

INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS

Series 2900

HIGH CAPACITY GENERAL
PURPOSE GLOBE VALVES

WOM

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PRODUCT OVERVIEW

This document covers the installation, operation and maintenance of the Series 2900 High Capacity, General Purpose, Globe Control Valves presented in the "Series 2900 Product Specification", including the 2920 Two-Way Single Seat Unbalanced Valve, the 2922 Two-Way Double Seat Balanced Valve, the 2923 Two-Way Cylinder Balanced Valve, the 2930 Three-Way Mixing Valve, and the 2932 Three-Way Diverting/ Mixing Valve. Warren Controls Series 2900 High Capacity General Purpose Globe Control Valves feature rugged iron bodies with a variety of trim materials. The equal percentage plugs in the 2-way valves and linear plugs in the 3-way valves provide excellent modulating control of a wide variety of fluids. The Series 2900 is ideally suited where value and long life are important objectives for applications including but not limited to: Food & Beverage, Packaged Water Heaters, Pharmaceutical, General Service, and Waste Water having moderate pressure drops and temperatures from -20° to 400°F.

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 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 2900 High Capacity, General Purpose, Globe 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 have a nameplate mounted on the actuator. The valve's part number (P/N) is present on the plate. 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 configuration table. If the information is incomplete, incorrect, or not present contact the factory with the valve serial number listed on the plate. (See [Information Present on Control Valves](#) section for location of part number, serial number, and other important information on valve.)

VALVE BODY								
Model	Valve Type	Size	Body Material	End Connection	Trim Style	Trim Material	Trim Cv	Packing Type
29N 49" or 84" Pneumatic	20 2-Way Single Seat	250 2-1/2 inch 300 3 inch	R Cast Iron	F 125 lb. Flanged G 250 lb. Flanged	E Equal % Types 20/22/23 L Linear Types 30/32/23	B Bronze S 300 SS H 17-4 PH 6 Alloy 6 Wrapped	F Full Port	T Teflon G Graphite Graphite Packing Available for Harsh Service V Vacuum Service L EPDM EPDM Packing NOT available with the 291 Model
291 115" Pneumatic	22 2-Way Double Seated 23 2-Way Cylinder Bal. 30 3-Way Mixing 32 3-Way Diverting	400 4 inch 500 5 inch 600 6 inch 800 8 inch 010 10 inch						

NOTE : Valve Type 22 is Only Used with 29N Body &

DL49/DL84 Actuators.

The 291 model CANNOT use Bronze Trim
- NO EXCEPTIONS!

Valve Type 23 Linear Trim NOT available
in Bronze

ACTUATOR

Actuator Series	Action	Spring Range	Handwheel
00 None	O None	O None	O None
49 DL49 (49 Sq.In.)	R Reverse Stem Fail Down	L Low 4-10psi 49R ; 3-9psi 49D, 84R/D, 115R/D	R Reverse
4X DL49XR (49 Sq.In.)	D Direct Stem Fail Up	F Full 5-14psi 49R ; 4-13psi 49D; 3-15psi 84R/D, 115R/D	D Direct
84 DL84 (84 Sq.In.)		H High 9-15 psi 84; 115 10-14 psi 49R 8-12 psi 49D	
8X DL84XR (84 Ext. Rng.)		X Xtra-High DL49XR, DL84XR & DL115XR	
15 DL115 (115 Sq.In.)			
5X DL115XR			
NOTE : 4X, 5X, & 8X Only in Xtra-High Spring Range. 4X, 5X, & 8X Reverse Acting for 2-Way Valves.			
5X & 8X Direct Acting for 3-Way Valves			
FAILURE MODES:			
MODE	VALVE TYPE	ACTUATOR ACTION	
Closed	20/22	Reverse	
Open	20/22	Direct	
Upper Closed*	30/32	Direct	
Upper Open	30/32	Reverse	
*Standard			

ACTUATOR / BODY COMPATIBILITY:

DIAPHRAGM	BODY
49 49 Sq.In. (DL49)	For 29N Bodies
4X DL49XR	For 29N Bodies
84 84 Sq.In. (DL84)	For 29N Bodies
8X DL84XR	For 29N Bodies
15 115 Sq.In. (DL115)	For 291 Bodies
5X DL115XR	For 291 Bodies

ACCESSORIES

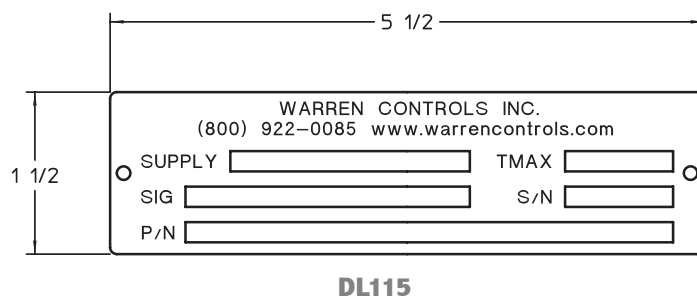
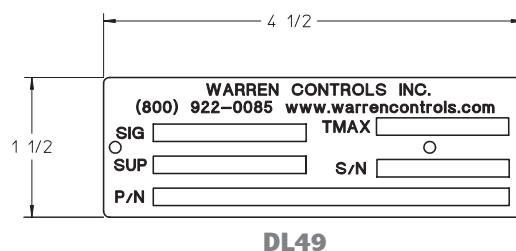
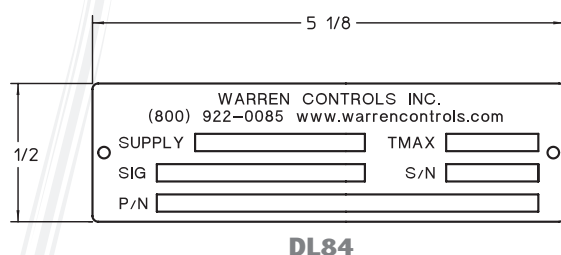
Positioners, I/P's & Limit Switches	Air Filter Regulators	ASCO Solenoids	Special Options
0000 None	O None	O None	O None
Positioners:	A Type 300, 0-30 PSI	120 VAC COILS	S Special Opt or Set-up
BxP BLX Pneumatic	B Type 300, 0-60 PSI	A 8320G184 3-Way Brass	T SS Tubing
BxE BLX ElectroPneumatic	D Type 350SS, 0-100 PSI	B 8320G202 3-Way SS	G SS Tagging
BxI BLX ElectroPneu. Intrn. Safe		L EF8320G184 3-Way EXP Br.	B SS Tubing and Tagging
BxX BLX ElectroPneu. Exp. Proof		M EF8320G202 3-Way EXP SS	
BxF BLX ElectroPneu. Fail Freeze			
76P Moore760 Pneumatic *			
76E Moore760 Electro-Pneumatic *			
TOZO ABB TZIDC 4-20mA *			
THN ABB TZIDC 4-20mA w/HART Intrn. Safe & Non-Incend *			
TPN ABB TZIDC PROFIBUS PA Intrn. Safe & Non-Incend.			
TFN ABB TZIDC FOUNDATION Fieldbus Intrn. Safe & Non-Incend.			
THX ABB TZIDC 4-20mA w/HART Exp. Proof *			
TPX ABB TZIDC PROFIBUS PA Exp. Proof			
TFX ABB TZIDC FOUNDATION Fieldbus Exp. Proof			
PROXIMITY SWITCHES:			
PX11 Mark 1 Series - 2 ea. SPDT			
PX12 Mark 1 Series - 2 ea. SPDT w/2k Pot.			
PX13 Mark 1 Series - 2 ea. SPDT w/4-20 Feedback			
PX14 Mark 1 Series - 4 ea. SPDT			
PX15 Mark 1 Series - 6 ea. SPDT			
I/P's Use with Diaphragm Only			
MAP1 Type 500X I/P, 3-9 PSI			
MAP2 Type 500X I/P, 9-15 PSI			
MAP3 Type 500X I/P, 3-15 PSI			
MAP4 Type 500X I/P, 1-17 PSI			
MAP5 Type 500X I/P, 6-30 PSI			
MAP6 Type 550X I/P, 0-30 PSI			
MAP7 Type 550X I/P, 0-60 PSI For 15 or 5X only			
MAP9 Type 950X I/P, 3-15 EXP			
x digit spec.	F Full Range Signal, 3-15 PSI or 4-20mA L Low of Split Range, 3-9 PSI or 4-12mA H High of Split Range, 9-15 PSI or 12-20mA		
4th digit spec.	O No Additions L w/Mech. Limit Switch's F w/4-20 Feedback B w/Switch's & Feedback Note: L, F & B not available for BxI or BxX		
4th digit spec.	O 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 R w/Proximity Switch's NO		
Option Combinations (For 4-20mA w/HART Models ONLY)	A = F & K B = F & L (Exp. Proof Models ONLY) C = F & P D = F & R E = K & L (Exp. Proof Models ONLY) G = K & P H = K & R J = F & K & L (Exp. Proof Models ONLY) M = F & K & P N = F & K & R		
See Actuators, Positioners, & Accessories Section of Product Specification for details.			

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.

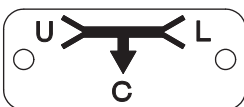
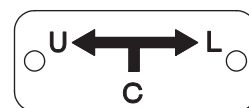
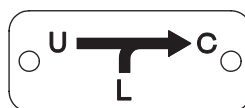
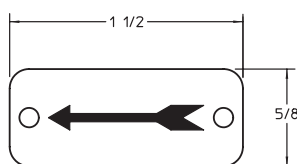
INFORMATION PRESENT ON CONTROL VALVES

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 plates used on Series 2900 control valves are shown here. The accompanying 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.

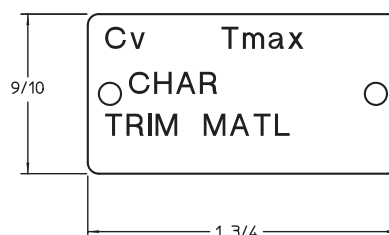
ACTUATOR NAMEPLATES




FLOW ARROW PLATES



VBA NAMEPLATES



INFORMATION PRESENT ON CONTROL VALVE SERIES 2900

Part Number & Serial Number			
Information	Symbol(s)	Location	Notes
Part number (Configuration)	P/N	On actuator	<ul style="list-style-type: none"> On Actuator Nameplate attached to leg(s) of actuator.
Serial number	S/N	On actuator and valve body	<ul style="list-style-type: none"> On Actuator Nameplate attached to leg(s) of actuator. Number only stamped on top of valve body top cover or top of valve body (2900).* * Number stamped using approximately 1/8 inch tall characters
Flow Direction(s)			
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 bottom port flange (2900 3-way) between the end connections. On Flow Arrow Plate attached to valve body top cover flange (2900 2-way except 2922 1-1/2 thru 4 inch) between the end connections. Arrow cast on valve body between the end connections (2922 1-1/2 thru 4 inch).
Port locations for 3-way valves	U upper port, L lower port, C common port	On valve body	<ul style="list-style-type: none"> On Flow Arrow Plate attached to valve body bottom port flange (2900 3-way) between the end connections.
Input Signal & Supply			
Information	Symbol(s)	Location	Notes
Input signal	SIG	On actuator	<ul style="list-style-type: none"> On Actuator Nameplate attached to leg(s) of actuator.
Supply pressure	SUP or SUPPLY	On actuator	<ul style="list-style-type: none"> On Actuator Nameplate attached to leg(s) of actuator.
Valve Attributes			
Information	Symbol(s)	Location	Notes
Maximum temperature rating of valve body	TMAX or Tmax	On actuator and valve body	<ul style="list-style-type: none"> On Actuator Nameplate attached to leg(s) of actuator. On Industrial VBA Nameplate attached to top cover flange (2900) between the end connections on side opposite flow arrow plate.
Trim Cv (Flow coefficient)	Cv	On valve body	<ul style="list-style-type: none"> On Industrial VBA Nameplate attached to top cover flange between the end connections on side opposite flow arrow plate.
Trim style (Characteristic)	CHAR	On valve body	<ul style="list-style-type: none"> On Industrial VBA Nameplate attached to top cover flange between the end connections on side opposite flow arrow plate.
Trim material	TRIM MATL	On valve body	<ul style="list-style-type: none"> On Industrial VBA Nameplate attached to top cover flange between the end connections on side opposite flow arrow plate.
Valve body material		On valve body	<ul style="list-style-type: none"> If the factory applied paint is black the valve body material is iron.

BODY STYLE VERSUS APPLICATION

2-Way Valves (Control of Liquids, Gases, and Steam)

2920 Two-Way Single Seat Unbalanced Valve

The most commonly applied solution for sizes 3" and under with ANSI Class IV shut-off.

Sizes:	2-1/2, 3, 4, 5, 6, 8, 10 inch
Body:	ANSI B16.1 Iron 125LB Flange or 250LB Flange
Trim:	EQ%, Bronze (2-1/2 thru 6), 300 Series Stainless Steel (2-1/2 thru 10), or 17-4 PH Hardened Stainless Steel (2-1/2 thru 6)
Packing:	Long-Life Multi-Stack, EPDM Lip Packing (Best for Water Service), 350°F Max Guided Low-Friction TFE V-Ring, Spring Loaded (Best for Steam Service), 400°F Max
Temperature:	+32 to 350°F (125 FLG) +32 to 400°F (250 FLG)
Rangeability:	50:1



2922 Two-Way Double Seat Balanced Valve

A balanced valve that is an effective solution for sizes over 3" and for higher pressures. Its double seat design allows for dirtier fluids and requires less force to operate than unbalanced valves so smaller actuators can be used. It is limited to ANSI Class III shut-off.

Sizes:	2-1/2, 3, 4, 5, 6, 8, 10 inch
Body:	ANSI B16.1 Iron 125LB Flange or 250LB Flange
Trim:	EQ%, Bronze or 300 Series Stainless Steel
Packing:	Long-Life Multi-Stack, EPDM Lip Packing (Best for Water Service), 350°F Max Guided Low-Friction TFE V-Ring, Spring Loaded (Best for Steam Service), 400°F Max
Temperature:	+32 to 350°F (125 FLG) +32 to 400°F (250 FLG)
Rangeability:	50:1



2923 Two-Way Cylinder Balanced Valve

A balanced valve that is an effective solution for sizes over 3" and for higher pressures. It requires less force to operate than unbalanced valves so smaller actuators can be used. Its single seat o-ring seal design facilitates ANSI Class IV shut-off. It is limited to cleaner fluids.

Sizes:	2-1/2, 3, 4, 5, 6 inch
Body:	ANSI B16.1 Iron 125LB Flange or 250LB Flange
Trim:	EQ% (Bronze, 300 Series Stainless Steel 17-4 PH Hardened Stainless Steel, or Alloy 6), Linear (300 Series Stainless Steel, 17-4 PH Hardened Stainless Steel, or Alloy 6)
Packing:	Long-Life Multi-Stack, EPDM Lip Packing (Best for Water Service), 350°F Max Guided Low-Friction TFE V-Ring, Spring Loaded (Best for Steam Service), 400°F Max
O-Ring:	EPDM (BRZ) Fluoraz 797 (300 SSTRim, 17-4 pH or Alloy 6 Trim)
Temperature:	+32 to 300°F (BRZ) +32 to 350°F (125 FLG w/ 300 SSTRim, 17-4 PH or Alloy 6 Trim) +32 to 400°F (250 FLG w/ 300 SSTRim, 17-4 PH or Alloy 6 Trim)
Rangeability:	50:1

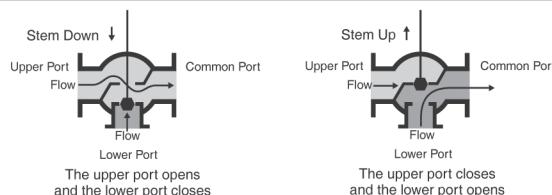


3-Way Valves (Control of Liquids)

2930 Three-Way Mixing Valve

This valve has two inlets and one outlet, and is the simplest solution for mixing or bypass applications with ANSI Class IV shut-off. In normal applications the inlet pressures are near equal and control is possible from 5% to 95% of travel with inlet pressures up to 100 PSI.

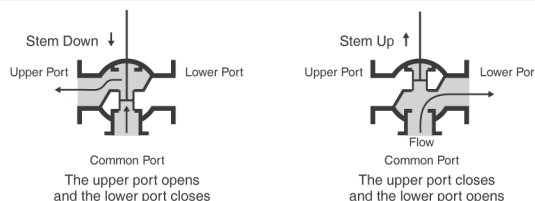
Sizes:	2-1/2, 3, 4, 5, 6, 8 inch
Body:	ANSI B16.1 Iron 125LB Flange or 250LB Flange
Trim:	Linear, Bronze (2-1/2 thru 6) or 300 Series Stainless Steel (2-1/2 thru 8)
Packing:	Long-Life Multi-Stack, EPDM Lip Packing (Best for Water Service), 350°F Max Guided Low-Friction TFE V-Ring, Spring Loaded (Best for Steam Service), 400°F Max
Temperature:	+32 to 350°F (125 FLG) +32 to 400°F (250 FLG)
Rangeability:	50:1



2932 Three-Way Diverting/Mixing Valve

Designed as a diverting valve with one inlet and two outlets with ANSI Class II shut-off. However, flow can be reversed for mixing if this port configuration is desirable. The difference between the upper port and lower port pressure must not exceed 50PSID.

Sizes:	2-1/2, 3, 4, 5, 6, 8 inch
Body:	ANSI B16.1 Iron 125LB Flange or 250LB Flange
Trim:	Linear, Bronze or 300 Series Stainless Steel
Packing:	Long-Life Multi-Stack, EPDM Lip Packing (Best for Water Service), 350°F Max Guided Low-Friction TFE V-Ring, Spring Loaded (Best for Steam Service), 400°F Max
O-Ring:	EPR
Temperature:	+32 to 300°F (2-1/2 through 5) +32 to 150°F (6 & 8)
Rangeability:	50:1



Body Pressure-Temperature Ratings:

Temperature (F)	125 FLG	250 FLG
+32° To 150°	175	400
175°	170	385
200°	165	370
225°	155	355
250°	150	340
275°	145	325
300°	140	310
350°	125	280
375°	-	265
400°	-	250

Pressure ratings are PSIG

For applications below 32° consult factory

Trim Materials	Flowing Differential Pressure Limit
Bronze	50 PSID
300 Series Stainless Steel	100 PSID
17-4 pH Hardened Steel	200 PSID
Alloy 6	300 PSID

DIMENSIONS & WEIGHTS

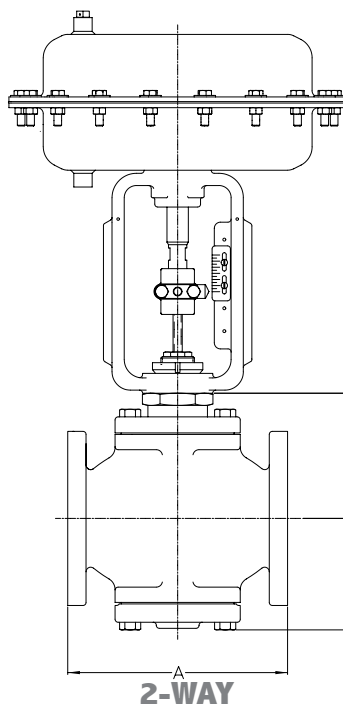
Dimension (IN) 2920		Valve Size (IN)						
		2-1/2	3	4	5	6	8	10
A	125FLG	9	10	13	15-3/4	17-3/4	16-1/4	20
	250FLG	9-5/8	10-3/4	13-5/8	16-5/8	18-5/8	16-1/4	21-3/8
B		4-3/4	5-3/8	6-3/8	5-3/4	6-1/2	8-7/8	9-7/8
C		5-1/4	6-1/8	7-1/8	7-3/4	8-3/8	9-5/8	10-3/8
Weight (LB)	125FLG	55	72	119	134	175	270	417
	250FLG	64	77	131	166	233	360	510

Dimension (IN) 2923		Valve Size (IN)				
Variable		2-1/2	3	4	5	6
A	125FLG	9	10	13	15-3/4	17-3/4
	250FLG	9-5/8	10-3/4	13-5/8	16-5/8	18-5/8
B		4-3/4	5-3/8	6-3/8	5-3/4	6-1/2
C		5-3/4	6-5/8	7-3/4	8-1/4	8-7/8
Weight (LB)	125FLG	57	75	127	149	197
	250FLG	66	80	139	181	256

Dimension (IN) 2922		Valve Size (IN)						
		2-1/2	3	4	5	6	8	10
A	125FLG	7-3/4	9	11-3/8	12	14-1/8	16-1/4	20
	250FLG	8-3/8	9-3/4	12	12-7/8	14-1/2	16-1/4	21-3/8
B		4-1/8	4-3/8	5	6-7/8	7-5/8	8-7/8	9-7/8
C		4-7/8	5-1/8	6-5/8	7-5/8	8-1/2	9-5/8	10-3/8
Weight (LB)	125FLG	32	42	77	124	169	290	435
	250FLG	42	54	96	162	220	380	540

Consult factory for drawings, weights, and dimensions of configurations not shown.

Face to face dimensions conform to historical Warren Controls standard and are **NOT** ANSI/ISA compatible.



Valve shown with DL84 Actuator as typical.

For additional actuator information see Series 2900 Product Specification and the Installation Operation and Maintenance Instructions for the actuator in use.

DIMENSIONS & WEIGHTS

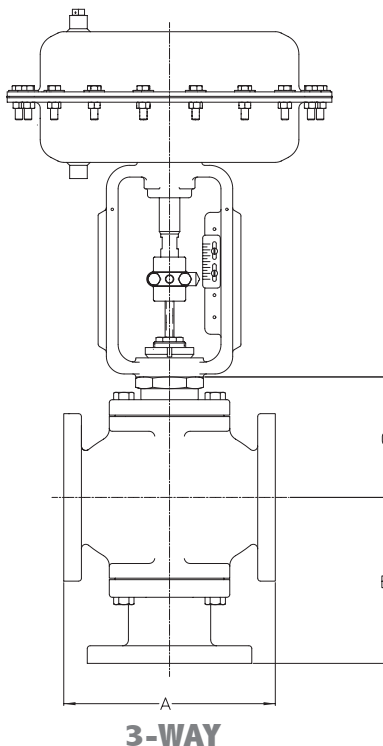
Dimension (IN) 2930		Valve Size (IN)					
Variable		2-1/2	3	4	5	6	8
A	125FLG	9	10	13	15-3/4	17-3/4	16-1/4
	250FLG	9-5/8	10-3/4	13-5/8	16-5/8	18-5/8	16-1/4
B	125FLG	7-1/8	8	9-7/8	9-1/4	9-7/8	11-7/8
	250FLG	7-3/8	8-3/8	10-1/4	10-3/8	11	12-3/8
C		5-1/4	6-1/8	7-1/8	6	6-3/4	9-5/8
Weight (LB)	125FLG	64	83	139	157	202	306
	250FLG	73	94	157	211	283	398

Dimension (IN) 2932		Valve Size (IN)					
Variable		2-1/2	3	4	5	6	8
A	125FLG	9	10	13	12	14-1/8	16-1/4
	250FLG	9-5/8	10-3/4	13-5/8	12-7/8	14-1/2	16-1/4
B	125FLG	7-1/8	8	9-7/8	10-1/2	11-1/8	11-7/8
	250FLG	7-3/8	8-3/8	10-1/4	11	11-1/2	12-3/8
C		5-1/4	6-1/8	6-7/8	7-1/2	8-1/8	9-1/4
Weight (LB)	125FLG	59	78	140	154	203	316
	250FLG	73	94	166	215	284	407

Consult factory for drawings, weights, and dimensions of configurations not shown.

Actual shipping weights may vary.

Face to face dimensions conform to historical Warren Controls standard and are **NOT** ANSI/ISA compatible.



Valve shown with DL84 Actuator as typical.

For additional actuator information see [Series 2900 Product Specification](#) and the [Installation Operation and Maintenance Instructions](#) for the actuator in use.

INSTALLATION

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

- Be sure that the flow medium, ambient temperature and the selected location will not exceed the maximum temperature of the valve, actuator, or accessories. Information can be found in the product specifications and on the nameplate(s) regarding these limits (See Information Present on Control Valves section for location of important information on valve).
- Follow good piping practices. Install a bypass around the valve. Install stop valves in inlet and outlet piping to provide means to isolate valve.
- A straight run of pipe is recommended for 10 pipe diameters upstream of the valve and 20 pipe diameters downstream of the valve.
- Protect valve and downstream equipment with a self-cleaning strainer.
- 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 vertical position with the stem pointing upward.
- Actuators mounted in any position other than vertical must be supported independent of the valve. **DO NOT MOUNT DL115 ACTUATORS IN THE HORIZONTAL POSITION.**
- Be sure to leave clearance to allow for actuator removal (See Dimensions & Weights section of 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(s). For proper operation in all applications, control valves must be piped according to the corresponding flow arrows, inlet markings, and port markings present on each valve (See Information Present on Control Valves section for location of important information on valve).



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.

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 valve stem relative to travel indicator on yoke.
- For valves fitted with a handwheel, manually operate valve using handwheel through rated travel to check freedom of movement. Return handwheel to its standby position.
- Place valve in operation.

For proper operation in all applications, control valves must be piped properly. If you need detailed information, please refer to the "Heat Exchanger Bypass Piping Applications" document.

- Pipes must be aligned squarely with the valve at each connection.
- If the valve has screwed ends, do not apply pipe dope to the threads of the valve body or to the first two threads of the pipe.
- If the valve has flanged ends, tighten flange bolts evenly to prevent excessive stress and the possibility of cracking.
- If the valve has welded ends, prevent plug and cage distortion by keeping excess heat from the body.
- The valve, actuator, and accessories (if so equipped) are assembled, tested, and calibrated at the factory. The actuator nameplate 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 actuator nameplate or you will damage the valve and void the warranty.
- Supply air or voltage, 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 nameplates with paint. If flow arrow plates or nameplates 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.

MAINTENANCE

Series 2900 High Capacity General Purpose Globe 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 2900 Product Specification](#) for details). In installations where high vibration exists, pneumatic and/or electrical connections should periodically be checked for integrity. In water or water and glycol applications, good water quality must be maintained or the service life of the valve may be reduced

(See [Water Quality Guidelines](#)). The valve stem must be kept free of debris, deposits, dirt, dust, and scratches or the packing parts may be damaged resulting in a packing leak. Control valve hunting will cause excessive stroking of the valve stem and result in premature failure of the packing seal. 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 Valve-Works sizing program will facilitate the selection of the optimum valve.

PACKING ADJUSTMENT

Series 2900 High Capacity General Purpose Globe Control Valves have either self-adjusting packing or adjustable packing. **29N** models with Packing Type **T** V-ring, **V** Vacuum Service, or **L** Lip Packing have self-adjusting packing and require no external adjustment. **291** models with Packing Type **T** V-ring Packing also have self-adjusting packing and require no external adjustment. If the valve has self-adjusting packing and a packing leak is observed replace the packing and if necessary the stem and plug assembly.

29N models with Packing Type **G** Graphite have adjustable packing. **291** models with Packing Type **G** Graphite also have adjustable packing. If the valve has adjustable packing and a packing leak is observed, tighten the packing nut $\frac{1}{4}$ turn and observe. If the leak continues tighten the packing nut another $\frac{1}{4}$ turn and observe. Repeat as necessary. If the leak continues and the packing nut cannot be tightened further with reasonable force replace the packing and if necessary the stem and plug assembly.

PARTS/ OVERHAUL

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

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

Damaged or worn trim parts including the plug, stem, seat ring, piston, piston chamber, piston guide, piston seal, and o-ring 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 surrounding equipment.

Should parts become worn or damaged, parts kits are available. Repack Kits are available to replace the packing. Repack/Inspection Kits are available to allow the valve to be opened for inspection of its internal parts. Rebuild/Repack Kits are available to completely rebuild/ overhaul the valve. 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 and correct parts.



DO NOT ATTEMPT TO SERVICE WITHOUT A
REPACK/INSPECTION KIT & SUPPLEMENTAL INSTRUCTIONS.

PARTS KITS

REPACK KIT

FOR 29N MODELS WITH PACKING TYPE **T** V-RING

SEE DWG C3769950

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
2	1	RETAINER BEARING	6	1	MALE ADAPTER
3	1	PACKING RETAINER	7	1	PACKING SPRING
5	1	V-RING PACKING SET	12	1	TUBE STEM LUBE

REPACK KIT

FOR 29N MODELS WITH PACKING TYPE **G** GRAPHITE

SEE DWG C3769952

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
2	1	PACKING RETAINER	5	1	PACKING CARTRIDGE
3	1	RETAINER BEARING	8	1	TUBE STEM LUBE

REPACK KIT

FOR 29N MODELS WITH PACKING TYPE **V** VACUUM SERVICE

SEE DWG C3761956

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
2	1	PACKING RETAINER	7	1	FEMALE ADAPTER
3	1	RETAINER BEARING	8	1	PACKING SPRING
5	1	MALE ADAPTER	13	1	TUBE STEM LUBE
6	1	V-RING PACKING SET			

REPACK KIT

FOR 29N MODELS WITH PACKING TYPE **L** LIP PACKING

SEE DWG C3769956

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
2	1	PACKING RETAINER	5	3	LIP PACKING
3	1	RETAINER BEARING	8	1	TUBE STEM LUBE

REPACK KIT

FOR 291 MODELS WITH PACKING TYPE **T** V-RING

SEE DWG C3760085

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
2	1	INTERNAL PACKING NUT	7	1	O-RING RETAINER
4	1	V-RING PACKING SET	8	1	O-RING
5	1	PACKING LOAD WASHER	10	1	TUBE STEM LUBE
6	1	WAVE SPRING			

REPACK KIT

FOR 291 MODELS WITH PACKING TYPE **G** GRAPHITE

SEE DWG C3760052

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
2	1	INTERNAL PACKING NUT		1	TUBE STEM LUBE
4	1	GRAPHITE RING PACKING			

PARTS KITS

REPACK / INSPECTION KIT

FOR MODEL **29N & 291** VALVE TYPE **20** SIZE **250** THRU **400** (2-1/2 THRU 4 INCH)

SEE DWG C3241352

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
12	2	GASKET		1	REPACK KIT
	1	ADDITIONAL BONNET SUBASSEMBLY PARTS (SEE TABLE)			

REBUILD / REPACK KIT

FOR MODEL **29N & 291** VALVE TYPE **20** SIZE **250** THRU **400** (2-1/2 THRU 4 INCH)

SEE DWG C3241352

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
1	1	VALVE STEM	12	2	GASKET
4	1	TRAVEL STOP (As required)	15	1	TUBE PERMATEX #2
8	1	GROOVE PIN		1	ADDITIONAL BONNET SUBASSEMBLY PARTS (SEE TABLE)
9	1	PLUG		1	REPACK KIT
10	1	SEAT RING			

REPACK / INSPECTION KIT

FOR MODEL **29N & 291** VALVE TYPE **20** SIZE **500 & 600** (5 & 6 INCH)

SEE DWG D3241554

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
8	1	GASKET		1	REPACK KIT
	1	ADDITIONAL BONNET SUBASSEMBLY PARTS (SEE TABLE)			

REBUILD / REPACK KIT

FOR MODEL **29N & 291** VALVE TYPE **20**

SIZE **500 & 600** (5 & 6 INCH)

SEE DWG D3241554

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
1	1	VALVE STEM	12	1	PLUG
8	1	GASKET	13	1	SEAT RING
9	1	TRAVEL STOP (As required)	17	1	TUBE PERMATEX #2
10	1	THREAD INSERT (Model 29N with St Stl Trim)		1	ADDITIONAL BONNET SUBASSEMBLY PARTS (SEE TABLE)
11	1	GROOVE PIN		1	REPACK KIT

PARTS KITS

REPACK / INSPECTION KIT

FOR MODEL 29N & 291 VALVE TYPE 20

SIZE 800 & 010 (8 & 10 INCH)

SEE DWG D3241750

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
14	2	GASKET		1	REPACK KIT
	1	ADDITIONAL BONNET SUBASSEMBLY PARTS (SEE TABLE)			

REBUILD / REPACK KIT

FOR MODEL 29N & 291 VALVE TYPE 20

SIZE 800 & 010 (8 & 10 INCH)

SEE DWG D3241750

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
1	1	VALVE STEM	12	1	PLUG
8	1	TRAVEL STOP	14	2	GASKET
9	1	GROOVE PIN	16	1	TUBE PERMATEX #2
10	1	THREAD INSERT (Model 29N with St Stl Trim)		1	ADDITIONAL BONNET SUBASSEMBLY PARTS (SEE TABLE)
11	1	SEAT RING		1	REPACK KIT

REPACK / INSPECTION KIT

FOR MODEL 29N & 291 VALVE TYPE 22

SIZE 250 THRU 400 (2-1/2 THRU 4 INCH)

SEE DWG C3201354

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
8	2	GASKET		1	REPACK KIT
	1	ADDITIONAL BONNET SUBASSEMBLY PARTS (SEE TABLE)			

REBUILD / REPACK KIT *

FOR MODEL 29N & 291 VALVE TYPE 22

SIZE 250 THRU 400 (2-1/2 THRU 4 INCH)

SEE DWG C3201354

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
1	1	VALVE STEM	10	1	PLUG
4	1	TRAVEL STOP (As required)	12	1	TUBE PERMATEX #2
7	1	GROOVE PIN		1	ADDITIONAL BONNET SUBASSEMBLY PARTS (SEE TABLE)
8	2	GASKET		1	REPACK KIT

REPACK / INSPECTION KIT

FOR MODEL 29N & 291 VALVE TYPE 22

SIZE 500 & 600 (5 & 6 INCH)

SEE DWG D3201752

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
14	2	GASKET		1	REPACK KIT
	1	ADDITIONAL BONNET SUBASSEMBLY PARTS (SEE TABLE)			



Seat rings for valve Type 22 size 250 thru 400 (2 1/2 thru 4 inch) and size 10 (10 inch) are machined in the valve and are NOT available separately as parts.

PARTS KITS

REBUILD / REPACK KIT

FOR MODEL 29N & 291 VALVE TYPE 22

SIZE 500 & 600 (5 & 6 INCH)

SEE DWG D3201752

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
1	1	VALVE STEM	12	1	LOWER SEAT RING
8	1	TRAVEL STOP	14	2	GASKET
9	1	GROOVE PIN	16	1	TUBE PERMATEx #2
10	1	UPPER SEAT RING		1	ADDITIONAL BONNET SUBASSEMBLY PARTS (SEE TABLE)
11	1	PLUG		1	REPACK KIT

REPACK / INSPECTION KIT

FOR MODEL 29N & 291 VALVE TYPE 22

SIZE 800 & 010 (8 & 10 INCH)

SEE DWG D3201950

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
14	2	GASKET		1	REPACK KIT
	1	ADDITIONAL BONNET SUBASSEMBLY PARTS (SEE TABLE)			

REBUILD / REPACK KIT ★

FOR MODEL 29N & 291 VALVE TYPE 22

SIZE 800 & 010 (8 & 10 INCH)

SEE DWG D3201950

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
1	1	VALVE STEM	14	2	GASKET
8	1	GROOVE PIN	16	1	TUBE PERMATEx #2
9	1	UPPER SEAT RING (Valve size 8 inch)		1	ADDITIONAL BONNET SUBASSEMBLY PARTS (SEE TABLE)
10	1	PLUG		1	REPACK KIT
11	1	LOWER SEAT RING (Valve size 8 inch)			

REPACK / INSPECTION KIT

FOR MODEL 29N & 291 VALVE TYPE 23

SIZE 250 THRU 400 (2-1/2 THRU 4 INCH)

SEE DWG C3241354

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
12	3	GASKET		1	REPACK KIT
	1	ADDITIONAL BONNET SUBASSEMBLY PARTS (SEE TABLE)			

REBUILD / REPACK KIT

FOR MODEL 29N & 291 VALVE TYPE 23

SIZE 250 THRU 400 (2-1/2 THRU 4 INCH)

SEE DWG C3241354

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
1	1	VALVE STEM	12	3	GASKET
3	1	TRAVEL STOP (As required)	15	1	TUBE O-RING LUBE
6	1	GROOVE PIN	16	1	TUBE PERMATEx #2
8	1	O-RING		1	ADDITIONAL BONNET SUBASSEMBLY PARTS (SEE TABLE)
9	1	PLUG		1	REPACK KIT
10	1	SEAT RING			

PARTS KITS

REPACK / INSPECTION KIT

FOR MODEL 29N & 291 VALVE TYPE 23

SIZE 500 & 600 (5 & 6 INCH)

SEE DWG D3241556

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
7	2	GASKET		1	REPACK KIT
	1	ADDITIONAL BONNET SUBASSEMBLY PARTS (SEE TABLE)			

REBUILD / REPACK KIT

FOR MODEL 29N & 291 VALVE TYPE 23

SIZE 500 & 600 (5 & 6 INCH)

SEE DWG D3241556

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
1	1	VALVE STEM	11	1	SEAT RING
3	1	TRAVEL STOP	15	1	TUBE O-RING LUBE
4	1	GROOVE PIN	16	1	TUBE PERMATEX #2
7	2	GASKET		1	ADDITIONAL BONNET SUBASSEMBLY PARTS (SEE TABLE)
9	1	O-RING		1	REPACK KIT
10	1	PLUG			

REPACK / INSPECTION KIT

FOR MODEL 29N & 291 VALVE TYPE 30

SIZE 250 THRU 400 (2-1/2 THRU 4 INCH)

SEE DWG C3261351

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
13	2	GASKET		1	REPACK KIT
	1	ADDITIONAL BONNET SUBASSEMBLY PARTS (SEE TABLE)			

REBUILD / REPACK KIT

FOR MODEL 29N & 291 VALVE TYPE 30

SIZE 250 THRU 400 (2-1/2 THRU 4 INCH)

SEE DWG C3261351

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
1	1	VALVE STEM	13	2	GASKET
7	1	VALVE BODY SEAT RING	15	1	TUBE PERMATEX #2
8	1	GROOVE PIN		1	ADDITIONAL BONNET SUBASSEMBLY PARTS (SEE TABLE)
9	1	PLUG		1	REPACK KIT
10	1	BOTTOM PORT SEAT RING			

REPACK / INSPECTION KIT

FOR MODEL 29N & 291 VALVE TYPE 30

SIZE 500 & 600 (5 & 6 INCH)

SEE DWG D3261551

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
10	1	GASKET		1	REPACK KIT
	1	ADDITIONAL BONNET SUBASSEMBLY PARTS (SEE TABLE)			

PARTS KITS

REBUILD / REPACK KIT

FOR MODEL 29N & 291 VALVE TYPE 30

SIZE 500 & 600 (5 & 6 INCH)

SEE DWG D3261551

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
1	1	VALVE STEM	13	2	TUBE PERMATEX #2
5	1	GROOVE PIN			
6	1	PLUG		1	ADDITIONAL BONNET SUBASSEMBLY PARTS (SEE TABLE)
7	2	SEAT RING		1	REPACK KIT
10	1	GASKET			

REPACK / INSPECTION KIT

FOR MODEL 29N & 291 VALVE TYPE 30

SIZE 800 & 010 (8 & 10 INCH)

SEE DWG D3261751

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
6	1	GASKET TOP COVER		1	ADDITIONAL BONNET SUBASSEMBLY PARTS (SEE TABLE)
14	1	GASKET BOTTOM PORT		1	REPACK KIT

REBUILD / REPACK KIT

FOR MODEL 29N & 291 VALVE TYPE 30

SIZE 800 & 010 (8 & 10 INCH)

SEE DWG D3261751

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
1	1	VALVE STEM	11	1	PLUG
6	1	GASKET TOP COVER	14	1	GASKET BOTTOM PORT
8	2	SEAT RING	17	1	TUBE PERMATEX #2
9	1	THREAD INSERT (As required)		1	ADDITIONAL BONNET SUBASSEMBLY PARTS (SEE TABLE)
10	1	GROOVE PIN		1	REPACK KIT

REPACK / INSPECTION KIT

FOR MODEL 29N & 291 VALVE TYPE 32

SIZE 250 THRU 800 (2-1/2 THRU 8 INCH)

SEE DWG D3261752

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
6	1	TOP COVER GASKET		1	ADDITIONAL BONNET SUBASSEMBLY PARTS (SEE TABLE)
17	1	BOTTOM PORT GASKET		1	REPACK KIT

REBUILD / REPACK KIT

FOR MODEL 29N & 291 VALVE TYPE 32

SIZE 250 THRU 800 (2-1/2 THRU 8 INCH)

SEE DWG D3261752

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
1	1	VALVE STEM	12	1	PISTON
6	1	TOP COVER GASKET	13	1	SEAT RING
7	1	PISTON CHAMBER	17	1	BOTTOM PORT GASKET
8	4	HEX JAM NUT	20	1	TUBE PERMATEX #2
9	1	PISTON SEAL (Valve sizes 6 & 8 inch)	21	1	TUBE O-RING LUBE
10	1	O-RING		1	ADDITIONAL BONNET SUBASSEMBLY PARTS (SEE TABLE)
11	1	PISTON GUIDE		1	REPACK KIT

PARTS KITS

ADDITIONAL BONNET SUBASSEMBLY PARTS IN REPACK/ INSPECTION KIT

FOR **29N** MODELS WITH PACKING TYPE **T** V-RING SEE DWG C3769950

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
8	1	O-RING RETAINER	9	1	O-RING

FOR **29N** MODELS WITH PACKING TYPE **G** GRAPHITE SEE DWG C3769952

NONE

FOR **29N** MODELS WITH PACKING TYPE **V** VACUUM SERVICE SEE DWG C3761956

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
9	1	O-RING RETAINER	10	1	O-RING

FOR **29N** MODELS WITH PACKING TYPE **L** LIP PACKING SEE DWG C3769956

NONE

FOR **291** MODELS WITH PACKING TYPE **T** V-RING SEE DWG C3760085

NONE

FOR **291** MODELS WITH PACKING TYPE **G** GRAPHITE SEE DWG C3760052

NONE

ADDITIONAL BONNET SUBASSEMBLY PARTS IN REBUILD/ REPACK KIT

FOR **29N** MODELS WITH PACKING TYPE **T** V-RING SEE DWG C3769950

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
8	1	O-RING RETAINER	10	1	BONNET BEARING
9	1	O-RING	11	1	BONNET

FOR **29N** MODELS WITH PACKING TYPE **G** GRAPHITE SEE DWG C3769952

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
6	1	BONNET	7	1	BONNET BEARING

FOR **29N** MODELS WITH PACKING TYPE **V** VACUUM SERVICE SEE DWG C3761956

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
9	1	O-RING RETAINER	11	1	BONNET BEARING
10	1	O-RING	12	1	BONNET

FOR **29N** MODELS WITH PACKING TYPE **L** LIP PACKING SEE DWG C3769956

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION
6	1	BONNET	7	1	BONNET BEARING

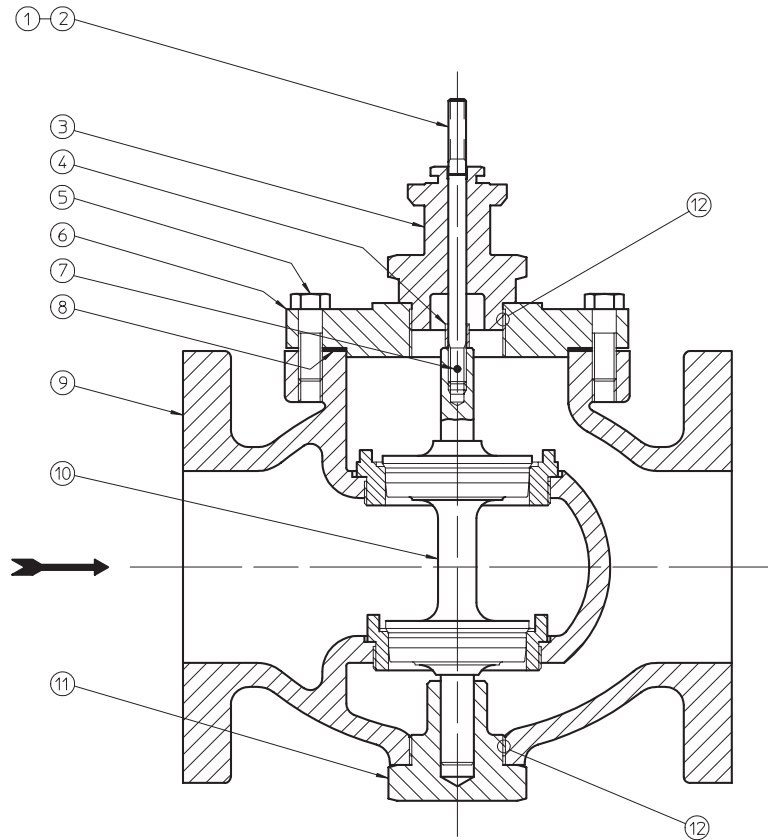
FOR **291** MODELS WITH PACKING TYPE **T** V-RING SEE DWG C3760085

NONE

FOR **291** MODELS WITH PACKING TYPE **G** GRAPHITE SEE DWG C3760052

NONE

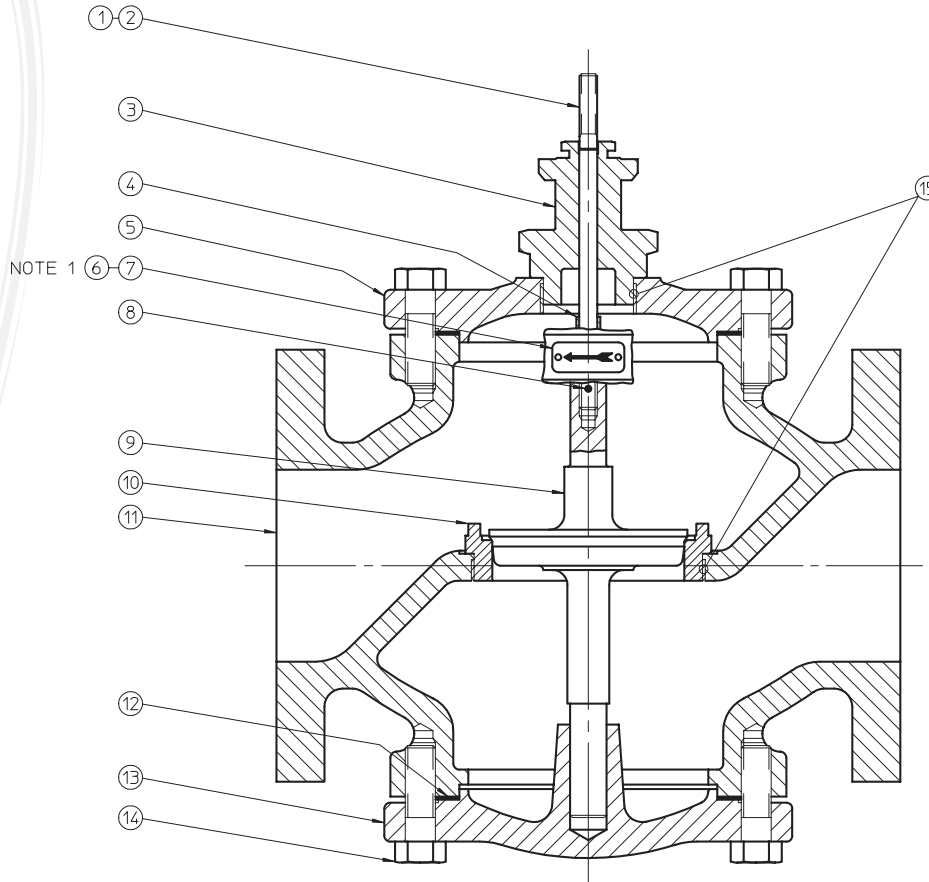
C3201354



12	A/R	PERMATEX #2
11	1	BOTTOM GUIDE PLUG
10	1	PLUG
9	1	VALVE BODY WITH SEAT RINGS
8	1	GASKET
7	1	GROOVE PIN
6	1	TOP COVER
5	A/R	HEX HEAD CAPSCREW
4	A/R	TRAVEL STOP
3	1	BONNET SUBASSEMBLY SEE SEPARATE DWG
2	A/R	STEM LUBE
1	1	VALVE STEM
ITEM	QTY	DESCRIPTION

DRAWN J.MARTOCCI	DATE 10/7/96	WARREN CONTROLS CORPORATION BROADWAY, NEW JERSEY 08808		
CHECKED		1 1/2 THRU 4 INCH TYPE 22 VBA		
APPROVED				
SIZE C	FSCH NO 03847	DWG NO C3201354	REV	

C3241352



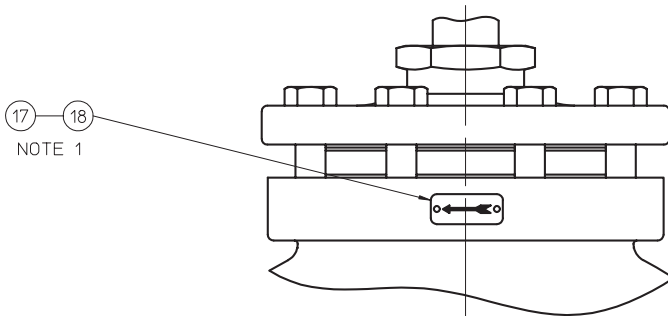
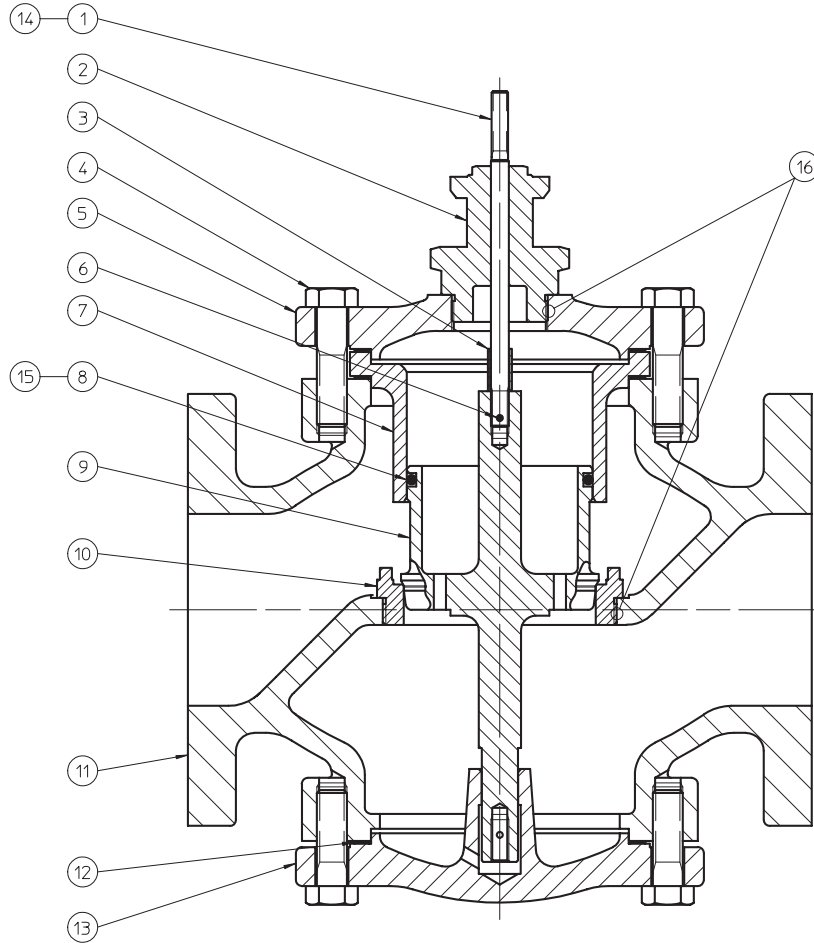
15	A/R	PERMATEX #2
14	A/R	HEX HEAD CAPSCREW
13	1	BOTTOM GUIDE COVER
12	2	GASKET
11	1	VALVE BODY
10	1	SEAT RING
9	1	PLUG
8	1	GROOVE PIN
7	2	DRIVE SCREW NO 4 x 1/4
6	1	FLOW ARROW PLATE
5	1	TOP COVER
4	1	TRAVEL STOP
3	1	BONNET SUBASSEMBLY SEE SEPARATE DWG
2	A/R	STEM LUBE
1	1	VALVE STEM
ITEM	QTY	DESCRIPTION

1) SECURE FLOW ARROW PLATE (6) TO VALVE BODY FLANGE
USING 2 DRIVE SCREWS (7)

NOTES:

DRAWN J.MARTOCCI	DATE 10/10/96	WARREN CONTROLS CORPORATION BROADWAY, NEW JERSEY 08808		
CHECKED		2 1/2, 3 & 4 INCH TYPE 20 VBA		
APPROVED				
SIZE C	FSCH NO 03847	DWG NO C3241352	REV	

C3241354

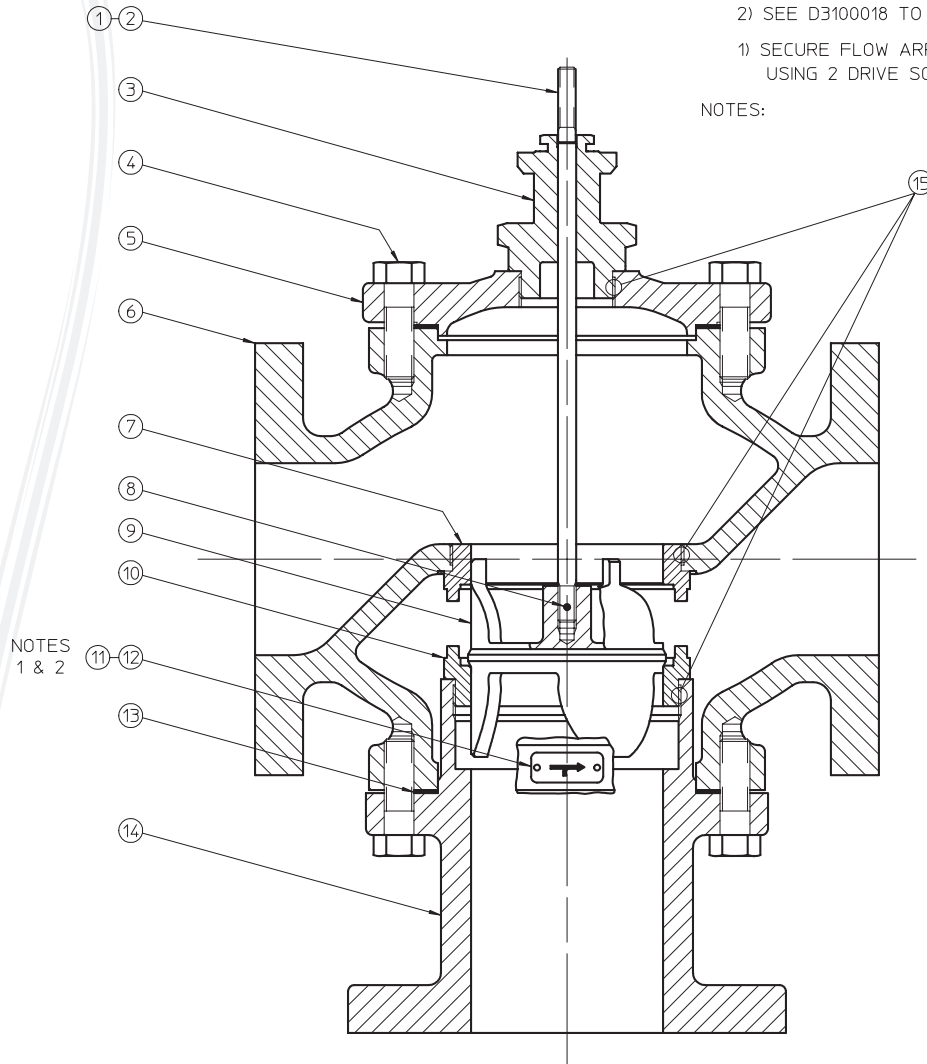


1) SECURE FLOW ARROW PLATE (17) TO VALVE BODY FLANGE
USING 2 DRIVE SCREWS (18).
NOTES:

18	2	DRIVE SCREW #4 x 1/4
17	1	FLOW ARROW PLATE
16	A/R	PERMATEX #2
15	A/R	O-RING LUBE
14	A/R	STEM LUBE
13	1	BOTTOM COVER
12	3	GASKET
11	1	VALVE BODY
10	1	SEAT RING
9	1	PLUG
8	1	O-RING
7	1	PISTON CHAMBER
6	1	GROOVE PIN
5	1	TOP COVER
4	A/R	HEX HD CAPSCREW
3	1	TRAVEL STOP
2	1	BONNET SUBASSEMBLY SEE SEPARATE DRAWING
1	1	VALVE STEM
ITEM	QTY	DESCRIPTION

DRAWN	BLB	DATE	3/9/04	WARREN CONTROLS INCORPORATED			
CHECKED				BETHLEHEM, PENNSYLVANIA 18020-8010			
APPROVED				2 1/2 - 4 INCH TYPE 23			
				VALVE BODY ASSEMBLY			
		SIZE	C	FSCH NO	03847	DWG NO	C3241354
						REV	

C3261351



2) SEE D3100018 TO SELECT FLOW ARROW PLATE.

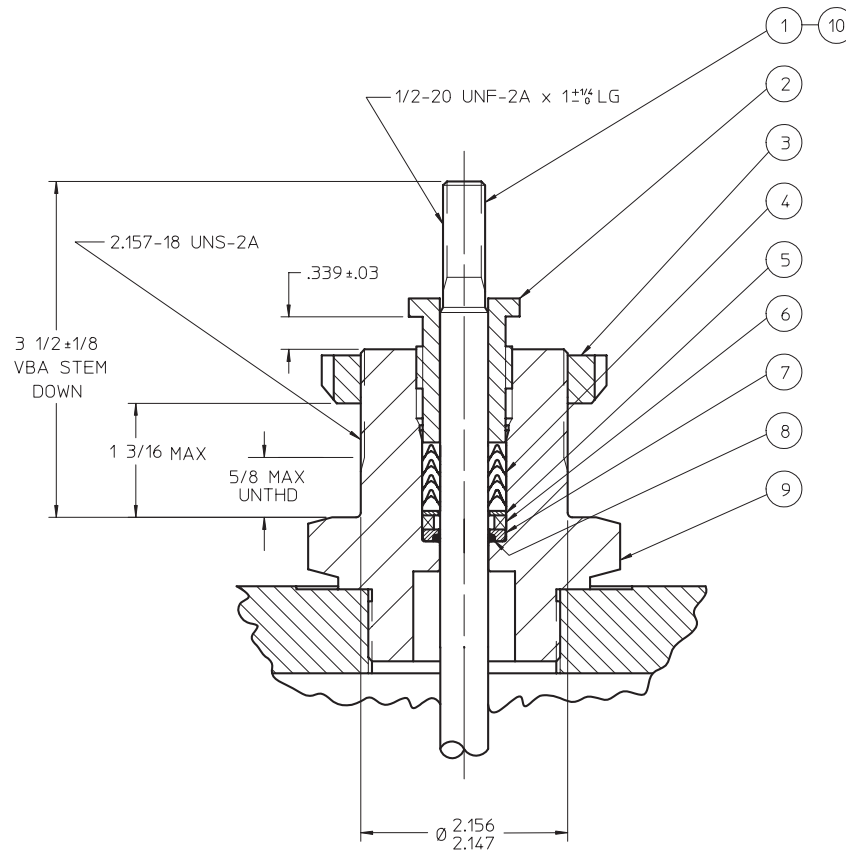
1) SECURE FLOW ARROW PLATE (11) TO VALVE BODY FLANGE USING 2 DRIVE SCREWS (12).

NOTES:

NOTES
1 & 2

15	A/R	THREAD SEALANT
14	1	BOTTOM PORT
13	2	GASKET
12	2	DRIVE SCREW NO 4 x 1/4
11	1	FLOW ARROW PLATE
10	1	BOTTOM PORT SEAT RING
9	1	PLUG
8	1	GROOVE PIN
7	1	VALVE BODY SEAT RING
6	1	VALVE BODY
5	1	TOP COVER
4	A/R	HEX HEAD CAPSCREW
3	1	BONNET SUBASSEMBLY SEE SEPARATE DWG
2	A/R	STEM LUBE
1	1	VALVE STEM
ITEM	QTY	DESCRIPTION

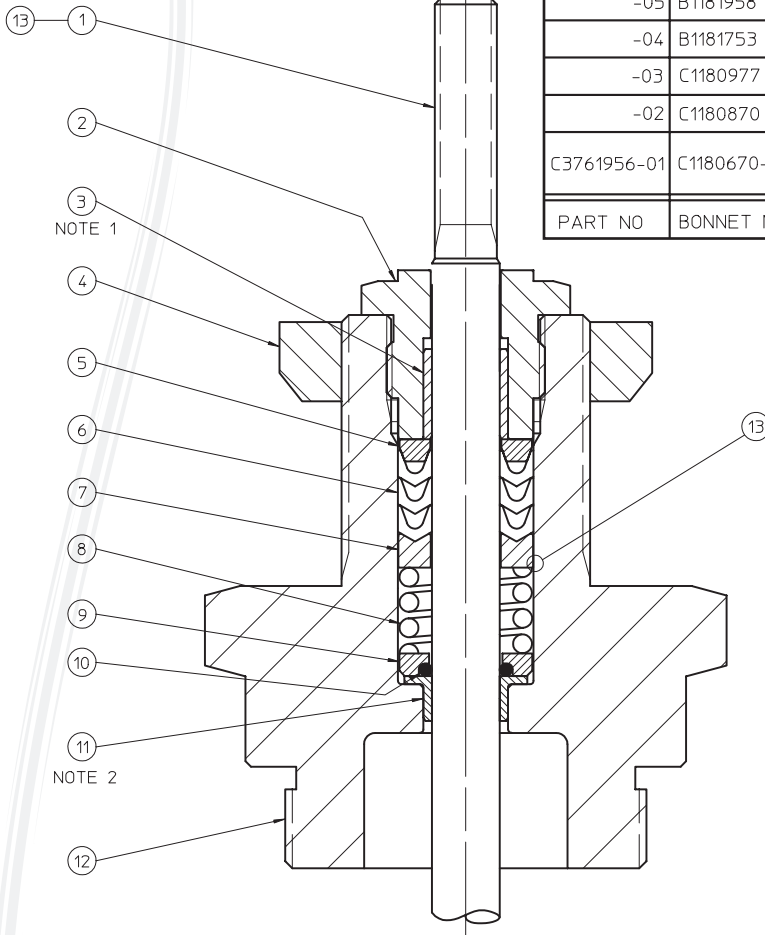
DRAWN J.MARTOCCI	DATE 11/13/96	WARREN CONTROLS INCORPORATED BETHLEHEM, PENNSYLVANIA 18020-8010			
CHECKED		2 1/2, 3 & 4 INCH TYPE 30 VBA			
APPROVED					
SIZE C	FSCH NO 03847	DWG NO C3261351	REV A		



10	A/R	A0940021	DC111 LUBE	
9	1	C1181952	ADAPTER BONNET	BRASS
8	1	04910014	O-RING -014	TEFLON
7	1	B1800053-01	O-RING RETAINER	BRASS
6	1	B1820068	WAVE SPRING	ST STL 17-7 PH
5	1	B2060003-01	PACKING LOAD WASHER	ST STL TYPE 316
4	1	B1700073	V-RING PACKING SET	TEFLON
3	1	B1640033-01	YOKE LOCKNUT	STL PLTD
2	1	B1720052	INTERNAL PACKING NUT	BRASS
1	1	AS REQD	VALVE STEM	ST STL TYPE 316
ITEM	QTY	PART NO	DESCRIPTION	MATL SPEC
REMOVE ALL SHARP EDGES AND BURRS		UNLESS OTHERWISE SPECIFIED:		WARREN CONTROLS CORPORATION BROADWAY, NEW JERSEY 08808 NON ADJUSTABLE V-RING PACKING SUBASSY BRASS 115 ADAPTER BONNET 2.157-18, 2-18
DIMENSIONED PER ASME Y14.5M-1994		DECIMAL .001	DECIMAL .005	
THIRD ANGLE PROJECTION		FRACTION 1/64	ANGLE 1°	
125/ FINISH ON ALL MACHINED SURFACES		TREATMENT		
NEXT ASSEMBLY		FINISH		DATE 1-11-01
				EPC
				CHECKED
				APPROVED
				SIZE C
				PDSH NO 03847
				DWS NO C3760085
				REV
				SCALE FULL
				WT
				SHEET

C3761956

REV	DESCRIPTION	DATE	APPROVED
A	REDRAWN WITH CHANGE ECN 2161	BLB 11/11/05	



-06	B1181959	B1060057	10 INCH TYPE 22/72 250# FLG
-05	B1181958	B1060057	10 INCH TYPE 22/72 125# FLG
-04	B1181753	B1060057	8 INCH TYPE 22/72
-03	C1180977	B1060055	2 INCH TYPE 20/70, 30
-02	C1180870	B1060055	1 1/2 INCH TYPE 20/70, 30
C3761956-01	C1180670-01	B1060057	1/2 - 1 & 2 1/2 - 10 INCH TYPE 20/70, 30, 32 1 1/2 - 6 INCH TYPE 22/72
PART NO	BONNET NO	BONNET BEARING NO	USED ON

NOTES:

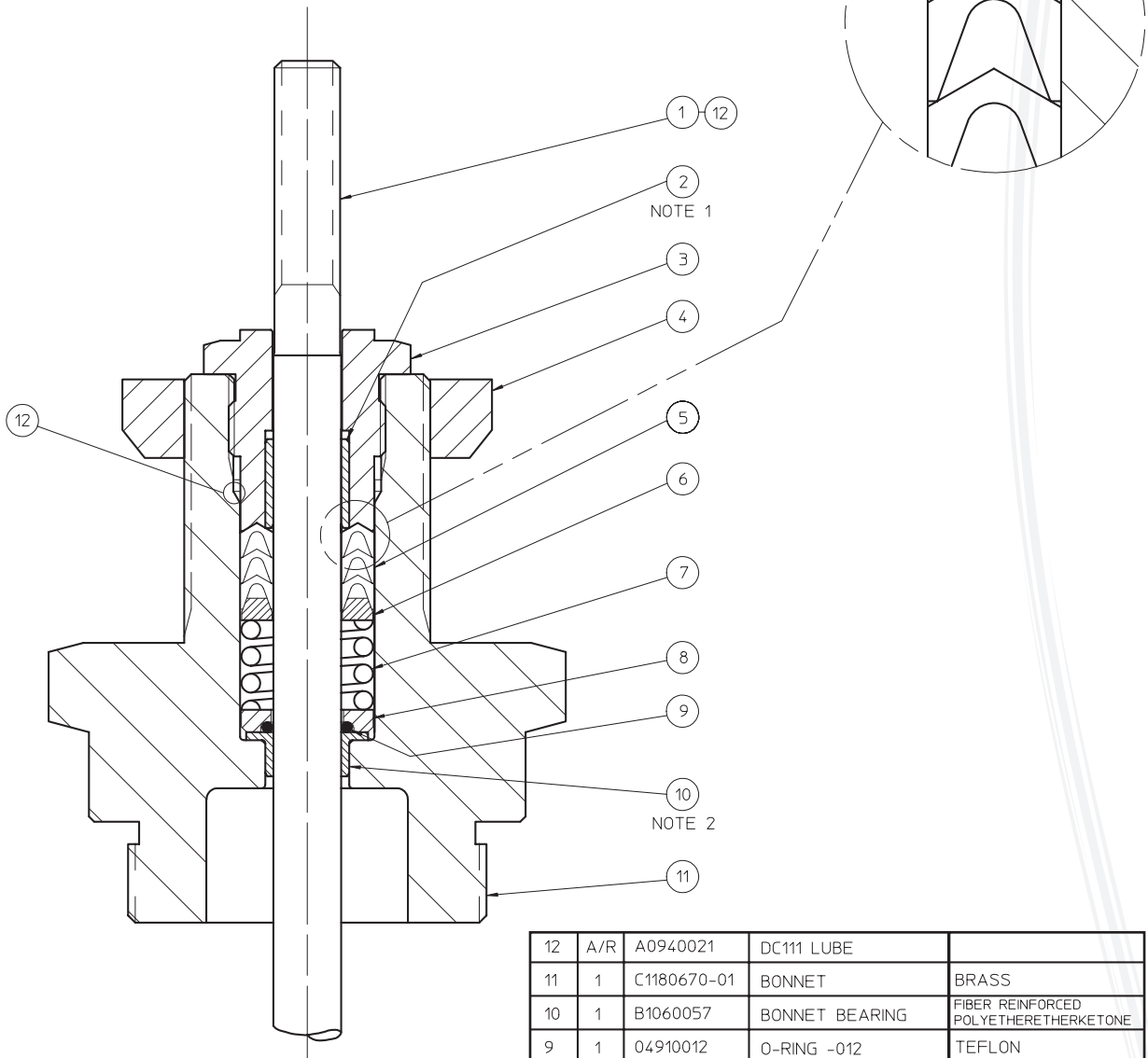
- 1) RETAINER BEARING (3) IS NOT A SYMMETRICAL PART & SHOULD ONLY BE ASSEMBLED AS FOLLOWS. PRESS RETAINER BEARING (3) INTO PACKING RETAINER (2) UNTIL THE END WITH THE CHAMFER ON THE ID IS ABOVE OR FLUSH WITH THE BOTTOM OF THE PACKING RETAINER (2)
- 2) PRESS BONNET BEARING (11) INTO BONNET (12), ORIENTED AS SHOWN, UNTIL IT BOTTOMS OUT IN PACKING GLAND

13	A/R	A0940021	DC111 LUBE				
12	1	SEE TABLE	BONNET	BRASS OR BRONZE			
11	1	SEE TABLE	BONNET BEARING	FIBER REINFORCED POLYETHERETHERKETONE			
10	1	04910012	O-RING -012	TEFLON			
9	1	B1800050-01	O-RING RETAINER	BRASS			
8	1	B1820059	SPRING	ST STL TYPE 302			
7	1	B1010066-01	FEMALE ADAPTER	BRASS			
6	1	A1700054	V-RING PACKING SET	TEFLON			
5	1	B1010050-03	MALE ADAPTER	BRASS			
4	1	B1640034-01	YOKE LOCKNUT	STEEL PLATED			
3	1	B1060056	RETAINER BEARING	FIBER REINFORCED POLYETHERETHERKETONE			
2	1	C1720062-03	PACKING RETAINER	BRASS			
1	1	AS REQD	VALVE STEM	ST STL TYPE 316			
ITEM	QTY	PART NO	DESCRIPTION	MATL SPEC			
UNLESS OTHERWISE SPECIFIED:		MATERIAL		WARREN CONTROLS INCORPORATED BETHLEHEM, PENNSYLVANIA 18020-8010 BONNET SUBASSY VACUUM SERVICE GLFVP 1.376-18 W/ BEARINGS			
DECIMAL .XX ±.010	DECIMAL .XXX ±.005	SEE TABLE					
FRACTION ± 1/64	ANGLE ± °	TREATMENT					
ALL FILLET RADI 1/32 MAX		APPROVED					
25 ✓ FINISH ON ALL MACHINED SURFACES		DATE 11/11/05					
ALL DIMENSIONS ARE IN INCHES		FINISH		SIZE C	FSCH NO 03847	DWG NO C3761956-	REV A

C3769950

REV	DESCRIPTION	DATE
A	REDRAWN WITH CHANGE ECN 2161	BLB 11/9/05

SEE NOTE 1



NOTES:

1) RETAINER BEARING (2) IS NOT A SYMMETRICAL PART & SHOULD ONLY BE ASSEMBLED AS FOLLOWS. PRESS RETAINER BEARING (2) INTO PACKING RETAINER (3) UNTIL THE END WITH THE CHAMFER ON THE ID IS ABOVE OR FLUSH WITH THE INSIDE EDGE OF THE V-NOTCH. THE BEARING MUST NOT EXTEND PAST THE V-NOTCH AND INTERFERE WITH THE V-RING PACKING.

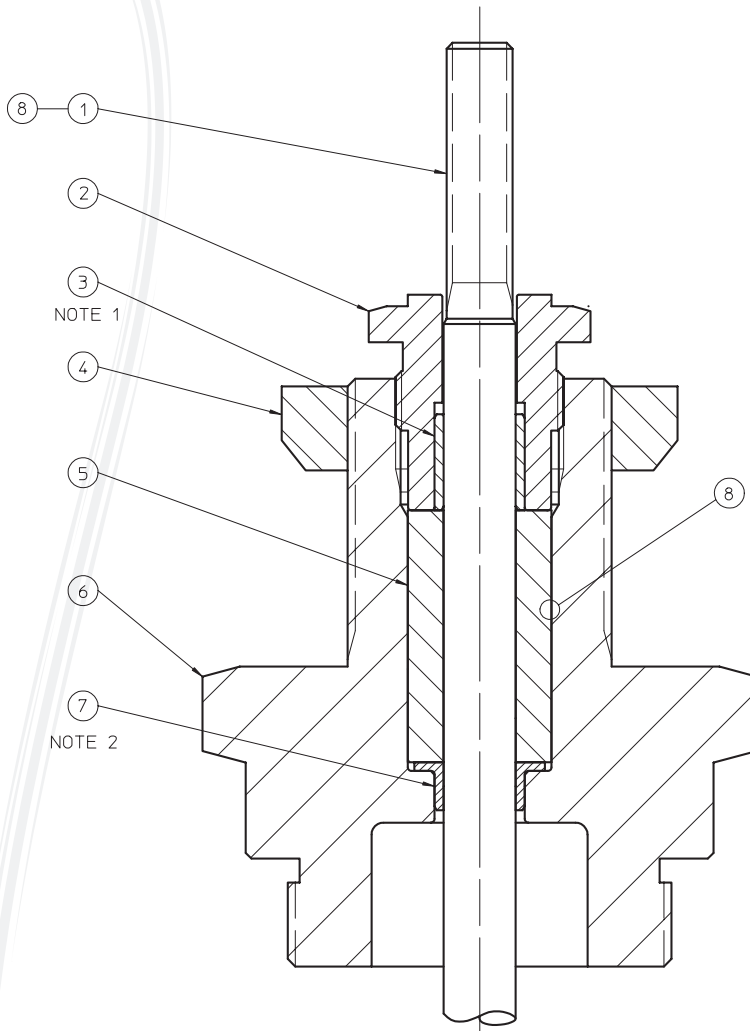
2) PRESS BONNET BEARING (10) INTO BONNET (11), ORIENTED AS SHOWN, UNTIL IT BOTTOMS OUT IN PACKING GLAND.

12	A/R	A0940021	DC111 LUBE	
11	1	C1180670-01	BONNET	BRASS
10	1	B1060057	BONNET BEARING	FIBER REINFORCED POLYETHERETHERKETONE
9	1	04910012	O-RING -012	TEFLON
8	1	B1800050-01	O-RING RETAINER	BRASS
7	1	B1820059	PACKING SPRING	ST STL TYPE 302
6	1	B1010050-03	MALE ADAPTER	BRASS
5	1	A1700054	V-RING PACKING SET	TEFLON
4	1	B1640034-01	YOKE LOCKNUT	STEEL PLATED
3	1	C1720060-03	PACKING RETAINER	BRASS
2	1	B1060056	RETAINER BEARING	FIBER REINFORCED POLYETHERETHERKETONE
1	1	AS REQD	VALVE STEM	ST STL TYPE 316
ITEM	QTY	PART NO	DESCRIPTION	MATL SPEC

MATERIAL	SEE TABLE	DRAWN	BLB	DATE	4/15/03	WARREN CONTROLS INCORPORATED BETHLEHEM, PENNSYLVANIA 18020-8010
TREATMENT		CHECKED				NONADJUSTABLE V-RING PACKING SUBASSY BONNET 1.376-18, 2-18 W/BEARINGS
FINISH		APPROVED				SIZE C PSCH NO 03847 DWG NO C3769950 REV A

C3769952

REV	DESCRIPTION	DATE
A	REDRAWN WITH CHANGE ECN 2161	BLB 11/10/05

**NOTES:**

- 1) RETAINER BEARING ③ IS NOT A SYMMETRICAL PART & SHOULD ONLY BE ASSEMBLED AS FOLLOWS. PRESS RETAINER BEARING ③ INTO PACKING RETAINER ② UNTIL THE END WITH THE CHAMFER ON THE ID IS ABOVE OR FLUSH WITH THE BOTTOM OF THE PACKING RETAINER ②
- 2) PRESS BONNET BEARING ⑦ INTO BONNET ⑥, ORIENTED AS SHOWN, UNTIL IT BOTTOMS OUT IN PACKING GLAND

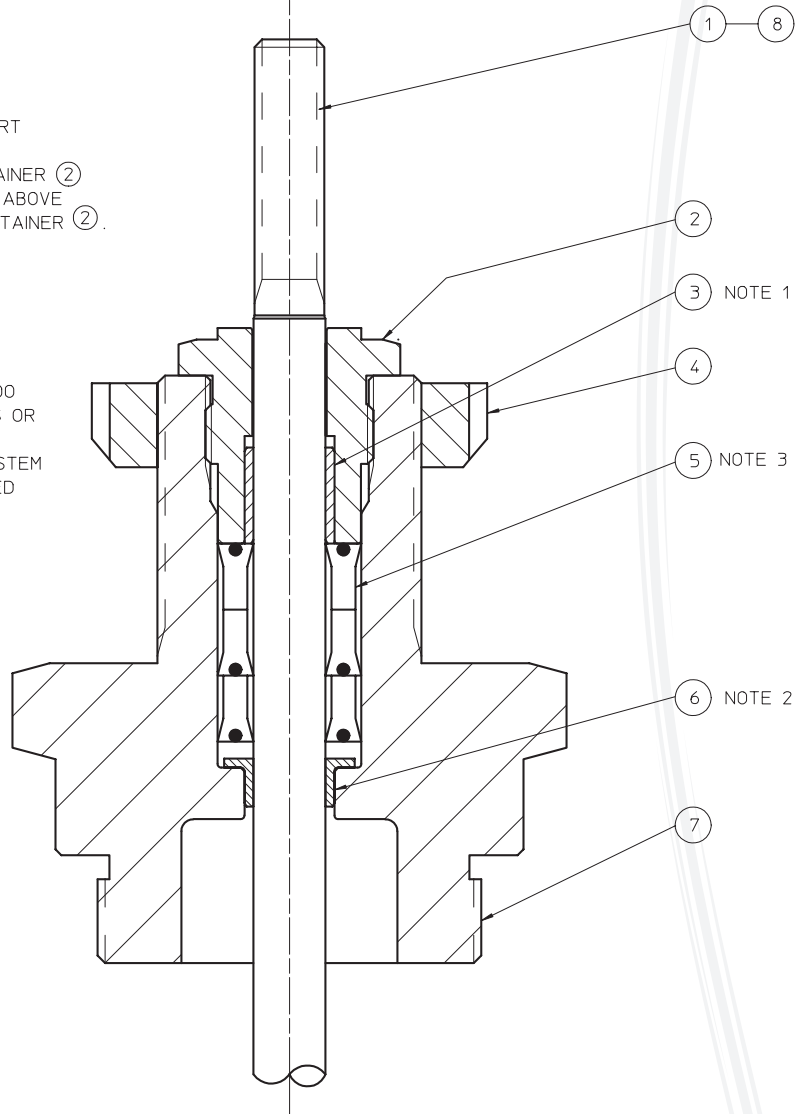
8	A/R	A0940021	DC111 LUBE	
7	1	B1060057	BONNET BEARING	FIBER REINFORCED POLYETHERETHERKETONE
6	1	C1180670-01	BONNET	BRASS
5	1	B1700056	PACKING CARTRIDGE	GRAPHITE
4	1	B1640034-01	YOKE LOCKNUT	STEEL PLATED
3	1	B1060056	RETAINER BEARING	FIBER REINFORCED POLYETHERETHERKETONE
2	1	C1720061-03	PACKING RETAINER	BRASS
1	1	AS REQD	VALVE STEM	ST STL TYPE 316
ITEM	QTY	PART NO	DESCRIPTION	MATL SPEC

MATERIAL SEE TABLE	DRAWN BLB	DATE 11/10/05	WARREN CONTROLS INCORPORATED BETHLEHEM, PENNSYLVANIA 18020-8010		
	CHECKED				
TREATMENT	APPROVED		BONNET SUBASSY ADJUSTABLE GRAPHITE PACKING 1.376-18 2-18 W/ BEARINGS		
FINISH			SIZE C	FSCH NO 03847	DWG NO C3769952
					REV A

C3769956

NOTES:

- 1) RETAINER BEARING (3) IS NOT A SYMMETRICAL PART & SHOULD ONLY BE ASSEMBLED AS FOLLOWS.
PRESS RETAINER BEARING (3) INTO PACKING RETAINER (2) UNTIL THE END WITH THE CHAMFER ON THE ID IS ABOVE OR FLUSH WITH THE BOTTOM OF THE PACKING RETAINER (2).
- 2) PRESS BONNET BEARING (6) INTO BONNET (7), ORIENTED AS SHOWN, UNTIL IT BOTTOMS OUT IN PACKING GLAND.
- 3) PROTECT ID & OD SEALING LIPS OF PACKING FROM CUTS, NICKS OR SCRAPES DURING INSTALLATION. DO NOT FORCE SEALING LIPS PAST BONNET THREADS OR STEM THREADS. USE OF INSTALLATION SLEEVE IS RECOMMENDED. LUBRICATE PACKING ID & OD AND STEM BEFORE INSTALLATION. PACKING MUST BE ORIENTED AS SHOWN.

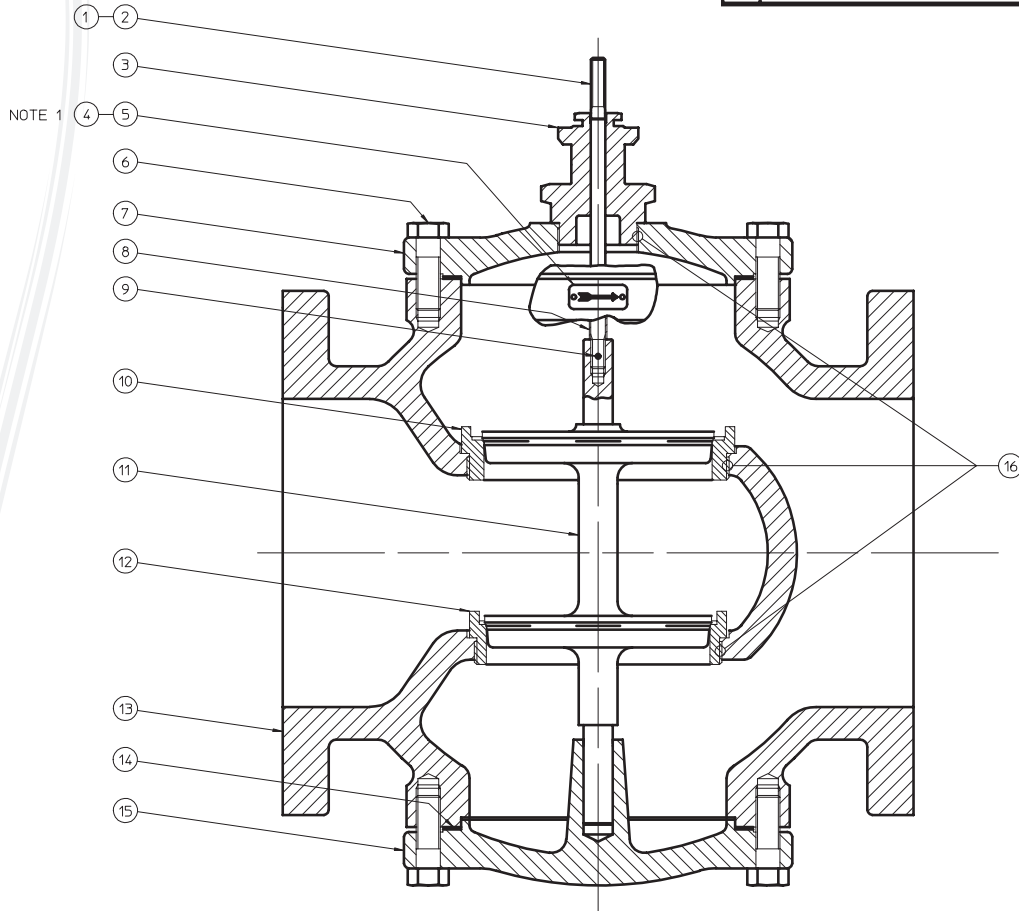


8	A/R	A0940021	DC111 LUBE	
7	1	C1180670-01	BONNET	BRASS ASTM B16 H02
6	1	B1060057	BONNET BEARING	FIBER REINFORCED POLYETHERETHERKETONE
5	3	4207-18700375-312	LIP PACKING	HIGH TEMP ETHYLENE PROPYLENE 90 DURO
4	1	B1640034-01	YOKE LOCKNUT	STL PLTD
3	1	B1060056	RETAINER BEARING	FIBER REINFORCED POLYETHERETHERKETONE
2	1	C1720061-03	PACKING RETAINER	BRASS ASTM B16
1	1	AS REQD	VALVE STEM	ST STL TYPE 316
ITEM	QTY	PART NO	DESCRIPTION	MATL SPEC

MATERIAL SEE TABLE	DRAWN BLB	DATE 11/10/05	WARREN CONTROLS INCORPORATED BETHLEHEM, PENNSYLVANIA 18020-8010			
	CHECKED		BONNET SUBASSEMBLY NLP PACKING 400°F EPDM 1.376-18 2-18 W/ BEARINGS			
TREATMENT	APPROVED					
FINISH			SIZE C	FSCH NO 03847	DWG NO C3769956	REV A

D3201752

REV	DESCRIPTION	DATE
A	ECN 1427	JM 1-22-97

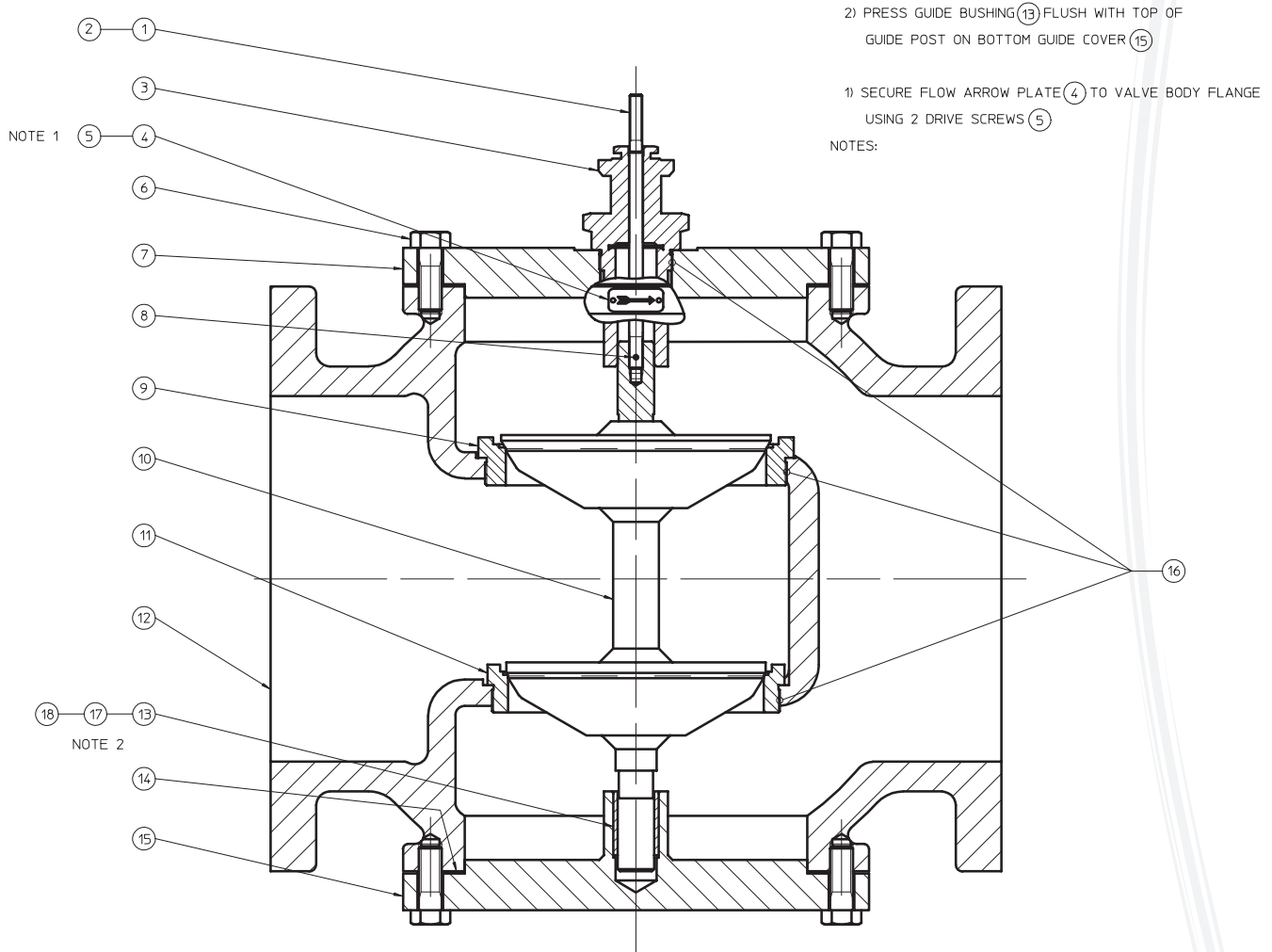


1) SECURE FLOW ARROW PLATE (4) TO VALVE BODY FLANGE
USING 2 DRIVE SCREWS (5)
NOTES:

16	A/R	PERMATEX #2
15	1	BOTTOM GUIDE COVER
14	2	GASKET
13	1	VALVE BODY
12	1	LOWER SEAT RING
11	1	PLUG
10	1	UPPER SEAT RING
9	1	GROOVE PIN
8	1	TRAVEL STOP
7	1	TOP COVER
6	A/R	HEX HEAD CAPSCREW
5	2	DRIVE SCREW NO 4 X 1/4
4	1	FLOW ARROW PLATE
3	1	BONNET SUBASSEMBLY SEE SEPARATE DWG
2	A/R	STEM LUBE
1	1	VALVE STEM
ITEM	QTY	DESCRIPTION

DESIGN J.MARTOCCI	DATE 11/5/96	WARREN CONTROLS CORPORATION BROADWAY, NEW JERSEY 08808		
CHECKED		5 & 6 INCH TYPE 22 VBA		
APPROVED				
SIZE D	PCH NO 03847	DWG NO D3201752	REV A	

D3201950

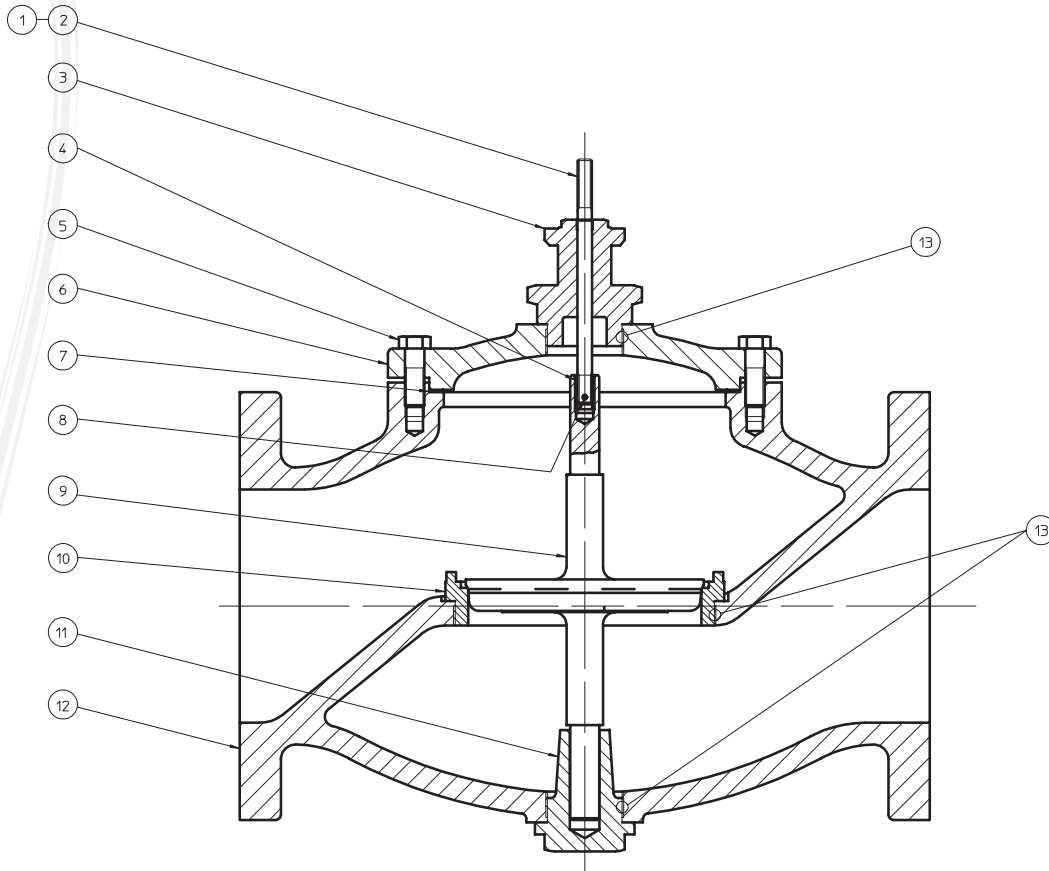


18	A/R	LOCTITE PRIMER T
17	A/R	LOCTITE 272
16	A/R	PERMATEX #2
15	1	BOTTOM GUIDE COVER
14	2	GASKET
13	1	GUIDE BUSHING
12	1	VALVE BODY
11	1	LOWER SEAT RING
10	1	PLUG
9	1	UPPER SEAT RING
8	1	GROOVE PIN
7	1	TOP COVER
6	A/R	HEX HEAD CAPSCREW
5	2	DRIVE SCREW NO 4 x 1/4
4	1	FLOW ARROW PLATE
3	1	BONNET SUBASSEMBLY SEE SEPARATE DRAWING
2	A/R	STEM LUBE
1	1	VALVE STEM
ITEM	QTY	DESCRIPTION

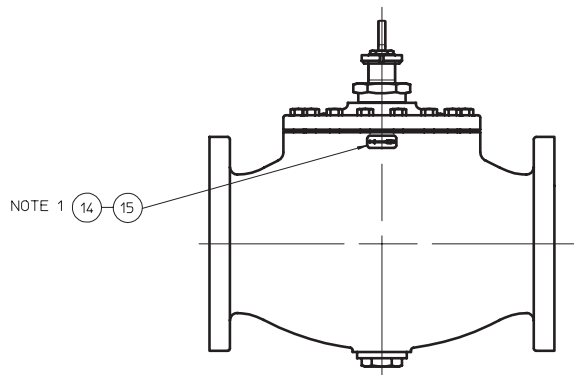
DESIGN	DATE	WARREN CONTROLS CORPORATION		
BLB	1/23/97	BROADWAY, NEW JERSEY 08808		
CHANGED		VALVE BODY ASSEMBLY		
APPROVED		8 & 10 INCH TYPE 22		
	SIZE	PICK NO	DWG NO	REV
	D	03847	D3201950	

D3241554

REV	DESCRIPTION	DATE
A	REDRAWN WITH CHANGE ECN 2284	BLB 7/2/07



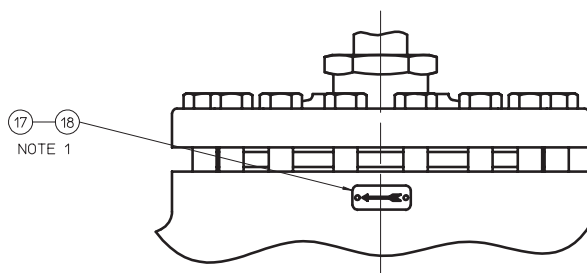
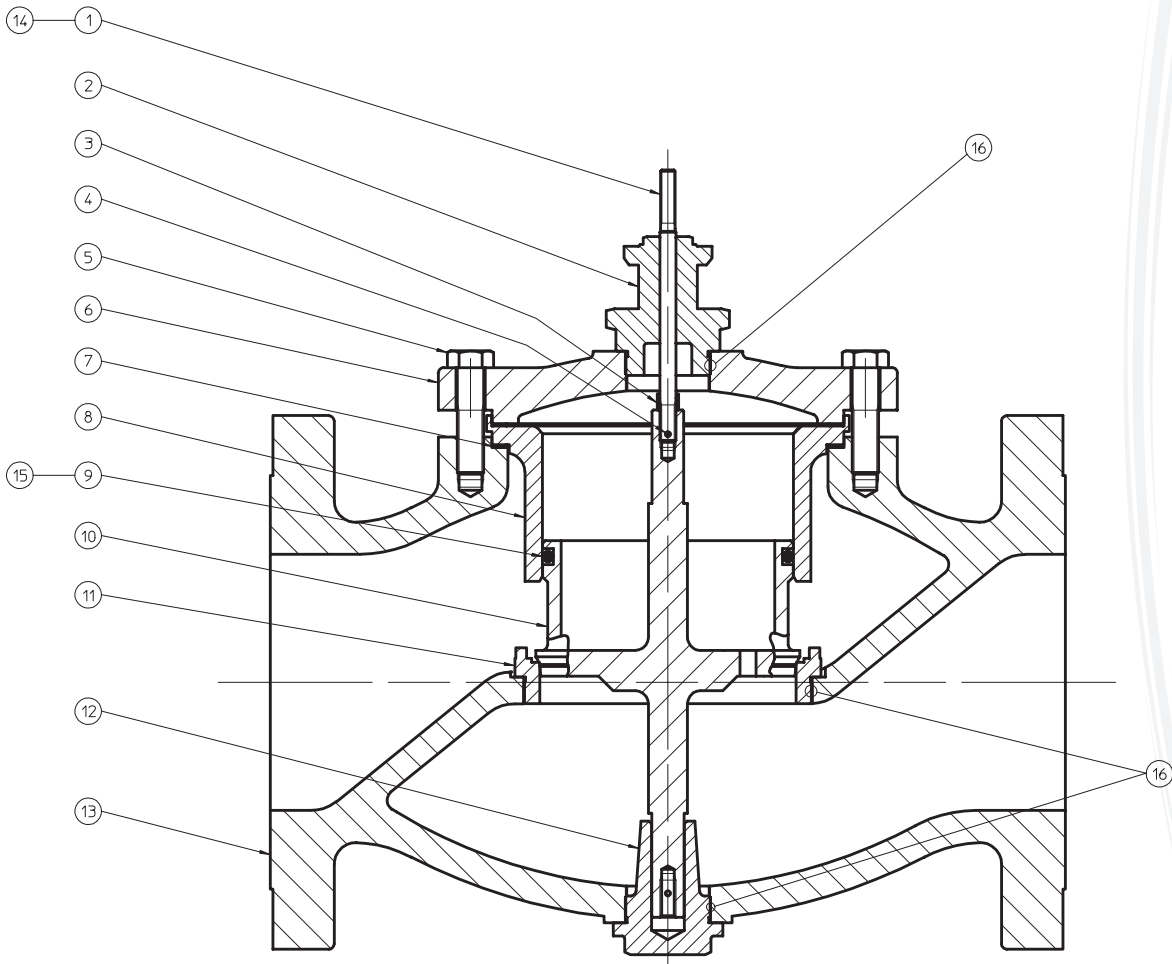
1) SECURE FLOW ARROW PLATE (ITEM 14) TO VALVE BODY FLANGE
USING 2 DRIVE SCREWS (ITEM 15).
NOTES:



15	2	DRIVE SCREW NO 4 x 1/4
14	1	FLOW ARROW PLATE
13	A/R	THD SEALANT
12	1	VALVE BODY
11	1	BOTTOM GUIDE PLUG
10	1	SEAT RING
9	1	PLUG
8	1	GROOVE PIN
7	1	GASKET
6	1	TOP COVER
5	A/R	HEX HEAD CAPSCREW
4	A/R	THREAD INSERT
3	1	BONNET SUBASSEMBLY SEE SEPARATE DWG
2	A/R	STEM LUBE
1	1	VALVE STEM
ITEM	QTY	DESCRIPTION

DESIGN	DATE	WARREN CONTROLS INCORPORATED			
BLB	7/2/07	BETHLEHEM, PENNSYLVANIA 18020-8010			
CHECKED		5 & 6 INCH TYPE 20			
APPROVED		VALVE BODY ASSEMBLY			
		SIZE	PUNCH NO	DATE NO	REV
		D	03847	D3241554	A

D3241556



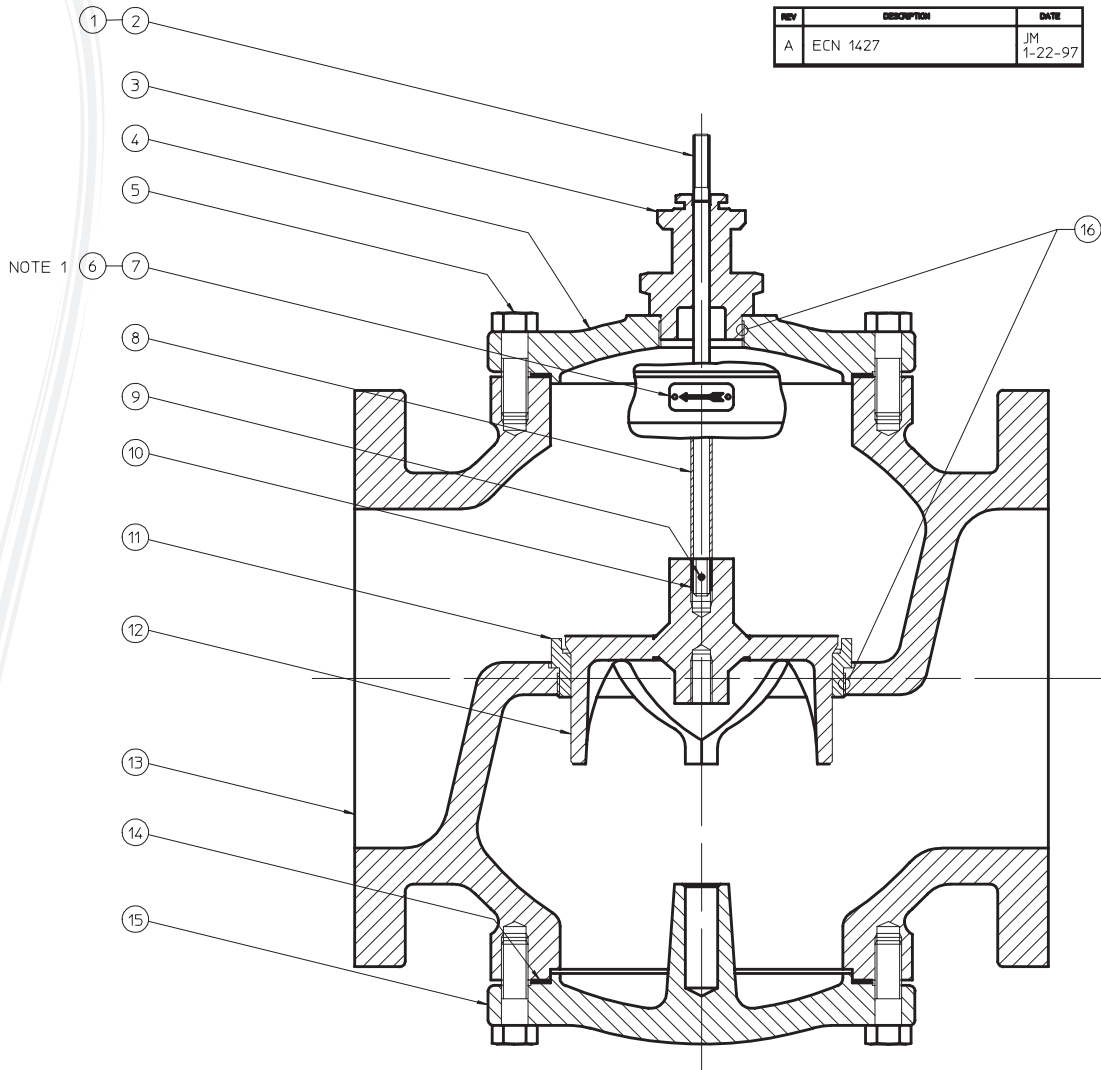
1) SECURE FLOW ARROW PLATE (17) TO VALVE BODY FLANGE USING 2 DRIVE SCREWS (18).
NOTES:

DESIGNED	DATE	6/20/03	WARREN CONTROLS INCORPORATED
APPROVED			BETHLEHEM, PENNSYLVANIA 18020-8010
			5 - 6 INCH TYPE 23
			VALVE BODY ASSEMBLY
	SIZE	PURCH NO	DATE NO
	D	03847	D3241556

18	2	DRIVE SCREW #4 x 1/4
17	1	FLOW ARROW PLATE
16	A/R	PERMATEX #2
15	A/R	O-RING LUBE
14	A/R	STEM LUBE
13	1	VALVE BODY
12	1	BOTTOM GUIDE PLUG
11	1	SEAT RING
10	1	PLUG
9	1	O-RING
8	1	PISTON CHAMBER
7	2	GASKET
6	1	TOP COVER
5	A/R	HEX HD CAPSCREW
4	1	GROOVE PIN
3	1	TRAVEL STOP
2	1	BONNET SUBASSEMBLY SEE SEPARATE DRAWING
1	1	VALVE STEM
ITEM	QTY	DESCRIPTION

D3241750

REV	DESCRIPTION	DATE
A	ECN 1427	JM 1-22-97



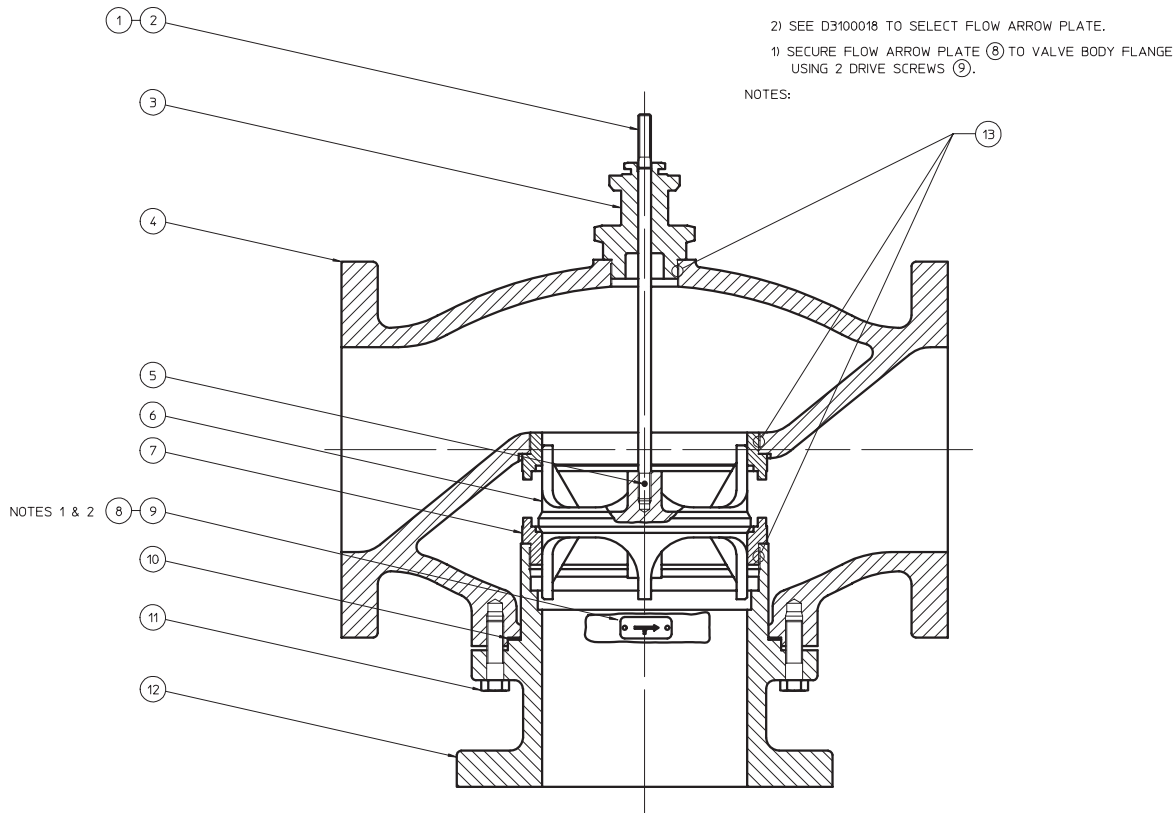
1) SECURE FLOW ARROW PLATE (6) TO VALVE BODY FLANGE
USING 2 DRIVE SCREWS (7)

NOTES:

16	A/R	PERMATEX #2
15	1	BOTTOM GUIDE COVER
14	2	GASKET
13	1	VALVE BODY
12	1	PLUG
11	1	SEAT RING
10	A/R	THREAD INSERT
9	1	GROOVE PIN 1/8 DIA x 1
8	1	TRAVEL STOP
7	2	DRIVE SCREW NO 4 x 1/4
6	1	FLOW ARROW PLATE
5	32	HEX HEAD CAPSCREW 5/8-11 x 2
4	1	TOP COVER
3	1	BONNET SUBASSEMBLY SEE SEPARATE DWG
2	A/R	STEM LUBE
1	1	VALVE STEM
ITEM	QTY	DESCRIPTION

DESIGN	DATE	WARREN CONTROLS CORPORATION			
J.MARTOCCI	11/1/96	BROADWAY, NEW JERSEY 08808			
CHECKED		8 & 10 INCH TYPE 20 VBA			
APPROVED					
SIZE	FIG NO	DATE NO	D3241750		
D	03847		A		

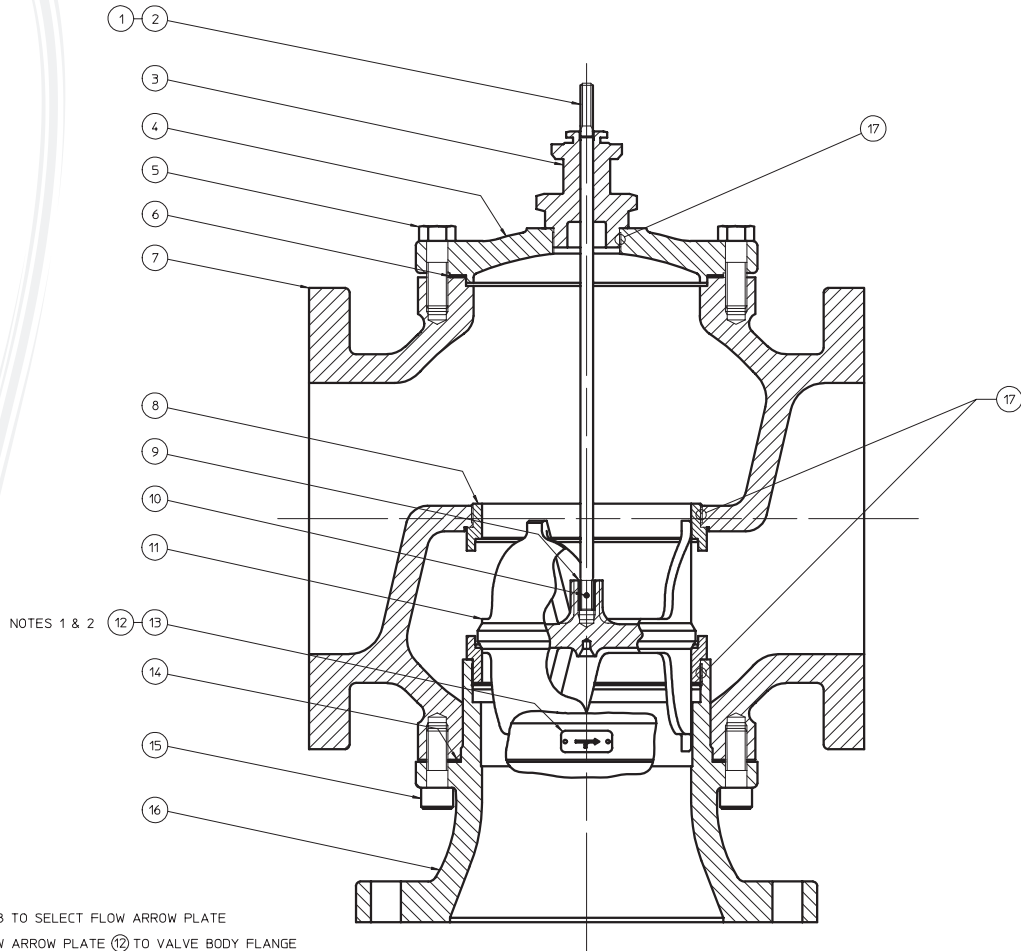
D3261551



13	A/R	THREAD SEALANT
12	1	BOTTOM PORT
11	A/R	HEX HEAD CAPSCREW
10	1	GASKET
9	2	DRIVE SCREW NO 4 x 1/4
8	1	FLOW ARROW PLATE
7	2	SEAT RING
6	1	PLUG
5	1	GROOVE PIN
4	1	VALVE BODY
3	1	BONNET SUBASSEMBLY SEE SEPARATE DWG
2	A/R	STEM LUBE
1	1	VALVE STEM
ITEM	QTY	DESCRIPTION

DESIGN	DATE	WARREN CONTROLS INCORPORATED			
J.MARTOCCI	11/1/96	BETHLEHEM, PENNSYLVANIA 18020-8010			
CHECKED		5 & 6 INCH TYPE 30 VBA			
APPROVED					
		SIZE	POUCH NO	DATE NO	REV
		D	03847	D3261551	A

D3261751



NOTES 1 & 2

2) SEE D3100018 TO SELECT FLOW ARROW PLATE

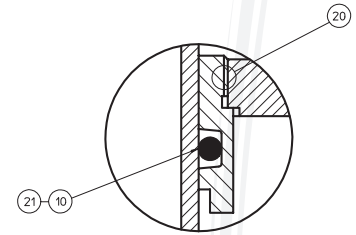
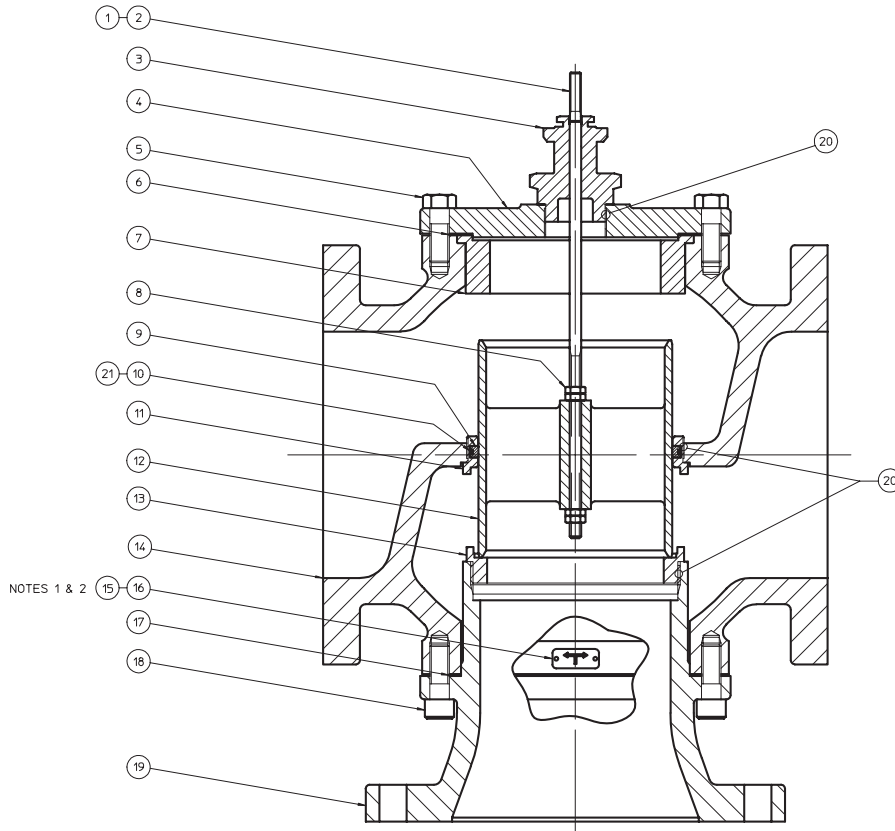
1) SECURE FLOW ARROW PLATE (12) TO VALVE BODY FLANGE USING 2 DRIVE SCREWS (13)

NOTES:

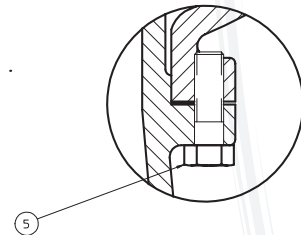
17	A/R	PERMATEX #2
16	1	BOTTOM PORT
15	16	SOCKET HEAD CAPSCREW 5/8-11 x 1 3/4
14	1	GASKET BOTTOM PORT
13	2	DRIVE SCREW NO 4 x 1/4
12	1	FLOW ARROW PLATE
11	1	PLUG
10	1	GROOVE PIN 1/8 DIA x 1
9	A/R	THREAD INSERT
8	2	SEAT RING
7	1	VALVE BODY
6	1	GASKET TOP COVER
5	16	HEX HEAD CAPSCREW 5/8-11 x 2
4	1	TOP COVER
3	1	BONNET SUBASSEMBLY SEE SEPARATE DWG
2	A/R	STEM LUBE
1	1	VALVE STEM
ITEM	QTY	DESCRIPTION

DESIGNED J.MARTOCCI	DATE 11/7/96	WARREN CONTROLS CORPORATION BROADWAY, NEW JERSEY 08808		
CHECKED		8 INCH TYPE 30 VBA		
APPROVED				
		REV D	PICK NO 03847	DWG NO D3261751

D3261752



2 1/2-5 INCH
PISTON SEAL



2 1/2-6 INCH
BOTTOM PORT
BOLTING

NOTES 1 & 2

2) SEE D3100018 TO SELECT FLOW ARROW PLATE
1) SECURE FLOW ARROW PLATE (15) TO VALVE BODY FLANGE
USING 2 DRIVE SCREWS (16)
NOTES:

21	A/R	O-RING LUBE
20	A/R	PERMATEX #2
19	1	BOTTOM PORT
18	A/R	SOCKET HEAD CAPSCREW
17	1	BOTTOM PORT GASKET
16	2	DRIVE SCREW NO 4 x 1/4
15	1	FLOW ARROW PLATE
14	1	VALVE BODY
13	1	SEAT RING
12	1	PISTON
11	1	PISTON GUIDE
10	1	O-RING
9	1	PISTON SEAL
8	4	JAMNUT 3/8-24
7	1	PISTON CHAMBER
6	1	TOP COVER GASKET
5	A/R	HEX HEAD CAPSCREW
4	1	TOP COVER
3	1	BONNET SUBASSEMBLY SEE SEPARATE DWG
2	A/R	STEM LUBE
1	1	VALVE STEM
ITEM	QTY	DESCRIPTION

DESIGNED J.MARTOCCI	DATE 11/8/96	WARREN CONTROLS CORPORATION BROADWAY, NEW JERSEY 08808			
CHECKED		2 1/2-8 INCH TYPE 32 VBA			
APPROVED					
		SIZE D	FIGURE NO 03847	DATE NO D3261752	REV



Series 2900

IOM2900 A 1209

IOM2900

 **WARREN CONTROLS**

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