

Baumann™ 24000F Wafer Body Control Valve

The Baumann unique 24000F wafer style control valve (figures 1 and 2) mates with ASME and EN line flange connections and is designed to control a wide range of process liquids, gases and vapors. This very compact package provides the connection integrity of flanged body globe valves while being significantly lighter and easier to install. Special alloy constructions are available and round out the standard S31603 stainless steel offering. The 24000F serves as a general purpose, modulating valve suitable for process line pressures up to 99 barg (1440 psig) and operating temperatures to 537°C (1000°F).

Features

- Compact and light-weight design reduces installed piping costs.
- Universal valve body construction mates with both ASME and EN flanges (see table 9).
- Multiple trim capacity reductions available to meet changing process requirements with Cv ratings as low as 0.00013.
- Optional extended bonnet for applications ranging from -195 to 537°C (-320 to 1000°F).
- Optional ENVIRO-SEAL™ packing system to meet critical emission control requirements
- Epoxy powder-coated actuator with stainless steel fasteners for corrosion resistance.
- Multi-spring, field-reversible actuator with reduced deadband, permits direct operation from remote signal devices.
- Actuator and yoke can be removed from the valve assembly while maintaining packing integrity.



W9762

Figure 1. 24000F Control Valve with Baumann 32 Dual-Stop Actuator



W9763

Figure 2. 24000F Control Valve with Baumann 32 Actuator and FIELDVUE DVC2000 Digital Valve Controller

- Fisher® FIELDVUE™ digital valve controller available for remote calibration and diagnostics in facilities utilizing the PlantWeb™ architecture.



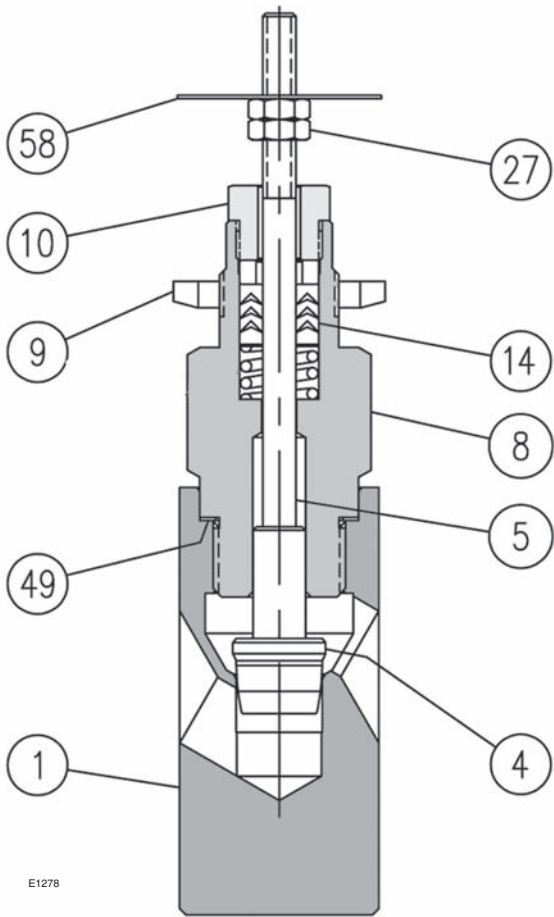


Figure 3. Baumann 24000F Valve Body with Standard Bonnet and NPS 1 Integral Seat

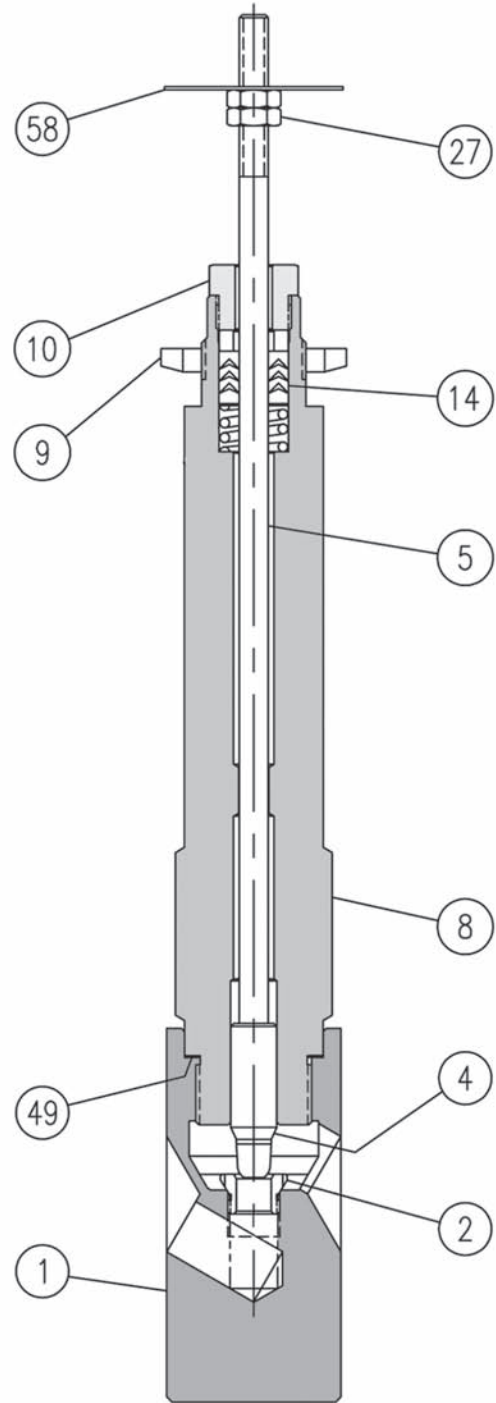


Figure 4. Baumann 24000F Valve Body with Extension Bonnet and Screwed-In Seat Ring

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Table 1. Materials of Construction

Key No.	Description	Material			
		S31603	N10276 ⁽¹⁾	N08020 ⁽¹⁾	N04400 ⁽¹⁾
1	Valve Body	ASTM A479 S31600/S31603 Dual Certified	ASTM B574 N10276	ASTM B473 N08020	ASTM B164 N04400
2	Seat Ring (standard) (For Low Flow Trim, see tables 2 and 3)	ASTM A276 S31600	ASTM B574 N10276	ASTM B473 N08020	ASTM B164 N04400
4	Plug (Metal Seat) Cv ≤ 2.5	ASTM A479 S21800 SST (Standard) / ASTM A582 S41600 Condition T (Optional)	ASTM B574 N10276	ASTM B473 N08020	Federal Specification QQ-N-286 N05500
	Plug (Metal Seat) Cv ≥ 4.0	ASTM A276 S31600 Condition A (Standard) / ASTM A582 S41600 Condition T (Optional)			
	Plug (Soft Seat)	ASTM A276 S31600 Condition A with PTFE (Polytetrafluoroethylene) insert	ASTM B574 N10276/PTFE	ASTM B473 N08020/PTFE	Federal Specification QQ-N-286 N05500
5	Stem	ASTM A276 S31600	ASTM B574 N10276	ASTM B473 N08020	ASTM B164 N04400
8	Bonnet	ASTM A479 S31600/S31603 Dual Certified	ASTM B574 N10276	ASTM B473 N08020	ASTM B164 N04400
9	Drive Nut (Yoke)	S31600 SST (ASTM A194 Grade 8M)			
10	Packing Follower	ASTM A276 S31600 Condition A	ASTM B576 N10276	ASTM B473 N08020	ASTM B164 N04400
14	V- Ring Packing (standard)	(Refer to page 4)			
	Packing (optional)	(Refer to page 4)			
27	Lock Nut	Stainless Steel (18-8 Stainless Steel)			
49	Body Gasket	Graphite Grade GHR with S31600 Stainless Steel Insert			
58	Travel Indicator	ASTM A240 S30400			

1. Optional valve and trim materials, consult your Emerson Process Management sale office for price and delivery. N08020 nickel alloy and N04400 nickel alloy materials are not rated to 206 barg (3000 psig) cold working pressure. (see tables 13, 14, 15, and 16).

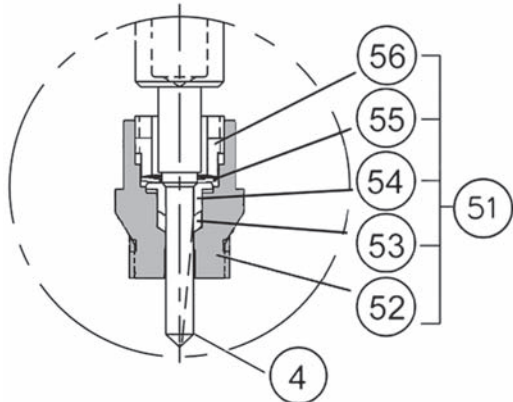


Figure 5. Optional 151 Low Flow Trim Assembly

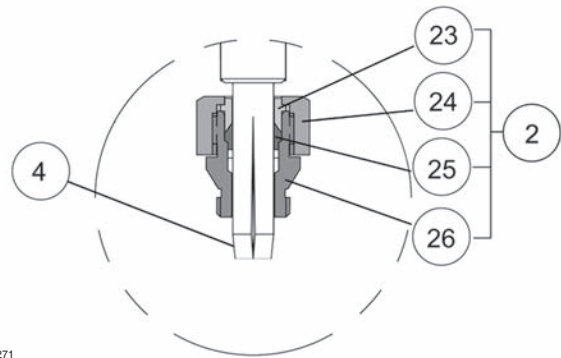


Figure 6. Optional 177 Low Flow Trim Assembly

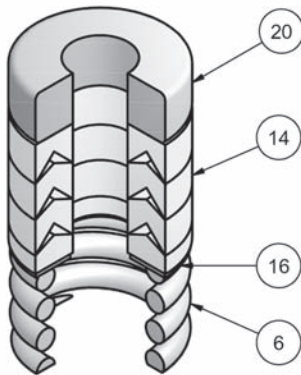
Table 2. 151 Low Flow Trim

Key Number	Description	Material	
4	Plug	ASTM A479 S21800	
51	Seat Sub-Assembly		
	52	Cage	ASTM A276 S31600
	53	Seat	PTFE
	54	Collar	ASTM A276 S31600
	55	Washer	ASTM A276 S31600
	56	Insert	ASTM A276 S31600

Table 3. 177 Low Flow Trim

Key Number	Description	Material	
2 ⁽¹⁾	Seat Sub-Assembly		
	23	Gland	ASTM A276 S31600
	24	Retainer Nut	ASTM A276 S31600
	25	Insert	Reinforced PTFE
	26	Housing	ASTM A276 S31600
4 ⁽¹⁾	Plug	ASTM A479 S21800	

1. For optional trim materials, consult your Emerson Process Management sales office for price and delivery. Baumann 32 actuator requires dual-stops with 177 trim series.



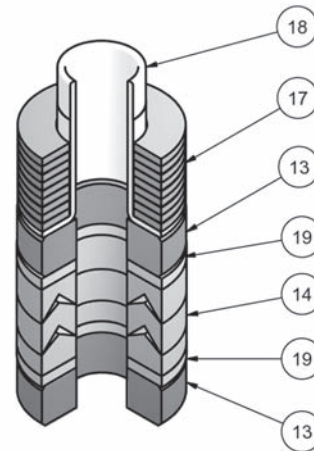
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Figure 7. Standard Spring-Loaded PTFE V-Ring Packing Kit

Table 4. Standard Spring-Loaded PTFE V-Ring Packing Kit

Key Number	Description	Material
6 ⁽¹⁾	Spring	ASTM A313 S30200
14	Packing Set	PTFE (Polytetrafluoroethylene) / PTFE, 25% carbon filled
16	Washer	ASTM A240 S31600
20	Spacer	J-2000 (filled-Polytetrafluoroethylene)

1. N10276 nickel alloy valve body construction is furnished with N10276 nickel alloy spring.

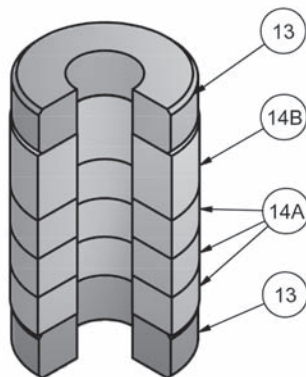


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Figure 9. ENVIRO-SEAL Packing Kit (Optional)

Table 6. ENVIRO-SEAL Packing Kit (Optional)

Key Number	Description	Material
13	Bushings	Carbon-Graphite
14	Packing Rings	PTFE (Polytetrafluoroethylene) / PTFE, 25% carbon filled
17	Belleville Spring	N06600 Nickel Alloy (ASTM B637 N07718, 40 HRC max)
18	Bushing	PEEK (polyetheretherketone)
19	Washers	Modified PTFE



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Figure 8. Molded Graphite (Flexible Graphite) Packing Kit (Optional)

Table 5. Molded Graphite (Flexible Graphite) Packing Kit (Optional)

Key Number	Description	Material
13	Bushings	Carbon-Graphite
14A	Packing Rings	Graphite
14B	Packing Ring	Graphite

Special ENVIRO-SEAL Packing Note

The ENVIRO-SEAL PTFE packing system is suitable for 100 ppm environmental applications on services up to 51.7 barg (750 psig) and process temperatures ranging from -46 to 232°C (-50 to 450°F).

For non-environmental applications, this packing system offers excellent performance at the same temperature range up to the maximum valve working pressure.

Temperature limits apply to packing arrangements only. Complete valve assembly temperature limits may differ, refer to appropriate pressure/temperature ratings.

(Reference Fisher Packing Selection Guidelines for Sliding-Stem Valves, Bulletin 59.1:062, D101986X012).

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Table 7. Technical Specifications

NOMINAL PIPE SIZE	DN 15, 20, and 25	NPS 1/2, 3/4, and 1
END CONNECTIONS	Refer to table 9	
PRESSURE RATING	Refer to tables 13, 14, 15, and 16	
CHARACTERISTIC	Equal Percentage or Linear	

Table 8. Temperature Ratings for Packing and Seat Material⁽¹⁾

SEATING MATERIAL	PTFE Soft Seat	151 Trim	-29 to 177°C (-20 to 350°F)
		577 & 677 Trim	-73 to 232°C (-100 to 450°F)
	Reinforced PTFE	177 Trim	-73 to 232°C (-100 to 450°F)
	Metal Seat	102, 548, 588, 648, 688 Trim	-195 to 537°C (-320 to 1000°F)
PACKING AND BONNET COMBINATIONS	BONNET STYLE	PACKING	TEMPERATURE LIMIT
	Standard Bonnet	Spring Loaded PTFE	-73 to 232°C (-100 to 450°F)
		ENVIRO-SEAL	-45 to 232°C (-50 to 450°F)
		Graphite	-73 to 232°C (-100 to 450°F)
	Extension Bonnet	Spring Loaded PTFE	-195 to 232°C (-320 to 450°F)
		ENVIRO-SEAL	-45 to 232°C (-50 to 450°F)
		Graphite	-195 to 537°C (-320 to 1000°F)

1. Temperature limits apply to seating or packing arrangements only. Complete valve assembly temperature limits may differ, refer to appropriate pressure/temperature ratings. For more information on packing selection, reference Fisher Packing Selection Guidelines for Sliding-Stem Valves, Bulletin 59.1:062, D101986X012.

Table 9. Connections Available

CONNECTIONS	VALVE SIZE		MATING LINE FLANGES			
	DN	NPS	CL150	CL300	CL600	PN10-40
	15	1/2	NO	Yes	Yes	Yes
20	3/4	Yes	Yes	Yes	Yes	
25	1	Yes	Yes	Yes	Yes	

Table 10. Actuator Specifications

TYPE	32, 54, 70 Multi-Spring Diaphragm (Single Acting)
DIAPHRAGM AREA	210, 350, 450 cm ² / 32, 54, 70 in ²
AIR FAILURE	32 and 54 Fails Open or Closed (Field Reversible) / 70 Fails Closed ONLY
TRAVEL⁽¹⁾	12.7 mm / 0.50 inches
AMBIENT TEMPERATURE RANGE	-29°C to 71°C / -20°F to 160°F
MAXIMUM AIR PRESSURE	2.4 barg / 35 psig
DIAPHRAGM MATERIAL⁽²⁾	NBR (Nitrile) / TPES (Polyester Thermoplastic)
SPRING CASES	Steel, Powder Epoxy-Coated with Stainless Steel Fasteners
YOKE	Ductile Iron, Powder Epoxy-Coated

1. Dual travel stops are available on Baumann 32 and 54 actuators. These are not field reversible.
2. Optional reinforced VMQ (Silicone) diaphragm with FKM (Fluorocarbon) O-ring actuator stem seal for high temperature conditions (-29°C to 121°C / -20°F to 250°F) is available with Baumann 32 and 54 actuators ONLY.

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Table 11. Cv Values at 100% Plug Opening ($K_v = 0.86 \times C_v$)

VALVE SIZE		ORIFICE DIAMETER		PLUG TRAVEL		PLUG SERIES						
DN	NPS	mm	inch	mm	inch	102 Cv	151 Cv	177 Cv	577 Cv	548 / 588 Cv	677 Cv	648 / 688 Cv
15 20 25	1/2 3/4 1	3.97	0.156	12.7	0.50	---	0.00013	---	---	---	---	---
							0.00025					
							0.0005					
0.001												
0.002												
0.004												
0.008												
0.015												
0.03												
0.06												
0.10												
0.20												
0.45												
15 20 25	1/2 3/4 1	6.3	0.25	12.7	0.50	0.02	---	---	---	0.2 0.5 1.0	---	0.5 1.0
						0.05						
						0.10						
0.20												
15 20 25	1/2 3/4 1	7.9	0.3125	12.7	0.50	---	---	0.0005	---	---	---	---
								0.001,				
								0.002				
0.005,												
0.01												
0.02,												
0.05												
15 20	1/2 3/4	9.5	0.375	12.7	0.50	---	---	---	1.0, 1.5 2.0	1.5 2.0	0.1, 0.2, 0.5 1.0, 2.0	1.5 2.0
25	1	9.5	0.375	12.7	0.50	---	---	---	1.0, 1.5 2.5	2.5	0.1, 0.2, 0.5 1.0, 2.5	1.5 2.5
25 ⁽¹⁾	1	20.6	0.8125	12.7	0.50	---	---	---	4.0, 6.5	4.0, 6.5	4.0	4.0, 6.5

1. 24000F NPS 1, Cv 4.0 and 6.5 are integral seat.

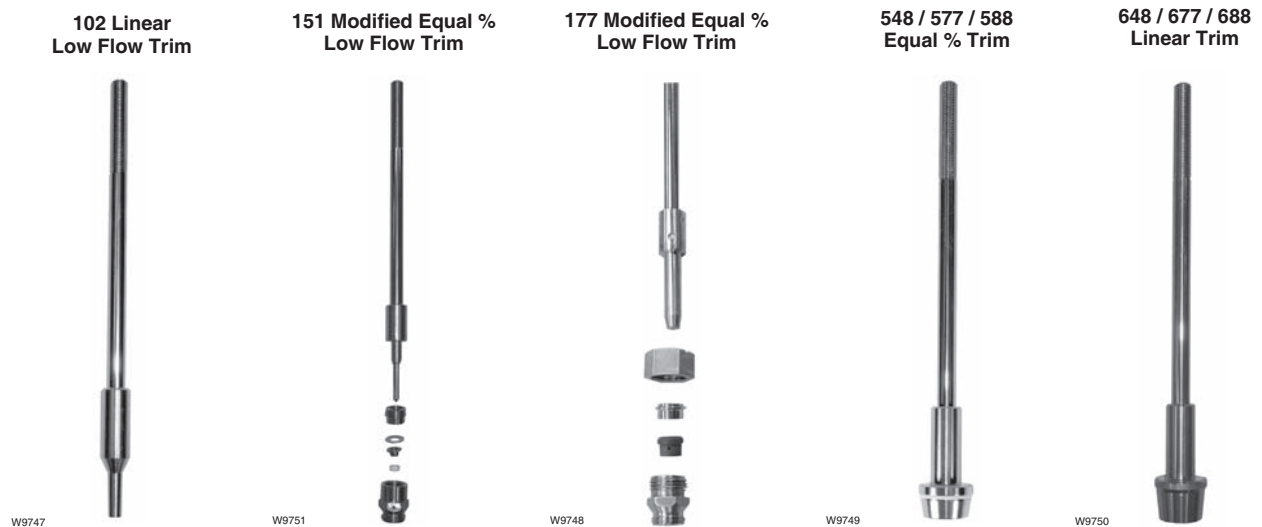


Figure 10. Baumann 24000F Trims

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Table 12. ISA Sizing Coefficients

Series	Cv Rating	FL	Fd	XT	KC
102	0.02 0.04 0.09 0.17	0.95	0.06 0.09 0.013 0.18	0.76	0.86
151	0.0001 0.0002 0.0004 0.0009 0.0017 0.003 0.007 0.013 0.026 0.052 0.09 0.17 0.39	0.98	0.35 0.04 0.05 0.06 0.075 0.10 0.11 0.15 0.18 0.22 0.25 0.30 0.40	0.81	0.94
177	0.0005 0.001 0.002 0.005 0.01 0.02 0.05	0.95	0.70	0.76	0.76
548/588	0.2	0.90	0.28	0.68	0.94
	0.5 1 1.5 2 2.5 4 6.5	0.90	0.40 0.33 0.42 0.46	0.68	
577	1	0.90	0.40	0.68	0.73
	1.5 2 4 6.5		0.33 0.42 0.46		
677	0.1	0.90	0.08	0.68	0.73
	0.2 0.5 1 2 2.5 4		0.12 0.19 0.27 0.46		
648/688	0.5	0.90	0.40	0.68	0.73
	1 1.5 2 2.5 4 6.5		0.33 0.42 0.46		

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Table 13. Pressure–Temperature Ratings for S31603 Stainless Steel Valve Body (Standard)

Temperature (°C) ⁽¹⁾	Working Pressure (barg)	Temperature (°F) ⁽¹⁾	Working Pressure (psig)
-195 to 37	99	-320 to 100	1440
93	85	200	1240
149	77	300	1120
204	70	400	1025
232	68	450	990
260	65	500	955
288	63	550	927
315	62	600	900
343	61	650	890
371	60	700	870
398	58	750	855
426	58	800	845
454	57	850	835
482	57	900	830
510	53	950	775
537	48	1000	700

1. Do not exceed seating and packing material ratings.

Table 14. Pressure–Temperature Ratings for N10276 Nickel Alloy Valve Body (Optional)

Temperature (°C) ⁽¹⁾	Working Pressure (barg)	Temperature (°F) ⁽¹⁾	Working Pressure (psig)
-195 to 37	103	-320 to 100	1500
93	103	200	1500
149	100	300	1455
204	97	400	1410
232	94	450	1370
260	91	500	1330
288	87	550	1270
315	83	600	1210
343	81	650	1175
371	78	700	1135
398	73	750	1065
426	69	800	1015
454	67	850	975
482	62	900	900
510	53	950	775
537	49	1000	725

1. Do not exceed seating and packing material ratings.

Table 15. Pressure–Temperature Ratings for N04400 Nickel Alloy Valve Body (Optional)

Temperature (°C) ⁽¹⁾	Working Pressure (barg)	Temperature (°F) ⁽¹⁾	Working Pressure (psig)
-195 to 37	82	-320 to 100	1200
93	72	200	1055
149	68	300	990
204	65	400	955
232	65	450	952
260	65	500	950
288	65	550	950
315	65	600	950
343	65	650	950
371	65	700	950
398	64	750	935
426	63	800	915
454	46	850	680
482	34	900	495

1. Do not exceed seating and packing material ratings.

Table 16. Pressure–Temperature Ratings for N08020 Nickel Alloy Valve Body (Optional)

Temperature (°C) ⁽¹⁾	Working Pressure (barg)	Temperature (°F) ⁽¹⁾	Working Pressure (psig)
-195 to 37	82	-320 to 100	1200
93	72	200	1045
149	67	300	980
204	67	400	980
232	67	450	980
260	67	500	980
288	67	550	980
315	67	600	980
343	67	650	980
371	67	700	980
398	67	750	980
426	67	800	980

1. Do not exceed seating and packing material ratings.

Table 17. Allowable Pressure Drops (bar)

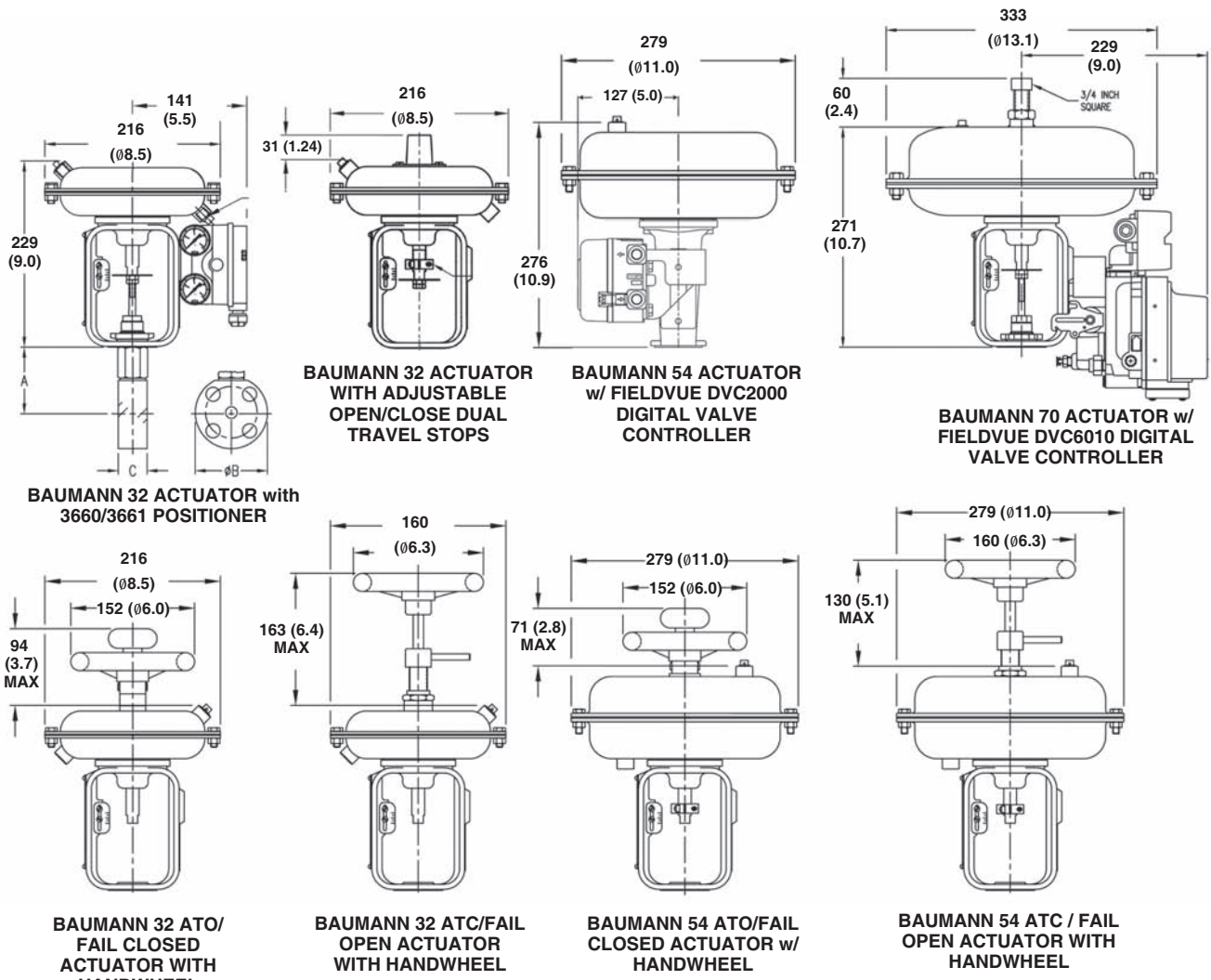
PORT DIA. (mm)	PLUG TRAVEL (mm)	ACT TYPE	AIR-TO-OPEN ACTION						AIR-TO-CLOSE ACTION					
			BENCH RANGE (barg)	0.2-1.0 barg SIGNAL TO ACTUATOR		WITH POSITIONER 1.38 barg AIR SUPPLY		BENCH RANGE (barg)	0.2-1.0 barg SIGNAL TO ACTUATOR		WITH POSITIONER 1.38 barg AIR SUPPLY			
				Max CL IV Shutoff Press.	Max CL VI Shutoff Press.	Max CL IV Shutoff Press.	Max CL VI Shutoff Press.		Max CL IV Shutoff Press.	Max CL VI Shutoff Press.	Max CL IV Shutoff Press.	Max CL VI Shutoff Press.		
6.4	12.7	32	0.3-1.0	61	---	99	---	0.2-0.9	61	---	99 ⁽¹⁾	---		
		32	0.5-1.0	99	---	99 ⁽¹⁾	---	0.2-0.7	99 ⁽¹⁾	---	99 ^(1,2)	---		
7.9	12.7	32	0.3-1.0	---	28	---	71	0.2-0.9	---	28	---	99 ⁽¹⁾		
		32	0.5-1.0	---	71	---	99	0.2-0.7	---	92	---	99 ^(1,2)		
9.5	12.7	32	0.3-1.0	31	19	62	50	0.2-0.9	31	19.1	99	97		
		32	0.5-1.0	62	50	93	81	0.2-0.7	77	65	99 ⁽¹⁾	99 ⁽¹⁾		
		54	0.6-1.0	99 ⁽¹⁾	99 ⁽¹⁾	99 ^(1,2)	99 ^(1,2)	0.2-0.7	---	---	---	---		
20.6	12.7	32	0.3-1.0	7.7	1.3	15.5	9.1	0.2-0.9	7.7	1.3	27	20		
		32	0.5-1.0	15.5	9.1	23	16.8	0.2-0.7	19.5	12.9	38	32		
		54	0.5-1.0	23	17.0	35	28	0.2-0.7	29.5	23	59	52		
		54	0.8-1.0	47	40	59	52	---	---	---	---	---		
		70	0.7-1.0	56	49	72	65	---	---	---	---	---		

1. The maximum shutoff pressure when using ENVIRO-SEAL packing is defined by: $\Delta P = \text{Table Value} - [1112(\text{Port Diameter})^2]$. These table values should not be modified by this formula and the maximum ΔP of 51 bar should be used for ENVIRO-SEAL packing.
 2. The maximum shutoff pressure when using Flexible Graphite packing is defined by: $\Delta P = \text{Table Value} - [5337(\text{Port Diameter})^2]$. These table values should not be modified by this formula and the maximum ΔP of 99 bar should be used for Flexible Graphite packing.

Table 18. Allowable Pressure Drops (psi)

PORT DIA. (in)	PLUG TRAVEL (in)	ACT TYPE	AIR-TO-OPEN ACTION						AIR-TO-CLOSE ACTION					
			BENCH RANGE (psig)	3-15 psig SIGNAL TO ACTUATOR		WITH POSITIONER 20 psig AIR SUPPLY		BENCH RANGE (psig)	3-15 psig SIGNAL TO ACTUATOR		WITH POSITIONER 20 psig AIR SUPPLY			
				Max CL IV Shutoff Press.	Max CL VI Shutoff Press.	Max CL IV Shutoff Press.	Max CL VI Shutoff Press.		Max CL IV Shutoff Press.	Max CL VI Shutoff Press.	Max CL IV Shutoff Press.	Max CL VI Shutoff Press.		
0.25	0.50	32	5-15	887	---	1440	---	3-13	887	---	1440 ⁽¹⁾	---		
		32	7-15	1440	---	1440 ⁽¹⁾	---	3-10	1440 ⁽¹⁾	---	1440 ^(1,2)	---		
0.3125	0.50	32	5-15	---	418	---	1033	3-13	---	418	---	1440 ⁽¹⁾		
		32	7-15	---	1033	---	1440	3-10	---	1341	---	1440 ^(1,2)		
0.375	0.50	32	5-15	452	278	905	730	3-13	452	278	1440	1409		
		32	7-15	905	730	1357	1182	3-10	1131	956	1440 ⁽¹⁾	1440 ⁽¹⁾		
		54	9-15	1440 ⁽¹⁾	1440 ⁽¹⁾	1440 ^(1,2)	1440 ^(1,2)	3-10	---	---	---	---		
0.8125	0.50	32	5-15	113	19	226	132	3-13	113	19	396	301		
		32	7-15	226	132	339	245	3-10	283	188	565	471		
		54	7-15	343	248	514	419	3-10	428	334	856	762		
		54	11-15	685	591	856	762	---	---	---	---	---		
		70	10-15	815	720	1048	953	---	---	---	---	---		

1. The maximum shutoff pressure when using ENVIRO-SEAL packing is defined by: $\Delta P = \text{Table Value} - [25(\text{Port Diameter})^2]$. These table values should not be modified by this formula and the maximum ΔP of 750 psi should be used for ENVIRO-SEAL packing.
 2. The maximum shutoff pressure when using Flexible Graphite packing is defined by: $\Delta P = \text{Table Value} - [120(\text{Port Diameter})^2]$. These table values should not be modified by this formula and the maximum ΔP of 1440 psi should be used for Flexible Graphite packing.



mm
(inch)

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NOTE: ACTUATOR REMOVAL REQUIRES 115 mm (4.5 INCHES) VERTICAL CLEARANCE.

Figure 11. Dimensional Drawings

Table 19. Valve Dimensions

VALVE SIZE		A BONNET				B DIAMETER		C	
		Standard		Extension					
DN	NPS	mm	Inch	mm	Inch	mm	Inch	mm	Inch
15	1/2	83.8	3.3	218.4	8.6	88.9	3.5	38.1	1.5
20	3/4	83.8	3.3	218.4	8.6	107.95	4.25	38.1	1.5
25	1	78.7	3.1	215.9	8.5	114.3	4.5	50.8	2.0

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Table 20. Valve Assembly Weights

VALVE SIZE		WEIGHT	
DN	NPS	kg	lb
15	1/2	1.7	3.8
20	3/4	2.4	5.3
25	1	3.3	7.3

Table 21. Actuator Weights

ACTUATOR TYPE	WEIGHTS	
	kg	lb
32	4.5	10
54	11.3	25
70	15.4	34
MV	10	22
VA	14	30

Table 22. Model Numbering System

Actuator	24			F		
	Valve Body Series	Plug Series	Characteristic	Seat Leakage	Wafer Valve Body	Bonnet Style
32 ⁽¹⁾		102	Linear / Metal Seat	IV		--- Standard
54		151	Modified Equal % / PTFE Seat	VI		E Extension
70		177	Modified Equal % / Reinforced PTFE	VI		
mv		548	Equal % / Metal Seat (S41600)	IV		
va		577	Equal % / PTFE Seat	VI		
		588	Equal % / Metal Seat (S31600)	IV		
		648	Linear / Metal Seat	IV		
		677	Linear / PTFE Seat	VI		
		688	Linear / Metal Seat	IV		

1. Baumann 32 actuator requires dual stops with 177 trim series.

Note

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