall not exceed  $\pm 1.0\%$ , as a percentage of rate for the entire flow range.
- For reduced variables, i.e.: turndown, temperatures, pressures and higher viscosities; accuracies of  $\pm 0.5\%$  or better may be obtained.
- Repeatability is 0.2%

## PRESSURE LOSS CURVES FOR WATER

### 3/4" TYPE S



### 1" TYPE S



Type S with Model 157 Register

# FLOWMETER OPERATING SPECIFICATIONS

CATEGORY		3/4" TYPE S	1" TYPE S	2" TYPE S
METER	Type of Measuring Element	Positive Displacement Double Case Nutating Disc		
	End Connections (Threaded)	3/4" External NPT	1" External NPT	Not Applicable
	End Connections (Flanged)		1 1/2", 2 bolt oval, 150# w/800 Register	2", 4 bolt round, 125#
	Temperature Rating (T Max)	121°C (250°F)		
	Pressure Rating (P max)	10.34 bar (150 psi) @ 121°C (250°F)		8.6 bar (125 psi) @ 121°C
	Pressure Rating (P min)	Dependent upon through-put, viscosity, and the torque required to drive the register		
	Flow Range (Q Max) (Q Min)	113 LPM (30 GPM) 11.3 LPM (3 GPM)	189 LPM (50 GPM) 19 LPM (5 GPM)	616 LPM (160 GPM) 62 LPM (16 GPM)
	Totalized Units	10 Litres, 10 Kilograms, 10 pounds, 1 US Gallon, or 10 US Gallons		
	Enclosure Class	Totally mechanical. If interfaced with a pulse transmitter, the rating of the device applies.		
	Power Supply	None, unless fitted with a pulse transmitter, then the rating of the installed device applies.		
	Main Body Material	Bronze (over 75% CU)		
	Main Body Cover Material	Bronze (over 75% CU)		
	Disc Piston	1" Glass Phenolic, 1 1/2" & 2" Ryton		
	Shaft Material	Stainless Steel		
	Gasket Material	Viton, Klingersil		
Type of Coupling	Mechanical			
COUNTER AND OPTIONS	Register Type	Model 157 Register <sup>1</sup> Model 600 Register <sup>2</sup>	Model 157 Register <sup>1</sup> 800 Series Register <sup>3</sup>	
	Alternate Units of Measure	Only with pulse transmitter and BATCHMATE (Batch Control Computer)		
	Auto Stop Valve	Single and Double Trip (Mechanical)		
	Switch a. Single Stage b. Double Stage	Model 23 B Model 23 A		
	Transmitter Type	Consult Form TS-510		
	Transmitter Output	Consult Form TS-510		
	Air Eliminator	Not Available		
	Strainer Size and Mesh	Recommend procure locally. Mesh dependent upon viscosity		
	Manufacturer	Red Seal Measurement		
	Model Number	TS-075	TS-100	TS-200

<sup>1</sup>Note: Non-Resettable, 7 digit Totalizer

Capacity: Totalizer 9999999

<sup>2</sup>Note: Resettable (5 digit), 8 digit Totalizer

Capacity: Totalizer 99999999: Reset 99999

<sup>3</sup>Note: Resettable (5 digit), 8 digit Totalizer

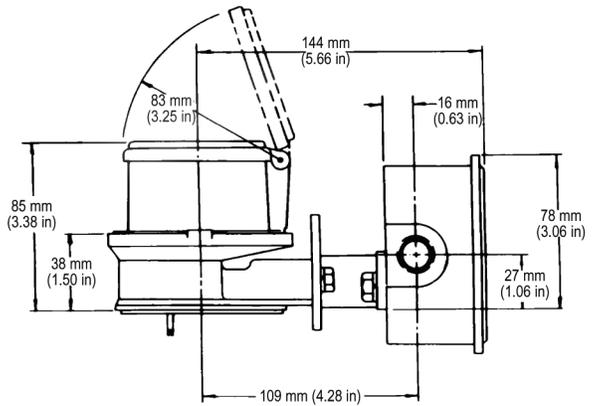
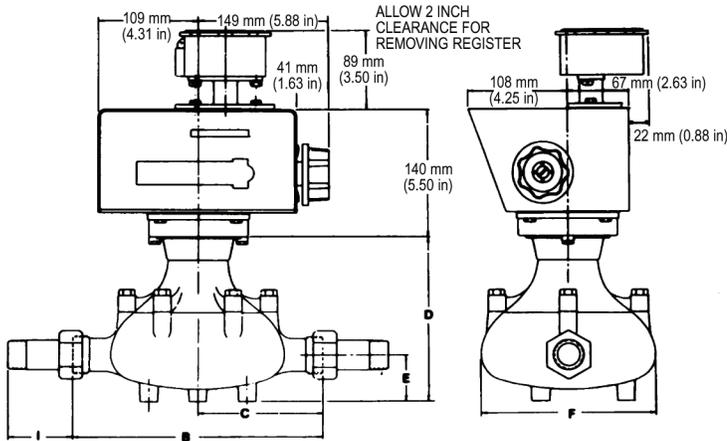
Capacity: Totalizer 99999999: Reset 99999

WEIGHT Kilograms (Pounds)	TYPE S METER SIZE	
REGISTER AND PULSE TRANSMITTER DATA	3/4"	1"
Model 157 Standard Unit	7.3 (16)	12.7 (28)
Model 157 with Dry Reed or Hall Effect Pulse Transmitter	9.1 (20)	14.5 (32)
Model 600 Standard Unit	10.9 (24)	15 (33)
Model 600 with Dry Reed or Hall Effect Pulse Transmitter	11.8 (26)	15.9 (35)

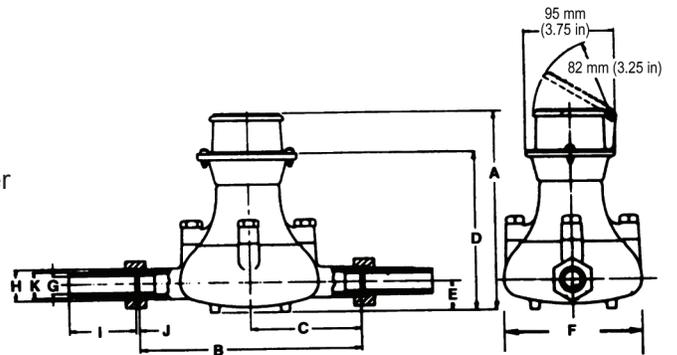
# DIMENSIONAL DATA

Model 30 Pulse Transmitter with Model 157 Register

3/4" and 1" Type S Flowmeter with Model 600 Register and Pulse Transmitter



3/4" and 1" Type S Flowmeter with Model 157 Register



**DIMENSIONS**      **Millimeters (Inches)**

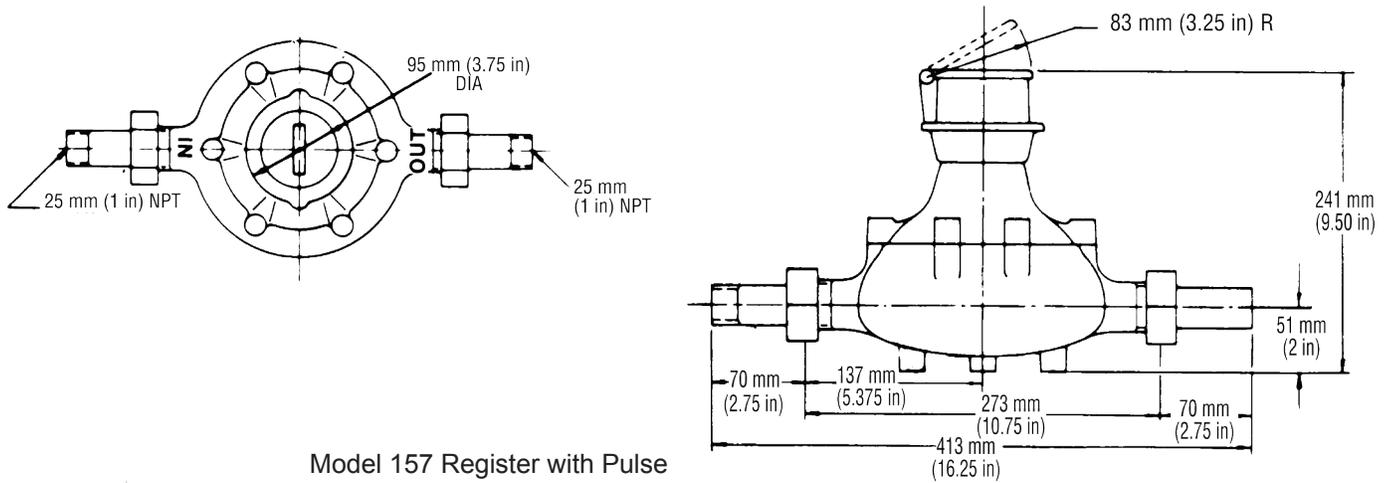
**NOTE:**      A1 = Model 157 Standard  
                   A2 = Model 157 with Model 30 Pulse Transmitter

Meter Size	A1	A2	B	C	D	E	F	G	H		I	J	K
									O.D. Inches	Threads Per inch			
3/4"	210 (8.25)	248 (9.75)	289 (9.00)	114 (4.50)	165 (6.50)	30 (1.19)	143 (5.63)	19 (0.75)	O.D.	Threads	64 (2.50)	3 (0.11)	0.75 NPT
									*	*			
1"	235 (9.25)	273 (10.75)	273 (10.75)	137 (5.38)	191 (7.50)	51 (2.00)	191 (7.50)		O.D.	Threads	67 (2.63)		* 1.0 NPT
									*	*			

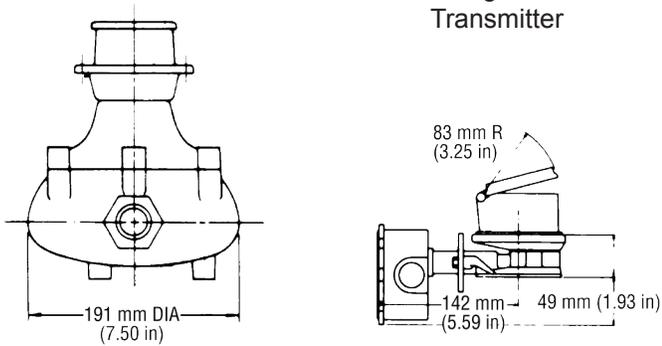
**NOTE:** Item H (Spud End Connections) on Meter Body is National Pipe Straight (NPS). Coupling Sets provided with meter are 1/2", 3/4" and 1" to fit National Pipe Tapered (NPT) threads.

# DIMENSIONAL DATA

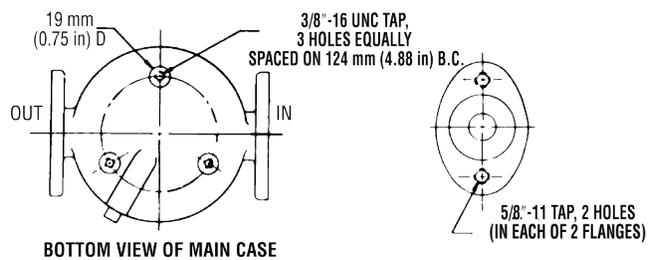
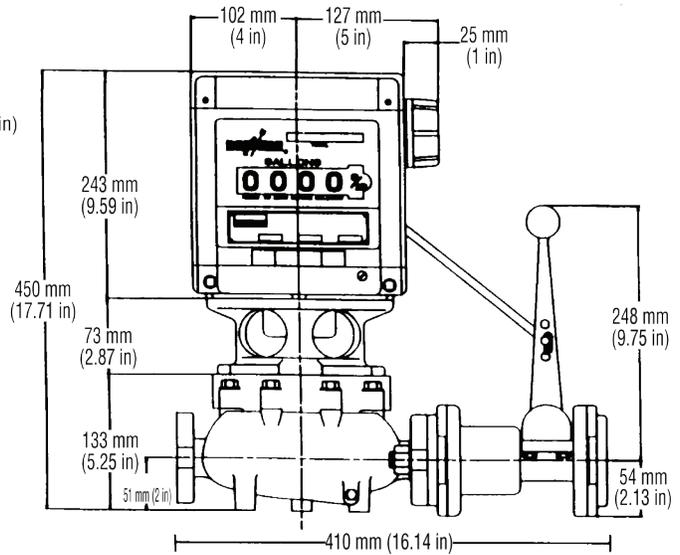
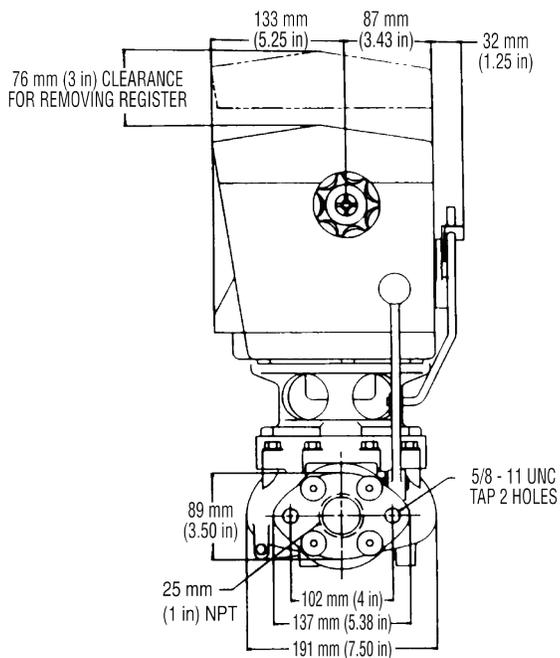
## 25 mm (1 in) Type S with Model 157 Register



## Model 157 Register with Pulse Transmitter



## 25 mm (1 in) Type S with 800 Series Register



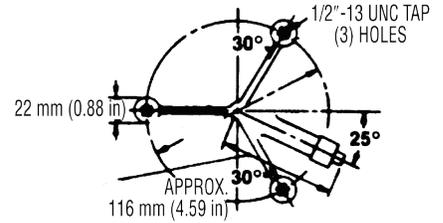
# DIMENSIONAL DATA

## DIMENSIONS - Millimeters (Inches)

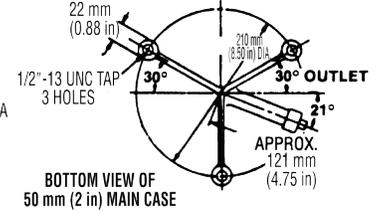
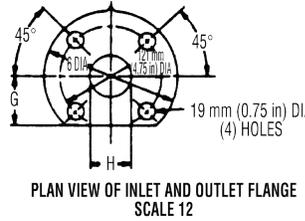
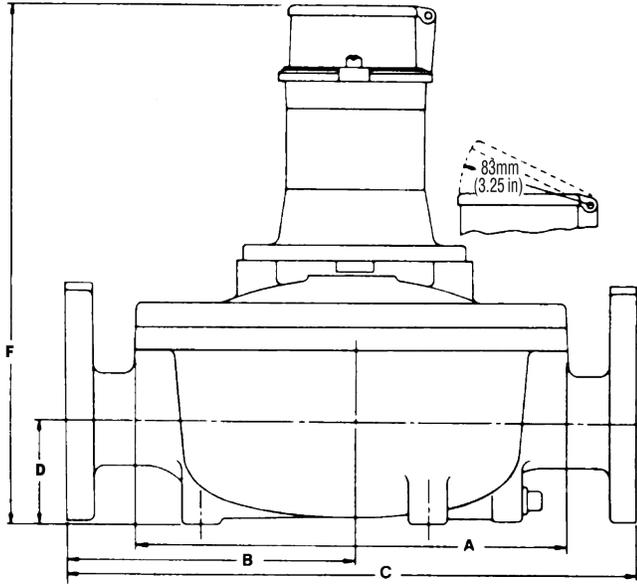
50 mm (2 in)

Type S with Model 157 Register

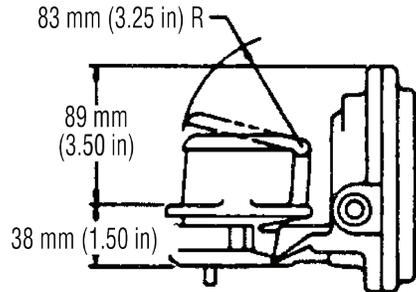
Flowmeter Size	A	B	C	D	E	F	G	H	Weight kg (lb)
50 (2)	311 (12.25)	216 (8.50)	432 (17)	91 (3.60)	--	473 (18.63)	59 (2.31)	54 (2.12)	32.7 (72)



**BOTTOM VIEW OF 38 mm (1.50 in) MAIN CASE**



**BOTTOM VIEW OF 50 mm (2 in) MAIN CASE**

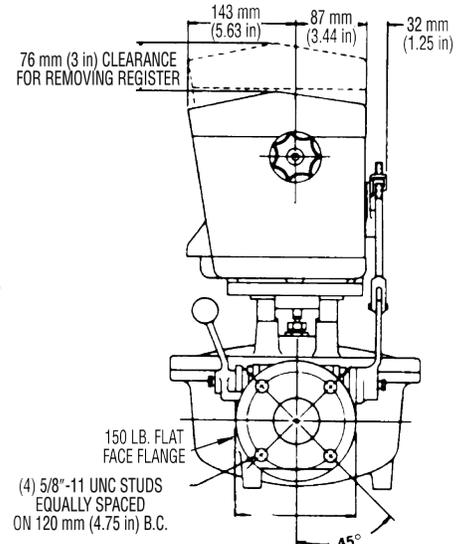
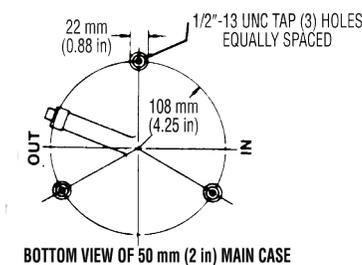
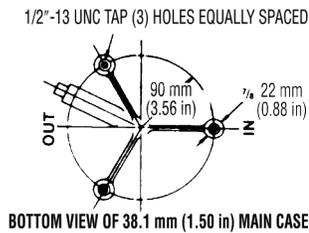
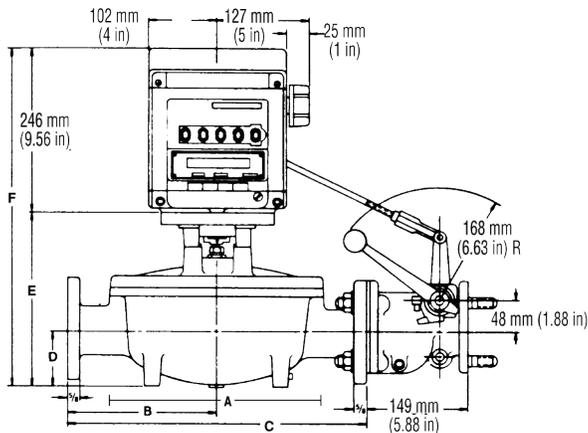
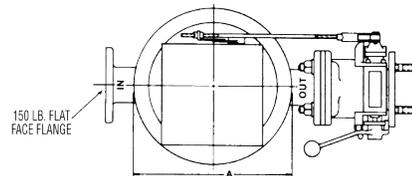


**MODEL 157 WITH IMPULSE SWITCH**

50 mm (2 in)

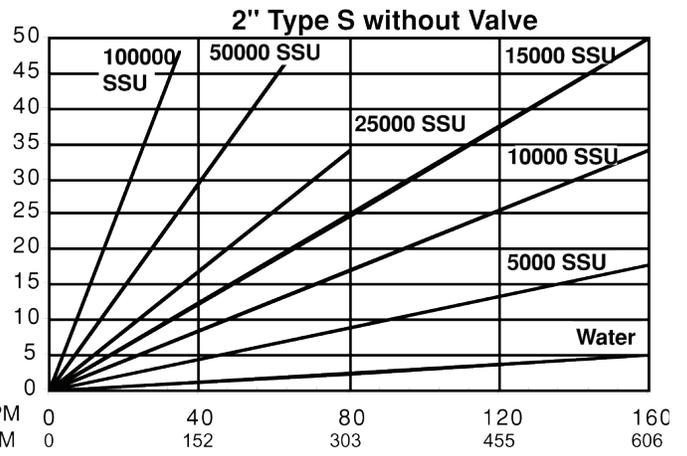
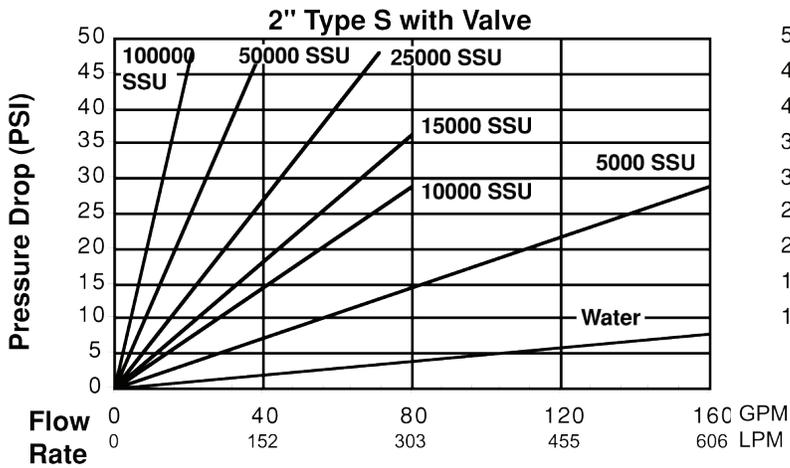
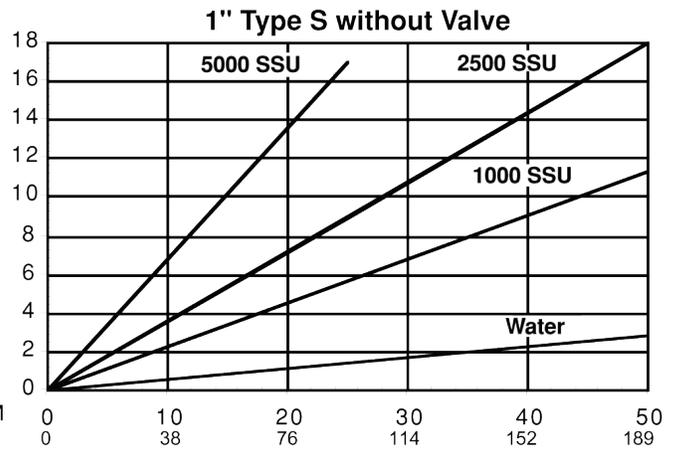
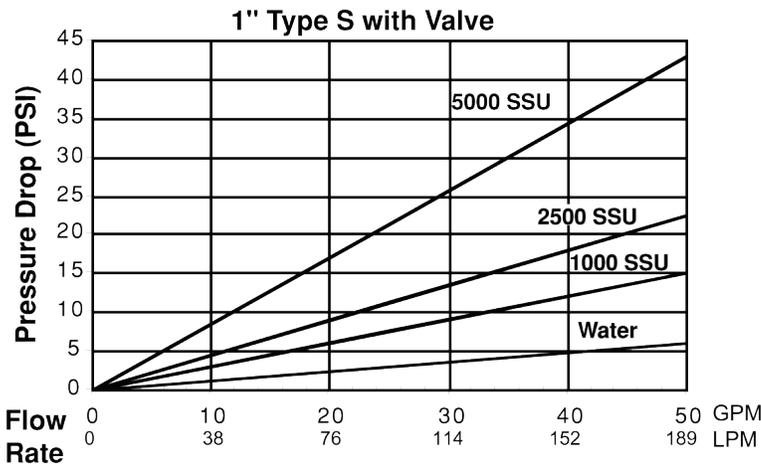
Type S with 800 Series Register

Flowmeter Size	A	B	C	D	E	F	G	H	Weight kg (lb)
50 (2)	311 (12.25)	216 (8.50)	432 (17)	91 (3.60)	232 (9.13)	480 (18.88)	59 (2.31)	54 (2.12)	55.3 (122)



# Pressure Drop Versus Flow Rate

## Pressure Drop Versus Flow Rate



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Fax: 1.864.223.0341

