Spence Type J Control Valve

⚠ WARNING

Failure to follow these instructions or to properly install and maintain this equipment could result in an explosion, fire and/or chemical contamination causing property damage and personal injury or death.

Emerson Control Valve must be installed, operated and maintained in accordance with federal, state and local codes, rules and regulations and Emerson Process Management Regulator Technologies, Inc. (Emerson) instructions.

If the control valve vents gas or a leak develops in the system, service to the unit may be required. Failure to correct trouble could result in a hazardous condition.

Installation, operation and maintenance procedures performed by unqualified personnel may result in improper adjustment and unsafe operation. Either condition may result in equipment damage or personal injury. Only a qualified person shall install or service the Type J control valve.

Introduction

Scope of the Manual

This manual provides instructions for the installation, start-up, setting, maintenance, troubleshooting and parts ordering for Type J control valve.

Product Description

Type J control valve is a single-seated, top-guided compact pneumatic globe control valve with a streamlined body designed for steam, water, gas and process applications in typical institutional, commercial and industrial processes. Type J is available with either a direct or reverse acting actuator and meets most installation requirements.

Figure 1. *Type J Control Valve*

The actuator is made of stainless steel hardware with a maximum deadband of 0.3 psig / 0.02 bar. The valve trim is made of 316 stainless steel with replaceable threaded seats for easy maintenance. Standard packing is spring-loaded Teflon V-Rings. Optional graphite or high temperature packing is available. The valve conforms to NEMUR 4 for mounting of accessories.

Principle of Operation

The Type J Control Valve is a flow-to-open, globe style, pneumatic diaphragm actuated control valve. It can be arranged to operate with either air-to-close or air-to-open control.

A controller sensing the controlled variable provides an air signal to the actuator of the control valve to obtain the desired control.

Specifications

This section lists the specifications for the Type J Control Valve. Factory specification are stamped on the nameplate fastened on the control valve at the factory.

Control Valve Types
Type J1: Cast Iron
Type J3: Stainless steel

Valve Sizes
NPS 1/2, 3/4, 1, 1-1/2 and 2 / DN 15, 20, 25, 40 and 50

Pressure and Temperature Chart(1)
See Figure 2

End Connection Styles
NPT, CL150, CL300 and CL600

Flow Coefficient, C_v
NPS 1/2 / DN 15: 5.1
NPS 3/4 / DN 20: 10.3
NPS 1 / DN 25: 18.2
NPS 1-1/2 / DN 40: 37
NPS 2 / DN 50: 67

Construction Materials
Body: Stainless steel or Cast iron
Seat Ring: Stainless steel
Packing: PTFE V ring, PTFE/Graphite or Graphite
Plug and Stem Assembly: Stainless steel
Yoke: Ductile iron
Diaphragm: Nitrile/Polyester
Piston: Stainless steel
Spring: Steel wire
Actuator Housing: Steel

Options
36 or 60 sq. in. / 0.02 or 0.04 sqm actuators
Soft Seats- 450°F / 232°C
Moore, PMV, Eckardt Positioner Accessories

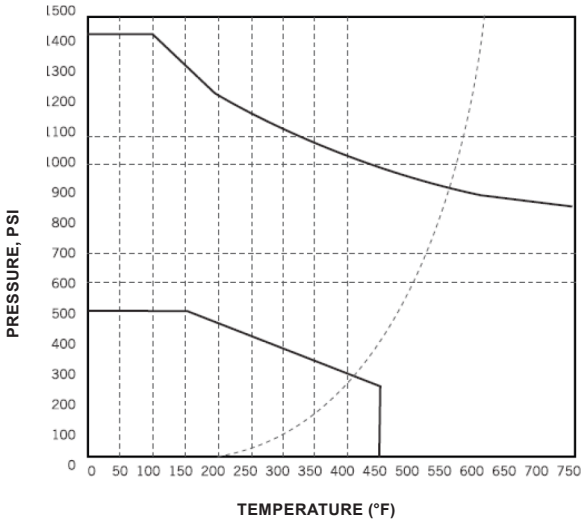
Approximate Weight
See Table 1

Seat Leakage Classifications
Metal Seats: ANSI/ISA 70-2 Class IV
Teflon Soft Seats: Class VI

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

Table 1. *Approximate Weight*

VALVE SIZE		SCREWED				FLANGED			
		36 in. sq / 0.02 sqm		60 in. sq / 0.04 sqm		36 in. sq / 0.02 sqm		60 in. sq / 0.04 sqm	
NPS	DN	lbs	kg	lbs	kg	lbs	kg	lbs	kg
1/2	15	20.5	9.3	36.5	16.6	23.5	10.7	39.5	17.9
3/4	20	20.5	9.3	36.5	16.6	25.75	11.7	41.75	18.9
1	25	22.5	10.2	38.75	17.6	29.0	13.2	45.25	20.5
1-1/2	40	29.25	13.3	45.5	20.6	40.25	18.3	57.5	26.1
2	50	38.25	17.3	54.25	24.6	50.25	22.8	68.25	31.0



– Saturated Steam
– J1 ANSI/ASME B16.1 Cast Iron
– J3 ANSI/ASME B16.34 Class 600 Stainless Steel

Figure 2. *Type J Pressure and Temperature Chart*

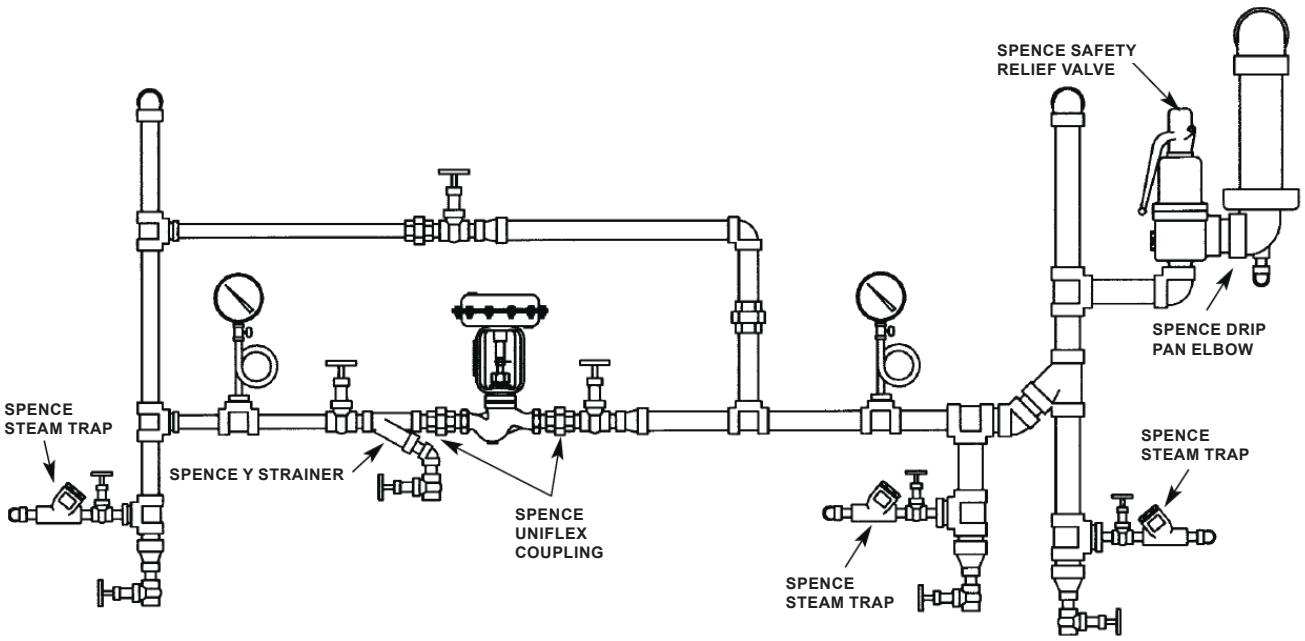


Figure 3. *Type J Control Valve Recommended Installation for Steam Application*

Installation

WARNING

Personal injury or system damage may result if this control valve is installed, without appropriate overpressure protection, where service conditions could exceed the limits given in the Specifications section and/or control valve nameplate.

Additionally, physical damage to the control valve may result in personal injury or property damage due to escaping of accumulated gas. To avoid such injury and damage, install the control valve in a safe location.

All pressure equipment should be installed in a non-seismic area; should not be exposed to fire; and should be protected from thunderbolt (lightning) strikes.

Planning

- Locate the valve in a straight run of horizontal pipe as shown in Figure 3. Mount the valve with the actuator in the upright position. Allow room for removal of the actuator.
- Prevent pipeline hammering in compressible fluid service by providing proper drainage before and after the valve.
- Avoid damaging effects of scale and dirt in pipelines by using a strainer.
- A 3-valve by-pass to facilitate inspection and maintenance without interrupting service is recommended.
- To eliminate excessive noise with steam and other compressible fluids, enlarge the delivery pipe size to allow a reasonable flow velocity at the reduced pressure. A concentric transition is recommended.
- If possible, avoid sharp turns close to the valve.
- Install upstream and downstream pressure gauges to indicate performance.
- If the rating of the delivery system or connected equipment is less than the initial pressure, provide a safety relief valve.
- Use Pipe Coupling for ease of maintenance. The spiral wound gasket provides a high performance seal similar to that of a flanged connection, yet retains the convenience of a ground joint union.

Start-up and Setting

WARNING

The valve may be handling hazardous fluids. Only qualified personnel, who are familiar with the installation, should be permitted to install, readjust, inspect or maintain the valve.

CAUTION

Insulation, may be applied to the valve body only. Do not insulate the bonnet.

1. Flush the piping system thoroughly to clear it of welding beads, scale, sand, etc.
2. Install the valve with the arrow on the side of the valve body pointing in the direction of fluid flow. Screwed end valves should be mounted between unions.
3. Install controller and accessories in accordance with instructions furnished by the manufacturer of these items.
4. Connect necessary air lines and/or electrical connections to the diaphragm chamber and valve mounted accessories. Use 1/4 in. / 6.35 mm outside diameter tubing for all air lines. If the length of the air line exceeds 25 ft / 7.62 m, use 3/8 in. / 9.53 mm outside diameter tubing.

Maintenance

WARNING

To avoid personal injury, property damage or equipment damage caused by sudden release of pressure or explosion of accumulated gas, do not attempt any maintenance or disassembly without first isolating the control valve from system pressure and relieving all internal pressure from the control valve.

Control valves that have been disassembled for repair must be tested for proper operation before being returned to service. Only parts manufactured by Emerson should be used for repairing this control valve.

Due to normal wear or damage that may occur from external sources, this control valve should be inspected and maintained periodically. The frequency of inspection and replacement of parts depends upon the severity of service conditions or the requirement of local, state and federal rules and regulations.

Removal of the Actuator from the Valve Body Assembly (Refer to Figures 4 and 7)

Remove all accessories from the control valve.

Reverse Acting Actuator

1. Loosen stem nuts (key 31) and move to approximately 1/3 down valve stem.
2. Retighten the stem nuts (key 31), being careful not to move valve stem.
3. Energize actuator with air to lift plug off seat.
4. Disengage packing nut (key 32) and lock nut (key 33) from bonnet (key 25).
5. De-energize actuator.
6. Move the actuator and yoke away from bonnet.
7. Lift actuator and yoke assembly along with plug and stem assembly (key 27) off seat.
8. With a 1/4 ft / 76.2 mm wrench, unthread valve stem from the actuator stem (key 16) until valve stem is dise ngaged from actuator stem.
9. Remove stem nuts, indicator, packing nut and lock nut.

Direct Acting Actuator

1. Energize actuator with air slightly (in case of back seating).
2. Loosen stem nuts (key 31) and re-tighten approximately 1/8 in. / 3.18 mm away from actuator stem (key 16).
3. Disengage packing nut (key 32) and lock nut (key 33) from bonnet (key 25). With a 1/4 ft / 76.2 mm wrench, unscrew valve stem from actuator stem.
4. When valve stem reaches seat, lift actuator (to prevent galling the seat and plug).
5. Remove stem nuts, indicator, packing nut and lock nut.

Disassembly of the Valve Body

1. Remove stem nuts (key 31), indicator (key 22), packing nut (key 32) and lock nut (key 33) as shown in Figure 4.
2. Lift yoke off the bonnet (key 25).
3. Remove bonnet bolts (key 23) and lift off bonnet flange (key 24), bonnet and stem and plug assembly (key 27).
4. Remove gasket (key 26). A new gasket should be installed each time the valve body is disassembled.
5. Turn stem and plug assembly out of the bonnet through packing.
6. Replace packing if necessary.
7. All parts should be inspected for wear and cleaned thoroughly before reassembling the valve body.

Disassembly of the Actuator

1. Remove actuator from the valve.
2. Remove regular casing bolts (key 4) and casing nuts (key 5).
3. Gradually loosen nuts on the remaining long casing bolts (key 14) to allow pre-compression of actuator springs.
4. Remove upper casing (key 2).
5. Pull actuator stem (key 16), along with diaphragm (key 15), springs (key 3) and piston (key 13), out through bushing (key 7).
6. Place a wrench on machined flats of the actuator stem and remove stem nut (key 10), seal washer (key 12) and stem washer (key 11).
7. Remove O-ring (key 8) from the bushing and replace if necessary. Lubricate O-ring after installing.

Reassembly of the Actuator

1. Refer to Figure 4 for correct orientation of casings, diaphragm (key 15), piston (key 13), stem (key 16) and springs (key 3) for direct or reverse action.
2. Be sure that piston spring recesses line up between casing ribs as shown in Figure 8B for all springs except 05-13085-00 and 05-13097-00 which are assembled per Figure 8A.
3. Note that seal washer rings and stem washer are below the diaphragm for 8 to 15 psi / 0.55 to 1.03 bar on the 36 $sq.in.$ / 0.02 sqm actuator as shown in Figure 9. For all other springs, the seal and stem washers are assembled above the diaphragm.
4. Lubricate bushing O-ring (key 8) and insert actuator stem through the bushing.
5. Reattach upper casing (key 2) with long bolts (key 14) and nuts (key 5), tightening alternately.
6. Install remaining casing nuts and bolts.

Lapping Plug into the Seat

CAUTION

Seats and plugs should never require more than the lightest touch up with very fine (400 grit) grinding compound. Heavy lapping will produce galling, a wider seating surface and a groove in the plug, all of which tend to cause leakage.

1. Remove old packing from the packing box with a hook type tool or with compressed air in the body.
2. Reface a damaged surface before attempting to grind it in. Lap sparingly.
3. Replace stem and plug assembly (key 27) in bonnet (key 25) through packing.
4. Apply lapping compound to the plug.
5. Place bonnet and bonnet flange (key 24) on the body and tighten bonnet bolt (key 23) finger tight. Do not tighten packing nut (key 32) during the lapping operation.
6. After lapping, disassemble and clean all parts thoroughly.

Packing Replacement

For the Teflon V-ring Packing

1. Install the spring, washer, and packing onto plug and stem assembly on valve sub-assembly.
2. Install O-ring followed by the packing follower and packing nut.
3. Lubricate O-ring with silicone lubricant.

For the Graphite and Hi-temp Graphite Packing

CAUTION

Stem should not be stroked without packing nut being tightened or packing O-ring may become dislodged. Forcing stem threads through installed packing will damage packing.

1. Install packing O-ring followed by a washer onto plug and stem assembly on valve sub-assembly.
2. Lubricate O-ring with silicone lubricant.
3. Use a 1/4 in. / 6.35 mm schedule 40 pipe to firmly seat the O-ring into the O-ring groove.
4. Install remaining packing, packing follower, and packing nut referring to Figure 5.

Reassembly of the Valve Body

1. Install a new gasket (key 26).
2. Attach bonnet (key 25) and bonnet flange (key 24) to body with bonnet bolts (key 23). Be sure to tighten bolts alternately and evenly to ensure proper seating of the plug.
3. Replace yoke (key 9), lock nut (key 33), packing nut (key 32), stem nuts (key 31), travel indicator (key 22), over plug and stem assembly (key 27).

Replacing the Actuator on the Valve Body

1. Put actuator assembly over the valve stem.
2. Place lock nut (key 33), packing nut (key 32) and stem nuts (key 31) with travel indicator (key 22) on valve stem.
3. Rest actuator stem (key 16) on valve stem.
4. Tighten stem nuts approximately 2/3 down valve stem.
5. Lift actuator assembly and engage valve stem with actuator stem (be careful not to gall the plug and seat).

Reverse Acting

When sufficient engagement is met, actuator can be energized with air to place yoke on the bonnet (key 25) and lift plug off the seat. Tighten lock nut and packing nut.

Direct Acting

Engage valve stem with actuator stem so no contact is made between plug and seat when the bottom of the yoke is rested on the bonnet. Tighten lock nut and packing nut.

Actuator Adjustment

1. Close inlet and outlet stop valves. Be sure valve body is not under pressure.
2. Place wrench on machined flats of actuator stem (key 16). Turn stem nuts (key 31) approximately halfway down threads of plug and stem assembly (key 27) and counter the two nuts.

Reverse Acting

1. Apply sufficient air pressure to diaphragm case to start moving the valve through its rated travel. This is shown by the travel indicator (key 22).
2. Engage lower stem nut (key 31) and turn plug and stem assembly (key 27) into actuator stem (key 16) until pre-compression of actuator springs (key 3) is relieved.

Note

Plug should not be seating on seat ring when air pressure is removed from actuator case.

3. Apply prescribed setting pressure to actuator. This is determined by specific operating conditions.
4. Turn plug and stem assembly out of actuator stem until plug seats on seat ring (key 28). To prevent galling, do not turn plug and stem assembly once plug has contacted seat ring. Turn stem nuts up plug and stem assembly and tighten to lock it in position.
5. Reduce air signal to 0 psi/bar and calibrate indicator scale (key 20). Check that full travel is achieved with a 15 psi signal, except for 20 to 60 psi / 1.38 to 4.14 bar springs.

Direct Acting

1. Engage lower stem nut (key 31) and turn plug and stem assembly (key 27) into actuator stem (key 16) until plug and stem assembly stops at upper limit of travel and/or a slight downward movement of actuator stem is detected.
2. Turn stem nut up the plug and stem assembly and tighten to lock in position.
3. Calibrate indicator scale (key 20). Check that full travel is achieved at a 0 psi signal, 20 to 60 psi / 1.38 to 4.14 bar springs.

Troubleshooting

WARNING

To avoid personal injury, property damage or equipment damage caused by sudden release of pressure or explosion of accumulated gas, do not attempt any troubleshooting or disassembly without first isolating the control valve from system pressure and relieving all internal pressure from the control valve.

Control valves that have been disassembled for repair must be tested for proper operation before being returned to service. Only parts manufactured by Emerson should be used for repairing this control valve.

For troubleshooting of the controlling device and accessories, see the instruction furnished by the manufacturer of these items.

To troubleshoot the valve and actuator, check for the following: change in operating conditions; pneumatic signal failure; diaphragm failure; foreign matter lodged between seat ring and plug; actuator vent plug may be: plugged, missing, replaced with a solid plug; packing leakage.

Graphite Packing/Hi Temp Graphite Packing (Refer to Figure 5)

1. If packing (key 35 or 36) leaks, tighten packing nut as necessary until leakage stops. Over-tightening of packing nut may cause erratic operation.
2. Install additional center packing rings. This can be accomplished by loosening packing nut (key 32).
3. Lift packing nut,gland and end packing ring a sufficient height on stem and plug assembly (key 26) to apply packing ring.
4. Insert one skive cut center packing ring over diameter of stem and plug assembly into packing box.
5. Replace end packing ring and tighten packing nut as necessary to stop leakage.
6. Replace packing.

Teflon Packing (Refer to Figure 5)

1. If the packing (key 34) leaks, isolate and depressurize the valve.
2. Check the stem for gouges and that the O-ring is properly seated.
3. Install replacement packing, if necessary, then return the valve to service.

Parts Ordering

When corresponding with your local Sales Office about this equipment, always reference the equipment valve size, service and serial number.

When ordering replacement parts, reference the key number of each needed part as found in the following parts list and indicate the part number. Separate kits containing all recommended spare parts are available.

Table 2. *Valve Body Assembly Parts list*

KEY	PART NAME	MATERIAL	VALVE SIZE, NPS / DN				
			1/2 / 15	3/4 / 20	1 / 25	1-1/2 / 40	2 / 50
22	Travel Indicator	Aluminum	WAL05-12962-00	WAL05-12962-00	WAL05-12962-00	WAL05-12962-00	WAL05-12962-00
23	Bonnet Bolt	Steel	WAL05-17301-00	WAL05-17301-00	WAL05-17302-00	WAL05-17303-00	WAL05-17304-00
24	Bonnet Flange	Steel	WAL04-13918-00	WAL04-13918-00	WAL04-13919-00	WAL04-13920-00	WAL04-13921-00
25	Bonnet, 316 Stainless Steel Valves	316 Stainless steel	WAL04-13549-00	WAL04-13549-00	WAL05-13549-00	WAL04-13550-00	WAL04-13551-00
	Bonnet, Cast iron and Steel	Steel	WAL04-12983-00	WAL04-12983-00	WAL04-12956-00	WAL04-13125-00	WAL04-13189-00
	Bonnet, Bronze	Brass	WAL04-13870-00	WAL04-13870-00	WAL04-13871-00	WAL04-13872-00	WAL04-13873-00
26*	Gasket, Cast Iron and Bronze	Graphite	WAL05-13395-00	WAL05-13395-00	WAL05-13396-00	WAL05-13397-00	WAL05-16398-00
	Gasket, Steek and Stainless steel	Graphite	WAL05-13396-00	WAL05-13396-00	WAL05-13396-00	WAL05-13397-00	WAL05-13398-00
27	Plug/Stem, Eq.% 1/8	316 Stainless steel	WAL04-13848-00	WAL04-13848-00	----------	----------	----------
	Plug/Stem, Eq.% 3/16		WAL04-13178-00	WAL04-13178-00	----------	----------	----------
	Plug/Stem, Eq.% 1/4		WAL04-13564-00	WAL04-13564-00	WAL04-13564-00	----------	----------
	Plug/Stem, Eq.% 5/8		WAL04-13565-00	WAL04-13565-00	WAL04-13565-00	----------	----------
	Plug/Stem, Eq.% 7/8		----------	WAL04-13566-00	WAL04-13566-00	WAL04-13566-00	----------
	Plug/Stem, Eq.% 1-1/4		----------	----------	WAL04-13567-00	WAL04-13567-00	WAL04-13894-00
	Plug/Stem, Eq.% 1-3/4		----------	----------	----------	WAL04-13568-00	WAL04-13887-00
	Plug/Stem, Eq.% 2-1/4		----------	----------	----------	----------	WAL04-13569-00
	Plug/Stem, Comp.% 1/4		WAL0A-13412-00	WAL0A-13412-00	WAL0A-13412-00	----------	----------
	Plug/Stem, Comp.% 5/8	316 Stainless steel/ Tetrafluoroetheylene	WAL0A-13413-00	WAL0A-13413-00	WAL0A-13413-00	----------	----------
	Plug/Stem, Comp.% 7/8		----------	WAL0A-13414-00	WAL0A-13414-00	WAL0A-13414-00	----------
	Plug/Stem, Comp.% 1-1/4		----------	----------	WAL0A-13415-00	WAL0A-13415-00	WAL0A-13419-00
	Plug/Stem, Comp.% 1-3/4		----------	----------	----------	WAL0A-13416-00	WAL0A-13418-00
	Plug/Stem, Comp.% 2-1/4		----------	----------	----------	----------	WAL0A-13417-00
28	Seat Ring, 1/8 Cast iron/Bronze	17-4 PH	WAL04-13847-00	WAL04-13847-00	----------	----------	----------
	Seat Ring, 1/4 Cast iron/Bronze	316 Stainless steel	WAL04-13173-01	WAL04-13173-01	WAL04-13525-00	----------	----------
	Seat Ring, 5/8 Cast iron/Bronze		WAL04-12981-00	WAL04-12981-00	WAL04-13526-00	----------	----------
	Seat Ring, 7/8 Cast iron/Bronze		----------	WAL04-12982-00	WAL04-13527-00	----------	----------
	Seat Ring, 1/8 Stainless steel/Steel	17-4 PH	WAL04-14299-00	WAL04-14299-00	WAL04-14299-00	----------	----------
	Seat Ring, 1/4 Stainless steel/Steel	316 Stainless steel	WAL04-13525-00	WAL04-13525-00	WAL04-13525-00	----------	----------
	Seat Ring, 5/8 Stainless steel/Steel		WAL04-13526-00	WAL04-13526-00	WAL04-13526-00	----------	----------
	Seat Ring, 7/8 Stainless steel/Steel		----------	WAL04-13527-00	WAL04-13527-00	WAL04-13529-00	----------
	Seat Ring, 1-1/4	316 Stainless steel	----------	----------	WAL04-13528-00	WAL04-13530-00	WAL04-13532-00
	Seat Ring, 1-3/4		----------	----------	----------	WAL04-13531-00	WAL04-13533-00
	Seat Ring, 2-1/4		----------	----------	----------	----------	WAL04-13534-00
	Seat Ring, 1/4 Comp. Cast iron/Bronze	316 Stainless steel	WAL04-13399-00	WAL04-13399-00	WAL04-13400-00	----------	----------
	Seat Ring, 5/8 Comp. Cast iron/Bronze		WAL04-13401-00	WAL04-13401-00	WAL04-13402-00	----------	----------
	Seat Ring, 7/8 Comp. Cast iron/Bronze		----------	WAL04-13491-00	WAL04-13404-00	----------	----------
	Seat Ring, 1/4 Comp. Stainless steel/Steel	316 Stainless steel	WAL04-13400-00	WAL04-13400-00	WAL04-13400-00	----------	----------
	Seat Ring, 5/8 Comp. Stainless steel/Steel		WAL04-13402-00	WAL04-13402-00	WAL04-13402-00	----------	----------
	Seat Ring, 7/8 Comp. Stainless steel/Steel		----------	WAL04-13404-00	WAL04-13404-00	WAL04-13405-00	----------
	Seat Ring, 1-1/4 Comp.	316 Stainless steel	----------	----------	WAL04-13406-00	WAL04-13407-00	WAL04-13408-00
	Seat Ring, 1-3/4 Comp.		----------	----------	----------	WAL04-13409-00	WAL04-13410-00
	Seat Ring, 2-1/4 Comp.		----------	----------	----------	----------	WAL04-13411-00
29	Body NPT Ends	Steel	WAL04-12979-00	WAL04-12920-00	WAL04-13063-00	WAL04-13097-00	WAL04-13196-00
		Bronze	WAL04-13849-00	WAL04-13850-00	WAL04-13851-00	WAL04-13852-00	WAL04-13853-00
		316 Stainless steel	WAL04-13576-00	WAL04-13580-00	WAL04-13584-00	WAL04-13588-00	WAL04-13592-00
		Steel	WAL04-13596-00	WAL04-13600-00	WAL04-13604-00	WAL04-13608-00	WAL04-13612-00
	Body Flanged Ends	316 Stainless steel	WAL04-13579-00	WAL04-13583-00	WAL04-13587-00	WAL04-13591-00	WAL04-13595-00
		Steel	WAL04-13599-00	WAL04-13603-00	WAL04-13607-00	WAL04-13611-00	WAL04-13617-00
	Flange Slip-on 150#	Steel	WAL04-13628-00	WAL04-13631-00	WAL04-13634-00	WAL04-13637-00	WAL04-13640-00
	Flange Slip-on 300#		WAL04-13629-00	WAL04-13632-00	WAL04-13635-00	WAL04-13638-00	WAL04-13641-00
	Flange Slip-on 600#		WAL04-13630-00	WAL04-13633-00	WAL04-13636-00	WAL04-13639-00	WAL04-13642-00
30	Retainer Ring	Steel	WAL04-14077-00	WAL04-14078-00	WAL04-14079-00	WAL04-14080-00	WAL04-14081-00
31	Stem Nut	Steel	WAL05-12972-00	WAL05-12972-00	WAL05-12972-00	WAL05-12972-00	WAL05-12972-00
32	Packing Nut	Stainless Steel	WAL04-12958-00	WAL04-12958-00	WAL04-12958-00	WAL04-12958-00	WAL04-12958-00
33	Lock Nut	Plated Steel	WAL04-12961-00	WAL04-12961-00	WAL04-12961-00	WAL04-12961-00	WAL04-12961-00
34*	V-Ring Packing Set	- - - -	WAL07-12932-01	WAL07-12932-01	WAL07-12932-01	WAL07-12932-01	WAL07-12932-01
35*	Braided TFE/Graph Package Set	- - - -	WAL07-12933-00	WAL07-12933-00	WAL07-12933-00	WAL07-12933-00	WAL07-12933-00
36*	High Temperature Graph Package Set	- - - -	WAL07-12936-00	WAL07-12936-00	WAL07-12936-00	WAL07-12936-00	WAL07-12936-00

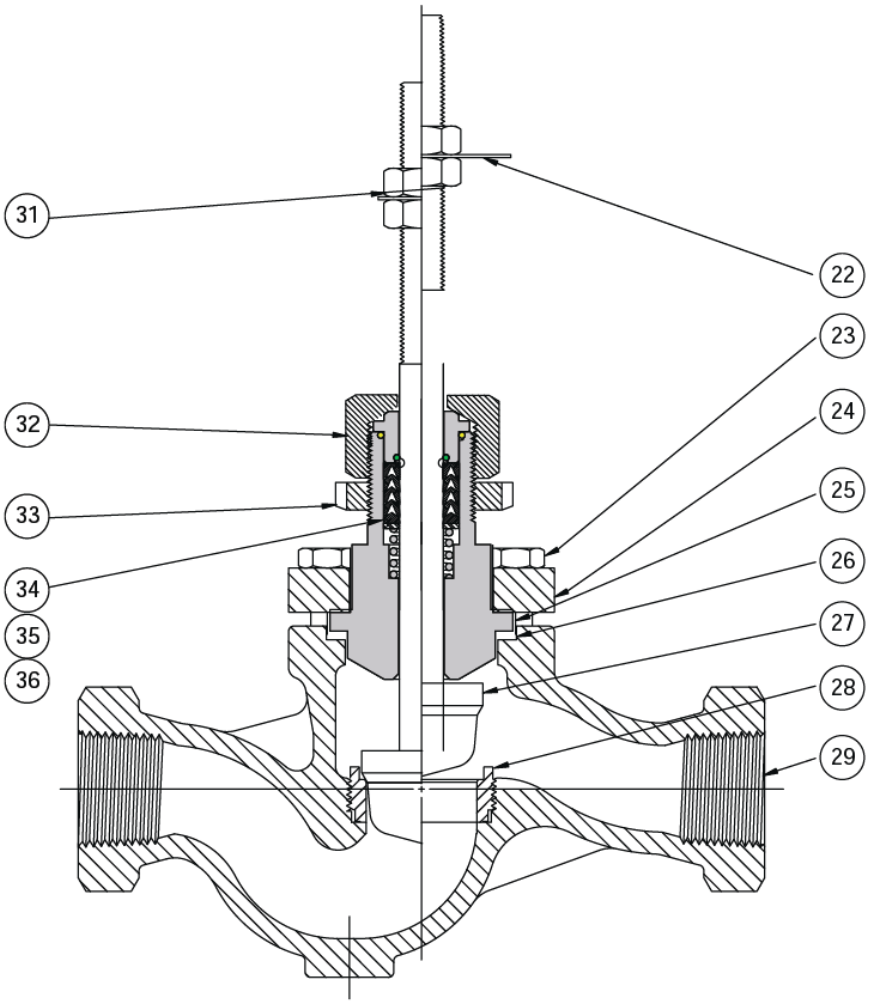


Figure 4. *Valve Body Assembly*

Parts List

Valve Body Assembly (See Table 2 and Figures 4 to 6)

Actuator Parts

Key	Description	Part Number
	Repair Part Kit	
	36 sq.in. / 0.02 sqm	WAL51447
	60 sq.in. / 0.04 sqm	WAL51448
	Actuators and Spring Kit	See Table 3
1	Vent Plug, High-density polyethylene	
2	Upper Casing, Steel/powder	
3	Springs, Steel	
3A	Spring Retainer. 12 required, Steel	
4	Casing Bolt, Regular, 10/14 required, 304 Stainless steel	
5	Casing Nut, 12/16 required, 316 Stainless steel	
6	Lower Casing, Steel/powder	
7	Bushing, Bronze	
8*	Oring, Nitrile	
9	Yoke, Cast Iron/Powder	
10'	Stem Nut, Steel	
11*	Stem Washer, 316 Stainless steel	
12*	Seal Washer, Steel	
13	Piston, 316 Stainless steel	
14	Casing Bolt, Long, 2 required, 304 Stainless steel	
14A[1]	Casing Bolt. Long, 2 required, Zinc-plated steel	
15*	Diaphragm, Nitrile	
16	Actuator Stem, 303 Stainless steel	
17	Machine Screw, 3 required, Steel	
18	Casing Gasket, Nitrile	
19	Machine Screw, 2 required, Steel	
20	Indicator Scale, Aluminum	
21	Specification Plate, Aluminum	

*These parts furnished in Actuator Repair Kit.
1. For spring range 10 to 15 psi / 0.69 to 1.03 bar on 36 sq. in. / 0.02 sqm actuator and 12 to 15 psi / 0.83 to 1.03 bar on 60 sq. in. / 0.04 sqm actuator.

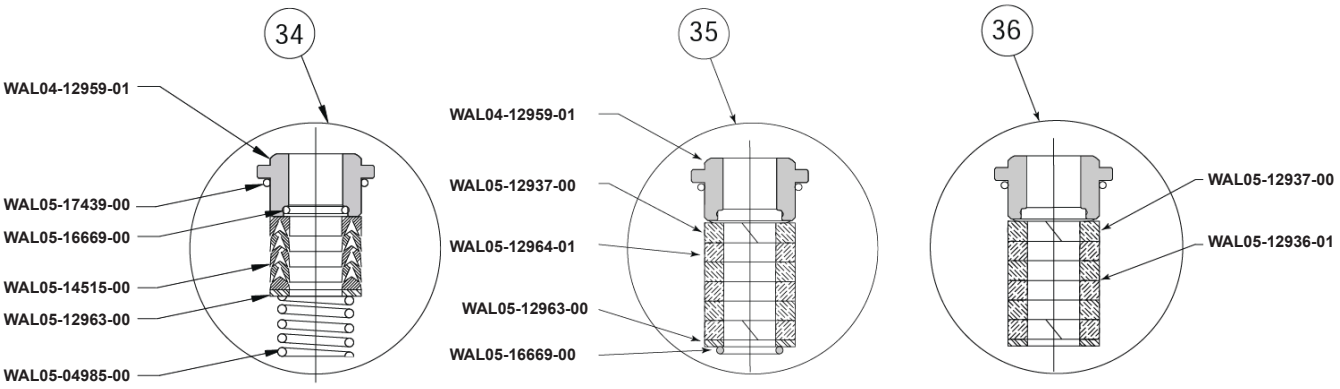


Figure 5. *Packing Assembly*

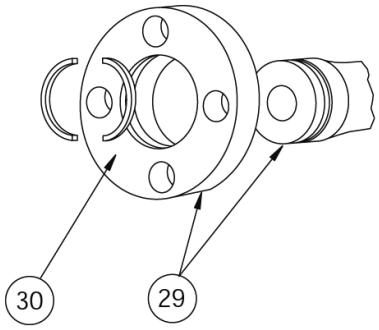


Figure 6. *Slip-on Flange Assembly*

Table 3. *Actuator, Spring Kit and Spring Part Numbers*

ACTUATOR ASSEMBLY	SPRING KIT PART NUMBER	BENCH RANGES		SPRINGS			BOLT (2)
		Reverse	Direct	Quantity	Part Number	Color	
36RC-ASM(1)	WAL36RC	5 to 15	3 to 13	6	WAL05-13090-01	Red	- - - -
36RD-ASM(1)	WAL36RD	8 to 15	3 to 10	4	WAL05-13090-01	Red	- - - -
36RE-ASM	WAL36RE	10 to 15	- - - -	6	WAL05-13085-00	Green	5-04889-0
36DE-ASM	WAL36DE	- - - -	3 to 5	3	WAL05-13087-00	Green	- - - -
60RG-ASM(1)	WAL60RG	8 to 15	3 to 11	6	WAL05-13093-01	Brown	- - - -
60RH-ASM(1)	WAL60RH	10 to 15	3 to 8(2) or 3 to 10(3)	4	WAL05-13093-01	Brown	- - - -
60RJ-ASM	WAL60RJ	12 to 15(2) or 11 to 15(3)	- - - -	6	WAL05-13097-00	Black	5-04889-0
60RK-ASM	WAL60RK	20 to 60	- - - -	6	WAL05-13094-00	Gray	- - - -
60RL-ASM	WAL60RL	20 to 60	- - - -	6	WAL05-13095-00	Blue	- - - -
				6	WAL05-13096-00	Blue	- - - -

1. Includes both J and K Valve travel scales.
2. 3/4 in. / 19.1 mm travel
3. 1-1/16 in. / 27 mm travel

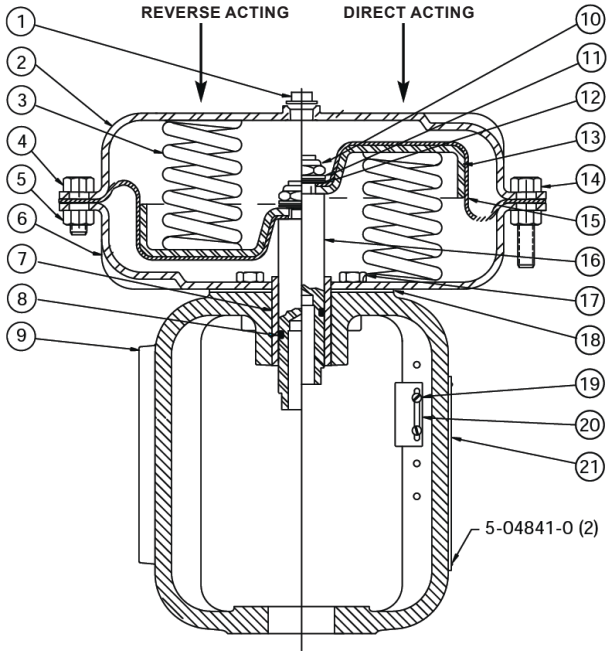


Figure 7. *Actuator Assembly*

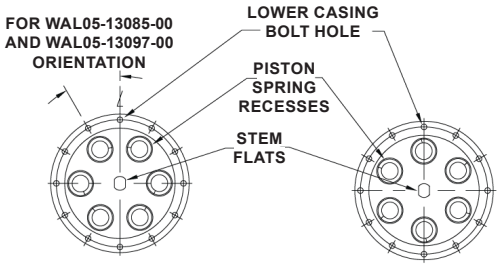


Figure 8. *Piston Diaphragm Assembly*

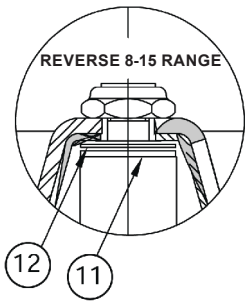


Figure 9. *Stem Assembly,*
Reverse 8 to 15 psi / 0.55 to 1.03 bar Spring Range Only

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