Fisher® 8510B Eccentric Disc Control Valve (EMA (1))

Contents

Figure 1. Fisher 8510B Eccentric Disc Control Valve

8510B CONTROL VALVE WITH FISHER 1052 ACTUATOR AND 3610J POSTIONER

8510B VALVE WITH ALTERNATE DOUBLE D SHAFT WITH ANTI-BLOWOUT AND FISHER 1035 ACTUATOR

Introduction

Scope of Manual

This instruction manual includes installation, maintenance, and parts information for NPS 2 through 12 Fisher 8510B eccentric disc control valves that mate with ASME, EN, or JIS flanges (see figure 1). Refer to separate instruction manuals for information covering the actuator and accessories.

Table 1. Specifications

Valve Body Sizes and End Connection Style

For flangeless valves that install between ASME and EN flanges, see table 2

Maximum Inlet Pressure(2)

Consistent with applicable ASME B16.34 or EN 12516-1 ratings

Maximum Inlet Pressures, Temperatures, and Pressure Drops(1,2)

WCC Steel, CF3M Stainless Steel (316L SST), CN7M (Alloy 20), and M35-1 Valve Bodies: Consistent with applicable pressure-temperature ratings per table 2 up to the maximum material temperature capabilities listed in table 3, but do not exceed the pressure, temperature, and pressure drop conditions of the valve construction. Also see the Installation section.

Shutoff Classifications

PTFE Seal Ring: Bidirectional shutoff to Class VI is standard
All-Metal Seal Ring: 0.001% of maximum valve capacity (one tenth of Class IV per ANSI/FCI 70-2 and IEC 60534-4)

Material Temperature Capabilities(1)

See table 3

Flow Characteristic

Approximately linear

Flow Direction

Standard (forward flow) is with seal retainer (key 2, figure 8) facing upstream; reverse flow is permissible, contact your Emerson Process Management sales office with application limits

Disc Rotation

Clockwise to close (when viewed from actuator end of valve body) through 90 degrees of disc rotation

Actuator/Valve Action

With diaphragm or piston rotary actuators, they are field reversible between:
■ Push-down-to-open (extending actuator rod opens the valve) and
■ Push-down-to-close (extending actuator rod closes the valve)

With 1035 Rack and Pinion actuator with spring return or double acting action, field-reversible between ■ fail-to-open and ■ fail-to-close

Valve Body Classification

■ ASME face-to-face dimensions for NPS 3 through 6 CL150 and 300, and face-to-face dimensions for NPS 8 through 12 CL150 meet API 609 standard
■ Face-to-face dimensions for all sizes meet EN 558 Series 25, and
■ JIS B2210 standard face-to-face dimensions are available upon request

Mating Flange Capabilities

All sizes compatible with welding-neck and slip-on flanges (schedule 80 or lighter for NPS 2 through 12)

Shaft Diameters

See table 2

Approximate Weights

See table 2

1. The pressure/temperature limits in this manual and any applicable standard or code limitation should not be exceeded.
2. The maximum allowable body inlet pressure might exceed the flange joint pressure rating. If so, actual inlet pressure must not exceed the flange joint pressure rating.

Do not install, operate, or maintain 8510B 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 Process Management sales office before proceeding.

Table 2. Valve Body Size, Shaft Diameter, Approximate Weight, and ASME Rating and Flange Compatibility

VALVE SIZE, NPS	SHAFT DIAMETER		APPROXIMATE WEIGHT		ASME RATING COMPATIBILITY—STEEL, STAINLESS STEEL, AND ALLOY 20 VALVE BODIES(2)	VALVE BODY DESIGNATION—M35-1(1)(2)	ASME FLANGE COMPATIBILITY(2)	EN FLANGE COMPATIBILITY(3)
	mm	Inches	kg	Pounds				
2 3 4 6 8	12.7 15.9 19.1 25.4 31.8	1/2 5/8 3/4 1 1-1/4	4.3 5.9 9.1 19 31	9.5 13 20 41 69	CL150, 300, & 600	CL150, 300, & 600	CL150, 300, & 600	PN10, PN16, & PN25 PN40, PN63, & PN100
10	31.8	1-1/4	46	102	CL150 CL300	CL150 CL300	CL150 CL300	PN10 & PN16 PN25 & PN40
12	38.1	1-1/2	72	158	CL150 CL300	CL150 CL300	CL150 CL300	PN10 & PN16 PN25 & PN40

1. M35-1 valve materials are not included in ASME B16.34 pressure/temperature ratings. See table 3 for pressure/temperature information for M35-1 valve bodies. The designations CL150, CL300, and CL600 for these valve bodies are used only to indicate relative pressure-retaining capabilities and are not ASME pressure/temperature rating class designations.
2. The Double D end connection with anti-blowout shaft is only available in CL150.
3. The Double D end connection with anti-blowout shaft is available only in PN10 and PN16.

Description

The 8510B flangeless control valve has an eccentrically mounted disc that self-centers in the line during installation. The valve includes built-in electrical bonding of the shaft to the valve body. This valve has either a splined shaft for use with power, handwheel, or handlever rotary actuators, or a double D end connection with anti-blowout shaft for use with 1035 Rack and Pinion actuators and other quarter-turn actuators. It is used for throttling or on/off control of a wide variety of liquids and gases. The 8510B is a balanced construction available in CL150 through 600. Figure 8 illustrates the various constructions.

Specifications

Specifications for the 8510B valve body are shown in table 1.

Installation

Key numbers in this procedure are shown in figure 8 unless otherwise indicated.

⚠ WARNING

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

To avoid personal injury or property damage resulting from the bursting of pressure retaining parts, be certain the service conditions do not exceed either the valve body rating or the flange joint rating, or other limits given in table 1 or on the nameplate. Use pressure-relieving or pressure-limiting devices to prevent the service conditions from exceeding these limits.

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

CAUTION

The valve configuration and construction materials were selected to meet particular pressure, temperature, pressure drop, and controlled fluid conditions specified in the customer's order. Because some valve body/trim material combinations are

limited in their pressure drop and temperature range capabilities (especially due to differences in thermal expansion rates), do not apply any other conditions to the valve without first contacting your Emerson Process Management sales office.

Table 3. Material Temperature Capabilities

MATERIAL						TEMPERATURE CAPABILITY	
Valve Body	**Disc**	**Shaft**	**Bearing Lining and Jacket**	**Seal**	**Packing[4]**	**°C**	**°F**
WCC steel	WCC steel with chrome-plated seating surface, or S31603 (316L SST)	S17400 (17-4PH)	PTFE[2]/Composition lined with S31603 (316L SST) jacket	PTFE Composition or S31600 (316 SST)	All	–29 to 232[1]	–20 to 450[1]
			S44004 (440-C SST) All metal bearing	S31600	PTFE V-ring or PTFE/Combustion	–29 to 232	–20 to 450
					Graphite ribbon	–29 to 427	–20 to 800
			PTFE[2]/Composition lined with S31603 (316L SST) jacket	S31600	All	–29 to 232[1]	–20 to 450[1]
CF3M (316L stainless steel)	S31603 (316L SST) with chrome-plated surface or S31603 (316L SST) without plating with PTFE seat only)	S17400[5]	PTFE[2]/Composition lined with S31603 (316L SST jacket	PTFE Composition	PTFE V-ring	–40 to 232[1]	–40 to 450[1]
					PTFE/Composition or graphite ribbon	–46 to 232[1]	–50 to 450[1]
			Filled PTFE[3] lined with S31603 (316L SST jacket	S31600	PTFE V-ring	–40 to 232	–40 to 450
					PTFE/Composition	–46 to 260	–50 to 500
					Graphite ribbon	–46 to 427	–50 to 800
		S20910	PTFE[2]/Composition lined with S31603 (316L SST jacket	PTFE Composition	PTFE V-ring	–40 to 232[1]	–40 to 450[1]
					PTFE/Composition or graphite ribbon	–46 to 232[1]	–50 to 450[1]
			Silver plated alloy 6B (CoCr-A)	S31600	PTFE V-ring	–40 to 232[1]	–40 to 450[1]
					PTFE/Composition	–46 to 232[1]	–50 to 450[1]
					Graphite ribbon	–46 to 232[1]	–50 to 450[1]
			Alloy 6B	S31600	PTFE V-ring	–40 to 232	–40 to 450
					PTFE/Composition	–46 to 232	–50 to 450
					Graphite ribbon	–46 to 538	–50 to 1000
M35-1[5]	M35-1	N05500[5]	Filled PTFE[3] with N04400 jacket	PTFE Composition	PTFE V-ring	–40 to 232[1]	–40 to 450[1]
					PTFE/Composition or graphite ribbon	–46 to 232[1]	–50 to 450[1]
CN7M[5] (alloy 20)	CN7M (alloy 20)	N08020[5] (alloy 20)	Filled PTFE[3] with N08020 jacket	PTFE Composition	PTFE V-ring	–40 to 149	–40 to 300
					PTFE/Composition or graphite ribbon	–46 to 149	–50 to 300

1. For hot water or steam service, limit maximum temperature to 207°C (405°F).
2. Reinforced PTFE in phenolic resin. Emerson Process Management designation is FMS 30B4.
3. PTFE with selected fillers. Emerson Process Management designation is FMS 30B5.
4. For temperature limits of ENVIRO-SEAL packing systems, see the instruction manual Fisher ENVIRO-SEAL Packing System for Rotary Valves (D101643X012).
5. These materials are only available in the splined shaft version of 8510B, and not in the double D end connection with anti-blowout shaft.

The maximum allowable inlet pressures for steel, stainless steel, alloy 20, and M35-1 valve bodies are consistent with the pressure-temperature ratings shown in table 2, except where further limited by the trim and packing material temperature capabilities given in table 3.

1. Install a three-valve bypass around the control valve assembly if continuous operation is necessary during inspection and maintenance of the valve body.
2. Inspect the valve body to be certain that it is free of foreign material.
3. The valve is normally shipped as part of a control valve assembly, with a power or manual actuator mounted on the valve body.

If the valve body and actuator have been purchased separately or if the actuator has been removed for maintenance, mount the actuator, and adjust actuator travel before inserting the valve body into the line. This is necessary due to the measurements that must be made during the actuator adjustment process. Refer to the Actuator Mounting

section of this manual and to the separate actuator instruction manual for mounting and adjusting instructions before proceeding.

4. Be certain that adjacent pipelines are free of any foreign material, such as pipe scale or welding slag, that could damage the valve body seating surfaces.

CAUTION

Damage to the disc (key 3) will occur if any pipe flanges or piping connected to the valve body interfere with the disc rotation path. However, the disc can be rotated without interference when the valve body is installed between adjacent pipe flanges or piping that has an inside diameter equal to or greater than either schedule 80 pipe or compatible DIN or JIS pipe sizes. If piping with a smaller inner diameter than specified above is connected to the valve, measure carefully to be certain the disc rotates without interference before putting the valve into operation.

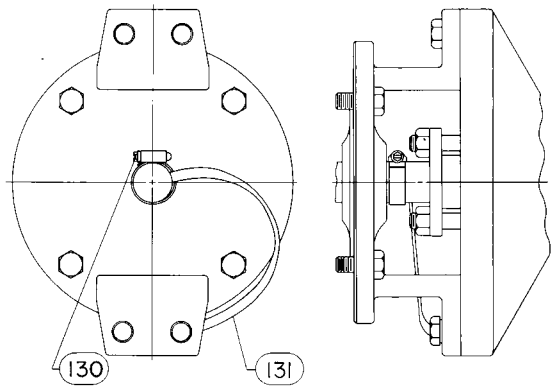
5. Flow is in the standard direction when the seal retainer (key 2) is facing upstream. Standard flow direction is also indicated by the flow direction arrow cast into the valve body. Flow in the reverse direction is permissible.

CAUTION

Rotating the disc (key 3) past either the open or closed position could damage the seal and disc sealing surfaces and could cause the disc to jam in the valve body bore. The disc stop should be zeroed in its flat position as shown in figure 7. Do not use the disc stop as a travel stop for the actuator. Use the actuator travel stop provisions.

6. With the disc in the closed position, install line flange gaskets, and insert the valve between the pipeline flanges. Use either flat sheet gaskets or spiral-wound gaskets with compression-controlling centering rings. Spiral-wound gaskets without compression-controlling centering rings are not recommended for this purpose. Composition gaskets may be used to 343°C (650°F), and the optional FGM gaskets (key 29, not shown) may be used for –129 to 538°C (–200 to 1000°F) temperatures.
7. There are four flange bolt holes in the valve body (key 1), and each hole engages one corresponding line flange stud. Insert the valve between the flanges and install the four line flange studs to roughly center the valve body in the pipeline.
8. After centering the valve body, first lubricate and then install the remaining line flange studs to secure the valve in the pipeline. Tighten the nuts to the line flange studs in a crisscross sequence to ensure proper alignment of the valve body with the flanges.

Figure 2. Optional Shaft-to-Valve Body Bonding Strap Assembly



⚠ WARNING

An 8510B valve body is not necessarily grounded when installed in a pipeline. If the valve is used in a flammable or hazardous atmosphere or for oxygen service, an explosion could result due to a discharge of static electricity from the valve components. To avoid personal injury or property damage, always make sure that the valve body is grounded to the pipeline before putting the control valve assembly into operation in a flammable or hazardous atmosphere.

Note

Standard 8510B packings are composed of all conductive packing rings (graphite ribbon packing) or partially conductive packing rings (such as a carbon-filled PTFE female adaptor with PTFE V-ring packing or a graphite composition packing ring with PTFE/composition packing) to electrically bond the shaft to the valve body for hazardous area service. For oxygen service applications, provide alternate shaft-to-valve body bonding according to the following step.

9. For oxygen service applications, attach the bonding strap assembly (key 131, figure 2) to the shaft with the clamp (key 130, figure 2), and connect the other end of the bonding strap assembly to the valve body with the cap screw (key 22). Secure each cap screw with a hex nut (key 30).

⚠ WARNING

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

Valves with ENVIRO-SEAL packing systems will not require this initial re-adjustment. See ENVIRO-SEAL Packing System for Rotary Valves Instruction Manual (D101643X012) for packing instructions. If you wish to convert your present packing arrangement to ENVIRO-SEAL packing, refer to the retrofit kits listed in the parts kit sub-section near the end of this manual.

Maintenance

Valve body parts are subject to normal wear and must be inspected regularly and replaced as necessary. The frequency of inspection and replacement depends upon the severity of service conditions. Instructions are given in this section for: replacing packing; replacing disc, shaft, or bearing(s); changing disc rotation or valve action; and mounting and adjusting the actuator.

As used in these instructions, actuator refers to power actuators (such as pneumatic diaphragm, piston actuators, and rack and pinion actuators) or manual actuators (such as handwheel or handlever actuators).

⚠ 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.**
- **Vent the power actuator loading pressure and relieve any spring precompression.**
- **Use lock-out procedures to be sure that 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 from 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.**

Packing Maintenance

Key numbers are referenced in figure 3 unless otherwise indicated. All maintenance operations in this section may be performed with the valve in the line. Packing may be PTFE V-ring or graphite.

An ENVIRO-SEAL packing system is also available with the 8510B control valve. To install the ENVIRO-SEAL packing system in an existing valve, follow the instructions in the instruction manual included with the packing system (D101643X012). To remove packing parts in a valve with the ENVIRO-SEAL packing system, follow the procedures for valves with the ENVIRO-SEAL packing system in this section. Install the replacement packing following the instructions in the packing system instruction manual (D101643X012).

Stopping Leakage

For valves with PTFE or graphite packing:

CAUTION

Tighten the packing flange only enough to prevent shaft leakage. Excessive tightening will only accelerate wear of the packing and could produce higher torques on the valve.

Leakage around the packing followers can be stopped by tightening the packing flange nuts (key 12, figure 8).

If the packing is relatively new and tight on the shaft, and if tightening the packing flange nuts does not stop leakage, the shaft may be worn or nicked so that a seal cannot be made. If the leakage comes from the outside diameter of the packing, the leakage may be caused by nicks or scratches around the packing box wall. Inspect the shaft and packing box wall for nicks and scratches when performing the packing replacement procedures.

For valves with the ENVIRO-SEAL packing system:

Optimum performance of the ENVIRO-SEAL packing system is obtained when the Belleville springs are tightened to their “target load.” The target load is the point where the springs are compressed to 85% of their maximum deflection, or nearly flat. Maximum deflection is when the springs are 100% compressed, or completely flat.

Under normal conditions, the packing nuts should not require re-tightening. However, when servicing, if the springs do not remain at the target load of 85% compression, retighten the packing box nuts according to the following procedure:

1. Tighten the packing flange nuts alternately and evenly, keeping the packing flange parallel with the valve flange (see figure 3), until the Belleville springs are compressed 100% (or completely flat).

- **For PTFE packing,** loosen each packing flange nut one half turn (180° of rotation).
- **For Graphite packing,** loosen each packing flange nut one quarter turn (90° of rotation).

The target load of 85% compression has now been reached. If leakage continues, replace the packing components as described in the following procedures.

Replacing the Packing

For valves with PTFE or graphite packing:

This procedure may be performed without removing the actuator from the valve body if adding split PTFE/composition packing rings as a temporary measure on the actuator side of the valve body. However, the actuator must be removed from the valve body if replacing any other kind of packing on the actuator side of the valve body.

Key numbers in this procedure are shown in figure 8 unless otherwise indicated.

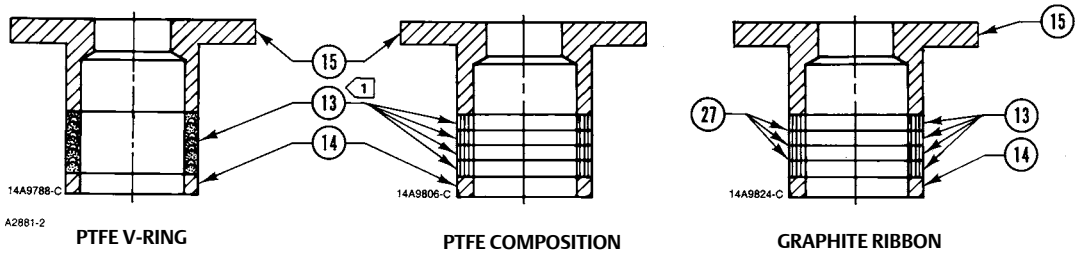
1. Isolate the control valve from the line pressure, release pressure from both sides of the valve body, and drain the process media from both sides of the valve. If using a power actuator, also shutoff all pressure lines to the power actuator, release all pressure from the actuator. Use lock-out procedures to be sure that the above measures stay in effect while you work on the equipment.
2. Remove the packing flange nuts (key 12) and packing follower (key 15), plus the packing flange (key 9) if used, from the side of the valve body opposite the actuator.

CAUTION

If removing the actuator in the following step, use a wheel puller to separate the actuator parts from the valve shaft. Do not drive the actuator parts off the valve shaft because this could move the valve bearings and disc away from the centered position, thereby damaging the disc and the valve body.

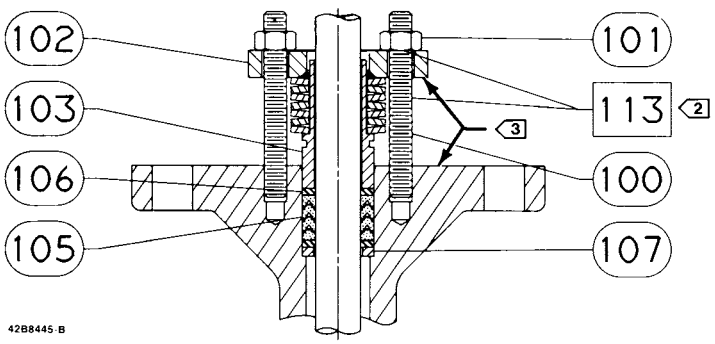
3. If necessary to remove the actuator, remove the cap screws and nuts (keys 22 and 30). Remove the clamp (key 130, figure 2) if the strap (key 131, figure 2) is used. If necessary, refer to separate actuator instruction manuals for assistance in removing the actuator.
4. Remove the packing flange nuts and pull out the packing follower (key 16), plus the packing flange (key 10) if used, from the actuator side of the valve body.
5. Remove the old packing rings (key 13) and, if used, the packing washers (key 27). Carefully avoid scratching the shaft or packing box wall to avoid damage that could cause leakage around the shaft. Clean all accessible metal parts and surfaces to remove particles that would prevent the packing from sealing.

Figure 3. Packing Arrangement Details

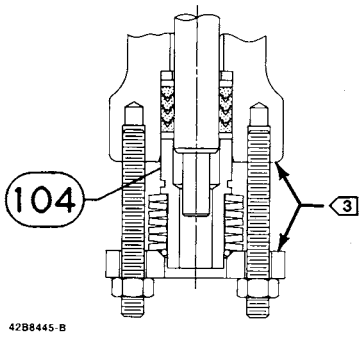


PTFE V-RING | PTFE COMPOSITION | GRAPHITE RIBBON

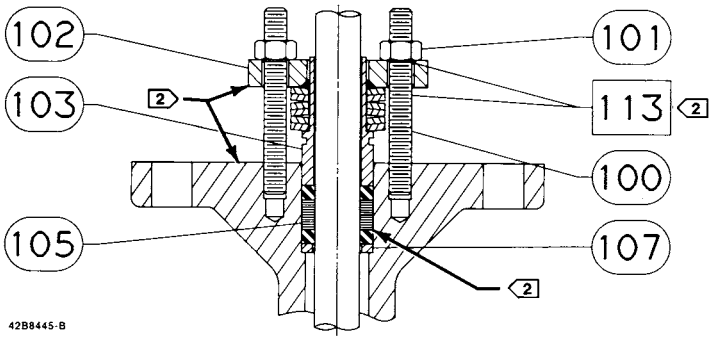
STANDARD PACKING



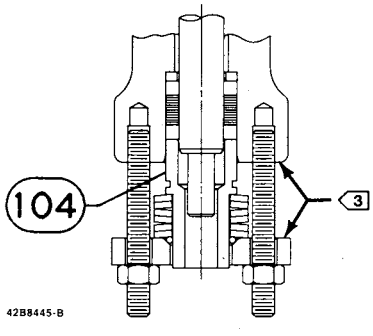
SINGLE PTFE PACKING FOR ACTUATOR END



SINGLE PTFE PACKING FOR OUTBOARD END



GRAPHITE PACKING FOR ACTUATOR END



GRAPHITE PACKING FOR OUTBOARD END

ENVIRO-SEAL PACKING

NOTES:
1. WITH CONDUCTIVE PACKING, THE FEMALE ADAPTOR IN PTFE V-RING PACKING IS CARBON-FILLED PTFE AND THE TOP RING IN COMPOSITION PACKING IS GRAPHITE/N06600.
2. APPLY LUBRICANT.
3. THESE TWO SURFACES SHOULD REMAIN PARALLEL AS YOU ALTERNATELY AND EVENLY TIGHTEN THE PACKING NUTS (KEY 101).

Note

Except with oxygen service, lightly lubricate new PTFE V-rings with phenylmethyl silicone lubricant to aid in assembly.

⚠ WARNING

Do not lubricate parts when used in oxygen service, or where the lubrication is incompatible with the process media. Any use of lubricant can lead to the sudden explosion of media due to the oil/oxygen mixture, causing personal injury or property damage.

6. Use the appropriate procedures below for installing packing in either end of the valve.

- Install the packing washers (key 14), and packing rings (key 13). Make sure that PTFE/composition packing rings are installed so that the ring splits do not line up to form a leak path.
- With graphite ribbon packing, stack the packing rings and packing washers together as shown in figure 3, and slide the stack into the packing box as far as it will go while carefully avoiding trapping air among the rings.
- Install both packing followers and, if used, the packing flanges.
- Install the packing flange nuts, and tighten them only far enough to stop leakage under normal operating conditions. For oxygen service applications, perform the next step.
- For oxygen service applications, attach the bonding strap assembly (key 131, figure 2) to the shaft with the clamp (key 130, figure 2), and connect the other end of the bonding strap assembly to the valve body with a cap screw (key 22). Secure each cap screw with a hex nut (key 30).

7. Mount the actuator, if it was removed from the valve body, and adjust the actuator travel before returning the valve to service. This is necessary due to the measurements that must be made during the actuator adjustment process.

Refer to the Actuator Mounting section of this manual or to the separate actuator instruction manual for mounting and adjusting instructions before proceeding.

8. When placing the control valve into operation, check around the packing follower or leakage; retighten the packing flange nuts as required according to accepted bolting procedures.

For valves with ENVIRO-SEAL packing systems:

To replace the packing at the actuator side of the valve, the actuator must be removed. Also, the valve should be removed from the pipeline to allow proper readjustment of the disc position.

CAUTION

If removing the actuator, use a wheel puller to separate the actuator parts from the valve shaft. Do not drive the actuator parts off the valve shaft because this could move the valve bearings and disc away from the centered position, thereby damaging the disc and the valve body.

1. Isolate the control valve, and shut off all pressure lines to the power actuator. Release pressure from the valve body and actuator, and disconnect the pressure lines from the actuator if it will be removed from the valve body.

2. Loosen the two packing hex nuts evenly to remove spring tension, then remove the nuts.
3. Remove the packing flange and spring pack assembly. The spring pack assembly consists of the spring stack and packing follower. The spring stack is retained on the packing follower by an O-ring. Remove the anti-extrusion washer, the packing set, and the packing ring.

CAUTION

The valve shaft surface condition is critical in making and maintaining a good seal. If the valve shaft surface is scratched, nicked, dented, or worn, replace the valve shaft before replacing the packing system.

4. Inspect the existing valve shaft. If necessary, replace the valve shaft as described in the procedures in this section.
5. Install the new packing system components as described in the ENVIRO-SEAL Packing System for Rotary Valves Instruction Manual (D101643X012).
6. Mount the actuator, if it was removed from the valve body, and adjust the actuator travel before returning the valve to service. This is necessary due to the measurements that must be made during the actuator adjustment process.

Refer to the Actuator Mounting section of this manual or to the separate actuator instruction manual for mounting and adjusting instructions.

Replacing the Seal Ring

Perform this procedure only if the control valve is not shutting off properly (that is, leaking downstream). This procedure does not require removing the actuator from the valve body.

Key numbers in this procedure are shown in figure 8 unless otherwise indicated.

1. Isolate the control valve from line pressure, and relieve pressure from the valve body. Shut off and disconnect all lines from the power actuator.

⚠ WARNING

The edges of a rotating disc have a shearing effect that may result in personal injury. To help prevent such injury, stay clear of the disc edges when rotating the disc (key 3).

CAUTION

Damage to the disc (key 3) may occur if the disc is not closed when the valve is being removed from the pipeline. If necessary, apply operating pressure to the actuator temporarily to retain the disc in the closed position while removing the valve from the pipeline.

2. Unscrew the flange bolts, and remove the valve from the pipeline.
3. Unscrew the machine screws (key 8), and remove the seal retainer (key 2) and the retainer clip (key 34).
4. Remove the seal ring or seal ring assembly (key 4). The spring (key 5) is removed with a PTFE seal ring.
5. For metal seal ring assemblies, replace the gaskets (key 4C) if the entire seal ring assembly is not replaced. Scrape off the old gaskets from both sides of the seal ring and the seal ring sides of the valve body (key 1) and seal retainer. Clean the gasket surfaces.

6. Reconnect or mount the actuator (if it was removed) before proceeding.

For an actuator with adjustable travel, also adjust the actuator before proceeding. This is necessary due to the measurements that must be made during the actuator adjustment process.

Refer to the Actuator Mounting section of this manual and to the separate actuator instruction manual for mounting and adjusting instructions.

7. The valve should be closed during seal ring installation to permit accurate centering of the seal. To install the new seal ring:

- For a PTFE seal, if the spring (key 5) was disassembled, hook the spring ends together. Work the spring into the recess in the seal ring (key 4). Install the seal ring and spring assembly into the recess in the valve body as shown in figure 8.
- For the metal seal ring assembly, install the seal ring assembly (key 4) as shown in figure 8.

CAUTION

New seal ring gaskets (key 4C) are very fragile and must be handled very carefully to avoid gasket kinking, cracking, or breakage that can cause leakage between the seal ring, seal retainer, and valve body. To avoid gasket damage, make sure that the valve body is lying flat so that the gaskets do not shift before the following step and step 8 are completed.

- For a metal seal ring on which the gaskets will be replaced, lay the following parts down in order so that they are accurately centered on the valve body: one new gasket; the seal ring oriented as shown in figure 8, and the second new gasket.

8. Attach the seal retainer (key 2) and the retainer clips (key 34) to the valve body and secure with the machine screws (key 8). Tighten the machine screws evenly so as not to crack or break the metal seal gaskets.
9. Be certain the disc is closed before installing the valve according to the Installation section of this instruction manual.

Replacing the Disc and Shaft Assembly or the Bearings

Perform this procedure to replace the valve disc, shaft, and taper key assembly if the disc does not rotate in response to rotation of the actuator end of the valve shaft. Key numbers in this procedure are shown in figure 8 unless otherwise indicated.

Disassembly

1. Remove the seal ring according to steps 1 through 5 of the Replacing Seal Ring section.

CAUTION

Use a wheel puller to separate actuator parts from the valve shaft. Driving the parts off the valve shaft could move the valve bearings and disc away from the centered position, damaging the disc and valve body.

2. Remove the cap screws (key 22) and hex nuts (key 30). Remove the clamp (key 130, figure 2) if the strap (key 131, figure 2) is used. Remove the actuator from the valve body (key 1) while referring to the separate actuator instruction manual for assistance.

3. Rotate the disc (key 3) to the fully open position.
4. Refer to figure 8 and determine the location of the smaller end of the taper key (key 21). Drive out the taper key towards the larger end.
5. Unscrew and remove the packing flange nuts (key 12), packing followers (keys 15 and 16), and packing flanges (keys 9 and 10) if used, from both sides of the valve body.

⚠ WARNING

Once the shaft has been removed in the following step, the disc may fall from the valve body. To avoid personal injury and disc damage, support the disc to prevent it from falling as the shaft is being removed.

6. Pull the shaft out through the actuator side of the valve body. If the shaft cannot be pulled free, carefully use a pin punch to drive the shaft out from the side opposite the actuator. Do not damage the end of the shaft with the punch.
7. Remove the disc and spacers (key 7) from the valve body.
8. Remove the packing rings (key 13, figure 3), the packing washers (key 27, figure 3) if used, and the packing box rings (key 14, figure 3) from both sides of the valve body.
9. If either of the bearings (key 6) require maintenance or replacement, press them out, or remove them using a bearing puller. (See figure 4 for the puller dimensions.) For constructions with a metal bearing, also remove the bearing stop (key 25) with the bearing.
10. Clean the packing boxes and metal packing box parts.

Assembly

Note

Before performing the following step, lubricate the outer bearing surfaces--except on oxygen service--with dry-film lubricant to facilitate future removal. Do not lubricate the insides of PTFE-lined bearings.

⚠ WARNING

Do not lubricate bearings that will be used for oxygen service, or where the lubrication is incompatible with the process media. Any use of lubricant can lead to the sudden explosion of media due to the oil/oxygen mixture, causing personal injury or property damage.

1. If new bearings and, if used, bearing stops (key 25) are required, insert them through the packing boxes. Press the bearings in until the bearing end is flush with the valve body bore at one point and the remainder of the bearing end protrudes into the valve body bore. Or, use a bearing puller (see figure 4 for puller dimensions) to properly install and locate the new bearings and the bearing stops.
2. Install spacers (key 7) into the disc (key 3). The spacers fit loosely in the disc.

Note

If contaminating the process fluid with grease is a concern, do not apply grease according to the following step; especially if the thorough cleaning in step 7 cannot be performed.

Figure 4. Bearing Puller Dimensions

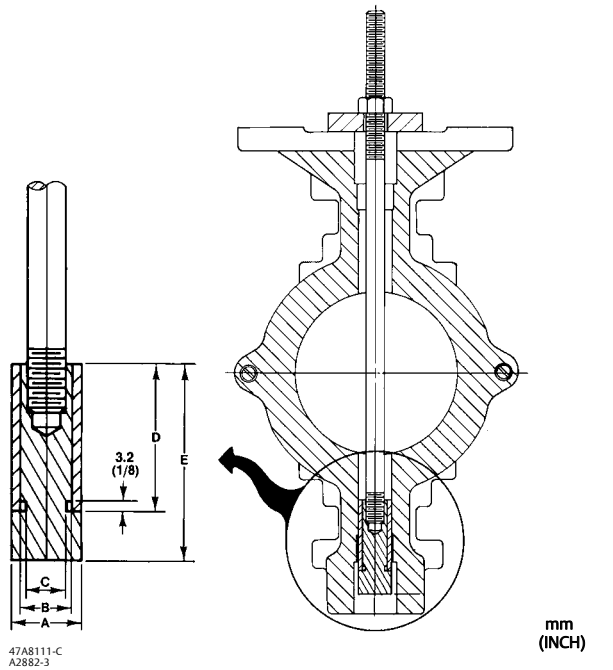


Table 4. Puller Dimensions for Bearing Stop(1)

VALVE SIZE, NPS	A		B		C		D		E	
	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch
2	15.49	0.610	13.56	0.534	10.31	0.406	14.29	0.563	33.34	1.313
	15.37	0.605	13.44	0.529						
3	18.67	0.735	16.74	0.659	13.49	0.531	15.88	0.625	34.93	1.375
	18.54	0.730	16.61	0.654						
4	22.71	0.894	19.91	0.784	16.66	0.656	22.23	0.875	41.28	1.625
	22.58	0.889	19.79	0.779						
6	29.06	1.144	26.26	1.034	23.01	0.906	28.58	1.125	47.63	1.875
	28.93	1.139	26.14	1.029						
8 & 10	35.41	1.394	32.61	1.284	29.36	1.156	34.93	1.375	53.98	2.125
	35.28	1.389	32.49	1.279						
12	41.76	1.644	38.96	1.534	35.71	1.406	41.28	1.625	60.33	2.375

1. Tolerance for the A & B dimensions are indicated by showing maximum and minimum dimensions.

Table 5. Puller Dimensions for PTFE Bearings(1)

VALVE SIZE, NPS	A		B		C		D		E	
	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch
2	15.49	0.610	12.65	0.498	9.53	0.375	33.24	1.313	50.80	2.000
	15.37	0.605	12.52	0.493						
3	18.67	0.735	15.82	0.623	12.70	0.500	39.70	1.563	58.74	2.313
	18.54	0.730	15.70	0.618						
4	22.71	0.894	19.00	0.748	15.88	0.625	47.63	1.875	66.68	2.625
	22.58	0.889	18.87	0.743						
6	29.06	1.144	25.35	0.998	22.23	0.875	60.33	2.375	79.38	3.125
	28.93	1.139	25.22	0.993						
8 & 10	35.41	1.394	31.70	1.248	28.58	1.125	73.03	2.875	92.08	3.625
	35.28	1.389	31.57	1.243						
12	41.76	1.644	38.05	1.498	34.93	1.375	85.73	3.375	104.8	4.125

1. Tolerance for the A & B dimensions are indicated by showing maximum and minimum dimensions.

Table 6. Puller Dimensions for Metal Bearings(1)

VALVE SIZE, NPS	A		B		C		D		E	
	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch
2	15.49	0.610	12.70	0.500	9.53	0.375	15.88	0.625	34.93	1.375
	15.37	0.605	12.57	0.495						
3	18.67	0.735	15.88	0.625	12.70	0.500	20.64	0.813	39.69	1.563
	18.54	0.730	15.72	0.619						
4	22.71	0.894	19.05	0.750	15.88	0.625	22.23	0.875	41.28	1.625
	22.58	0.889	18.92	0.745						
6	29.06	1.144	25.40	1.000	22.23	0.875	28.58	1.125	47.63	1.875
	28.93	1.139	25.27	.995						
8 & 10	35.41	1.394	31.75	1.250	28.58	1.125	34.93	1.375	53.98	2.125
	35.28	1.389	31.62	1.245						
12	41.76	1.644	38.10	1.500	34.93	1.375	41.28	1.625	60.33	2.375

1. Tolerance for the A & B dimensions are indicated by showing maximum and minimum dimensions.

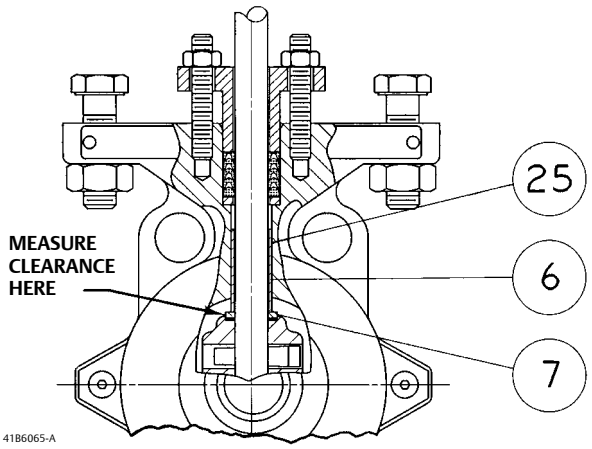
3. Apply a small amount of heavy grease to the spacers. The grease will help to hold the spacers in place during the subsequent centering procedure.

- Valves with PTFE bearings use one PTFE coated spacer on each side of the disc. Install the spacer with the PTFE side against the disc.

- Valves with metal bearings use two metal spacers on each side of the disc.

4. Insert the disc into the valve body. Be certain the taper key hole in the disc is on the actuator side of the valve body.
5. Slide the shaft through the valve body and disc.
6. Rotate the disc to the closed position. Measuring carefully, center the disc in the valve body bore. With the disc centered, use a feeler gauge to measure the clearance between each spacer and bearing. The clearance between each spacer and bearing should be equal and should be as close as possible to the value given in figure 5. If necessary, remove the disc and shaft, and reposition the bearings. Reinstall the disc and shaft, and repeat the centering and measuring process.
7. If the grease used to hold the spacers will contaminate the process fluid, disassemble the shaft and disc, remove the spacers, and clean the shaft, disc, valve body bore, and spacers thoroughly. Reinstall the disc and spacers into the valve body. Insert the shaft into the valve body and through the disc.

Figure 5. Spacer-Bearing Clearance (Metal Bearing Assembly Shown)



VALVE BODY SIZE, NPS	SPACER TO BEARING CLEARANCE			
	Minimum		Maximum	
	mm	Inches	mm	Inches
2,3, & 4	0.102	0.004	0.229	0.009
6	0.152	0.006	0.279	0.011
8	0.203	0.008	0.330	0.013
10	0.254	0.010	0.381	0.015
12	0.305	0.012	0.432	0.017

Table 7. Recommended Bolt Torques for Actuator-Mounting Cap Screws

VALVE SIZE, NPS	RECOMMENDED TORQUE	RECOMMENDED TORQUE
	N•m	lbf•in.
2, 3, 4, and 6	87.7	60
8, 10, and 12	135	100

8. Slide the shaft all the way into the valve body.
9. Temporarily install the packing follower (key 16) or, if used, the packing flange (key 9). With the disc fully open, rotate the shaft until the hole in the disc (key 3) aligns with the slot in the shaft. Insert the taper key (key 21), small end first, into the taper key hole. Do not drive in the taper key. Remove the packing follower or flange.

- Current standard construction materials require the taper key (key 21) to be tack welded in place **after properly seating**.

Note

Make sure the drive shaft (key 20) is free of oil or grease, otherwise the taper key will not seat properly.

Failure to properly set the taper key could result in it coming loose while in service.

10. Insert a packing box ring (key 14) into each packing box.
11. Install the packing according to the appropriate instructions presented in steps 5 through 8 of the Replacing Packing section.

12. Drive in the taper key until solid contact is felt, then:

    a. Drive the taper key in farther as follows:

VALVE BODY SIZE, NPS	MINIMUM ALLOWABLE DEPTH TO DRIVE TAPER KEY AFTER INITIAL SOLID CONTACT, mm (INCH)
2	3.2 (0.125)
3 , 4, 6	4.8 (0.188)
8, 10, 12	5.7 (0.219)

    b. The disc, shaft and taper key assembly must be inspected to verify that the taper key spans the entire shaft flat width. If not, the taper key must be driven in farther until this condition is satisfied. However, the following depth limits must not be exceeded:

VALVE BODY SIZE, NPS	MAXIMUM ALLOWABLE DEPTH TO DRIVE TAPER KEY AFTER INITIAL SOLID CONTACT, mm (INCH)
2	5.6 (0.219)
3 & 4	7.1 (0.281)
6	7.9 (0.312)
8 & 10	9.5 (0.375)
12	10.3 (0.406)

13. When the above conditions are met, tack weld the taper key (key 21) to the valve disc (key 3). Use a :

- 1/8 inch diameter weld on NPS 2 through 6 valves,
- 3/16 inch diameter weld on NPS 8 through 10 valves, and
- 1/4 inch diameter weld on NPS 12 valves.

14. Rotate the disc to the closed position.
15. Refer to the Replacing Seal Ring and Packing Maintenance procedures in this section.

Actuator Mounting

With the valve body out of the line, mount the actuator on the valve body in accordance with the instructions in the actuator instruction manual. Mount the actuator yoke to the valve body, and tighten the actuator-mounting cap screws and nuts (keys 22 and 30) to the appropriate torque from table 7. The valve body might have an optional disc stop. Do not use the disc stop as a travel stop; use the actuator travel stop (if necessary, refer to the actuator instruction manual).

Key numbers in this procedure are shown in figure 8 unless otherwise indicated.

1. If using a power actuator, determine the actuator mounting style and position from figure 6.

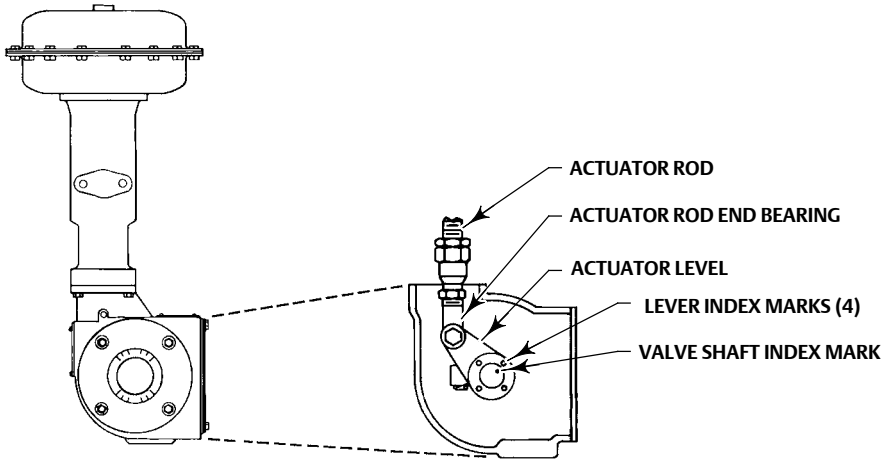
If using a manual handwheel or handlever actuator, refer to the appropriate actuator instruction manual for mounting positions.

CAUTION

Rotating the disc (key 3) in the wrong direction will damage the seal ring (key 4). To avoid such damage, remove the seal ring according to the following step before mounting the actuator.

2. Mark the orientation of the seal ring with respect to the valve body so that the seal can be reinstalled in its original position. Remove the seal ring according to the procedure in the Replacing Seal Ring section of this instruction manual.

Figure 6. Lever/Shaft/Disc Orientation with Valve Closed



ACTUATOR MOUNTING	ACTUATOR STYLE	VALVE CLOSED 4	MOUNTING POSITION 1 5	MOUNTING POSITION 2 5	MOUNTING POSITION 3 5	MOUNTING POSITION 4 5
RIGHT-HAND 1	STYLE A (PDTO)	FORWARD FLOW				
	STYLE B (PDTC) 3	FORWARD FLOW				
LEFT-HAND 2	STYLE C (PDTC) 3	FORWARD FLOW				
	STYLE D (PDTO)	FORWARD FLOW				

NOTES:
1 WHEN ONE IS FACING THE INLET, THE ACTUATOR IS TO THE RIGHT OF THE VALVE BODY.
2 WHEN ONE IS FACING THE INLET, THE ACTUATOR IS TO THE LEFT OF THE VALVE BODY.
3 FOR 60-DEGREE OPERATION WITH PUSH-DOWN-TO-CLOSE ACTION (EXTENDING ACTUATOR ROD CLOSES VALVE), ROTATE ACTUATOR LEVER COUNTERCLOCKWISE SO THAT LEVER INDEX MARK IS OFFSET 1 SPLINE TOOTH FROM VALVE SHAFT INDEX MARK FOR NPS 2 THROUGH 4 VALVES AND 2 SPLINE TEETH FROM VALVE SHAFT INDEX MARK FOR NPS 6 THROUGH 12 VALVES.
4 CURVED ARROWS IN "VALVE CLOSED' COLUMN INDICATE ROTATION REQUIRED TO OPEN VALVE (COUNTERCLOCKWISE WHEN VIEWED FROM ACTUATOR SIDE OF VALVE).
5 ARROWS IN "MOUNTING POSITION" COLUMNS INDICATE DIRECTION OF ACTUATOR ROD TRAVEL REQUIRED TO OPEN VALVE.
6. PDTC—PUSH DOWN TO CLOSE; PDTO—PUSH DOWN TO OPEN.

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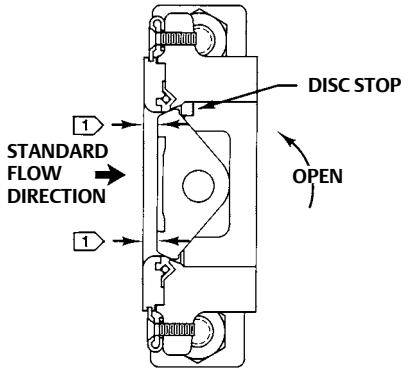
CAUTION

To prevent damage to the valve seal, due to the disc rotating past the fully closed position, use the following procedures:

- **For actuators with an adjustable turnbuckle, such as the Fisher 1051, 1052, or 1061 actuator, the turnbuckle must be adjusted so that the valve is closed (determined by measuring as shown in figure 7) when the diaphragm plate or piston is against the actuator travel stop.**
- **For manually-operated actuators or actuators without adjustable linkage, such as a Fisher 1066 or 1066SR actuator, make certain the actuator travel stop prevents the disc from rotating past the fully closed position.**

3. For actuators with an adjustable turnbuckle, adjust the turnbuckle to its minimum length to prevent damage. If necessary, refer to the appropriate actuator instruction manual for assistance with adjustment.
4. For power actuators, refer to figure 6 to locate the view of the mounting style and position to be used. When adjusting the actuator, be certain that the disc is rotated in the proper direction (clockwise to close when viewed from the actuator side of the valve) and that the disc is not rotated beyond the limits defined in the Installation section of this instruction manual.
5. For actuators with turnbuckles, adjust the turnbuckle to bring the disc to the fully closed position at the end of the actuator stroke. Refer to the appropriate actuator instruction manual for assistance.
6. To determine the fully closed disc position (zero degrees of disc rotation), measure the distances between the disc face and the retaining ring face (or from a line from the top to the bottom of the valve body) at the top and bottom of the valve as shown in figure 7. When necessary, adjust the actuator to rotate the disc slightly until the two measurements are equal.
7. Reinstall the seal ring according to the procedure in the Replacing Seal Ring section.

Figure 7. Sectional of Typical Valve Body



NOTE:
1 THESE TWO MEASUREMENTS MUST BE EQUAL TO ENSURE THAT THE DISC IS FULLY CLOSED

Parts Ordering

When corresponding with your Emerson Process Management sales office about this equipment, always mention the valve serial number. When ordering replacement parts, also specify the complete 11-character part number of each part required from the following parts list.

⚠ WARNING

Use only genuine Fisher replacement parts. Components that are not supplied by Emerson Process Management 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.

Parts Kits

Retrofit Kits for ENVIRO-SEAL Packing

Retrofit kits are available for replacing the packing in an existing valve with an ENVIRO-SEAL packing system. These kits are available for single PTFE or graphite packing. All parts required for installation of the ENVIRO-SEAL packing system into an existing 8510B control valve are included in the kits. Select two kits, one for the actuator end of the valve and one for the outboard end.

Worn shafts, packing box damage, or other components that do not meet Emerson Process Management finish specifications, dimensional tolerances, and design specifications, may adversely alter the performance of the retrofit kit.

ENVIRO-SEAL Packing System Retrofit Kits for Splined Shafts

SHAFT DIAMETER		SINGLE PTFE PACKING		GRAPHITE PACKING	
mm	Inches	For Actuator End Packing Box	For Outboard End Packing Box	For Actuator End Packing Box	For Outboard End Packing Box
12.7	1/2	RRTYXRT0012	RRTYXRT0082	RRTYXRT0312	RRTYXRT0382
15.9	5/8	RRTYXRT0022	RRTYXRT0092	RRTYXRT0322	RRTYXRT0392
19.1	3/4	RRTYXRT0032	RRTYXRT0102	RRTYXRT0332	RRTYXRT0402
25.4	1	RRTYXRT0052	RRTYXRT0112	RRTYXRT0352	RRTYXRT0412
31.8	1-1/4	RRTYXRT0062	RRTYXRT0122	RRTYXRT0362	RRTYXRT0422
38.1	1-1/2	RRTYXRT0072	RRTYXRT0132	RRTYXRT0372	RRTYXRT0432

ENVIRO-SEAL Packing System Retrofit Kits for Double D End Connection with Anti-Blowout Shaft

SHAFT DIAMETER		SINGLE PTFE PACKING		GRAPHITE PACKING	
mm	Inches	For Actuator End Packing Box	For Outboard End Packing Box	For Actuator End Packing Box	For Outboard End Packing Box
12.7	1/2	RRTYXRT0972	RRTYXRT0082	RRTYXRT1072	RRTYXRT0382
15.9	5/8	RRTYXRT0982	RRTYXRT0092	RRTYXRT1082	RRTYXRT0392
19.1	3/4	RRTYXRT0992	RRTYXRT0102	RRTYXRT1092	RRTYXRT0402
25.4	1	RRTYXRT1012	RRTYXRT0112	RRTYXRT1102	RRTYXRT0412
31.8	1-1/4	RRTYXRT1022	RRTYXRT0122	RRTYXRT1112	RRTYXRT0422
38.1	1-1/2	RRTYXRT1032	RRTYXRT0132	RRTYXRT1122	RRTYXRT0432

Repair Kits for ENVIRO-SEAL Packing

Repair kits for ENVIRO-SEAL PTFE packing include one packing set and two anti-extrusion washers. Repair kits for ENVIRO-SEAL graphite packing include two packing rings and two anti-extrusion rings. A quantity of two of the appropriate kit is required to repair both ends of the valve.

Worn shafts, packing box damage, or other components that do not meet Emerson Process Management finish specifications, dimensional tolerances, and design specifications, may adversely alter the performance of the repair kit.

ENVIRO-SEAL Packing System Repair Kits

SHAFT DIAMETER		FOR PTFE PACKING	FOR GRAPHITE PACKING
mm	Inches		
12.7	1/2	RRTYX000012	13B8816X012
15.9	5/8	RRTYX000022	13B8816X032
19.1	3/4	RRTYX000032	13B8816X052
25.4	1	RRTYX000052	13B8816X092
31.8	1-1/4	RRTYX000062	13B8816X112
38.1	1-1/2	RRTYX000072	13B8816X142

Parts List

Note
Part numbers are shown for recommended spares only. For part numbers not shown, contact your Emerson Process Management sales office.
Except where indicated, sizes shown are valve body sizes.

Key	Description	Part Number
1	Valve Body	---

Note
The valve body is available as an assembly only. If valve body replacement information is necessary, contact your Emerson Process Management sales office.

Key	Description	Part Number
2*	Seal Retainer	See following table
	Part numbers are listed for steel and stainless steel only. For alloy construction part numbers, contact your Emerson Process Management sales office.	
3	Valve Disc	
4*	Seal Ring(1), PTFE	See following table
4*	Seal Ring Assembly, All-metal seal	
	S31600 (316 SST) & graphite laminate (Assembly includes gaskets. For gasket only, see key 4C below)	
	NPS 2	17A7544X022
	NPS 3	17A7550X022
	NPS 4	17A7556X022
	NPS 6	17A8171X022
	NPS 8	17A8172X022
	NPS 10	18A1129X022
	NPS 12	18A1139X022
4C*	Gasket, graphite laminate (2 req'd)	
	NPS 8	17A7567X012
	NPS 10	18A1128X012
5*	Spring (PTFE seal ring only)(1)	See following table
6*	Bearing (2 req'd)	
	PTFE/composition lining with S31603 (316L SST) jacket (Reinforced PTFE in phenolic resin. Emerson Process Management designation is FMS 30B4.)	
	NPS 2	12A9015X272
	NPS 3	12A8904X292
	NPS 4	12A8985X332
	NPS 6	12A8819X362
	NPS 8 & 10	12A8965X262
	NPS 12	12A8928X242
	Filled PTFE with S31603 (316L SST) jacket (PTFE with selected fillers. Emerson Process Management designation is FMS 30B5.)	
	NPS 2	12A9015X282
	NPS 3	12A8904X302
	NPS 4	12A8985X322
	NPS 6	12A8819X372
	NPS 8 & 10	12A8965X272
	NPS 12	12A8928X272
	S44004 (440C SST)	
	NPS 2	14A6543X012
	NPS 3	12A9300X012
	NPS 4	14A5698X012
	NPS 6	14A4618X012
	NPS 8 & 10	14A5699X012
	NPS 12	14A6549X012
	Alloy 6B	
	NPS 2	14A6544X012
	NPS 3	14A6545X012
	NPS 4	14A6546X012
	NPS 6	14A6547X012
	NPS 8 & 10	14A6548X012
	NPS 12	14A6550X012
	Silver-plated alloy 6B	
	NPS 2	14A6536X012
	NPS 3	12A9161X012
	NPS 4	14A6537X012
	NPS 6	14A2498X012
	NPS 8 & 10	14A6538X012
	NPS 12	14A6539X012
7*	Spacer	
	For PTFE lined or filled PTFE bearings	
	PTFE/S31603 (316LSST) (2 req'd)	
	NPS 2	16A6036X092
	NPS 3	16A6045X162
	NPS 4	16A6041X152
	NPS 6	16A6033X102
	NPS 8 & 10	16A6055X062
	NPS 12	16A6061X152
	For S44004 (440C SST) bearings	
	S17700 (17-7 PH SST) (4 req'd)	
	NPS 2	18B9857X022
	NPS 3	11B9444X012
	NPS 4	11B9608X012
	NPS 6	12B1356X012
	NPS 8 & 10	12B1997X012
	NPS 12	12B3905X012
	For alloy 6B or silver-plated alloy 6B bearings	
	Alloy 6B (4 req'd)	
	NPS 2	18B9857X022
	NPS 3	11B9444X022
	NPS 4	11B9608X022

*Recommended spare parts
1. To make certain that a spring is available with each seal ring, a new spring (key 5) should be ordered to be stocked with each ring ordered.

Key	Description	Part Number
	NPS 6	12A1356X022
	NPS 8 & 10	12B1997X022
	NPS 12	12B3905X022
8	Cap Screw (SST)	
	NPS 2 through 8 (2 req'd) NPS 10 & 12 (4 req'd)	
9	Packing Flange	
10	Packing Flange	
11	Packing Flange Stud (4 req'd)	
12	Packing Flange Nut (4 req'd)	
13*	Packing Set (2 req'd)	
	PTFE & carbon-filled PTFE V-ring (standard)	
	NPS 2	12A9016X022
	NPS 3	1R5795X0012
	NPS 4	12A8995X022
	NPS 6	12A8832X022
	NPS 8 & 10	12A8951X022
	NPS 12	12A8935X022
	PTFE V-ring (nonconductive)	
	NPS 2	12A9016X012
	NPS 3	1R579501012
	NPS 4	12A8995X012
	NPS 6	12A8832X012
	NPS 8 & 10	12A8951X012
	NPS 12	12A8935X012
	Packing Parts (included in packing set)	
	Female Adaptor (2 req'd)	
	Carbon-filled PTFE (standard)	
	NPS 2	1H7844X0012
	NPS 3	1R5794X0012
	NPS 4	12A8992X022
	NPS 6	12A8831X022
	NPS 8 & 10	12A8953X022
	NPS 12	12A8932X022
	PTFE (nonconductive)	
	NPS 2	1H784401012
	NPS 3	1R579401012
	NPS 4	12A8992X012
	NPS 6	12A8831X012
	PTFE (nonconductive)	
	NPS 8 & 10	12A8953X012
	NPS 12	12A8932X012
	Packing Ring, PTFE (6 req'd)	
	NPS 2	1H784301012
	NPS 3	1R579301012
	NPS 4	12A8994X012
	NPS 6	12A8830X012
	NPS 8 & 10	12A8954X012
	NPS 12	12A8933X012
	Male Adaptor, PTFE (2 req'd)	
	NPS 2	1H784201012
	NPS 3	1R579201012
	NPS 4	12A8993X012
	NPS 6	12A8829X012
	NPS 8 & 10	12A8952X012
	NPS 12	12A8934X012
13*	Packing Ring (8 req'd) (not req'd for V-ring packing set)	
	Graphite ribbon	
	NPS 2	12A9134X012
	NPS 3	12A9135X012
	NPS 4	12A9136X012
	NPS 6	12A9137X012
	NPS 8 & 10	12A9138X012
	NPS 12	12A9139X012

Note

When ordering a PTFE-composition & graphite composition/N06600 packing ring arrangement, order 6 PTFE-composition packing rings and 2 graphite composition/N06600 packing rings per valve.

Key	Description	Part Number
	PTFE-composition (6 req'd)	
	NPS 2	1P390501042
	NPS 3	1J822501042
	NPS 4	14A1937X012
	NPS 6	14A0915X012
	NPS 8 & 10	14A0916X012
	NPS 12	14A1933X012
	Graphite composition/N06600 (2 req'd)	
	NPS 2	1P3905X0172
	NPS 3	1J8225X0182
	NPS 4	14A1937X042
	6-inch	14A0915X042
	NPS 8 & 10	14A0916X072
	NPS 12	14A1933X022
14*	Packing Box Ring	
	S31600 (316L SST) (2 req'd)	
	NPS 2	16A6082X052
	NPS 3	16A6083X092
	NPS 4	16A6084X062
	NPS 6	16A6085X062
	NPS 8 & 10	16A6086X082
	NPS 12	16A6087X072
15	Packing follower, CF8M (316 SST)	
16	Packing follower, SST	
18	Drive Screw, SST (2 req'd)	
20	Valve Shaft	
	Splined Shaft Connection	
	S17400 (17-4 PH SST)	
	NPS 2	31B2526X012
	NPS 3	31B6892X012
	NPS 4	31B9456X012
	NPS 6	32B1347X012
	NPS 8	32B1994X012
	NPS 10	32B2824X012
	NPS 12	32B3901X012
	S20190	
	Do not use with S44004 (440C SST) bearings	
	NPS 2	31B2526X022
	NPS 3	31B6892X022
	NPS 4	31B9456X022
	NPS 6	32B1347X022
	NPS 8	32B1994X022
	NPS 10	32B2824X022
	NPS 12	32B3887X022
	Double D End Connection and Anti-Blowout Shaft	
	S17400 (17-4 PH SST)	
	NPS 2	3Q57352F012
	NPS 3	3Q57353F012
	NPS 4	3Q57354F012
	NPS 6	3Q57355F012
	NPS 8	3Q57356F012
	NPS 10	3Q57357F012
	NPS 12	3Q57358F012

*Recommended spare parts

Figure 8. Typical Fisher 8510B Valve Assemblies

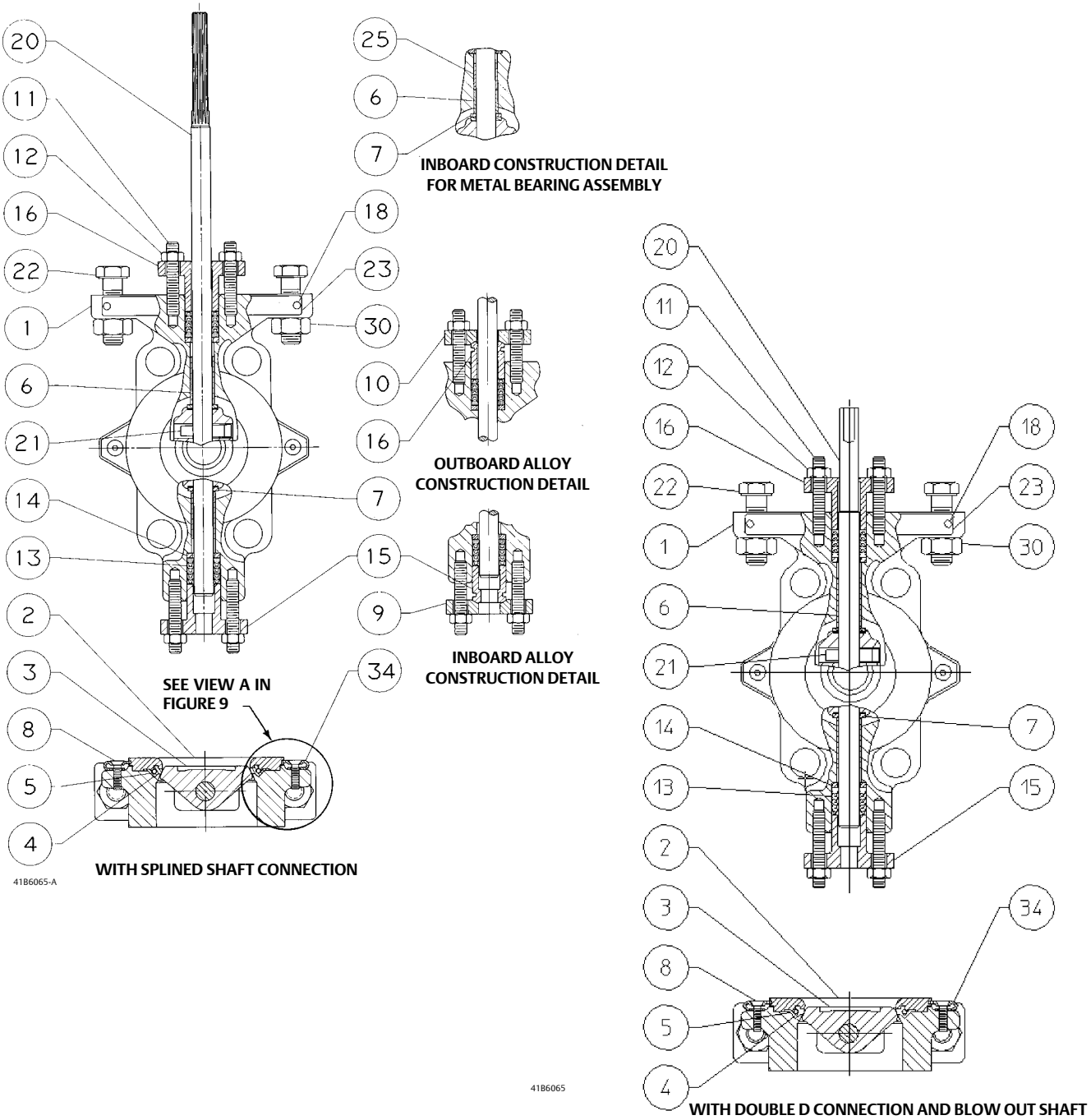
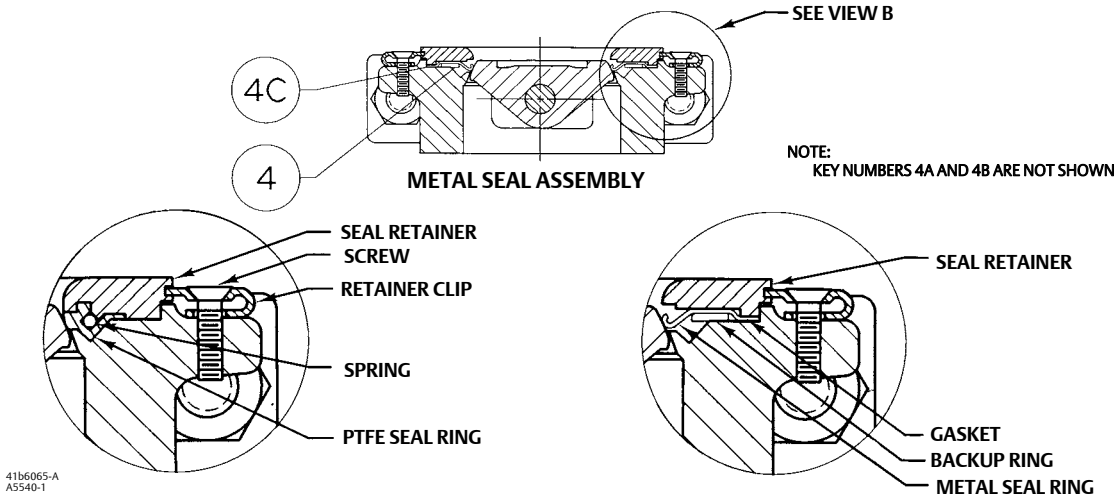


Figure 9. Seal Details



VIEW A DETAIL OF PTFE SEAL

VIEW B DETAIL OF METAL SEAL

Key	Description	Part Number
20	Valve Shaft (continued)	
	Double D End Connection and Anti-Blowout Shaft S20190	
	Do not use with S44004 (440C SST) bearings	
	NPS 2	3Q57352F022
	NPS 3	3Q57353F022
	NPS 4	3Q57354F022
	NPS 6	3Q57355F022
	NPS 8	3Q57356F022
	NPS 10	3Q57357F022
	NPS 12	3Q57358F022
21*	Taper Key, S20910	
	NPS 2	11B0654X012
	NPS 3	11B0674X012
	NPS 4	11B0674X012
	NPS 6	11B0695X012
	NPS 8 & 10	11B0722X012
	NPS 12	11B4684X012
22	Cap Screw (2 req'd for 2 & 3-inch; 4 req'd on all other sizes)	
23	Nameplate, stainless steel	11B9434X0A2
25*	Bearing Stop (2 req'd) S31600 (316 SST)	
	For use with metal bearings (not shown)	
	NPS 2	14A6531X022
	NPS 3	12A9162X012
	NPS 4	14A5697X022
	NPS 6	14A2497X012
	NPS 8 & 10	14A5700X022
	NPS 12	14A6532X022

Key	Description	Part Number
26	Line Flange Stud (not shown)	
27	Packing Washer, zinc (6 req'd)	
29*	Line Flange Gasket, FGM (2 req'd)	
	(use only when specified) (not shown)	
	Recommended for temperatures above 650°F (343°C)	
	CL150	
	NPS 2	16A6224X012
	NPS 3	16A6226X012
	NPS 4	16A6228X012
	NPS 6 & 8	16A6231X012
	NPS 10	16A6237X012
	NPS 12	16A6239X012
	CL300	
	NPS 2	16A6225X012
	NPS 3	16A6227X012
	NPS 4	16A6229X012
	NPS 6 & 8	16A6232X012
	NPS 10	16A6238X012
	NPS 12	16A6240X012
	CL600	
	NPS 2	16A6225X012
	NPS 3	16A6227X012
	NPS 4	16A6230X012
	NPS 6 & 8	16A6233X012
30	Hex Nut	
32	Nameplate, stainless steel	
33	Nameplate Wire	
34	Retainer Clip, S31600	
130	Clamp, stainless steel (req'd w/nonconductive packing)	
131	Bonding Strap Assembly (req'd w/nonconductive packing)	

*Recommended spare parts

ENVIRO-SEAL PACKING

Key	Description	Part Number
100	Packing Stud (4 required)	
101	Packing Nut (4 required)	
102	Packing Flange (2 required)	
103	Spring Pack Assembly	
104	Spring Pack Outboard	
105*	Packing Set	
	Single PTFE Packing	
	NPS 2	12B7053X012
	NPS 3	12B7402X012
	NPS 4	12B7414X012
	NPS 6	12B7438X012
	NPS 8	12B7450X012
	NPS 10	12B7450X012
	NPS 12	12B7643X012
	Graphite Packing	
	NPS 2	13B8816X012
	NPS 3	13B8816X032
	NPS 3	13B8816X052
	NPS 6	13B8816X092
	NPS 8	13B8816X112
	NPS 10	13B8816X112
	NPS 12	13B8816X142
106*	Anti-extrusion Ring	
	Single PTFE Packing	
	NPS 2	12B7054X012
	NPS 3	12B7406X012
	NPS 4	12B7418X012
	NPS 6	12B7442X012
	NPS 8	12B7454X012
	NPS 10	12B7454X012
	NPS 12	12B7646X012
107*	Packing Box Ring	
	NPS 2	16A6082X012
	NPS 3	16A6083X012
	NPS 4	16A6084X012
	NPS 6	16A6085X012
	NPS 8	16A6086X012
	NPS 10	16A6086X012
	NPS 12	16A6086X012
111	Tag	
112	Cable Tie	

Key 2*, Seal Retainer, ASME

VALVE SIZE, NPS	FOR COMPOSITION SEAL		FOR ALL-METAL SEAL	
	SA-514-70 Steel	S31603 (316L SST)	SA-515-70 Steel	S31603 (316L SST)
2	21B4666X012	21B4666X062	21B4667X012	21B4667X032
3	21B6894X012	21B6894X062	21B6895X012	21B6895X032
4	21B9458X012	21B9458X062	21B9459X012	21B9459X032
6	22B1343X012	22B1343X032	22B1344X012	22B1344X032
8	22B1988X012	22B1988X032	22B1989X012	22B1989X032
10	28A1124X012	28A1124X132	28A1125X012	28A1125X132
12	28A1134X012	28A1134X172	28A1135X012	28A1135X092

*Recommended spare parts

Key 2* Seal Retainer, DIN

VALVE SIZE, NPS	SEAL MATERIAL	SEAL RETAINER MATERIAL			
		SA-515-70	1.0481 Steel DIN 17155	1.4571 Steel DIN 17440	S31603 (316L SST)
For PN 63-100					
2	PTFE Composition	21B4668X092	21B4668X152	21B4668X162	21B4668X142
	All-Metal Seal	**21B4669X062**	**21B4669X092**	**21B4669X102**	**21B4669X082**
3	PTFE Composition	21B6896X092	21B6896X152	21B6896X162	21B6896X142
	All-Metal Seal	**21B6897X062**	**21B6897X092**	**21B6897X102**	**21B6897X082**
4	PTFE Composition	21B9458X212	21B9458X272	21B9458X282	21B9458X262
	All-Metal Seal	**21B9459X112**	**21B9459X142**	**21B9459X152**	**21B9459X132**
6	PTFE Composition	22B1345X092	22B1345X152	22B1345X162	22B1345X142
	All-Metal Seal	**22B1346X062**	**22B1346X092**	**22B1346X102**	**22B1346X082**
8	PTFE Composition	22B1992X092	22B1992X152	22B1992X162	22B1992X142
	All-Metal Seal	**22B1993X062**	**22B1993X092**	**22B1993X102**	**22B1993X082**
For PN 10-40					
2	PTFE Composition	21B4668X012	21B4668X072	21B4668X082	21B4668X062
	All-Metal Seal	**21B4669X012**	**21B4669X042**	**21B4669X052**	**21B4669X032**
3	PTFE Composition	21B6896X012	21B6896X072	21B6896X082	21B6896X062
	All-Metal Seal	**21B6897X012**	**21B6897X042**	**21B6897X052**	**21B6897X032**
4	PTFE Composition	21B9458X012	21B9458X192	21B9458X202	21B9458X062
	All-Metal Seal	**21B9459X012**	**21B9459X092**	**21B9459X102**	**21B9459X032**
6	PTFE Composition	22B1345X012	22B1345X072	22B1345X082	22B1345X062
	All-Metal Seal	**22B1346X012**	**22B1346X042**	**22B1346X052**	**22B1346X032**
For PN 10-16					
8	PTFE Composition	22B1990X012	22B1990X072	22B1990X082	22B1990X062
	All-Metal Seal	**22B1991X012**	**22B1991X042**	**22B1991X052**	**22B1991X032**
10	PTFE Composition	22B2826X012	22B2826X072	22B2826X082	22B2826X062
	All-Metal Seal	**22B2827X012**	**22B2827X042**	**22B2827X052**	**22B2827X032**
For PN 25-40					
8	PTFE Composition	22B1992X012	22B1992X072	22B1992X082	22B1992X062
	All-Metal Seal	**22B1993X012**	**22B1993X042**	**22B1993X052**	**22B1993X032**
10	PTFE Composition	22B2828X012	22B2828X072	22B2828X082	22B2828X062
	All-Metal Seal	**22B2829X012**	**22B2829X042**	**22B2829X052**	**22B2829X032**
For PN 10					
12	PTFE Composition	22B3889X012	22B3889X072	22B3889X082	22B3889X062
	All-Metal Seal	**22B3890X012**	**22B3890X042**	**22B3890X052**	**22B3890X032**
For PN 16					
12	PTFE Composition	22B3891X012	22B3891X072	22B3891X082	22B3891X062
	All-Metal Seal	**22B3892X012**	**22B3892X042**	**22B3892X052**	**22B3892X032**
For PN 25					
12	PTFE Composition	22B3893X012	22B3893X072	22B3893X082	22B3893X062
	All-Metal Seal	**22B3894X012**	**22B3894X042**	**22B3894X052**	**22B3894X032**
For PN 40					
12	PTFE Composition	22B3895X012	22B3895X072	22B3895X082	22B3895X062
	All-Metal Seal	**22B3896X012**	**22B3896X042**	**22B3896X052**	**22B3896X032**
For PN 63					
12	PTFE Composition	22B3895X092	22B3895X152	22B3895X162	22B3895X142
	All-Metal Seal	**22B3896X062**	**22B3896X092**	**22B3896X102**	**22B3896X082**

*Recommended spare parts

Key 4* Seal Ring and Key 5* Seal Spring used with PTFE Composition Seals

VALVE SIZE, NPS	KEY NUMBER	SEAL RING MATERIAL IS PTFE (KEY 4)			
		Spring Material (Key 5)			
		S31600 (316 SST)	N05500	N10276 (Alloy 276)	N08020 (Alloy 20)
2	**4** **5**	22A9023X012 12A9022X012	22A9023X012 12A9022X022	22A9023X012 12A9022X032	22A9023X012 12A9022X042
3	**4** **5**	22A8897X012 12A8902X012	22A8897X012 12A8902X022	22A8897X012 12A8902X032	22A8897X012 12A8902X042
4	**4** **5**	22A8986X012 12A8991X012	22A8986X012 12A8991X022	22A8986X012 12A8991X032	22A8986X012 12A8991X042
6	**4** **5**	22A8825X012 12A8818X012	22A8825X012 12A8818X022	22A8825X012 12A8818X032	22A8825X012 12A8818X042
8	**4** **5**	22A8961X012 12A8974X012	22A8961X012 12A8974X022	22A8961X012 12A8974X032	22A8961X012 12A8974X042
10	4 5	22A8946X012 12A8948X012	22A8946X012 12A8948X022	22A8946X012 12A8948X032	22A8946X012 12A8948X042
12	4 5	22A8920X012 12A8922X012	22A8920X012 12A8922X022	22A8920X012 12A8922X032	22A8920X012 12A8922X042

*Recommended spare parts

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Emerson Process Management
Marshalltown, Iowa 50158 USA
Sorocaba, 18087 Brazil
Chatham, Kent ME4 4QZ UK
Dubai, United Arab Emirates
Singapore 128461 Singapore

www.Fisher.com