

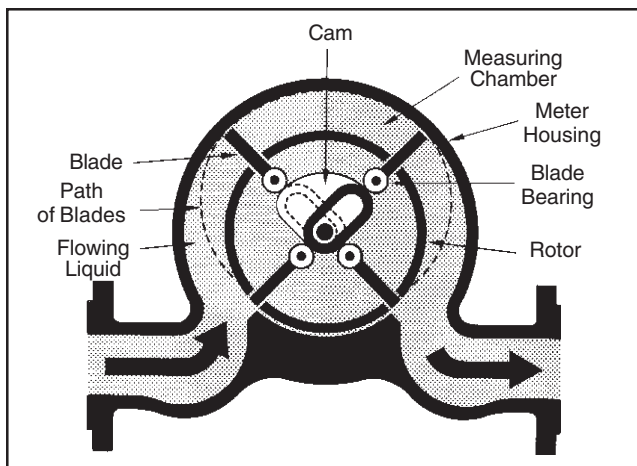
The **Smith Meter™ Aircraft Refueling Meters** are non ferrous, single case, rotary vane, positive displacement meters. They are available with a straight-through or an angle flow path, and with Victaulic, NPT, or Class 125 ANSI B16.1 flat-face flanges. Applications include: refuelers, defuelers, truck loading, and accountability of other aircraft fuel transfers.

### Features

- **Superior Accuracy** - The Smith Meter™ Rotary Vane meter principle minimizes pressure drop across the measuring chamber, which reduces flow through meter clearances to maximize accuracy.
- **Low Pressure Drop** - Streamlined flow path provides low pressure drop.
- **Positive and Accurate Registration** - High torque drive calibrator with adjustment in 0.05% increments ensures accurate registration.
- **Long Service Life** - Low friction ball bearings, fixed cam-type timing, and rugged construction give sustained accuracy and long service life.

### Principle of Operation

The rotor, which revolves on stainless steel bearings, has four evenly-spaced slots. The slots control the position of two blades that are at right angles to each other. As liquid flows through the meter, the rotor and blades revolve around a fixed cam. Ball bearings fixed to the blades roll around the cam, causing the blades to move radially. The successive movement of the blades, outward toward the case wall, forms a measuring chamber of precise volume between the blades, rotor, case wall, and the bottom of the case. Four measuring chambers



Models T-11 and T-20



Models ASD, ASF, and ASG



Models SD, SF, and SG

are produced for each revolution of the rotor, continuously and uninterrupted. Neither the blades nor the rotor contact the stationary walls of the measuring chamber.

There is an illustration of a straight-through meter on Page 1. Port location of angle meters do not change this basic principle of operation.

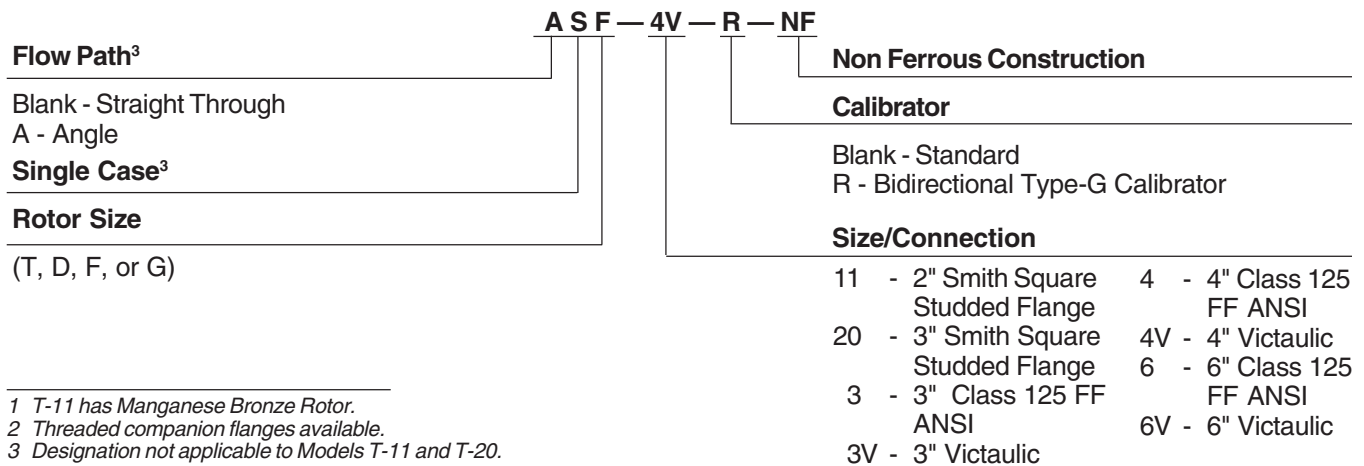
### Materials of Construction

<b>Body and Cover</b>	Hard Anodized Aluminum.
<b>Block</b>	Hard Anodized Aluminum.
<b>Rotor<sup>1</sup></b>	Aluminum.
<b>Bearings</b>	Stainless Steel.
<b>Shaft and Cam</b>	Stainless Steel.
<b>Gears</b>	(In contact with liquid) Stainless Steel.
<b>Blades</b>	Hard Anodized Aluminum/Nylon Wear Strips.
<b>Bushings</b>	Rulon (T-11, Bronze).
<b>Optional T-11 and T-20:</b>	
<b>Companion Flanges</b>	Aluminum or Manganese Bronze.

### Maximum Flow Rate

Model	Connections	Maximum Flow Rate				Net Wt. Lb (Kg.)
		USGPM	IGPM	l/min	m <sup>3</sup> /h	
T-11-NF (Angle Type)	2" Smith FF Studded Flanges <sup>2</sup>	100	85	375	23	30 (14)
T-20-NF (Angle Type)	3" Smith FF Studded Flanges <sup>2</sup>	250	210	950	57	45 (20)
SD or ASD-3-NF	3" Class 125 FF Flanges	420	350	1,600	95	75 (34)
SD or ASD-3V-NF	3" Victaulic Flanges	420	350	1,600	95	68 (31)
SD or ASD-4-NF	4" Class 125 FF Flanges	420	350	1,600	95	80 (36)
SD or ASD-4V-NF	4" Victaulic Flanges	420	350	1,600	95	70 (32)
SF or ASF-4-NF	4" Class 125 FF Flanges	800	650	3,000	180	115 (52)
SF or ASF-4V-NF	4" Victaulic Flanges	800	650	3,000	180	105 (48)
SF or ASF-6-NF	6" Class 125 FF Flanges	800	650	3,000	180	120 (54)
SF or ASF-6V-NF	6" Victaulic Flanges	800	650	3,000	180	108 (49)
SG or ASG-6-NF	6" Class 125 FF Flanges	1,200	1,000	4,600	270	160 (73)
SG or ASG-6V-NF	6" Victaulic Flanges	1,200	1,000	4,600	270	148 (67)

### Modeling



<sup>1</sup> T-11 has Manganese Bronze Rotor.  
<sup>2</sup> Threaded companion flanges available.  
<sup>3</sup> Designation not applicable to Models T-11 and T-20.

### Specifications

#### Repeatability

±0.02%

#### Temperature

##### Standard

-20°F to 150°F (-29°C to 65°C).

##### Optional

-40°F to 200°F (-40°C to 93°C). Consult factory.

#### Maximum Working Pressure

All meters 150 psig (1,034 kPa).

### Application

All meters, except T-11-NF, must be downstream of a fine mesh (e.g., 5 micron) filter.

# Dimensions

Inches (mm) **Note:** Dimensions — Inches to the nearest tenth (millimetres to the nearest whole mm), each independently dimensioned from respective engineering drawings.

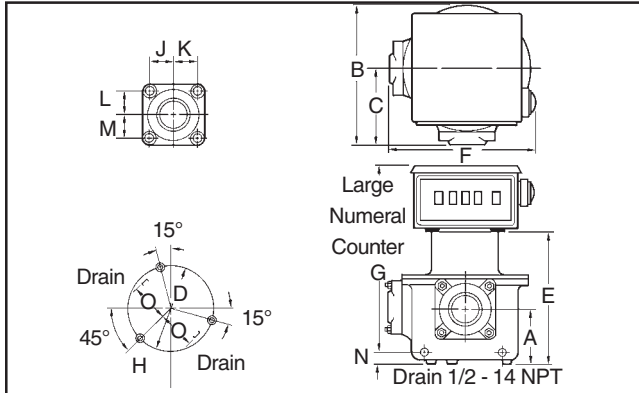


Figure 1

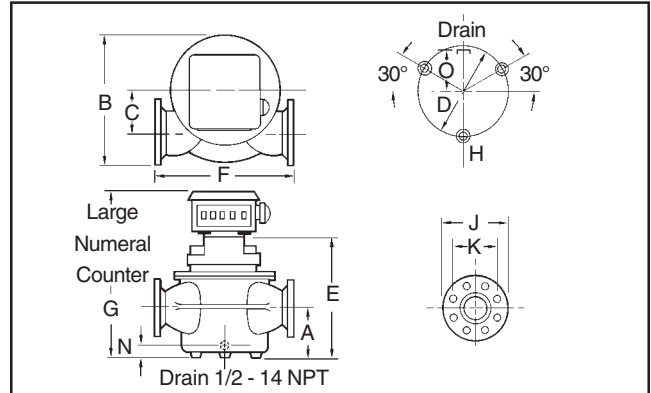


Figure 2

Figure	Model	Size	A	B	C	Anchor Bolt Circle D	E	F	G	Anchor Bolt Holes H	Flange Data				N	O
											J	K	L	M		
1	T-11-NF	2" NPT	4.1 (105)	10.3 (261)	5.6 (143)	6.6 (168)	10.8 (275)	12.2 (310)	16.8 (425)	(3) .375-16 (9.5)	1.5 (38)	1.5 (38)	1.5 (38)	1.5 (38)	.8 (21)	4 (102)
	T-20-NF	3" NPT	4.7 (119)	12.5 (318)	7.0 (178)	8.5 (216)	11.9 (302)	13.6 (345)	17.8 (452)	(3) .375-16 (9.5)	Removable, Threaded for 2" Pipe				.8 (21)	4.8 (121)
2	SD-3-NF	3"	4.9 (124)	14.2 (360)	4.4 (113)	8.1 (206)	14.0 (356)	15.5 (394)	19.9 (506)	(3) .375-16 (9.5)	7.5 (191)	6 (152)	No. of Holes & Dia. (4) .75 (19)	Bolt Dia. .625 (16)	.9 (22)	5.2 (133)
	SD-3V-NF	3"	4.9 (124)	13.4 (340)	4.4 (113)	8.1 (206)	14.0 (356)	15.5 (394)	19.9 (506)	(3) .375-16 (9.5)	3.5 (89)	—	—	—	.9 (22)	5.2 (133)
	SD-4-NF	4"	4.9 (124)	14.9 (379)	4.4 (113)	8.1 (206)	14.0 (356)	15.5 (394)	19.9 (506)	(3) .375-16 (9.5)	9.0 (229)	7.5 (191)	(8) .75 (19)	.625 (16)	.9 (22)	5.2 (133)
	SD-4V-NF	4"	4.9 (124)	13.4 (340)	4.4 (113)	8.1 (206)	14.0 (356)	15.5 (394)	19.9 (506)	(3) .375-16 (9.5)	4.5 (114)	—	—	—	.9 (22)	5.2 (133)
	SD-3R-NF	3"	4.9 (124)	14.2 (360)	4.4 (113)	8.1 (206)	14.3 (364)	15.5 (394)	20.2 (514)	(3) .375-16 (9.5)	7.5 (191)	6.0 (152)	(4) .75 (19)	.625 (16)	.9 (22)	5.2 (133)
	SD-3VR-NF	3"	4.9 (124)	13.4 (340)	4.4 (113)	8.1 (206)	14.3 (364)	15.5 (394)	20.2 (514)	(3) .375-16 (9.5)	3.5 (89)	—	—	—	.9 (22)	5.2 (133)
	SD-4R-NF	4"	4.9 (124)	14.9 (379)	4.4 (113)	8.1 (206)	14.3 (364)	15.5 (394)	20.2 (514)	(3) .375-16 (9.5)	9.0 (229)	7.5 (191)	(8) .75 (19)	.625 (16)	.9 (22)	5.2 (133)
	SD-4VR-NF	4"	4.9 (124)	13.4 (340)	4.4 (113)	8.1 (206)	14.3 (364)	15.5 (394)	20.2 (514)	(3) .375-16 (9.5)	4.5 (114)	—	—	—	.9 (22)	5.2 (133)
	SF-4-NF	4"	7.6 (193)	17.5 (445)	8.5 (140)	11.2 (286)	17.7 (449)	20.0 (508)	23.4 (600)	(3) .625-11 (16)	9.0 (229)	7.5 (191)	(8) .75 (19)	.625 (16)	1.8 (44)	4.7 (119)
	SF-4V-NF	4"	17.6 (447)	16.5 (419)	5.5 (140)	11.2 (286)	17.7 (449)	20.0 (508)	23.6 (600)	(3) .625-11 (16)	4.5 (114)	—	—	—	1.8 (44)	4.7 (119)
	SF-6-NF	6"	7.6 (193)	18.5 (470)	5.5 (140)	11.2 (286)	17.7 (449)	20.0 (508)	23.6 (600)	(3) .625-11 (16)	11.0 (279)	9.5 (241)	(8) .875 (22)	.75 (19)	1.8 (44)	4.7 (119)
	SF-6V-NF	6"	7.6 (193)	16.5 (419)	5.5 (140)	11.2 (286)	17.7 (449)	20.0 (508)	23.6 (600)	(3) .625-11 (16)	6.6 (168)	—	—	—	1.8 (44)	4.7 (119)
	SF-4R-NF	4"	7.6 (193)	17.5 (445)	5.5 (140)	11.2 (286)	18.0 (457)	20.0 (508)	23.9 (608)	(3) .625-11 (16)	9.0 (229)	7.5 (191)	(8) .75 (19)	.625 (16)	1.8 (44)	4.7 (119)
	SF-4VR-NF	4"	7.6 (193)	16.5 (419)	5.5 (140)	11.2 (286)	18.0 (457)	20.0 (508)	23.9 (608)	(3) .625-11 (16)	4.5 (114)	—	—	—	1.8 (44)	4.7 (119)
	SF-6R-NF	6"	7.6 (193)	18.5 (470)	5.5 (140)	11.2 (286)	18.0 (457)	20.0 (508)	23.9 (608)	(3) .625-11 (16)	11.0 (279)	9.5 (241)	(8) .875 (22)	.75 (19)	1.8 (44)	4.7 (119)
	SF-6VR-NF	6"	7.6 (193)	16.5 (419)	5.5 (140)	11.2 (286)	18.0 (457)	20.0 (508)	23.9 (608)	(3) .625-11 (16)	6.625 (168)	—	—	—	1.8 (44)	4.7 (119)

(Continued on next page.)

# Dimensions

Inches (mm) (continued)

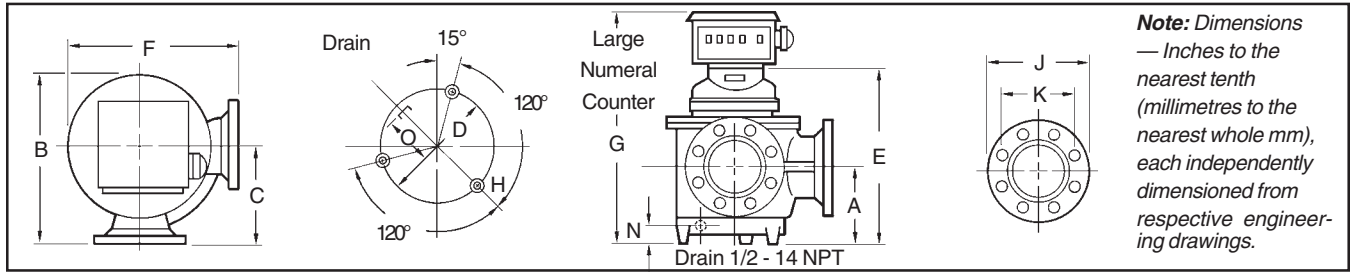
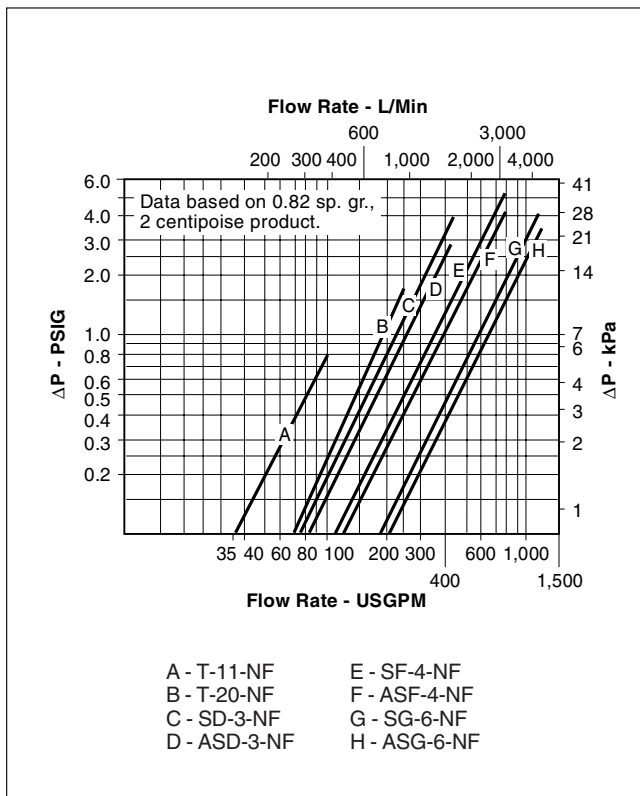


Figure 3

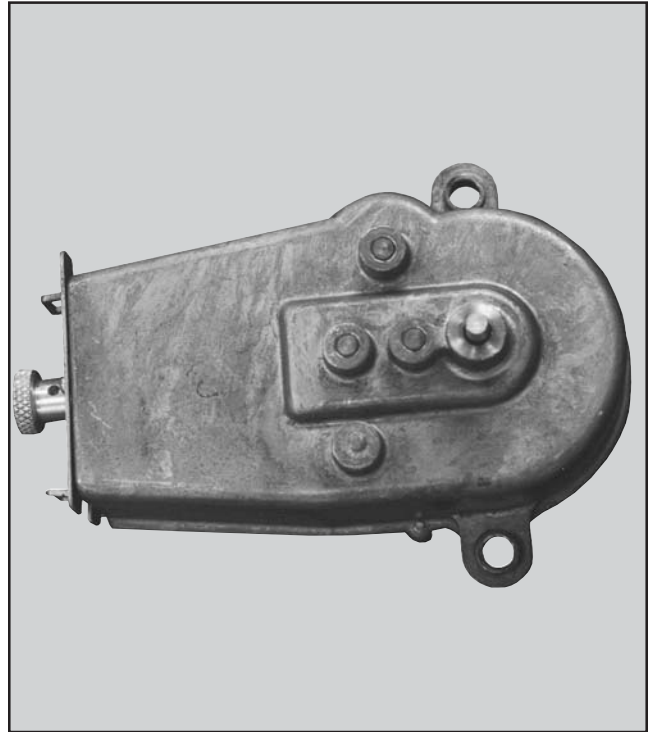
Figure	Model	Size	A	B	C	Anchor Bolt Circle D	E	F	G	Anchor Bolt Holes H	Flange Data				N	O
											J	K	L	M		
2	SG-6-NF	6"	9.2 (235)	20.1 (510)	5.8 (148)	12.8 (324)	20.4 (519)	23.0 (584)	26.4 (670)	(3) .75-10 (19)	11.0 (279)	9.5 (241)	(8) .875 (22)	.75 (19)	2.4 (60)	5.4 (138)
	SG-6V-NF	6"	9.2 (235)	19.8 (502)	5.8 (148)	12.8 (324)	20.4 (519)	23.0 (584)	26.4 (670)	(3) .75-10 (19)	6.625 (168)	—	—	—	2.4 (60)	5.4 (138)
	SG-6R-NF	6"	9.2 (235)	20.1 (510)	5.8 (148)	12.8 (324)	20.8 (527)	23.0 (584)	26.7 (678)	(3) .75-10 (19)	11.0 (279)	9.5 (241)	(8) .875 (22)	.75 (19)	2.4 (60)	5.4 (138)
	SG-6VR-NF	6"	9.2 (235)	19.8 (502)	5.8 (148)	12.8 (324)	20.8 (527)	23.0 (584)	26.7 (678)	(3) .75-10 (19)	6.6 (168)	—	—	—	2.4 (60)	5.4 (138)
	ASD-3-NF	3"	4.9 (124)	14.1 (359)	8.1 (206)	8.1 (206)	14.0 (356)	14.1 (359)	19.9 (506)	(3) .375-16 (9.5)	7.5 (191)	6.0 (152)	(4) .75 (19)	.625 (16)	.9 (22)	5.2 (133)
3	ASD-3V-NF	3"	4.9 (124)	14.1 (359)	8.1 (206)	8.1 (206)	14.0 (356)	14.1 (359)	19.9 (506)	(3) .375-16 (9.5)	3.5 (89)	—	—	—	.9 (22)	5.2 (133)
	ASD-4-NF	4"	4.9 (124)	14.1 (359)	8.1 (206)	8.1 (206)	14.0 (356)	14.1 (359)	19.9 (506)	(3) .375-16 (9.5)	9.0 (229)	7.5 (191)	(8) .75 (19)	.625 (16)	.9 (22)	5.2 (133)
	ASD-4V-NF	4"	4.9 (124)	14.1 (359)	8.1 (206)	8.1 (206)	14.0 (356)	14.1 (359)	19.9 (506)	(3) .375-16 (9.5)	4.5 (114)	—	—	—	.9 (22)	5.2 (133)
	ASD-3R-NF	3"	4.9 (124)	14.1 (359)	8.1 (206)	8.1 (206)	14.3 (364)	14.1 (359)	20.2 (514)	(3) .375-16 (9.5)	7.5 (191)	6.0 (152)	(4) .75 (19)	.625 (16)	.9 (22)	5.2 (133)
	ASD-3VR-NF	3"	4.9 (124)	14.1 (359)	8.1 (206)	8.1 (206)	14.3 (364)	14.1 (359)	20.2 (514)	(3) .375-16 (9.5)	3.5 (89)	—	—	—	.9 (22)	5.2 (133)
	ASD-4R-NF	4"	4.9 (124)	14.1 (359)	8.1 (206)	8.1 (206)	14.3 (364)	14.1 (359)	20.2 (514)	(3) .375-16 (9.5)	9 (229)	7.5 (191)	(8) .75 (19)	.625 (16)	.9 (22)	5.2 (133)
	ASD-4VR-NF	4"	4.9 (124)	14.1 (359)	8.1 (206)	8.1 (206)	14.3 (364)	14.1 (359)	20.2 (514)	(3) .375-16 (9.5)	4.5 (114)	—	—	—	.9 (22)	5.2 (133)
	ASF-4-NF	4"	7.6 (193)	17.5 (445)	10.5 (267)	11.2 (286)	17.7 (449)	7.5 (445)	23.6 (600)	(3) .625-11 (16)	9.0 (229)	7.5 (191)	(8) .75 (19)	.625 (16)	1.8 (44)	4.7 (119)
	ASF-4V-NF	4"	7.6 (193)	17.5 (445)	10.5 (267)	11.2 (286)	17.7 (449)	17.5 (445)	23.6 (600)	(3) .625-11 (16)	4.5 (114)	—	—	—	1.8 (44)	4.7 (119)
	ASF-6-NF	6"	7.6 (193)	17.5 (445)	10.5 (267)	11.2 (286)	17.7 (449)	17.5 (445)	23.6 (600)	(3) .625-11 (16)	11.0 (279)	9.0 (229)	(8) .875 (22)	.75 (19)	1.8 (44)	4.7 (119)
	ASF-6V-NF	6"	7.6 (193)	17.5 (445)	10.5 (267)	11.2 (286)	17.7 (449)	17.5 (445)	23.6 (600)	(3) .625-11 (16)	6.625 (168)	—	—	—	1.8 (44)	4.7 (119)
	ASF-4R-NF	4"	7.6 (193)	17.5 (445)	10.5 (267)	11.2 (286)	18.0 (457)	17.5 (445)	23.9 (608)	(3) .625-11 (16)	9.0 (229)	7.5 (191)	(8) .75 (19)	.625 (16)	1.8 (44)	4.7 (119)
	ASF-4VR-NF	4"	7.6 (193)	17.5 (445)	10.5 (267)	11.2 (286)	18.0 (457)	17.5 (445)	23.9 (608)	(3) .625-11 (16)	4.5 (114)	—	—	—	1.8 (44)	4.7 (119)
	ASF-6R-NF	6"	7.6 (193)	17.5 (445)	10.5 (267)	11.2 (286)	18.0 (457)	17.5 (445)	23.9 (608)	(3) .625-11 (16)	11.0 (279)	9.0 (229)	(8) .875 (22)	.75 (19)	1.8 (44)	4.7 (119)
	ASF-6VR-NF	6"	7.6 (193)	17.5 (445)	10.5 (267)	11.2 (286)	18.0 (457)	17.5 (445)	23.9 (608)	(3) .625-11 (16)	6.625 (168)	—	—	—	1.8 (44)	4.7 (119)
	ASG-6-NF	6"	9.2 (235)	20.2 (514)	11.5 (292)	12.8 (324)	20.4 (519)	20.2 (514)	26.4 (670)	(3) .75-10 (19)	11.0 (279)	9.0 (229)	(8) .875 (22)	.75 (19)	2.4 (60)	5.4 (138)
	ASG-6V-NF	6"	9.2 (235)	20.2 (514)	11.5 (292)	12.8 (324)	20.4 (519)	20.2 (514)	26.4 (670)	(3) .75-10 (19)	6.625 (168)	—	—	—	2.4 (60)	5.4 (138)
	ASG-6R-NF	6"	9.2 (235)	20.2 (514)	11.5 (292)	12.8 (324)	20.8 (527)	20.2 (514)	26.7 (678)	(3) .75-10 (19)	11.0 (279)	9.0 (229)	(8) .875 (22)	.75 (19)	2.4 (60)	5.4 (138)
	ASG-6VR-NF	6"	9.2 (235)	20.2 (514)	11.5 (292)	12.8 (324)	20.8 (527)	20.2 (514)	26.7 (678)	(3) .75-10 (19)	6.625 (168)	—	—	—	2.4 (60)	5.4 (138)

## Pressure Drop ( $\Delta P$ )



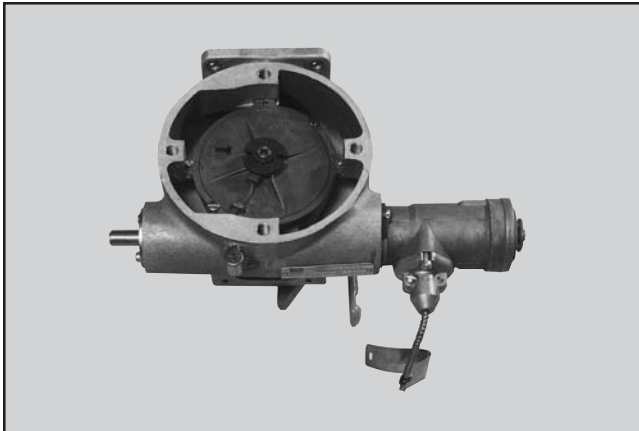
## G-Type Reversing Calibrator

Allows bidirectional registration on mechanical counters (reference Bulletin SS01035).



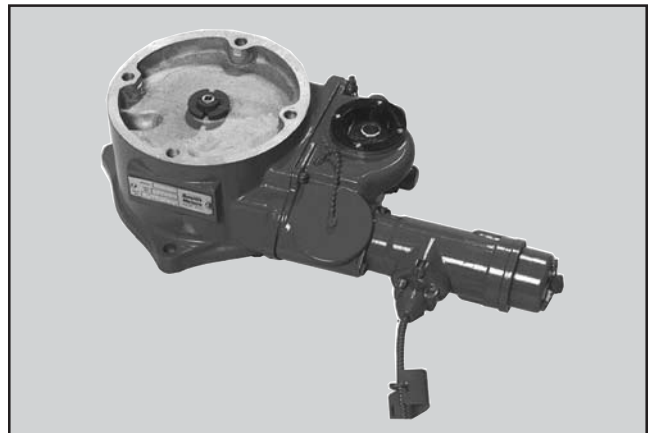
## ATC Mechanical Temperature Compensator<sup>4</sup>

Provides volume registration at a reference temperature (net volume). The compensator is factory set for a specific product's coefficient of expansion (reference Bulletin SS01038).



## ATG Mechanical Temperature Compensator<sup>4</sup>

Provides bidirectional net volume registration and is field adjustable for different products (reference Bulletin SS01037).



<sup>4</sup> Thermowell Adapter (316 SS) required with ATC or ATG Calibrators.

## ***Purchasing Specification***

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Meter shall be of the positive displacement, rotary vane type with undisturbed flow passages to provide low pressure drop. The rotor shall revolve on low friction stainless steel ball bearings and have four blades that extend into the measurement chamber. The blades should be of ample area with a long moment arm to provide high driving torque at low flow rates and should be guided by a fixed cam arrangement. Neither the blades nor the rotor should contact the stationary wall of the measurement chamber.

Revisions included in SS01009 Issue/Rev. 0.3 (6/02):  
Page 2 : Added repeatability  $\pm 0.02\%$ .

The specifications contained herein are subject to change without notice and any user of said specifications should verify from the manufacturer that the specifications are currently in effect. Otherwise, the manufacturer assumes no responsibility for the use of specifications which may have been changed and are no longer in effect.

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### ***Gas Measurement Products:***

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**Thetford, England** Phone (44) 1842-82-2900  
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