

Fisher™ Baumann™ 24000C Carbon Steel Control Valve



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Section 1: Introduction

Fisher Baumann 24000C carbon steel industrial control valves (Figure 1) are intended for general utility service in pressure, flow and temperature control applications.

1.1 Scope of the Manual

This instruction manual includes installation, maintenance and parts information for the Fisher Baumann 24000C control valve.

WARNING



Do not install, operate or maintain Fisher Baumann 24000C control valves without being fully trained and qualified in valve, actuator and accessory installation, operation and maintenance. To avoid personal injury or property damage, it is important to carefully read, understand and follow all the contents of this manual, including all safety cautions and warnings. If you have any questions about these instructions, contact your [Emerson sales office](#) before proceeding.

Figure 1. 24000C Control Valve with Fisher Baumann 32 Actuator



w9743-1

 WARNING

Always wear protective gloves, clothing and eyewear when performing any installation operations to avoid personal injury.

Personal injury or property damage caused by sudden release of pressure or bursting of pressure retaining parts may result if service conditions exceed those for which the product was intended. To avoid injury or damage, provide a relief valve for over pressure protection as required by government or accepted industry codes and good engineering practices.

Check with your process or safety engineer for any additional measures that must be taken to protect against process media.

If installing into an existing application, also refer to the WARNING at the beginning of the Maintenance section in this instruction manual.

 WARNING

This valve is intended for a specific range of pressures, temperatures and other application specifications. Applying different pressures and temperatures to the valve could result in parts damage, malfunction of the control valve or loss of control of the process. Do not expose this product to service conditions or variables other than those for which the product was intended. If you are not sure what these conditions are you should contact your [Emerson sales office](#) for more complete specifications. Provide the product serial numbers (shown on the nameplate) and all other pertinent information.

NOTE

The acronym of CWP may appear on the nameplate. CWP (Cold Working Pressure) denotes the pressure rating at normal ambient temperature. A normal ambient temperature range being -4 to +100°F / -20 to +38°C.

 WARNING

If you move or work on an actuator installed on a valve with loading pressure applied, keep your hands and tools away from the stem travel path to avoid personal injury. Be especially careful when removing the stem connector to release all loading on the actuator stem whether it be from air pressure on the diaphragm or compression in the actuator springs.

Likewise take similar care when adjusting or removing any optional travel stop. Refer to the relevant actuator Maintenance Instructions.

If hoisting the valve, take care to prevent people from being injured in case the hoist or rigging slips. Be sure to use adequate sized hoists and chains or slings to handle the valve.

Personal injury could result from packing leakage. Valve packing is tightened before shipment; however, the packing might require some readjustment to meet specific service conditions.

1.2 Education Services

Emerson's Education Services

Phone: 800-338-8158

Email: education@emerson.com

emerson.com/en/final-control/services/valve-training

Section 2: Maintenance

WARNING

Avoid personal injury and property damage from sudden release of process pressure or bursting of parts. Before performing any maintenance operations:

- Do not remove the actuator from the valve while the valve is still pressurized.
- Always wear protective gloves, clothing and eyewear when performing any maintenance operations.
- Disconnect any operating lines providing air pressure, electric power or a control signal to the actuator. Be sure the actuator cannot suddenly open or close the valve.
- Use bypass valves or completely shut off the process to isolate the valve from process pressure. Relieve process pressure on both sides of the valve. Drain the process media from both sides of the valve.
- Depending on the actuator construction, it will be necessary to manage the pneumatic actuator spring pre-compression. It is essential to refer to the relevant actuator instructions in this manual to perform safe removal of the actuator from the valve.
- Use lock-out procedures to be sure the above measures stay in effect while you work on the equipment.
- The valve packing box may contain process fluids that are pressurized, even when the valve has been removed from the pipeline. Process fluids may spray out under pressure when removing the packing hardware or packing rings or when loosening the packing box pipe plug.
- Check with your process or safety engineer for any additional measures that must be taken to protect against process media.

NOTE

Whenever a gasket seal is disturbed by removing or shifting gasketed parts, install a new gasket during reassembly. This provides a good gasket seal because the used gasket may not seal properly.

WARNING

Avoid personal injury or property damage by thoroughly cleaning the line of all dirt, welding chips, scale, oil or grease and other foreign material. Failure to do so could result in damage to the seating and sealing surfaces of the valve and result in damage to the valve and release of process materials.

Section 3: Installation

Refer to key numbers in Figure 3 unless otherwise specified.

1. Before installing the valve in the pipeline, thoroughly clean the line of all dirt, welding chips, scale, oil or grease and other foreign material.
2. Install the valve so the controlled fluid will flow through the valve body in the direction indicated by the arrow cast on the valve body.
3. A three-valve bypass would permit removal of the control valve from the line without shutting down the system.
4. In case of a heat-insulated installation, insulate the valve body only, not the bonnet.



WARNING

To avoid personal injury or property damage, do not attempt to do any work on a valve while the system is in operation. The valve must be isolated 100% from the active system and the isolated line voided of pressure and/or hazardous fluids.

3.1 Air Piping

1. For an air-to-extend actuator (air-to-close action), connect the actuating air pressure line to the 1/4 NPT opening in the upper diaphragm case. For an air-to-retract actuator (air-to-open action) connect the actuating air pressure line to the 1/4 NPT opening in the lower diaphragm case.
2. Use 6.4 mm / 1/4 in. O.D. tubing or equivalent for all air lines. If air line exceeds 8 m / 25 ft in length, 9.5 mm / 3/8 in. tubing is preferred. Air pressure should not exceed 2.5 barg / 35 psig.



CAUTION

- **When assembling or disassembling the valve, do not turn the valve stem while the plug is touching the valve seat. This will damage the valve's seating surfaces.**
- **When adjusting the valve stem do not grip the stem directly with pliers or a wrench. This will damage the surface of the stem and cause damage to the packing in the valve. Instead, counter-tighten the two locknuts (key 27) on the stem (key 5). This will allow you to turn the stem by turning the locknuts (key 27) with a wrench.**
- **When placing valve in a vise, clamp the flat end faces of the valve. Do not clamp the rounded sides of the valve. This will distort the shape of the casting and will ruin the valve.**

3.2 Disassembly

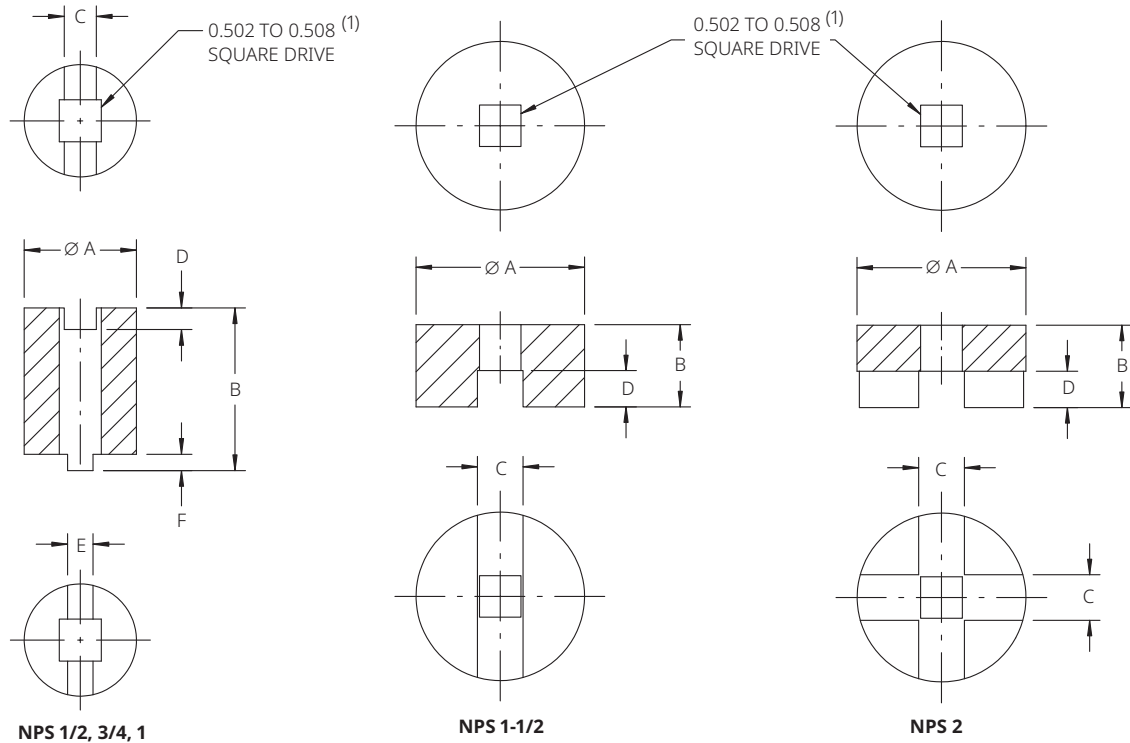
1. Mount the valve in a vise by clamping flat end faces of the valve (Figure 3). Caution must be taken not to damage the serrated flange faces.
2. Remove the actuator, stem locknuts (key 27), travel indicator (key 58) and yoke drive nut (key 9).
3. Turn the bonnet (key 8) in a counter-clockwise direction from the valve body (key 1). Remove the O-ring (key 12) and remove and discard the valve body gasket (key 49). A new gasket should be installed each time the valve is disassembled.
4. Pull the plug and stem assembly (keys 4 and 5) out through the bottom of the bonnet. Rotate the assembly to prevent damage to the packing. Wipe the parts with a clean soft cloth and examine for signs of wear.

CAUTION

Handle the parts carefully to avoid damaging the seating and guiding surfaces.

5. Use a seat ring tool made according to the dimensions in Figure 2 and Table 1 to remove the seat ring (key 2) as follows:
 - a. Insert the tool into the valve body. Be certain the tool lugs are engaged in the corresponding recesses in the seat ring.
 - b. Use a 1/2 in. drive breaker bar or impact wrench having sufficient torque capability to remove the seat ring. Seat ring installation torque is provided in Table 2 for reference. Connect the breaker bar or impact wrench and if needed, an impact-rated extension bar, to the square drive of the seat ring tool.
 - c. Remove the seat ring (key 2) from the valve body. Make sure the seat ring tool is held at a right angle to the seat ring during removal to prevent the tool from disengaging from the lugs of the seat ring.
 - d. Inspect parts for wear or damage that would prevent proper operation of the valve body.

Figure 2. Seat Ring Tool Dimensions



1. MAX ALLOWABLE CENTER DRILL Ø 0.532

Table 1. Seat Ring Tool Dimensions (see Figure 2)

PART NUMBER	DN	NPS	A	B	C	D	E	F
			in.					
GE96219X012	15	1/2	1.32	2.0	0.38	0.26	0.29	0.19
	20	3/4						
GE96219X022	25	1	1.52	2.3	0.40	0.25	0.35	0.20
GE96219X032	40	1-1/2	2.06	0.9	0.55	0.30	---	---
GE96219X042	50	2	2.74	1.0	0.55	0.44	---	---

Table 2. Seat Ring Assembly and Torque Tool

24000C		VALVE SIZE NPS, in. / DN				
		1/2 / 15	3/4 / 20	1 / 25	1-1/2 / 40	2 / 50
Port Diameter	0.25 ⁽¹⁾	GE96219X012	GE96219X012	GE96219X022	---	---
	0.375 ⁽¹⁾	GE96219X012	GE96219X012	GE96219X022	---	---
	0.8125 ⁽²⁾	GE96219X012	GE96219X012	GE96219X022	---	---
	1.0625 ⁽²⁾	---	---	GE96219X022	---	---
	1.25	---	---	---	GE96219X032	---
	1.5	---	---	---	GE96219X032	GE96219X042
	2	---	---	---	---	GE96219X042
Installation Torque, lb•ft		60	60	80	100	130

1. Male end used for trim 151.177 and port diameters 0.25 and 0.375.
2. Female end used for port diameters 0.8125 and 1.0625.

3.3 Lapping the Valve Seat

If valve seat leakage becomes excessive, it may be necessary to lap the valve seat.

Lapping is the process of mating the valve plug to the seat ring, with an abrasive to produce a close fit. When valve seat leakage becomes excessive, lapping becomes necessary. The plug and seat ring seating surfaces should be free of large scratches or dents and the contact surface of the seats should be as narrow as possible.

1. Use a good quality lapping compound with a mixture that contains 280 to 600 grit. Apply at several spots around the plug seating surface. Replace the plug (key 4) in the bonnet (key 8).
2. Place the bonnet (key 8) loosely into the valve body (key 1) to serve as a guide during the lapping operation.
3. Lap the valve by applying a slight pressure on the stem and rotate the stem in short oscillating strokes approximately 8 to 10 times or until you see an even and complete lap line. The plug should be intermittently lifted and turned 90 degrees while lapping to keep the plug and seat ring concentric.
4. Clean the valve seat and plug (key 4) thoroughly when the lapping is complete, removing all traces of lapping compound.

3.4 Replacing Packing

Refer to the standard packing construction and the optional packing shown in Figures 3, 4 and 5 to determine the packing that has been preinstalled in your valve.

1. Disassemble the valve as directed earlier. Remove the locknuts (key 27) and indicator disk (key 58) and turn the plug and stem (keys 4 and 5) out through the packing box. Remove the packing follower (key 10). Push out the old packing (key 14) by working from the underside of the bonnet (key 8).
2. Standard spring loaded PTFE V-ring packing (Figures 3 and 4): Insert each piece in exact order shown in Figures 3 and 4. Hand tighten the packing follower (key 10) until it shoulders on the bonnet (key 8). This will compress the packing spring (key 6), to enable constant stem sealing throughout the packing life.
3. Molded graphite (flexible graphite) packing (Figure 5): Insert each piece in exact order shown in the Figure 5. Hand tighten the packing follower (key 10). Use a wrench to increase tightness by turning the nut an additional 60 degrees.

3.5 Actuator and Valve Body Reassembly

1. Before installing seat ring in valve body, thoroughly clean the threads in the valve body port. Apply suitable lubricate to the threads and tighten to torque specified in Table 2. Remove all excess lubricant after tightening.
2. Insert a new valve body gasket (key 49) and install the bonnet assembly (key 8) with the plug and stem assembly in the valve. The O-ring (key 12) must be reinstalled by gently stretching over the bonnet and snapping into the gap between the top of the valve body (key 1) and the bonnet (key 8). This O-ring acts as a dust/moisture seat.
3. Place the actuator yoke over the stem (key 5). While tilting the actuator back, drop the yoke drive nut (key 9) over the stem (key 5). Run the locknuts (key 27) and travel indicator (key 58) down as far as possible and counter tighten the locknuts (key 27) to lock.

See the Fisher Baumann Pneumatic Actuator Instruction Manual ([D103352X012](#)) for reassembly and bench range adjustment.

CAUTION

When assembling or disassembling the valve, do not turn the valve stem while the plug is in contact with the valve seat. This can damage the seating surface very quickly.

Section 4: Parts

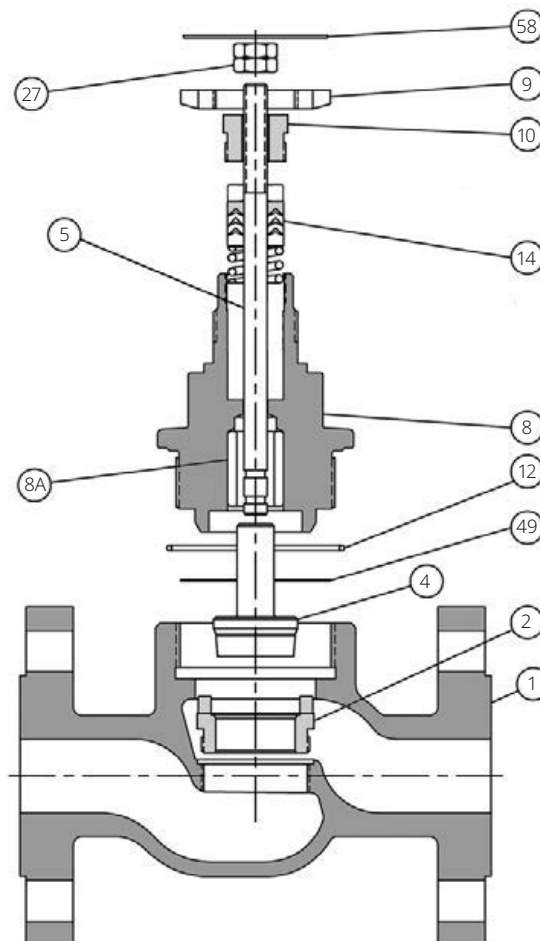
4.1 Parts Ordering

When corresponding with your [Emerson sales office](#) about this equipment, always mention the valve serial number. When ordering replacement parts, also specify the key number, part name and desired material using the following parts tables.

⚠ WARNING

Use only genuine Fisher replacement parts. Components that are not supplied by Emerson should not, under any circumstances, be used in any Fisher valve, because they may void your warranty, might adversely affect the performance of the valve and could cause personal injury and property damage.

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



E1239

Table 3. Fisher Baumann 24000C Common Parts⁽¹⁾

KEY NO.	DESCRIPTION
1	Valve Body, Carbon Steel, EN PN 10 to 40
	Valve Body, Carbon Steel, ASME CL150 RF
8	Bonnet
8A	Bonnet Bushing
9	Drive Nut (Yoke)
10	Packing Follower
12	O-ring
14*	Packing Kit, Spring Loaded PTFE V-Ring (standard)
	Packing Kit, Molded Graphite (optional)
27	Locknuts, qty 2
49*	Valve Body Gasket, Copper (standard)
	Valve Body Gasket, S31600 reinforced Graphite (optional)
58	Travel Indicator

*Recommended spare parts.
1. For valves made before 2005, the common parts numbers above may not apply. Please notify your [Emerson sales office](#) if the valve is prior to 2005 so the appropriate parts can be ordered.

Table 4. Plug for NPS 1/2, 3/4 and 1 Valves - Metal Seat

KEY NO.	DESCRIPTION	PLUG TYPE	PLUG NO.	ORIFICE DIAMETER mm / in.	C _v	K _v
4*	Plug and Stem Assy	Metal Seat, Micro Trim (Linear)	102	6.3 / 0.25	0.2 ⁽¹⁾	0.17 ⁽¹⁾
		Metal Seat (Equal %)	548 (S41600)	6.3 / 0.25	0.2A	0.17A
					0.5 ⁽¹⁾	0.43 ⁽¹⁾
					1.0 ⁽¹⁾	0.86 ⁽¹⁾
				9.5 / 0.375	1.5 ⁽¹⁾	1.29 ⁽¹⁾
					2.5 ⁽¹⁾	2.15 ⁽¹⁾
				20.6 / 0.8125	4	3.4
					7.7	6.6
					10.1	8.7
				26.9 / 1.0625	13.6	11.7

*Recommended spare parts.
1. A matching seat ring (Table 5, key 2) must be furnished with replacement plug orders.

- continued -

Table 4. Plug for NPS 1/2, 3/4 and 1 Valves - Metal Seat (continued)

KEY NO.	DESCRIPTION	PLUG TYPE	PLUG NO.	ORIFICE DIAMETER mm / in.	C _V	K _V
4*	Plug and Stem Assy	Metal Seat (Equal %)	588 (S41600)	6.3 / 0.25	0.2	0.17
					0.5	0.43
					1.0	0.86
				9.5 / 0.375	1.5 ⁽¹⁾	1.29 ⁽¹⁾
					2.5 ⁽¹⁾	2.15 ⁽¹⁾
				20.6 / 0.8125	4	3.4
					7.7	6.6
					10.1	8.7
				26.9 / 1.0625	13.6	11.7
		Metal Seat (Linear)	648 (S41600)	6.3 / 0.25	0.5	0.43
					1.0	0.86
				9.5 / 0.375	1.5	1.29
					2.5	2.15
				20.6 / 0.8125	4	3.4
					6	5.16
					8	6.88
					9	7.74
				26.9 / 1.0625	13	11.18
		Metal Seat (Linear)	688	6.3 / 0.25	0.5	0.43
					1.0	0.86
				9.5 / 0.375	1.5	1.29
					2.5	2.15
				20.6 / 0.8125	4	3.4
					6	5.16
					8	6.88
					9	7.74
				26.9 / 1.0625	13	11.18

*Recommended spare parts.
1. A matching seat ring (Table 5, key 2) must be furnished with replacement plug orders.

Table 5. Seat Ring for NPS 1/2, 3/4 and 1 Valves - Metal Seat

KEY NO.	DESCRIPTION	ORIFICE DIAMETER mm / in.
2*	Seat Ring S31600 ⁽¹⁾	6.3 / 0.25
		9.5 / 0.375
		20.6 / 0.8125
		26.9 / 1.0625
	Seat Ring S41600 ⁽¹⁾	6.3 / 0.25
		9.5 / 0.375
		20.6 / 0.8125
		26.9 / 1.0625
*Recommended spare parts 1. A matching seat ring (key 2) must be furnished with replacement plug orders. See Table 4.		

Table 6. Plug and Seat Ring for NPS 1/2, 3/4 and 1 Valves - Soft Seat

KEY NO.	DESCRIPTION	PLUG TYPE	PLUG NO.	ORIFICE DIAMETER mm / in.	C _V	K _V
4*	Plug and Stem Assy	PTFE Seat (Equal %)	577	9.5 / 0.375	1.0	0.86
					1.5	1.29
					2.5	2.15
				20.6 / 0.8125	4	3.44
					6	5.16
					7.5	6.45
					8.5	7.31
					26.9 / 1.0625	13
		PTFE Seat (Linear)	677	9.5 / 0.375	0.1	0.086
					0.2	0.172
					0.5	0.43
					1.0	0.86
					2.5	2.15
					20.6 / 0.8125	5
2*	Seat Ring			6.3 mm / 0.25 in. Orifice Diameter		
		9.5 mm / 0.375 in. Orifice Diameter				
		20.6 mm / 0.8125 in. Orifice Diameter				
		26.9 mm / 1.0625 in. Orifice Diameter				
*Recommended spare parts						

Table 7. Plug and Seat Ring for NPS 1-1/2 and 2 Valves

KEY NO.	DESCRIPTION	PLUG TYPE	PLUG NO.	ORIFICE DIAMETER mm / in.	C _v	K _v
4*	Plug and Stem Assy	PTFE Seat (Equal %)	577	31.8 / 1.25	20	17.2
				38.1 / 1.50	10	8.6
					17	14.62
					28	24.08
				50.8 / 2.0	30	25.8
		PTFE Seat (Linear)	677	38.1 / 1.50	10	8.6
					17	14.62
				50.8 / 2.0	30	25.8
					50	43
		Metal Seat (Equal %)	548 (S41600)	31.8 / 1.25	10	8.6
					20	17.2
				38.1 / 1.50	10	8.6
					17	14.62
					32.9	28.3
				50.8 / 2.0	30	25.8
					52.9	45.5
		Metal Seat (Equal %)	588	31.8 / 1.25	10	8.6
					20	17.2
				38.1 / 1.50	10	8.6
					17	14.62
					32.9	28.3
				50.8 / 2.0	30	25.8
					52.9	45.5
		Metal Seat (Linear)	648 (S41600)	31.8 / 1.25	10	8.6
					20	17.2
				38.1 / 1.50	10	8.6
					17	14.62
					28	24.08
				50.8 / 2.0	30	25.8
					50	43
		Metal Seat (Linear)	688	31.8 / 1.25	10	8.6
					20	17.2
				38.1 / 1.50	10	8.6
					17	14.62
					28	24.08
				50.8 / 2.0	30	25.8
					50	43

*Recommended spare parts

- continued -

Table 7. Plug and Seat Ring for NPS 1-1/2 and 2 Valves (continued)

KEY NO.	DESCRIPTION	PLUG TYPE	PLUG NO.	ORIFICE DIAMETER mm / in.	C _v	K _v
2*	Seat Ring		38.1 mm / 1.25 in. Orifice Diameter, S31600			
			38.1 mm / 1.50 in. Orifice Diameter, S31600			
			50.8 mm / 2.0 in. Orifice Diameter, S31600			
			38.1 mm / 1.25 in. Orifice Diameter, S41600			
			38.1 mm / 1.50 in. Orifice Diameter, S41600			
			50.8 mm / 2.0 in. Orifice Diameter, S41600			
*Recommended spare parts						

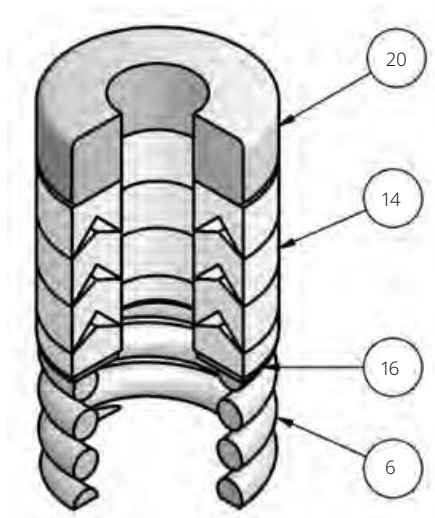
Table 8. Spring Loaded PTFE V-Ring Packing Kit P/N 24494T001

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)

Table 9. Molded Graphite (Flexible Graphite) Packing Kit P/N 24492T001 (Optional)

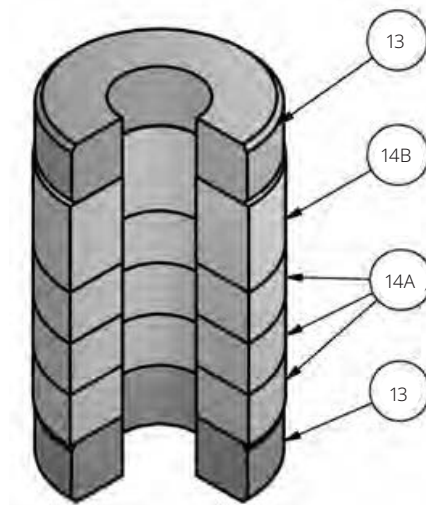
Key No.	Description	Material
13	Bushing, Qty 2	Carbon-Graphite
14A	Packing Ring, Qty 3	Graphite
14B	Packing Ring	Graphite

Figure 4. Spring Loaded PTFE V-Ring Packing Kit P/N 24494T001



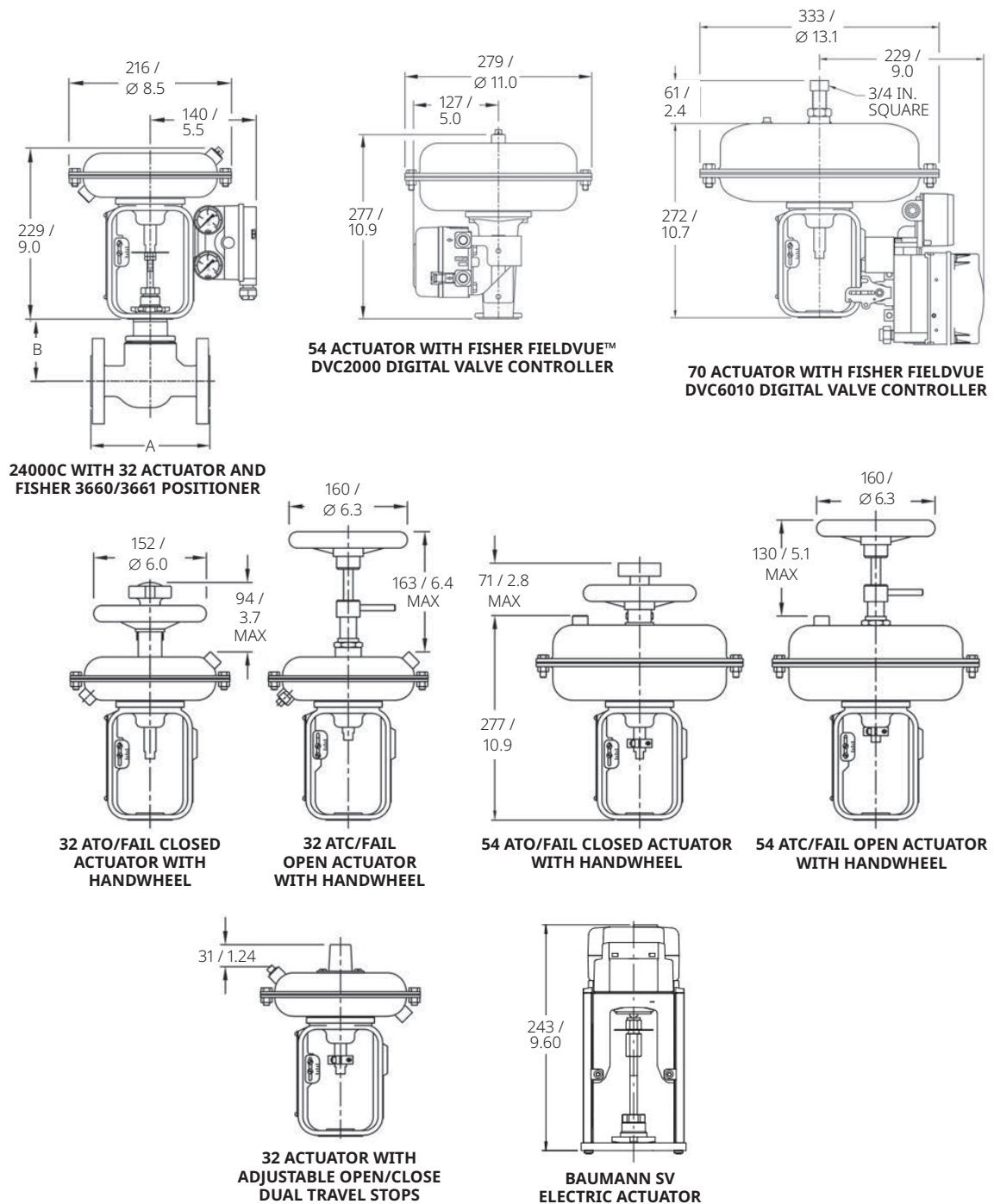
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Figure 5. Molded Graphite (Flexible Graphite) Packing Kit P/N 24492T001 (Optional)



E1241

Figure 6. Dimensional Drawings



E1244

mm / in.

NOTE: ACTUATOR REMOVAL REQUIRES 115 mm / 4-1/2 in. VERTICAL CLEARANCE.

Table 10. Valve Dimensions

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

Table 11. Valve Assembly Weights

VALVE SIZE		WEIGHT	
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	WEIGHT	
	kg	lb
32	4.5	10
54	11.3	25
70	15.4	34
CML-250 ⁽¹⁾	8.3	18
CML-750 ⁽¹⁾	11.5	25
SVX-LIL (non-spring return)	1.3	3
SVK-FO or SVK-FC (spring return) ⁽¹⁾	1.6	4

1. Electric actuators, reference CML Electric Actuator for Fisher Baumann 24000 Series Bulletin (D103347X012) for additional information.

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