

Fisher® EDR and ETR easy-e™ Valves

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Figure 1. Reverse Acting easy-e Valve with Actuator



W2080-1

Introduction

Scope of Manual

This instruction manual includes installation, maintenance, and parts information for NPS 1 through 4 EDR and ETR valves (see figure 1). The valves are available in CL150 through 600 ratings.

The valves are also available with full-size and restricted-trim designs. Refer to separate manuals for instructions covering the actuator and accessories.

Do not install, operate, or maintain an EDR or ETR valve 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.

Description

The EDR and ETR are single-port, globe-style valves that feature cage guiding, a balanced plug design, and push-down-to-open valve plug action. The valve constructions are available with metal-to-metal or metal-to-composition seats. These constructions permit access to the internal trim parts through the bottom flange without removing the actuator from the valve.



Table 1. Specifications

<p>Available Valve Constructions</p> <p>See table 2</p> <p>End Connection Styles</p> <p>Cast Iron Valves <i>Flanged:</i> CL125 flat-face or 250 raised-face flanges per ASME B16.1</p> <p>Steel and Stainless Steel Valves <i>Flanged:</i> CL150, 300, and 600 raised-face or ring-type joint flanges per ASME B16.5 <i>Screwed or Socket Welding:</i> All available ASME B16.11 schedules that are consistent with CL600 per ASME B16.34 <i>Buttwelding:</i> Consistent with ASME B16.25</p> <p>Maximum Inlet Pressure⁽¹⁾</p> <p>Cast Iron Valves <i>Flanged:</i> Consistent with CL125B or 250B pressure-temperature ratings per ASME B16.1</p> <p>Steel and Stainless Steel Valves <i>Flanged:</i> Consistent with CL150, 300, and 600⁽²⁾ pressure-temperature ratings per ASME B16.34 <i>Screwed or Welding:</i> Consistent with CL600 pressure-temperature ratings per ASME B16.34</p>	<p>Shutoff Classification</p> <p>EDR: ANSI/FCI 70-2 and IEC 60534-4 Class II (standard); Class III for valves with a graphite piston ring and 78 mm (3.4375 inch) or larger port diameter</p> <p>ETR: Standard air test (0.05 mL/minute/psid/inch of port diameter) using air at service pressure drop or 3.5 bar (50 psi), whichever is lower; or ANSI/FCI 70-2 and IEC 60534-4 Class V (optional) with PTFE seats; Class IV or V (optional) with metal seats</p> <p>Flow Characteristics</p> <p>Linear (all cages), quick-opening, or equal percentage</p> <p>Flow Directions</p> <p>Linear, Quick Opening, or Equal Percentage Cage: Normally up, Whisper Trim™ I Cage: Always down</p> <p>Approximate Weights</p> <table border="1"> <thead> <tr> <th rowspan="2">VALVE SIZE, NPS</th> <th colspan="2">WEIGHT</th> </tr> <tr> <th>kg</th> <th>Pounds</th> </tr> </thead> <tbody> <tr> <td>1 & 1-1/4</td> <td>14</td> <td>30</td> </tr> <tr> <td>1-1/2</td> <td>20</td> <td>45</td> </tr> <tr> <td>2</td> <td>39</td> <td>67</td> </tr> <tr> <td>2-1/2</td> <td>45</td> <td>100</td> </tr> <tr> <td>3</td> <td>54</td> <td>125</td> </tr> <tr> <td>4</td> <td>77</td> <td>170</td> </tr> </tbody> </table>	VALVE SIZE, NPS	WEIGHT		kg	Pounds	1 & 1-1/4	14	30	1-1/2	20	45	2	39	67	2-1/2	45	100	3	54	125	4	77	170
VALVE SIZE, NPS	WEIGHT																							
	kg	Pounds																						
1 & 1-1/4	14	30																						
1-1/2	20	45																						
2	39	67																						
2-1/2	45	100																						
3	54	125																						
4	77	170																						

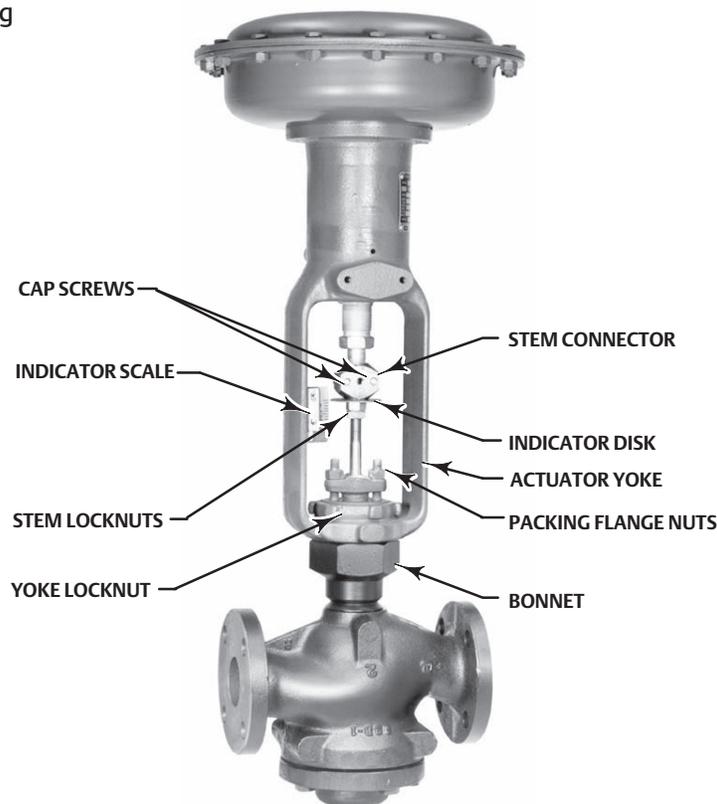
1. The pressure/temperature limits in this manual and any applicable standard or code limitation for the valve should not be exceeded.
 2. Certain bonnet bolting material selections may require a CL600 easy-e valve assembly to be derated. Contact your Emerson Process Management sales office.

Table 2. Available Valve Constructions

VALVE DESIGN	VALVE SIZE, NPS	VALVE MATERIAL AND END CONNECTION STYLE							
		Screwed	Carbon Steel, Alloy Steel, or Stainless Steel Valve			Butt-welding	Socket Weld	Cast Iron Valve	
			RF or RTJ Flanged					CL125B FF Flanged	CL250B RF Flanged
			CL150	CL300	CL600				
EDR	1, 1-1/2, or 2	X	X	X	X	X	X	X	X
	1-1/4	X	---	---	---	---	---	---	---
	2-1/2, 3, or 4	---	X	X	X	X	---	X	X
ETR	1, 1-1/2, or 2	X	X	X	X	X	X	---	---
	1-1/4	X	---	---	---	---	---	---	---
	2-1/2, 3, or 4	---	---	---	---	---	---	---	---

X = Available Construction

Figure 2. Actuator Mounting



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Installation

⚠ WARNING

Always wear protective gloves, clothing, and eyewear when performing any installation operations.

To avoid personal injury or property damage resulting from the sudden release of pressure, do not install the valve assembly where service conditions could exceed the limits given on the valve and actuator nameplates. Use pressure-relieving devices as required by accepted industry, local, state, or Federal codes, and good engineering practices.

Check with your process or safety engineer for any other hazards that may be present from exposure to process media.

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. Because some body/trim material combinations are limited in their pressure drop and temperature range capabilities, do not exceed these conditions without first contacting your Emerson Process Management sales office.

Inspect the valve and pipelines to ensure they are not damaged, are clean, and free of foreign material.

1. Before installing the valve, inspect the valve and associated equipment for any damage and any foreign material.
2. Make certain the valve body interior is clean, that pipelines are free of foreign material, and that the valve is oriented so that pipeline flow is in the same direction as the arrow (see figure 2) on the side of the valve.
3. The control valve assembly can be installed in any orientation unless limited by seismic criteria. However, the normal method is with the actuator vertical above the valve body (see figure 2). Other positions may result in uneven valve plug and cage wear, and improper operation. With some valves, the actuator may also need to be supported when it is not vertical. For more information, consult your Emerson Process Management sales office.
4. Use accepted piping and welding practices when installing the valve in the line. If a post-weld heat treatment process is to be applied to the valve end connections, and the valve has composition or elastomer trim parts, remove the trim to avoid damage to the soft parts.

CAUTION

Depending on valve body materials used, post weld heat treating may be required. If so, damage to internal elastomeric and plastic parts, as well as internal metal parts is possible. Shrink-fit pieces and threaded connections may loosen. In general, if post weld heat treating is to be performed, all trim parts should be removed. Contact your Emerson Process Management sales office for additional information.

5. If continuous operation is required during inspection or maintenance, install a three-valve bypass around the control valve assembly.
6. If the actuator and valve are shipped separately, refer to the actuator mounting procedure in the appropriate actuator instruction manual and also see figure 2.

⚠ WARNING

Personal injury could result from packing leakage. Valve packing was tightened prior to shipment; however some readjustment will be required to meet specific service conditions.

Maintenance

⚠ WARNING

Avoid personal injury from sudden release of process pressure. Before performing any maintenance operations:

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

Valve parts are subject to normal wear and must be inspected and replaced as necessary. Inspection and maintenance frequency depends on the severity of service conditions. This section includes instructions for trim maintenance, packing maintenance, and packing lubrication. All maintenance operations may be performed with the valve installed in the pipeline.

Note

If the valve has ENVIRO-SEAL™ live-loaded packing installed (figure 8, 9, or 10), see the Fisher instruction manual entitled ENVIRO-SEAL Packing System for Sliding-Stem Valves for packing instructions.

Trim Maintenance

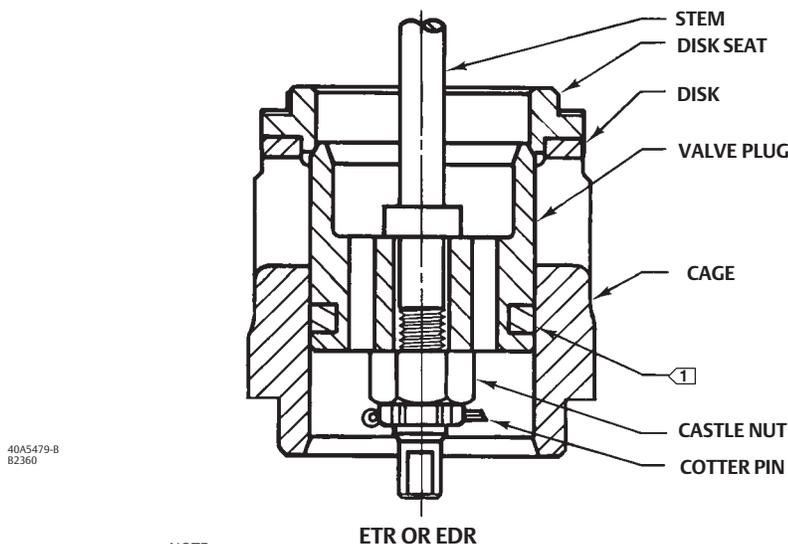
Disassembly

Note

Whenever a gasket seal is disturbed by removing or shifting gasketed parts, install a new gasket upon reassembly. This is necessary to ensure a good gasket seal.

Key number locations are shown in figure 11 or 12 unless otherwise indicated.

Figure 3. Valve Plug Assembly



CAUTION

Take care when removing the bottom flange (key 31) in the following procedure, to prevent possible product damage from parts unexpectedly falling out of the valve body.

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 shut off 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. When removing the bottom flange (key 31), be careful that the cage and other parts are not damaged by unexpectedly falling out of the valve body. Remove the nuts (key 16) or cap screws from the bottom flange.
2. Removing the valve plug from the valve body, the valve plug can be removed independently of the valve stem by removing the cotter pin and castle nut (keys 30 and 8). Then, slide the valve plug out of the cage (see figure 3).
 - Disconnect the stem connector, and loosen the packing flange nuts (see figure 2).
 - Move the valve stem away from the actuator stem allowing room to remove the indicator disk and stem locknuts. Remove the parts indicated.
 - Remove the valve plug by pulling the valve plug/stem assembly through the packing and out of the bottom of the bonnet.
 - If the valve plug is to be re-used but the stem needs to be replaced, drive the pin (key 8) out of the plug/stem assembly and unscrew the valve stem.

CAUTION

Take care during disassembly in the following procedure, to prevent possible damage to sealing surfaces.

3. Remove the seat ring (key 9), gaskets (keys 10, 11, 12, and 13), and any remaining parts if they did not come out with the valve plug. If the seat ring (key 9) is stuck in the valve body, strike the outside of the valve body at the seat ring line with a rubber hammer while pulling down on the seat ring. Carefully remove the seat ring without damaging sealing surfaces.

If necessary, machine or grind metal seats before installing the piston ring/seal ring or packing, or refer to the Lapping Metal Seats procedure in this section.

Lapping Metal Seats

A certain amount of leakage should be expected with metal-to-metal seating in any valve body. If the leakage becomes excessive, however, the condition of the seating surfaces of the valve plug and seat ring can be improved by lapping. (Deep nicks should be machined out rather than ground out.) Use a good quality lapping compound of a mixture of 280 to 600-grit.

Assemble the valve to the extent that the seat ring (key 9), cage (key 3), cage adaptor (key 4, if used), and bonnet are in place. Also, remove the piston ring or seal ring from the valve plug (if used).

1. Insert the valve stem (key 7) into the bonnet and thread the plug (key 2) onto the end of the stem. Make a simple handle from a piece of strap iron; lock it to the valve with the stem locknuts.

- Apply the lapping compound to the seating surfaces. Rotate the handle alternately in each direction to lap the seats. After lapping the seats, remove the valve plug and stem, then clean all parts. Repeat the lapping procedure if necessary.

Trim Assembly

Carefully clean all gasket surfaces. Use new gaskets during reassembly of the valve.

Table 3. Valve Body-to-Flange Nut Torques⁽³⁾

VALVE SIZE, NPS	TORQUES ⁽¹⁾			
	SA193-B7		SA193-B8M ⁽²⁾	
	N•m	Lbf•ft	N•m	Lbf•ft
1 and 1-1/4	129	95	64	47
1-1/2, 1-1/2 x 1, 2, or 2 x 1	96	71	45	33
2-1/2, 2-1/2 x 1-1/2, or 3 x 1-1/2	129	95	64	47
3, 3 x 2, 3 x 2-1/2, or 4 x 2	169	125	88	65
4, 4 x 2-1/2, or 4 x 3	271	200	156	115

1. Determined from laboratory tests.
 2. SA193-B8M annealed.
 3. For other materials, contact your Emerson Process Management sales office.

Replacing the Seal or Piston Ring

CAUTION

Be careful not to scratch the surface of the ring groove in the valve plug (key 2), or the new ring may not seal properly.

- For EDR, if the piston ring (key 6) is visibly damaged, remove the ring and replace it with a new part. Refer to the Parts List at the end of this manual for a replacement part.
- For ETR, if the seal ring and backup ring (keys 24 and 25) are visibly damaged, remove the rings by prying or cutting them from the groove. Be careful not to scratch valve plug surfaces. Refer to the Parts List at the end of this manual for replacement parts.

Assembling the Valve Plug and Stem

1. For EDR and ETR, perform the following steps:

- Insert the stem (key 7) into the plug (key 2, figure 3) and thread the castle nut (key 8) onto the end of the stem and hand tighten.

CAUTION

To prevent possible product damage, take care that the stem and plug are not damaged during the following tightening procedure.

- When tightening the castle nut with a wrench, line up the hole in the end of the stem with a slot in the castle nut. Ensure that the stem and plug are not damaged during the tightening procedure.
- Insert the cotter pin (key 30) and lock it in place.

Installing the Piston Rings or Backup Ring/Seal Rings

1. For EDR: When using a carbon-filled PTFE piston ring, spread the ring apart slightly at the split, start one end of the split into the groove in the valve plug. Work the ring around the valve plug inserting the ring into the groove in the valve plug.

The replacement graphite piston rings will arrive in one piece. Use a vise with smooth or tapered jaws to break the replacement piston ring into two halves. Place the new ring in the vise so that the jaws compress the ring into an oval. Compress the ring slowly until the ring snaps on both sides. If one side snaps first, do not try to tear or cut the other side. Instead, keep compressing the ring until the other side snaps. The piston ring can also be fractured by scoring and snapping over a hard surface such as a table edge. Sawing or cutting the ring is not recommended.

2. For ETR: Apply a lubricant to both backup and seal rings (keys 25 and 24). Place the backup ring over the stem (key 7) and into the groove in the valve plug (key 3). Slowly and gently stretch the seal ring over the valve plug and work it into the groove. Stretching the ring over the valve plug can cause it to appear too large for the groove, but it will contract to its original size when inserted into the cage.

CAUTION

When installing the EDR or ETR valve plug into the cage, make sure the piston or seal ring is evenly engaged in the entrance chamfer of the cage to avoid damage to the ring.

Note

Use the preceding procedures to assemble the valve plug and stem before installing the parts into the valve body. Insert the valve plug into the cage (figure 3), then stack the parts as recommended in steps below.

Installing the Parts into the Valve Body

1. Stack the valve trim parts using figures 11 and 12 to determine the sequence of parts.
2. Lubricate the stud bolts (key 15) before installing the valve trim into the valve body. (Note: For ease of installing trim parts, remove all packing parts from the packing box before installing the trim parts.)
3. When inserting the stack of trim parts into the valve body, carefully align the parts in the recess of the valve body.
4. Slide the bottom flange onto the stud bolts (key 15). Secure the bottom flange (key 31) in place on the valve body with the hex nuts (key 16). Tighten the hex nuts to the torque value shown in table 3.
5. Torque the nuts in a criss-cross pattern. Repeat the pattern until all nuts are torqued to the value indicated in table 3.
6. Refer to the Packing Maintenance procedures below.

Packing Maintenance

This procedure covers PTFE V-ring, graphite ribbon/filament, and PTFE composition packing rings. Key numbers refer to figure 5 for PTFE V-ring packing and PTFE/composition packing, unless otherwise indicated.

Note

If the valve has ENVIRO-SEAL live-loaded packing installed (figure 8, 9, or 10), see the Fisher instruction manual entitled ENVIRO-SEAL Packing System for Sliding-Stem Valves for packing instructions.

For all except spring-loaded packing, if the packing is relatively new and tight on the stem, and if tightening the packing flange nuts does not stop the leakage, it is possible that the valve stem is worn or nicked so that a seal cannot be made. If the leakage comes from the outside diameter of the packing follower, it is possible that the leakage is caused by nicks or scratches around the inside of the packing box wall.

For spring-loaded single PTFE V-ring packing, the spring (key 8) maintains a sealing force on the packing. If leakage is noted around the packing follower (key 13), check to be sure the shoulder on the packing follower is touching the bonnet. If the shoulder is not touching the bonnet, tighten the packing flange nuts (key 5, figure 4) until the shoulder is against the bonnet. If leakage cannot be stopped in this manner, proceed to the Removing Packing and Installing Packing procedures below.

Removing Packing

⚠ WARNING

Refer to the **WARNING** at the beginning of the Maintenance section in this instruction manual.

The packing may have been removed in earlier steps, or during trim maintenance procedures. Use the following steps, when necessary, to remove packing and associated assemblies.

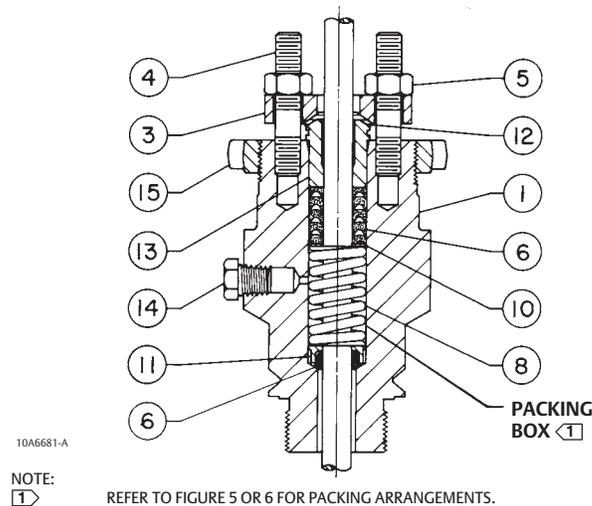
Key number locations for packing parts are shown in figures 5 and 6. For valve parts and the live loaded packing system, refer to figures 8 through 10 (in the Parts List section), for key number locations.

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 shut off all pressure lines to the power actuator and 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. Exhaust all actuator pressure, disconnect the operating lines from the actuator, and disconnect any leakoff piping from the actuator. Relieve any actuator precompression from the stem connector. (If necessary, refer to the appropriate actuator instruction manual for warnings, cautions, and disassembly procedures.)
3. When removing the bottom flange (key 31), be careful that the cage and other parts are not damaged by unexpectedly falling out of the valve body. Remove the nuts (key 16) or cap screws from the bottom flange.
4. To remove the packing for maintenance, disconnect the stem connector (see figure 2). Remove the yoke locknut, and lift the actuator off the valve.
5. Remove the packing flange nuts (key 5, figure 4), packing flange (key 15), upper wiper (key 12), and packing follower (key 13). If maintaining the packing while the valve stem is in place, ensure that the valve stem surface is not scratched or marred while working with the packing.

Table 4. Recommended Torque for Packing Flange Nuts

VALVE STEM DIAMETER		PRESSURE RATING	GRAPHITE PACKING				PTFE PACKING			
			Minimum Torque		Maximum Torque		Minimum Torque		Maximum Torque	
mm	Inches		N•m	Lbf•in	N•m	Lbf•in	N•m	Lbf•in	N•m	Lbf•in
9.5	3/8	CL125, 150	3	24	5	48	1	12	3	24
		CL250, 300	4	36	7	60	2	18	3	30
		CL600	5	48	8	72	3	24	4	36
12.7	1/2	CL125, 150	5	48	8	72	3	24	4	36
		CL250, 300	7	60	10	84	3	30	5	42
		CL600	10	84	14	120	5	42	7	60
19.1	3/4	CL125, 150	11	96	16	144	5	48	8	72
		CL250, 300	14	120	20	180	7	60	10	90
		CL600	20	180	30	264	10	90	15	132

Figure 4. Bonnet Assembly

**CAUTION**

To prevent possible product damage, avoid scratching the packing box walls when removing old packing parts. Also inspect valve stem threads and packing box surfaces for sharp edges which may damage packing.

6. Avoid scratching the packing box walls when removing the old packing parts. Clean the packing box (see figure 4), and clean, inspect, or replace metal packing parts. Generally, the metal packing parts are not part of the packing kits listed in the Parts List section, and they must be ordered individually.
7. Inspect the valve stem threads and packing box surfaces for any sharp edges which might cut the packing. Scratches or burrs on the stem surfaces can cause packing box leakage or damage to new packing. If the surface condition cannot be improved by light sanding, replace the damaged parts by following the appropriate steps in the Trim Maintenance procedure.

Note

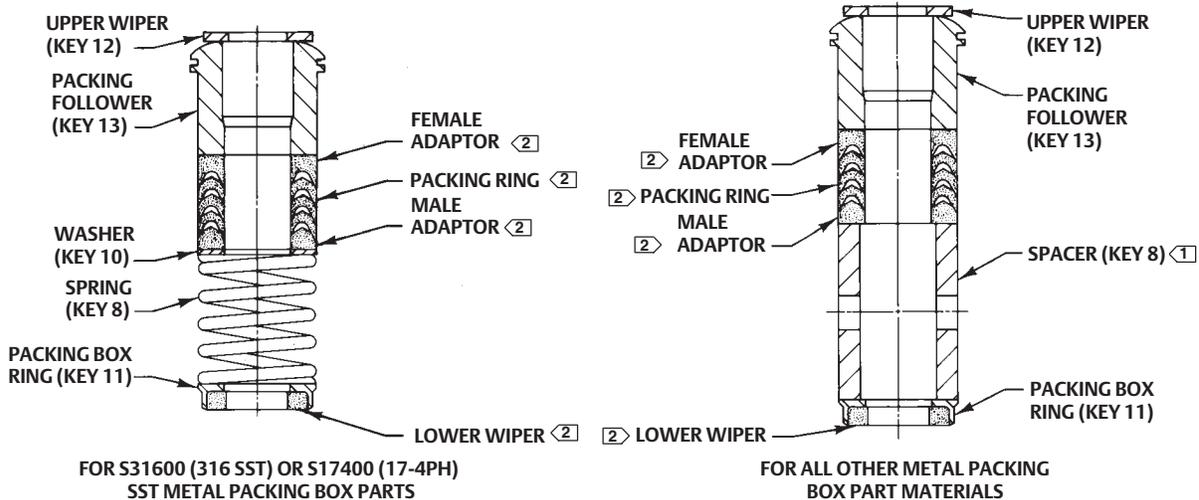
If the control valve assembly was purchased for an application where the service temperatures are under 232°C (450°F), the bonnet may be unscrewed from the valve body. Where temperatures are greater than 232°C (450°F), the bonnet is seal welded to the valve body.

CAUTION

To prevent possible product damage, set the bonnet on a protective surface in the following procedure.

8. If necessary, remove the bonnet assembly from the valve by unscrewing it. Some applications require seal welding the bonnet to the valve body, and the bonnet should not be removed. Set the bonnet on a protective surface to prevent damage to the bonnet gasket surface.

Figure 5. Packing Arrangements



FOR S31600 (316 SST) OR S17400 (17-4PH)
SST METAL PACKING BOX PARTS

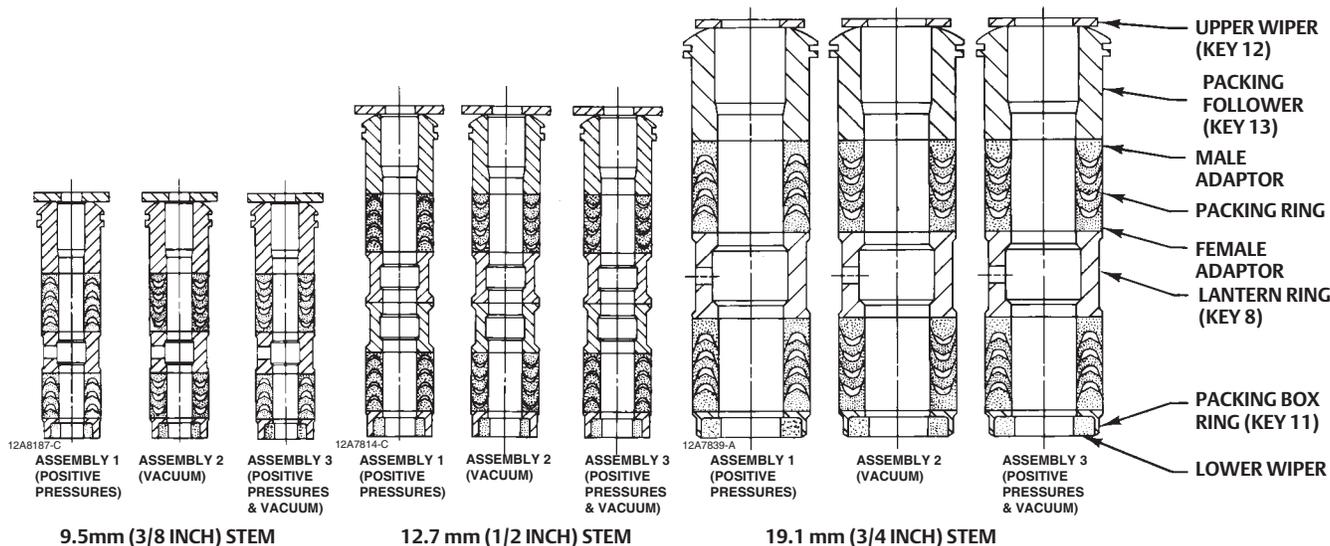
FOR ALL OTHER METAL PACKING
BOX PART MATERIALS

NOTES:

- 1 REFER TO THE VALVE SERIAL NUMBER AND THE PARTS ORDERING SECTION FOR THE SPACER AND OTHER METAL PARTS.
- 2 PACKING SET (KEY 6) (2 REQ'D FOR DOUBLE ARRANGEMENTS).

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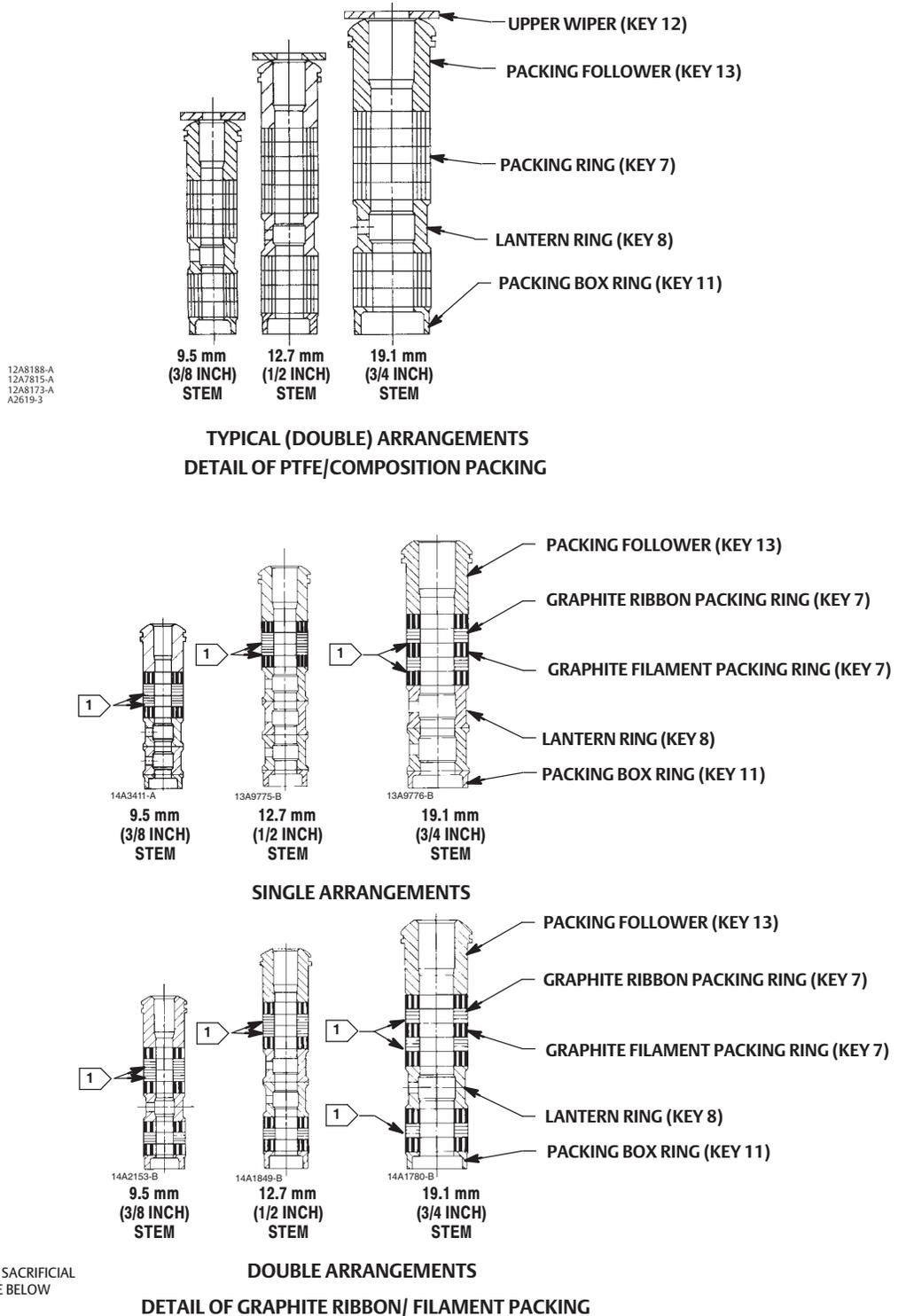
TYPICAL SINGLE ARRANGEMENTS



TYPICAL DOUBLE ARRANGEMENTS

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Figure 6. Packing Arrangements



1 NOTE:
0.102 mm (0.004 INCH) THICK SACRIFICIAL
ZINC WASHERS; USE ONLY ONE BELOW
EACH GRAPHITE RIBBON RING.

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Installing Packing

If the trim is removed, refer to Trim Maintenance procedures, and install the trim (including the valve stem) before installing the packing. If necessary, use the Lapping Metal Seats procedures before installing packing. Key number locations are shown in figure 5 or 6 unless otherwise indicated.

CAUTION

To prevent possible product damage, take care when installing the bonnet over the valve stem in the following procedure.

1. If the bonnet has been removed from the valve body, install the replacement bonnet (see figure 4). Carefully slide the bonnet over the valve stem without damaging the stem surfaces.
2. Refer to figure 5 or 6 for the sequence of parts to make up the appropriate packing set for your application. Arrange the packing parts in sequence before installing them into the packing box.
3. For split-ring packing, alternate the positions of the splits to avoid creating a leak path. Place a smooth-edged pipe over the valve stem and gently tap each soft packing ring into the packing box. Be sure that air is not trapped between adjacent soft parts.
4. Install the packing follower (key 13), packing flange (key 3), and upper wiper (key 12, if required). Install the packing flange nuts (key 5).
5. Refer to actuator installation procedures in the actuator instruction manual, and the installation procedures in the manual when mounting and connecting the actuator to the valve. If lubrication is required, refer to the Packing Lubrication section below.
6. For spring-loaded PTFE V-ring packing, tighten the packing flange nuts until the shoulder on the packing follower (key 13, figure 4) contacts the bonnet.

For **graphite packing**, tighten the packing flange nuts to the maximum recommended torque shown in table 4. Then, loosen the packing flange nuts, and retighten them to the recommended minimum torque shown in table 4.

For **other packing types**, tighten the packing flange nuts alternately in small equal increments until one of the nuts reaches the minimum recommended torque shown in table 4. Then, tighten the remaining flange nuts until the packing flange is level and at a 90-degree angle to the valve stem.

Note

If the valve has ENVIRO-SEAL live-loaded packing installed (figure 8, 9, or 10), see the Fisher instruction manual entitled ENVIRO-SEAL Packing System for Sliding-Stem Valves for packing instructions.

Packing Lubrication

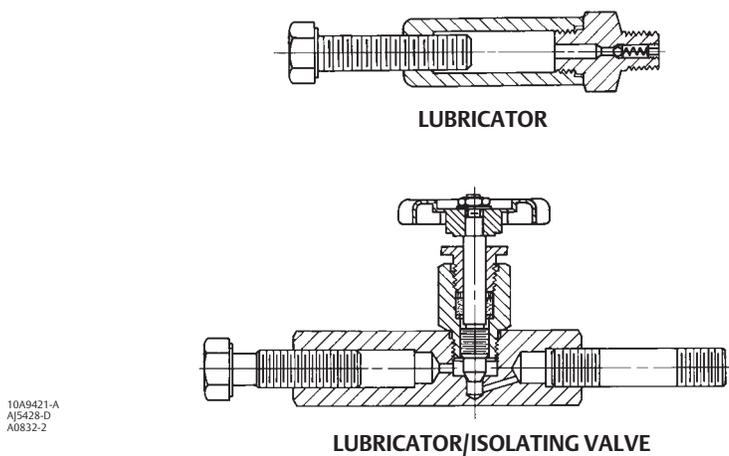
⚠ WARNING

To avoid personal injury or property damage resulting from fire or explosion, do not lubricate packing used in oxygen service or in processes with temperatures over 260°C (500°F).

Packing used in oxygen service or in processes with temperatures over 260°C (500°F) should not be lubricated. If a lubricator or lubricator/isolating valve (see figure 7) is required for the packing, install the lubricator or lubricator/isolating valve into the threaded hole in the side of the bonnet (see figure 7). Use a good quality silicon-base lubricant.

To operate the lubricator, simply turn the cap screw clockwise to force the lubricant into the packing box. The lubricator/isolating valve operates the same way except the isolating valve must first be opened and then closed after lubrication is completed.

Figure 7. Lubricator and Lubricator/Isolating Valve



Parts Ordering

Each body-bonnet assembly is assigned a serial number which can be found on the valve body. This same number also appears on the actuator nameplate when the valve is shipped from the factory as part of a control valve assembly. Refer to the serial number when contacting your Emerson Process Management sales office for technical assistance. When ordering replacement parts, refer to the serial number and to the eleven-character part number for each part required from the following parts kit or parts list information.

⚠ 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.

Note

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

Packing Kits

Standard Packing Repair Kits (Non Live-Loaded)

Standard Packing Repair Kits (non live-loaded)

Stem Diameter, mm (Inches) Yoke Boss Diameter, mm (Inches)	9.5 (3/8) 54 (2-1/8)	12.7 (1/2) 71 (2-13/16)	19.1 (3/4) 90 (3-9/16)
PTFE (Contains keys 6, 8, 10, 11, and 12)	RPACKX00012	RPACKX00022	RPACKX00032
Double PTFE (Contains keys 6, 8, 11, 12)	RPACKX00042	RPACKX00052	RPACKX00062
PTFE/Composition (Contains keys 7, 8, 11, and 12)	RPACKX00072	RPACKX00082	RPACKX00092
Single Graphite Ribbon/Filament (Contains keys 7 [ribbon ring], 7 [filament ring], 8, and 11)	RPACKX00102	RPACKX00112	RPACKX00122
Single Graphite Ribbon/Filament (Contains keys 7 [ribbon ring], 7 [filament ring])	RPACKX00132	RPACKX00142	RPACKX00152
Double Graphite Ribbon/Filament (Contains keys 7 [ribbon ring], 7 [filament ring], 8, and 11)	RPACKX00162	RPACKX00172	RPACKX00182

ENVIRO-SEAL Packing Retrofit Kits

Retrofit kits include parts to convert valves with existing standard bonnets to the ENVIRO-SEAL packing box construction. Refer to figure 8 for key numbers for PTFE packing, to figure 9 for key numbers for graphite packing, and to figure 10 for key numbers for duplex packing. PTFE kits include keys 200, 201, 211, 212, 214, 215, 216, 217, 218, tag, and cable tie. Graphite kits include keys 200, 201, 207, 208, 209, 210, 211, 212, 214, 217, tag, and cable tie. Duplex kits include keys 200, 201, 207, 209, 211, 212, 214, 215, 216, 217, tag, and cable tie.

Stems and packing box constructions that do not meet Fisher stem finish specifications, dimensional tolerances, and design specifications, may adversely alter the performance of this packing kit.

For part numbers of individual components in the ENVIRO-SEAL packing kits, refer to instruction manual ENVIRO-SEAL Packing System for Sliding-Stem Valves, D101642X012.

ENVIRO-SEAL Packing Retrofit Kits

PACKING MATERIAL	STEM DIAMETER AND YOKE BOSS DIAMETER, mm (INCH)		
	9.5 (3/8) 54 (2-1/8)	12.7 (1/2) 71 (2-13/16)	19.1 (3/4) 90 (3-9/16)
Double PTFE	RPACKXRT012	RPACKXRT022	RPACKXRT032
Graphite ULF	RPACKXRT262	RPACKXRT272	RPACKXRT282
Duplex	RPACKXRT212	RPACKXRT222	RPACKXRT232

ENVIRO-SEAL Packing Repair Kits

Repair kits include parts to replace the “soft” packing materials in valves that already have ENVIRO-SEAL packing arrangements installed or in valves that have been upgraded with ENVIRO-SEAL retrofit kits. Refer to figure 8 for key numbers for PTFE packing, to figure 9 for key numbers for graphite packing, and to figure 10 for key numbers for duplex packing. PTFE repair kits include keys 214, 215, and 218. Graphite repair kits include keys 207, 208, 209, 210, and 214. Duplex repair kits include keys 207, 209, 214, and 215.

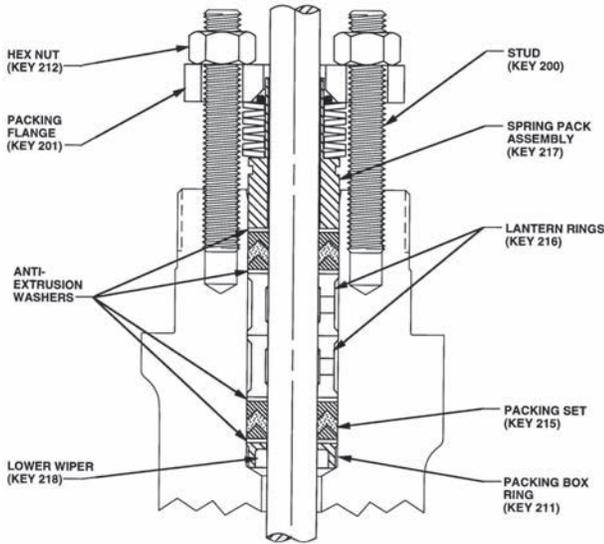
Stems and packing box constructions that do not meet Fisher stem finish specifications, dimensional tolerances, and design specifications, may adversely alter the performance of this packing kit.

For part numbers of individual components in the ENVIRO-SEAL packing kits, refer to instruction manual ENVIRO-SEAL Packing System for Sliding-Stem Valves, D101642X012.

ENVIRO-SEAL Packing Repair Kits

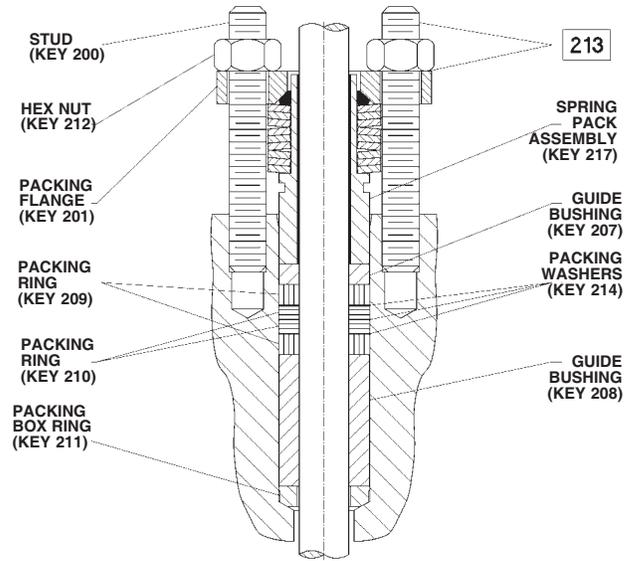
Stem Diameter, mm (Inches) Yoke Boss Diameter, mm (Inches)	9.5 (3/8) 54 (2-1/8)	12.7 (1/2) 71 (2-13/16)	19.1 (3/4) 90 (3-9/16)
Double PTFE (contains keys 214, 215, & 218)	RPACKX00192	RPACKX00202	RPACKX00212
Graphite ULF (contains keys 207, 208, 209, 210, and 214)	RPACKX00592	RPACKX00602	RPACKX00612
Duplex (contains keys 207, 209, 214, and 215)	RPACKX00292	RPACKX00302	RPACKX00312

Figure 8. Typical ENVIRO-SEAL Packing System with PTFE Packing



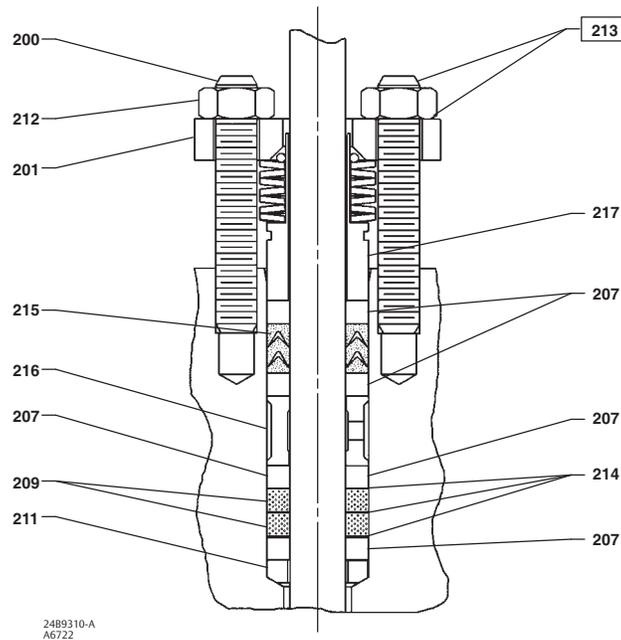
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Figure 9. Typical ENVIRO-SEAL Packing System with Graphite ULF Packing



3984612/A

Figure 10. Typical ENVIRO-SEAL Packing System with Duplex Packing



2489310-A
A6722

Parts Kits

Note

Kits do not apply to alloy C (N10276 & CW2M), Alloy 20 (N08020 & CN7M), or alloy 400 (N04400 & M35-1) trims.

Kits for full- and restricted- capacity trims with service temperature to 593°C (1100°F) include S31600 [316 stainless steel (SST)] shim and N06600/graphite spiral wound gasket.

Gasket Kits and Shims⁽¹⁾

Valve Size, NPS	Key Number	To 593°C (To 1100°F)	Valve Size, NPS	Key Number	To 593°C (To 1100°F)
1 or 1-1/4	Set	RGASKETX162	2-1/2 x 1-1/2	Set	RGASKETX262
	10	1R2859X0042		10	1R3847X0032
1-1/2	12	1R286099442	3	11	1R3100X0032
	13	1R2862X0062		12	1R309999442
1-1/2 x 1	32	16A1936X012	3 x 2	13	1R3098X0052
	Set	RGASKETX172		14	1R3844X0052
1-1/2	10	1R3101X0032	4	32	16A1937X012
	12	1R309999442		Set	RGASKETX202
1-1/2 x 1	13	1R3098X0052	4 x 2-1/2	10	1R3484X0042
	20	1U2152X0042		12	1R348299442
2	32	16A1936X012	4	13	1R3481X0052
	Set	RGASKETX242		32	16A1940X012
2	10	1R3101X0032	4 x 2-1/2	Set	RGASKETX272
	11	1R2861X0042		10	1R3484X0042
2 x 1	12	1R286099442	4 x 2-1/2	11	1R3298X0032
	13	1R3098X0052		12	1R329799442
2-1/2	20	1U2152X0042	4	13	1R3296X0042
	32	16A1936X012		32	1R3481X0052
2-1/2	Set	RGASKETX182	4	Set	RGASKETX212
	10	1R3299X0042		10	1R3724X0042
2-1/2	12	1R329799442	4	12	1R372299442
	13	1R3296X0042		13	1J5047X0062
2-1/2	32	16A1938X012	4	32	16A1941X012
	Set	RGASKETX252		Set	RGASKETX282
2-1/2	10	1R3299X0042	4 x 2-1/2	10	1R3724X0042
	11	1R2861X0042		11	1R3846X0042
2 x 1	12	1R286099442	4 x 2-1/2	12	1R384599442
	13	1R2862X0062		13	1R3844X0052
2 x 1	14	1R3296X0042	4 x 2-1/2	14	1J5047X0062
	32	16A1936X012		32	16A1939X012
2-1/2	Set	RGASKETX192	4 x 2-1/2	Set	RGASKETX282
	10	1R3847X0032		10	1R3724X0042
2-1/2	12	1R384599442	4 x 2-1/2	11	1R3846X0042
	13	1R3844X0052		12	1R384599442
2-1/2	32	16A1939X012	4 x 2-1/2	13	1R3844X0052
	Set	RGASKETX192		14	1J5047X0062
2-1/2	10	1R3847X0032	4 x 2-1/2	32	16A1939X012
	12	1R384599442		Set	RGASKETX282
2-1/2	13	1R3844X0052	4 x 2-1/2	10	1R3724X0042
	32	16A1939X012		11	1R3846X0042
2-1/2	Set	RGASKETX192	4 x 2-1/2	12	1R384599442
	10	1R3847X0032		13	1R3844X0052
2-1/2	12	1R384599442	4 x 2-1/2	14	1J5047X0062
	13	1R3844X0052		32	16A1939X012
2-1/2	32	16A1939X012	4 x 2-1/2	Set	RGASKETX282
	Set	RGASKETX192		10	1R3724X0042
2-1/2	10	1R3847X0032	4 x 2-1/2	11	1R3846X0042
	12	1R384599442		12	1R384599442
2-1/2	13	1R3844X0052	4 x 2-1/2	13	1R3844X0052
	32	16A1939X012		14	1J5047X0062
2-1/2	Set	RGASKETX192	4 x 2-1/2	32	16A1939X012
	10	1R3847X0032		Set	RGASKETX282
2-1/2	12	1R384599442	4 x 2-1/2	10	1R3724X0042
	13	1R3844X0052		11	1R3846X0042
2-1/2	32	16A1939X012	4 x 2-1/2	12	1R384599442
	Set	RGASKETX192		13	1R3844X0052
2-1/2	10	1R3847X0032	4 x 2-1/2	14	1J5047X0062
	12	1R384599442		32	16A1939X012
2-1/2	13	1R3844X0052	4 x 2-1/2	Set	RGASKETX282
	32	16A1939X012		10	1R3724X0042
2-1/2	Set	RGASKETX192	4 x 2-1/2	11	1R3846X0042
	10	1R3847X0032		12	1R384599442
2-1/2	12	1R384599442	4 x 2-1/2	13	1R3844X0052
	13	1R3844X0052		14	1J5047X0062
2-1/2	32	16A1939X012	4 x 2-1/2	32	16A1939X012
	Set	RGASKETX192		Set	RGASKETX282

1. The bonnet gasket (key 10), spiral gasket (key 12), seat gasket (key 13), adapter gasket (key 14), adapter gasket (key 20) and shim (key 32) are included in gasket kit (RGASKET).

Gasket Descriptions

KEY NUMBER	DESCRIPTION	MATERIAL
		FGM -198° to 593°C (-325° to 1100°F)
10	Bonnet Gasket	Graphite/S31600
11	Cage Gasket	
13	Seat Ring or Liner Gasket	
14 or 20	Adapter Gasket	
12	Spiral-Wound Gasket	N06600/Graphite
32	Shim	S31600

Parts List

Note

Part numbers are shown for recommended spares only. For part numbers not shown, contact your Emerson Process Management sales office.

Bonnet Assembly (figure 4)

Note

For ENVIRO-SEAL packing box parts, see instruction manual ENVIRO-SEAL Packing System for Sliding-Stem Valves, D101642X012.

Key	Description	Part Number
1	Bonnet If you need a bonnet as a replacement part, order by valve size and stem diameter, serial number, and desired material.	
3	Packing flange	
4	Packing flange stud	
5	Packing flange nut	
6*	Packing Set, Single PTFE V-ring, (2 req'd) For 9.5 mm (3/8 inch) stem	1R290001012
	For 12.7 mm (1/2 inch) stem	1R290201012
	For 19.1 mm (3/4 inch) stem	1R290401012
7*	Packing ring	See key 5, Set
8	Spring	
8	Lantern ring	
8	Spacer Please refer to the valve serial number and the Parts Ordering section for the spacer and packing replacement parts information.	
11*	Packing Box ring, S31600 (standard) 9.5 mm (3/8 inch) stem	1J873135072
	12.7 mm (1/2 inch) stem	1J873235072
	19.1 mm (3/4 inch) stem	1J873335072
14	Pipe plug	
14	Optional lubricator	
14	Optional lubricator/isolating valve	
15	Yoke Locknut	
27	Pipe nipple for optional lubricator/isolating valve	
30*	Lower Wiper, PTFE	See key 6, Set
31*	Male Adapter, PTFE	See key 6, Set
32*	Female Adapter, PTFE	See key 6, Set

Valve Assembly (figures 11 and 12)

Key	Description	Part Number
1	Valve Body If you need a valve body as a replacement part, order by valve size, serial number, and desired material.	
2*	Valve plug	See following table
3*	Cage	See following table
4	Cage adaptor	
5	Seat Ring Adaptor	
6*	Piston Ring	See following table
7*	Valve Stem	See following table
8*	Castle Nut (standard), SST For EDR and ETR only 9.5 mm (3/8 inch) O.D. stem with 9.5 mm (3/8 inch) VSC ⁽¹⁾ and 12.7 mm (1/2 inch) O.D. stem with 9.5 mm (3/8 inch) VSC	1E5034X0012
	12.7 mm (1/2 inch) O.D. stem with 12.7 mm (1/2 inch) VSC and 19.1 mm (3/4 inch) O.D. stem with 12.7 mm (1/2 inch) VSC	1J141235072
9*	Seat Ring	See following table
10*	Bonnet Gasket	See following table
11*	Cage Gasket	See following table
12*	Spiral-Wound Gasket	See following table
13*	Seat Ring or Liner Gasket	See following table
14*	or	
20*	Adapter Gasket	See following table
15	Cap Screw or Stud Bolt	
16	Hex Nut	
17	Pipe plug for tapped bottom flanges	
18	Flow Arrow	
19	Drive screw	
21*	Disk retainer, S31600 For ETR only NPS 1, 1-1/4 or 2 x 1 valve	1V710035072
	NPS 1-1/2 valve	1V710335072
	NPS 1-1/2 x 1 valve	1V712135072
	NPS 1-1/2 or 2-1/2 x 1-1/2 valve	1V710335072
	NPS 2 or 3 x 2 valve	1V710835072
	NPS 2-1/2 or 4 x 2-1/2 valve	1V710935072
	NPS 3 valve	1V711235072
	NPS 4 valve	1V711533092
22*	Disk Seat For ETR only Use w/soft seat, 1, NPS 1-1/4, or 2 x 1 restricted trim	1V710235072
	S31600	1V710239102
	R30006 (alloy 6)	
	NPS 1-1/2 x 1 restricted trim	
	S31600	1V712235072
	R30006	1V712239102
	NPS 1-1/2 or 2-1/2 x 1-1/2 valve	
	S31600	1V710535072
	R30006	1V710539102
	NPS 2 or 3 x 2 valve	
	S31600	1V710635072
	R30006	1V710639102
	NPS 2-1/2 or 4 x 2-1/2 valve	
	S31600	1V711135072
	R30006	1V711139102

Key	Description	Part Number	Key	Description	Part Number
	NPS 3 valve			NPS 3 valve	1V659705092
	S31600	1V711435072		NPS 4 valve	1V659905092
	R30006	1V711439102	25*	Backup ring	
	NPS 4 valve			For ETR only	
	CF8M	1V711733092		NPS 1, 1-1/4, 1-1/2 x 1, or	
	R30006	1V711739102		2 x 1 valve	
23*	Disk			Nitrile	1V659003052
	Use with composition seats only			Fluorocarbon	1V659005292
	NPS 1, 1-1/4, 1-1/2 x 1 or 2 x 1 valve			Ethylene-propylene	1V6590X0042
	PTFE	1V710106242		NPS 1-1/2, or 2-1/2 x 1-1/2 valve	
	Nylon	1V710103152		Nitrile	1V659203052
	NPS 1-1/2, or 2-1/2 x 1-1/2 valve			Fluorocarbon	1V659205292
	PTFE	1V710406242		Ethylene-propylene	1V6592X0032
	Nylon	1V710403152		NPS 2 or 3 x 2 valve	
	NPS 2 or 3 x 2 valve			Nitrile	1V550703052
	PTFE	1V710706242		Fluorocarbon	1V550705292
	Nylon	1V710703152		Ethylene-propylene	1V5507X0042
	NPS 2-1/2 or 4 x 2-1/2 valve			NPS 2-1/2 or 4 x 2-1/2 valve	
	PTFE	1V711006242		Nitrile	1V659403052
	Nylon	1V711003152		Fluorocarbon	1V659405292
	NPS 3 valve			Ethylene-propylene	1V6594X0032
	PTFE	1V711306242		NPS 3 valve	
	Nylon	1V711303152		Nitrile	1V659603052
	NPS 4 valve			Fluorocarbon	1V659605292
	PTFE	1V711606242		Ethylene-propylene	1V6596X0032
	Nylon	1V711603152		NPS 4 valve	
24*	Seal ring, carbon filled PTFE			Nitrile	1V659803052
	For ETR only			Fluorocarbon	1V659805292
	NPS 1, 1-1/4, 1-1/2 x 1, or			Ethylene-propylene	1V6598X0022
	2 x 1 valve	1V659105092	30	Cotter pin	
	NPS 1-1/2, or 2-1/2 x 1-1/2 valve	1V653905092	31	Bottom Flange	
	NPS 2 or 3 x 2 valve	1V550805092	32*	Shim	See following table
	NPS 2-1/2 or 4 x 2-1/2 valve	1V659505092	33	Nameplate	

Key 2* Valve Plug for EDR and ETR Valves

VALVE SIZE, NPS	ORIFICE SIZE		STEM DIAMETER		S41600 (416 SST) STANDARD	S31600 (316 SST)	S31600/ CoCr-A SEAT	S31600/ CoCr-A SEAT & GUIDE	HI TEMPERATURE S31600/CoCr-A SEAT & GUIDE
	mm	Inches	mm	Inches					
1, 1-1/4 1-1/2 x 1, 2 x 1	33	1.3125	9.5	3/8	20A6125X012	20A6125X022	20A6126X012	20A6127X012	21A2891X012
1-1/2 & 2-1/2 x 1-1/2	48	1.875	9.5	3/8	20A6128X012	20A6128X022	20A6129X012	20A6130X012	21A2892X012
2 & 3 x 2	59	2.3125	12.7	1/2	20A6131X012	20A6131X022	20A6132X012	20A6133X012	21A2893X012
2-1/2 & 4 x 2-1/2	73	2.875	12.7	1/2	20A6134X012	20A6134X022	20A6135X012	20A6136X012	21A2894X012
3	87	3.4375	12.7	1/2	20A6137X012	20A6137X022	20A6138X012	20A6139X012	21A2895X012
4	111	4.375	12.7	1/2	20A6140X012	20A6140X022	20A6141X012	20A6142X012	21A2896X012

Key 3* Cage

Cage Style	CB7Cu-1 Hardened (17-4 HT)	CF8M (316 SST)	CF8M, Nickel Coated	Alloy 6 (Cast)
Valve Sizes NPS 1, 1-1/4, 1-1/2 x 1, and 2 x 1				
Equal Percentage Linear	2U215333272	2U215333092	2U740848932	2U215339102
Quick Opening	2U215633272	2U215633092	2U741448932	2U215639102
Whisper I	2U215033272	2U215033092	2U740348932	2U215039102
	2V502333272	---	2V503048932	---
Valve Sizes NPS 1-1/2 and 2-1/2 x 1-1/2				
Equal Percentage Linear	2U219533272	2U219533092	2U740948932	2U219539102
Quick Opening	2U219833272	2U219833092	2U741548932	2U219839102
Whisper I	2U219233272	2U219233092	2U725448932	2U219239102
	2V502433272	---	2V503148932	---
Valve Sizes NPS 2 and 3 x 2				
Equal Percentage Linear	2U223733272	2U223733092	2U741048932	2U223739102
Quick Opening	2U224033272	2U224033092	2U741648932	2U224039102
Whisper I	2U223433272	2U223433092	2U740448932	2U223439102
	2V502533272	---	2U503248932	---
Valve Sizes NPS 2-1/2 and 4 x 2-1/2				
Equal Percentage Linear	2U227933272	2U227933092	2U741148932	2U227939102
Quick Opening	2U228233272	2U228233092	2U741748932	2U228239102
Whisper I	2U227633272	2U227633092	2U740548932	2U227639102
	2V502633272	---	2V503348932	---
Valve Size NPS 3				
Equal Percentage Linear	2U232133272	2U232133092	2U741248932	2U232139102
Quick Opening	2U232433272	2U232433092	2U741848932	2U232439102
Whisper I	2U231833272	2U231833092	2U740648932	2U231839102
	2V502733272	---	2V503448932	---
Valve Size NPS 4				
Equal Percentage Linear	2U236333272	2U236333092	2U741348932	2U236339102
Quick Opening	2U236633272	2U236633092	2U741948932	2U236639102
Whisper I	2U236033272	2U236033092	2U740748932	2U236039102
	23A8915X032	---	2V503548932	---

Key 6* Piston Ring (EDR only)

VALVE SIZE, NPS	GRAPHITE
	Oxidizing Service
1, 1-1/4, 1-1/2 x 1, 2 x 1	1U2174X0012
1-1/2, 2-1/2 x 1-1/2	1U2216X0012
2, 3 x 2	1U2258X0012
2-1/2, 4 x 2-1/2	1U2300X0012
3	1U2342X0012
4	1U2392X0012

Group 1 Actuators by Type Number

54 mm (2-1/8 inches), 71 mm (2-13/16 inches), or 90 mm (3-9/16 inches) Yoke Boss
585C Series—50.8 mm (2 inches) maximum travel
585C
1B
644 & 645
655
657 & 667—76.2 mm (3 inches) maximum travel
1008—71.4 mm (2-13/16 inches) yoke boss

Key 7* Valve Stem, S31600 (316 Stainless Steel) for EDR and ETR Valves

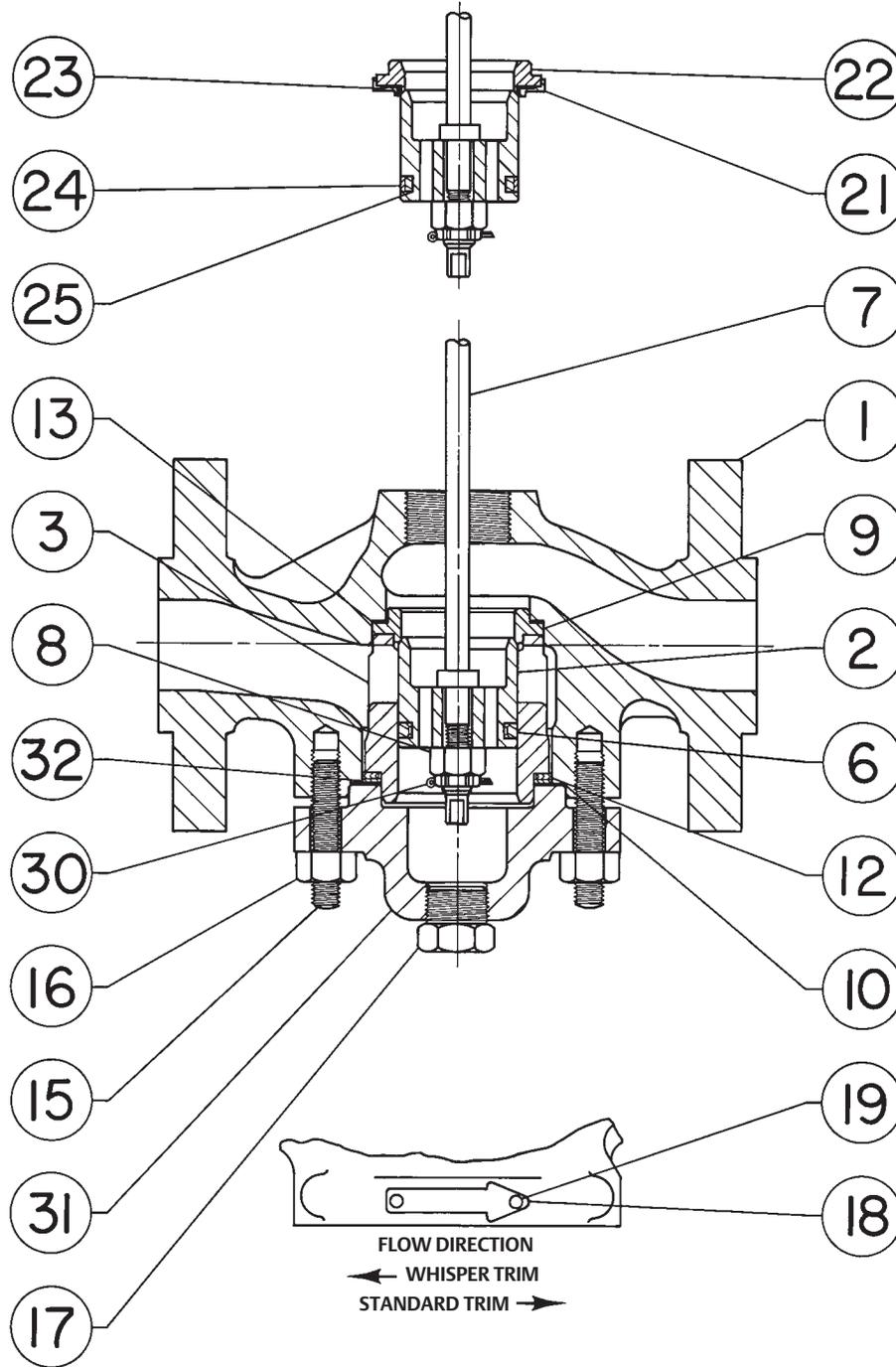
GROUP 1 ACTUATOR ⁽¹⁾							
Valve Size, NPS	Travel		Stem Diameter		Stem Connection Diameter		Part Number
	mm	Inches	mm	Inches	mm	Inches	
Valves with Full Size Trim							
1 & 1-1/4	7 to 19	0.25 to 0.75	9.5	3/8	9.5	3/8	22A3121X012
			12.7	1/2	12.7	1/2	22A3122X012
1-1/2	7 to 19	0.25 to 0.75	9.5	3/8	9.5	3/8	20A6492X012
			12.7	1/2	9.5	3/8	20A6496X012
2	7 to 19	0.25 to 0.75	12.7	1/2	12.7	1/2	22A3123X012
	29	1.125	12.7	1/2	12.7	1/2	20A6493X012
	7 to 29	0.25 to 1.125	19.1	3/4	12.7	1/2	20A6499X012
2-1/2	7 to 19	0.25 to 0.75	12.7	1/2	12.7	1/2	22A3124X012
	29 to 38	1.125 to 1.5	12.7	1/2	12.7	1/2	20A6494X012
	7 to 29	0.25 to 1.125	19.1	3/4	12.7	1/2	22A3127X012
	38	1.5	19.1	3/4	12.7	1/2	20A6500X012
3	7 to 19	0.25 to 0.75	12.7	1/2	12.7	1/2	21A4298X012
	29 to 38	1.125 to 1.5	12.7	1/2	12.7	1/2	20A6494X012
	7 to 29	0.25 to 1.125	19.1	3/4	12.7	1/2	22A3128X012
	38	1.5	19.1	3/4	12.7	1/2	20A6500X012
4	7 to 19	0.25 to 0.75	12.7	1/2	12.7	1/2	21A5097X012
	29 to 38	1.125 to 1.5	12.7	1/2	12.7	1/2	22A3126X012
	51	2	12.7	1/2	12.7	1/2	20A6495X012
	7 to 29	0.25 to 1.125	19.1	3/4	12.7	1/2	22A3129X012
	38 to 51	1.5 to 2	19.1	3/4	12.7	1/2	20A6501X012
Valves with Restricted Trim							
1-1/2 x 1	7 to 19	0.25 to 0.75	9.5	3/8	9.5	3/8	20A6492X012
2 x 1	7 to 19	0.25 to 0.75	12.7	1/2	9.5	3/8	27A2091X012
2-1/2 x 1-1/2	7 to 19	0.25 to 0.75	12.7	1/2	9.5	3/8	27A2092X012
3 x 2	7 to 19	0.25 to 0.75	12.7	1/2	12.7	1/2	27A2093X012
	29	1.125	12.7	1/2	12.7	1/2	27A2094X012
4 x 2-1/2	7 to 19	0.25 to 0.75	12.7	1/2	12.7	1/2	22A3126X012
	29 to 38	1.125 to 1.5	12.7	1/2	12.7	1/2	20A6495X012

1. For Group 1 actuators by type number, see following table.

Key 9* Seat Ring (for metal seat only)

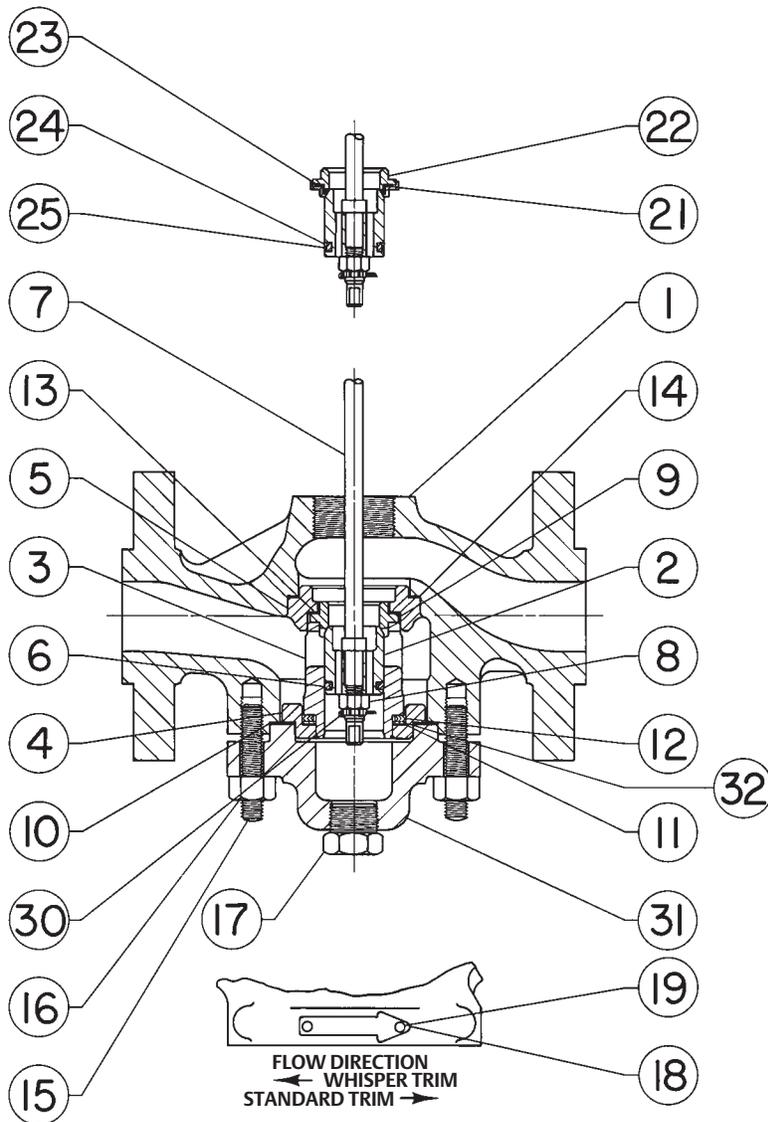
Valve Size, NPS	S41600 (416 SST) Hardened	S31600 (316 SST)	S31600/CoCr-A Seat
1, 1-1/4 & 2 x 1	1U222546172	1U222535072	1U222539102
1-1/2 & 2-1/2 x 1-1/2	1U221946172	1U221935072	1U221939102
1-1/2 x 1	1U222046172	1U222035072	1U222039102
2 & 3 x 2	1U222646172	1U222635072	1U222639102
2-1/2 & 4 x 2-1/2	1U222746172	1U222735072	1U222739102
3	1U222846172	1U222835072	1U222839102
4	1U222946172	1U222933092	1U222939102

Figure 11. EDR and ETR with Full-Size Trim Valve Assembly



40A5480-D

Figure 12. EDR and ETR with Restricted Trim Valve Assembly



40A5482-D

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