

Vertarator 500™ Variable Area Armored Through-flow Rotameter with Optional Electronic or Pneumatic Transmission

Type 10A5000

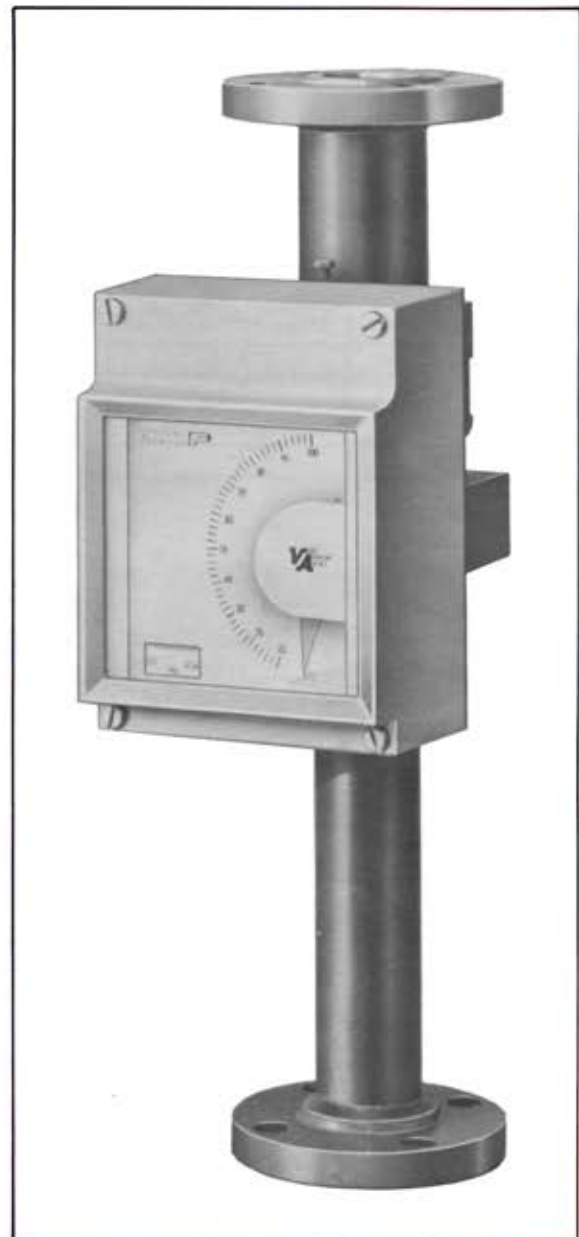
The *Vertarator 500* is an all metal through flow type *VIA* flowmeter designed to measure the flow rate of liquids, vapors or gases. The most modern instruments of their kind, the *Vertarator 500* meters are engineered to meet today's requirements for accuracy, reliability, economy and ease of maintenance.

The 10A5000 series of *VIA* meters consists of a number of metal metering tubes and floats, with a wide selection of float-weights for an exceptional choice of readily available capacities. The metering float is magnetically coupled to an indicator, an indicator with alarms or an indicator with pneumatic or electronic transmission.

The special design of the magnetic coupling assures easy calibration, having span, zero and linearity adjustments which have minimum interaction.

DESIGN FEATURES

- Straight through design eliminates elbows and recessed or stagnant areas.
- Completely protected lower float rod eliminates need for spool piece.
- Removable float stops can be replaced alone without replacing the entire meter body.
- Heavy gauge float stops prevent damage which might be caused by flow surges.
- All transmitters can be interchanged with any tube size without the need of special input discs or difficult alignment procedures.
- Easy to read vertical, linear, 150 mm long scales.
- Spiral upper guide rods on gas service floats dampen float bounce at low pressure operation and eliminate need for special piping configurations.
- Spacer gauges supplied to allow calibration of meters in place. No need to remove meters to the instrument shop for use of the calibration fixture.



ENGINEERING SPECIFICATIONS

Accuracy: (\pm % of full scale)

Calibration Type	Indicator Only	Indicating Transmitter	
		Output Signal	Indicator Scale
Standard (Fluid Calibration)	1%	1%	1.6%
Optional (Dry Calibration)	2%	2%	2.5%

Accuracy includes effects of conformity, hysteresis, deadband and repeatability.

Range: 10:1

Scale: 6" (150 mm) vertically arranged on a 170° arc. Graduated in percent of full scale (10-100%) or direct reading units.

Mounting: Pipe mounted in line.

Connections: Vertical flanged. Standard—ANSI B16.5; Class 150 RF, ANSI B16.5; Class 300 RF

NOTE: For other flange facings and/or ratings consult factory.

Tube Size	Flange Size	
	Standard Meter	Steam Jacketed Meter
½", ¾", 1"	1"	2"
1½"	1½"	2½"
2"	2"	3"
3"	3"	4"

Materials of Construction

Wetted Parts

Tubes and Floats

Standard: 316 sst

Optional: 316 L sst, Hastelloy C', Alloy 20

Fittings

Standard: 316 sst or carbon steel with integral flanges.

Optional: 316L sst with integral flanges, Hastelloy C' or Alloy 20 with steel or 316 sst loose backing flanges.

Steam Jacket: 316 sst

Non-Wetted Parts

Instrument Case: Die cast aluminum with Buna "N" O-ring seal and glass window.

Housing Protection: Weathertight construction NEMA type 3R/IEC Type IP25

Unit Weight		Standard Meter				Steam Jacketed Meter			
		Connection Size				Connection Size			
		1	1½	2	3	2	2½	3	4"
ANSI Class 150 RF	Lbs.	19	25	34	88	60	68	121	*
	Kg	8.6	11.3	15.4	40	27	31	55	*
ANSI Class 300 RF	Lbs.	20	28	36	93	*	*	*	*
	Kg	9.1	12.7	16.3	42	*	*	*	*

NOTE: Add 2 Lbs. to Pneumatic Transmitter if filter regulator and gauges supplied.

*Consult Factory

1. TM Cabot Corp.

Operational Limits

Pressure

Temperature °F (°C)	Pressure Rating psig (MPa ga)			
	150 ANSI		300 ANSI	
	316 sst or steel	316 L sst	316 sst or steel	316 L sst
100 (38)	275 (1.90)	230 (1.59)	720 (4.96)	600 (4.14)
200 (93)	240 (1.66)	195 (1.34)	620 (4.28)	505 (3.48)
300 (149)	215 (1.48)	175 (1.21)	560 (3.86)	455 (3.14)
400 (240)	195 (1.35)	160 (1.10)	515 (3.55)	415 (2.86)
500 (260)	170 (1.17)	145 (1.00)	480 (3.31)	380 (2.62)
600 (316)	140 (0.96)	140 (0.96)	450 (3.11)	360 (2.48)

Temperature

	Indicator	Pneumatic Transmitter	Electronic Transmitter
Ambient	-40 to +150°F (-40 to 66°C)	-40 to +150°F (-40 to 66°C)	-40 to +150°F (-40 to 66°C)
Process Fluid	32 to 600°F (0 to 315°C)	32 to 600°F (0 to 315°C)	32 to 400°F (0 to 204°C)

INDICATOR SPECIFICATIONS

Flow Indicator—Model 10A5001

Input: Movement of float as flow occurs.

Repeatability: \pm 0.3% of maximum flow rate.

Speed of Response: <1 sec for 10 to 90% step change.

Flow Indicator with Alarm—Model 10A5002

Alarm: Slot initiator type with one or two units.

Input: Rotating disc on pointer assembly.

Contact Point: Adjustable 0-100%—both units.

Explosion-proof: Intrinsically safe loop capability.

Contact Rating: 4 A, 250 V

Output: SPDT relay—single alarm*; 2 SPDT relays—dual alarm*

Repeatability: <0.5% of full scale.

*DPDT relay output available on special order, consult Factory for details.

Flow Indicator with Pneumatic Transmitter—Model 10A5003

Input: Rotating disc on pointer assembly, 170° scale.

Speed of Response: 1.3s for 10-90% step change.

Output: 3-15 psig (20-100 kPa ga)

Output signal drops below 3 psig (20 kPa ga) when flow drops below 5% (approximately) full scale.

Air Supply: 20 \pm 2 psig (140 \pm 14 kPa ga)

Supply Press Effects: < \pm 0.25% full scale for \pm 2 psig (\pm 14 kPa ga) change.

Air Consumption: 15 scfh (0.42 m³/h) max.

Output and Supply Gauges (with or without regulator): Optional extra.

**Flow Indicator with Electronic Transmitter—
Model 10A5004**

Input: Rotating indicator disc, 170° scale.
Speed of Response: <1s for 10-90% step change.
Output: 4-20 mA dc
 Output signal drops below 4 mA (to 0 mA) when flow drops below 5% (approximately) full scale.

Electrical Connection: ½" NPT (internal) thread
Minimum Load: No limitation.
Max. Load (ohms): $\frac{\text{Supply Voltage} - 12 \text{ Volts}}{0.02}$
Max. Supply Voltage: 49 V dc
FM Approval: Applied for.

MODEL NUMBER DESIGNATION

10A500

<p>Function Reserved for specials and series Indicator only Indicator with single or double alarm Indicator with pneumatic transmitter Indicator with electronic transmitter</p> <hr/> <p>Output signal and function Reserved for specials and series Basic Indicator</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th style="width: 15%;">Alarm</th> <th colspan="2">Transmitter Output</th> </tr> <tr> <th style="text-align: left;">Unit†</th> <th style="text-align: center;">pneumatic††</th> <th style="text-align: center;">electronic†††</th> </tr> <tr> <td style="text-align: left;">one</td> <td style="text-align: center;">3 to 15 psig</td> <td style="text-align: center;">4 to 20 mA d.c.</td> </tr> <tr> <td style="text-align: left;">two</td> <td colspan="2"></td> </tr> <tr> <td></td> <td style="text-align: center;">20 to 100 kPa ga</td> <td></td> </tr> </table> <p style="font-size: small; margin-top: 10px;"> †Only available with option 2 above. ††Only available with option 3 above. †††Only available with option 4 above. </p>	Alarm	Transmitter Output		Unit†	pneumatic††	electronic†††	one	3 to 15 psig	4 to 20 mA d.c.	two				20 to 100 kPa ga		 	↑ 0 1 2 3 4 A X B C E A A B C D E F M G H J K L N A B C
Alarm	Transmitter Output																
Unit†	pneumatic††	electronic†††															
one	3 to 15 psig	4 to 20 mA d.c.															
two																	
	20 to 100 kPa ga																

Design level, letter assigned by F&P

Meter size/Connection size
Reserved for specials

Standard meters

Meter size	Tube size	ANSI flanges
1"	½"	1"
1"	¾"	1"
1"	1"	1"
1½"	1½"	1½"
2"	2"	2"
3"	3"	3"

Steam jacketed meter

Meter size	Tube size	ANSI flanges
1"	½"	2"
1"	¾"	2"
1"	1"	2"
1½"	1½"	2½"
2"	2"	3"
3"	3"	4"

Flange type and rating
Reserved for specials and series
150 ANSI, RF
300 ANSI, RF

CAPACITIES

Tube Size	Metering Tube	Float Type Add (G) For Gas	Maximum Capacities				ΔP Factor ²	VIC ¹ Liquid only	Min. psig ³ gas only	
			Water		Air @ 14.7 psia & 70 °F					
			gpm	Lpm	scfm	std m ³ /h				
1/2"	FP-1/2-07-M-5	SVR(G)	0.66	2.5	2.75	4.67	3927	17.3	25	
			0.69-0.92	2.61-3.48	2.88-3.87	4.89-6.57	3600	2.4	25	
		NSVR(G)	0.93	3.52	3.88	6.59	1800	0.98	25	
	FP-1/2-13-M-5		0.99-1.37	3.75-5.18	4.11-5.71	6.98-9.70	1830	0.8	25	
		SVR(G)	1.29	4.88	5.36	9.11	1141	9.3	25	
			1.40-1.89	5.30-7.15	5.84-7.88	9.92-13.4	1033	2.12	25	
	FP-1/2-20-M-5	NSVR(G)	1.81	6.85	7.55	12.8	507	0.92	25	
			2.10-2.33	7.95-8.82	8.76-9.70	14.9-16.5	460	0.48	25	
		SVR(G)	1.97	7.47	8.22	13.96	467	6.0	10	
	FP-1/2-26-M-5		2.05-2.53	7.76-9.58	8.54-10.5	14.5-17.9	352	1.27	10	
		NSVR(G)	2.54-2.87	9.62-10.9	10.6-12.0	18.0-20.3	380	0.24	10	
		SVR(G)	2.90	11.0	12.09	20.5	216	3.9	10	
3/4"	FP-3/4-25-M-5		3.02-4.15	11.4-15.7	12.6-17.3	21.4-29.4	201	0.72	10	
		SVR(G)	4.63	17.5	19.41	33.0	53	2.5	10	
			4.91-5.47	18.6-20.7	20.55-22.84	34.9-38.8	48.1	1.64	10	
	FP-3/4-35-M-5	SVR(G)	5.50-7.60	20.8-28.8	22.98-31.81	39.0-54.0	41.6	0.54	10	
			7.60-10.9	28.8-41.3	31.8-45.2	54.0-76.8	23.5	1.25	10	
		SVR(G)	11.0-14.4	41.6-54.5	45.2-59.8	71.0-102	18.1	0.4	10	
	1"	FP-1-35-M-5		10.3	39.0	43.1	73.2	13.2	1.93	0
			SVR(G)	12.7-16.9	48.1-64.0	53-70.1	90.0-119	12.8	1.00	0
				17.0-21.3	64.4-80.6	70.2-90.1	119.2-153	11.1	0.31	0
		FP-1-29-M-5	NSVR(G)	18.9	71.5	79	134	9.2	0.05	0
				21.7-33.0	82.2-124.9	90.1-137.6	153-233.7	8.6	0.05	0
			SVR(G)	19.0	71.9	79.0	134	4.8	1.50	0
1 1/2"		FP-1 1/2-29-M-5		22.5-26.1	85.2-98.8	93.7-108	159-183	4.1	0.80	0
			SVR(G)	26.8-32.3	101-122	111-134	189-222	3.7	0.3	0
				32.7	124	136	231	2.4	0.05	0
		FP-1 1/2-35-M-5	NSVR(G)	42.0-49.7	159-188	196-206	333-350	2.3	0.05	0
				27.5	104	114	194	2.88	1.33	0
			SVR(G)	33.0-47.3	125-179	137-196	233-333	2.56	0.67	0
	FP-2-35-M-5	NSVR(G)	42.8	162	178	302	1.88	0.05	0	
			51.8-71.9	196-272	215-298	365-506	1.78	0.05	0	
		SVR(G)	50.6-83.5	192-316	210-345	357-586	.84	0.50	0	
	FP-3-35-M-5	NSVR(G)	71.8	272	298	506	0.60	.035	0	
			85.5-134	324-507	354-552	601-937	0.52	.035	0	
		SVR(G)	130-190	492-719	541-790	919-1341	.74	.30	0	
3"	NSVR(G)	182	689	757	1285	.40	.03	0		
		192-300	727-1136	799-1248	1357-2119	.45	.03	0		

NOTES:

- V.I.C. = Viscosity Immunity Ceiling—Maximum allowable centipoise for which sizing procedure and standard scales are valid.

$$VIC = (\text{gpm water equivalent}) \times (\text{VIC factor}) \times \sqrt{e}$$

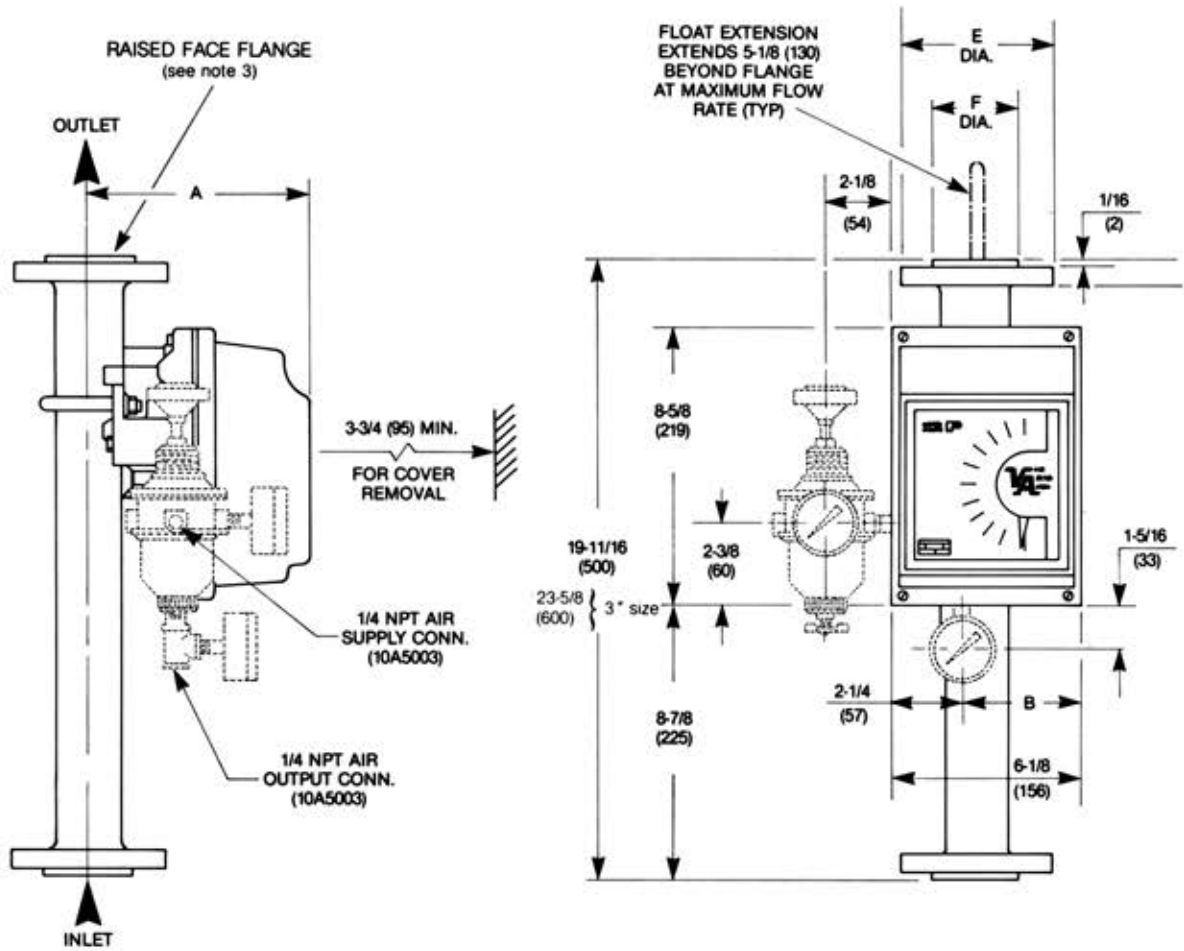
- Total Pressure drop across meter at 100% flow (inches of water column)

$$\text{Liquid Service } \Delta p = \left(\frac{\text{gpm water equivalent}}{10} \right)^2 \times \Delta \text{Factor} \times \frac{e_f - e}{7.02}$$

$$\text{Gas Service } \Delta p = \left(\frac{\text{scfm air equivalent}}{41.4} \right)^2 \times \Delta \text{Factor} \times \frac{e_f}{7.02}$$

- Critical pressure = minimum allowable operating pressure (psig) required to prevent float bounce when throttling at meter outlet.

DIMENSIONS



1. All dimensions in inches and (mm).
2. Dimensions provided for reference only.
3. Flanges are available as follows: ANSI standard B16.5, Class 150, 300 RF.
4. Optional equipment is shown in dotted outline.

STEAM JACKET METERS—
STEAM JACKET CONNECTIONS
ARE 1/2" N.P.T.; (1) CONN.
ADJACENT TO EACH FLANGE.

F & P METER SIZE	FLANGES (SEE NOTE 3)	
	USA	
1/2"	2"	
3/4"	2"	
1"	2"	
1 1/2"	2 1/2"	
2"	3"	
3"	4"	

F & P METER SIZE	DIM. A		DIM. B		FLANGES (SEE NOTE 3)	
	INCH	mm	INCH	mm	USA	
1/2"	5-5/8"	143	3-7/16"	87	1" ANSI	
3/4"	5-5/8"	143	3-7/16"	87	1" ANSI	
1"	5-5/8"	143	3-7/16"	87	1" ANSI	
1 1/2"	7-1/16"	179	3-13/16"	97	1/2" ANSI	
2"	7-1/16"	179	3-13/16"	97	2" ANSI	
3"	7-5/8"	194	4-3/16"	105	3" ANSI	

ORDERING INFORMATION

When Ordering Specify

Model Number
Materials of Tube, Float, Fittings
Fluid Measured
If Liquid—Density and Viscosity at Operating
Temperature
If Gas—Specific Gravity or Density at Standard
Conditions

Operating Temperature or Pressure
Maximum Flow Rate
Scale Units
Accuracy
Allowable Pressure Loss
Tube and Connection Flange Size
Optional Equipment (Air Gauge and/or Regulator)

Note: Specifications are subject to change without notice.