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**PRODUCT OVERVIEW**

This document covers the installation, operation and maintenance of the Series 3800 E-Ball Rotary Control Valves presented in the "Series 3800 Product Specification". The 3800 Series Rotary Globe Control Valve incorporates the time-tested and proven Segmented Ball-Eccentric Geometry design (E-Ball), combining exceptionally tight control and rangeability (100:1), with superior trim wear characteristics inherent with the eccentric design. Available as completely automated valve assemblies with the highest quality actuators and accessories or as bare stem product ready for your automation needs, the 3800 Series comes in a wide variety of standard options for body/trim materials and construction

builds, from Class IV to Class VI shut off. The ever-popular TTZ Ceramic Trim is an off-the-shelf choice for erosive or corrosive fluids and a vast array of custom alloys can be selected for custom construction, engineered to your specific application needs. The 3800 can flow in the forward direction, flow-to-open; or reverse direction, flow-to-close. The 3800 is available in a thru-shaft or split-shaft configuration. These features allow for maximum flexibility in matching benefits to your application. The 3800 offers a large combination of preferred piping positions and acceptable actuator orientations to provide maximum flexibility in mounting the valve in the piping.

GENERAL INFORMATION

The instructions given herein cover generally the operation and maintenance of subject equipment. Should any questions arise which may not be answered specifically by these instructions, they should be referred to Warren Controls Inc. for further detailed information and technical assistance. This manual cannot possibly cover every situation connected with the operation, adjustment, inspection, test, overhaul and maintenance of the equipment furnished. Every effort is made to prepare the text of this manual

so that engineering and design data is transformed into the most easily understood wording. Warren Controls Inc., in furnishing this equipment and this manual, must presume that the operation and maintenance personnel assigned thereto have sufficient technical knowledge and experience to apply sound safety and operational practices which may not be covered herein. In applications where Warren Controls Inc. furnished equipment is to be integrated with a process or other machinery, these instructions should be

GENERAL INFORMATION (CONTINUED)

thoroughly reviewed to determine the proper integration of the equipment into the overall plant operational procedures. Warren Controls does not assume responsibility for the selection, use, or

maintenance of any product. Responsibility for proper selection, use, and maintenance of any Warren Controls product remains solely with the purchaser and end-user.

ACTUATORS AND ACCESSORIES

Series 3800 E-Ball Rotary Control Valves are available with a variety of actuators and accessories. These actuators and accessories have separate instructions. For complete control valve installation,

operation, and maintenance instructions see also the instructions for the actuator and accessories in use.

VALVE IDENTIFICATION

To use these instructions it is necessary to identify the configuration of the valve. Factory assembled control valves with a pneumatic or electric actuator have a serial number label attached to the actuator. The valve's part number (P/N) is present on the label. The part number represents the configuration of the control valve. To identify the valve's type, size, actuator, accessories, and other characteristics

decode the part number using the configuration table in the Series 3800 Product Specification. If the information is incomplete, incorrect, or not present contact the factory with the valve serial number. (See [Information Present on Control Valves](#) or [Information Present on Bare Stem Valves](#) section for location of important information on valves.)

VALVE BODY											
Model	Size	Body Material	End Conn.	Trim Material	Trim Cv	Shaft Design	Shaft Mat'l.	Bearing & Seals	Packing	Flow Dir.	
385 1"-2" Bodies (EN ISO 5211-F07-N-L-11*)	100 1 inch	W WCB	F 150 lb. Flanged	S 316 SS	F Full Port	C Thru, Direct	S 17-4 Hard	S PEEK	T Teflon V-ring Self Adjusting	0 None	
	150 1-1/2 in.	F CF8M		T TFE Soft Seats*							1 1st Port Reduction
386 3" Bodies (EN ISO 5211-F07-N-L-14*)	200 2 inch		G 300 lb. Flanged	P PEEK Soft Seats*	2 2nd Port Reduction	D Thru, Indir.	I Inconel	T PEEK w/ Fluoraz Seal	G Adjustable Graphite Indir Mtg & Alloy 6 Brngs	2 Flow to Open	
	300 3 inch			6 Alloy 6 w/ 316 SS Seat Retainer							E Split, Direct
387 4" Bodies (EN ISO 5211-F07/F10-N-L-17*)	400 4 inch			H Alloy 6 w/17-4 Seat Retainer	3 3rd Port Reduction	E Split, Direct		Y Alloy 6 w/ Fluoraz Seal	A Adjustable Teflon V-Ring Indir Mtg	NOTE: "0" Not allowed on Actuated Valve	
	600 6 inch			Z TTZ Ceramic w/316 SS Seat Retainer							F Split, Indir.
388 6" or 8" Bodies (EN ISO 5211-F10-N-L-22*)	800 8 inch			R TTZ Ceramic w/17-4PH Seat Retainer				ST PEEK Brngs; Self-Adj Teflon Pkg to 450F			
				Y Y-TZP Ceramic (Ceramic Seat, Sleeve & Plug)							SJ PEEK Brngs; Adj Graphite Pkg (Requires Indir Shaft) to 450F
389 6" or 8" Bodies (EN ISO 5211-F12-N-L-22*)								SA PEEK Brngs; Adj Teflon Pkg (Requires Indir Shaft) to 450F			
											6G Alloy 6 Brngs; Adj Graphite Pkg (Requires Indir Shaft) to 800F
*ISO 5211-2001 Designations											
Actuator / Valve Compatibility:											
PNEUMATIC RACK & PINION	VALVE MODEL	VALVE SIZE									
073 Size RP73	385	1" - 2"									
	386	3"									
103 Size RP103	385	1" - 2"									
	386	3"									
148 Size RP148	385	1" - 2"									
	386	3"									
	387	4"									
	388	6" & 8"									
222 Size RP222	385	1" - 2"									
	386	3"									
	387	4"									
	388	6" & 8"									
295 Size RP295	385	1" - 2"									
	386	3"									
	387	4"									
	388	6" & 8"									
470 Size RP470	387	4"									
	388	6" & 8"									
586 Size RP586	387	4"									
	388	6" & 8"									
900 Size RP900	389	6" & 8"									
999 Size RP1213	389	6" & 8"									

ELECTRIC 120VAC	VALVE MODEL	VALVE SIZE
EA3 Size P2	385	1" - 2"
	386	3"
	387	4"
EB3 Size P3	386	3"
	387	4"
E04 Size P4	388	6" & 8"
E05 Size P5	388	6" & 8"
E06 Size P6	388	6" & 8"

*TFE & PEEK Soft Seats require Flow-to-Close flow direction

SG, 6J, 6T, 6A, TG, YT, YJ, YA Not Available

ACTUATOR **ACCESSORIES**

Actuator Series	Action	Fail Mode	Declutch. Gear Op.	Positioners & Limit Switches
000 None	0 None, or Gear Op.	0 None or Gear Op.	0 None	0000 None
PNEU. RACK & PINION			1 GOW02	POSITIONERS:
073 Size RP73	SINGLE ACTING W/ SPRING RETURN	PNEUMATIC	2 GOW06	2xP VAC Pneumatic
103 Size RP103			3 GOW09	2xE VAC ElectroPneumatic
148 Size RP148			4 GOW12	2xI VAC ElectroPneu. Intrn. Safe
222 Size RP222			5 GOW16	2xX VAC ElectroPneu. Exp. Proof
295 Size RP295			NOTE: Only for use as Accessory to Pneumatic R&P Actuator.	2xF VAC ElectroPneu. Fail Freeze
470 Size RP470	4 8 Springs	ELECTRIC		TOZO ABB TZIDC 4-20mA *
586 Size RP586	5 10 Springs		THN ABB TZIDC 4-20mA w/HART Intrn. Safe & Non-Incend *	
900 Size RP900	6 12 Springs		TPN ABB TZIDC PROFIBUS PA Intrn. Safe & Non-Incend.	
999 Size RP1213	ELECTRIC		TFN ABB TZIDC FOUNDATION Fieldbus Intrn. Safe & Non-Incend.	
MANUAL GEAR OP:	M Modulating		2 20mA to Open, Signal Loss Closed	THX ABB TZIDC 4-20mA w/HART Exp. Proof *
G30 Size G0-30 w. 12" HW (1"-4")	T On-Off	3 20mA to Close, Signal Loss As Is	TPX ABB TZIDC PROFIBUS PA Exp. Proof	
G50 Size G0-50 w. 12" HW (6")		4 20mA to Open, Signal Loss As Is	TFX ABB TZIDC FOUNDATION Fieldbus Exp. Proof	
G51 Size G0-50 w. 18" H (8")			LIMIT SWITCHES:	
ELECTRIC 120VAC:			PX21 Mark 4 Series- 2 ea. SPDT w/Indication	
EA3 Size P2				
EB3 Size P3				
E04 Size P4				
E05 Size P5				
E06 Size P6				

See Key Below

* Available with split ranges, select "S" in Special Options.

x digit spec.
F Full Range Signal, 3-15 PSI or 4-20mA (Factory Default)
L Low of Split Range, 3-9 PSI or 4-12mA
H High of Split Range, 9-15 PSI or -20mA
VAC 4th digit spec.
0 No Additions
L w/Mech. Lmt Swtch's
F w/4-20 Feedback
B w/Swtch's & Feedbck
<i>NOTE: L,F,B not available for 2xl, 2xX.</i>
TZIDC 4th digit spec.
Individual Options
0 No Additions
F w/4-20 Feedback Module (4-20mA w/HART Models ONLY)
K w/Digital Position Feedback Module (4-20mA w/HART Models ONLY)
L w/24VDC/AC Micro-Switch's (Exp. Proof Models ONLY)
P w/Proximity Switch's NC
Option Combinations (For 4-20mA w/HART Models ONLY)
A = F & K
B = F & L (Exp. Proof Mod. ONLY)
C = F & P
E = K & L (Exp. Proof Mod. ONLY)
G = K & P
J = F & K & L (Exp. Proof Mod. ONLY)
M = F & K & P
<i>See Actuators, Positioners, & Accessories - Section of Product Specification for details.</i>

Note:
Yellow & Black raised beacons are standard.
Red & Black is a special order option for VAC.

Air Filter Regulators	ASCO Solenoids	Special Options
0 None	0 None	0 None
B Type 300 0-60 PSI	120 VAC Coils: C 8320G704 3-Way Brass	S Special Opt's or Set-Up
C Type 300 0-120 PSI	D 8320G714 3-Way SS	T SS Tubing
D Type 300SS 0-100 PSI	N EF8320G704 3-Way EXP Br.	G SS Tagging
	P EF8320G714 3-Way EXP SS	B SS Tubing and Tagging
	24 Vdc Coils: 2 EF8320G704 3-Way EXP Br.	

*Fail Last Position
Note: All solenoids are direct mounted.

NOTE:

- Standard pneumatic tubing is copper. SS tubing "T" is optional.
- SS tagging "G" (Two lines, 24 characters/line) is optional.
- SS tubing and tagging together "B" is optional.
- Actuator Orientation "1", "2" or "3" is optional.
- Special Options or Set-Up "S"- Use this code to identify custom bodies, trim, non-default set ups, etc. not identified by another code. The description of the special option or set-up and complete process conditions must be present on the purchase order.
- If your application requires a special option or set-up contact factory for details.

Codes & Descriptions (Codes shown in bold)		
Valve Model *ISO 5211-2001 Designations	Actuator Series	Max Air Declutchable Gear Operator
385 1" - 2" Bodies (EN ISO 5211-F07-N-L-11*)	073 RP73, 103 RP103, 148 RP148, 222 RP222 & 295 RP295	1 GOW02
386 3" Bodies (EN ISO 5211-F07-N-L-14*)	073 RP73 & 103 RP103	1 GOW02
	148 RP148, 222 RP222 & 295 RP295	2 GOW06
387 4" Bodies (EN ISO 5211-F07/F10- N-L-17*)	148 RP148, 222 RP222 & 295 RP295	2 GOW06
	470 RP470 & 586 RP586	3 GOW09
388 6" or 8" Bodies (EN ISO 5211-F10-N-L-22*)	148 RP148, 222 RP222 & 295 RP295	2 GOW06
	470 RP470 & 586 RP586	4 GOW12
389 6" or 8" Bodies (EN ISO 5211-F12-N-L-22*)	900 RP900 & 999 RP1213	5 GOW16

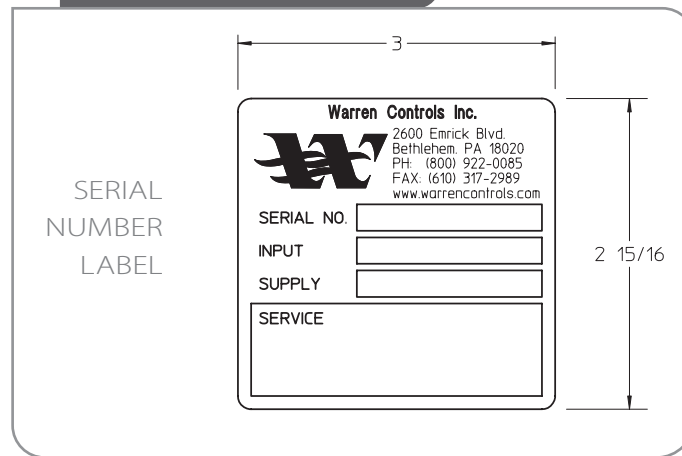
Warren Controls does not assume responsibility for the selection, use, or maintenance of any product. Responsibility for proper selection, use, and maintenance of any Warren Controls product remains solely with the purchaser and end-user.

INFORMATION PRESENT ON CONTROL VALVES

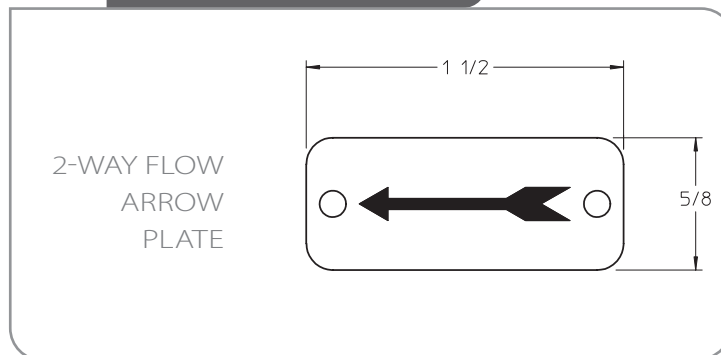
There is a great deal of information present on each control valve ranging in importance from the part number and serial number to the color of the paint and casting numbers. This information is important for identifying the valve, installing it correctly, and obtaining parts. Examples of the current factory nameplates and flow arrow plate used on Series 3800 control valves are shown here. The ac-

companying table identifies the information present and where to find it on the control valve. There may also be other casting numbers and foundry marks present that do not provide useful information. Customer specific tagging may also present. The plates used, and information present, on Warren Controls other product lines or older valves may be different, contact the factory for details.

ACTUATOR NAMEPLATES




FLOW ARROW PLATES




INFORMATION PRESENT ON BARE STEM VALVES

Information is present on each valve ranging in importance from the serial number to the color of the paint and casting numbers. This information is important for identifying the valve, installing it correctly, and obtaining parts. The accompanying table identifies the information present and where to find it on the valve. Flow arrow plates are supplied for field insulation on the valve.

INFORMATION PRESENT ON CONTROL VALVE SERIES 3800

Information	Symbol(s)	Location	Notes
Part number (Configuration)	P/N	On actuator	• On Serial Number Label attached to actuator.
Serial number	SERIAL NO. or S/N	On actuator and valve body	<ul style="list-style-type: none"> • On Serial Number Label attached to actuator. • Sales order number only stamped on top of raised cast surface on valve body between end connections (1, 1-1/2 & 2 inch 3800)* • Sales order number stamped on bottom of valve body bottom cover (3 through 8 inch 3800)* * Number stamped using approximately 1/8 inch tall characters
FLOW DIRECTION			
Information	Symbol(s)	Location	Notes
Flow direction through valve		On valve body	<ul style="list-style-type: none"> • On Flow Arrow Plate attached to valve body actuator mounting flange between the end connections.* *Valves that are factory assembled without an actuator of G Series handwheel do not have a factory installed flow arrow plate. A loose flow arrow plate is provided for field installation.
INPUT SIGNAL, SUPPLY & SERVICE			
Information	Symbol(s)	Location	Notes
Input signal	INPUT	On actuator	• On Serial Number Label attached to actuator.
Supply pressure	SUPPLY	On actuator	• On Serial Number Label attached to actuator.
Service	SERVICE	On actuator	• On Serial Number Label attached to actuator.
VALVE ATTRIBUTES			
Information	Symbol(s)	Location	Notes
Valve body material		On valve body	• If WCB is cast on the valve, and or the factory applied paint is gray, the valve body material is steel. If CF8M is cast on the valve the valve body material is 316 stainless steel.

INFORMATION PRESENT ON BARE STEM VALVE SERIES 3800

Information	Symbol(s)	Location	Notes
Serial number	N/A	On valve body	<ul style="list-style-type: none"> • Sales order number only stamped on top of raised cast surface on valve body between end connections (1 & 1-1/2" 3800)* • Sales order number only stamped on bottom of valve bottom cover (2 - 8" 3800)." * Number stamped using approximately 1/8 inch tall characters
FLOW DIRECTION			
Information	Symbol(s)	Location	Notes
Flow direction through valve		On valve body	<ul style="list-style-type: none"> • On Flow Arrow Plate attached to valve body actuator mounting flange between the end connections.* *Valves that are factory assembled without an actuator of G Series handwheel do not have a factory installed flow arrow plate. A loose flow arrow plate is provided for field installation.
Valve Attributes			
Information	Symbol(s)	Location	Notes
Valve body material		On valve body	• If WCB is cast on the valve, and or the factory applied paint is gray, the valve body material is steel. If CF8M is cast on the valve the valve body material is 316 stainless steel.

PERFORMANCE CHARACTERISTICS

BODY PRESSURE-TEMPERATURE RATINGS

BODY PRESSURE-TEMPERATURE RATINGS:				
Temp. (F)	150 FLG WCB	300 FLG WCB	150 FLG CF8M	300 FLG CF8M
+32° To 100°	285	740	275	720
150°	272	710	255	670
175°	266	695	245	645
200°	260	680	235	620
225°	252	673	230	605
250°	245	667	225	590
275°	237	661	220	575
300°	230	655	215	560
325°	222	650	210	548
350°	215	645	205	535
375°	207	640	200	526

BODY PRESSURE-TEMPERATURE RATINGS:				
Temp. (F)	150 FLG WCB	300 FLG WCB	150 FLG CF8M	300 FLG CF8M
400°	200	635	195	515
450°	185	620	182	497
500°	170	605	170	480
550°	155	587	155	465
600°	140	570	140	450
650°	125	550	125	440
700°	110	530	110	435
750°	95	505	95	425
800°	80	410	80	420

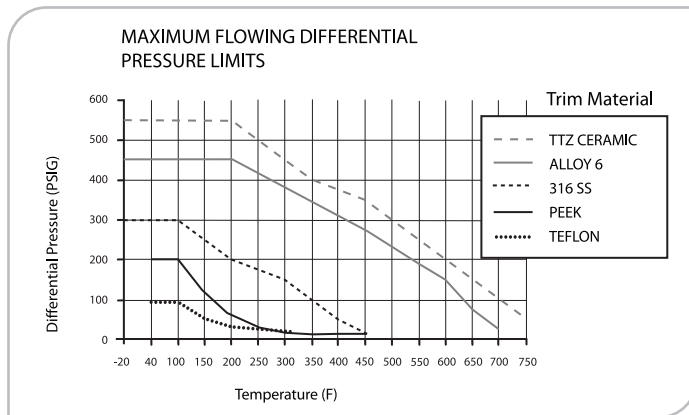
Body Pressure — Temperature Rating conform to ANSI based on body/flange rating and body material. As the fluid temperature increases, the maximum allowable internal pressure decreases. Verify maximum pressures and temperatures prior to selecting body material and body/flange rating.

Pressure ratings are PSIG
For applications below 32°F consult factory.

FLOWING DIFFERENTIAL PRESSURE

NOTE: Approaching limits for continuous use will reduce trim life. For continuous use, stay within half of rated maximum.

NOTE ON BEARINGS: PEEK Bearings should not be used for temperatures above 450°F or flowing differential pressure above 300 PSIG.



SEAT LEAKAGE CLASSES

3800 with Metal Seats in any flow direction or TTZ Ceramic Seats Flow-To-Open
ANSI Class IV

3800 with TTZ Ceramic Seats Flow-To-Close
Class IV+
Class IV+ is a proprietary designation of Warren Controls and is not an ANSI/FCI classification.

3800 with PEEK or TFE Soft Seats
ANSI Class VI

ALLOWABLE SEAT LEAKAGE CLASSES				
Leakage Relative Seat	Maximum Seat Leakage	Test Fluid	Test Pressure	Relative Seat Tightness
Class II	0.5% of rated CV	Water	45 to 60 PSI	1
Class III	0.1% of rated CV	Water	45 to 60 PSI	5
Class IV	0.01% of rated CV	Water	45 to 60 PSI	50
Class IV+	0.0015 ml/min/inch of trim size/ ΔP (PSI)	Water	Max Operating ΔP	150,000
Class V	0.0005 ml/min/inch of trim size/ ΔP (PSI)	Water	Max Operating ΔP	300,000
Class VI	Class VI about 0.9 ml/min*	Air	50 PSI	600,000

*Leakage rate varies by nominal port diameter, refer to the Standard ANSI/FCI 70.2.

INTERNAL CONFIGURATIONS VS MAX TEMP

Trim Material	Shaft Design	Bearing & Seals	Packing	Max Temp ¹
S 316 Stainless Steel Z TTZ Ceramic T TFE Soft Seats P PEEK Soft Seats 6 Alloy 6	C Thru Direct D Thru Indirect E Split Direct F Split Indirect	S PEEK T PEEK w/ Fluoraz 797 Seal	T Teflon V-ring	450°F
S 316 Stainless Steel Z TTZ Ceramic T TFE Soft Seats P PEEK Soft Seats 6 Alloy 6	D Thru Indirect F Split Indirect	S PEEK T PEEK w/ Fluoraz 797 Seal	J Graphite A Teflon V-ring	450°F
S 316 Stainless Steel Z TTZ Ceramic 6 Alloy 6	D Thru Indirect F Split Indirect	Y Alloy 6B w/ Fluoraz 797 Seal	G Graphite	500°F
S 316 Stainless Steel Z TTZ Ceramic 6 Alloy 6	D Thru Indirect F Split Indirect	6 Alloy 6B	G Graphite	800°F

¹For Maximum Temperatures see also Valve Body Pressure-Temperature Ratings and Actuator Temperature Ratings

DIMENSIONS & WEIGHTS

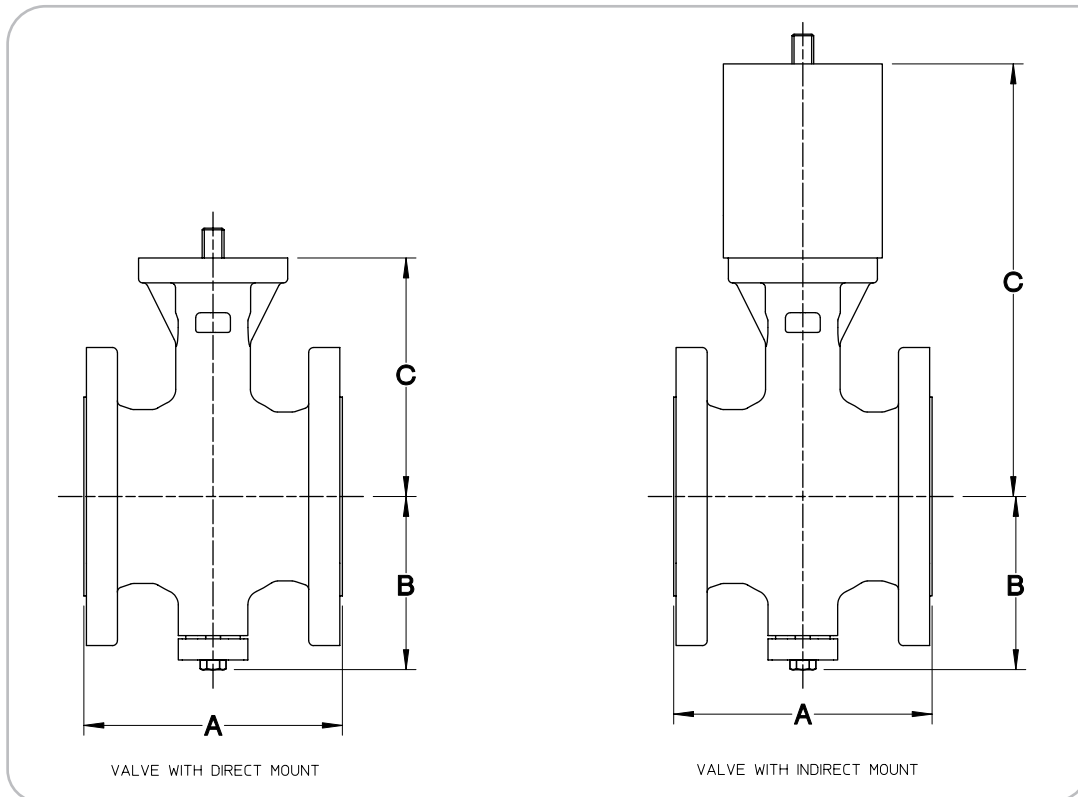
(See also Flange Sizes and Patterns section in the Series 3800 Product Specification)

DIMENSION (IN)		VALVE SIZE (IN)						
		1	1-1/2	2	3	4	6	8
A	150FLG	4	4-1/2	4-7/8	6-1/2	7-5/8	9	9-9/16
	300FLG	4	4-1/2	4-7/8	6-1/2	7-5/8	9	9-9/16
B		2-7/8	3-1/4	3-5/8	4-1/2	5-3/8	6-5/8	7-3/4
C	DIRECT MTG	4-3/4	5	5-1/8	6-1/8	7-1/8	8-5/8	10-1/8
	INDIRECT MTG	9-5/8	9-7/8	10	11	14	15-1/2	17

FACE TO FACE DIMENSIONS CONFORM TO ANSI/ISA S75.04

VALVE SIZE (IN)	WEIGHT (LB)			
	DIRECT MTG		INDIRECT MTG	
	150FLG	300FLG	150FLG	300FLG
1	20	22	29	31
1-1/2	23	30	32	39
2	20	25	29	34
3	35	50	44	59
4	55	80	76	101
6	100	140	121	161
8	145	200	166	221

ACTUAL SHIPPING WEIGHTS MAY VARY





Check valve for any damage due to improper storage or transportation. Immediately notify your sales organization of any damaged goods upon receipt. Do not attempt to move or disturb the valve further so photos may be taken. If the shipping container is noticeably damaged refuse receipt, as the shipping company should be held liable until a shipping representative is available to take photos.

See also separate actuator and accessory instructions for additional installation guidelines.

- Series 3800 E-Ball Rotary Control Valves are manufactured to order for a specific set of process conditions. Warren Controls, Inc. maintains all original process information that each valve was manufactured to. This information is readily available with the valve serial number. Contact the appropriate department to verify 800-922-0085.
- Be sure that the fluid pressure, temperature, flow, and flowing differential pressure will not exceed the limits of the valve. (See the Body Pressure-Temperature Ratings, Internal Configurations vs. Max Temp, and Flowing Differential Pressure Limits sections).
- Be sure that the ambient temperature of the selected location will not exceed the maximum temperature of the actuator or accessories. Information can be found in the Product Specification regarding these limits.
- Follow good piping practices. Install a bypass around the valve. Install stop valves in inlet and outlet piping to provide means to isolate valve.
- Provide proper inlet and outlet drainage in steam service to prevent water hammer or possible erosion in equipment.
- Install gauges in inlet and outlet piping to provide means for checking adjustment and operation.
- For maximum efficiency and minimum wear install valve in a preferred position. (See Piping Orientation and Actuator Mounting, Orientation, & Flow Direction sections in the Product Specification for preferred positions).
- Be sure to leave clearance to allow for actuator removal (See Dimensions & Weights section in 3800 Product Specification for actuator removal clearance).

- Before installing, be sure valve and piping are clean inside and free of scale, chips, welding spatter, and foreign material. Thoroughly blow out or flush pipe lines.
- The valve must be installed with the fluid flowing in the correct direction. For proper operation in all applications, control valves must be piped according to the corresponding flow arrow present on each valve (See [Information Present on Control Valves](#) section for location of important information on valve). Pipes must be aligned squarely with the valve at each connection.
- Tighten flange bolts evenly to prevent excessive stress and the possibility of uneven sealing.
- The valve, actuator, and accessories (if so equipped) are assembled, tested, and calibrated at the factory. The actuator serial number label specifies set-up parameters used (See [Information Present on Control Valves](#) section for location of important information on valve). Do not exceed the supply pressure listed on the serial number label or you will damage the valve and void the warranty.
- Supply air, instrument signal, and accessories should be connected to ports or terminals as indicated on the control valve.
- Final tuning may be required under actual operating conditions.
- On critical or dangerous equipment, provide suitable safety and emergency systems to protect personnel and property from injury due to a valve malfunction. If the valve handles flammable, toxic, corrosive or explosive fluids, provide for safety in the event of valve leakage or malfunction.
- Do not obscure flow arrow plates or serial number labels with paint. If flow arrow plates will be covered with insulation, it is recommended the information on the plates be transcribed on the outside of the insulation in the same location as the plate.

OPERATION

- Close inlet and outlet stop valves.
- Check that valve responds through rated travel in relation to changes in input signal. Rated travel is shown by position of travel indicator on top of actuator.
- For valves fitted with handwheel, manually operate valve through rated travel to check freedom of movement. Return handwheel to its standby position.
- Place valve in operation.

ACTUATOR INSTALLATION ON, AND REMOVAL FROM, VALVE

See also:

- [Shut-off Classes](#), [Rated Torques](#), and [Actuator Interface](#) sections in the Series 3800 Product Specification
- Separate instructions supplied by actuator manufacturer

ACTUATOR INSTALLATION

- 1) Isolate valve body if already installed in piping.
- 2) Top of valve shaft has line that indicates plug position. Valve is open when line is parallel to pipeline, valve is closed when line is across the pipeline. Turn valve shaft CCW (looking down on shaft) until plug is in full open position. Note shaft location. Shaft adapter must be on valve shaft.
- 3) Operate actuator to full open position.
- 4) Position actuator in desired orientation.
- 5) Place actuator over valve shaft and onto valve. Shaft must be in full open position.
- 6) Install fasteners in actuator base hand tight. Twist actuator CW (looking down on actuator) to take play out of actuator mounting in the closing direction, then tighten fasteners to secure actuator to valve.
- 7) Operate actuator to open and close valve and check that valve responds through rated travel in relation to changes in input signal.
- 8) If isolated, return line pressure to valve and check operation.

ACTUATOR REMOVAL

- 1) Isolate valve body if already installed in piping.
- 2) Operate actuator so valve is in full open position.
- 3) Remove fasteners holding the actuator to valve.
- 4) Remove actuator from valve. Shaft adapter must remain on valve shaft.

Series 3800 E-Ball Rotary Control Valves are for the most part maintenance free when properly selected and installed. Rebuilding of these valves should not be necessary under normal operating conditions. For best operation follow installation guidelines (See [Installation](#) section); maintain the fluid pressure, temperature, flow, flowing differential pressure, and shut-off differential pressure within the limits of the valve (See [Series 3800 Product Specification](#) for details). In installations where high vibration exists, pneumatic and/or electrical connections should periodically be checked for integrity. Control valve hunting will cause excessive stroking of the valve stem. The system must be stabilized to prevent hunting to ensure reasonable packing life and optimal control performance. Oversizing of a control valve will result in an unstable condition, which can cause noise, vibration, and premature trim and packing seal failure. The use of Warren Controls ValveWorks sizing program will

facilitate the selection of the optimum valve.

RP Pneumatic Rack & Pinion Actuators are for the most part maintenance free when properly selected and installed. Rebuilding of the actuator should not be necessary under normal operating conditions. For best operation follow installation guidelines (See [Installation](#) section), maintain the ambient temperature within the limits of -10F to 195F, and maintain a clean dry oil-free air supply. Damaged or worn actuator seals can cause poor response to the air signal, increased hysteresis, and poor shut-off by allowing air pressure to leak from the actuator. Damaged or worn actuator seals can also allow dirt and contaminants to enter the actuator shortening its life. Should the seals become damaged or worn an actuator seal kit is available. Contact the factory for details. To ensure getting the correct parts, please provide the valve's serial number.

PACKING ADJUSTMENT

Series 3800 E-Ball Rotary Control Valves have either self-adjusting packing or adjustable packing. Valves with Packing Type T Teflon V-ring, have self-adjusting packing and require no external adjustment. Properly maintained, the typical life expectancy of this packing type exceeds five years. If the valve has self-adjusting packing and a packing leak is observed replace the packing and if necessary the stem and plug assembly.

Valves with Packing Type G Graphite, J Graphite, or A Teflon V-ring have adjustable packing. If a packing leak is observed, tighten the hex nuts above the packing flange ¼ turn and observe. If the leak continues tighten the hex nuts another ¼ turn and observe. Repeat as necessary. If the leak continues and the hex nuts cannot be tightened further with reasonable force replace the packing and if necessary the stem and plug assembly. Over tightening the hex nuts may create excessive friction between the packing and the valve shaft causing sticking and poor control.

PARTS/ OVERHAUL

Damaged or worn valve parts can decrease performance and shorten valve life.

Damaged or worn packing parts including the packing, spring, bearings, and surrounding parts can cause a packing leak resulting in damage to the actuator, accessories, and nearby equipment. Damaged or worn packing parts can also cause increased hysteresis resulting in poor control.

Damaged or worn trim parts including the plug, plug face, seat ring, seat retainer, shaft, bearings, bearing seals, and drive pin can cause increased hysteresis, poor control, excessive internal leakage, and poor shut-off. Damaged or worn trim parts can also cause damage to the packing parts resulting in a packing leak.

Damaged or worn body gaskets or o-ring seals can cause external leakage resulting in damage to the actuator, accessories, and nearby equipment.

Should parts become worn or damaged, parts kits are available. Repack Kits are available to replace the packing. Rebuild/Repack Kits are available to completely rebuild/ overhaul the valve. Warren Controls recommends that the rebuilding of 3800 series valves be performed at the factory by qualified technicians with access to any required special tools and techniques. Parts kits come with complete step-by-step instructions. Each kit has its own part number. Please provide the valve's serial number to ensure getting the correct kit part number, correct parts, and correct instruction document.

REPACK KITS

PACKING TYPE T REPACK KIT INCLUDES

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
2	1	RETAINING RING	6	1	PACKING SPACER
3	1	PACKING RETAINER	7	1	PACKING SPRING
4	1	SLEEVE BEARING		1	TUBE STEM LUBE
5	1	V-RING PACKING SET			

REPACK KIT INSTRUCTION DOCUMENT NO. 9250066

PACKING TYPE G REPACK KIT INCLUDES

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
26	2	HEX HEAD CAPSCREW	33	2	YARN PACKING
27	1	PACKING FLANGE	34	3	RING PACKING
28	1	ADJUSTABLE PACKING RETAINER	35	1	PACKING SPACER
32	2	HEX NUT		1	TUBE STEM LUBE

REPACK KIT INSTRUCTION DOCUMENT NO. 9250058

PACKING TYPE J REPACK KIT INCLUDES

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
26	2	HEX HEAD CAPSCREW	33	2	YARN PACKING
27	1	PACKING FLANGE	34	3	RING PACKING
28	1	ADJUSTABLE PACKING RETAINER	35	1	PACKING SPACER
32	2	HEX NUT		1	TUBE STEM LUBE
4	2	SLEEVE BEARING			

REPACK KIT INSTRUCTION DOCUMENT NO. TBD/CF

PACKING TYPE A REPACK KIT INCLUDES

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
26	2	HEX HEAD CAPSCREW	5	1	V-RING PACKING SET
27	1	PACKING FLANGE	4	2	SLEEVE BEARING
28	1	ADJUSTABLE PACKING RETAINER	35	1	PACKING SPACER
32	2	HEX NUT		1	TUBE STEM LUBE

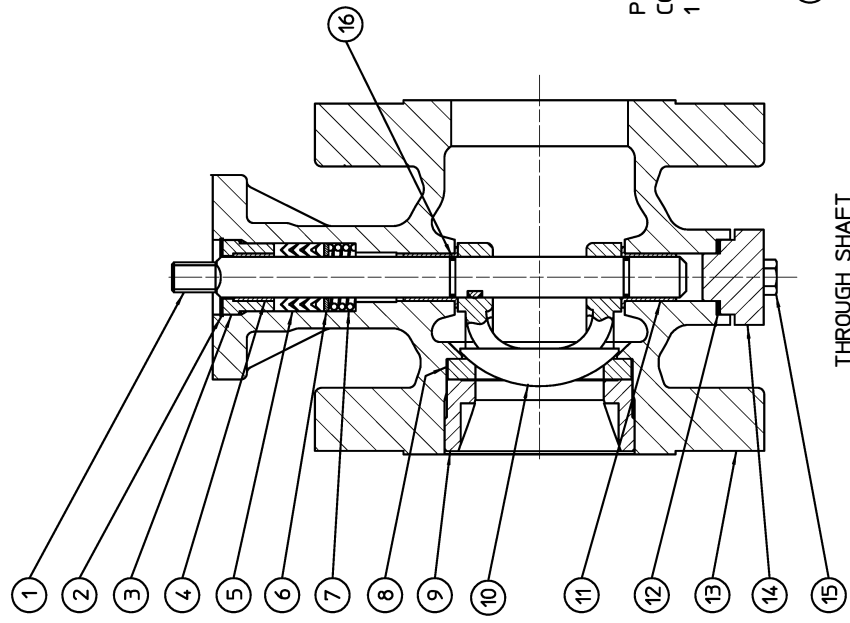
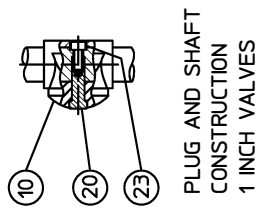
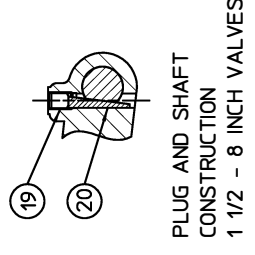
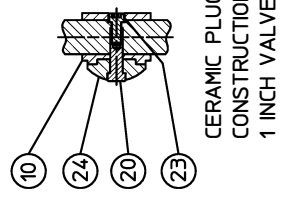
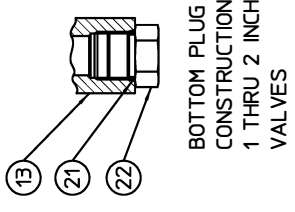
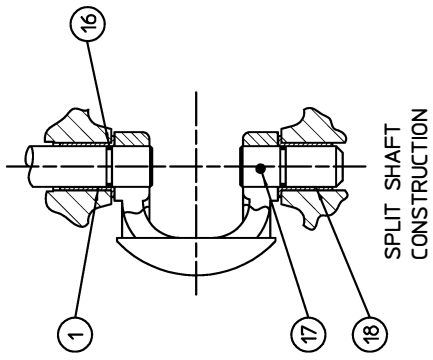
REPACK KIT INSTRUCTION DOCUMENT NO. 9250066

REBUILD / REPACK KITS

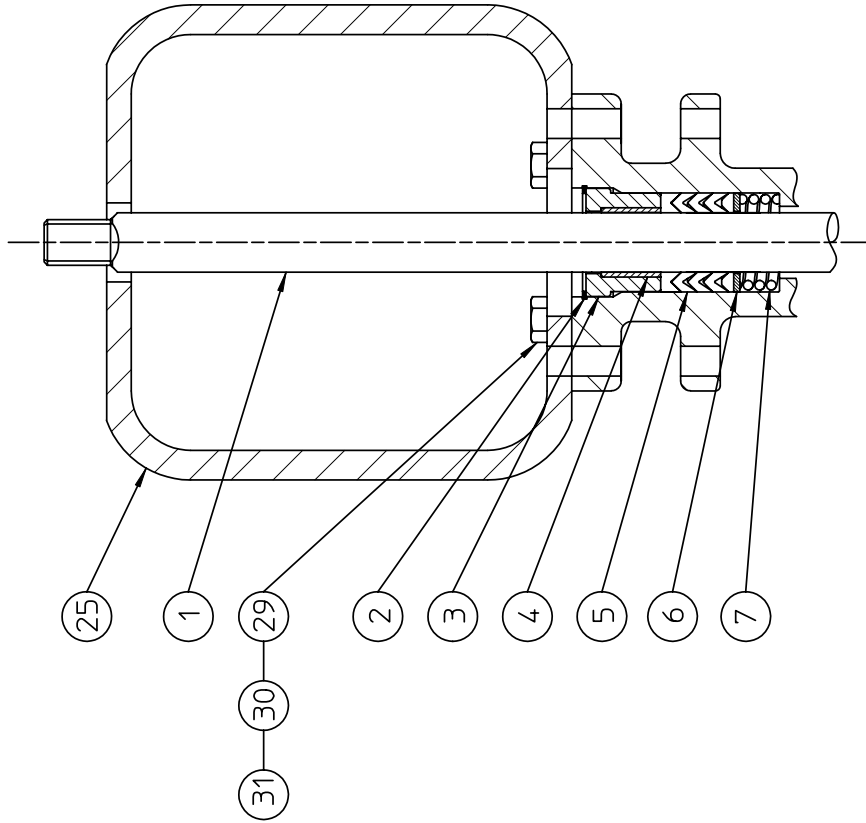
SERIES 3800 REBUILD / REPACK KITS INCLUDE					
ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
1	1	VALVE SHAFT / UPPER SHAFT	18	1	LOWER SHAFT (if required)
8	1	SEAT RING	19	1	SET SCREW
9	1	SEAT RETAINER	20	1	DRIVE PIN
10	1	PLUG	21	1	O-RING (Valve size 1, 1-1/2 & 2 inch)
11	2	SHAFT BEARING	23	1	SOCKET HEAD CAPSCREW (Valve size 1 inch)
12	1	GASKET (Valve sizes 2 thru 8 inch)	24	1	CERAMIC PLUG FACE (Valve size 1 inch with ceramic trim)
16	2	BEARING SEAL (Valves with bearing seals)		1	REPACK KIT
17	1	GROOVE PIN (if required)		1	TUBE ANTI-SEIZE LUBRICANT

REPACK KIT INSTRUCTION DOCUMENT NO. 9250043

ITEM	DESCRIPTION
1	VALVE SHAFT / UPPER SHAFT
2	RETAINING RING
3	PACKING RETAINER
4	SLEEVE BEARING
5	V-RING PACKING SET
6	PACKING SPACER
7	PACKING SPRING
8	SEAT RING
9	SEAT RETAINER
10	PLUG
11	SHAFT BEARING
12	GASKET
13	VALVE BODY
14	BOTTOM COVER
15	HEX HEAD BOLT
16	OPTIONAL BEARING SEAL
17	GROOVE PIN
18	LOWER SHAFT
19	SET SCREW
20	DRIVE PIN
21	O-RING
22	BOTTOM PLUG
23	SOCKET HD CAPSCREW
24	CERAMIC PLUG FACE

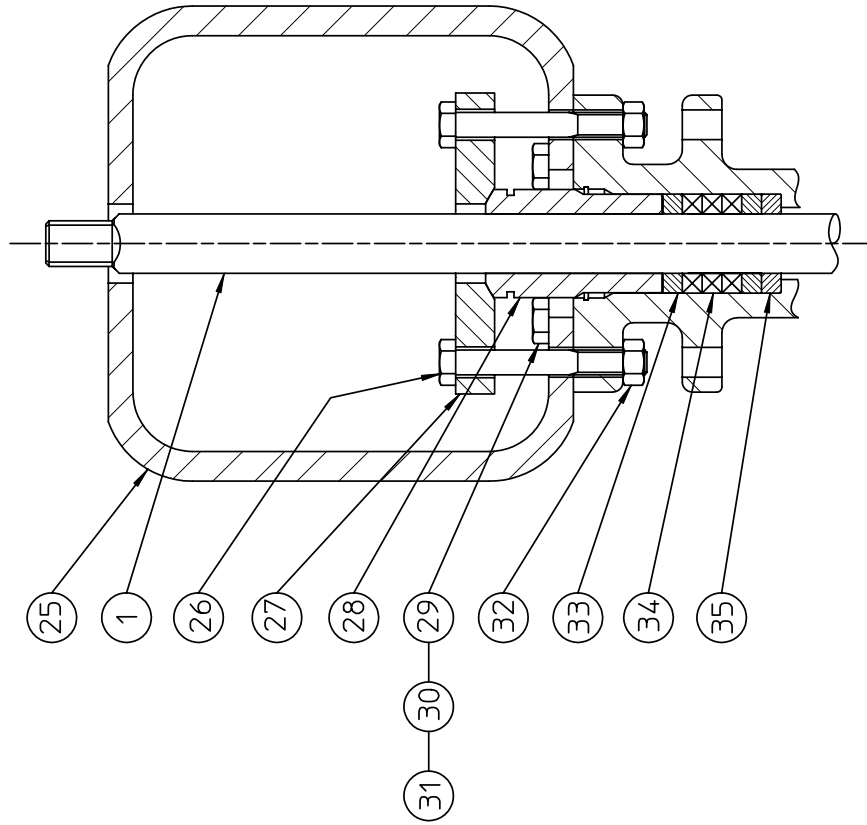


ITEM	DESCRIPTION
1	VALVE SHAFT / UPPER SHAFT
2	RETAINING RING
3	PACKING RETAINER
4	SLEEVE BEARING
5	V-RING PACKING SET
6	PACKING SPACER
7	PACKING SPRING
25	ACTUATOR ADAPTER
29	HEX NUT
30	REGULAR LOCKWASHER
31	HEX HEAD BOLT



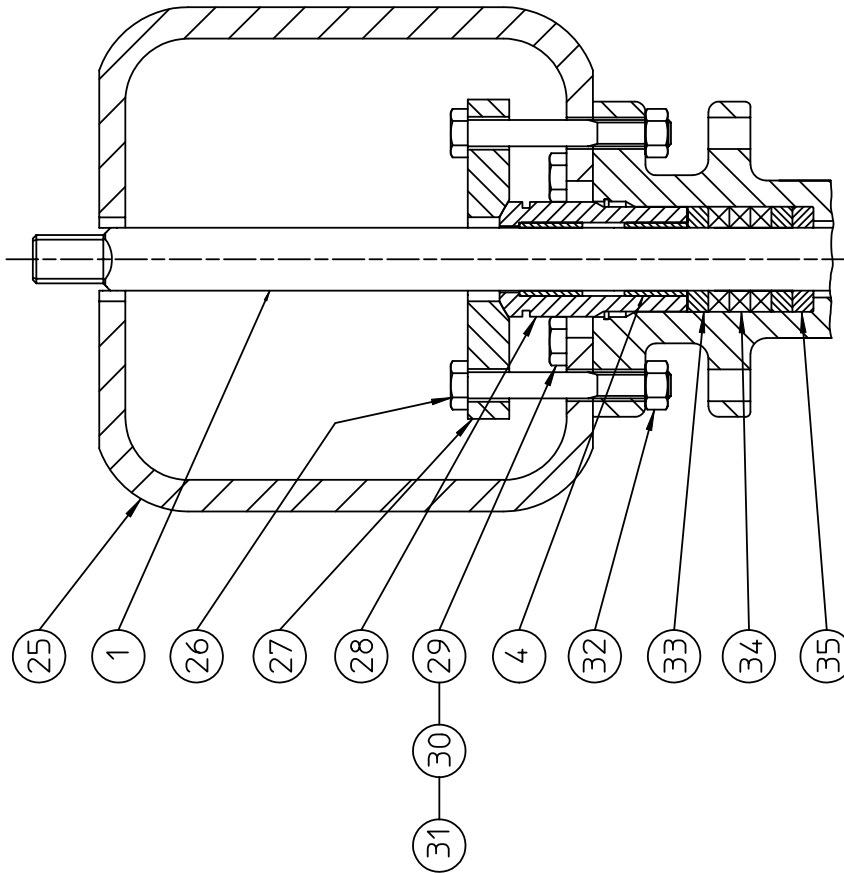
INDIRECT MOUNT
 SELF-ADJUSTING V-RING
 PACKING CONSTRUCTION
 TYPE T

ITEM	DESCRIPTION
1	VALVE SHAFT / UPPER SHAFT
25	ACTUATOR ADAPTOR
26	HEX HEAD CAPSCREW
27	PACKING FLANGE
28	ADJUSTABLE PACKING RETAINER
29	HEX NUT
30	REGULAR LOCKWASHER
31	HEX HEAD BOLT
32	HEX NUT
33	YARN PACKING
34	RING PACKING
35	PACKING SPACER



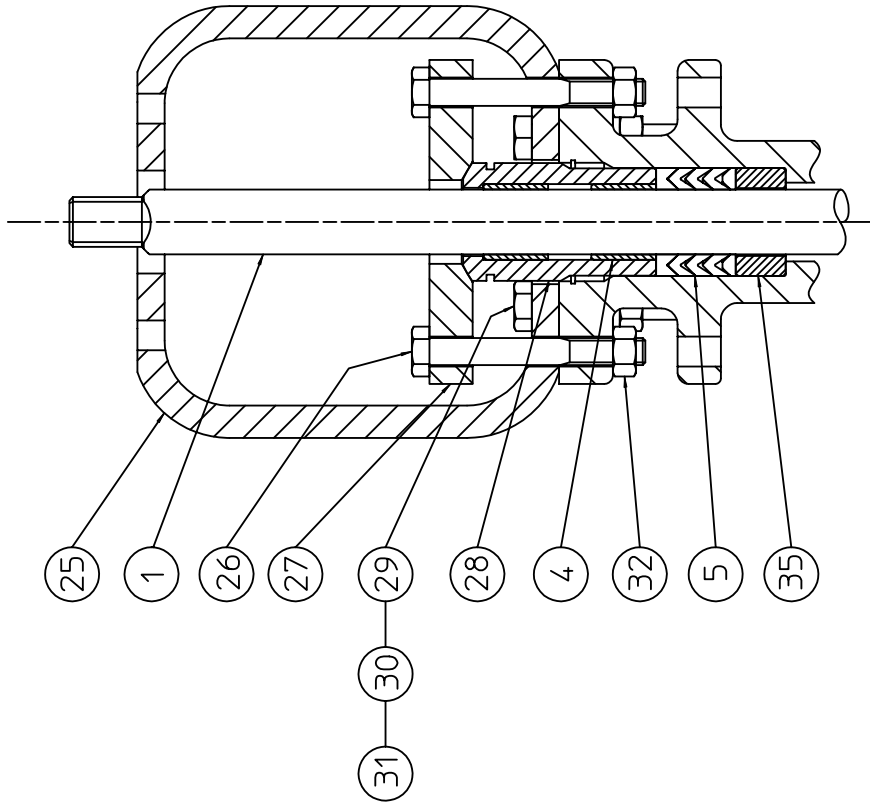
INDIRECT MOUNT
 ADJUSTABLE GRAPHITE
 PACKING CONSTRUCTION
 TYPE G

ITEM	DESCRIPTION
1	VALVE SHAFT / UPPER SHAFT
4	SLEEVE BEARING
25	ACTUATOR ADAPTER
26	HEX HEAD CAPSCREW
27	PACKING FLANGE
28	ADJUSTABLE PACKING RETAINER
29	HEX NUT
30	REGULAR LOCKWASHER
31	HEX HEAD BOLT
32	HEX NUT
33	YARN PACKING
34	RING PACKING
35	PACKING SPACER

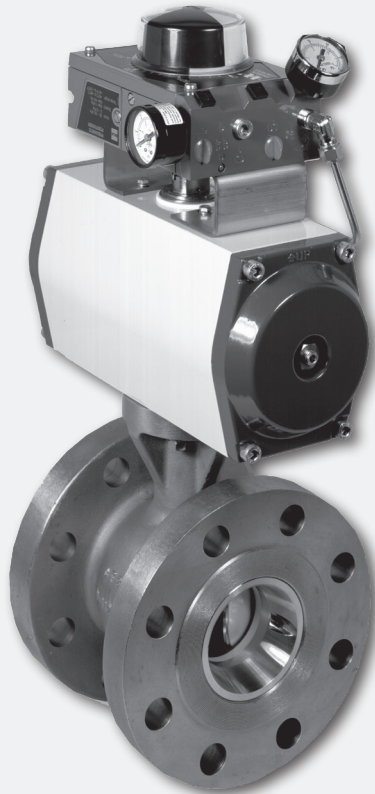


INDIRECT MOUNT
 ADJUSTABLE GRAPHITE PACKING CONSTRUCTION
 WITH PEEK BEARINGS
 TYPE J

ITEM	DESCRIPTION
1	VALVE SHAFT / UPPER SHAFT
4	SLEEVE BEARING
5	V-RING PACKING SET
25	ACTUATOR ADAPTER
26	HEX HEAD CAPSCREW
27	PACKING FLANGE
28	ADJUSTABLE PACKING RETAINER
29	HEX NUT
30	REGULAR LOCKWASHER
31	HEX HEAD BOLT
32	HEX NUT
35	PACKING SPACER



INDIRECT MOUNT
 ADJUSTABLE V-RING PACKING
 CONSTRUCTION
 TYPE A



3800_IOM_RevC_0821

WARREN CONTROLS

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