

## Instructions

24S.1:IM  
August 2003

## 24000S Series Instructions

# 24000S, SF, SWF, & SMF Series Stainless Steel Control Valve Instructions



**WARNING:** For Warnings and Cautions refer to Supplemental Safety Instruction No. SSI-1

### INSTRUCTIONS

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 must be used to 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.

#### CAUTION!

Before attempting 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.

### 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 1/4 in (6.4 mm) O.D. tubing or equivalent for all air lines. If air line exceeds 25 ft. (8 m) in length, 3/8 in (9.5 mm) tubing is preferred. Air lines must not leak. Air pressure should not exceed 35 psig (2.5 barg).

#### 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 surface.

#### CAUTION!

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 (27) on the stem (14) together. This will allow you to turn the stem by turning the locknuts (27) with a wrench.

#### CAUTION!

When placing valve in vise, clamp the flat end faces of the valve. Do not try to clamp the rounded sides of the valve. This will distort the shape of the casting, and will ruin the valve.

### BODY DISASSEMBLY

1. Mount the valve in a vise by clamping flat end faces of the valve (Fig 1 and 2). Caution must be taken not to damage the serrated flange faces.
2. Remove actuator, stem locknuts (27), travel indicator (58), packing nut (20) and yoke drive nut (9) as described in the actuator instruction manual.
3. Remove hex nuts (12) and hex head cap screws (13) for 1-1/2 in - 3 in (DN 40-80). Lift bonnet (8), bonnet flange (5), and plug and stem (4) from valve body (1). A new body gasket (49) should be installed each time the valve is disassembled.
4. Turn the plug and stem assembly (4) out through the packing box. Handle the parts carefully to avoid damaging the seating and guiding surfaces. Wipe the parts with a clean soft cloth and examine for signs of wear.
5. Remove the seat ring (2), when applicable, using a 5/8 in socket wrench. Clean thoroughly and examine for signs of wear.
6. For low flow trim only (Fig. 8, page 7) unscrew retainer nut (24) using 3/4 in socket wrench. Remove gland (23) and insert (25). Replace insert (25), if required, making sure that the tapered portion faces up.

**BAUMANN**

  
**EMERSON**  
Process Management

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If replacement of the housing (26) is required, use a 5/8 in socket wrench.

### LAPPING THE VALVE SEAT

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

1. Apply fine lapping compound (e.g. United States Products Co. Grade 600 Crystolon) at several spots around the plug seating surface. Replace the plug (4) in the bonnet (8).
2. Place the bonnet (8) loosely into the body (1) to serve as a guide during the lapping operation.
3. Excessive lapping will shoulder the seat ring, and will not improve the seating.
4. Clean the valve seat and plug (4) thoroughly when the lapping is complete.

### REPLACING THE PACKING

Refer to the standard packing construction and the optional packing illustrated on pages 7 & 8 to determine the packing that has been pre-installed in your valve.

1. Disassemble the valve as directed earlier. Remove the locknuts (27) and indicator disk (58), and turn the plug stem (4) out through the packing box. Remove the packing nut (20) and follower (10). Push out the old packing (14) by working from the underside of the bonnet (8).
2. **For Standard Bonnet:**
  - A. **Standard PTFE Spring Loaded Packing with dual or optional EPASEAL<sup>(R)</sup> Packing Followers** (see Fig. 1 & 2, page 3 and Fig. 9 & 10, page 7 & 8): Insert each piece in exact order shown in the illustration. Tighten the packing nut (20) until follower (10) shoulders on the bonnet (8). This will compress the packing spring (7) to ensure constant stem sealing throughout the packing life.
  - B. **Optional Molded Graphite (Grafoil) Packing** (see Fig. 11, page 8): Insert each piece in exact order shown in the illustration on page 8. Hand tighten packing nut (20). Use a wrench to increase tightness by turning the nut an additional 60°.

### 3. For Optional NOLEEK™ Bonnet:

**NOLEEK™ Bellows Seal Packing** (see Fig. 7, page 4 and Fig. 12, Page 8): Insert each piece in the exact order shown in the illustration. Tighten the packing nut (20) until follower (10) shoulders on the bonnet (8). This will compress the packing spring (7) to ensure constant stem sealing throughout packing life.

### 4. For EXTENSION BONNETS ONLY:

- A. **Standard PTFE Spring Loaded Packing** (see Fig. 3, page 3 and Fig. 13, page 9): Insert each piece in exact order shown in the illustration. Tighten the packing nut (20) until follower (10) shoulders on the bonnet (8). This will compress the packing spring (7) to ensure constant stem sealing throughout the packing life.
- B. **Optional Molded Graphite (Grafoil) Packing** (see Fig. 14, page 9): Insert each piece in exact order shown in the illustration on page 9. Hand tighten packing nut (20). Use a wrench to increase tightness by turning the nut an additional 60°.
- C. **ENVIRO-SEAL<sup>(R)</sup> Packing** (see Fig. 15, page 9): Carefully insert each piece in exact order as shown in Figure 15 on page 9. Tighten the packing nut (20) until the Belleville springs are compressed. This will be signaled by a significant increase in resistance. Back off the follower 1/8 to 1/4 turn. A gap of approximately 1/16 inch between the packing follower and the bonnet will assure packing is seated properly.

### REASSEMBLY

After replacing the packing, place the valve body in a vise and reinstall the packing nut (20).

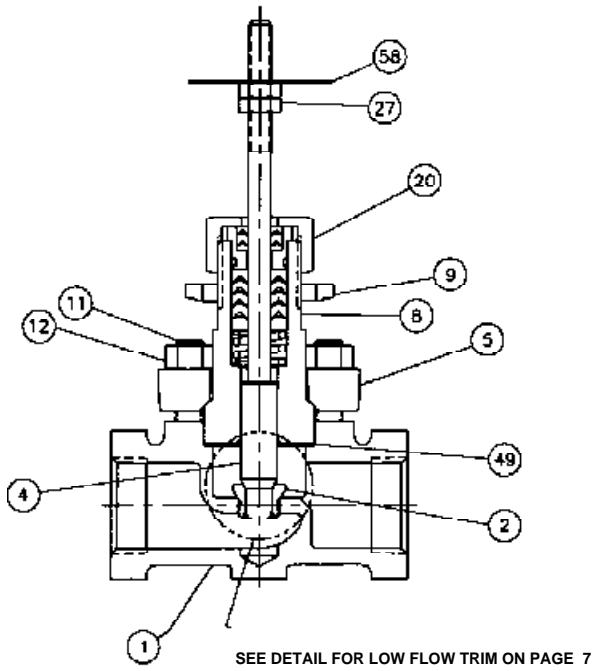
Insert a new body gasket (49) and reassemble bonnet (8) and the plug and stem (4), in the valve. Place bonnet flange (5) over bonnet (8). Fasten the bonnet flange (8) to body (1) using either studs (11) and hex nuts (12) or hex head cap screws (13) for 1-1/2 - 3 in. Tighten evenly. See the appropriate instructions (ACT.1:IM for size 32, 54 or 70 actuator) for reassembly and bench range adjustment.

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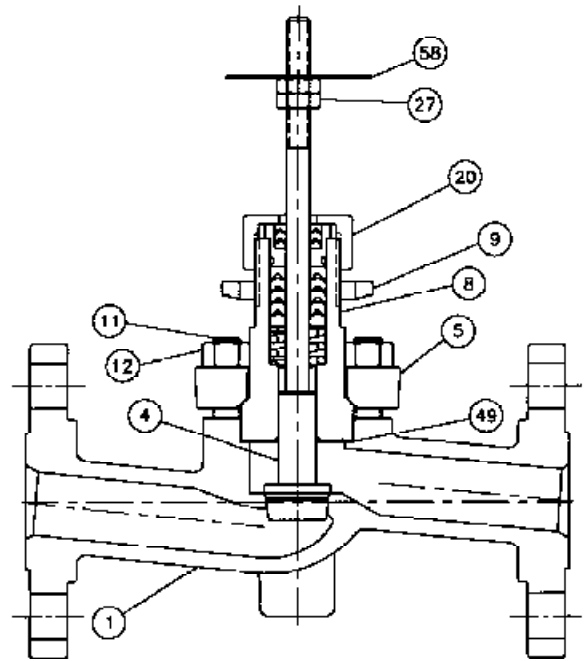
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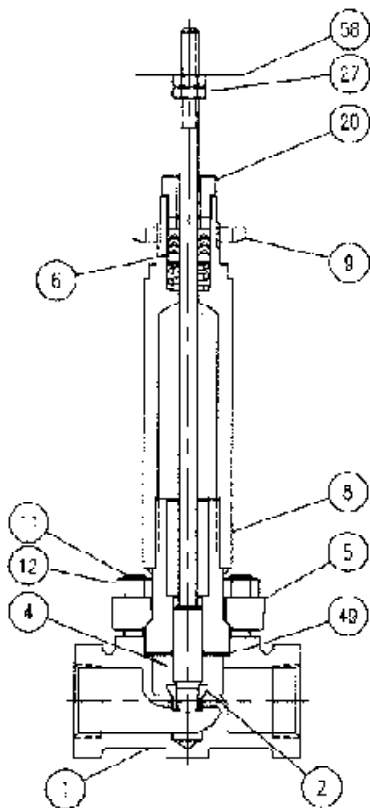
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**Figure 1.** Flangeless (NPT) Threaded Valve Body Assembly with Standard Bonnet

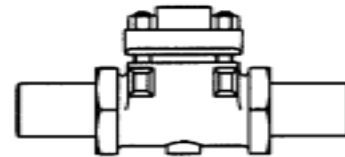


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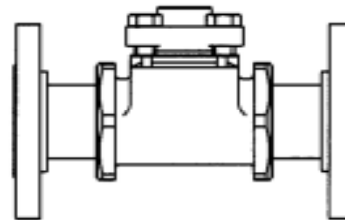
**Figure 2.** Flanged Valve Body Assembly with Standard Bonnet, 24000SF, Sizes 1/2", 3/4", 1" and 1-1/2"



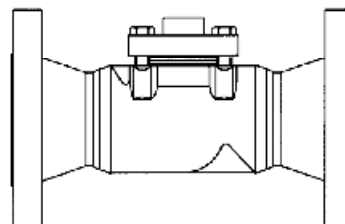
**Figure 3.** Flangeless (NPT) Threaded Valve Body Assembly with Single Extension Bonnet



**Figure 4.** 24000S BUTTWELD Sizes 1/2", 3/4", 1", 1-1/2", 2" and 3"



**Figure 5.** 24000SMF DIN Flanged, Sizes 1/2", 3/4", 1", 1-1/2", 2", and 3" (DN 15, 20, 25, 40, 50, 80) and 24000SWF 2" ANSI Flanged



**Figure 6.** 24000SWF ANSI Flanged 3"

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**Table 1. Valve Body Parts**

KEY NO.	VALVE TYPE	CONNECTION	SEAT	VALVE BODY PART NUMBERS					
				1/2 in/15 DN	3/4 in/20 DN	1 in/25 DN	1-1/2 in/40 DN	2 in/50 DN	3 in/80 DN
1	24000S	NPT	Threaded	24165	---	24162	---	---	---
		NPT	Integral	---	---	24139	24178	24204	24645
	24000SF	CL 150 RF	Threaded	24950	24965	24955	---	---	---
		CL 150 RF	Integral	---	24962	24954	24978	---	---
		CL 300 RF	Threaded	24952	24967	24957	---	---	---
		CL 300 RF	Integral	---	24964	24956	24979	---	---
	24000SWF	CL 150 RF	Integral	---	---	---	---	24697-1	24645-1
		CL 300 RF	Integral	---	---	---	---	24697-3	---
	24000SMF	PN 10-40	Threaded	24981-1	24981-22	24981-15	---	---	---
		PN 10-40	Integral	---	24981-19	24981-3	24981-5	24981-7	24981-18(A)

Note A: PN 10 & 16 ONLY!

**Table 2. Common Parts**

KEY NO.	DESCRIPTION	VALVE SIZE		PART NO.
		INCHES	DN	
2*	Seat Ring	1/2 - 1	15 - 25	24161 (1/4 in/6.3 mm) Port 24167 (3/8 in /9.5 mm) Port
	Seat Assy, 177 Trim	1/2 - 1	15 & 25	24241
5	Bonnet Flange	1/2 - 1	15 - 25	24138
		1-1/2	40	24180
		2	50	24206
		3	80	24652
8	Bonnet, Standard -100°F to + 450°F (-73°C to 232 °C)	1/2 & 3/4	15 & 20	24137
		1	25	---
		1-1/2	40	24179
		2	50	24205
		3	80	24647
	Bonnet, Extension, Single -320°F to + 1000°F (-195°C to 537 °C)	1/2 & 3/4	15 & 20	24268
		1	25	---
		1-1/2	40	24188-015-999
		2	50	24188-120-999
	Bonnet, NOLEEK S/A -320°F to + 850°F (-195°C to 454 °C)	1/2 - 1	15 - 25	24583-1
		1-1/2	40	24584-1
		2	50	24585-1
3		80	24586-1	
9	Drive Nut	1/2 - 3	15 - 80	011757-003-153
11	Stud	1/2 - 1	15 - 25	25703 (4)
12	Hex Nut	1/2 - 1	15 - 25	25705 (4)
13	Hex Head Cap Screw	1-1/2	40	24181 (4)
		2 & 3	50 - 80	24209 (4)
20	Packing Nut (standard bonnet)	1/2 - 3	15 - 80	011986-002-152
	Packing Nut (extension bonnet)	1/2 - 3	15 - 80	24490-1
27	Lock Nut	1/2 - 3	15 - 80	971514-002-250 (2)
49*	Body Gasket	1/2 - 1	15 - 25	24156
		1-1/2	40	24192
		2	50	24208
		3	80	24650
58	Travel Indicator	1/2 - 3	15 - 80	24299

\* Recommended Spare Parts; also order appropriate Packing Kit from Page 7, 8 or 9.

**Table 2A. Common NOLEEK Bellows Parts**

KEY NO.	DESCRIPTION	PART NO.	VALVE SIZE	
			INCHES	DN
8	Complete Bellows/Bonnet S/A	24583-1	1/2 - 1	15 - 25
	Complete Bellows/Bonnet S/A	24584-1	1-1/2	40
	Complete Bellows/Bonnet S/A	24585-1	2	50
	Complete Bellows/Bonnet S/A	24586-1	3	80
14	Packing Kit	24461-1	1/2 thru 3	15 thru 80
21	Plug Retaining Pin*	971342-005-163		
22	Hex Socket Pipe Plug, 1/8 in NPT Stainless Steel	81307		

\* To order Plug & Retaining Pin, simply place -SEB- in middle portion of standard plug/stem S/A part number, i.e 24171-SEB-999.

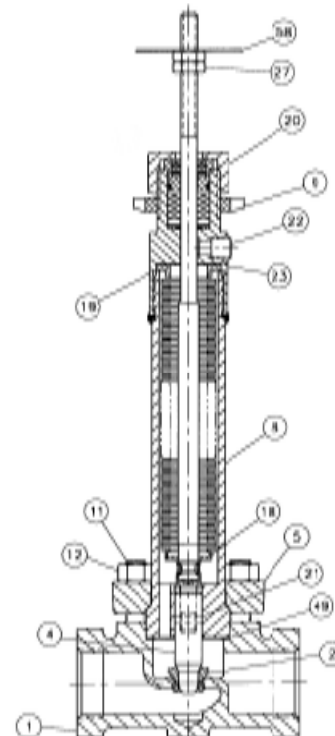


Figure 7. Valve Body Assembly with NOLEEK Bonnet(representative illustration)

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**Table 3.** Plug and Stem Subassemblies ( continued on page 6)

KEY NO.	DESCRIPTION	REMARKS						MATERIAL	1/2 in / DN 15	3/4 in / DN 20 (B)	1 in / DN 25
		PLUG TYPE	PLUG SERIES	ORIFICE DIA.		Cv	Kv		PART NO.	PART NO.	PART NO.
in	mm										
4 (A)	Plug & Stem S/A for Standard Bonnet	Low Flow	177						See page 7, Table 3B		
		Micro Trim	102	1/4	6.3	*0.02	*0.02	ASTM A479 S218	24229-668-999	24229-668-999	24229-668-999
						*0.05	*0.04		24230-668-999	24230-668-999	24230-668-999
						*0.1	*0.09		24231-668-999	24231-668-999	24231-668-999
		Parabolic	588	1/4	6.3	*0.2	*0.17	ASTM A479 S218	24232-668-999	24232-668-999	24232-668-999
						*0.5	*0.43		24758-668-999	24758-668-999	24758-668-999
						1	0.86		24786-668-999	24786-668-999	24786-668-999
				3/8	9.5	1.5	1.3	ASTM A479 S218	24127-668-999	24127-668-999	24127-668-999
						2.5	2.5		24634-668-999	24634-668-999	24634-668-999
						4	3.4		24171-668-999	24171-668-999	24171-668-999
		13/16	20.6	8.2	7.1	ASTM A276 S31600	---	24185-668-999	24185-668-999		
				9.5	8.2		---	24061-668-999	---		
				---	---		---	---	24061-668-999		
		Teflon Seat	577	3/8	9.5	1.0	0.86	ASTM A276 S31600 w/PTFE insert	24893-668-999	24893-668-999	24893-668-999
						1.5	1.3		24796-668-999	24796-668-999	24796-668-999
						2.5	2.2		24609-668-999	24609-668-999	24609-668-999
				13/16	20.6	4	3.4	ASTM A276 S31600 w/PTFE insert	---	24010-2-668-999	24010-2-668-999
						7.5	6.5		---	24010-668-999	---
		8.5	7.3	---	---	24010-668-999					
		Linear Teflon Seat	677	3/8	9.5	0.1	0.09	ASTM A276 S31600 w/PTFE insert	24660-668-999	24660-668-999	24660-668-999
						0.2	0.17		24625-668-999	24625-668-999	24625-668-999
						0.5	0.43		24617-668-999	24617-668-999	24617-668-999
						1.0	0.86		24631-668-999	24631-668-999	24631-668-999
				2.5	2.2	24656-668-999	24656-668-999	24656-668-999			
				13/16	20.6	4	3.4	ASTM A276 S31600 w/PTFE insert	---	24010-1-668-999	24010-1-668-999
		Linear	688	1/4	6.3	0.5	0.43	ASTM A479 S218	24898-668-999	24898-668-999	24898-668-999
						1.0	0.86		24145-668-999	24145-668-999	24145-668-999
				3/8	9.5	1.5	1.3	ASTM A479 S218	24669-668-999	24669-668-999	24669-668-999
						2.5	2.2		24671-668-999	24671-668-999	24671-668-999
				13/16	20.6	4	3.4	ASTM A276 S31600	---	24757-668-999	24757-668-999
8.2	7.1					---	24717-668-999		---		
9.5	8.2					---	---		24717-668-999		

NOTES A: Recommended Spare Parts

B: Size 3/4 inch / DN20 only available in 24000SF/SMF series.

\*Matching Seat Ring, P/N 24161, must be furnished with replacement plug orders for micro trim plug no. 102 and 588, Cv = 0.2 and 0.5; Cv = 2.5 and below is a threaded seat; Cv = 4.0 and above is an integral seat.

<p><b>For Extension Bonnet Construction:</b></p> <p>Substitute: -678 for -668 -679 for -671 -681 for -680</p> <p>Example: 24229-678-999</p>	<p><b>For Triple Extension Bonnet Construction:</b></p> <p>Substitute: -689 for -668 -687 for -671 N/A for -680</p>
<p><b>For Double Extension Bonnet Construction:</b></p> <p>Substitute: -684 for -668 -694 for -671 -688 for -680</p>	<p><b>FOR NOLEEK Bonnet Construction:</b></p> <p>Substitute: -SEB for -668; -671; or -680</p>

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Table 3A. Plug and Stem Subassemblies (continued from page 5)

KEY NO.	DESCRIPTION	REMARKS						MATERIAL	1-1/2 in / DN 40	2 in / DN 50	3 in / DN 80
		PLUG TYPE	PLUG SERIES	ORIFICE DIA.		Cv	Kv		PART NO.	PART NO.	PART NO.
				in	mm						
4 (A)	Plug & Stem S/A for Standard Bonnet  See Table Below for Non-Standard Bonnet Constructions.	Low Flow	177					See Page 7, Table 3B			
		Micro Trim	102	1/4	6.3	*0.02	*0.02	ASTM A479 S21800	---	---	---
						*0.05	*0.04		---	---	---
						*0.1	*0.09		---	---	---
						*0.2	*0.17		---	---	---
		Parabolic	588	1-1/4	31.8	9	7.7	ASTM A276 S31600	24421-671-999	---	---
						17.5	15.1		24401-671-999	---	---
						10	8.6	ASTM A276 S31600	---	24635-671-999	---
						17.5	15.1		---	24710-671-999	---
				1-1/2	38.1	30.5	26.3	ASTM A276 S31600	---	24038-671-999	---
						35	30.2		---	---	24905-680-999
				2	50.8	61	52.6	ASTM A276 S31600	---	---	24039-680-999
		Teflon Seat	577	1-1/4	31.8	17.5	15.1	ASTM A276 S31600 w/ PTFE insert	---	---	---
						10	8.6	---	24884-671-999	---	
				1-1/2	38.1	18	15.5	ASTM A276 S31600 w/ PTFE insert	---	24774-671-999	---
						30.5	26.3	---	24254-671-999	---	
				2	50.8	35	30.2	ASTM A276 S31600 w/ PTFE insert	---	---	24882-680-999
		Linear Teflon Seat	677	1-1/4	31.8	9	7.7	ASTM A276 S31600 w/ PTFE insert	24432-671-999	---	---
						17.5	15.1	24436-671-999	---	---	
				1-1/2	38.1	10	8.6	ASTM A276 S31600 w/ PTFE insert	---	24799-671-999	---
						17.5	15.1	---	24798-671-999	---	
				2	50.8	61	52.6	ASTM A276 S31600 w/ PTFE insert	---	---	24070-680-999
						35	30.2	---	---	24891-680-999	
		Linear	688	1-1/4	31.8	9	7.7	ASTM A276 S31600	24425-671-999	---	---
						17.5	15.1	24424-671-999	---	---	
1-1/2	38.1			10	8.6	ASTM A276 S31600	---	24761-671-999	---		
				17.5	15.1		---	24899-671-999	---		
				30.5	26.3	---	24760-671-999	---			
				35	30.2	ASTM A276 S31600	---	---	24887-680-999		
61	52.6			---	---		24762-680-999				

NOTE A: Recommended Spare Parts

<p><b>For Extension Bonnet Construction:</b></p> <p>Substitute: -678 for -668 -679 for -671 -681 for -680 Example: 24229-678-999</p>	<p><b>For Triple Extension Bonnet Construction:</b></p> <p>Substitute: -689 for -668 -687 for -671 N/A for -680</p>
<p><b>For Double Extension Bonnet Construction:</b></p> <p>Substitute: -684 for -668 -694 for -671 -688 for -680</p>	<p><b>For NOLEEK Bonnet Construction:</b></p> <p>Substitute: -SEB for -668; -671; or -680</p>

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**Table 3B.** Plug and Stem for 177 Trim

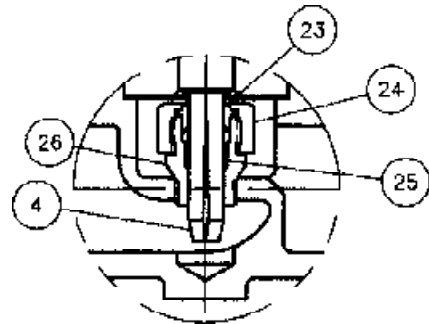
KEY NO.	DESCRIPTION	REMARKS					Cv	Kv	MATERIAL	1/2 in / DN15; 3/4 in / DN20 (C); 1 in / DN25
		PLUG TYPE	PLUG SERIES	ORIFICE DIA.		PART NO.				
				in	mm					
4 (A)	Plug (B)	Low Flow	177	5/16	7.9	0.05	0.04	ASTM A479 S21800 Stainless Steel	24658-10	
						0.02	0.02		24621-10	
						0.010	0.01		24596	
						0.005	0.004		24595	
						0.002	0.002		24594	
						0.001	0.001		24597	
						0.0005	0.0005		24598	
4a (A)	Stem	Standard Bonnet							A276 S31600 Condition A	010168-668
		Extension Bonnet								

NOTES: A: Recommended Spares  
B: Replacement plug (Key 4) order must include stem (Key 3) and will be furnished factory assembled.  
C: Size 3/4 inch / DN20 only available in 24000SF/SMF series.

## OPTIONAL 24177S LOW FLOW TRIM

**Table 4.** Low Flow 177 Trim

KEY NO.	QTY	DESCRIPTION	MATERIAL
4	1	Plug	ASTM A479 S21800
23	1	Gland	ASTM A276 S31600
24	1	Retainer Nut	ASTM A276 S31600
25	1	Insert	Rulon <sup>®</sup> LR
26	1	Housing	ASTM A276 S31600

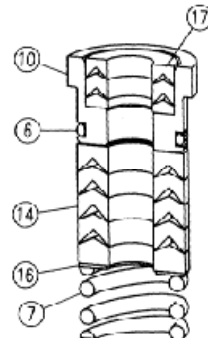


**Figure 8.** Optional 24177S Low Flow Assembly

## STANDARD PACKING KIT

**Table 5.** PTFE Spring Loaded Packing Kit

KEY NO.	QTY	DESCRIPTION	MATERIAL
6	1	O-Ring	Viton
7	1	Spring	ASTM A313 S30200
10	1	Packing Follower	ASTM A582 S30300
14	1	V-Ring Packing Set (5 rings)	Teflon
16	1	Washer	ASTM A240 S31600
17	1	V-Ring Set	PTFE



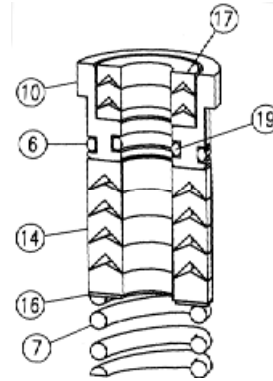
**Figure 9.** Standard Packing Kit P/N 24466

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## OPTIONAL PACKING KITS

**Table 6.** EPASEAL Packing Kit

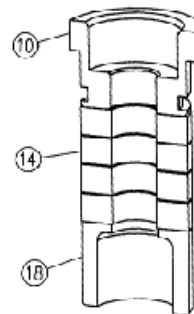
KEY NO.	QTY	DESCRIPTION	MATERIAL
6	1	O-Ring	Kalrez
7	1	Spring	ASTM A313 S30200
10	1	Epaseal Follower	ASTM A582 S30300
14	1	V-Ring Packing Set (5 rings)	Teflon
16	1	Washer	ASTM A240 S31600
17	1	V-Ring Set	PTFE
19	1	O-Ring	Kalrez



**Figure 10.** EPASEAL Packing Kit P/N 24466-1

**Table 7.** Molded Graphite (Grafoil) Packing Kit

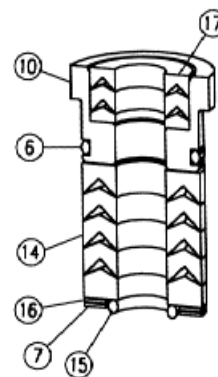
KEY NO.	QTY	DESCRIPTION	MATERIAL
10	1	Packing Follower	ASTM A582 S30300
14	1	Packing Set (4 rings)	Graphite
18	1	Spacer	ASTM A276 S31600



**Figure 11.** Molded Graphite (Grafoil) Packing Kit P/N 24470-2S

**Table 8.** Packing Kit for NOLEEK Bellows Bonnet

KEY NO.	QTY	DESCRIPTION	MATERIAL
6	1	O-Ring	Viton
7	3	Wave Spring	17-7 PH Stainless Steel
10	1	Packing Follower	ASTM A582 S30300
14	1	V-Ring Packing Set (5 rings)	PTFE
15	1	O-Ring	PTFE
16	1	Washer	ASTM A240 S31600
17	1	V-Ring Set	PTFE



**Figure 12.** Standard Packing Kit P/N 24461-1 for NOLEEK Bellows Bonnet



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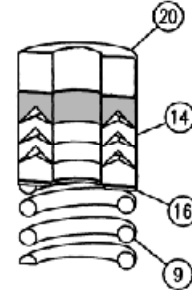
24S.1:IM  
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**EXTENSION BONNET ONLY PACKING KITS**

**Table 9.** Spring Loaded PTFE V-Ring Packing Kit

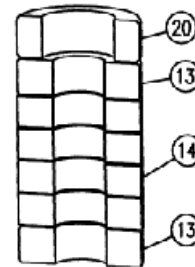
KEY NO.	DESCRIPTION	MATERIAL
9	Spring	ASTM A313 S30200
14	Packing Set	PTFE / carbon filled PTFE
16	Washer	ASTM A240 S31600
20	Spacer	JLON 2000 (proprietary plastic)



**Figure 13.** Spring Loaded PTFE V-Ring Packing Kit P/N 24494T001 (Standard)

**Table 10.** Molded Graphite (Grafoil) Packing Kit

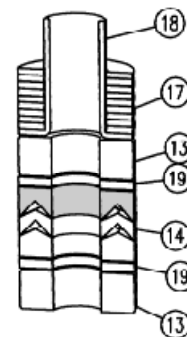
KEY NO.	QTY	DESCRIPTION	MATERIAL
13	2	Bushing	Carbon-Graphite
14	1	Packing Rings (4)	Graphite
20	1	Spacer	ASTM A582 S30300



**Figure 14.** Molded Graphite Ribbon Packing Kit P/N 24492T001 (Optional)

**Table 11.** ENVIRO-SEAL Packing Kit

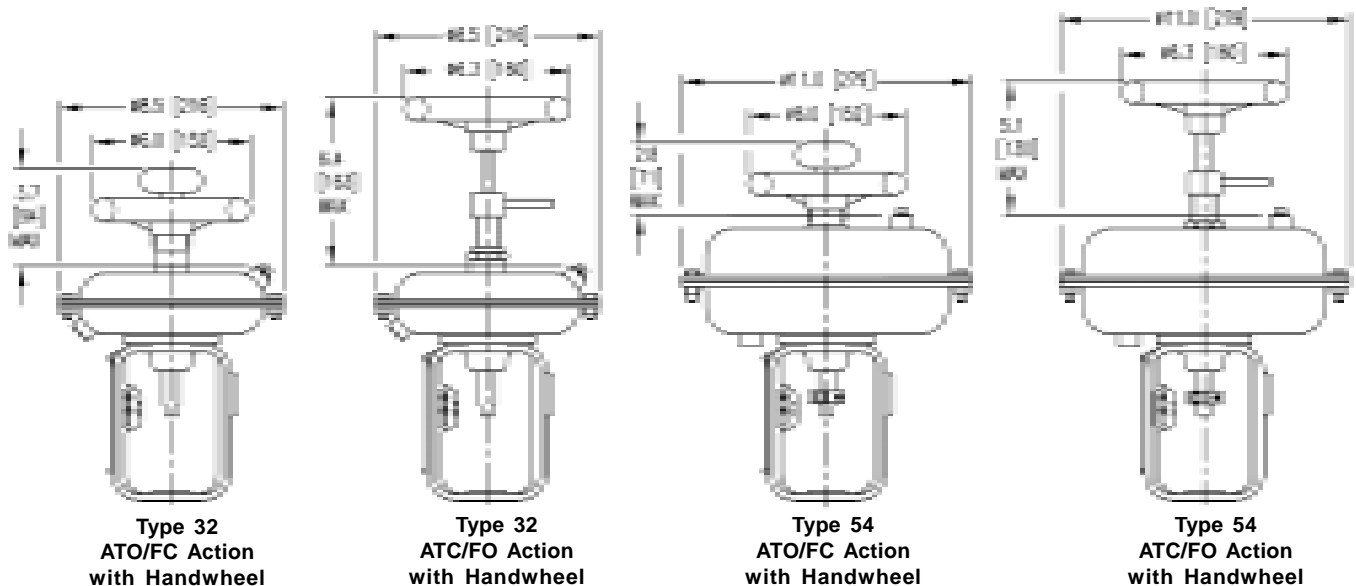
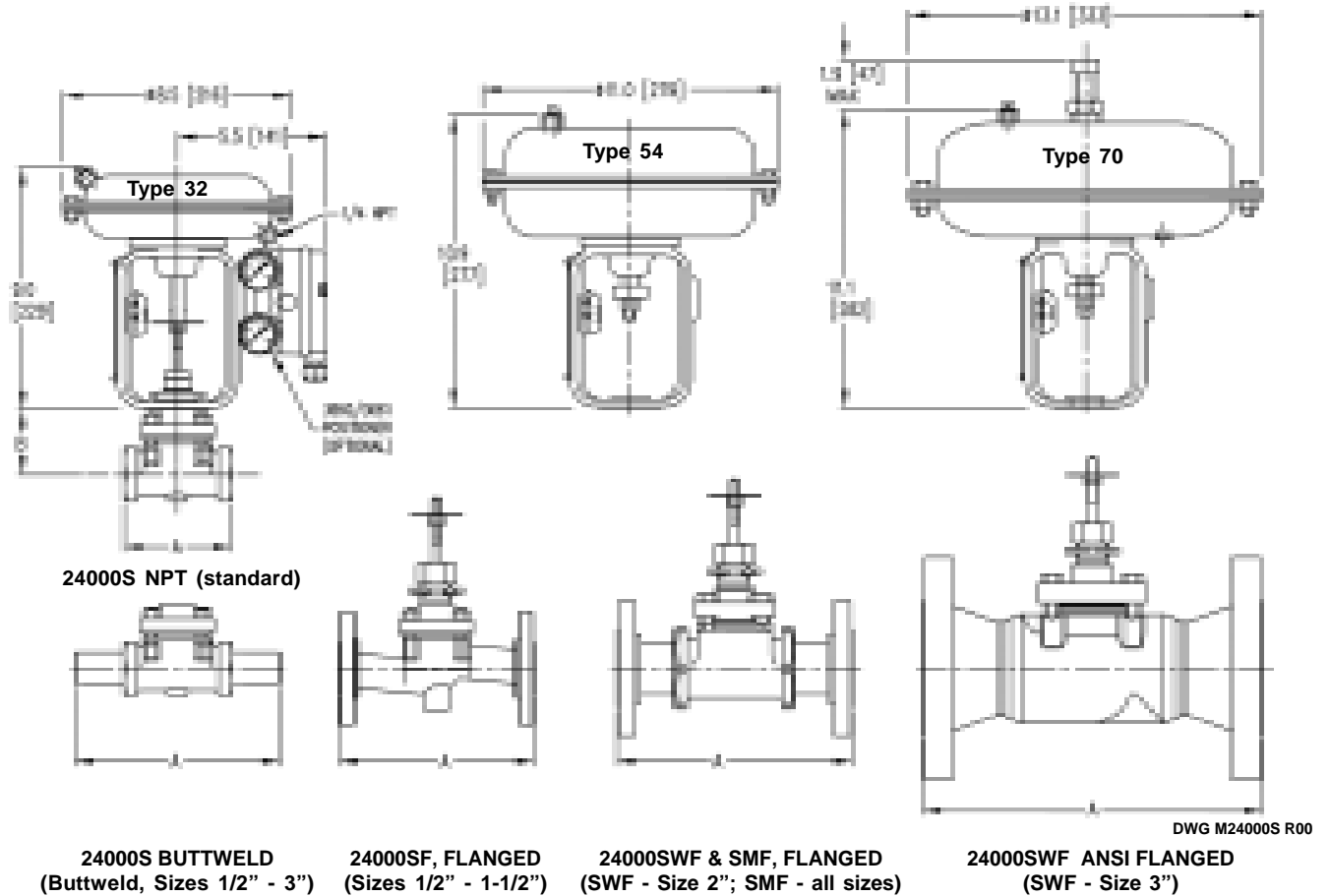
KEY NO.	DESCRIPTION	MATERIAL
13	Bushings	Carbon Graphite
14	Packing Set	PTFE / carbon filled PTFE
17	Belleville Springs	ASTM B637 N07718
18	Bushing	PEEK
19	Washers	PTFE, Filled Gylon



**Figure 15.** ENVIRO-SEAL Packing Kit P/N 24490T001 (Optional with size 54 actuator only)

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Figure 16. Dimensions: inches [millimeters]



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**Table 12.** Dimensions (Actuator requires 4-1/2 inches (115 millimeters) vertical clearance for removal.)

VALVE SIZE		DIMENSION A, VALVE										DIMENSION B, BONNET					
		24000S		24000SF		24000SWF				24000SMF		STANDARD		EXTENSION		NOLEEK	
		NPT (Except 3 in)	BUTTWELD SCH 40	CL 150 & CL 300		CL 150		CL 300		PN 10, 16, 25, 40							
in	DN	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
1/2	15	3.1	79	7.25	184	---	---	---	---	5.1	130	2.4	61	7.8	199	8.2	209
3/4	20	---	---			---	---	---	---	---	5.9	150	2.4	61	7.8	199	8.2
1	25	4.0	102	7.25	184	---	---	---	---	6.3	160	2.4	61	7.8	199	8.2	209
1-1/2	40	4.5	114	8.75	223	---	---	---	---	7.9	200	3.1	79	8.5	216	8.4	214
2	50	4.9	124	---	---	10.00	254	10.5	267	9.1	230	3.1	79	8.5	216	8.4	214
3	80	6.5	165	---	---	11.75	298	---	---	12.2	310 (A)	3.9	99	9.3	237	8.4	214

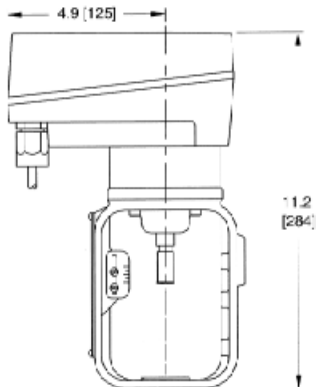
NOTE A: PN10 & PN16 ONLY!

**Table 13.** Valve Assembly Weights

VALVE SIZE		VALVE WEIGHTS			
		lb		kg	
in	DN	24S	24SF/SWF/SMF	24S	24SF/SWF/SMF
1/2	15	5	8	2.3	3.6
3/4	20	--	9	--	4.1
1	25	6	10	2.7	4.5
1-1/2	40	9	15	4.1	6.8
2	50	11	33	5.0	15.0
3	80	20	35	9.1	15.9

**Table 14.** Actuator Weights

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



**Figure 17.** NV Electric Actuator

This product may be covered under one or more of the following patents 4,577,873, 4,434,965, 5,058,861 or under pending patent applications.

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