

Bulletin

24C/24D.1.LS:BTN

August 2003

24000C/D CONTROL VALVES

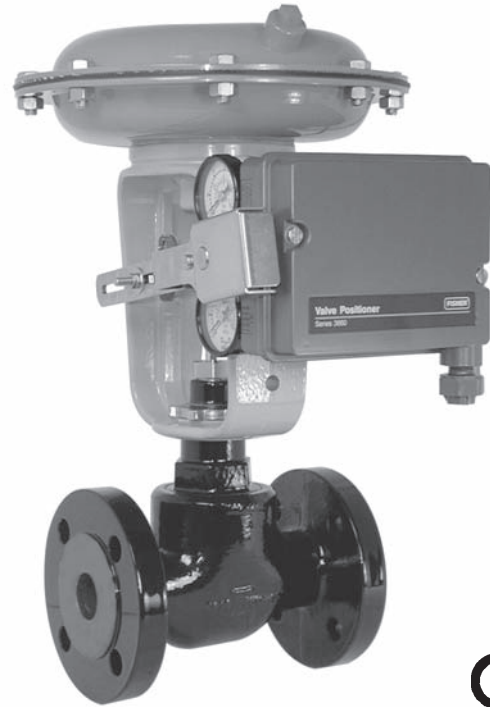
24000C Series Carbon Steel and 24000D Series Ductile Iron Little Scotty Control Valves

Little Scotty industrial control valves are intended for general utility service in pressure, flow and temperature control applications for the textile, pharmaceutical, semiconductor and industrial Heating, Ventilation & Air Conditioning markets.

This compact control valve series is positioned to take advantage of the trend toward industrial grade requirements in a range of applications spanning from general utility and special applications. Industrial grade control valves exhibit low hysteresis and deadband, good control characteristics, tight shutoff, rugged construction, high performance packing and easy maintainability which translates into reduced long-term operating costs.

FEATURES:

- Compact and light weight design reduces installed piping costs.
- ASME and DIN end connection options to meet your piping standards.
- Epoxy powder coated valve body and actuator with stainless steel fasteners for maximum corrosion resistance.
- High quality type 316 austenitic stainless steel trim materials. (ASTM A582 S41600 optional trim available).
- Multiple trim capacity reductions available to meet changing process requirements.
- Superior dual stem and plug guiding provides increased stability during plug travel.
- FIELDVUE^(R) Digital Valve Controller available for remote calibration and diagnostics in facilities using the PlantWeb^(R) architecture.
- ENVIRO-SEAL^(R) packing option for increased packing life and integrity.
- Multi-spring field reversible actuator with reduced deadband permits direct operation from remote signal devices.
- Entire actuator and yoke can be removed from the valve assembly while maintaining packing integrity and providing user safety.



CE

BAUMANN


EMERSON
Process Management

24000C/D Control Valves

MATERIALS OF CONSTRUCTION

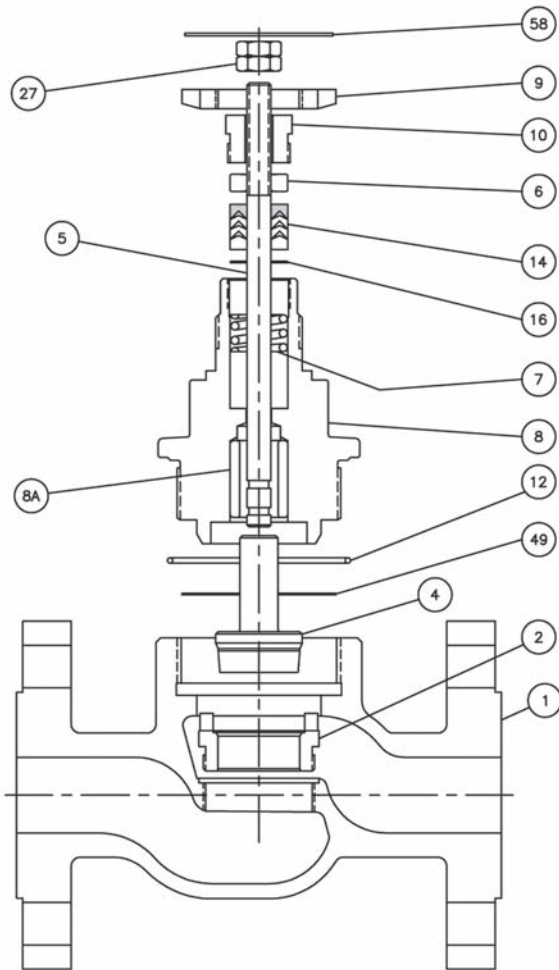
KEY NO.	DESCRIPTION	MATERIAL
1	Body, Ductile Iron	DIN GGG-40.3 / WN 0.7043
	Body, Carbon Steel	Dual Certified to ASTM A216 WCC & DIN Spec GP240GH / WN 1.0619 (cast steel)
2	Seat Ring	ASTM A276 S31600 / CF8M (standard)
		ASTM A582 S41600 (optional)
4	Plug (Metal Seat) $C_v \leq 2.5$	ASTM A479 S21800 (Nitronic 60) (standard)
		ASTM A582 S41600 (optional)
	Plug (Metal Seat) $C_v \geq 4.0$	ASTM A479 or ASTM A351 GR. CF8MS31600 (standard)
		ASTM A582 S41600 (optional)
Plug (Soft Seat)	ASTM A479 S31600 with PTFE Insert	
5	Stem	ASTM A276 S31600
6	Stem Guide	JLON 2000 (proprietary plastic)
7	Spring	ASTM A313 S30200
8	Bonnet	Dual Certified to ASTM A216 WCC & DIN Spec GP240GH / WN 1.0619 (cast steel)
8A	Bonnet Bushing	JLON 2000 (proprietary plastic)
9	Drive Nut (Yoke)	ASTM A194 GR.8 (304 stainless steel)
10	Packing Follower	ASTM A276 S31600
12	O-Ring	Viton
14	Packing Set	PTFE (standard)
		Molded Graphite Ribbon(Grafoil) (optional)
		ENVIRO-SEAL (optional)
16	Washer	ASTM A240 S31600
27	Locknuts	18-8 Stainless Steel
49	Body Gasket	Annealed Soft Copper (standard)
		Graphite with stainless steel insert (optional)
58	Travel Indicator	ASTM S240 S30400

Bulletin

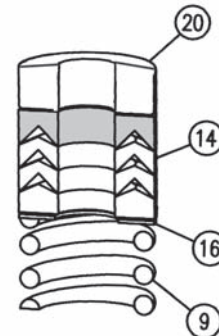
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24000C/D CONTROL VALVES

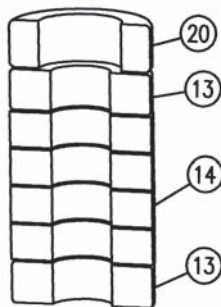


Valve Body Subassembly shown with Standard Packing



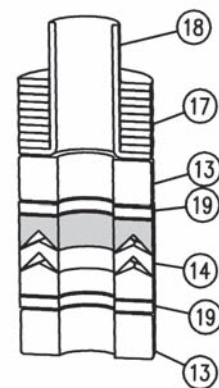
Spring Loaded PTFE V-Ring Packing (standard)

KEY NO.	DESCRIPTION	MATERIAL
9	Spring	ASTM A313 S30200
14	Packing Set	PTFE / carbon filled PTFE
16	Washer	ASTM A240 S31600
20	Stem Guide	JLON 2000 (proprietary plastic)



Molded Graphite (Grafoil) Packing (optional)

KEY NO.	DESCRIPTION	MATERIAL
13	Bushings	Carbon-Graphite
14	Packing Set	Graphite
20	Stem Guide	ASTM A582 S30300



ENVIRO-SEAL Packing (optional)

KEY NO.	DESCRIPTION	MATERIAL
13	Bushings	Carbon Graphite
14	Packing Set	PTFE / carbon filled PTFE
17	Belleville Springs	ASTM B637 N07718
18	Bushing	PEEK
19	Washers	PTFE, Filled Gylon

24000C/D Control Valves

Cv VALUES @ 100% PLUG OPENING

VALVE SIZE		PORT DIAMETER		PLUG TRAVEL						
						102	577	588	677	688
in	DN	in	mm	in	mm	Cv	Cv	Cv	Cv	Cv
1/2, 3/4, & 1	15, 20, & 25	0.25	6.3	0.50	12.7	0.02	---	0.2, 0.5, 1.0	---	0.5, 1.0
		0.375	9.5	0.50	12.7	---	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	15	0.8125	20.5	0.50	12.7	---	4, 6	4, 7.7	5	4, 6
3/4	20	0.8125	20.5	0.50	12.7	---	4, 7.5	4, 10.1	5	4, 8
1	25	0.8125	20.5	0.50	12.7	---	4, 8.5	4, 10.1	5	4, 9
		1.0625	27.0	0.50	12.7	---	13	13.6	---	13
1-1/2	40	1.25	31.8	0.75	19.1	---	20	10, 20	20	10, 20
		1.5	38.1	0.75	19.1	---	10, 17, 28	10, 17, 32.9	10, 17	10, 17, 28
2	50	1.5	38.1	0.75	19.1	---	10, 17, 28	10, 17, 32.9	10, 17	10, 17, 28
		2.0	50.8	0.75	19.1	---	30	30, 52.9	30, 50	30, 50

TECHNICAL SPECIFICATIONS

NOMINAL SIZE		1/2", 3/4", 1", 1-1/2", & 2" / DN15, 20, 25, 40, & 50
BODY RATING		ASME Class 150 or PN 40 per EN 1092-2
CONNECTIONS		Mates to ASME Class 150 RF or PN10 thru PN40 flanges per EN 1092-2
FLANGE FINISH	ANSI	ANSI 250 to 125 Ra circular lay
	DIN	DIN 500 to 300 Ra circular lay
SEAT PLUG SEALING	PTFE Soft Seat, Class VI	-100° to 450°F / -73° to 232°C
	Metal Seat, Class IV	-320° to 450°F / -195° to 232°C
BONNET		-100° to 450°F / -73° to 232°C
PACKING (A)	Spring Loaded PTFE V-Ring	-320° to 450°F / -195° to 232°C
	Molded Graphite Ribbon	- 50° to 450°F / - 45.5° to 232°C
	ENVIRO-SEAL PTFE	-320° to 450°F / -195° to 232°C
CHARACTERISTIC		Equal Percentage or Linear
Note A. See Pressure Temperature Ratings chart for specific body material rating.		

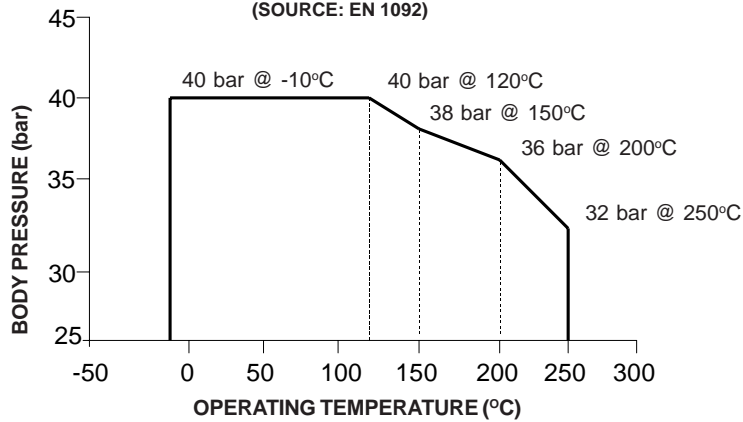
ACTUATOR SPECIFICATIONS

TYPE	32, 54, 70 Multi-Spring Diaphragm (Single Acting)
DIAPHRAGM AREA	32, 54, 70 in ² / 210, 350, 450 cm ²
ACTION	Push Down to Close
AIR FAILURE	32 & 54 in ² Open or Closed (Field-Reversible) / 70 in ² Closed Only
TRAVEL	1/2 & 3/4 inch / 12.7 & 19.1 mm
AMBIENT TEMPERATURE RANGE	-20 to 160°F / -30 to 70°C
MAXIMUM AIR PRESSURE	35 psig / 2.5 barg
DIAPHRAGM MATERIAL	Nitrile Elastomer, Polyester Fabric
SPRING CASES	Steel, Powder Epoxy-Coated with stainless steel Fasteners
YOKE	Ductile Iron, Powder Epoxy-Coated

NOTE: Optional reinforced silicon elastomer diaphragm with viton o-ring actuator stem seal for high ambient temperature conditions (-20°F to 250°F / -29°C to 121°C) is available with type 32 and 54 actuators only.

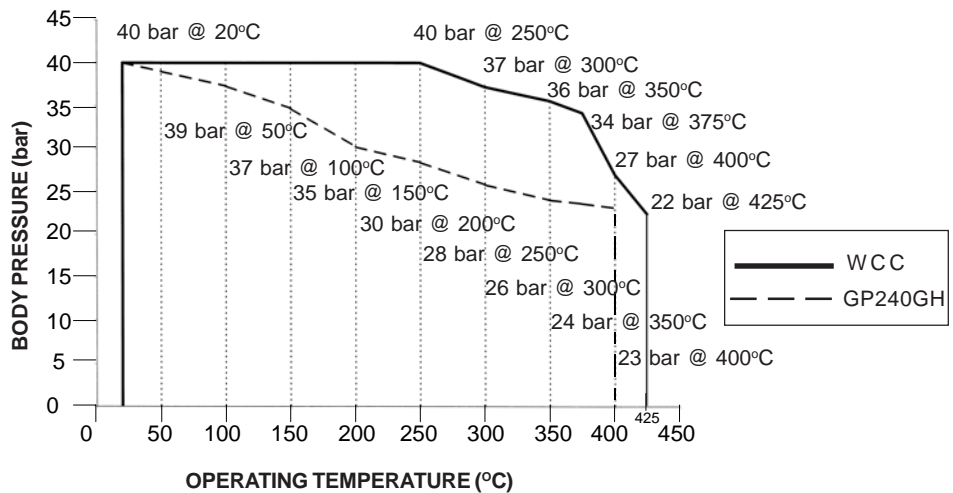
**DUCTILE IRON FLANGES, BODY PRESSURE-TEMPERATURE RATINGS
DIN PN10- 40 FLANGED VALVES**

(SOURCE: EN 1092)



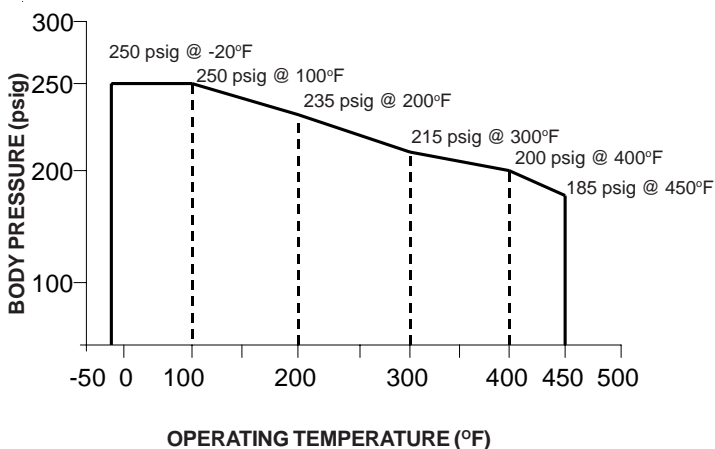
**CARBON STEEL FLANGES, BODY PRESSURE-TEMPERATURE RATINGS
DIN PN10- 40 FLANGED VALVES**

(SOURCE: EN 1092, Material group 1C2, A216 Grade WCC and SOURCE: EN 1092, Material group 3E0, GP240GH -EN 10213-2 1.0619)



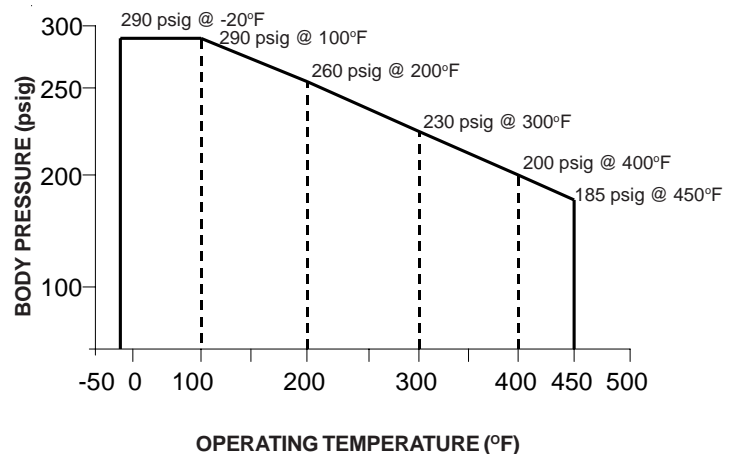
DUCTILE IRON FLANGES, BODY PRESSURE-TEMPERATURE RATINGS, ASME CLASS 150 FLANGED VALVES

(SOURCE: ASME B16.42)



CARBON STEEL FLANGES, BODY PRESSURE-TEMPERATURE RATINGS, ASME CLASS 150 FLANGED VALVES

(SOURCE: ASME B16.5a)



24000C/D Control Valves

DIFFERENTIAL PRESSURE TABLE (All pressures stated in bar)

PORT DIA. (mm)	PLUG TRAVEL (mm)	ACT TYPE	AIR TO OPEN ACTION						AIR TO CLOSE ACTION			
			BENCH RANGE (barg)	0.21-1.0 barg SIGNAL TO ACTUATOR		WITH POSITIONER 1.4 barg AIR SUPPLY		BENCH RANGE (barg)	0.21-1.0 barg SIGNAL TO ACTUATOR		WITH POSITIONER 1.4 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	0.34-1.0	40.0(1)(2)	---	40.0(1)(2)	---	0.20-0.89	40.0(1)(2)	---	40.0(1)(2)	---
9.5	12.7	32	0.34-1.0	31.6(2)	19.5(2)	40.0(1)	40.0(1)	0.20-0.89	40.0(2)	17.3(2)	40.0(1)(2)	40.0(1)(2)
20.6	12.7	32	0.34-1.0	7.9(2)	1.4(2)	15.8	9.3(2)	0.20-0.89	7.3(2)	0.8(2)	25.7(1)	19.1
	12.7	32	0.48-1.0	14.5	7.9(2)	21.6(1)	15.2	0.20-0.68	18.3	11.8	36.6(1)(2)	30.2(1)
	12.7	54	0.28-1.0	5.9(2)	---	17.6	11.2(2)	0.20-0.89	11.7(2)	5.2(2)	40.0(1)(2)	34.4(1)(2)
	12.7	54	0.48-1.0	23.5(1)(2)	17.0	35.3(1)(2)	28.8(1)	0.20-0.68	29.2(1)	22.6(1)	40.0(1)(2)	40.0(1)(2)
	12.7	54	0.62-1.0	35.3(1)(2)	28.8(1)	40.0	40.0(1)	---	---	---	---	---
27.0	12.7	32	0.34-1.0	4.8(2)	---	9.6	4.4	0.20-0.89	4.4(2)	---	15.5	10.4
	12.7	32	0.48-1.0	8.8	3.6(2)	13.1	7.9	0.20-0.68	11.1	5.9(2)	20.8(1)	17.0
	12.7	54	0.28-1.0	3.6(2)	---	10.7	5.5(2)	0.20-0.89	7.1(2)	1.9(2)	24.1(1)	19.1
	12.7	54	0.48-1.0	14.3	9.1	28.6	16.2	0.20-0.68	17.2	12.6	34.4(1)(2)	29.4(1)(2)
	12.7	54	0.62-1.0	21.4	16.2	21.4	16.3(1)	---	---	---	---	---
31.8	19.1	32	0.34-1.0	3.45	---	6.96	2.48	0.20-0.89	3.45	---	12.1	7.65
	19.1	32	---	---	---	---	---	0.20-0.68	8.69	4.20	17.3	12.9
	19.1	54	0.34-1.0	5.24	---	10.5	6.07	0.20-0.89	5.24	---	18.3	13.9
	19.1	54	0.48-1.0	10.9	6.07	15.7	11.3	0.20-0.68	13.1	8.69	26.3(1)(2)	21.8(1)
	19.1	54	0.68-0.96	18.3	13.9	23.6(1)	19.2	--	---	---	---	---
	19.1	70	0.82-1.24	24.9(1)	20.5	32.1(1)(2)	27.6(1)(2)	--	---	---	---	---
38.1	19.1	32	0.34-1.0	2.4(2)	---	4.9	1.1(2)	0.20-0.89	2.3(2)	--	8.1	4.3
	19.1	32	---	---	---	---	---	0.20-0.68	5.7	2.0(2)	11.5	7.7
	19.1	54	0.34-1.0	3.7	---	7.4	3.6(2)	0.20-0.89	3.7(2)	--	12.8	9.0
	19.1	54	0.48-0.89	7.4	3.6(2)	11.1	7.3	0.20-0.68	9.2	5.4	18.3	14.6
	19.1	54	0.68-0.96	10.9	7.2	14.6	10.8	---	---	---	---	---
	19.1	70	0.68-1.0	17.7	13.9	22.7(1)	18.9	---	---	---	---	---
	19.1	70	0.82-1.24	---	---	27.7(1)(2)	24.0(1)(2)	---	---	---	---	---
50.8	19.1	32	0.34-1.0	1.4(2)	---	2.8	---	0.20-0.89	1.3(2)	---	4.6	1.7(2)
	19.1	32	---	---	---	---	---	0.20-0.68	3.3	0.4(2)	6.6	3.7
	19.1	54	0.34-1.0	2.1	---	4.2	1.3(2)	0.20-0.89	2.1	---	7.4	4.5
	19.1	54	0.48-0.89	4.2	1.4(2)	6.3	3.4	0.20-0.68	5.2	2.3	10.6	7.7
	19.1	54	0.68-0.96	6.3	3.4	8.3	5.4	---	---	---	---	---
	19.1	70	0.68-1.0	10.1	7.2	13.0	10.1	---	---	---	---	---
	19.1	70	0.82-1.24	---	---	15.9	13.1	---	---	---	---	---

NOTE A: The maximum shutoff pressure when using ENVIRO-SEAL Packing is defined by: $\Delta P = \text{Table Value} - [1112/(\text{Port Diameter})^2]$

(1) These table values should not be modified by this formula and the maximum ΔP of 40 bar should be used for ENVIRO-SEAL Packing.

NOTE B: The maximum shutoff pressure when using Grafoil Packing is defined by: $\Delta P = \text{Table Value} - [5337/(\text{Port Diameter})^2]$

(2) These table values should not be modified by this formula and the maximum ΔP of 40 bar should be used for Grafoil Packing.

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24000C/D CONTROL VALVES

DIFFERENTIAL PRESSURE TABLE (All pressures stated in psig)

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

NOTE A: The maximum shutoff pressure when using ENVIRO-SEAL Packing is defined by: $\Delta P = \text{Table Value} - [25/(\text{Port Diameter})^2]$

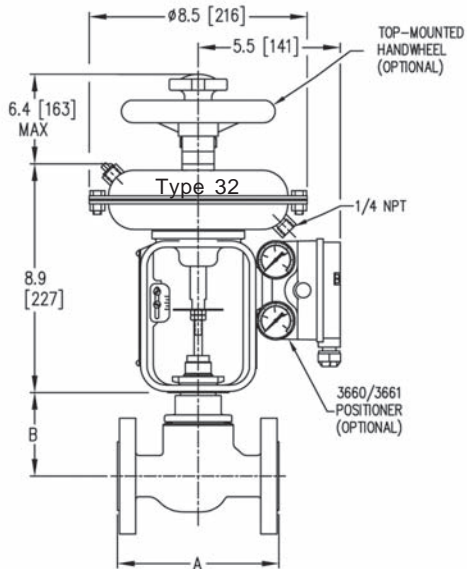
(1) These table values should not be modified by this formula and the maximum ΔP of 290 psi should be used for ENVIRO-SEAL Packing.

NOTE B: The maximum shutoff pressure when using Grafoil Packing is defined by: $\Delta P = \text{Table Value} - [120/(\text{Port Diameter})^2]$

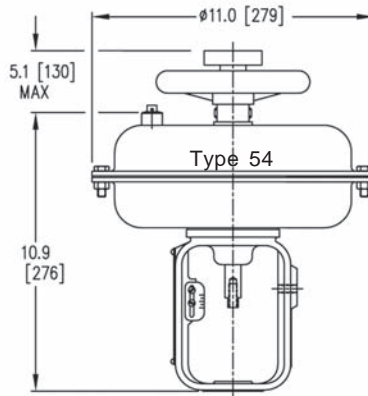
(2) These table values should not be modified by this formula and the maximum ΔP of 290 psi should be used for Grafoil Packing.

24000C/D Control Valves

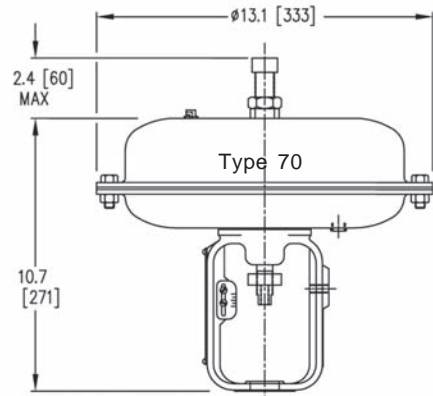
DIMENSIONS: inches [millimeters]



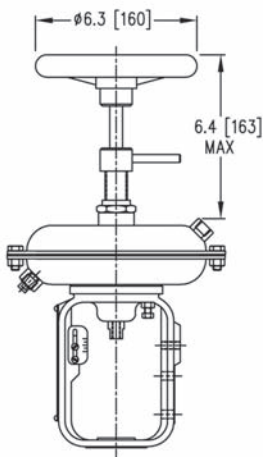
**24000C/D FLANGED
ATO/Fail Closed Action
with Handwheel**



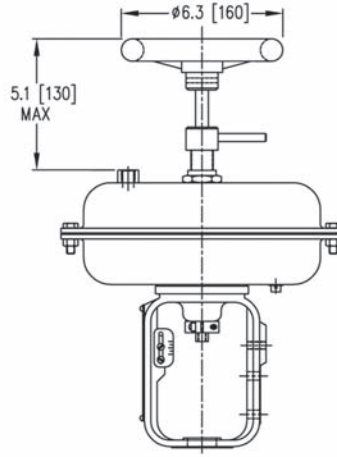
**ATO/Fail Closed Action
with Handwheel**



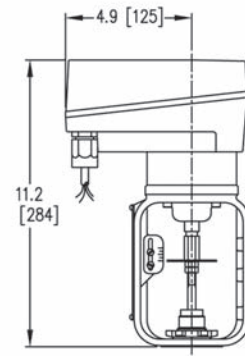
ATO/Fail Closed Action



**Type 32
ATC/Fail Open Action
with Handwheel**



**Type 54
ATC/Fail Open Action
with Handwheel**



Type NV Electric

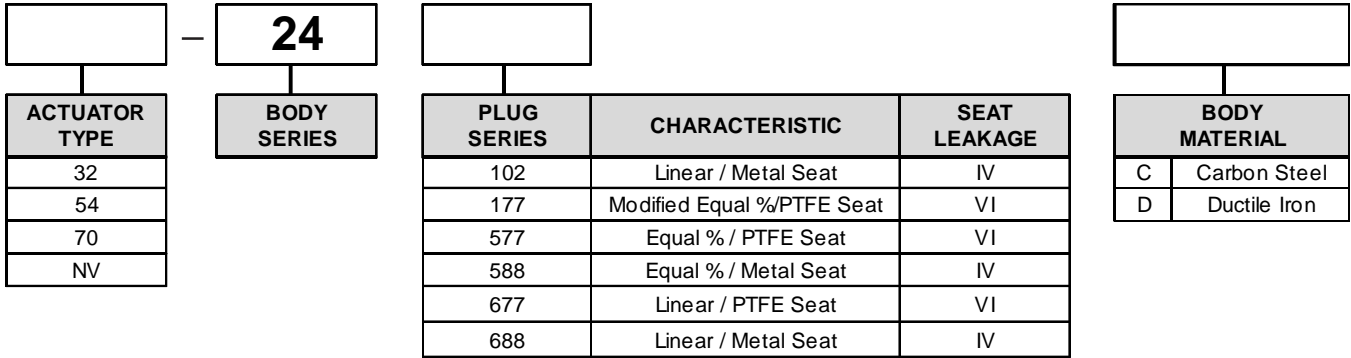
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24C/24D.1.LS:BTN

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24000C/D CONTROL VALVES

MODEL NUMBERING SYSTEM



DIMENSIONS

VALVE SIZE		"A" Class 150 RF		"A" PN10-40		"B"	
in	DN	in	mm	in	mm	in	mm
1/2	15	7.25	184	5.1	130	3.2	80
3/4	20	7.25	184	5.9	150	3.2	80
1	25	7.25	184	6.3	160	3.3	83
1-1/2	40	8.75	222	7.9	200	3.9	99
2	50	10.00	254	9.1	230	4.2	107

ACTUATOR REMOVAL REQUIRES 4-1/2" or 115 mm VERTICAL CLEARANCE

WEIGHTS

VALVE ASSEMBLY:

VALVE SIZE		WEIGHTS	
in	DN	lbs	kg
1/2	15	9.0	3.9
3/4	20	11	4.8
1	25	14	6.4
1-1/2	40	22	10
2	50	33	15

ACTUATOR:

TYPE	WEIGHTS	
	lbs	kg
32	10	4.5
54	25	11.3
70	34.4	15.6
NV24-MFT (non spring return)	3.3	1.5
NVF24-MFT or NVF24-MFT-E (spring return)	4.0	1.8

24000C/D Control Valves

ACCESSORY OPTIONS



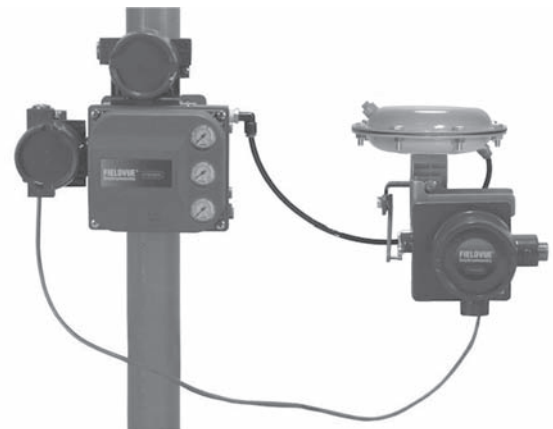
- Top-Mounted Handwheel for pull up or push down manual override (available on type 32 and 54 actuators ONLY).
- Adjustable mechanical travel stops to limit valve opening and closing available on type 32 and 54 actuators.



- FIELDVUE Digital Valve Controller maximizes the user's flexibility by providing programmable flow characteristics, adjustable gain, travel limits, and position transmission.



- Electric Actuators are available in various electrical enclosure ratings, input signal ranges and supply voltages to suit thrust, stem travel time and duty cycles (continuous & intermittent) as dictated by the process criteria.
- Multifunction technology includes standard autocalibration, input signal, and three different failure modes.
- Compact and lightweight design.
- Rugged epoxy coated ductile iron yoke with visible valve travel indication.
- Polycarbon ABS actuator housing, meets UL94-5V flammability rating and NEMA 2/IP54 with cable entry down.
- Ease of motor assembly replacement minimizes downtime and service cost.



- With today's unique process environments, you can not always mount a positioner on the valve. For high temperature environments up to 257°F (125°C) smaller valves, small footprints or inaccessible locations, you could remote mount a FIELDVUE Digital Valve Controller.

Bulletin

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24000C/D CONTROL VALVES

ACCESSORY OPTIONS



- 3661 Electropneumatic Positioner, CENELEC intrinsically EEx ia IIC T6 safe with gain and damping adjustments for tuning valve to process loop dynamics. (CE label).
- 3660 Pneumatic Positioner with gain and damping adjustments for tuning valve to process loop dynamics. (Bypass valve available.)



- 646 I/P Transducer certified for LCIE flameproof or PTB intrinsically safe applications. (CE label).



- The 3582 Series pneumatic valve positioner and 3582i electropneumatic valve positioner offer field proven positioner design which is accurate, fast-responding and able to withstand the vibrations of most plant environments. Low steady-state air consumption contributes to efficient operation. Both units provide split range capabilities.



- 846 I/P Transducer is available in explosion proof, dust proof, intrinsically safe and non-incendiary constructions. The housing is available in CSA Type 4X and NEMA 4X designs, designed to meet IP66, tropicalization. (CE label).



- 67CF Air Filter Regulator with or without supply gauge.

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Emerson Process Management

Baumann Inc.

130 International Drive
Portsmouth, NH 03801

T 1 (603) 766-8500

F 1 (603) 766-8590

www.baumann.com

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