Product Bulletin
52.1:24C
D103328X012
March 2010

Baumann™ 24000C Carbon Steel Little Scotty™ Control Valve

Baumann Little Scotty industrial control valves (figures 1 and 2) are intended for general utility service in pressure, flow, and temperature control applications. This compact carbon steel control valve is positioned to take advantage of the trend toward industrial grade requirements spanning general utility and special applications. These control valves exhibit low hysteresis and deadband, good control characteristics, tight shutoff, rugged construction, high performance packing, and easy maintainability. These attributes translate into reduced maintenance costs, reduced process variability, and increased process availability, resulting in lower long−term operating costs.

Figure 1. 24000C Control Valve with Baumann 32 Actuator

Figure 2. 24000C Control Valve with Baumann 32 Actuator and Fisher 3661 I/P Positioner

Features

- Compact and light weight design reduces installed piping costs
- ASME and EN end connections are available to meet your piping standards
- High quality type 316 austenitic stainless steel trim materials
- 416 stainless steel trim available
- Dual plug and stem guiding provides increased stability during plug travel
- Multiple trim capacity reductions available to meet changing process requirements
- Epoxy powder−coated valve body and 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
- Fisher® FIELDVUE™ digital valve controller available for remote calibration and diagnostics in facilities using the PlantWeb™ architecture

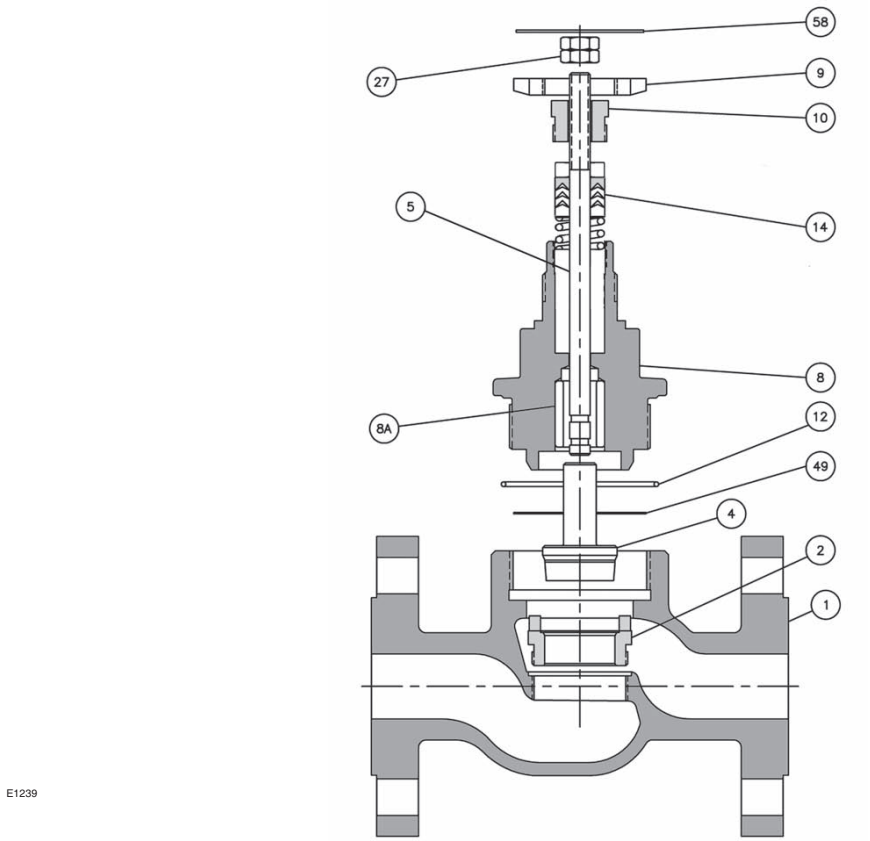


Figure 3. Baumann 24000C Valve Body Assembly with Standard PTFE Spring−Loaded Packing

Table 1. Materials of Construction

Key No.	Description		Material
1	Valve Body		Cast Carbon Steel (ASTM A216 Grade WCC/GP240GH WN 1.0619)
2	Seat Ring	Standard	ASTM A276 S31600 Condition A
		Optional	ASTM A582 S41600 Condition T
4	Plug (Metal Seat) Cv < 2.5	Standard	ASTM A479 S21800 Annealed
		Optional	ASTM A582 S41600 Condition T
	Plug (Metal Seat) Cv > 4.0	Standard	ASTM A276 S31600 Condition A
		Optional	ASTM A582 S41600 Condition T
	Plug (Soft Seat)		ASTM A276 S31600 Condition A with PTFE (Polytetrafluoroethylene) Insert
5	Stem		ASTM A276 S31600 Condition A
8	Bonnet		Cast Carbon Steel (ASTM A216 Grade WCC/GP240GH WN 1.0619)
8A	Bonnet Bushing		ASTM A276 S44004, HT 56−60 HRC or ASTM A311 Class B Stressproof 62−65 HRC
9	Drive Nut (Yoke)		304 SST (ASTM A194 GRADE 8M)
10	Packing Follower		ASTM A276 S31600 Condition A
12	O−Ring		FKM (Fluorocarbon)
14	Packing	Standard	Refer to figure 4, table 2, shown below
		Optional	Refer to figure 5, table 3, shown below
27	Locknuts		Stainless Steel (18−8 SST)
49	Body Gasket	Standard	Annealed Soft Copper
		Optional	Graphite Grade GHR with 316 SST Insert
58	Travel Indicator		ASTM A240 S30400

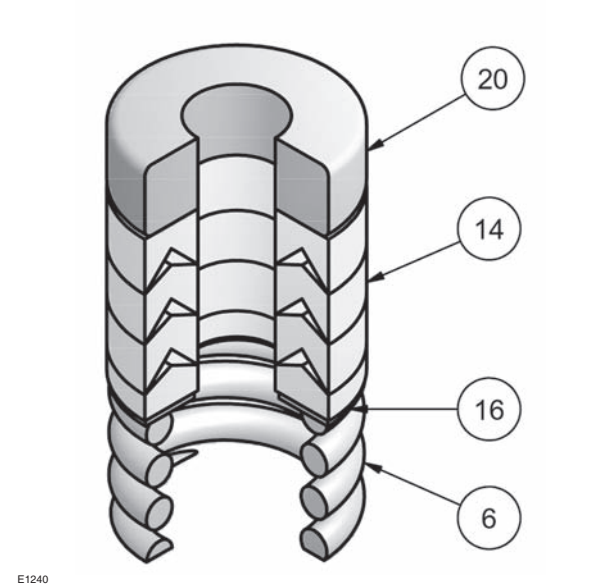


Figure 4. Standard Spring Loaded PTFE V−Ring Packing Kit

Table 2. Standard Spring Loaded PTFE V−Ring Packing Kit

Key No.	Description	Material
6	Spring	ASTM A313 S30200
14	Packing Set	PTFE (Polytetrafluoroethylene)/ 25% carbon filled PTFE
16	Washer	ASTM A240 S31600
20	Spacer	J−2000 (filled Polytetrafluoroethylene)

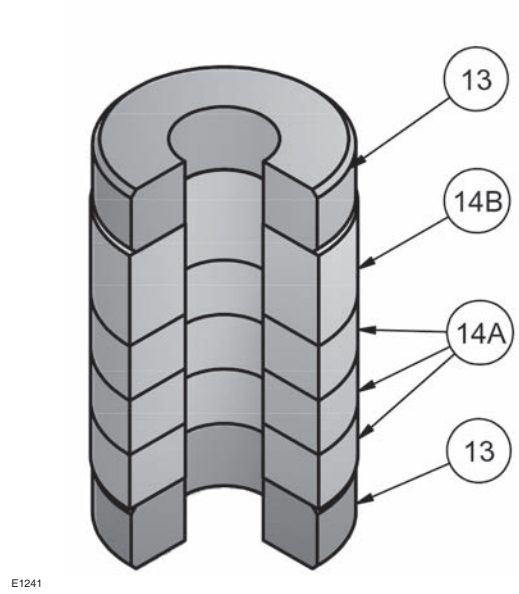


Figure 5. Molded Graphite (Flexible Graphite) Packing Kit (Optional)

Table 3. Molded Graphite (Flexible Graphite) Packing Kit (Optional)

Key No.	Description	Material
13	Bushings	Carbon−Graphite
14A	Packing Rings	Graphite
14B	Packing Ring	Graphite

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

VALVE SIZE	ORIFICE DIAMETER	PLUG TRAVEL	PLUG SERIES				
			102	577	548 / 588	677	648 / 688
NPS	inch	inch	Cv	Cv	Cv	Cv	Cv
1/2 3/4 1	0.25	0.5	0.02 0.05 0.1 0.2	---	0.2 0.5 1.0	---	0.5 1.0
	0.375	0.5	---	1.0 1.5 2.5	1.5 2.5	0.1 0.2 0.5 1.0 2.5	1.5 2.5
1/2	0.8125	0.5	---	4 6	4 7.7	5	4 6
3/4	0.8125	0.5	---	4 7.5	4 10.1	5	4 8
1	0.8125	0.5	---	4 8.5	4 10.1	5	4 9
	1.0625	0.5	---	13	13.6	---	13
1−1/2	1.25	0.75	---	20	10 20	20	10 20
	1.5	0.75	---	10 17 28	10 17 32.9	10 17	10 17 28
2	1.5	0.75	---	10 17 28	10 17 32.9	10 17	10 17 28
	2.0	0.75	---	30	30 52.9	30 50	30 50

Table 5. ISA Sizing Coefficients

Series	Cv Rating	FL	Fd	XT	KC
102	0.2 0.04 0.09 0.17	0.95	0.06 0.09 0.013 0.18	0.76	0.86
577	1 1.5 2.5 4 6 7.5 8.5 10 13 17 28 30	0.9	1.46	0.40 0.33 0.42 0.68	0.73
548/588	0.2 0.5 1 1.5 2.5 4 7.7 10 13.6 17 20 30 32.9 52.9	0.98	0.28	0.81	0.94
		0.9	0.4 0.33 0.42 0.46	0.68	0.73
677	0.1 0.2 0.5 1 2.5 5 10 17 30 50	0.9	0.08 0.12 0.19 0.27 0.46	0.68	0.73
648/688	0.5 1 1.5 2.5 4 6 8 9 10 13 20 28 30 50	0.9	0.4 0.33 0.42 0.46	0.68	0.73

Table 6. Technical Specifications

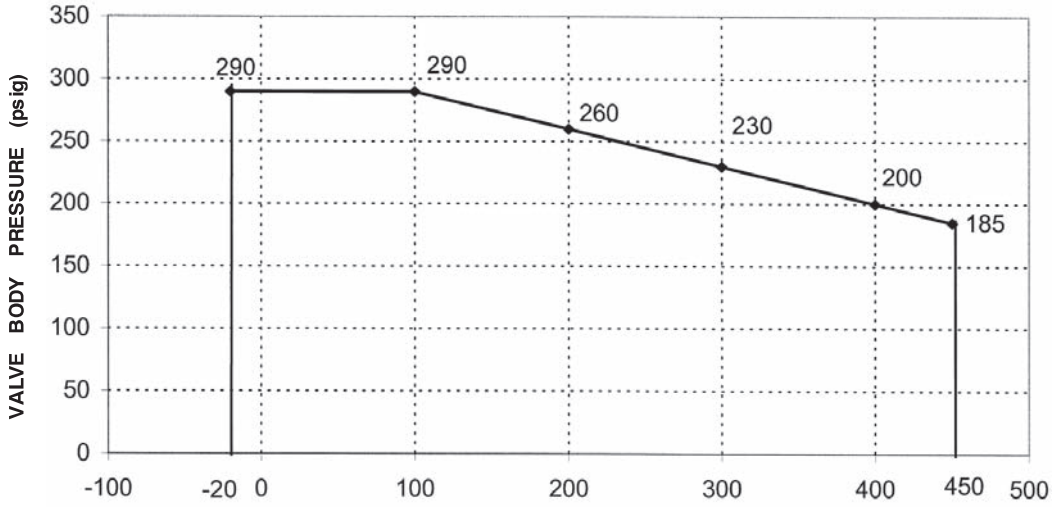
VALVE TYPE	EN	ASME
NOMINAL SIZE	DN 15, 20, 25, 40, & 50	NPS 1/2, 3/4, 1, 1−1/2, & 2
END CONNECTIONS	Mates with PN 10−40 Flanges per EN 1092−1	Mates with ASME CL150 RF Flanges per ASME B16.5
PRESSURE RATING	PN 40 per EN 1092−2	ASME CL150 per ASME B16.34
SEAT PLUG SEALING	Metal−to−Metal or PTFE Soft Seat	Metal−to−Metal or PTFE Soft Seat
FLANGE FINISH	EN 500 to 300 Ra circular lay	ASME 250 to 125 Ra circular lay
FACE−TO−FACE DIMENSIONS	Consistent with EN 558−1	Consistent with EN 588−2 (same as ISA S75.03)
CHARACTERISTIC	Equal Percentage or Linear	Equal Percentage or Linear
TEMPERATURE LIMITS	−29°C to 232°C (−20°F to 450°F)	−29°C to 232°C (−20°F to 450°F)

Table 7. 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 or 19.1 mm / 0.50 or 0.75 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 higher ambient temperature conditions (−29°C to 121°C / −20°F to 250°F) is available with Baumann 32 and 54 actuators ONLY.

PRESSURE–TEMPERATURE RATINGS
ASME CL150 FLANGED VALVES
(SOURCE: ASME B16.34)



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PRESSURE–TEMPERATURE RATINGS
EN PN10–40 FLANGED VALVES
(SOURCE: EN 1092, MATERIAL GROUP 3E0, GP240GH –EN 10213–2 1.0619)

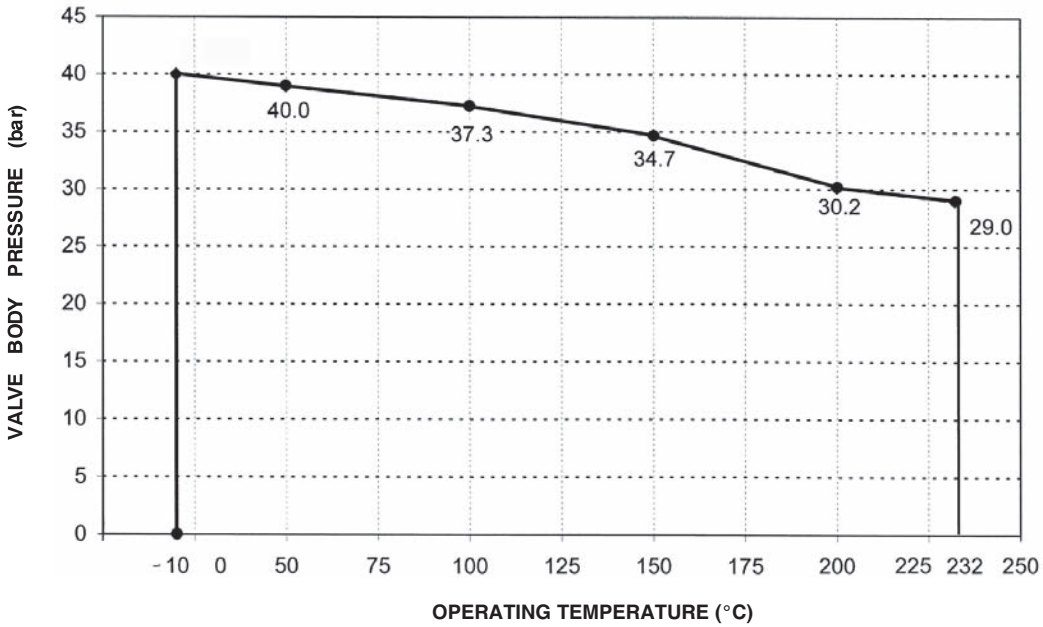

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Figure 6. Baumann Pressure–Temperature Ratings

Table 8. Allowable Pressure Drops (all pressures stated in bar)

ORIFICE 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	40.0(1)(2)	–––	40.0(1)(2)	–––	0.2–0.9	40.0(1)(2)	–––	40.0(1)(2)	–––
9.5	12.7	32	0.3–1.0	31.6(2)	19.5(2)	40.0(1)	40.0(1)	0.2–0.9	40.0(2)	17.3(2)	40.0(1)(2)	40.0(1)(2)
20.6	12.7	32	0.3–1.0	7.9(2)	1.4(2)	15.8	9.3(2)	0.2–0.9	7.3(2)	0.8(2)	25.7(1)	19.1
		32	0.5–1.0	14.5	7.9(2)	21.6(1)	15.2	0.2–0.7	18.3	11.8	36.6(1)(2)	30.2(1)
		54	0.3–1.0	5.9(2)	–––	17.6	11.2(2)	0.2–0.9	11.7(2)	5.2(2)	40.0(1)(2)	34.4(1)(2)
		54	0.5–1.0	23.5(1)(2)	17.0	35.3(1)(2)	28.8(1)	0.2–0.7	29.2(1)	22.6(1)	40.0(1)(2)	40.0(1)(2)
		54	0.6–1.0	35.3(1)(2)	28.8(1)	40.0	40.0(1)	–––	–––	–––	–––	–––
27.0	12.7	32	0.3–1.0	4.8(2)	–––	9.6	4.4	0.2–0.9	4.4(2)	–––	15.5	10.4
		32	0.5–1.0	8.8	3.6(2)	13.1	7.9	0.2–0.7	11.1	5.9(2)	20.8(1)	17.0
		54	0.3–1.0	3.6(2)	–––	10.7	5.5(2)	0.2–0.9	7.1(2)	1.9(2)	24.1(1)	19.1
		54	0.5–1.0	14.3	9.1	28.6	16.2	0.2–0.7	17.2	12.6	34.4(1)(2)	29.4(1)(2)
		54	0.6–1.0	21.4	16.2	21.4	16.3(1)	–––	–––	–––	–––	–––
31.8	19.1	32	0.3–1.0	3.45	–––	6.96	2.48	0.2–0.9	3.45	–––	12.1	7.65
		32	–––	–––	–––	–––	–––	0.2–0.7	8.69	4.20	17.3	12.9
		54	0.3–1.0	5.24	–––	10.5	6.07	0.2–0.9	5.24	–––	18.3	13.9
		54	0.5–0.9	10.9	6.07	15.7	11.3	0.2–0.7	13.1	8.69	26.3(1)(2)	21.8(1)
		54	0.7–1.0	18.3	13.9	23.6(1)	19.2	–––	–––	–––	–––	–––
		70	0.7–1.0	24.9(1)	20.5	32.1(1)(2)	27.6(1)(2)	–––	–––	–––	–––	–––
38.1	19.1	32	0.3–1.0	2.4(2)	–––	4.9	1.1(2)	0.2–0.9	2.3(2)	–––	8.1	4.3
		32	–––	–––	–––	–––	–––	0.2–0.7	5.7	2.0(2)	11.5	7.7
		54	0.3–1.0	3.7	–––	7.4	3.6(2)	0.2–0.9	3.7(2)	–––	12.8	9.0
		54	0.5–0.9	7.4	3.6(2)	11.1	7.3	0.2–0.7	9.2	5.4	18.3	14.6
		54	0.7–1.0	10.9	7.2	14.6	10.8	–––	–––	–––	–––	–––
		70	0.7–1.0	17.7	13.9	22.7(1)	18.9	–––	–––	–––	–––	–––
		70	0.8–1.2	–––	–––	27.7(1)(2)	24.0(1)(2)	–––	–––	–––	–––	–––
50.8	19.1	32	0.3–1.0	1.4(2)	–––	2.8	–––	0.2–0.9	1.3(2)	–––	4.6	1.7(2)
		32	–––	–––	–––	–––	–––	0.2–0.7	3.3	0.4(2)	6.6	3.7
		54	0.3–1.0	2.1	–––	4.2	1.3(2)	0.2–0.9	2.1	–––	7.4	4.5
		54	0.5–0.9	4.2	1.4(2)	6.3	3.4	0.2–0.7	5.2	2.3	10.6	7.7
		54	0.7–1.0	6.3	3.4	8.3	5.4	–––	–––	–––	–––	–––
		70	0.7–1.0	10.1	7.2	13.0	10.1	–––	–––	–––	–––	–––
		70	0.8–1.2	–––	–––	15.9	13.1	–––	–––	–––	–––	–––

1. The maximum shutoff pressure when using ENVIRO–SEAL™ packing is defined by: ΔP = Table Value – [1112(Port Diameter)^2]. These table values should not be modified by this formula and the pressure shown in the table should be used for ENVIRO–SEAL packing.
2. The maximum shutoff pressure when using Flexible Graphite packing is defined by: ΔP = Table Value – [5337(Port Diameter)^2]. These table values should not be modified by this formula and the pressure shown in the table should be used for Flexible Graphite packing.

Table 9. Allowable Pressure Drops (all pressures stated in psig)

ORIFICE 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	290(1)(2)	–––	290(1)(2)	–––	3–13	290(1)(2)	–––	290(1)(2)	–––
0.375	0.50	32	5–15	290(2)	278+	290(1)	290(1)	3–13	290(2)	278(2)	290(1)(2)	290(1)(2)
0.8125	0.50	32	5–15	113(2)	19(2)	226	132(2)	3–13	113(2)	19(1)(2)	290(1)	290
		32	7–15	226	132(2)	290(1)	245	3–10	283	188	290(1)(2)	290(1)
		54	4–15	86(2)	–––	257	162(2)	3–13	171(2)	77(2)	290(1)(2)	290(1)(2)
		54	7–15	290(1)(2)	248	290(1)(2)	290(1)	3–10	290(1)	290(1)	290(1)(2)	290(1)(2)
		54	9–15	290(1)(2)	290(1)	290(1)(2)	290(1)	–––	–––	–––	–––	–––
1.0625	0.50	32	5–15	68(2)	–––	137	62(2)	3–13	68(2)	–––	239	165
		32	7–15	137	62(2)	205	130	3–10	171	96(2)	290(1)	267
		54	4–15	52(2)	–––	155	81(2)	3–13	104(2)	29(2)	290(1)	288
		54	7–15	207	132	290	236	3–10	259	184	290(1)(2)	290(1)(2)
		54	9–15	290	236	290(1)(2)	290(1)	–––	–––	–––	–––	–––
1.25	0.75	32	5–15	50	–––	101	36	3–13	50	–––	176	111
		32	–––	–––	–––	–––	–––	3–10	126	61	251	187
		54	5–15	76	–––	152	88	3–13	76	–––	266	202
		54	7–13	152	88	228	164	3–10	190	126	290(1)(2)	290(1)
		54	10–14	266	202	290(1)	278	–––	–––	–––	–––	–––
		70	10–15	290(1)	290	290(1)(2)	290(1)(2)	–––	–––	–––	–––	–––
1.5	0.75	32	5–15	35(2)	–––	71	16(2)	3–13	35(2)	–––	124	69
		32	–––	–––	–––	–––	–––	3–10	89	34(2)	177	123
		54	5–15	54	–––	107	53(2)	3–13	54(2)	–––	188	133
		54	7–13	107	53(2)	161	106	3–10	134	80	269	214
		54	10–14	188	133	242	187	–––	–––	–––	–––	–––
		70	10–15	256	201	290(1)	274	–––	–––	–––	–––	–––
		70	12–18	–––	–––	290(1)(2)	290(1)(2)	–––	–––	–––	–––	–––
2.0	0.75	32	5–15	20(2)	–––	41	–––	3–13	20(2)	–––	71	29(2)
		32	–––	–––	–––	–––	–––	3–10	51	9(2)	102	60
		54	5–15	31	–––	62	20(2)	3–13	31	–––	108	66
		54	7–13	62	20(2)	92	51	3–10	77	35	154	112
		54	10–14	108	66	139	97	–––	–––	–––	–––	–––
		70	10–15	147	105	189	147	–––	–––	–––	–––	–––
		70	12–18	–––	–––	230	189	–––	–––	–––	–––	–––

1. The maximum shutoff pressure when using ENVIRO–SEAL™ packing is defined by: ΔP = Table Value – [25(Port Diameter)^2]. These table values should not be modified by this formula and the pressure shown in the table should be used for ENVIRO–SEAL packing.
2. The maximum shutoff pressure when using Flexible Graphite packing is defined by: ΔP = Table Value – [120(Port Diameter)^2]. These table values should not be modified by this formula and the pressure shown in the table should be used for Flexible Graphite packing.

Table 10. Valve Dimensions

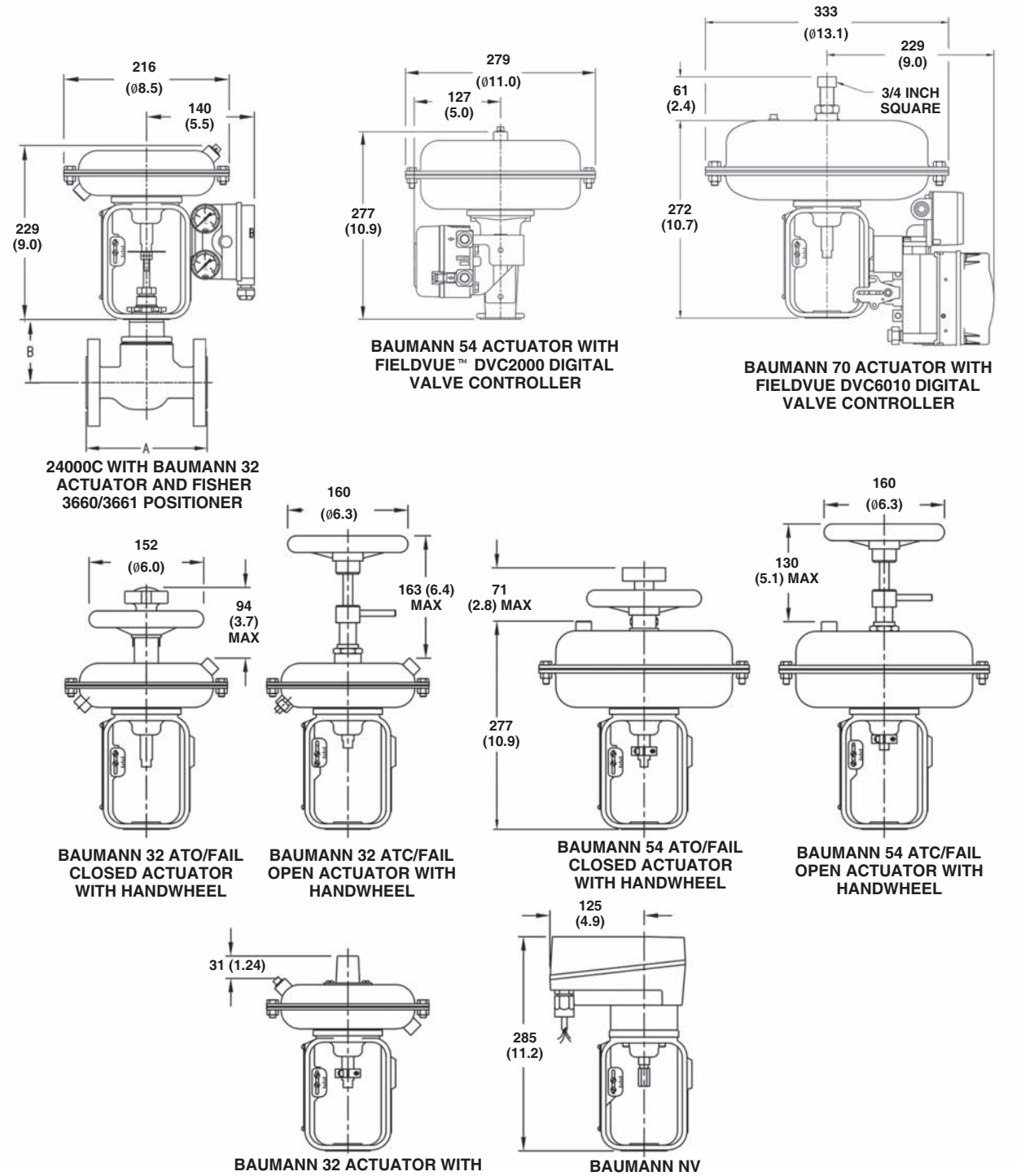
VALVE SIZE		A FACE–TO–FACE				B BONNET	
EN	ASME	EN 10–40		CL150			
DN	NPS	mm	in	mm	in	in	mm
15	1/2	130	5.1	184	7.25	3.2	80
20	3/4	150	5.9	184	7.25	3.2	80
25	1	160	6.3	184	7.25	3.3	83
40	1–1/2	200	7.9	222	8.75	3.9	99
50	2	230	9.1	254	10.00	4.2	107

Table 11. Valve Assembly Weights

VALVE SIZE		WEIGHTS	
EN	ASME		
DN	NPS	kg	lb
15	1/2	3.9	9
20	3/4	4.8	11
25	1	6.4	14
40	1–1/2	10	22
50	2	15	33

Table 12. Actuator Weights

ACTUATOR TYPE	WEIGHTS	
	kg	lb
32	4.5	10
54	11.3	25
70	15.4	34
MV1020	10	22
VA1020	13.6	30
NV24–MFT (non spring return)	1.5	3.3
NVF24–MFT or NVF24–MFT–E (spring return)	1.8	4



NOTE: ACTUATOR REMOVAL REQUIRES 115 mm (4–1/2 INCHES) VERTICAL CLEARANCE.

Figure 7. Dimensional Drawings

Table 13. Pneumatic Actuators

Actuator Type
32
54
70

Table 14. Electric Actuators(1)

Actuator Type	Travel
MV1020	n/a
VA1020	n/a
NV(2)	50
NVF(3)	75
NVFE(4)	

1. Refer to 52.1:NVACT, Baumann NV Electric Actuator with 24000 Control Valves, D103326X012 for details.
2. NV24–MFT = Non Spring Return
3. NVF24=–MFT = Spring Return – Fail Open
4. NV24–MFT–E = Spring Return – Fail Closed

Table 15. Model Numbering System

	24				C	
Actuator Type(1)	Valve Body Series	Plug Series	Characteristic	Seat Leakage	Valve Body Material	
		102	Linear / Metal Seat	IV	C	Carbon Steel
		577	Equal % / PTFE Seat	VI		
		548	Equal % / Metal Seat (S41600)	IV		
		588	Equal % / Metal Seat (S31600)	IV		
		677	Linear / PTFE Seat	VI		
		648	Linear / Metal Seat (S41600)	IV		
		688	Linear / Metal Seat (S41600)	IV		

1. Choose from tables 13 and 14 above.

Note

Neither Emerson, Emerson Process Management, nor any of their affiliated entities assumes responsibility for the selection, use, or maintenance of any product. Responsibility for the selection, use, and maintenance of any product remains with the purchaser and end user.

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