Baumann ™ 24000SB Barstock Control Valve

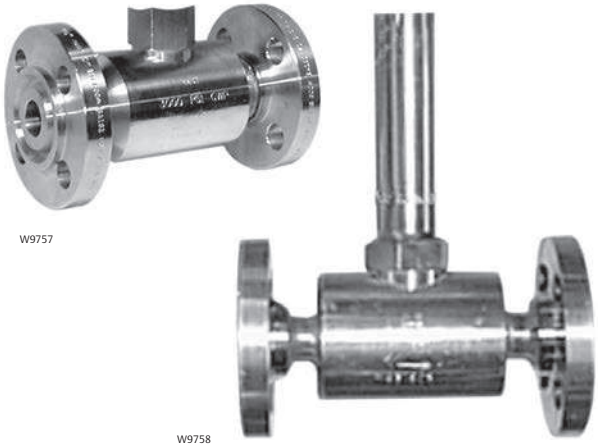
This rugged Baumann control valve is recommended for low-flow, high-pressure, industrial control applications. S31600 / S31603 stainless steel barstock valve body and bonnet is suitable for process pressures up to 413 barg (6000 psig). The 24000SB is the ideal solution for applications that exceed the operating range of our other 24000 series valves. Various end connections ranging from threaded (standard), buttweld, and flanged add versatility to this high-pressure product line. Special high nickel alloy constructions are available and round out the basic S31600/S31603 stainless steel offering.

W9756

24000SB Control Valve with Baumann 32 Actuator and FIELDVUE DVC2000 Digital Valve Controller

Features

- Compact and light-weight design reduces installed piping costs.
- Dual plug and stem guiding provides increased stability during plug travel.
- Multiple trim capacity reductions available to meet changing process requirements with C_V 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.



W9757

W9758

Baumann 24000SB Control Valve with Flanges and Extension Bonnet

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

Figure 1. Valve Body Subassembly with Standard PTFE Spring-Loaded V-Ring Packing

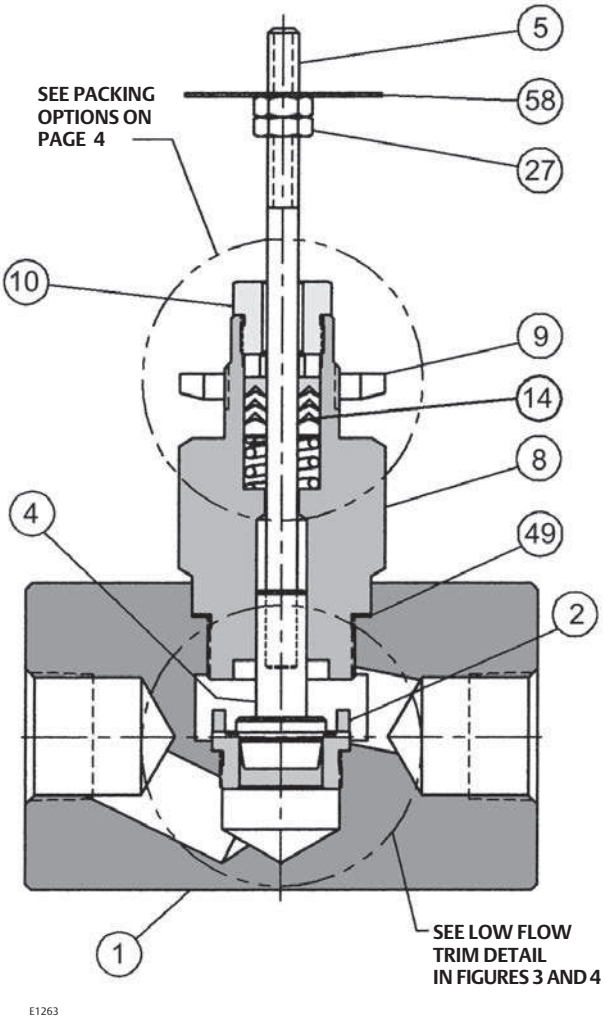


Figure 2. Valve Body with Extension Bonnet

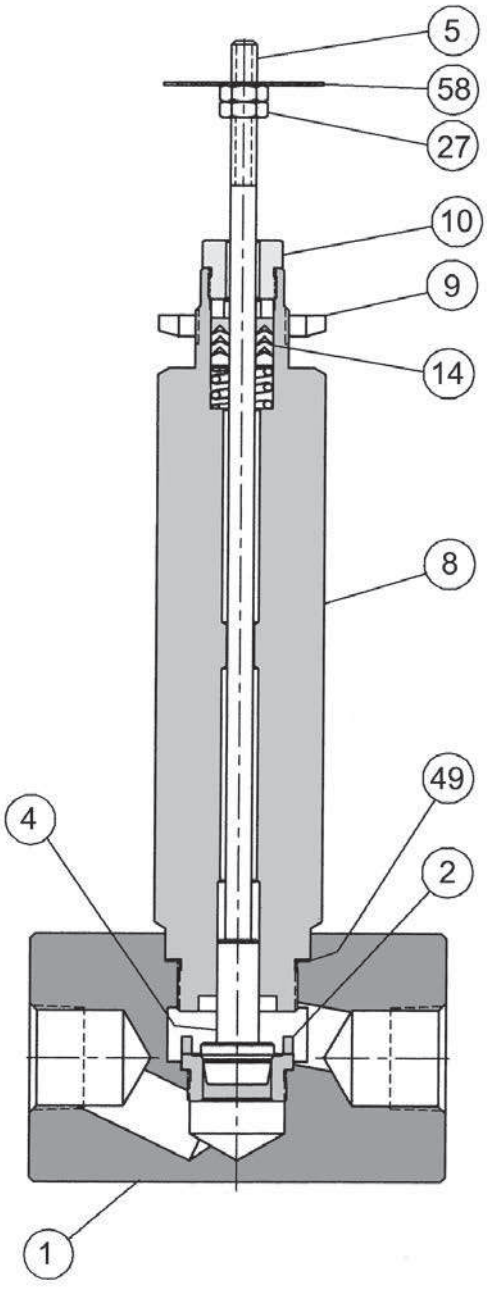


Table 1. Materials of Construction

Key No.	Description	Material			
		S31603 Stainless Steel	N10276 Nickel Alloy(1)	N08020 Nickel Alloy(1)	N04400 Nickel Alloy(1)
1(1)	Valve Body	ASME SA479 S31600/ S31603 Dual Certified	ASME SB574 N10276	ASTM B473 N08020	ASME SB164 N04400
2(1)	Seat Ring (standard) (For low flow trim, refer to tables 2 & 3)	ASTM A276 S31600/ S31603 Dual Certified	ASME SB574 N10276	ASTM B473 N08020	ASME SB164 N04400
4(1)	Plug (Metal Seat) Cv ≤ 2.5	ASME SA479 S21800 (standard) / ASTM A582 S41600 Condition T (optional)	ASME SB574 N10276	ASTM B473 N08020	ASME SB164 N04400
	Plug (Metal Seat) Cv ≥ 4.0	ASTM A276 S31600/ S31603(standard) / ASTM A582 S41600 Condition T (optional)			
	Plug (Soft Seat)	ASTM A276 S31600/ S31603 with PTFE (Polytetrafluoroethylene) insert	ASME SB574 N10276/PTFE	ASTM B473 N08020/PTFE	ASME SB164 N04400/ PTFE
5(1)	Stem	ASTM A276 S31600	ASME SB574 N10276	ASTM B473 N08020	ASME SB164 N04400
8(1)	Bonnet	ASME SA479 S31600/ S31603 Dual Certified	ASME SB574 N10276	ASTM B473 N08020	ASME SB164 N04400
9	Drive Nut (Yoke)	S30400			
10(1)	Packing Follower	ASTM A276 S31600/ S31603 Dual Certified	ASME SB574 N10276	ASTM B473 N08020	ASME SB164 N04400
14(1)	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 Insert			
58	Travel Indicator	ASME SA240 S30400			

1. For optional valve and trim materials, consult your Emerson Process Management sales office for price and delivery. N08020 and N04400 nickel alloy materials have pressure-temperature ratings less than 206 barg (3000 psig) or 413 barg (6000 psig) respectively.

Figure 3. Optional 151 Low Flow Trim Assembly

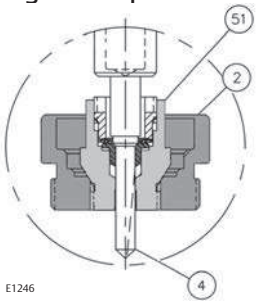


Table 2. 151 Low Flow Trim

Key Number	Description	Material
2(1)	Seat Ring	ASTM A276 S31600/ S31603
4(1)	Plug	ASME SA479 S21800
51(1)	Seat Sub-Assembly	
	Cage	ASTM A276 S31600/ S31603
	Seat	PTFE
	Collar	ASTM A276 S31600/ S31603
	Washer	ASTM A276 S31600 Cond B
	Insert	ASTM A276 S31600/ S31603

1. For optional trim materials, consult your Emerson Process Management sales office for price and delivery.

Figure 4. Optional 177 Low Flow Trim Assembly

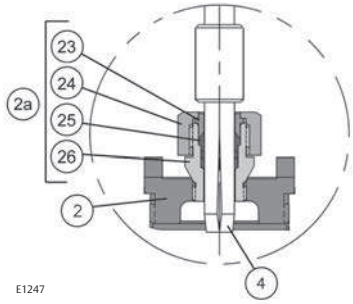


Table 3. 177 Low Flow Trim

Key Number		Description	Material
2(1)		Seat Ring	ASTM A276 S31600/ S31603
2a(1)	Seat Sub-Assembly		
	23	Gland	ASTM A276 S31600/ S31603
	24	Retainer Nut	ASTM A276 S31600/ S31603
	25	Insert	Reinforced PTFE
	26	Housing	ASTM A276 S31600/ S31603
4(1)		Plug	ASME SA479 S21800

1. For optional trim materials, consult your Emerson Process Management sales office for price and delivery.

Figure 5. Standard Spring-Loaded PTFE V-Ring Packing Kit

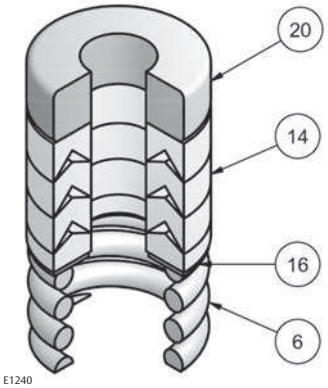


Table 4. Standard Spring-Loaded PTFE V-Ring Packing Kit

Key Number	Description	Material
6(1)	Spring	ASTM A313 S30200
14	Packing Set	PTFE (Polytetrafluoroethylene) / PTFE, 25% carbon filled
16	Washer	ASME SA240 S31600
20	Spacer	J-2000 (filled-Polytetrafluoroethylene)

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

Figure 6. Molded Graphite (Flexible Graphite) Packing Kit (Optional)

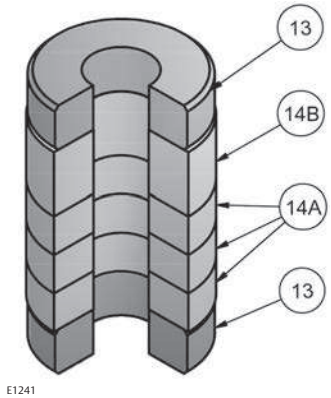


Table 5. Molded Graphite (Flexible Graphite) Packing Kit (Optional)

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

Figure 7. ENVIRO-SEAL Packing Kit (Optional)

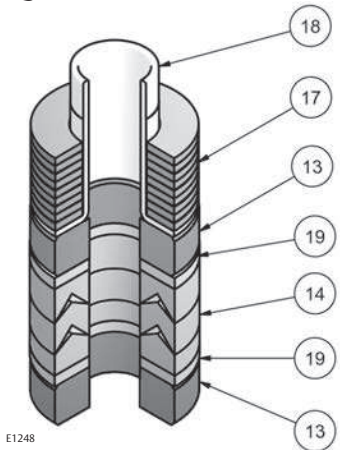


Table 6. ENVIRO-SEAL Packing Kit (Optional)

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

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).

Table 7. Technical Specifications

NOMINAL PIPE SIZE		DN 15, 20, and 25 (NPS 1/2, 3/4, and 1)
END CONNECTIONS	**Standard**	Threaded (NPT)
	Available(1)	Buttweld, Flanged (CL150 to CL2500)
PRESSURE RATING		See Pressure-Temperature Ratings, tables 10, 11, 12, 13, 14, and 15
CHARACTERISTIC		Equal Percentage or Linear

1. Consult your Emerson Process Management sales office for other available connections.

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(2)	Spring Loaded PTFE Packing	-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 Packing	-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.
2. PTFE packing may be used in cryogenic service but becomes stiff.

Figure 8. Baumann 24000SB Trims

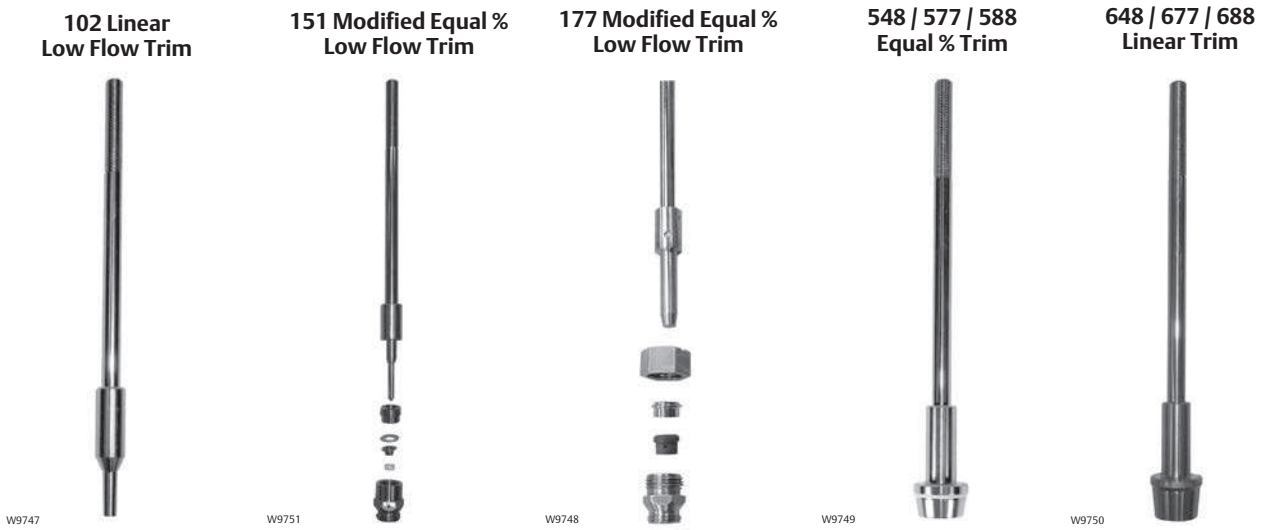


Table 9. Cv Values at 100% Plug Opening (Kv = 0.86 x Cv)[4]

VALVE SIZE	ORIFICE DIAMETER	PLUG TRAVEL	PLUG SERIES						
			102	151	177	577	548 / 588	677	648 / 688
NPS	inch	inch	Cv	Cv	Cv	Cv	Cv	Cv	Cv
1/2	0.156	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	---	---	---	---	---
	0.25	0.50	0.02, 0.05, 0.10, 0.20	---	---	---	0.20, 0.50, 1.0	---	0.50, 1.0
	0.3125	0.50	---	---	0.0005, 0.001, 0.002, 0.005, 0.01, 0.02, 0.05	---	---	---	---
	0.375	0.50	---	---	---	1.0, 1.5, 2.0	1.5, 2.0	0.10, 0.20, 0.50, 1.0, 2.0	1.5, 2.0
3/4	0.156	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	---	---	---	---	---
	0.25	0.50	0.02, 0.05, 0.10, 0.20	---	---	---	0.20, 0.50, 1.0	---	0.50, 1.0
	0.3125	0.50	---	---	0.0005, 0.001, 0.002, 0.005, 0.01, 0.02, 0.05	---	---	---	---
	0.375	0.50	---	---	---	1.0, 1.5, 2.5	1.5, 2.5	0.10, 0.20, 0.50, 1.0, 2.5	1.5, 2.5
	0.8125	0.50	---	---	---	3.8	3.8	3.8	3.8
1	0.156	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	---	---	---	---	---
	0.25	0.50	0.02, 0.05, 0.10, 0.20	---	---	---	0.20, 0.50, 1.0	---	0.50, 1.0
	0.3125	0.50	---	---	0.0005, 0.001, 0.002, 0.005, 0.01, 0.02, 0.05	---	---	---	---
	0.375	0.50	---	---	---	1.0, 1.5, 2.5	1.5, 2.5	0.10, 0.20, 0.50, 1.0, 2.5	1.5, 2.5
	0.8125	0.50	---	---	---	4.0, 6.8	4.0, 6.8	4.0	4.0, 6.8

1. For DN 15 (NPS 1/2
2. For DN 20 (NPS 3/4)
3. For DN 25 (NPS 1)
4. See Fisher Catalog 12 for a full range of flow and sizing information.

⚠ WARNING

Refer to pressure - temperature rating tables 10, 11, 12, 13, 14, and 15 and consult your Emerson Process Management sales office for potential cavitation and noise concerns.

Table 10. Pressure-Temperature Ratings for S31600/S31603 Dual Certified Stainless Steel Valve Body - 3000 psig (Standard)(1)

Temperature (°C)(2)	Working Pressure (barg)	Temperature (°F)(2)	Working Pressure (psig)
-195 to 37	206	-320 to 100	3000
93	177	200	2580
148	160	300	2330
204	147	400	2141
232	142	450	2066
260	137	500	1992
287	133	550	1936
315	129	600	1880
343	127	650	1849
371	124	700	1810
398	122	750	1779
426	121	800	1758
454	120	850	1742
482	119	900	1729
510	110	950	1609
537	100	1000	1458

1. Caution: When the valve is furnished with CL150 through CL900 flanges, the pressure-temperature ratings are limited to the values published in ASME B16.34. Valve assemblies with CL1500 flanges are limited to 206 barg (3000 psig) maximum Cold Working Pressure (CWP).
2. Do not exceed seating and packing material ratings.

Table 11. Pressure-Temperature Ratings for S31600/S31603 Dual Certified Stainless Steel Valve Body - 6000 psig (Optional)(1)

Temperature (°C)(2)	Working Pressure (barg)	Temperature (°F)(2)	Working Pressure (psig)
-195 to 37	413.7	-320 to 100	6000
93	355.8	200	5160
149	321.3	300	4660
204	295.1	400	4280
232	284.8	450	4130
260	274.4	500	3980
288	266.8	550	3870
316	259.2	600	3760
343	253.7	650	3680
371	249.6	700	3620
399	245.5	750	3560
427	242.7	800	3520
454	239.9	850	3480
482	238.6	900	3460
510	222.0	950	3220
538	208.9	1000	3030

1. Caution: When the valve is furnished with CL150 through CL1500 flanges, the pressure-temperature ratings are limited to the values published in ASME B16.34.
2. Do not exceed seating and packing material ratings.

Table 12. Pressure-Temperature Ratings for N10276 Nickel Alloy Valve Body - 3000 psig (Optional)[1]

Temperature (°C)[2]	Working Pressure (barg)	Temperature (°F)[2]	Working Pressure (psig)
-195 to 37	215	-320 to 100	3125
93	215	200	3125
148	209	300	3033
204	202	400	2941
232	196	450	2856
260	190	500	2770
287	182	550	2645
315	173	600	2520
343	168	650	2450
371	163	700	2366
398	152	750	2216
426	145	800	2116
454	139	850	2029
482	128	900	1870
510	110	950	1608
537	104	1000	1516

1. Caution: When the valve is furnished with CL150 through CL900 flanges, the pressure-temperature ratings are limited to the values published in ASME B16.34. Valve assemblies with CL1500 flanges are limited to 206 barg (3000 psig) maximum Cold Working Pressure (CWP).
2. Do not exceed seating and packing material ratings.

Table 13. Pressure-Temperature Ratings for N10276 Nickel Alloy Valve Body - 6000 psig (Optional)[1]

Temperature (°C)[2]	Working Pressure (barg)	Temperature (°F)[2]	Working Pressure (psig)
-195 to 37	430.9	-320 to 100	6250
93	430.9	200	6250
149	418.5	300	6070
204	401.3	400	5820
232	391.6	450	5680
260	382.0	500	5540
288	364.7	550	5290
316	347.5	600	5040
343	338.2	650	4905
371	326.1	700	4730
399	305.4	750	4430
427	291.6	800	4230
454	279.9	850	4060
482	258.2	900	3745
510	222.0	950	3220
538	208.9	1000	3030

1. Caution: When the valve is furnished with CL150 through CL1500 flanges, the pressure-temperature ratings are limited to the values published in ASME B16.34.
2. Do not exceed seating and packing material ratings.

Table 14. Pressure-Temperature Ratings for N08020 Nickel Alloy Valve Body (Optional)(1)

Temperature (°C)(2)	Working Pressure (barg)	Temperature (°F)(2)	Working Pressure (psig)
-195 to 37	172	-320 to 100	2500
93	150	200	2175
148	140	300	2041
204	140	400	2041
232	140	450	2041
260	140	500	2041
287	140	550	2041
315	140	600	2041
343	140	650	2041
371	140	700	2041
398	140	750	2041
426	140	800	2041

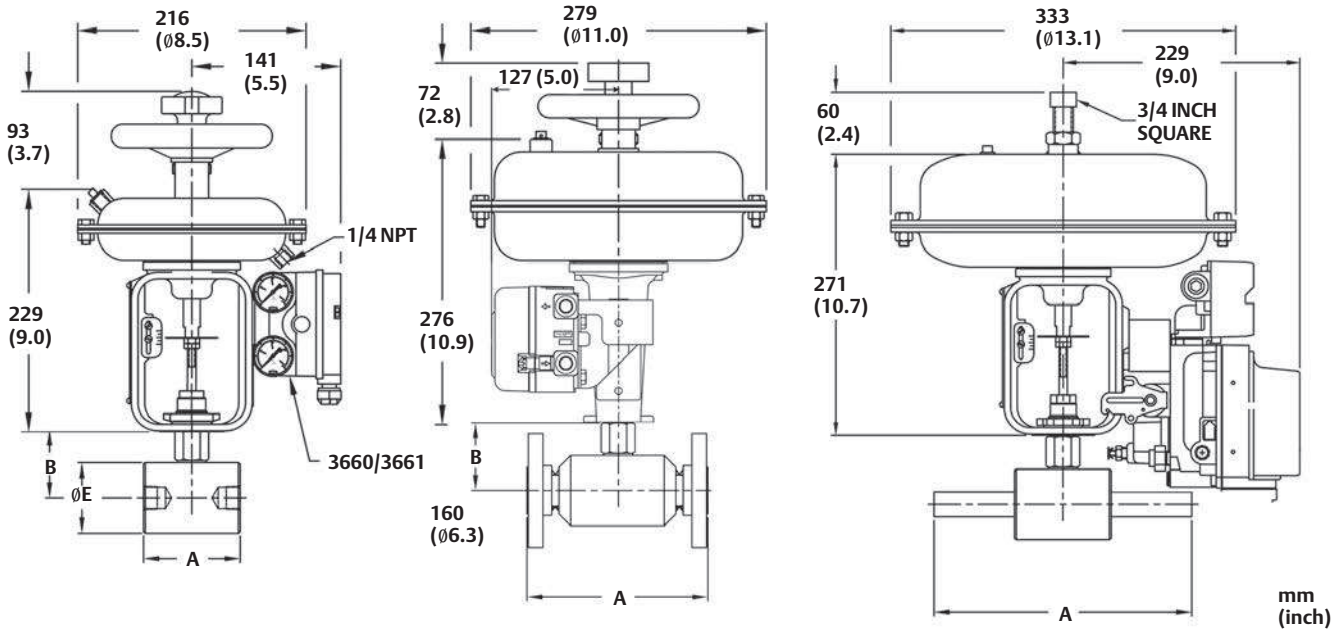
1. Caution: When the valve is furnished with CL150 through CL900 flanges, the pressure-temperature ratings are limited to the values published in ASME B16.34. Valve assemblies with CL1500 flanges are limited to 206 barg (3000 psig) maximum Cold Working Pressure (CWP).
2. Do not exceed seating and packing material ratings.

Table 15. Pressure-Temperature Ratings for N08020 Nickel Alloy Valve Body (Optional)(1)

Temperature (°C)(2)	Working Pressure (barg)	Temperature (°F)(2)	Working Pressure (psig)
(-)195 to 37	430.9	(-) 320 to 100	6250
93	426.1	200	6180
149	408.2	300	5920
204	391.6	400	5680
232	384.0	450	5570
260	376.5	500	5460
288	362.0	550	5250
316	347.5	600	5040
343	338.2	650	4905
371	326.1	700	4730
399	305.4	750	4430
427	291.6	800	4230

1. Caution: When the valve is furnished with CL150 through CL1500 flanges, the pressure-temperature ratings are limited to the values published in ASME B16.34.
2. Do not exceed seating and packing material ratings.

Figure 9. Dimensional Drawings



THREADED (NPT) VALVE BODY (VALVE ROTATED 90° FOR CLARITY) BAUMANN 32 ATO / FAIL CLOSE w/ HANDWHEEL

E1265

BAUMANN 54 ATO FLANGED VALVE BODY ACTUATOR w/ FIELDVUE DVC2000 DIGITAL VALVE CONTROLLER

BAUMANN 70 ATO ACTUATOR w/ BUTTWELD ENDS AND FIELDVUE DIGITAL VALVE CONTROLLER

Note: Actuator removal requires 115 mm (4.5 inches) vertical clearance.

Table 16. Valve Dimensions

VALVE SIZE		A VALVE BODY													
		NPT		Flanged										Buttweld	
				CL150		CL300		CL600		CL900/1500		CL2500			
DN	NPS	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
15	1/2	102	4.00	184	7.25	191	7.50	203	8.00	273	10.25	264	10.38	387	15.25
20	3/4	105	4.13	184	7.25	194	7.62	206	8.12	273	10.75	273	10.75	387	15.25
25	1	127	5.00	184	7.25	197	7.75	210	8.25	273	10.75	308	12.12	406	16.00

Table 17. Valve Dimensions

VALVE SIZE		B BONNET				E DIAMETER	
		Standard		Extension			
DN	NPS	mm	inch	mm	inch	mm	inch
15	1/2	71	2.8	208	8.2	64	2.50
20	3/4	74	2.9	211	8.3	76	3.00
25	1	74	2.9	211	8.3	76	3.00

Table 18. Valve Assembly Weights

VALVE SIZE		WEIGHT	
DN	NPS	kg	lb
15	1/2	3.0	6.6
20	3/4	3.1	6.9
25(1)	1(1)	5.1	11.3
25(2)	1(2)	5.8	12.8

1. For 206 barg (3000 psig) valve body.
2. For 413 barg (6000 psig) valve body.

Table 19. Actuator Weights

ACTUATOR TYPE	WEIGHTS	
	kg	lb
MV1020	10	22
VA1020	13.6	30

Table 20. Model Numbering System

	24				S		B		
Actuator Type	Valve Body Series	Plug Series	Characteristic	Seat Leakage	Valve Body Material		Barstock Body	Bonnet Style	
MV1020		548	Equal % / Metal Seat (S41600)	IV					
VA1020		577	Equal % / PTFE Seat	VI					
		588	Equal % / Metal Seat (S21800 Cv ≤ 2.5 or S31600 Cv ≥ 4.0)	IV					
		648	Linear / Metal Seat (S41600)	IV					
		677	Linear / PTFE Seat	VI					
		688	Linear / Metal Seat	IV