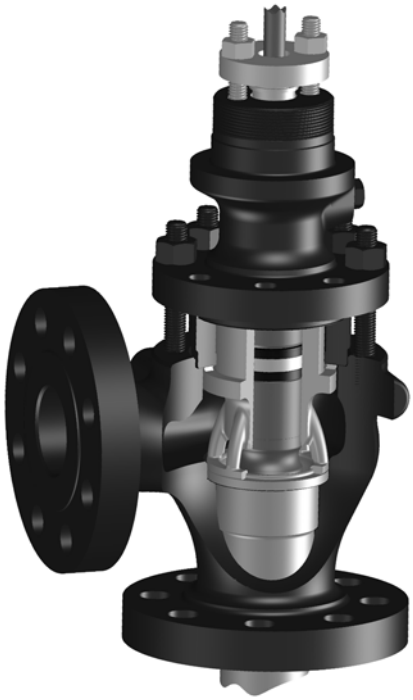
Fisher™ CCV-N Control Valves

Contents

Figure 1. Fisher NPS 2 CCV-N



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Introduction

Scope of Manual

This instruction manual includes installation, maintenance and parts information for NPS 2, 3 and 4 Class 300 CCV-N fuel gas control valves. These valves are used in gas turbines which meter the fuel gas to the combustion chamber of the turbine and provide linear flow with the ability to choke very quickly at a low pressure drop. Refer to separate manuals for instructions covering the actuator and accessories.

Do not install, operate, or maintain CCV-N valves without being fully trained and qualified in valve, actuator, and accessory installation, operation, and maintenance. **To avoid personal injury or property damage, it is important to carefully read, understand, and follow all the contents of this manual, including all safety cautions and warnings.** If you have any questions about these instructions, contact your Emerson sales office or Local Business Partner before proceeding.

Table 1. Specifications

Valve Sizes

NPS ■ 2 ■ 3 ■ 4

End Connection Style(1)

CL 300 Raised Face (RF) Flanges per ASME B16.5

Maximum Inlet Pressure and Temperature(1)

Consistent with CL300 pressure-temperature ratings to 316°C (600°F)

Maximum Pressure Drop

Consistent with pressure-temperature ratings per ASME B16.34

Shutoff Classification

Class IV shutoff per ANSI/ FCI 70-2

Flow Direction

Flow Down

Flow Characteristic

Linear from 15% to 100% travel

Approximate Weights

VALVE SIZE, NPS	WEIGHT	
	Kg	Pounds
2	31	68
3	51	112
4	77	168

1. The pressure/temperature limits in this manual and any applicable standard or code limitation for valve should not be exceeded.

Description

CCV-N valves are single port, angle-style, and balanced valves with metal seat, seat ring retainer guide, and push-down-to-close valve plug action.

Educational Services

For information on available courses for Fisher CCV-N fuel gas control valves, as well as a variety of other products, contact:

Emerson Automation Solutions
Educational Services - Registration
Phone: 1-641-754-3771 or 1-800-338-8158
E-mail: education@emerson.com
emerson.com/fishervalvetraining

Installation

⚠ WARNING

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

Personal injury or equipment damage caused by sudden release of pressure may result if the valve assembly is installed where service conditions could exceed the limits given in table 1 or on the appropriate nameplates. To avoid such injury or damage, provide a relief valve for over-pressure protection as required by government or accepted industry codes and good engineering practices.

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

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

CAUTION

When ordered, the valve configuration and construction materials were selected to meet particular pressure, temperature, pressure drop, and controlled fluid conditions. Since some valve body/trim material combinations are limited in their pressure drop and temperature ranges, do not apply any other conditions to the valve without first contacting your Emerson sales office or Local Business Partner.

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 on the side of the valve.
3. The control valve assembly may be installed in any orientation, unless limited by seismic criteria. However, the normal method is with the actuator installed vertically above the valve. Other positions may result in uneven valve plug and seat ring retainer wear and improper operation. For more information, consult your Emerson sales office or Local Business Partner.
4. Use a suitable gasket between valve and pipeline flanges.
5. If continuous operation is required during inspection or maintenance, install a three-valve bypass around the control valve assembly.
6. Refer to the actuator mounting procedure in the appropriate actuator instruction manual.

⚠ WARNING

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

Maintenance

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 packing maintenance and trim maintenance. All maintenance operations may be performed with the valve in the line.

⚠ WARNING

Avoid personal injury or property damage from sudden release of process pressure. 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 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 from both sides of the valve. Drain the process media from both sides of the valve.**
- **Release the actuator loading pressure and relieve any actuator spring pre compression.**
- **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.**

CAUTION

Follow instructions carefully to avoid damaging the product surfaces, which could result in damage to the product.

Note

Whenever a gasket seal is disturbed by removing or shifting parts, a new gasket should be installed upon reassembly. This is necessary to ensure a good gasket seal, since the used gasket may not seal properly.

Packing Maintenance

If there is undesirable packing leakage, first try to limit the leakage and establish a stem seal by tightening the packing flange nuts.

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. The surface finish of a new valve stem is critical for a good packing seal. If the leakage comes from the outside diameter of the packing, it is possible that the leakage is caused by nicks or scratches around the packing box wall. If performing any of the following procedures, inspect the valve stem and packing box wall for nicks and scratches.

Replace Packing

⚠ WARNING

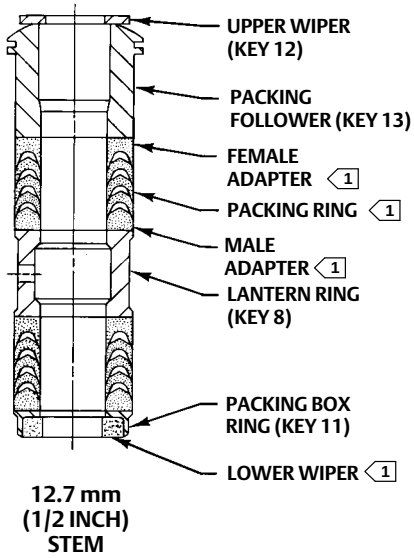
Refer to the WARNING at the beginning of the Maintenance section in this instruction manual

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 releases 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. Observe the Warnings at the start of the Maintenance section.
2. Disconnect the operating lines from the actuator and any leak-off piping from the bonnet. Disconnect the stem connector and remove the actuator from the valve.
3. Loosen the packing flange nuts (key 5, figure 3) so that the packing is not tight on the valve stem (key 7, figure 3). Remove any travel indicator parts and stem locknuts from the valve stem threads.

⚠ WARNING

To avoid personal injury or property damage caused by uncontrolled movement of the bonnet, loosen the bonnet by following the instructions in the next step. Do not remove a stuck bonnet by pulling on it with equipment that can stretch or store energy in any other manner. The sudden release of stored energy can cause uncontrolled movement of the bonnet.

Figure 2. Double PTFE Arrangements



NOTE:
1 PACKING SET (KEY 6) CONTAINS A FEMALE ADAPTER, V-RING PACKING RINGS, MALE ADAPTER, AND LOWER WIPER RINGS.

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4. Hex nuts (key 16, figures 4, 5, or 6) attach the bonnet (key 1, figure 3) to the body (key 1, figures 4, 5, or 6). Loosen these nuts approximately 3 mm (1/8 inch). Then loosen the body-to-bonnet gasketed joint by either rocking the bonnet or prying between the bonnet and valve. Work the prying tool around the bonnet until the bonnet loosens. If no fluid leaks from the joint, remove the nuts or cap screws completely and carefully lift the bonnet off the valve.

CAUTION

Avoid damaging the seating surface caused by the valve plug and stem assembly dropping from the bonnet (key 1, figure 3) after being lifted partway out. When lifting the bonnet, temporarily install a valve stem locknut on the valve stem. The locknut will prevent the valve plug and stem assembly from dropping out of the bonnet.

5. Remove the locknut and separate the valve plug and stem from the bonnet. Set the parts on a protective surface to prevent damage to gasket or seating surfaces.
6. Remove the bonnet gasket (key 10, figure 4, 5, or 6) and cover the opening in the valve to protect the gasket surface and prevent foreign material from getting into the valve body cavity.

CAUTION

To prevent possible product damage, cover the opening in the valve in the following procedure to prevent foreign material from getting into the valve body cavity.

7. Remove the packing flange nuts, packing flange, upper wiper, and packing follower (keys 5, 3, 12, and 13, figure 3). Carefully push out all the remaining packing parts from the valve side of the bonnet using a rounded rod or other tool that will not scratch the packing box wall. Clean the packing box and the metal packing parts.
8. Inspect the valve stem threads and packing box surfaces for any sharp edges which might cut the packing. Scratches or burrs could cause packing box leakage or damage to the 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.
9. Remove the covering protecting the valve body cavity and install a new bonnet gasket (key 10, figure 4, 5, or 6) making sure the gasket seating surfaces are clean and smooth. Then slide the bonnet over the stem and onto the stud bolts (key 15, figure 4, 5, or 6)

⚠ WARNING

Personal injury or damage to equipment could occur if improper stud and nut materials or parts are used. Do not operate or assemble this product with stud(s) and nut(s) that are not approved by Emerson/Fisher engineering and/or listed on the serial card provided with this product. Use of unapproved materials and parts could lead to stresses exceeding the design or code limits intended for this particular service. Install studs with the material grade and manufacturer's identification mark visible. Contact your Emerson sales office or Local Business Partner representative immediately if a discrepancy between actual parts and approved parts is suspected.

10. Lubricate the studs (key 15, figure 4, 5, or 6) and all surfaces the studs and nuts come into contact with. Tighten the nuts (key 16, figure 4, 5, or 6) in a uniform, multistage cross pattern. It is recommended that torquing be performed in a minimum of four torque levels until the final torque level is achieved. Required bolt torques can be found in table 2 below.

Table 2. Body-to-Bonnet Torque Guidelines

VALVE SIZE, NPS	BOLT TORQUES	
	SA193-B7	
	N•m	Lbf-ft
2	91	67
3	122	90
4	163	120

11. Install new packing and the metal packing box parts according to the appropriate arrangement in figure 2. Place a smooth-edged pipe over the valve stem and gently tap each soft packing part into the packing box.
12. Slide the packing follower, upper wiper, and packing flange (keys 13, 12, 3, figure 3) into position. Lubricate the packing flange studs (key 4, figure 3) and the faces of the packing flange nuts (key 5, figure 3). Install the packing flange nuts.
13. Tighten the packing flange nuts alternately in small equal increments until one of the nuts reaches the minimum recommended torque shown in table 3 below. Then, tighten the remaining flange nuts until the packing flange is level and at a 90-degree angle to the valve stem.

Table 3. Recommended Torque for Packing Flange Nuts

VALVE STEM DIAMETER		PRESSURE RATING	PTFE PACKING			
			Minimum Torque		Maximum Torque	
mm	Inch		N•m	Lbf-in	N•m	Lbf-in
12.7	1/2	CL300	3	30	5	42

14. Mount the actuator on the valve assembly and reconnect the actuator and valve stem according to the procedure in the appropriate actuator instruction manual.

Trim Maintenance

⚠ WARNING

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

Disassembly

1. Remove the actuator and the bonnet according to steps 1. through 6. of the Replacing Packing procedure in the Maintenance section.

⚠ WARNING

To avoid personal injury due to leaking fluid, avoid damaging gasket sealing surfaces. The surface finish of the valve stem (key 7, figure 3) is critical for making a good packing seal. The inside surface of the seat ring retainer (key 3, figure 4, 5, or 6), is critical for smooth operation of the valve plug. The seating surfaces of the valve plug (key 2, figure 4, 5, or 6) and seat ring (key 9, figure 4, 5, or 6) are critical for proper shutoff. Unless inspection reveals otherwise, assume all these parts are in good condition and protect them accordingly.

2. Remove the packing flange nuts, packing flange, upper wiper, and packing follower (keys 5, 3, 12, and 13, figure 3). Carefully push out all the remaining packing parts from the valve side of the bonnet using a rounded rod or other tool that will not scratch the packing box wall. Clean the packing box and the metal packing parts.
3. Inspect the valve stem threads and packing box surfaces for any sharp edges which might cut the packing. Scratches or burrs could cause packing box leakage or damage to the new packing. If the surface condition cannot be improved by light sanding, replace the damaged parts.
4. On an NPS 2 CCV-N, remove the bonnet spacer (key 32, figure 4) and associated gasket (key 10, figure 4) on top of the spacer.
5. Remove the seat ring retainer (key 3, figure 4, 5, or 6), valve plug and stem assembly, and associated gaskets (key 10, 12 , figure 4, 5, or 6).

6. Separate the plug stem assembly and seat ring retainer (key 3, figure 4, 5, or 6) by sliding the plug stem assembly through the bottom of seat ring retainer (key 3, figure 4, 5, or 6).
7. Remove the seat ring (key 9, figure 4, 5, or 6) and seat ring gasket (key 13, figure 4, 5, or 6).
8. For all constructions, inspect parts for wear or damage which would prevent proper operation of the valve. Replace or repair trim parts according to the following procedure for plug maintenance procedure.

Valve Plug Maintenance

Except where indicated, NPS 2 key numbers are referenced in figure 4, NPS 3 key numbers are referenced in figure 5, and NPS 4 key numbers are referenced in figure 6.

Note

Due to the design requirement of this product, the valve and stem are precision-matched and the stem is not replaceable. If damaged, the valve plug and stem must be replaced as an assembly. Contact your Emerson sales office or Local Business Partner for parts replacement.

CAUTION

To avoid the valve plug seal ring (key 24) not sealing properly, be careful not to scratch the surfaces of the ring groove in the valve plug or any of the surfaces of the replacement ring.

1. With the valve plug (key 2) removed according to the Disassembly portion of the Trim Maintenance procedure, proceed as appropriate:
2. For NPS 2 (figure 4): Punch out the pin (key 8) that connects the valve plug (key 2), stem (key 7, figure 3) and seal retainer (key 4). Remove the seal retainer (key 4) with a spanner wrench or strap wrench and slide the upper anti-extrusion ring, seal ring, bi-directional back up ring, seal ring, and anti-extrusion ring (key 63, 24, and 33) off the plug.

   Inspect all parts for defects and cleanliness and replace the damaged parts. To install the seal parts, slide the lower anti-extrusion ring, seal ring, bi-directional back up ring, seal ring, and upper anti-extrusion ring (key 63, 24, and 33) into the plug, as shown in figure 4. Apply anti-seize lubricant (key 45) to the thread of the seal retainer and flat mating surfaces between the seal retainer and plug (key 2 and 4). Then, install the seal retainer (key 4) into the plug (key 2) and tighten it with a spanner wrench or strap wrench until the pin holes are aligned. Once the holes are aligned, secure the seal retainer (key 4) to the plug stem assembly with a new pin (key 8). Make sure the pin is inserted completely into the assembly with 0.025” depth from the radial surface.

CAUTION

To avoid damaging the seal ring, slowly and gently stretch it for the following procedure. Avoid jerking sharply on the ring.

For NPS 3 (figure 5): Remove the retainer ring (key 26) off the groove, and slide the back up ring, upper anti-extrusion ring, seal ring, bidirectional back up ring, seal ring, and anti-extrusion ring (key 63, 24, 25, and 33) off the plug.

Inspect all parts for defects and cleanliness and replace the damaged parts. To install the seal parts, slide the lower anti-extrusion ring, seal ring, bi-directional back up ring, seal ring, upper anti-extrusion ring, and back up ring (key

63, 24, 25, and 33) into the plug, as shown in figure 6, view B. Then install the retaining ring (key 26) by inserting one end in the groove and pressing the ring into the groove while turning the plug. Again, be careful not to scratch any surfaces of the ring or plug.

NPS 4 (figure 6): Using a punch, drive the pin (key 5) further into the pin hole, as shown in figure 7. To prevent damaging the outer diamter of the plug, use a face spanner wrench to unthread the seal retainer (key 4) from the plug (key 2) using the pin holes on the top surface of the seal retainer, as shown in figure 7. Once the seal retainer is unthreaded, slide the upper anti-extrusion ring, seal ring, bi-directional back up ring, seal ring, and anti-extrusion ring (key 63, 24, and 33) off the plug.

Inspect all parts for defects and cleanliness and replace the damaged parts. To install the seal parts, slide the lower anti-extrusion ring, seal ring, bi-directional back up ring, seal ring, and upper anti-extrusion ring (key 63, 24, and 33) into the plug, as shown in figure 6, view B. Then, apply anti-seize lubricant (key 45) to the seal retainer threads and flat mating surfaces between the seal retainer and plug (key 2 and 4). Install the seal retainer into the plug (key 2 and 4) and tighten it with a spanner wrench until the pin holes are aligned. Retain the seal retainer (key 4) to the plug (key 2) by pinning a new pin (key 5) into one of the remaining pin holes with 0.025" depth from the surface. Do not insert the pin into a pin hole that was previously pinned, as shown in figure 7.

Assembly

Except where indicated, key numbers are referenced in figure 4, 5, or 6.

1. Inspect all parts for defects and cleanliness; remove any burrs on metal valve components.
2. Place a gasket (key 13) into the valve body (key 1) where the seat ring flanges seats. Then, insert the seat ring (key 9) into the valve body (key 1). The seat ring (key 9) end will protrude out from the valve body (key 1).
3. Assemble the plug stem assembly of each size into the valve body (key 1) as the following:
4. Inspect the sealing surface of the plug stem seal assembly for nicks and scratches. Then, apply white lithium grease (key 46) sparingly around the spring-loaded seal ring (key 24).
5. For NPS 2 and 3, carefully insert the bottom end of plug stem seal assembly into the top of the seat ring retainer (key 3) through the inner bore as shown in figure 8. Make sure no damage is done to the seals. Slide the plug stem seal assembly into the seat ring retainer (key 3) until the top of the plug stem seal assembly is even with the top of the seat ring retainer (key 3). At this point, the plug (key 2) should have a snug fit with the seal ring retainer (key 3). For NPS 4, carefully insert the top end of the plug stem seal assembly into the bottom of the seat ring retainer (key 3) through the inner bore. Ensure no damage is done to the seals, as shown in figure 9. Slide the plug stem seal assembly into the seat ring retainer (key 3) until the top of the plug stem seal assembly is even with the top of the seat ring retainer (key 3). At this point, the plug (key 2) should have a snug fit with the seat ring retainer (key 3).
6. Hold on to the end of the stem (key 7) and seat ring retainer (key 3) and slowly insert them into the valve body (key 1), as shown in figure 4, 5, or 6. Be cautious and do not swing the assemblies, as the seat ring retainer (key 3) may fall off. At the same time, ensure that the seat ring retainer (key 3) bottom diameter is guided properly to the seat ring (key 9) when installed into the valve body (key 1).
7. After the plug (key 2), stem (key 7, figure 3), and seat ring retainer (key 4) assembly is placed into valve body (key 1), ensure one of the seat ring retainer legs is aligned with the inlet. Once the seat ring retainer is oriented, gently push the plug seating surface against the seat ring (key 9). Note – the plug stem assembly is symmetrical, so no orientation is necessary.
8. Slide quantity-1 spiral wound gasket (key 12) and quantity-1 flat sheet gasket (key 10) over the seat ring retainer (key 3). Make sure the bottom of the gasket is flush with the mating surface on the seat ring retainer shoulder.
9. Coat the bonnet studs (key 15) with anti-seize lubricant (key 45) up to the deformed thread. Thread the studs into the valve body (key 1) by hand until the deformed thread prevents further insertion.
10. If no bonnet spacer is required for the construction, skip this step and go to step 11. . Slide the bonnet spacer (key 32) onto the flat sheet gasket (key 10) over the seat ring retainer (key 3). Then, slide another flat sheet gasket (key 10) onto the bonnet spacer (key 32) over the seat ring retainer (key 3).
11. Mount the bonnet on the valve body and complete the assembly according to steps 10 through 14 of the packing replacement procedure.

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 sales office or Local Business Partner 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.

CAUTION

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

Parts Kits

Standard Packing Repair Kits

Table 4. Standard Packing Repair Kits

Stem Diameter mm (Inches) Yoke Boss Diameter, mm (Inches)	12.7 (1/2) 71 (2-13/16)
Double PTFE (Contains Keys 12, 6, 8, 11, and 218)	RPACKX00662

Gasket Kits

Table 5. Gasket Kits

Valve Size, NPS	Key Numbers	Kits
2	10, 12, 13	RGASKETXF82
3	10, 12, 13	RGASKETXF92
4	10, 12, 13	RGASKETXG12

Table 6. Gasket Descriptions

Key Number	Description	Materials
10	Bonnet Gasket	Graphite/ S31600
12	Spiral-Wound Gasket	N06600/ Graphite
13	Seat Ring Gasket	Graphite/ S31600

Seal Ring Kits

Table 7. Seal Ring Kits

Valve Size	Port Size	Key Numbers	Kits
NPS 2	1 1/2	8, 63, 24, 33	RSEALX00262
NPS 3	2 1/4	26, 25, 63, 24, 33	RSEALX00272
NPS 4	3 1/10	5, 63, 24, 33	RSEALX00282

Parts List

Note
Contact your Emerson sales office for Part Ordering information.

Bonnet Assembly (figure 3)

Key	Description	
1	Bonnet	
3	Packing Flange	
4	Packing Stud	
5	Packing Nut	
6*	Packing Set	See Parts Kits
7	Valve Stem	
8*	Lantern Ring	See Parts Kits
11*	Packing Box Ring	See Parts Kits
12*	Upper Wiper	See Parts Kits
13	Packing Follower	
14	Pipe Plug	
34	Lubricant, anti-seize	
218*	Lower Wiper	See Parts Kits

Valve Assembly (figure 4, 5, or 6)

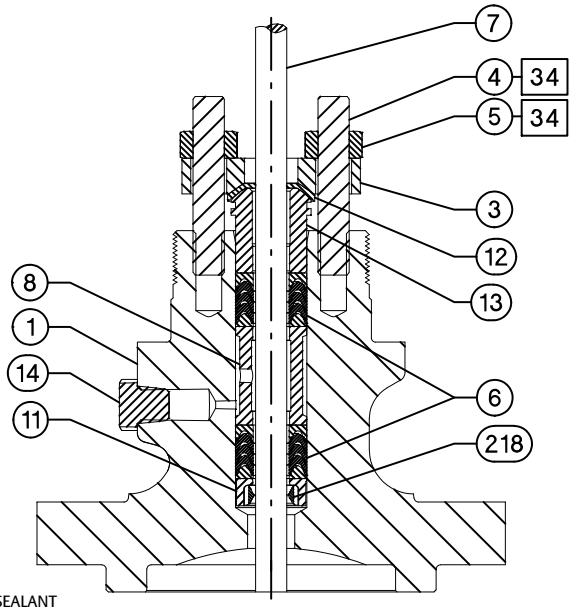
Key	Description	
1	Valve Body	
2	Plug	
3*	Seat Ring Retainer	
4	Seal Retainer	
5*	Groove pin	See Parts Kits
7	Valve Stem	
8*	Groove pin	
9*	Seat Ring	
10*	Bonnet Gasket	See Parts Kits
12*	Spiral-wound Gasket	See Parts Kits
13*	Seat Ring Gasket	See Parts Kits
15	Bonnet Stud	
16	Bonnet Nut	
24*	Spring Load Seal Ring	See Parts Kits
25*	Backup Ring	See Parts Kits
26*	Retaining Ring	See Parts Kits
32	Bonnet Spacer	
33*	Bi-directional Ring	See Parts Kits
45	Lubricant, anti-seize	
46	White lithium grease	
63*	PEEK Anti-extrusion Ring	See Parts Kits

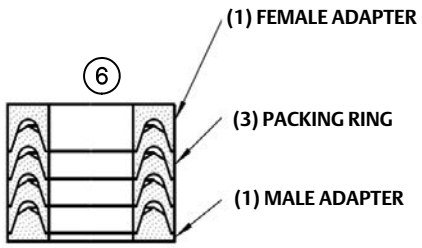
Recommended Spare Parts Assembly

*Plug/Stem/Seal Assembly
NPS 2: Includes key 7, 4, 2, 8, 24 (2 qty), 63 (2 qty), 33
NPS 3: Includes key 7, 2, 8, 24 (2 qty), 63 (2 qty), 33, 25, 26
NPS 4: Includes key 2, 4, 7, 8, 5, 24 (2 qty), 63 (2 qty), 33

*Recommended spare parts

Figure 3. Bonnet and Packing Arrangements with Key Numbers





☐ APPLY LUB/SEALANT

Figure 4. NPS 2 CCV-N Valve Assembly with Key Numbers

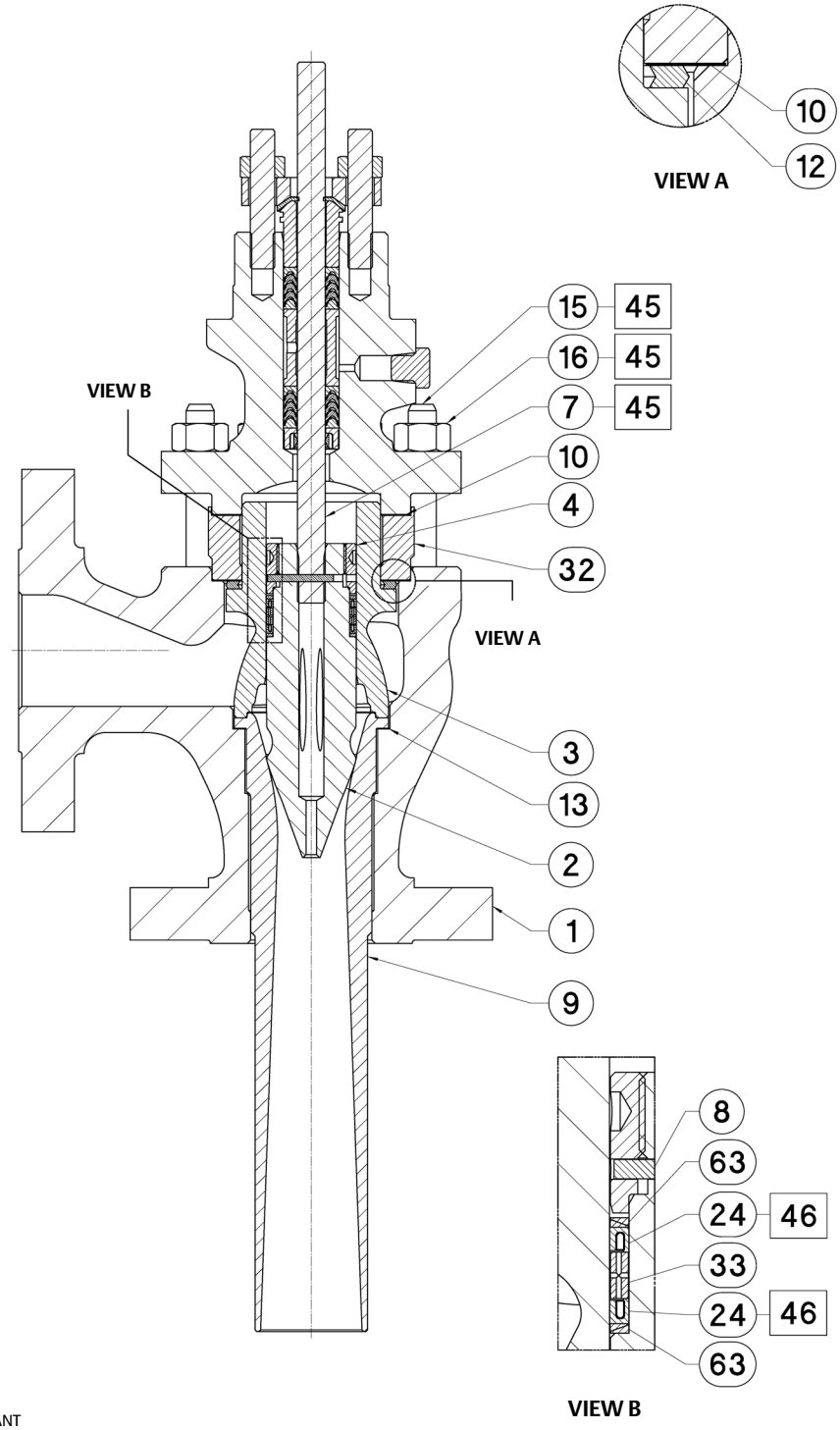
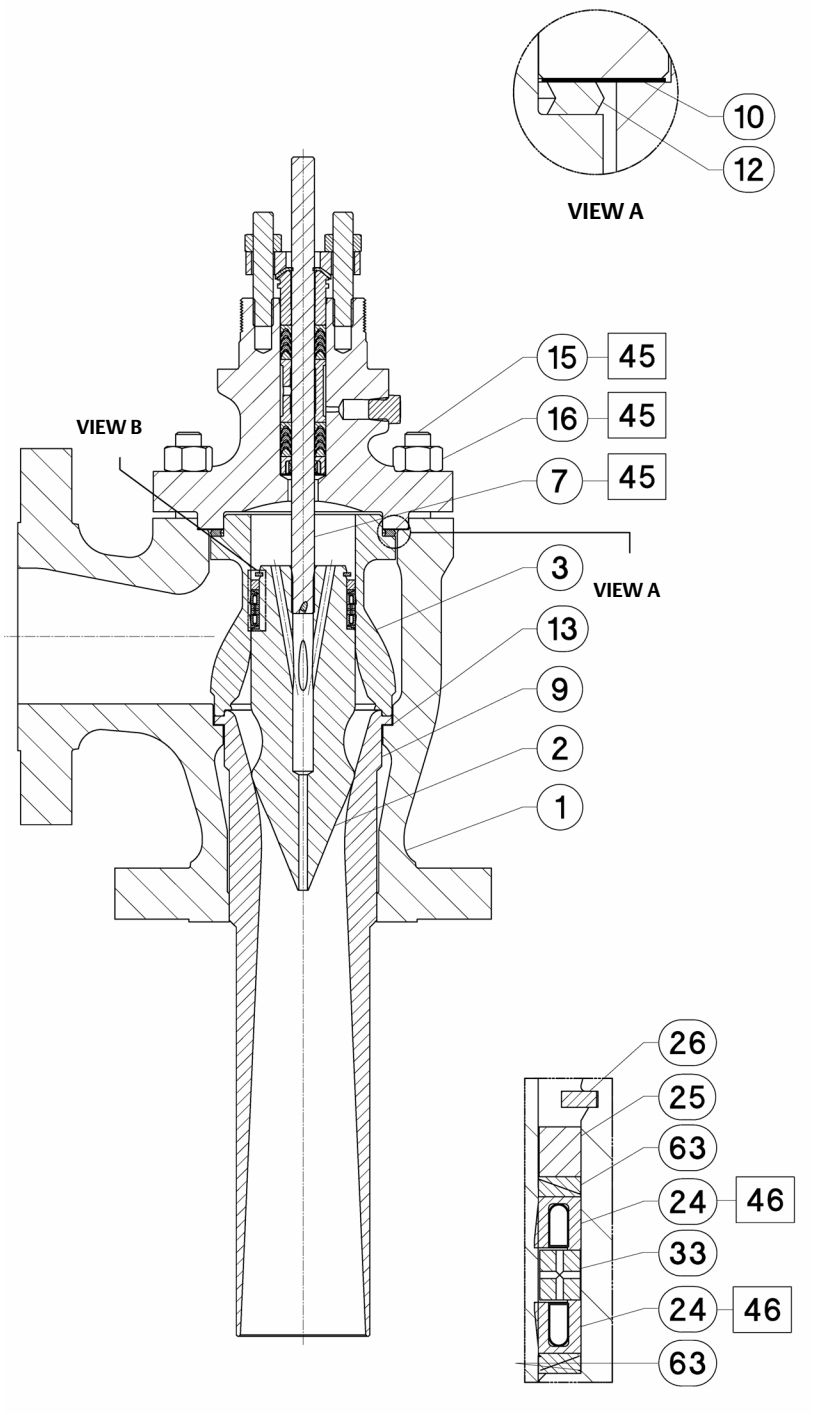


Figure 5. NPS 3 CCV-N Valve Assembly with Key Numbers



☐ APPLY LUB/SEALANT

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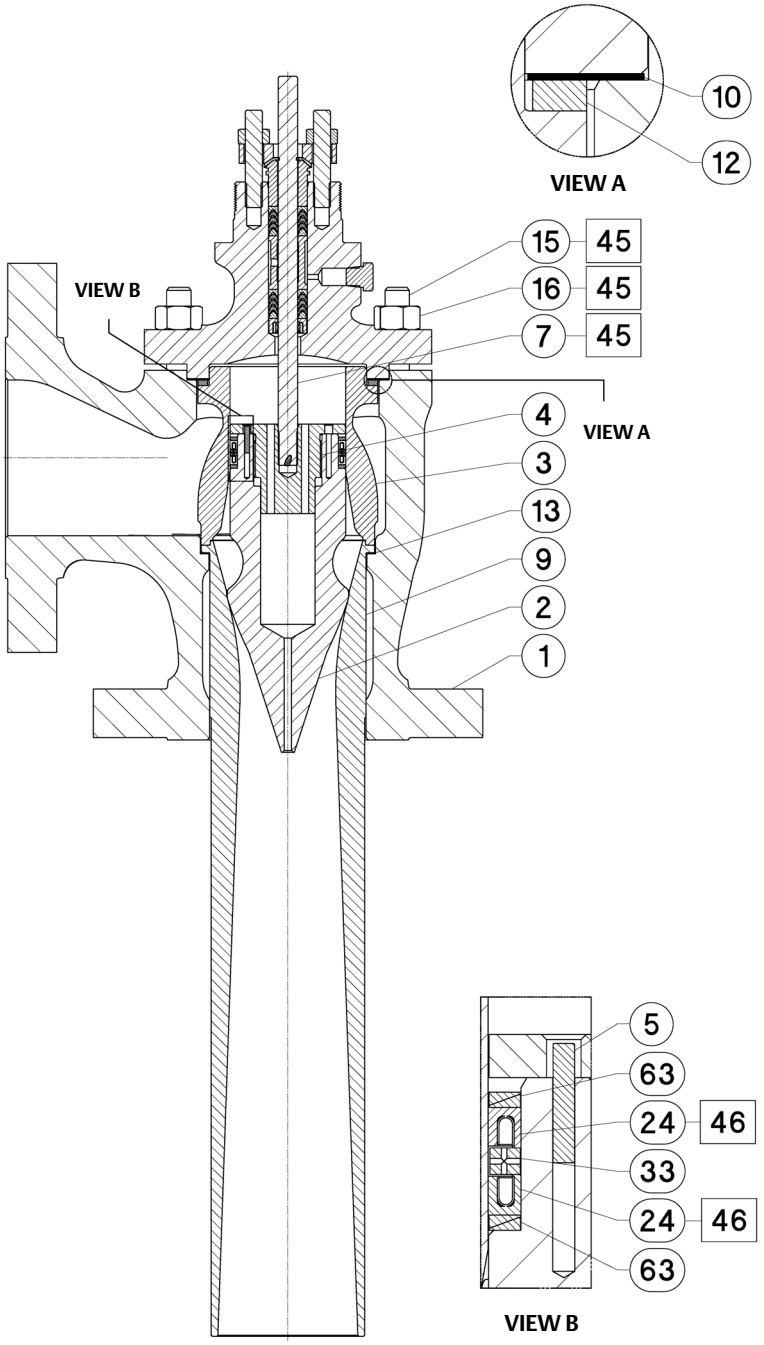
Figure 6. NPS 4 CCV-N Valve Assembly with Key Numbers



☐ APPLY LUB/SEALANT

GE84780

Figure 7. NPS 4 CCV-N Plug Maintenance

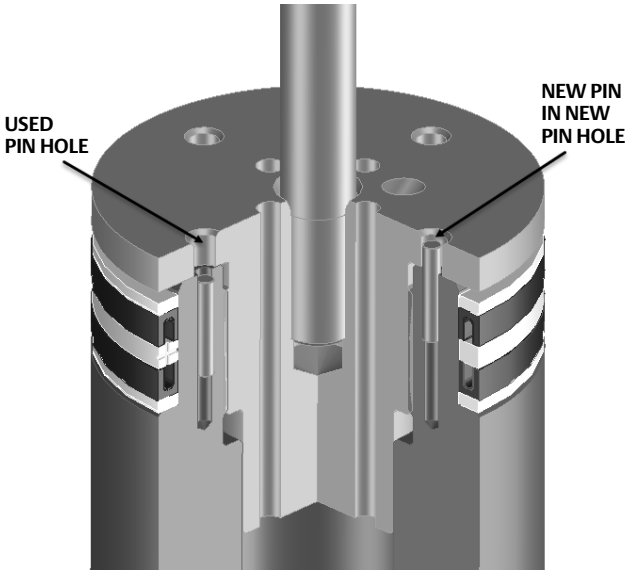


Figure 8. CCV NPS 2 and 3 Assembly - Insert of Plug Stem Seal Assembly through the Top of the Seat Ring Retainer

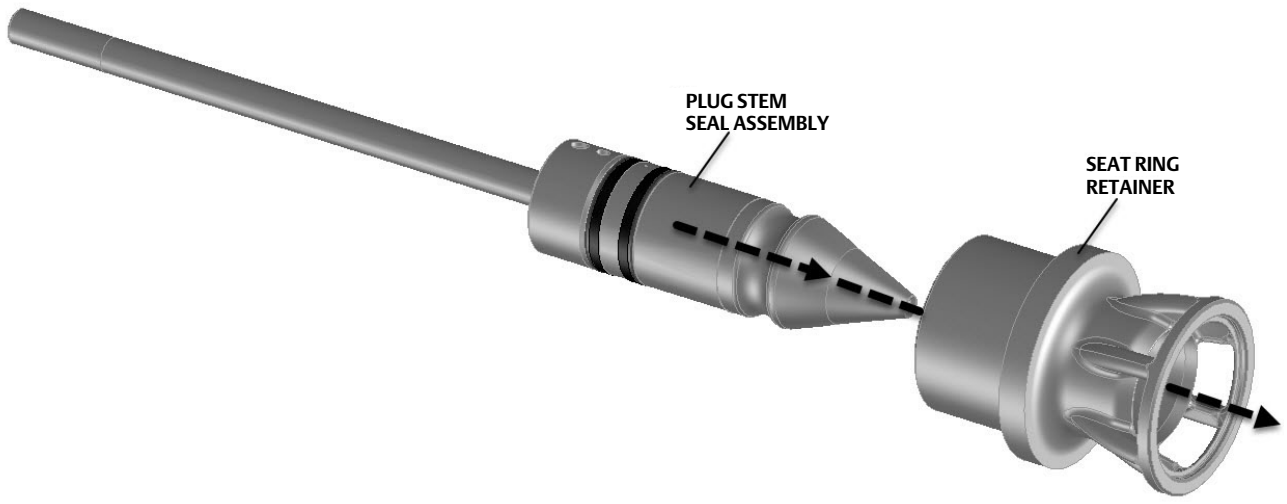


Figure 9. CCV NPS 4 Assembly - Insert of Plug Stem Seal Assembly through the Bottom of the Seat Ring Retainer

Emerson Automation Solutions
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