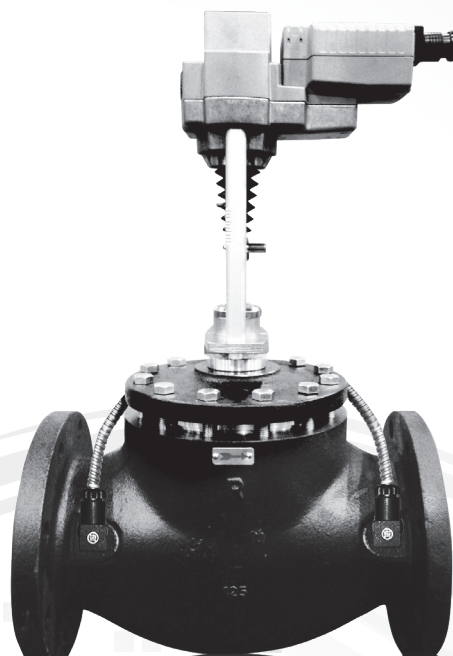




MONITROL

SIZES 2-1/2 - 10 INCH



WARREN CONTROLS

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PRODUCT OVERVIEW

MON_DP_IOM_RevD_0721

The Monitrol is a turn-key fluid control system featured with an industrial quality globe style control valve with built in and/or remote sensors for flow, pressure and temperature, modulated with a precision electric actuator and driven by a dedicated touchscreen controller that can manage the up to three sensors with various control algorithms. With the ability to also run in Manual mode or in Bypass mode as well as Auto, the Monitrol can still work in conjunction with a Building Management System for control or supervision via analog feedback or digital communications.

THE MON-DP FLOW REGULATOR

This version of the Monitrol has two dedicated pressure sensors installed on the valve – one at the inlet and one at the outlet. They are identical sensors and serve the role of providing a Differential Pressure derived variable for which it will use to help control with. Using this differential pressure variable along with a known specific gravity of the fluid, Cv information about the valve and valve position, a variable orifice flow calculation accurately calculates

flow and can effectively provide constant and stable flows when desired by the controller despite system pressure fluctuations and surges. The MON-DP acts as dramatically improved Pressure Independent Control Valve with better response, accuracy and improved dynamic range. Additionally, the MON-DP can be for simple flow regulation, it can also be biased by a feedforward signal and it can further operate in a compound loop for temperature and flow, with temperature as the primary variable.

Other models in the series include the MON-RG Pressure and Temperature regulator and the MON-FM Flow Regulator that uses a magnetic flowmeter as its flow sensor for yet improved flow accuracy. Each of these models also have single loop or compound loop control capability as well.

This Document is the Installation, Operation and Maintenance document for the MON-DP Flow Regulator only. Contact Warren Controls for other IOM documents.

CONFIGURATIONS

MODEL & SERIES		BODY								BODY
Model & Family		Valve Body	Body Size	Body Mat'l.	Ends	Flow Char.	Trim Mat'l.	Port Size	Packing	Bonnet Construction
MON-DP-29N	DP Flow Version (Sizes 2-1/2"-10")	20 Single Seat Valve 2-1/2" & 3"	250 2-1/2" 300 3"	R Cast Iron W WCB	F ANSI 125/150 lb.	E Equal % L Linear	B Bronze S 300 SS	F Full Port 1 1st Port Reduction 2 2nd Port Reduction E Extended Port	L NLP Ethylene Prop. Lip Packing T Teflon V-ring Self Adj.	S Standard PEEK Bearings
MON-DP-58H	DP Flow Version (Sizes 2-1/2"-4")	23 Cylinder Bal- anced 2-1/2" - 8"	400 4" 500 5"	D Ductile Iron	6 PN16 Flg. for MON-DP29N Only		7 400 SS (4" size 43 only)			FIELD ONLY USED FOR MON-DP-58H
MON-DP-291	(Type 23 Extended Port 6") (Type 23- 8")	22 Double Seat Valve 8" & 10" Only 40 Cage Unbalanced 2-1/2" & 3" 43 Cage Balanced 4" Only	600 6" 800 8" 010 10"		G ANSI 250 lb. for MON-DP29N Only					
		NOTE: See compatibility chart below								
		NOTE: 450°F for Teflon; 400°F for NLP Limited to Temperature Limit of the Pressure Sensors								
		Port Size: Xtnd Port ONLY available on 6" Type 23. See page 11 for full list of Cv's and Port Reductions available								
		Bronze Trim not available in the 5800 Series								
TRIM TYPE / VALVE SIZE / BODY MATERIAL - COMPATIBILITY										
MON-DP-29N:	Type 20 for 2.5"& 3" (Cast Iron Only)									
	Type 23 for 2.5"-4" (Cast Iron Only)									
	Type 23 for 5", 6" (Cast Iron & Ductile Iron)									
	Type 22 for 8" & 10" (Cast Iron Only)									
MON-DP-58N:	Type 40 for 2.5" & 3" only must use type 'S' Trim (Carbon Steel Only)									
	Type 43 for 4" only - must use type '7' Trim (Carbon Steel Only)									
MON-DP-291:	Type 23, 6" Extended Port (Cast Iron or Ductile)									
	Type 23, 8" (Cast Iron or Ductile)									

CONFIGURATIONS

	SENSORS				ACTUATION	COMM.	SPEC.
	Location 1	Location 2	Location 3	Location 4	Actuator Series	Proto- col	Specials
The Standard temperature sensor has a 'stub' tip end. The 100 mm Temperature sensor has a 100 mm tip end. For applications above 125C (257F), where a pressure sensor is used, the optional pigtail is required in the special order code. Fluid & Temperature are required process conditions for accepting an Order!	00 No Sensor/ Plug	P0 30 PSIG	P0 30 PSIG	00 No Sensor/ Plug	E024 Lin. 337 Lb. / 24 Vac Fail-in-Place (MON-DP-29N 2.5" & 3" Only)	0 None	0 None
		P1 60 PSIG	P1 60 PSIG		E025 Lin. 337 Lb. / 24 Vac w/Capacitive Backup (MON-DP-29N 2.5" & 3" Only)	M Modbus Ethernet	S Described by Line Item
	P0 30 PSIG	P2 100 PSIG	P2 100 PSIG	P0 30 PSIG	E026 Lin. 450 Lb. / 24 Vac w/Capacitive Backup (MON-DP-29N 2.5" - 5" Only)	B BACnet Ethernet	
	P1 60 PSIG	P3 200 PSIG	P3 200 PSIG	P1 60 PSIG	E029 Lin. 1011 Lb. / 24 Vac Fail-in-Place (MON-DP-29N models Only)		
	P2 100 PSIG	P4 300 PSIG	P4 300 PSIG	P2 100 PSIG	E031 Lin. 1011 Lb. / 24 Vac w/Battery Backup (MON-DP-29N Only)		
	P3 200 PSIG			P3 200 PSIG	E035 450 Lbf., 85 Secs/In., Fail Actuator Stem Down, 115 Vac		
	P4 300 PSIG			P4 300 PSIG	E036 450 Lbf., 85 Secs/In., Fail Actuator Stem Down, 220 Vac		
	T1 100 mm			T1 100 mm	E037 450 Lbf., 85 Secs/In., Fail Actuator Stem Down, 24 Vac		
	T2 10 mm			T2 10 mm	E038 450 Lbf., 85 Secs/In., Fail Actuator Stem Down, 24 Vdc		
					E039 450 Lbf., 85 Secs/In., Fail Actuator Stem Up, 115 Vac		
					E040 450 Lbf., 85 Secs/In., Fail Actuator Stem Up, 220 Vac		
					E041 450 Lbf., 85 Secs/In., Fail Actuator Stem Up, 24 Vac		
					E042 450 Lbf., 85 Secs/In., Fail Actuator Stem Up, 24 Vdc		
					E043 450 Lbf., 21 Secs/In., Fail In Place, 115 Vac		
					E044 450 Lbf., 21 Secs/In., Fail In Place, 220 Vac		
					E045 450 Lbf., 21 Secs/In., Fail In Place, 24 Vac		
					E046 450 Lbf., 21 Secs/In., Fail In Place, 24 Vdc		
					E147 1010 Lbf., 5.5 Secs/In., Fail In Place, 115 Vac		
					E148 1010 Lbf., 5.5 Secs/In., Fail In Place, 220 Vac		
					E149 1010 Lbf., 5.5 Secs/In., Fail In Place, 24 Vac		
					E150 1010 Lbf., 5.5 Secs/In., Fail In Place, 24 Vdc		
					E151 1010 Lbf., 5.5 Secs/In., Fail Safe, 115 Vac		
					E152 1010 Lbf., 5.5 Secs/In., Fail Safe, 220 Vac		
					E153 1010 Lbf., 5.5 Secs/In., Fail Safe, 24 Vac		
					E154 1010 Lbf., 5.5 Secs/In., Fail Safe, 24 Vdc		
					E160 1798 Lbf., 36 Secs/In., 2.5" Travel, IP-67 Encl, Fail In Place, 115 Vac		
					E161 1798 Lbf., 36 Secs/In., 2.5" Travel, IP-67 Encl, Fail In Place, 220 Vac		
					E162 1798 Lbf., 36 Secs/In., 2.5" Travel, IP-67 Encl, Fail In Place, 24 Vac		
					E163 1798 Lbf., 36 Secs/In., 2.5" Travel, IP-67 Encl, Fail In Place, 24 Vdc		
					E164 1798 Lbf., 36 Secs/In., 2.5" Travel, IP-67 Encl, Fail Safe, 115 Vac		
					E165 1798 Lbf., 36 Secs/In., 2.5" Travel, IP-67 Encl, Fail Safe, 230 Vac		
					E166 1798 Lbf., 36 Secs/In., 2.5" Travel, IP-67 Encl, Fail Safe, 24 Vac		
					E167 1798 Lbf., 36 Secs/In., 2.5" Travel, IP-67 Encl, Fail Safe, 24 Vdc		

For model MON-DP, Location 2 and Location 3 must be both the same 'P' pressure sensor

NOTE:

E024 - E031 Actuators are excluded from use on MON-DP-58H valves.
The E029/E031 with the 8" 23 will result in reduced MAX Cv for stroke length.
E024 & E025 Actuators are excluded for valves 4" and larger.

ACTUATOR COMPATIBILITY TABLE

All 8" - 10" Type 22 valves compatible for E029, E031 & E147-E154
Type 40 & 43 valves compatible with E147-E154
Type 20 or 2.5" & 3" compatible with all except E024 and E025
Type 23 or 2.5" & 3" compatible with all except E029 and E031
Type 23, 4" and 5" compatible w/all except the E024 and E025 actuators
Type 23, 6" Standard & Reduced Ports compatible with with E029, E031 & E147-E154
Type 23, 6" Extended Port & Type 23, 8" Compatible with E160-E167

VALVE IDENTIFICATION

To use these instructions it is necessary to identify the configuration of the valve. Factory assembled control valves have a valve tag mounted on the actuator. The valve's part number (P/N) is present on the tag. 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 Monitrol Control Valves section for location of part number, serial number, and other important information on valve.)

ACTUATOR NAMEPLATES

3"

3"

1.5"

WARREN CONTROLS, INC.
2600 Emrick Blvd Bethlehem, PA 18020-0010
PH: (610) 317-0800/FAX: (610) 317-2989
www.warrencontrols.com MADE IN U.S.A.

MONITROL

Model No. _____

Serial No. _____

Supply _____

TMax: _____

For use on E022, E023, PL1A, PL1B, PL1C, PL2A, PL2B & PL2C actuators

1.5"

2.5"

WARREN CONTROLS warrencontrols.com

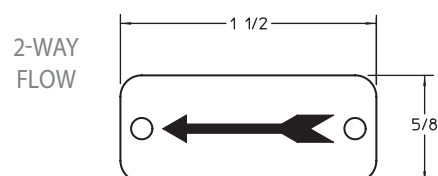
Model No. _____

Serial No. _____

Supply _____ TMax: _____

For use on E024, E025, E026, E029 & E031 actuators

FLOW ARROW PLATE



VBA NAMEPLATE

INDUSTRIAL
VBA

9/10

1 3/4

Cv Tmax

CHAR

TRIM MATL

QUICK SELECTION GUIDE

Proper Selection of control valves involves matching the valve's rated Cv with the required pressure drop. This ensures the proper authority ratio for the application. However, in keeping up with the PICV marketing practices and in order to facilitate the valve selection process, the table below gives the reader an easy selection guide per size over given design ranges of flow rates.

MON-DP-29N MODEL VALVES										
SUGGESTED SELECTION FLOW RANGE PER VALVE SIZE										
VALVE SIZE		VALVE CHARACTERISTICS			DESIGN FLOW RANGE (GPM) @ 5 PSI ΔP		DESIGN FLOW RANGE (GPM) @ 10 PSI ΔP		DESIGN FLOW RANGE (GPM) @ 15 PSI ΔP	
ANSI	DIN	Valve Type	Port Size	Cv	MIN flow range	MAX flow range	MIN flow range	MAX flow range	MIN flow range	MAX flow range
2.5 in	65 mm	20	Full	65	3	145	4	206	5	252
3.0 in	80 mm	20	Full	90	4	201	6	285	7	349
4.0 in	100 mm	23	2 Sizes Reduced	116	5	259	7	367	9	449
			1 Size Reduced	144	6	322	9	455	11	558
			Full	170	8	380	11	538	13	658
5.0 in	125 mm	23	2 Sizes Reduced	203	9	454	13	642	16	786
			1 Size Reduced	237	11	530	15	749	18	918
			Full	280	13	626	18	885	22	1084
6.0 in	150 mm	23	2 Sizes Reduced	275	12	615	17	870	21	1065
			1 Size Reduced	315	14	704	20	996	24	1220
			Full	360	16	805	23	1138	28	1394
			Extended	420	19	939	27	1328	33	1627
8.0 in	200 mm	22	2 Sizes Reduced	520	23	1163	33	1644	40	2014
			1 Size Reduced	595	27	1330	38	1881	46	2304
			Full	680	30	1520	43	2150	53	2634
8.0 in	200 mm	23	Full	680	30	1520	43	2150	53	2634
10.0 in	250 mm	22	2 Sizes Reduced	735	33	1643	46	2324	57	2847
			1 Size Reduced	840	38	1878	53	2656	65	3253
			Full	960	43	2147	61	3036	74	3718

MON-DP-58H MODEL VALVES										
SUGGESTED SELECTION FLOW RANGE PER VALVE SIZE										
VALVE SIZE		VALVE CHARACTERISTICS			DESIGN FLOW RANGE (GPM) @ 5 PSI ΔP		DESIGN FLOW RANGE (GPM) @ 10 PSI ΔP		DESIGN FLOW RANGE (GPM) @ 15 PSI ΔP	
ANSI	DIN	Valve Type	Port Size	Cv	MIN flow range	MAX flow range	MIN flow range	MAX flow range	MIN flow range	MAX flow range
2.5 in	65 mm	40	Full	65	3	145	4	206	5	252
3.0 in	80 mm	40	1 Size Reduced	65	3	145	4	206	5	252
			Full	100	4	224	6	316	8	387
4.0 in	100 mm	43	1 Size Reduced	100	4	224	6	316	8	387
			Full	170	8	380	11	538	13	658

Remarks:

- 1- The above ranges are based on a minimum pressure drop of 5 psig (0.34 barg) to 15 psig (1.03 barg) respectively across the control valve element of the Monitrol assembly.
- 2- The Above Figures are based on water (SG = 1).
- 3- The Above figures do not account for reducers if and when used.
- 4- For the most economical selection, always select the smallest size that meets a design flow rate.

INFORMATION PRESENT ON MONITROL 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 Monitrol control valves are shown on the next page. The table on page 5 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 be present. The plates used, and information present, on Warren Controls other product lines or older valves may be different, contact the factory for details.

INFORMATION PRESENT ON MONITROL CONTROL VALVES

MON-DP-29N

MON-DP-58H

Model Number & Serial Number			
Information	Symbol(s)	Location	Notes
Model number (Configuration)	Model No.	On actuator	• On Actuator Nameplate attached to actuator.
Serial number	Serial No.	On actuator and valve body	<ul style="list-style-type: none"> • On Actuator Nameplate attached to actuator. • Sales order number only stamped on top of valve body top cover or top of valve body (MON-DP-29N)* • Sales order number only stamped on flat boss on valve body between end connections (MON-DP-58H)* * Number stamped using approximately 1/8 inch tall characters
Flow Direction			
Information	Symbol(s)	Location	Notes
Flow direction through valve		On valve body	• On Flow Arrow Plate attached to valve body top cover flange
Supply			
Information	Symbol(s)	Location	Notes
Supply voltage	Supply	On actuator	• On Actuator Nameplate attached to actuator.

MON-DP-29N

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 actuator. • On Industrial VBA Nameplate attached to top cover flange between the end connections on side opposite flow arrow plate (MON-DP-29N).
Trim Cv (Flow coefficient)	Cv	On valve body	• On Industrial VBA Nameplate attached to top cover flange between the end connections on side opposite flow arrow plate. (MON-DP-29N)
Trim style (Characteristic)	CHAR	On valve body	• On Industrial VBA Nameplate attached to top cover flange between the end connections on side opposite flow arrow plate. (MON-DP-29N)
Trim material	TRIM MATL	On valve body	• On Industrial VBA Nameplate attached to top cover flange between the end connections on side opposite flow arrow plate. (MON-DP-29N)

MON-DP-58H

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 valve body bonnet flange between the end connections on side opposite flow arrow plate. (MON-DP-58H)
Trim Cv (flow coefficient)	Cv	On valve body	• On Industrial VBA Nameplate attached to valve body bonnet flange between the end connections on side opposite flow arrow plate. (MON-DP-58H)
Trim style (Characteristic)	CHAR	On valve body	• On Industrial VBA Nameplate attached to valve body bonnet flange between the end connections on side opposite flow arrow plate. (MON-DP-58H)
Trim material	TRIM MATL	On valve body	• On Industrial VBA Nameplate attached to valve body bonnet flange between the end connections on side opposite flow arrow plate. (MON-DP-58H)

VALVE BODY SPECIFICATIONS

2-Way Valves (CONTROL OF LIQUIDS, GASES, AND STEAM)

29N20 2-Way Single Seat Unbalanced Valve

The most commonly applied solution for sizes 3" and under with ANSI Class IV leakage rating. **See Table on page 8 for Fluid Temperature Limits.**

Sizes:	2-1/2 & 3 inch (DN 65 & 80)
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 (EPDM Lip Packing is <u>not</u> suitable for use with oils, hydrocarbons, or acids.) Guided Low-Friction TFE V-Ring, Spring Loaded Adjustable Graphite Packing,
Rangeability:	50:1



29N22 2-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 leakage rating. **See Table on page 8 for Fluid Temperature Limits**

Sizes:	8, 10 & 12 inch (DN 200, 250 & 300)
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 (EPDM lip packing is <u>not</u> suitable for use with oils, hydrocarbons, or acids) Guided Low-Friction TFE V-Ring, Spring Loaded Adjustable Graphite Packing
Rangeability:	50:1



29N23 2-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 leakage rating. It is limited to cleaner fluids. **See Table on page 8 for Fluid Temperature Limits.**

Sizes:	4, 5, 6 & 8 inch (DN 100, 125, 150 & 200)
Body:	ANSI B16.1 Iron 125LB Flange or 250LB Flange Ductile Iron ANSI B16.42 Class 150 FLG or EN1092-2 PN16 400-18 FLG (5 thru 8, DN125 thru 200)
Trim:	EQ% [Bronze, (4 thru 6, DN 100 thru 150); 300 Series Stainless Steel (4 thru 8, DN 100 thru 200)], Linear [300 Series Stainless Steel, (4 thru 8, DN 100 thru 200)]
Packing:	Long-Life Multi-Stack, EPDM Lip Packing (EPDM lip packing is <u>not</u> suitable for use with oils, hydrocarbons, or acids.) Guided Low-Friction TFE V-Ring, Spring Loaded Adjustable Graphite Packing
O-Ring:	EPDM (BRZ Trim) *Fluoraz 797 (300 SSTRim)
Rangeability:	50:1



Note: Fluoraz o-ring in Type 2923 is not compatible with the following solvents: acetates, acetone, benzene, carbon tetrachloride, ethers, Freons, ketones, lacquers, methyl ethyl ketone, and toluene - Consult Factory with service conditions for alternate o-ring selection.

BODY PRESSURE-TEMPERATURE RATINGS (PSIG) ANSI B16.1 IRON		
TEMP (°F)	125 FLG & PN16	250 FLG
-20 to 150	175	400
200	165	370
250	150	340
300	140	310
350	125	280
400	--	250

BODY PRESSURE-TEMPERATURE RATINGS (PSIG) WCB STEEL	
TEMP (°F)	150 FLG
-20 to 100	285
150	272
200	260
250	245
300	230
350	215
400	200
450	185

BODY PRESSURE-TEMPERATURE RATINGS (PSIG) ANSI B16.42 DUCTILE IRON	
TEMP (°F)	150 FLG
-20 to 100	250
150	242
200	235
250	225
300	215
350	207
400	200
450	185

BODY PRESSURE-TEMPERATURE RATINGS (BAR) EN 1092-2 DUCTILE IRON	
Temp (°C)	PN16 400-18 FLG
-10 to 120	16
150	15.5
200	14.7
232	14.1

Body Pressure — Temperature Ratings conform to ANSI or EN 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.

58H40 2-Way Single Seat Unbalanced Valve with Cage Retained Seat

The 5840 Valve is particularly effective for the control of liquids, gases, and steam. It is a suitable solution for applications with dirty fluids and high pressure drops. ANSI Class IV leakage rating standard. **See Table on page 8 for Fluid Temperature Limits**

Sizes:	2-1/2 & 3 inch (DN 65 & 80)
Body:	WCB Steel 150LB Flange
Trim:	EQ% or Linear: 316 Stainless Steel
Leakage Ratings:	ANSI Class IV (Stainless Steel Trim)
Packing Type &	EPDM Lip w/ PEEK Bearings
Bonnet Construction:	TFE V-Ring, Spring Loaded, w/ PEEK Bearings
Rangeability:	50:1



Trim Materials	Flowing Differential Pressure Limit
Bronze	50 PSID
300 Series Stainless Steel	100 PSID
316 Stainless Steel	100 PSID
400 Stainless Steel	200 PSID

58H43 2-Way Single Seat Caged Balanced Valve with Cage Retained Seat

The 5843 is a balanced valve that is an effective solution for the control of liquids, gases, and steam at 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 leakage rating standard. It is limited to cleaner fluids. **See Table on page 8 for Fluid Temperature Limits**

Sizes:	4 inch (DN 100)
Body:	WCB Steel 150LB Flange
Trim:	EQ% or Linear: 400 Stainless Steel
Leakage Ratings:	ANSI Class IV (Fluoraz Seal)
Packing Type &	EPDM Lip w/ PEEK Bearings and Fluoraz Seal
Bonnet Construction:	TFE V-Ring, Spring Loaded, w/ PEEK Bearings and Fluoraz Seal
Rangeability:	50:1



Note: Fluoraz Seal in Type 5843 is not compatible with the following solvents: acetates, acetone, benzene, carbon tetrachloride, ethers, Freons, ketones, lacquers, methyl ethyl ketone, and toluene - Consult Factory with service conditions for alternate seal selection.

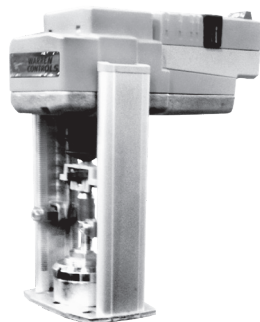
FLUID TEMPERATURE LIMITS

FLUID TEMPERATURE LIMITS						
VALVE TYPE	BODY MATERIAL	END CONNECTION	TRIM MATERIAL	PACKING TYPE	T MAX	T MIN
20 2-Way Single Seat	Cast Iron	125FLG, PN16 FLG	Bronze, 300 Stainless Steel	EPDM	350°F	-20°F
	Cast Iron	125FLG, PN16 FLG	Bronze, 300 Stainless Steel	Teflon	350°F	60°F
	Cast Iron	250FLG	Bronze, 300 Stainless Steel	EPDM	400°F	-20°F
	Cast Iron	250FLG	Bronze, 300 Stainless Steel	Teflon	400°F	60°F
22 2-Way Double Seat	Cast Iron	125FLG, PN16 FLG	Bronze, 300 Stainless Steel	EPDM	350°F	-20°F
	Cast Iron	125FLG, PN16 FLG	Bronze, 300 Stainless Steel	Teflon	350°F	60°F
	Cast Iron	250FLG	Bronze, 300 Stainless Steel	EPDM	400°F	-20°F
	Cast Iron	250FLG	Bronze, 300 Stainless Steel	Teflon	400°F	60°F
23 2-Way Cylinder Balanced	Cast Iron	125FLG, PN16 FLG	Bronze	EPDM	300°F	-20°F
	Cast Iron	125FLG, PN16 FLG	Bronze	Teflon	300°F	60°F
	Cast Iron	125FLG, PN16 FLG	300 Stainless Steel	EPDM	350°F	23°F
	Cast Iron	125FLG, PN16 FLG	300 Stainless Steel	Teflon	350°F	60°F
	Cast Iron	250FLG	Bronze	EPDM	300°F	-20°F
	Cast Iron	250FLG	Bronze	Teflon	300°F	60°F
	Cast Iron	250FLG	300 Stainless Steel	EPDM	400°F	23°F
	Cast Iron	250FLG	300 Stainless Steel	Teflon	400°F	60°F
	Ductile Iron	150FLG	Bronze	EPDM	300°F	-20°F
	Ductile Iron	150FLG	Bronze	Teflon	300°F	60°F
	Ductile Iron	150FLG	300 Stainless Steel	EPDM	400°F	23°F
	Ductile Iron	150FLG	300 Stainless Steel	Teflon	450°F	60°F
	Ductile Iron	PN16 FLG	Bronze	EPDM	300°F	14°F
	Ductile Iron	PN16 FLG	Bronze	Teflon	300°F	60°F
	Ductile Iron	PN16 FLG	300 Stainless Steel	EPDM	400°F	23°F
	Ductile Iron	PN16 FLG	300 Stainless Steel	Teflon	450°F	60°F
40 2-Way Single Seat	Steel	150FLG	316 Stainless Steel	EPDM	400°F	-20°F
	Steel	150FLG	316 Stainless Steel	Teflon	450°F	60°F
43 2-Way Cage Balanced	Steel	150FLG	316 Stainless Steel, 400 Stainless Steel	EPDM	400°F	23°F
	Steel	150FLG	316 Stainless Steel, 400 Stainless Steel	Teflon	450°F	60°F

NOTE: -20°F T MIN temperature limit is for indoor applications with low humidity where ice will not form on the valve stem.

E024, E025, E026, E029 & E031 ELECTRIC ACTUATOR SPECIFICATIONS

E024



E025



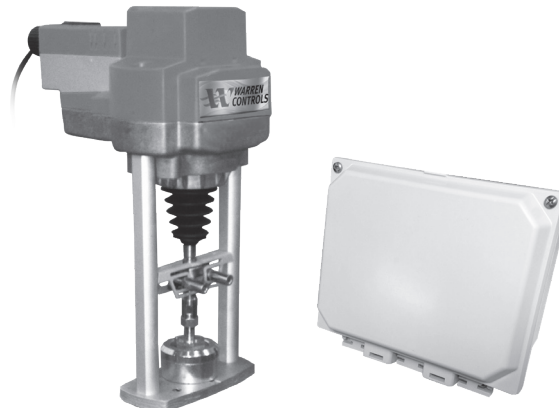
E026



E029



E031



E024, E025, E026, E029 & E031: (Not Available for 58H40 and 58H43 Valve Series)

Control Signal: 2-10 Vdc

(4-20 mA_{dc} with 500 ohm resistor Kit KR500-supplied with motor)

Control Action, Loss of Signal: Increasing Signal Opens Valve,
Loss of Signal Closes Valve (Default Setting)
Reversible with Switch. Can be specified when ordering.

Feedback Signal: 2-10 Vdc

Power Supply: 24 VAC/DC

Loss of Power: **E024 & E029** (FAIL LAST POSITION)

E031 (E029 w/ VMS-50 BCM, FAIL SAFE TO LOSS OF SIGNAL POSITION)

E025 & E026 (ELECTRONIC FAIL SAFE)

Fail Lower Port Closed/ Upper Port Open (Default Setting)

Reversible with Switch. Can be specified when ordering.

Power Consumption

Running: **E024** 4W; **E025** 8.5W; **E026** 12W; **E029/E031** 6W

Holding: **E024** 2.5W; **E025** 2.5W; **E026** 3W; **E029/E031** 3.5W

Timing: See Configuration Tables

Manual Override: Hex crank (supplied with actuator)

Construction: Aluminum Die Cast and Plastic Housing

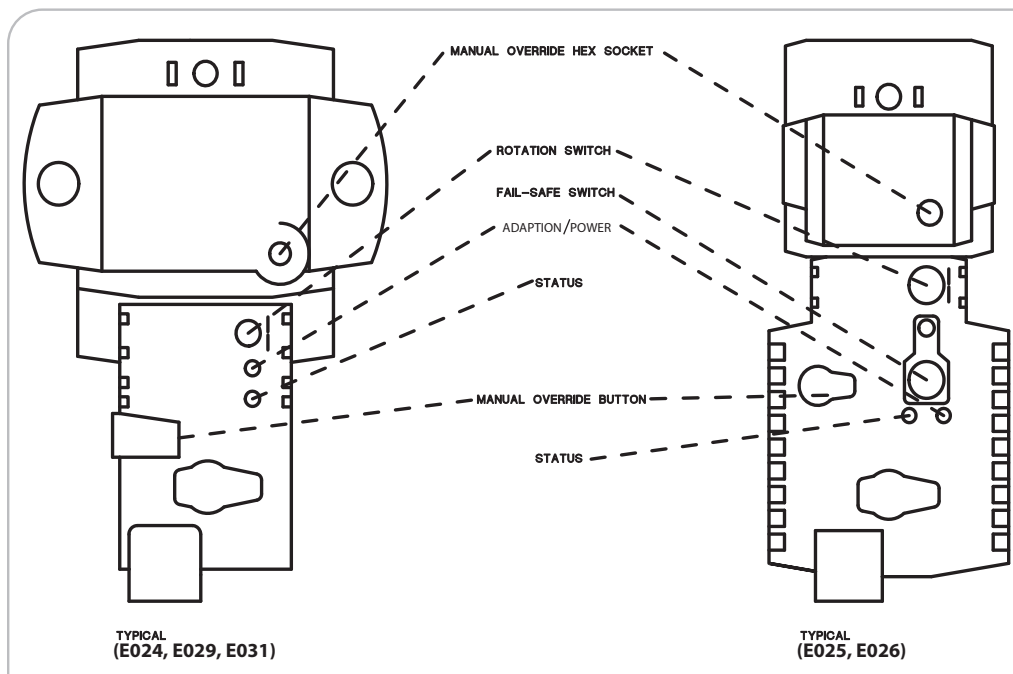
Locations: NEMA Type 2 / IP54, UL enclosure type 2

Temperature Limits: +32°F to 122°F Ambient

Mounting: Vertical above centerline of valve

Safety Agency Listing: CE, cUL pending

ELECTRIC ACTUATOR OVERVIEW

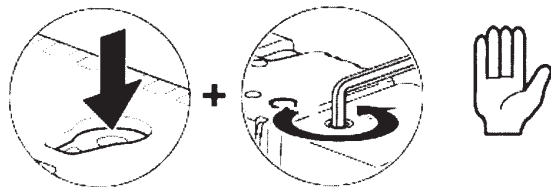
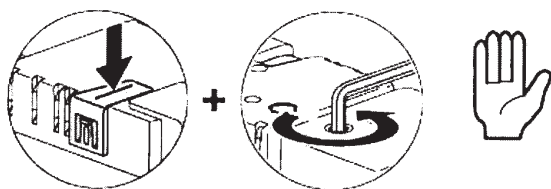


The actuators feature a native 2-10 Vdc Control Signal. Installation of the KR500 Resistor Kit converts the Control Signal input to **4-20 mAdc**. When using 4-20 mA input, terminate the 500 ohm resistor from the KR500 resistor kit between the White and Black actuator wires. When using the VMS-50, this can be easily done between the NO1 and LN terminals for Actuator 1 and between the NO2 and LN terminals for Actuator 2.

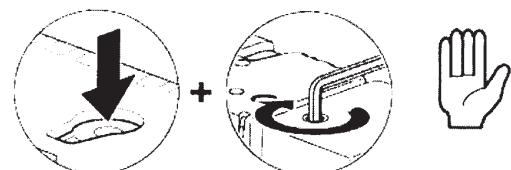
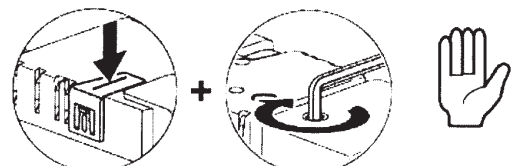
A single wire brings a 2-10 Vdc Feedback Signal. The Feedback Signal is not available using 4-20 mAdc.

Manual Override is possible by turning off the power, pressing the Manual Override button and rotating the supplied Allen key in the Socket.

To raise the actuator stem turn the Allen key counter-clockwise.



To lower the actuator stem turn the Allen key clockwise.



DANGER

PRESS THE MANUAL OVERRIDE BUTTON IN FIRMLY WHILE OPERATING THE MANUAL OVERRIDE. FAILURE TO DO SO WHILE THE ACTUATOR IS POWERED OR BEING DRIVEN TO THE POWER FAILURE DIRECTION CAN CAUSE SERIOUS PERSONAL INJURY AND DAMAGE THE ACTUATOR.

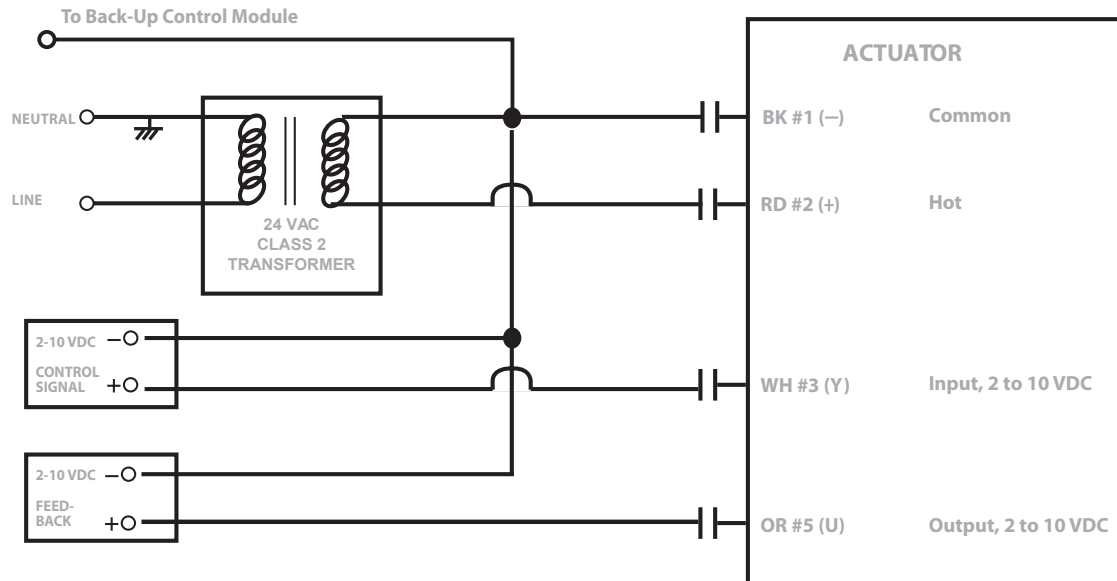
The Rotation Switch can be adjusted to set the direction the Control Signal opens and closes the valve (and Loss of Signal direction in some actuators) in the field without actuator removal.

Adaption (Auto-Calibration - green LED), a combined Adaption/Power button to reset and relearn the valve stroke as well as indicate the actuator is powered. When the Button is pressed, the actuator will drive one full cycle to its mechanical end stops OR the valves mechanical seats. Upon completion of this cycle the actuators working range (Control Signal, Feedback Signal and running time) will be adjusted to the actual stroke of the actuator.

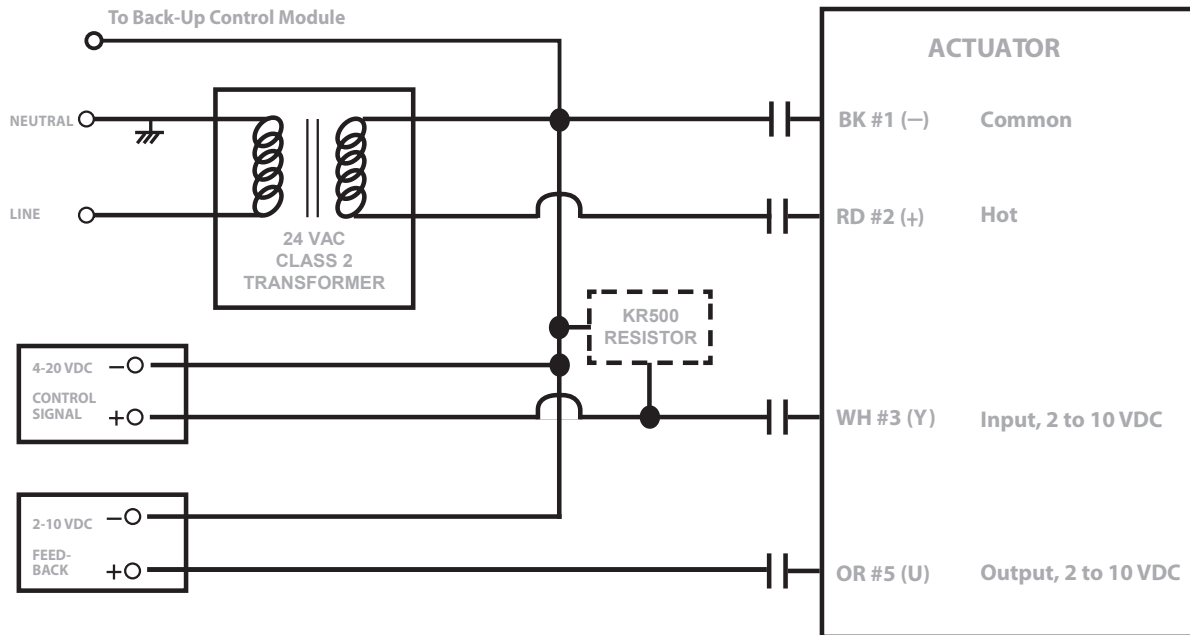
Status (yellow LED) to confirm communication.

ELECTRIC ACTUATOR WIRING DIAGRAMS

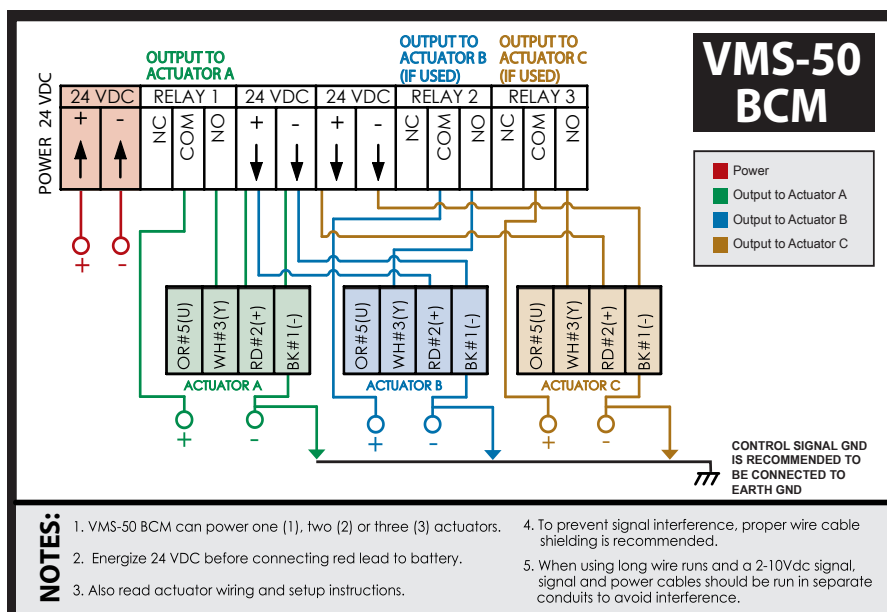
2-10 VDC



4-20 mADC



VMS-50 WIRING DIAGRAM



VMS-50 BCM	
TERMINAL IDENTIFICATION	CONNECTION/DESCRIPTION
24 VDC + ←	24 Vdc (+) IN
24 VDC - ←	24 Vdc (-) IN
RELAY 1 NC	Normally Closed Relay Contact 1st Actuator
RELAY 1 COM	Common Relay Contact/Control Signal (+) 1st Actuator
RELAY 1 NO	Normally Open Relay Contact 1st Actuator
24 VDC + →	24 Vdc (+) OUT
24 VDC - →	24 Vdc (-) OUT
RELAY 2 NC	Normally Closed Relay Contact 2nd Actuator
RELAY 2 COM	Common Relay Contact/Control Signal (+) 2nd Actuator
RELAY 2 NO	Normally Open Relay Contact 2nd Actuator
RELAY 3 NC	Normally Closed Relay Contact 3rd Actuator
RELAY 3 COM	Common Relay Contact/Control Signal (+) 3rd Actuator
RELAY 3 NO	Normally Open Relay Contact 3rd Actuator

Operation:Proportional Normal:

24 Vdc External Power Supply LOAD connected to 24 Vdc IN terminals of VMS-50 BCM. Building Power Source, 115 VAC 50/60 Hz required for VMS-50 PS, connected to 24 Vdc External Power Supply LINE. Actuator responds to modulating input signal.

Power Failure: 24 Vdc OUT from VMS-50 BCM changes from 24 Vdc from External Power Supply to 24 Vdc from battery/inverter. Relay(s) break the connection between Common and Normally Open

Contact terminals forcing the actuator(s) to go to the signal failure direction for their rotation switch position.

Loss of Signal: 24 Vdc External Power Supply connected to 24 Vdc IN terminals of VMS-50 BCM. Building Power Source, 115 VAC 50/60 Hz required for VMS-50 PS, connected to 24 Vdc External Power Supply. The control signal is broken forcing the actuator(s) to go to the signal failure direction for their rotation switch position.

VMS-50 INSTALLATION- PROPORTIONAL CONTROL

1. Disengage the building power circuit before wiring. Verify that the battery inside the VMS-50 BCM has its wires disconnected and leave them that way for now. Disconnect them if they are connected.

2. Connect the VMS-50 BCM to the actuator(s) as shown on wiring diagram. The VMS-50 BCM can power one, two or three actuators.

Actuator A: Connect Relay 1 Normally Open Contact **RELAY 1 NO** to white wire from actuator to drive the valve stem in the direction determined by the actuator rotation switch position. Connect 24 Vdc (+) OUT **24 VDC + →** to red wire from actuator to provide power. Connect grounded reference - negative/black wire from actuator to 24 Vdc (-) OUT **24 VDC - →**. Also connect the control signal (-) to the black wire from the actuator. Connect Relay 1 Common Contact **RELAY 1 COM** to the control signal positive (+). If the control signal is 4-20mADC a KR500 500 ohm resistor is required. Terminate the resistor between Relay 1 Normally Open Contact **RELAY 1 NO** and 24 Vdc (-) OUT **24 VDC - →**.

Actuator B: Connect Relay 2 Normally Open Contact **RELAY 2 NO** to white wire from actuator to drive the valve stem in the direction determined by the actuator rotation switch position. Connect 24 Vdc (+) OUT **24 VDC + →** to red wire from actuator to provide power. Connect grounded reference - negative/black wire from actuator to 24 Vdc (-) OUT **24 VDC - →**. Also connect the control signal (-) to the black wire from the actuator. Connect Relay 2 Common Contact **RELAY 2 COM** to the control signal positive (+). If the control signal is 4-20mADC a KR500 500 ohm resistor is required. Terminate the resistor between Relay 2 Normally Open Contact **RELAY 2 NO** and 24 Vdc (-) OUT **24 VDC - →**.

Actuator C: Connect Relay 3 Normally Open Contact **RELAY 3 NO** to white wire from actuator to drive the valve stem in the direction determined by the actuator rotation switch position. Connect 24 Vdc (+) OUT **24 VDC + →** to red wire from actuator to provide power. Connect grounded reference - negative/black wire from actuator to 24 Vdc (-) OUT **24 VDC - →**. Also connect the control signal (-) to the black wire from the actuator. Connect Relay 3 Common Contact **RELAY 3 COM** to the control signal positive (+). If the control signal is 4-20mADC a KR500 500 ohm resistor is required. Terminate the resistor between Relay 3 Normally Open Contact **RELAY 3 NO** and 24 Vdc (-) OUT **24 VDC - →**.

VMS-50 INSTALLATION- PROPORTIONAL CONTROL- CONT'D

3. While still disconnected, wire the 24 Vdc External Power Supply LOAD to the VMS-50 BCM. Connect the POSITIVE (+) lead to the 24 Vdc (+) IN **24 VDC+** ← terminal, then connect the NEGATIVE (-) lead to the 24 Vdc (-) IN **24 VDC-** ← terminal.

4. Connect the 24 Vdc External Power Supply LINE into the building power source. For the VMS-50 PS plug the three pin LINE input plug into the 115 VAC 50/60 Hz building power source.

5. Verify that building power is live then connect the loose red wire inside the VMS-50 BCM enclosure to the positive (+) battery terminal and the black wire to the negative (-) battery terminal.

NOTE: Engage the building power to the VMS-50 BCM before connecting the battery. Connecting the battery first causes the VMS-50 BCM to go into the power failure mode.

VMS-50 BCM (SP12-1.2 (12V1.4 AH/T1)) BATTERY REPLACEMENT**Black****Red****PROCEDURE:**

NOTE: Normal valve operation under 24 Vdc power need not be interrupted during battery replacement; however, the fail-safe function will not be available until the new battery is in place, connected and sufficiently charged (typically 2-4 hours).

1. Refer to the picture (left) to locate and disconnect the Red and Black wires from the battery.
2. Remove the two battery mounting bracket screws and remove the battery and bracket.
3. Place the bracket over the new battery and install the assembly as shown, using the two screws removed in step 2 (above).
4. Connect the Black wire to the black (unmarked) terminal.
5. With 24 Vdc power present, connect the Red wire to the red terminal. VMS-50 BCM circuitry will automatically charge the battery. (If 24 Vdc is not present, the valve may move to its fail-safe position, depending upon residual charge in the new battery.)
6. Recycle or dispose of the old battery properly. Do not incinerate!

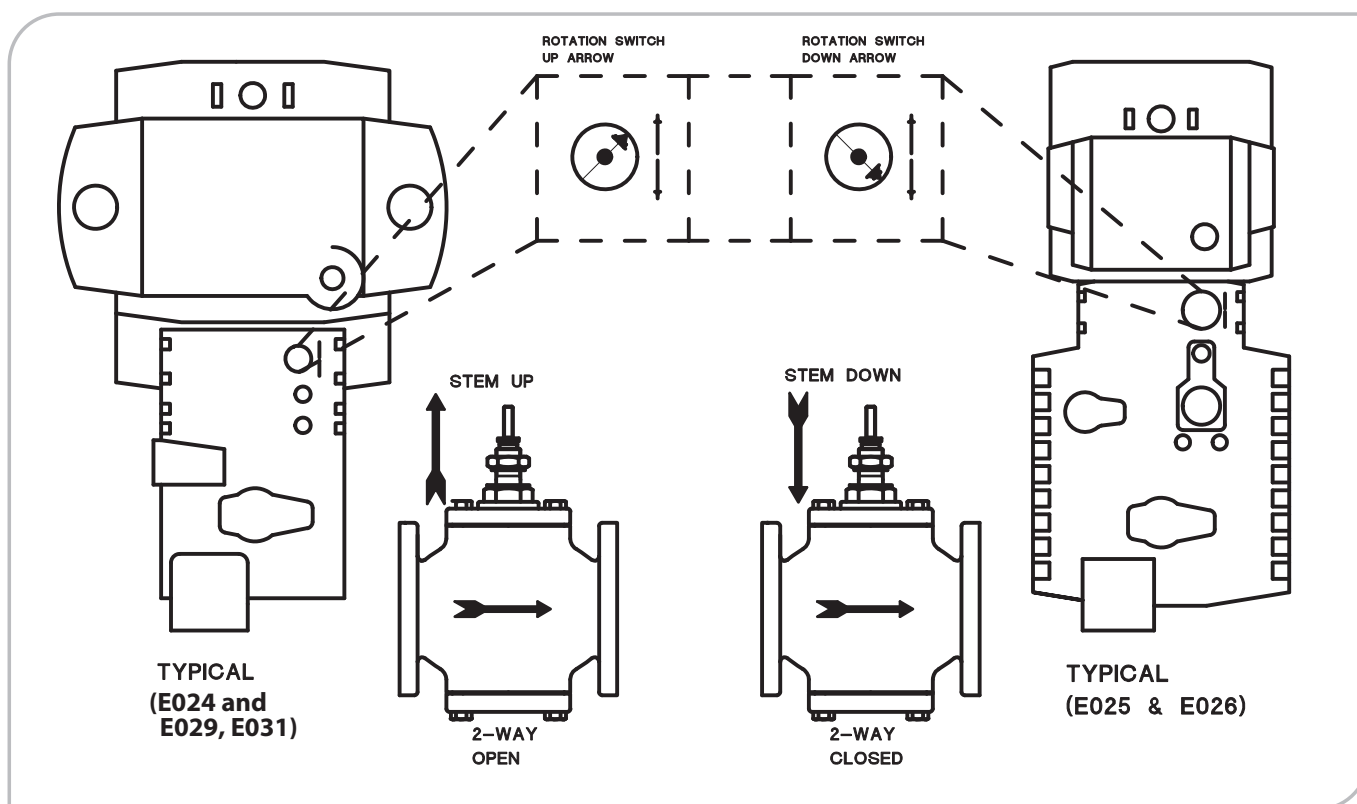
REPLACE BATTERY LED FUNCTION

Under normal conditions of 24Vdc power supplied to the VMS-50 BCM, a battery requiring an initial charge should become fully charged in 2 to 4 hours and remain charged until a building power failure occurs. The VMS-50 BCM has a red REPLACE BATTERY LED. For the LED to illuminate the VMS-50 BCM must be powered by a 24Vdc external power supply. The LED will illuminate if the circuit board is unable to charge or maintain the charge of the battery. The LED will also illuminate if the battery terminals are not connected to the circuit board. If the REPLACE BATTERY LED illuminates and the battery is connected to the circuit board replace the battery. Typical battery life is 5 years. This common gel cell battery is available from most battery supply houses.

ACTUATOR CONTROL ACTION

E024, E025, E026, E029 & E031 Actuators - Rotation Switch position. How the valve and actuator react to the Control Signal. The Fail-Safe position during Loss of Power and Loss of Signal are identical for an E024 and E029/E031 with VMS-50 BCM.

FACING	DESCRIPTION
Up Arrow (E024 and E029/E031)	Increasing Control Signal Closes, 2-way valves and Lower port for 3-way valve. Signal Failure Direction is Fail Open (FO) 2-way valves and Fail Upper Port Closed for 3-way valves.
Down Arrow (E024 and E029/E031)	Decreasing Control Signal Closes, 2-way valves and Lower Port for 3-way valves. Signal Failure Direction is Failed Closed (FC) for 2-way valves and Fail Lower Port Closed for 3-way valves.
Up Arrow (E024 and E029/E031 w/VMS-50 BCM)	Increasing Control Signal Closes, 2-way valves and Lower port for 3-way valve. Signal and Power Failure Direction is Fail Open (FO) 2-way valves and Fail Upper Port Closed for 3-way valves.
Down Arrow (E024 and E029/E031 w/VMS-50 BCM)	Decreasing Control Signal Closes, 2-way valves and Lower Port for 3-way valves. Signal and Power Failure Direction is Fail Closed (FC) for 2-way valves and Fail Lower Port Closed for 3-way valves.
Up Arrow (E025 & E026)	Increasing Control Signal Closes 2-way valves and Lower Port for 3-way valves. Signal Failure Direction is Fail Open (FO) 2-way valves and Fail Upper Port Closed for 3-way valves.
Down Arrow (E025 & E026)	Decreasing Control Signal Closes 2-way valves and Lower Port for 3-way valves. Signal Failure Direction is Fail Closed (FC) for 2-way valves and Fail Lower Port Closed for 3-way valves.

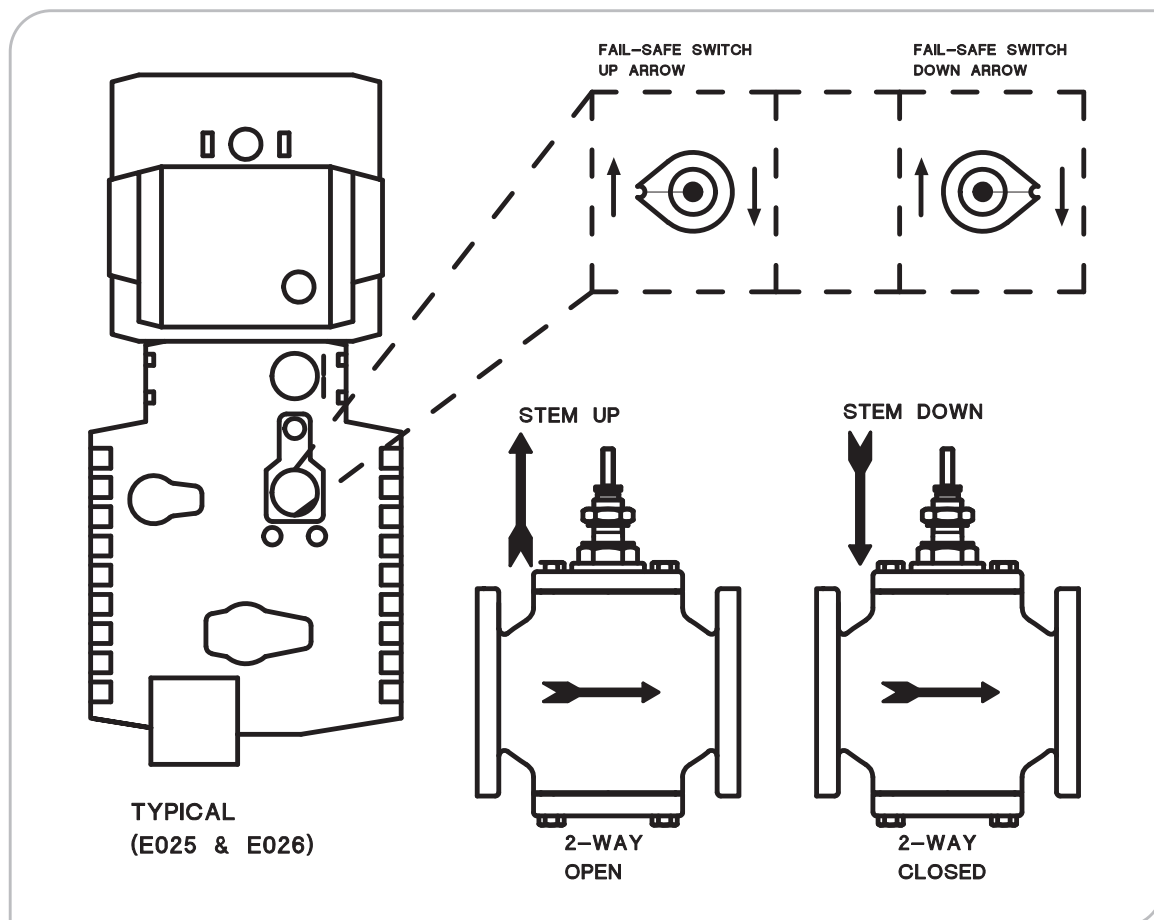


ACTUATOR POWER FAILURE

E025 & E026 Actuators - Fail-Safe Switch position: Valve and actuator Power Failure Direction.

FACING	DESCRIPTION
Up Arrow (E025 & E026)	Power Failure Direction is Fail Open (FO) 2-way valves.
Down Arrow (E025 & E026)	Power Failure Direction is Fail Closed (FC) for 2-way valves.

Switch must be fully in position shown or actuator will go to intermediate position on loss of power.



INDICATOR LIGHTS

STATUS (yellow LED)	ADAPTION/ POWER (green LED)	DESCRIPTION
OFF	ILLUMINATED	Normal (no faults)
OFF	BLINKING	Power Failure is active (E025 & E026 only)
ILLUMI- NATED	OFF	Fault is detected ¹
OFF	OFF	No Power or Capaci- tors charging
ILLUMI- NATED	ILLUMINATED	Auto-Calibration is running

NOTE:

1) Verify Control and Feedback Wiring and Signals if a Fault is detected.

BASIC SPECIFICATIONS

	UNITS	Spring -Fail	Fail-In-Place
		ILEA-F18-U/D	ILEA-FIA-M
Thrust / Force	(Lbf)	450	450
MAX Stroke	(Inches)	1.57	1.57
Pillar distance, C to C	(Inches)	4	4
Weight, approx. kg 5.6	(Lbs.)	12.3	11
Stroke Speed	(Secs / Inch)	Motor Operation 28	21
		Fail-Safe Operation 23	
Approximate Height	(Inches)	11	11
Approx. clearance above to remove cover	(Inches)	3.25	3.25
Manual Override		electrically via 2 push buttons	electrically via 2 push buttons or Handwheel
What happens under the condition of Overvoltage/Undervoltage on the power supply or loss of power.		Actuator engages Spring Fail, to Open or Closed, Depending on model.	Actuator Stops in Position when event occurs.
What happens under the condition of Loss of Analog Control Signal.		Actuator engages Spring Fail, to Open or Closed, Depending on model.	4-20mA or 2-10 VDC
			0-20mA or 0-10 VDC
Loss of Binary Inputs Control Signal		Actuator stops in position when event occurs	Actuator stops in position when event occurs
Loss of Binary Override		Actuator responds to Analog Control Signal	Actuator responds to Analog Control Signal

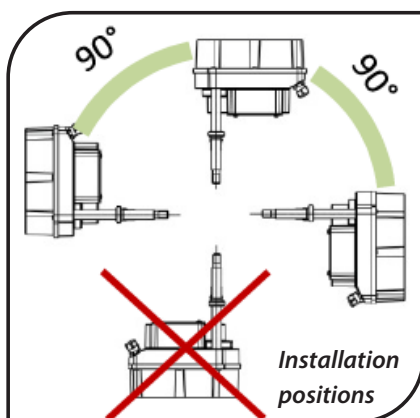
GLOBAL SPECIFICATIONS

Power Supply:	24 VAC/DC +/-10%, optionally wide range PS (100-240 VAC)
Motor protection:	Electronic motor current monitoring with safety cut-off
Duty cycle as per IEC 60034-1,8:	S2 30 min/ S4 1200c/h-50% ED
Permitted ambient temperature:	-4°F to 140°F (-20°C to +60°C)
Internal fault monitoring:	Thrust, Control Signal, Temperature, Power Supply
Binary control:	24-230- VAC for ON/OFF service (minimum duration of pulse 1 sec.)
Control Signal and Feedback:	0-20 mA, 4-20 mA, 0-10 V, 2-10 V selectable
Mounting Position:	Any position, except cover pointing downwards
Conduit entries:	2 pcs. M 20 x 1.5 /1 pc. M 16 x15
Cover material	Polycarbonate
Gear case materia	High quality aluminium die casting, powder-coated (60 µm thickness)
Enclosure Rating. to EN 60529:	IP65: Standard, IP67: Optional
Fuse - HV Power Supply:	1 AMP, 5 x 20 mm, 250 VAC, Slow Blow

POWER CONSUMPTION
9 WATTS, MAX CURRENT

0.7 A at 24 VAC / DC
0.14 A at 115 VAC
0.07 A at 230 VAC

OPERATING CONDITIONS AND INSTALLATION POSITION



- Standard actuators may be operated at ambient temperatures according to the ILEA-F Series basic specifications.
- Operating modes correspond to IEC 60034-1, 8: S2 for short cycle and S4 for modulating operation.
- For protection against moisture and dust, the enclosure rating is IP65 according to EN 60529.
- When installing the actuators, leave enough space to allow cover removal.
- The actuator can be installed vertically or horizontally or any position in between. The actuator must not be installed with the cover pointing downwards.



Outdoor usage: When using the actuators in environments with high temperature fluctuations or high humidity, we recommend using the optional heating resistor. IP67

REMOVING / CLOSING THE COVER

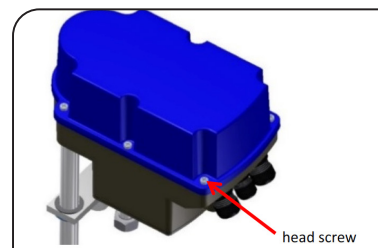


Open the cover only in a dry environment.

Open: Loosen the screws by using a screwdriver and unscrew them entirely out of the gear casing. The screws are captivated. Open the cover only in a dry environment.

Close: Put the cover on the gear casing and press down slightly. Tighten the screws gently and then crosswise for even tightening.

DO NOT OVERTIGHTEN



WIRING DIAGRAM

Wiring diagram indicates the electrical connections for standard actuators. The wiring diagram inside the actuator is binding for the specific actuator wiring. For any optional accessories, see the separate wiring diagram in the corresponding installation instructions, at the end of this document.

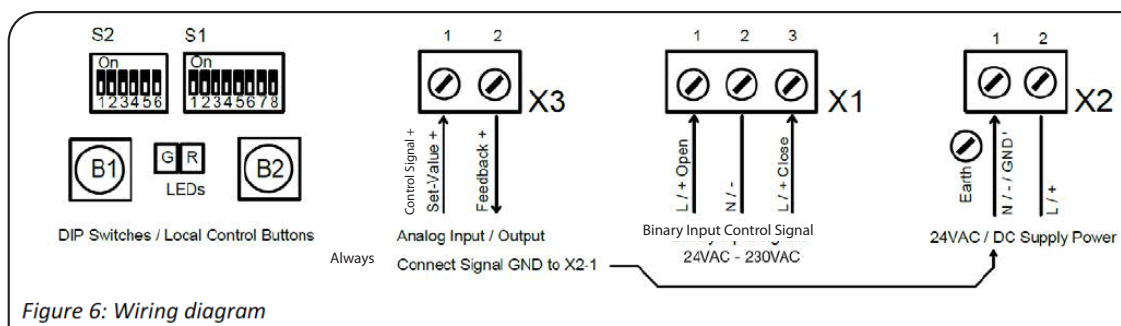
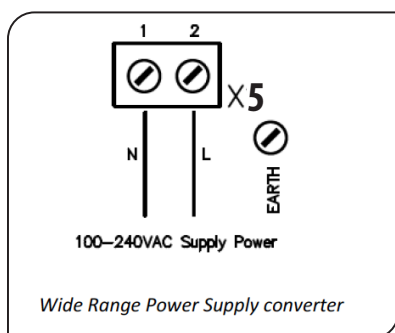


Figure 6: Wiring diagram

HIGH VOLTAGE POWER SUPPLY

Terminal overview wiring diagram for the Wide Range Power Supply Converter

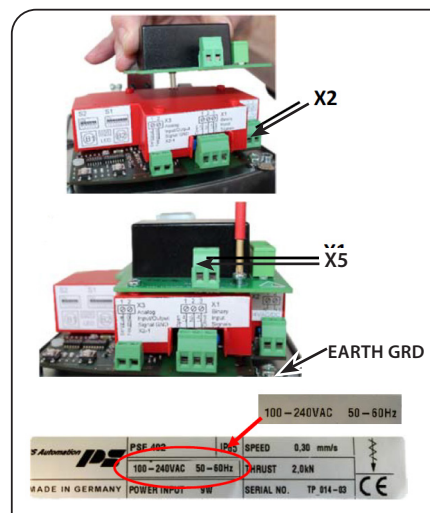


Disconnect the 24 VAC/VDC power (X2), if connected. Remove the screws of the protective cover but don't remove the cover.

Put the power supply board converter with the connecting pins carefully through the opening of the protective cover and fix it with the screws.

Wire the 100-240 VAC source to the power supply (X5) terminations as shown. On the high voltage power supply.

Take the provided label "100-240VAC 50-60Hz" and stick it on the type plate of the actuator as shown in figure to the bottom left.



PE earth connection has to be connected to gear casing at  !

DIP SWITCH FUNCTIONS & SETTINGS

S1 Dip Switches Function	1	2	3	4	5	6	7	8
Signal	Control Signal				Position Feedback			
Voltage	On	On	Off	Off	Off	On	Off	On
Current (DEFAULT)	Off	Off	On	On	On	Off	On	Off

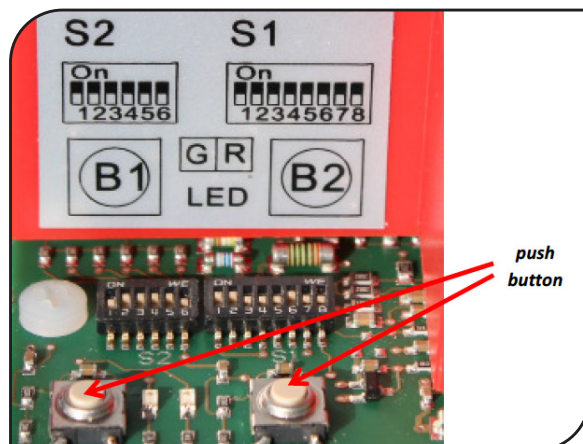
S2 Dip Switches Function	1	2	3 ²⁾	4 ²⁾	5	6
Control via analog Control Signal (Default)						On
Control via binary inputs						Off ³⁾
Valve stem up out of valve with increasing Control Signal (Default)					On	
Valve stem down into valve with increasing Control Signal					Off	
Automatic Commissioning	Close with force/Open with force ¹⁾		On	On		
	Do not use		On	Off		
	Do not use		Off	On		
	Do not use		Off	Off		
Manual Commissioning	Close with force/Open with required stroke		On	On		
Control Signal Range: 0-10 V/ 0-20 mA		On				
Control Signal Range: 2-10 V/ 4-20 mA (Default)		Off				
Cut-off by force if valve stem is in up / out of valve position	On					
Cut-off by force if valve stem is in down / into valve position (Default)	Off					

1) "Open with force" refers **solely** to automatic **commissioning**. During operation the actuator will stop at the found position (see PG 13. Operation)

2) After changing the switches S2.3 and S2.4, perform re-calibration to activate the new operating mode.

3) Switch S2.6 Off (control via binary inputs) switch S2.5 on (Default)

MANUAL OPERATION (ELECTRICALLY)



Two push buttons are available to drive the actuator for installation work such as mounting onto a valve, or setting the limit switches positions or manual mode troubleshooting.

This function is available in both Spring-Fail or Fail-In-Place Models, only for when power is applied.

See: "MANUAL OPERATION PUSH BUTTON" on Page 13.

SET UP & GENERAL SAFETY

'Signal' as 20-4 CL, to indicate it is a 4 – 20 mA signal and CLOSED at 4 ma. The actuator should be preprogrammed for control action and which signal is designated. Switching from a milliamp signal to a voltage signal is simply a matter of wiring termination. Switching whether the control signal is ZERO based or not, or the control action must be done in the software set up. This can be done on the job site as necessary with the programming umbilical cord option along with a laptop computer that has a USB connection. If this is required, contact the Warren Controls factory.

SIGNAL	CONTROL VS. LABEL DESIGNATIONS			
	2-WAY VALVE CLOSED	LABEL DESIGNATION	3-WAY VALVE LOWER PORT CLOSED	LABEL DESIGNATION
4 – 20 mA	@ 4 mA	20 – 4 mA CL	@ 4 mA	20 – 4 mA DN
4 – 20 mA	@ 20 mA	4 – 20 mA CL	@ 20 mA	4 – 20 mA DN
0 – 20 mA	@ 0 mA	20 – 0 mA CL	@ 0 mA	20 – 0 mA DN
0 – 20 mA	@ 20 mA	0 – 20 mA CL	@ 20 mA	0 – 20 mA DN
2 – 10 Vdc	@ 2 Vdc	10 – 2 Vdc CL	@ 2 Vdc	10 – 2 Vdc DN
2 – 10 Vdc	@ 10 Vdc	2 – 10 Vdc CL	@ 10 Vdc	2 – 10 Vdc DN
0 – 10 Vdc	@ 0 Vdc	10 – 0 Vdc CL	@ 0 Vdc	10 – 0 Vdc DN
0 – 10 Vdc	@ 10 Vdc	0 – 10 Vdc CL	@ 10 Vdc	0 – 10 Vdc DN

With power applied, preferably, use a signal calibrator to verify that the valve is fully stroking from one end to the other as depicted by the travel indicator on the side of the actuator mounting Pillar and with the proper control action. Alternately the process controller could be directly connected to test if it has a 'Manual-Mode' of operation where the controllers output can be manually adjusted from 0% - 100%.

IF THE ACTUATOR IS ONE WITH A DEFINED 'FAIL-SAFE' DIRECTION, THAT CAN BE VERIFIED BY:

1. Using the signal calibrator to move the actuator position to mid-stroke.
2. Safely disconnecting power at the power breaker switch and observing the actuator going to its fail-safe position.

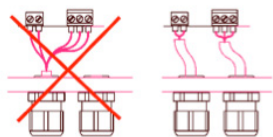
Once these steps are verified you may proceed to commissioning the control valve. If either of these tests did not perform as expected, then contact the Warren Controls factory for further troubleshooting steps.

BASIC SAFETY NOTES:

- Before opening the actuator cover, ensure that the electrical mains supply voltage is disconnected.
- If operating the actuator with the cover removed for troubleshooting reasons make sure the wiring terminations are clearly understood. Contact the Warren Controls factory for further troubleshooting steps as may be necessary.
- Do NOT attempt to auto-stroke the actuator when the actuator is not connected to a control valve as it will not function.
- Do NOT adjust the Manual Override completely downward when the actuator is not connected to a control valve as this could permanently damage the actuator.
- If the actuator is removed from the control valve, upon reinstallation the auto-calibration procedure must be performed.

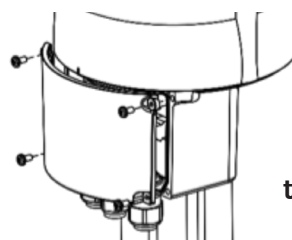


Electric installation as well as over-current and over-voltage protection devices must conform to the standard DIN IEC 60364-4-41, protection class I resp. protection class III (24VAC/24VDC) and also to the standard DIN IEC 60364-4-44 according to the applied over-voltage category of the actuator.

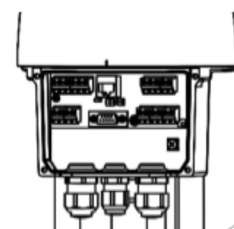


Never install the power supply and the control cables together in one conduit but instead please always use two different conduit.

Please protect all of the power supply and control cables in front of the terminals mechanically by using suitable measures against unintentional loosening.






Remove connection terminal cover



WIRING TERMINATION (A/B ONLY)

Electric supply for 1-phase AC/DC

1		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23			TTL	Button						
↑		↑	↑	↓	↓	↓	↕	↕	↑	↑	↑	↑	↑	↓	↑	↑	↑	↕	↕	↕	↕	↑	↑	 									
+0(2) - 10V		+0(4) - 20 mA		+0(2) - 10V		GND		+0(4) - 20 mA		max. Last/max. Load 100 mA/At 24 VD (Option)		L / + Open		N/-		L / + Close		L / + (24V AC/DC)		N / - (24V AC/DC) L / + (24V AC/DC) (Option)		21-40 VDC/ 100 mA		+0(2) - 10V		+0(4) - 20 mA		GND		(Option)		(Option)	
												24 V AC/DC		115V- 230V AC																			
Control Signal Input		Position Feedback Output		Monitor relay potential-free		Binary Input signals		Fail safe signal		Supply		Actual value		Closed		Open		Supply Voltage		Fieldbus Interface		PC Communication		Commissioning									
Galvanically isolated 1 kV												Process-Sensor (Option)			Position switch potential-free contact																		

COMMISSIONING

ILEA actuators are commissioned at the factory when mounted to a control Valve.

It must be commissioned if provided separately from a valve or has been dismantled.

The actuator can only be commissioned when correctly mounted to a valve and with at least one cut off set to "force/torque".

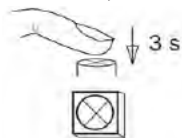
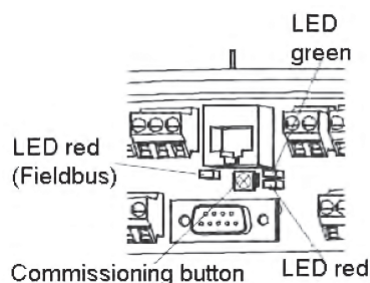


CAUTION! ELECTRICAL OPERATION OF THE ACTUATOR IS ALLOWED ONLY AFTER MOUNTING TO A VALVE!

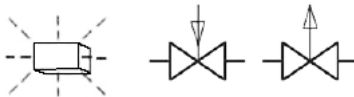
AUTOMATIC COMMISSIONING

(Only available if at least one of the cut-offs is set to be "by force/torque" or "by position automatically".)

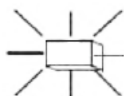
OPERATING DISPLAY - CONTROLS



1 *Press the commissioning button for 3 sec*



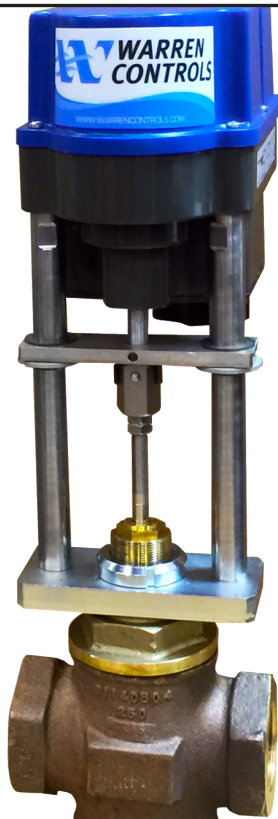
2 Commissioning in progress (Green LED is flashing, actuator drives in both positions).



3 *Green LED lights – Actuator successfully commissioned and ready to be used.*

ILEA-F

E035-E046

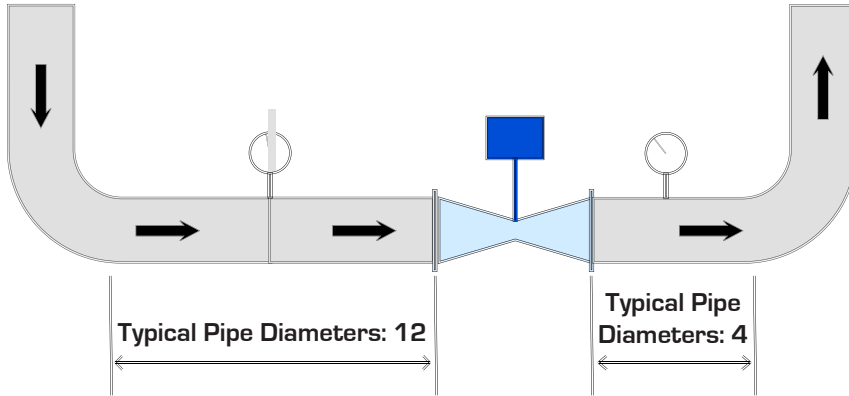


ILEA-A

E147-E167



INSTALLATION GUIDELINES



RECOMMENDED LENGTHS OF STRAIGHT PIPE		
VALVE SIZE	UPSTREAM STRAIGHT PIPE	DOWN-STREAM STRAIGHT PIPE
2.5"	30"	10"
3.0"	36"	12"
4.0"	48"	16"
5.0"	60"	20"
6.0"	72"	24"
8.0"	96"	32"
10.0"	120"	40"

MOUNTING:

Horizontal Pipe with Actuator Vertically above the valve Assembly

Recommended Piping:

Typical satisfactory arrangement of upstream and downstream piping

Per ISA's recommended piping practices, control valves are best served when avoiding turbulent flows. The general specification for this is 12 pipe diameters upstream of straight pipe and 4 pipe diameters downstream of straight pipe. However, this is a broad specification covering all pipe diameters and velocities. Many applications neither have this kind of space and may have very low head pressures where velocities are so low that there is no need to take these precautions. While more length of straight pipe is always desirable, Warren Controls has produced a table of recommended straight pipe lengths, upstream and downstream, as design and installation guidelines for use with Monitrol.. However, when these pipe length minimums cannot be achieved, there will be some drop off in accuracy and stability of measurements. The Monitrol Controller does have digital filtering settings that can mitigate some of this for these instances.



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 while operating the controller in Manual Mode.
- Verify actuator feedback signal is operational and appears accurate. Test this while running the controller in manual mode or with a signal generator while the actuator has power.
- Proceed to commissioning the Monitrol Controller to completely place the valve into operation. A primer is on page 29 of this IOM. Refer to the Monitrol MON-DP Controller IOM for final set up and commissioning.

MON-DP VALVE TRAVEL			
TYPE	VALVE SIZE	TRIM SIZE (PORT)	TRAVEL (IN)
MON-DP-58H	2-1/2 in, DN65	Full	1-1/2
	3 in, DN80	Full, 1SR	1-1/2
	4 in, DN100	Full, 1SR	1-1/2
	2-1/2 in, DN65	Full	3/4
	3 in, DN80	Full	3/4
and MON-DP-29N	4 in, DN100	Full, 1SR, 2SR	1-1/8
	5 in, DN125	Full, 1SR, 2SR	1-1/8
	6 in, DN150	Full, 1SR, 2SR	1-1/8
	6 in, DN150	Extended	1-3/4
	8 in, DN200	Full, 1SR, 2SR	1-1/2 or 2
	10 in, DN250	Full, 1SR, 2SR	1-1/2
	12 in, DN300	Full	TBD

Note: 1SR = 1 Size Reduced, 2SR = 2 Sizes Reduced

- Be sure that the flow medium, ambient temperature and the selected location will not exceed the maximum temperature of the valve, actuator, or accessories.
- Follow good piping practices. Install a bypass around the valve. Install stop valves in inlet and outlet piping to provide means to isolate valve.
- Verify straight run of pipe distances upstream and downstream of the valve per schedule on page 23.
- Protect valve and downstream equipment with a self-cleaning strainer upstream of the valve.
- Install gauges in inlet and outlet piping to provide means for checking adjustment and operation. When pressure sensors are not inclusive in the assembly.
- For maximum efficiency and minimum wear install valve in a horizontal pipeline valve stem pointing upward. Alternate positions should be factory verified.
- Be sure to leave clearance to allow for actuator removal, Full 3" above actuator override.
- 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 arrows, inlet markings, and port markings present on each valve.
- Pipes must be aligned squarely with the valve at each connection.
- If the valve has flanged ends, tighten flange bolts evenly to prevent excessive stress and the possibility of cracking (cast iron) or otherwise leaking.
- The valve and actuator are assembled, tested, and calibrated at the factory. The actuator nameplate specifies set-up parameters used
- Supply voltage, and signal connections to terminals should be verified prior to start up as indicated in this manual .
- 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.
- 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.



DO NOT attempt to service without a Soft Goods Kit & Supplemental instructions.

MAINTENANCE

Monitrol Valves 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. Maintain the fluid pressure, temperature, flow, flowing differential pressure, and shut-off differential pressure within the limits of the valve. In installations where high vibration exists, 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, see page 29](#)). The valve stem must be kept free of debris, deposits, dirt,

MON-DP-29N

MON-DP-58H

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 ValveWorks sizing program will facilitate the selection of the optimum valve.

PACKING ADJUSTMENT

MON-DP-29N valves with Packing Type T V-ring, or L Lip Packing have self-adjusting packing and require no external adjustment. If the valve

MON-DP-29N

has self-adjusting packing and a packing leak is observed replace the packing and if necessary the stem and plug assembly.

MON-DP-58H

MON-DP-58H valves have either self-adjusting packing or adjustable packing. Models with Packing Type L Lip Packing 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. Models with Packing Type T V-ring Packing have adjustable packing. If the valve has adjustable pack-

ing 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.

MON-DP-29N

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. Soft Goods Kits are available to allow the valve to be opened for inspection of its internal parts and replacement of its soft goods. 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.

MON-DP-58H

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, seat ring, stem, cage, o-ring, piston ring, cage spring, seat gasket, and bearing 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. Soft Goods Kits are available to allow the valve to be opened for inspection of its internal parts and replacement of its soft goods. 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.

MODEL G2 PRESSURE TRANSDUCER



APPLICATIONS

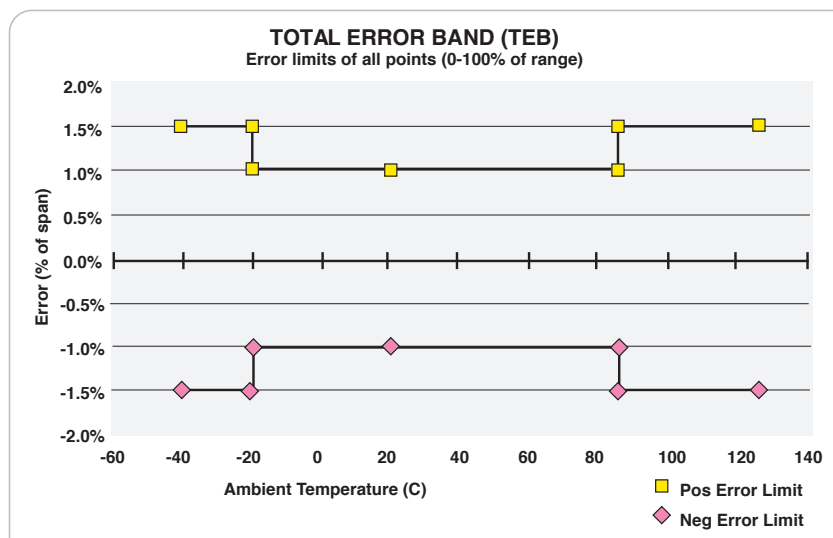
The G2 pressure transducer combines performance with value to meet the demanding needs of the original equipment manufacturer in applications found in:

- Off-road Equipment
- Construction Machinery
- Performance Racing
- Railroad/Transportation
- Compressor Control
- HVAC and Refrigeration
- Agricultural Implements
- Process Automation and Control
- Hydraulic & Pneumatic Sensing
- Pump Monitoring

FEATURES

- 1% Total Error Band Accuracy
- Broad Temperature Capability
- All-welded pressure construction
- High EMI/RFI rating
- Ranges 30 psi through 300 psi
- IP 67 Ingress rating
- Diagnostic rails

A $\pm 1\%$ Total Error Band accuracy is accomplished by marrying a high performance ASIC to a very stable, field proven polysilicon thin film pressure sensor. The sensor is electron beam welded to a pressure fitting of stainless steel, which provides excellent overpressure capability and outstanding durability in the presence of shock and vibration. The circuitry is held within an internal cage and housed in an enclosure of reinforced Nylon.



MODEL G2 PRESSURE TRANSDUCER

PERFORMANCE SPECIFICATIONS

Ref. Condition 21°C ±1°C (72°F ±2°F)

Accuracy: Total Error Band includes combined effects of temperature, non-linearity (Terminal Point Method), hysteresis,

non repeatability, zero offset and span setting errors

±1% of Span: From -20 to 85°C (-4 to 185°F)

±1.5% of Span: From -40 to -20°C (-40 to -4°F)

±1.5% of Span: From 85 to 125°C (185 to 257°F)

Note: Static accuracy ±0.25% of span BFSL (Best Fit Straight Line Method); includes non-linearity, hysteresis and non-repeatable effects at reference temperature 72°F (21°C)

Stability: Less than ±0.25% span/year

Durability: Tested to 50 million cycles

FUNCTIONAL SPECIFICATIONS

Select from over 25 pressure ranges starting at 30 psi and running through 20,000 psi gauge. Compound (vacuum & pressure) ranges are also available, see "To Order" on back.

Overpressure (F.S.): Proof Burst

750 psi & below 200% F.S. 1000% F.S.

Vibration: Random vibration (20 g) over temperature range (-40° to 125°C). Exceeds typical MIL STD. requirements

Shock: 100gs, 6 ms

Drop Test: Withstands 1 meter on concrete 3 axis

Response Time: Less than 1 msec

Warm-up Time: Less than 500 msec typical

Position Effect: Less than ±0.01% span, typical

ENVIRONMENTAL SPECIFICATIONS

Temperature: Compensated -40 to 125°C (-40 to 257°F)

Operating -40 to 125°C (-40 to 257°F)

Storage -40 to 125°C (-40 to 257°F)

Humidity: 0 to 100% R.H., no effect

ELECTRICAL SPECIFICATIONS

Output Signals Available:

Supply Current: 5mA; 4mA

Ratiometric Output:

0.5-4.5 Vdc, 3 wire

5 Vdc ±0.5 Vdc

3.5mA

Current Output:

4-20mA, 2 wire

9-36 Vdc

Reverse Polarity & Miswired Protected: Yes

Insulation Breakdown Voltage: 100 Vac

Insulation Resistance: Greater than 100 megohms at 100 Vdc

CE Marked: Per DoC

EMC Directive 2004/108/EC

IEC/EN 61326-1: Edition 1.0 Industrial

IEC/EN 61326-2-3: Edition 1.0 Annex BB Industrial

PED Directive

All specifications are subject to change without notice.

All sales subject to standard terms and conditions.

ISO 9001
REGISTERED FIRM

MODEL G2 PRESSURE TRANSDUCER

PHYSICAL

Wetted Materials: 304SS pressure connection and 17-4PH SS sensor diaphragm

Housing: 20% Glass Reinforced Nylon,
Fire retardant to UL94 V1

Available Process Connections (Male):
See "How To Order" section below. For other connections consult factory.

Ingress Rating:

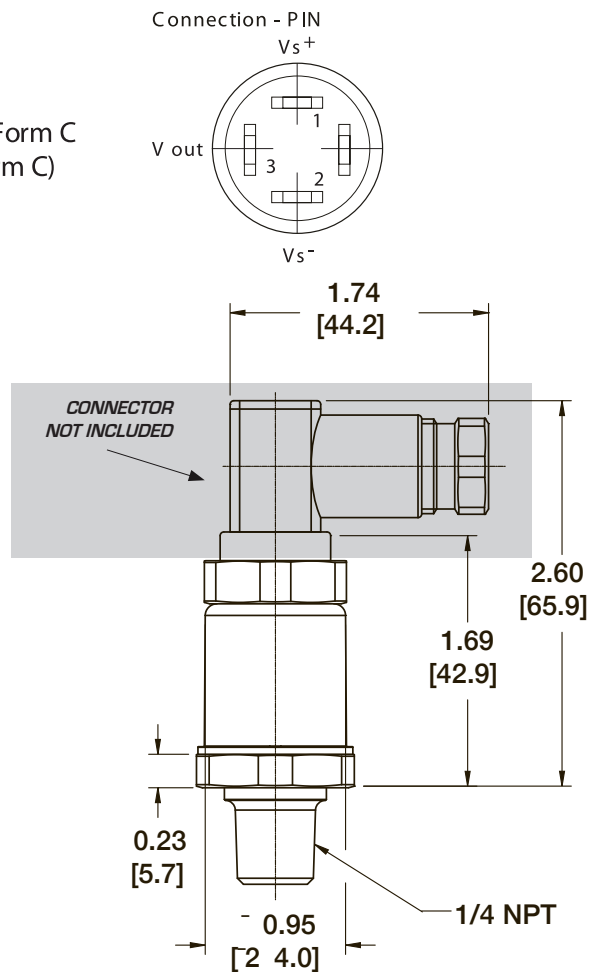
- **IP65, NEMA 4X:**
 - EN 175301-803, Form C
 - (DIN 43650, Form C)

ELECTRICAL TERMINATION

See "How To Order" section below for electrical termination options.

DIMENSIONS

EN 175301-803, Form C
(DIN 43650, Form C)



G2 & T2 SENSOR INSTRUCTIONS

DIN 43650 FORM C (EN 175301-803-C) ELECTRICAL TERMINATION (DC), (N1), (N2), (N3), (N9)

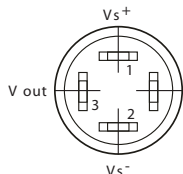
Mates to Hirschmann P/N: G55NR 300,
Ashcroft P/N 300A126-01

NOT INCLUDED

Pin No.	Voltage Output	4-20mA Output*	Mating Cable Color
1	V +	V +	Red
2	Common	V -	Black
3	Output		White

IP65 Ingress rating

Connection - PIN



WARNING!
READ BEFORE
INSTALLATION.

DO NOT INSTALL
UNTIL VALVE
ASSEMBLY IS
INSTALLED.

OVERPRESSURE

Pressure spikes in excess of the rated overpressure capability of the transducer may cause irreversible electrical and/or mechanical damage to the pressure measuring and containing elements. Fluid hammer and surges can destroy any pressure transducer and must always be avoided. A pressure snubber should be installed to eliminate the damaging hammer effects. Fluid hammer occurs when a liquid flow is suddenly stopped, as with quick closing solenoid valves. Surges occur when flow is suddenly begun, as when a pump is turned on at full power or a valve is quickly opened. Liquid surges are particularly damaging to pressure transducers if the pipe is originally empty. To avoid damaging surges, fluid lines should remain full (if possible), pumps should be brought up to power slowly, and valves opened slowly. To avoid damage from both fluid hammer and surges, a surge chamber should be installed. **Symptoms of fluid hammer and surge's damaging effects:**

- Pressure transducer exhibits an output at zero pressure (large zero offset).
- Pressure transducer output remains constant regardless of pressure
- In severe cases, there will be no output.

FREEZING

Prohibit freezing of media in pressure port. Unit should be drained (mount in vertical position with electrical termination upward) to prevent possible overpressure damage from frozen media.

STATIC ELECTRICAL CHARGES

Any electrical device may be susceptible to damage when exposed to static electrical charges. **To avoid damage to the transducer observe the following:**

- Ground the body of the transducer BEFORE making any electrical connections.
- When disconnecting, remove the ground LAST!
Note: The shield and drain wire in the cable (if supplied) is not connected to the transducer body, and is not a suitable ground.

GENERAL

A failure resulting in injury or damage may be caused by excessive over pressure, excessive vibration or pressure pulsation, excessive instrument temperature, corrosion of the pressure containing parts, or other misuse. Consult before installing if there are any questions or concerns.

DESCRIPTION

The G2 / T2 transducer are high performance instruments intended for use in industrial applications where the process media is compatible with the 17-4PH stainless steel sensor material and the 304 SS process connection.

MECHANICAL INSTALLATION

Environmental: The G2 transducer can be stored and used within the temperature limits of -40°C to 125°C (-40°F to 257°F). Ingress protection ratings of the units are dependent on the electrical termination specified. Refer to the wiring diagrams on the reverse for the IP rating of the unit which is being installed.

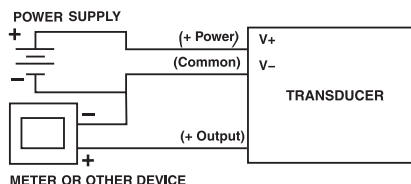
Mounting: The G2 / T2 transducer require no special mounting hardware and can be mounted in any orientation with negligible position error. Although the units can withstand considerable vibration without damage or significant output effects, it is always good practice to mount the transducer where there is minimum vibration. For units with NPT type pressure fittings apply sealing tape or an equivalent sealant to the threads before installing. When installing or removing the unit apply a wrench to the hex wrench flats, located above the pressure fitting. DO NOT tighten by using a pipe wrench on the housing. A 27mm (1-1/6") wrench can be used on the wrench flats of the hex. For G2 / T2 models with detachable electrical connectors a 6 point deep socket can also be used to install the unit.

Electro-Magnetic Interference: The circuitry of the G2 / T2 transducers is designed to minimize the effect of electromagnetic and radio frequency interference. To minimize susceptibility to noise, avoid running the termination wiring in a conduit which contains high current AC power cables. Where possible avoid running the termination wiring near inductive equipment. **Field Adjustments:** The G2 / T2 transducers are precisely calibrated and temperature compensated at the factory to ensure long and stable performance.

There are no field accessible adjustments on the G2 / T2 transducers.

ELECTRICAL INSTALLATION

Please refer to the reverse of this page for power supply requirements and for appropriate wiring protocol based on the particular output signal and electrical terminal.



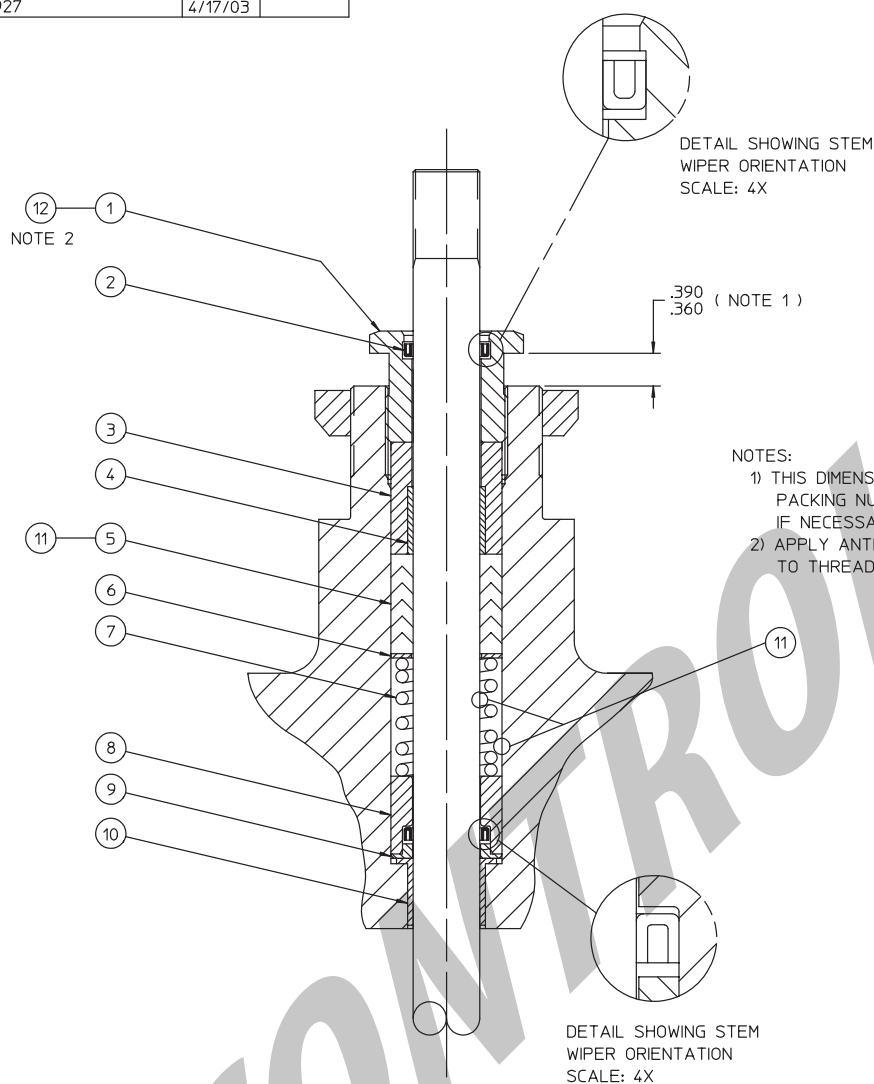
3-Wire Voltage Output

Power Supply Requirements:

Output Signal	Min Supply	Max Supply
Ratiometric* (0.5V to 4.5V)	4.5Vdc	5.5Vdc

*0.5Vdc-4.5Vdc output is ratiometric to the nominal 5Vdc supply

REV	DESCRIPTION	DATE	APPROVED
B	REDRAWN WITH CHANGE ECN 1927	BLB 4/17/03	

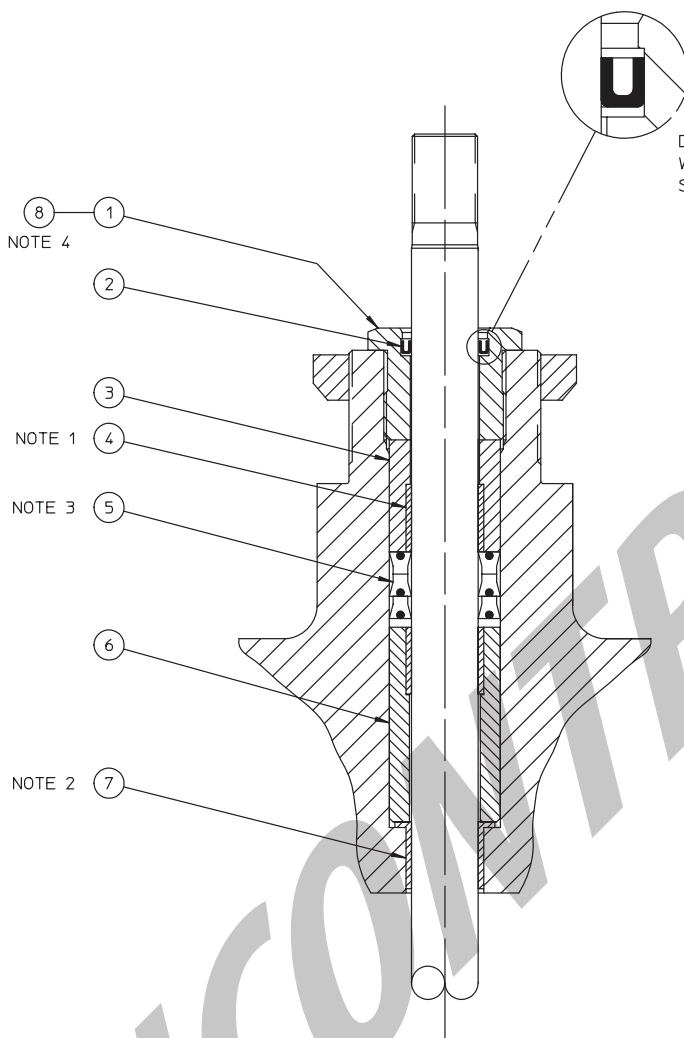


12	A/R	A0940033	ANTI-SEIZE LUBRICANT	
11	A/R	A0940021	DC111 LUBE	
10	1	B1061155	BONNET BEARING FLANGED	PEEK
9	1	B1800033-01	WIPER RETAINER	SST TYPE 316 ASTM A479
8	1	B1660030-01	PACKING BOX RING W/ STEM WIPER GROOVE	SST TYPE 316 ASTM A479
7	1	B1820066	PACKING SPRING	SST TYPE 316 ASTM A313
6	1	B2060002-01	PACKING WASHER	SST TYPE 316 ASTM A479
5	1	B1700071	V-RING PACKING SET	VIRGIN TFE
4	1	B1061153	SLEEVE BEARING	PEEK
3	1	B1710034-01	PACKING RETAINER	SST TYPE 316 ASTM A479
2	2	FS11725	STEM WIPER	TFE / SST
1	1	B1721331-01	PACKING NUT	SST TYPE 316 ASTM A479
ITEM	QTY	PART NO	DESCRIPTION	MATL SPEC

REMOVE ALL SHARP EDGES AND BURRS		UNLESS OTHERWISE SPECIFIED:		MATERIAL <
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NLP PACKING for the MON-DP-58H

DRAWING NUMBER: **C3761357**



NOTES:

- 1) SLEEVE BEARING (4) IS NOT A SYMMETRICAL PART & MUST BE ORIENTED WITH CHAMFER FACING THE HOUSING BORE IT IS BEING PRESSED INTO PRIOR TO INSTALLATION.
- 2) PRESS BONNET BEARING (7) INTO BONNET AS SHOWN UNTIL FLANGE 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 WITH (9) BEFORE INSTALLATION. PACKING MUST BE ORIENTED AS SHOWN.
- 4) APPLY ANTI-SEIZE LUBRICANT TO THREADS OF ITEM 1.

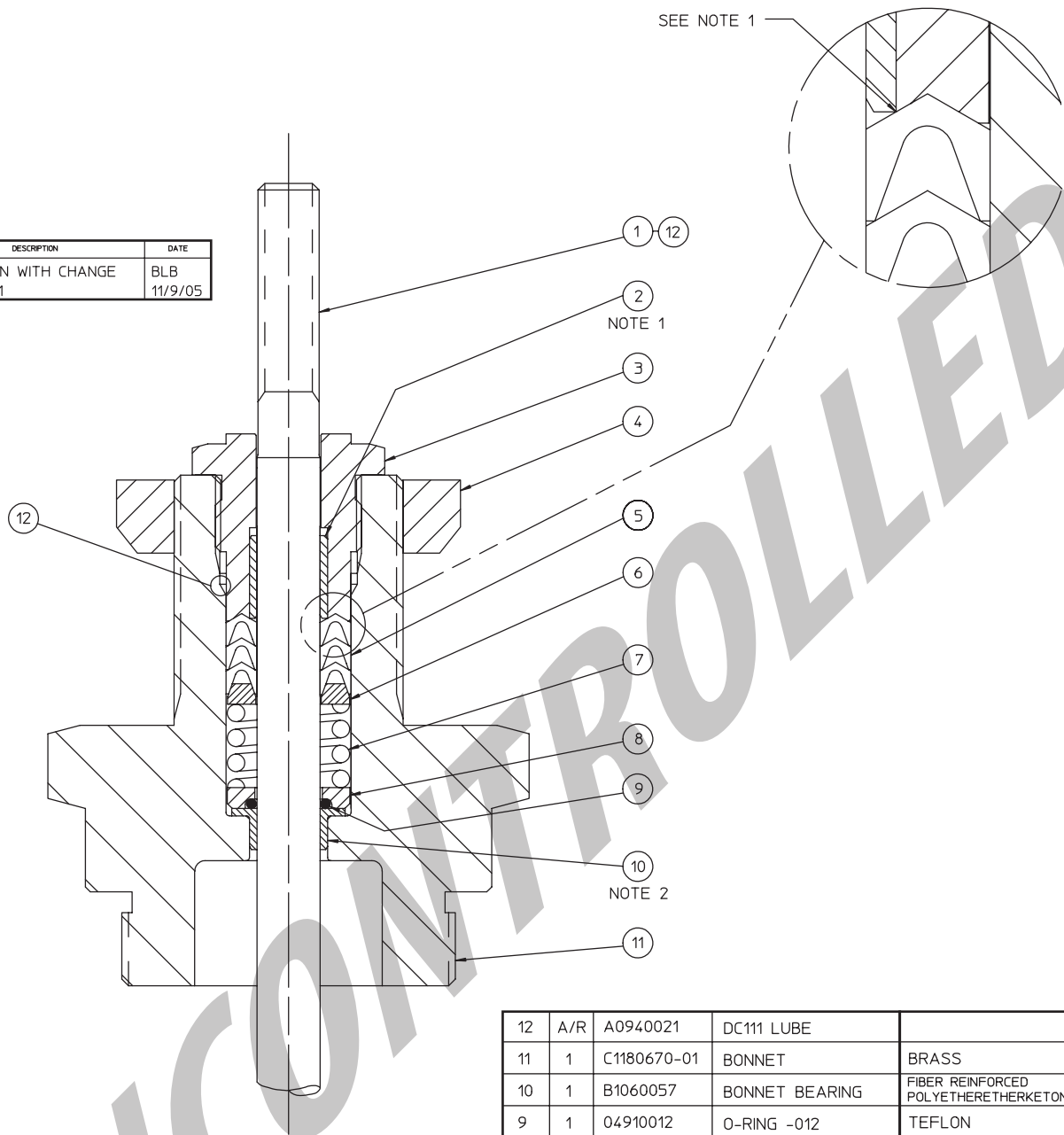
9	A/R	A0940021	DC111	
8	A/R	A0940033	ANTI-SEIZE LUBRICANT	
7	1	B1061155	BONNET BEARING FLANGED	REINFORCED PEEK
6	1	B1661340-01	PACKING BOX RING	SST TYPE 316 ASTM A479
5	3	PUR1211	PARKER SEAL P/N 4207-25000750 (STYLE SPP)	EPDM
4	2	B1061153	SLEEVE BEARING	REINFORCED PEEK
3	1	B1710034-01	PACKING RETAINER	SST TYPE 316 ASTM A479
2	1	FS11725	STEM WIPER	TFE / SST
1	1	B1721331-01	PACKING NUT	SST TYPE 316 ASTM A479
ITEM	QTY	PART NO	DESCRIPTION	MATL SPEC

REMOVE ALL SHARP EDGES AND BURRS	UNLESS OTHERWISE SPECIFIED:		MATERIAL SEE TABLE	DRAWN DGS	DATE 7-25-12	WARREN CONTROLS INCORPORATED BETHLEHEM, PENNSYLVANIA 18020-8010	
	DECIMAL .XX	DECIMAL .XXX					
THIRD ANGLE PROJECTION	FRACTION *	ANGLE *	TREATMENT	APPROVED		NLP PACKING SUBASSY 2 1/2 THRU 4 INCH TYPE 5800 TO 400°F	
	ALL DIMENSIONS ARE IN INCHES		FINISH			SIZE C	FSCH NO 03847
NEXT ASSEMBLY						DWG NO C3761357	REV
						SCALE FULL	SHEET

TEFLON V-RING PACKING FOR MON-DP-29N WITH A SEPARABLE BONNET

DRAWING NUMBER: **C3769950**

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



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

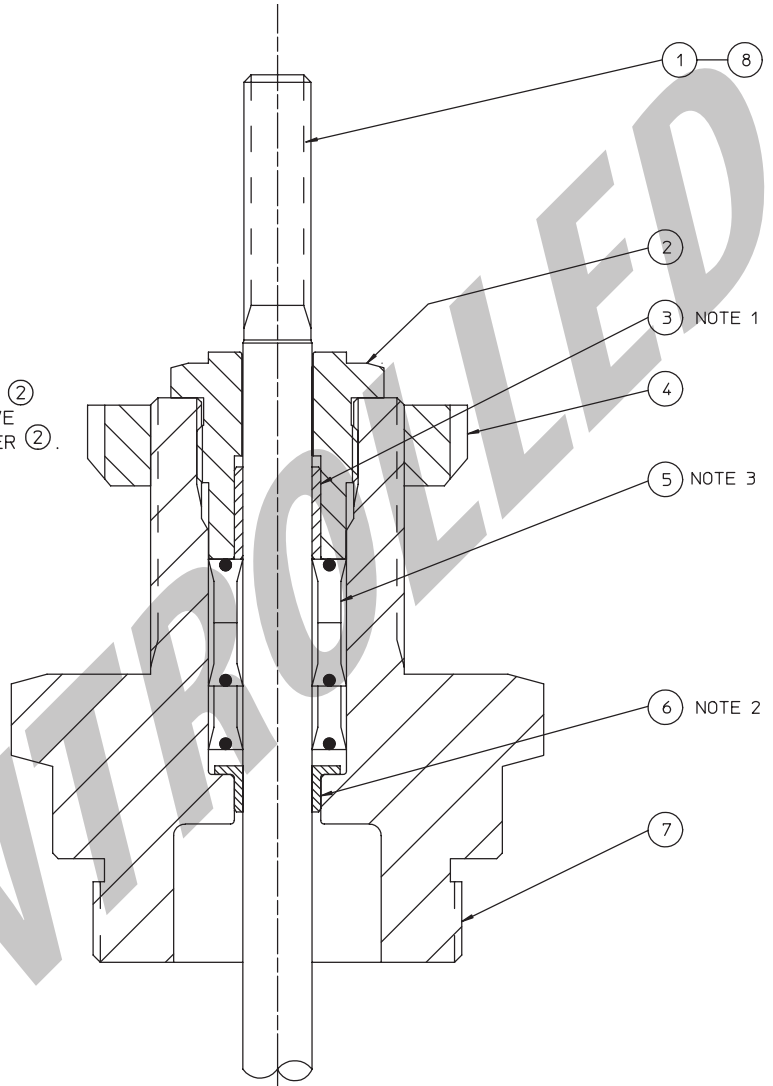
NLP PACKING FOR MON-DP-29N WITH A SEPARABLE BONNET

DRAWING NUMBER: **C3769956**

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 (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		SIZE C	FSCM NO 03847
FINISH			DWG NO C3769956	REV A
		SCALE 2X	WT	SHEET

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

-

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(m)

NOTE

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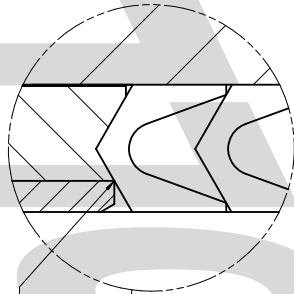
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NOTE 2



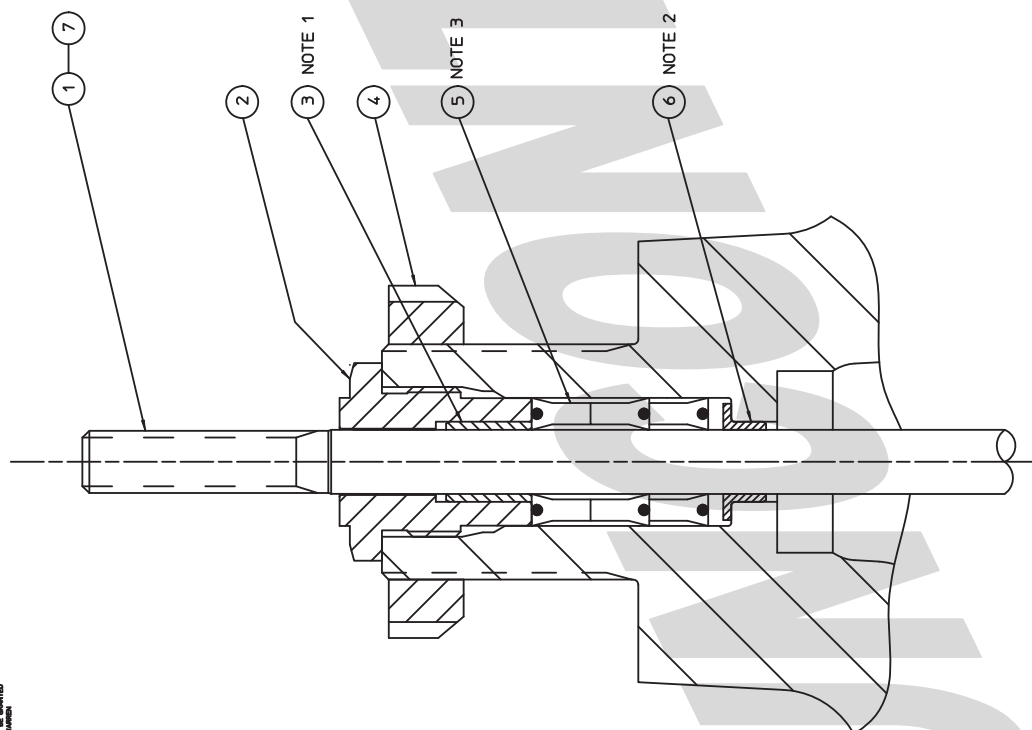
SEE NOTE 1

REMOVE ALL SHARP EDGES AND BARRS	THIRD ANGLE PROJECTION 	FRACTION = 1/64 ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED	ITEM	QTY	PART NO	DESCRIPTION	UNAM	DATE	DRAWN	CHECKED	APPROVED	TREATMENT	MATERIAL	SEE TABLE	FISH	UNLESS OTHERWISE SPECIFIED XX XX DECIMAL DECIMAL FRACTION = 1/64 ANGLE = 90° ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED	REMOVE ALL SHARP EDGES AND BARRS
12	1	AS REQD	BONNET					2/20/14									
11	A/R	A0940021	DC111 LUBE														
10	1	B1060057	BONNET BEARING														
9	1	04910012	O-RING -012														
8	1	B1800050-01	O-RING RETAINER														
7	1	B1820059	SPRING														
6	1	B1010050-03	MALE ADAPTER														
5	1	A1700054	V-RING PACKING SET														
4	1	B1640034-01	YOKE LOCKNUT														
3	1	B1060056	RETAINER BEARING														
2	1	C1720060-03	PACKING RETAINER														
1	1	AS REQD	VALVE STEM														
<div> <div>  THIRD ANGLE PROJECTION NEXT ASSEMBLY </div> <div> ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED XX XX DECIMAL DECIMAL FRACTION = 1/64 ANGLE = 90° ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED </div> </div>																	
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DRAWING NUMBER: C3769960

DRAWING NUMBER: C3769960

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED



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, 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 REQUIRED. LUBRICATE PACKING ID & OD AND STEM BEFORE INSTALLATION. PACKING MUST BE ORIENTED AS SHOWN. THE REQUIRED TOOLS ARE B6150020, B6150033-03 AND B6150034-03

REVISE ALL SHARP EDGES AND ROUNDED PER ASME Y14.5-1994		THIRD ANGLE PROJECTION		NEXT ASSEMBLY	
7	A/R	A0940021	DC111 LUBE		
6	1	B1060057	BONNET BEARING		
5	3	4207-18700375-312	LIP PACKING		
4	1	B1640034-01	YOKE LOCKNUT		
3	1	B1060056	RETAINER BEARING		
2	1	C1720061-03	PACKING RETAINER		
1	1	AS REQD	VALVE STEM		
ITEM	QTY	PART NO	DESCRIPTION	MATL SPEC	
UNLESS OTHERWISE SPECIFIED			DRAWN DATE	WARREN CONTROLS INCORPORATED	
DECIMAL	XXX	SEE TABLE	BLB 5/31/13	BETHLEHEM PENNSYLVANIA 48020-8010	
FRACTION	1/64	ANGLE	APPROVED	PACKING SUBASSEMBLY NLP PACKING 400T EPDM 137-18 W/ BEARINGS IN INTEGRAL BONNET	
ALL DIMENSIONS ARE IN INCHES			REV. 1	DATE 8/0	REV
ALL DIMENSIONS ARE IN INCHES					C3769960

C3769960

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REV	DESCRIPTION	DATE	APPROVED
E	REDRAWN WITH CHANGES EEN 2207	05/05 17-05-07	

- 7) APPLY ANTI-SEIZE LUBRICANT TO BOTH SURFACES OF THE SEAT GASKET (11) AND THE BONNET GASKET (5)
- 8) SECURE THE NAMEPLATE (14) TO THE VALVE BODY FLANGE AS SHOWN USING 2 DRIVE SCREWS (7) DRIVEN INTO HOLES $\phi .04 \times .27$ DEEP. THE APPROPRIATE INFORMATION FROM THE SALES ORDER MUST BE STAMPED ON THE NAMEPLATE.
- IF THE VBA IS NOT BEING SHIPPED WITH AN ACTUATOR INSTALLED, THE FLOW ARROW PLATE (8) AND THE 2 DRIVE SCREWS (7) ARE TO BE SHIPPED UNATTACHED TO THE VBA. TWO HOLES $\phi .04 \times .27$ DEEP FOR FLOW ARROW PLATE ATTACHMENT MUST BE DRILLED INTO THE VALVE BODY FLANGE ON THE SIDE OPPOSITE THE NAMEPLATE LOCATION.
- IF THE VBA IS BEING SHIPPED WITH AN ACTUATOR INSTALLED, THE FLOW ARROW PLATE (8) IS TO BE SECURED TO THE VALVE BODY FLANGE ON THE SIDE OPPOSITE THE NAMEPLATE LOCATION USING THE 2 DRIVE SCREWS (7) DRIVEN INTO THE $\phi .04 \times .27$ DEEP HOLES. THE ARROW DIRECTION IS TO BE DETERMINED BY THE SALES ORDER.
- 5) EVENLY TORQUE ALL CAPSCREWS TO AN INITIAL VALUE OF 10 LB-FT FOLLOWED BY A FINAL MINIMUM TORQUE OF 70 LB-FT.
- 4) PRIOR TO TORQUING THE CAPSCREWS, MOVE THE PLUG (9) FULLY INTO THE SEAT RING (10) AND ADJUST THE POSITION OF THE SEAT RING AND THE BONNET (3) TO ENSURE NON-BINDING VALVE OPERATION.
- 3) ORIENT THE CAGE (9) SO THAT ONE POST IS CENTERED ON THE LEFT FLOW PASSAGE AS SHOWN.
- 2) PRIOR TO ASSEMBLY, THE PLUG STEM MUST BE FULLY BURNISHED TO PROVIDE A FINISH OF 8/ ON THE LARGEST DIAMETER OF THE STEM ALONG THE ENTIRE LENGTH AND AS CLOSE TO THE PLUG HEAD AS ALLOWABLE BY THE BURNISHING EQUIPMENT.
- 1) PRIOR TO FINAL ASSEMBLY, PRESET THE SPIRAL WOUND GASKET (6) PER W10005.

NOTES

ITEM	QTY	DESCRIPTION
15	A/R	ANTI-SEIZE LUBRICANT
14	1	NAMEPLATE
13	1	VALVE BODY
12	1	PLUG
11	1	SEAT GASKET
10	1	SEAT RING
9	1	CAGE
8	1	FLOW ARROW PLATE
7	4	DRIVE SCREW NO 4 x 1/4
6	1	SPIRAL WOUND GASKET CAGE SPRING
5	1	BONNET GASKET
4	A/R	HEX HD CAPSCREW
3	1	BONNET
2	1	YOKE LOCKNUT
1	1	PACKING SUBASSEMBLY

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4	A/R	HEX HD CAPSCREW
3	1	BONNET
2	1	YOKE LOCKNUT
1	1	PACKING SUBASSEMBLY

ITEM	QTY	DESCRIPTION
13	1	VALVE BODY
12	1	PLUG
11	1	SEAT GASKET
10	1	SEAT RING
9	1	CAGE
8	1	FLOW ARROW PLATE
7	4	DRIVE SCREW NO 4 x 1/4
6	1	SPIRAL WOUND GASKET CAGE SPRING
5	1	BONNET GASKET
4	A/R	HEX HD CAPSCREW
3	1	BONNET
2	1	YOKE LOCKNUT
1	1	PACKING SUBASSEMBLY

ITEM	QTY	DESCRIPTION
13	1	VALVE BODY
12	1	PLUG
11	1	SEAT GASKET
10	1	SEAT RING
9	1	CAGE
8	1	FLOW ARROW PLATE
7	4	DRIVE SCREW NO 4 x 1/4
6	1	SPIRAL WOUND GASKET CAGE SPRING
5	1	BONNET GASKET
4	A/R	HEX HD CAPSCREW
3	1	BONNET
2	1	YOKE LOCKNUT
1	1	PACKING SUBASSEMBLY

ITEM	QTY	DESCRIPTION
13	1	VALVE BODY
12	1	PLUG
11	1	SEAT GASKET
10	1	SEAT RING
9	1	CAGE
8	1	FLOW ARROW PLATE
7	4	DRIVE SCREW NO 4 x 1/4
6	1	SPIRAL WOUND GASKET CAGE SPRING
5	1	BONNET GASKET
4	A/R	HEX HD CAPSCREW
3	1	BONNET
2	1	YOKE LOCKNUT
1	1	PACKING SUBASSEMBLY

ITEM	QTY	DESCRIPTION
13	1	VALVE BODY
12	1	PLUG
11	1	SEAT GASKET
10	1	

VALVE BODY ASSEMBLY FOR 4" (DN 100) 58H Type 43

DRAWING NUMBER: **D3241336**

REV	DESCRIPTION	DATE	APPROVED
A	REDRAWN WITH CHANGE	DGS 11-29-05	
B	ECN 2199	DGS 4-6-06	

6) APPLY ANTISEIZE TO BOTH SURFACES OF THE SEAT GASKET (12) AND THE BONNET GASKET (5).

5) SECURE NAMEPLATE (15) TO VALVE BODY FLANGE AS SHOWN USING CAPSCREWS (17) AND SPRINGS (16). THE APPROPRIATE INFORMATION FROM SALES ORDER MUST BE STAMPED ON NAMEPLATE.

IF THE VBA IS NOT BEING SHIPPED WITH AN ACTUATOR INSTALLED, FLOW ARROW PLATE (4) AND 2 DRIVE SCREWS (7) ARE TO BE SHIPPED UNATTACHED TO VBA. 2 HOLES 0.104 x .27 DEEP FOR FLOW ARROW PLATE ATTACHMENT MUST BE DRILLED INTO VALVE BODY FLANGE ON SIDE OPPOSITE THE NAMEPLATE LOCATION.

IF VBA IS BEING SHIPPED WITH AN ACTUATOR INSTALLED, THE FLOW ARROW PLATE (4) IS TO BE SECURED TO VALVE BODY FLANGE ON SIDE OPPOSITE THE NAMEPLATE LOCATION USING 2 DRIVE SCREWS (7) DRIVEN INTO THE 0.104 x .27 DEEP HOLES. THE ARROW DIRECTION IS TO BE DETERMINED BY SALES ORDER.

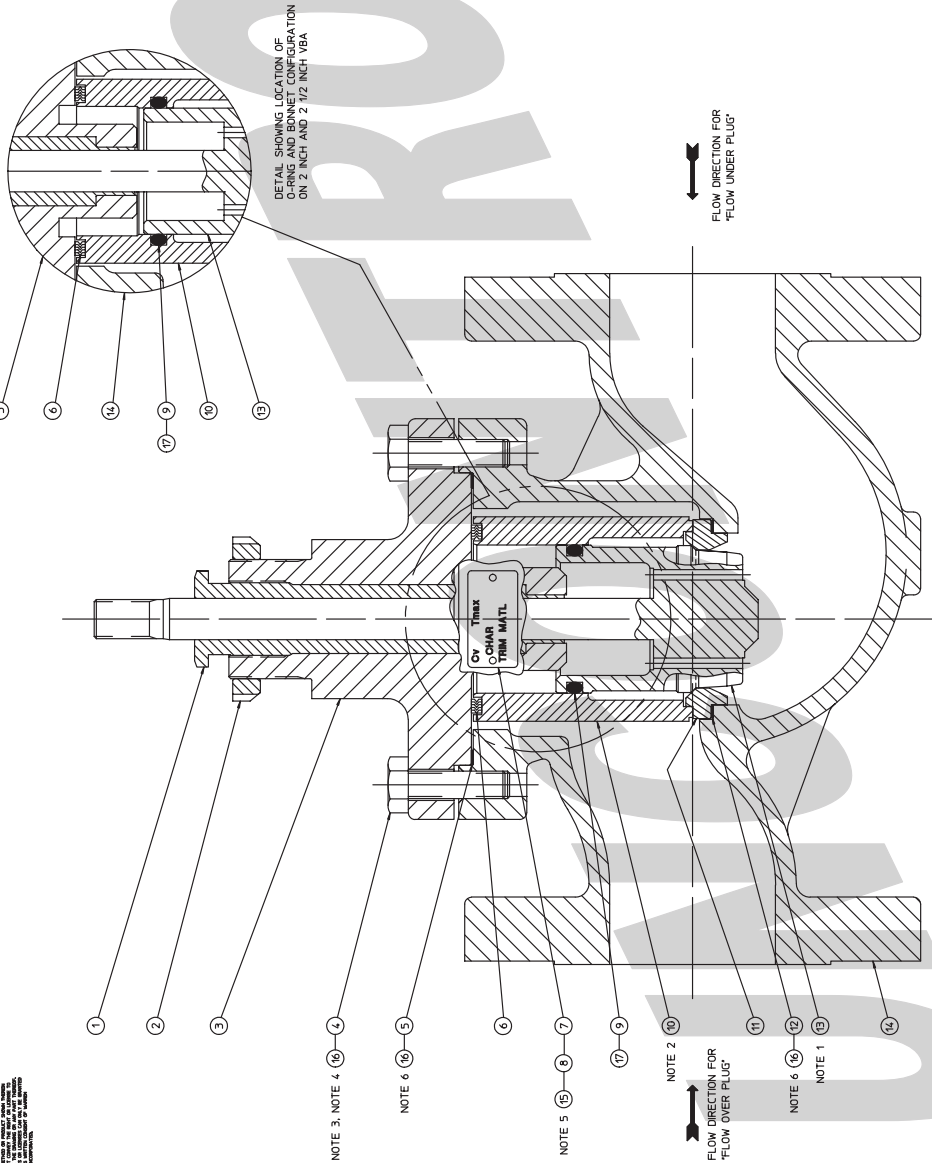
4) TORQUE ALL CAPSCREWS TO AN INITIAL VALUE OF 10 LB-FT FOLLOWED BY A FINAL MINIMUM TORQUE OF 70 LB-FT.

3) PRIOR TO TORQUING CAPSCREWS, MOVE PLUG (13) FULLY INTO SEAT RING (11) AND ADJUST POSITION OF SEAT RING, GASKET (10) AND BONNET (3) TO ENSURE NON-BINDING VALVE OPERATION.

2) ORIENT GASKET SUCH THAT ONE POST IS CENTERED WITH THE LEFT FLOW PASSAGE AS SHOWN.

1) PRIOR TO ASSEMBLY, PLUG STEM SHOULD BE ROLLER BURNISHED TO PROVIDE A FINISH OF 32 ON LARGEST DIAMETER OF STEM ALONG ENTIRE LENGTH AS CLOSE TO PLUG HEAD AS ALLOWABLE BY BURNISHING EQUIPMENT.

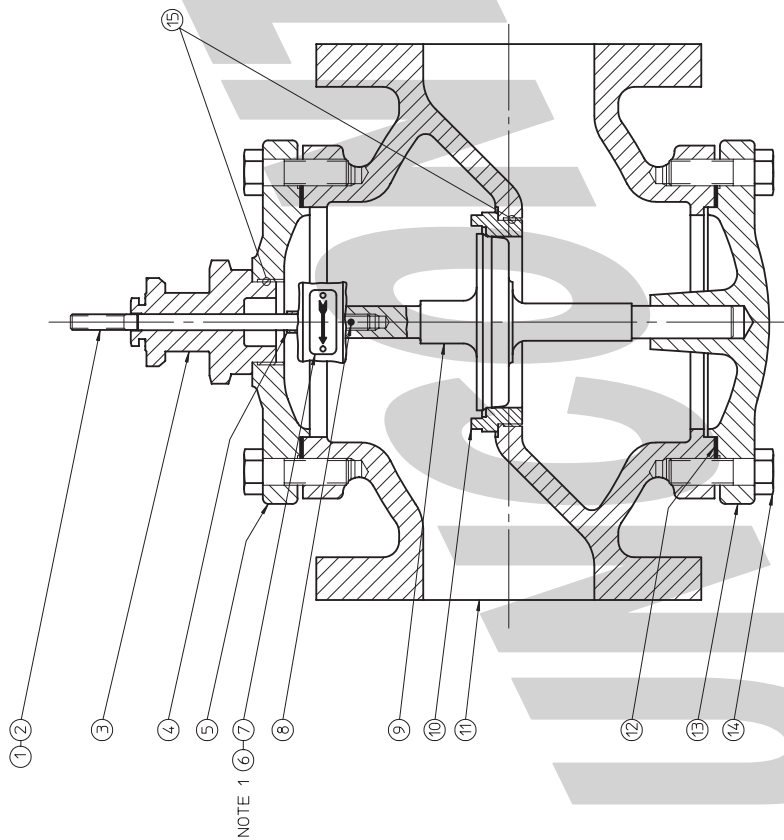
NOTES:



ITEM	QTY	DESCRIPTION
17	AVR	O-RING LUBE
16	AVR	ANTISEIZE
15	1	NAMEPLATE
14	1	VALVE BODY
13	1	PLUG
12	1	SEAT GASKET
11	1	SEAT RING
10	1	GASKET
9	1	O-RING
8	1	FLOW ARROW PLATE
7	4	DRIVE SCREW NO 4 x 1/4
6	1	SPIRAL WOUND GASKET CAGE SPRING
5	1	BONNET GASKET
4	AVR	HEX HD CAPSCREW
3	1	BONNET
2	1	YOKE LOCKNUT
1	1	PACKING SUBASSEMBLY

ITEM	QTY	DESCRIPTION
17	AVR	O-RING LUBE
16	AVR	ANTISEIZE
15	1	NAMEPLATE
14	1	VALVE BODY
13	1	PLUG
12	1	SEAT GASKET
11	1	SEAT RING
10	1	GASKET
9	1	O-RING
8	1	FLOW ARROW PLATE
7	4	DRIVE SCREW NO 4 x 1/4
6	1	SPIRAL WOUND GASKET CAGE SPRING
5	1	BONNET GASKET
4	AVR	HEX HD CAPSCREW
3	1	BONNET
2	1	YOKE LOCKNUT
1	1	PACKING SUBASSEMBLY

REV	DESCRIPTION	DATE	APPROVED



NOTE 1 (6) (7)

ITEM	QTY	DESCRIPTION
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

DATE	DESIGNED	CHECKED	APPROVED	DATE
10/10/96	JMARTOCCI			
WARREN CONTROLS CORPORATION BROADWAY, NEW JERSEY 08808				
2 1/2, 3 & 4 INCH TYPE 20 VBA				
SIZE	PSG	NO	DWG NO	REV
C	038.47		C3241352	

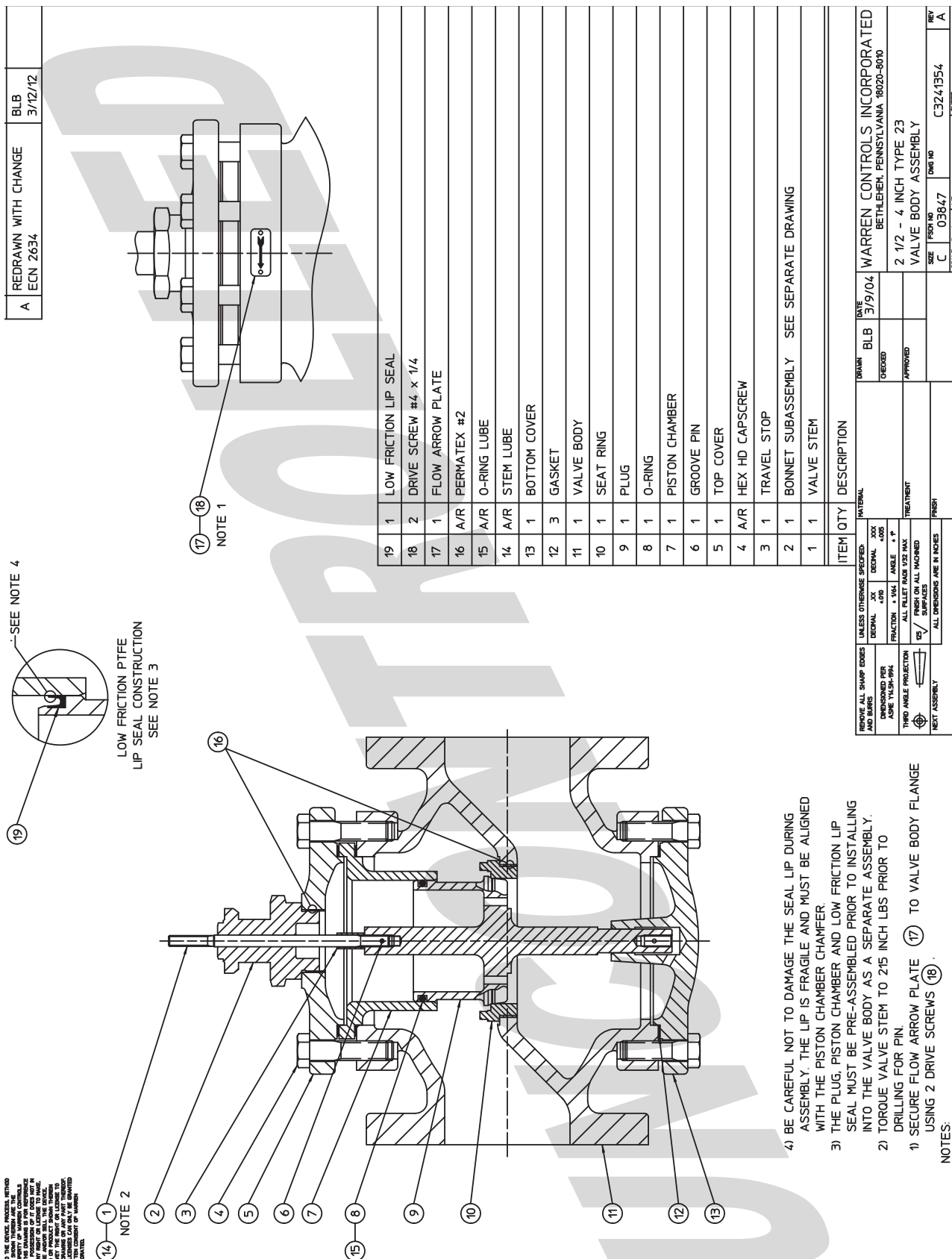
1) SECURE FLOW ARROW PLATE (6) TO VALVE BODY FLANGE
USING 2 DRIVE SCREWS (7)

NOTES:

C3241352
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DRAWING NUMBER: C3241354

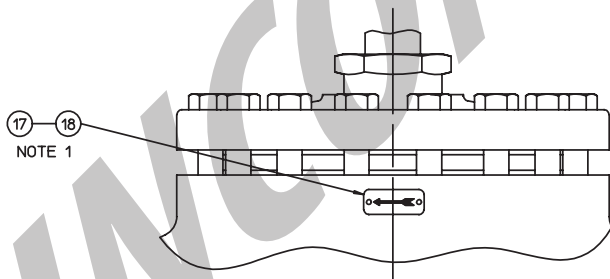
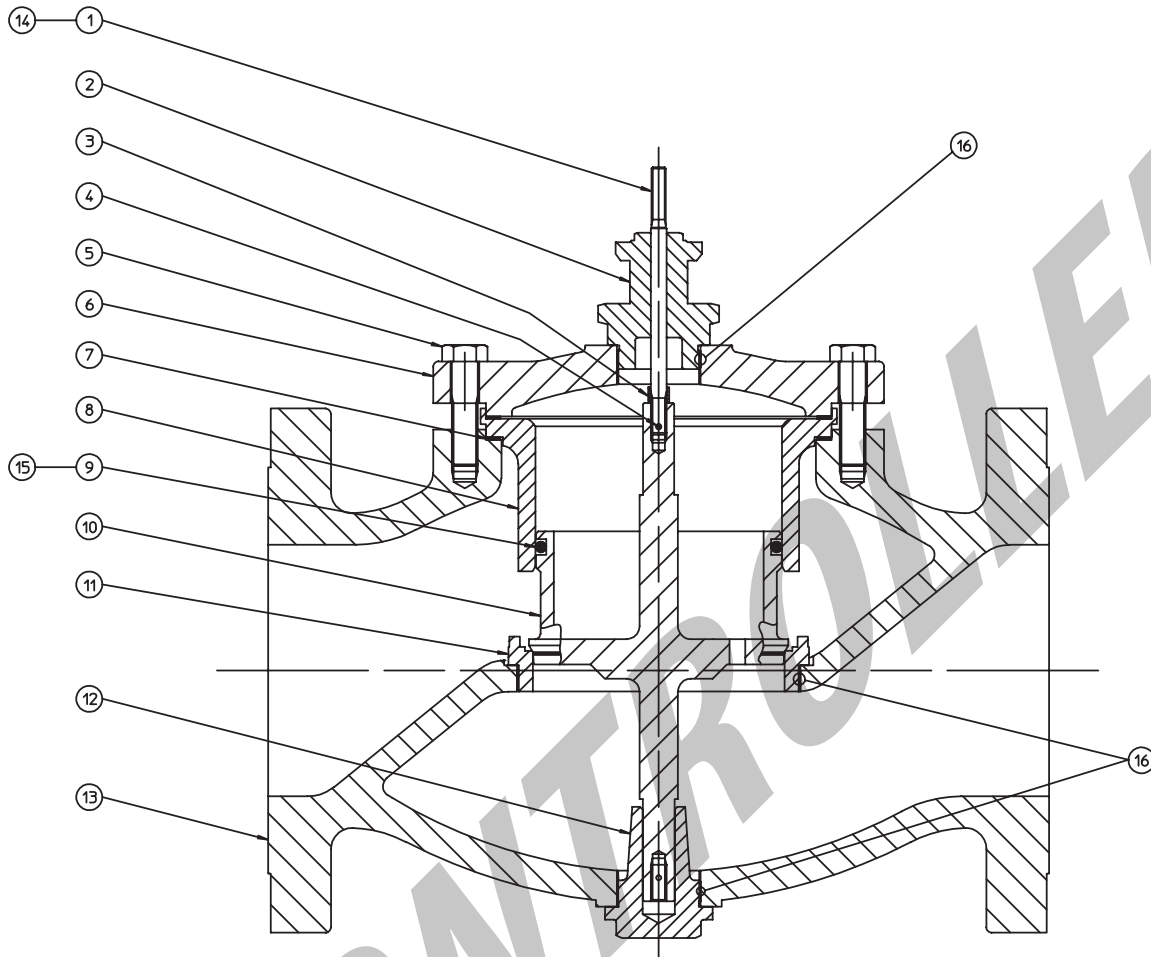
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- 4) BE CAREFUL NOT TO DAMAGE THE SEAL LIP DURING ASSEMBLY. THE LIP IS FRAGILE AND MUST BE ALIGNED WITH THE PISTON CHAMBER CHAMFER
- 3) THE PLUG, PISTON CHAMBER AND LOW FRICTION LIP SEAL MUST BE PRE-ASSEMBLED PRIOR TO INSTALLING INTO THE VALVE BODY AS A SEPARATE ASSEMBLY.
- 2) TORQUE VALVE STEM TO 215 INCH LBS PRIOR TO DRILLING FOR PIN.

1) SECURE FLOW ARROW PLATE
USING 2 DRIVE SCREWS (18).

PROVIDE ALL SHARP EDGES DIMENSIONS PER ASME Y14.5-1994	UNLESS OTHERWISE SPECIFIED DECIMAL DECIMAL INCHES FRACTION 1/16" ANGLE ± °	MATERIAL CHECKED	DRAWN BLB DATE 3/9/04	WARREN CONTROLS INCORPORATED BETHLEHEM, PENNSYLVANIA 18020-8010
THIRD ANGLE PROJECTION 	ALL PARTS FOR VISE MAX FINISH ON ALL MACHINED CS /	TREATMENT APPROVED	2 1/2 - 4 INCH TYPE 23 VALVE BODY ASSEMBLY	
NEXT ASSEMBLY 	ALL DIMENSIONS ARE IN INCHES	FINISH	SIZE DRAW NO C 038.47	REV A C3241354



NOTE 1

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

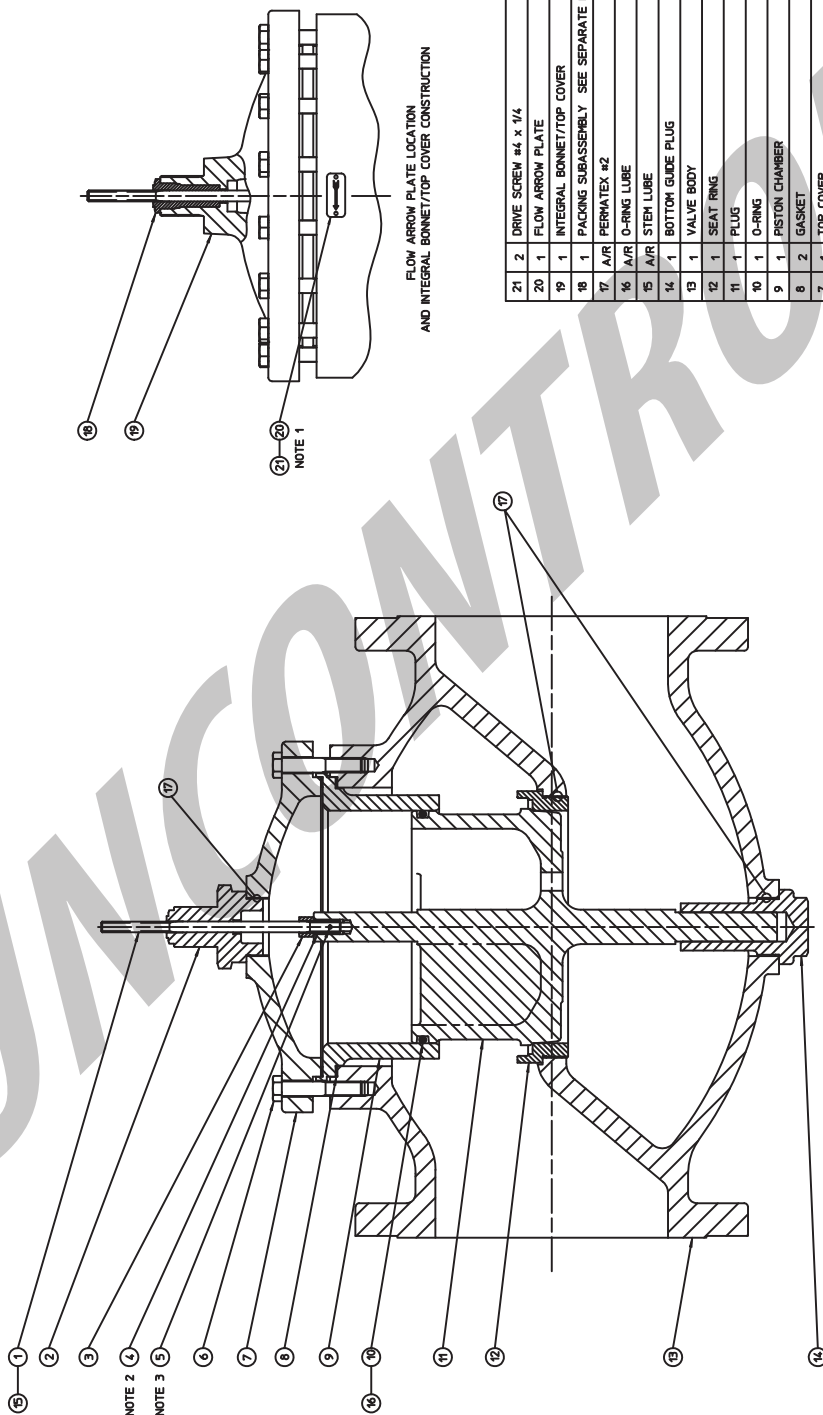
NOTES:

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	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

DRAWN	BLB	DATE	6/20/03	WARREN CONTROLS INCORPORATED			
CHECKED				BETHLEHEM, PENNSYLVANIA 18020-8010			
APPROVED				5 - 6 INCH TYPE 23			
				VALVE BODY ASSEMBLY			
		SIZE	D	FRCH NO	03847	DWG NO	D3241556
						REV	

VALVE BODY ASSEMBLY FOR 8" (DN 200) 29N Type 23

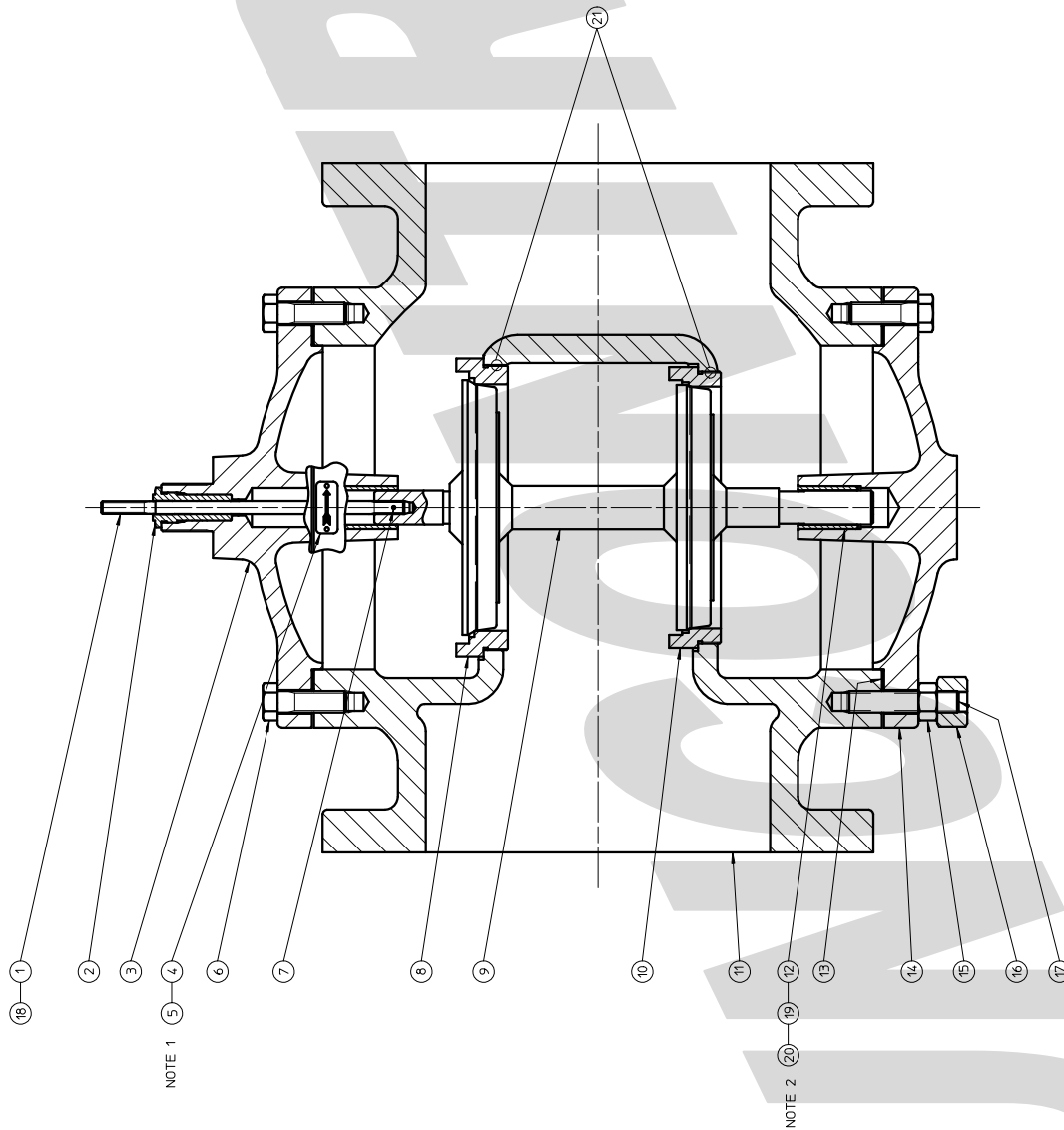
DRAWING NUMBER: D3201950



21	2	DRIVE SCREW #4 x 1/4
20	1	FLOW ARROW PLATE
19	1	INTEGRAL BONNET/TOP COVER
18	1	PACKING SUBASSEMBLY SEE SEPARATE DRAWING
17	A/R	PERMATEX #2
16	A/R	O-RING LUBE
15	A/R	STEM LUBE
14	1	BOTTOM GUIDE PLUG
13	1	VALVE BODY
12	1	SEAT RING
11	1	PLUG
10	1	O-RING
9	1	PISTON CHAMBER
8	2	GASKET
7	1	TOP COVER
6	1/8	HEX HD CAPSCREW
5	1	GROOVE PIN
4	A/R	THREAD INSERT
3	A/R	TRAVEL STOP
2	1	BONNET SUBASSEMBLY SEE SEPARATE DRAWING
1	1	VALVE STEM

NOTES:
 3) PRIOR TO DRILLING HOLE FOR GROOVE PIN (ITEM 5) INSTALLATION, TORQUE STEM (ITEM 1) INTO PLUG (ITEM 11) 140 IN-LB FOR Ø3/8 STEM AND 420 IN-LB FOR Ø1/2 STEM.
 2) THREAD INSERT (ITEM 4) ONLY REQUIRED WITH Ø3/8 VALVE STEMS.
 1) SECURE FLOW ARROW PLATE (ITEM 20) TO VALVE BODY FLANGE USING 2 DRIVE SCREWS (ITEM 21).

ITEM	QTY	DESCRIPTION	DATE	BLB	5/30/13	WARREN CONTROLS INCORPORATED
BETHLEHEM, PENNSYLVANIA 18020-8000						
8 INCH TYPE 23 VALVE BODY ASSEMBLY						
VALVE BODY ASSEMBLY			DATE	5/30/13	WARREN CONTROLS INCORPORATED	
VALVE BODY ASSEMBLY			DATE	5/30/13	WARREN CONTROLS INCORPORATED	
VALVE BODY ASSEMBLY			DATE	5/30/13	WARREN CONTROLS INCORPORATED	
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VALVE BODY ASSEMBLY			DATE	5/30/13	WARREN CONTROLS INCORPORATED	
VALVE BODY ASSEMBLY			DATE	5/30/13	WARREN CONTROLS INCORPORATED	



NOTE 1

NOTE 2

WARREN CONTROLS INCORPORATED
BETHLEHEM, PENNSYLVANIA 18020-8000

VALVE BODY ASSEMBLY 8 & 10 INCH
TYPE 22 WITH INTEGRAL BONNET

D 03847 D3201952
1/2 1/2 1/2 1/2

21	A/R	PERMATEX #2
20	A/R	LOCTITE PRIMER T
19	A/R	LOCTITE 272
18	A/R	STEM LUBE
17	4	STUD
16	4	VALVE FOOT
15	4	HEX NUT
14	1	BOTTOM GUIDE COVER
13	2	GASKET
12	2	GUIDE BUSHING
11	1	VALVE BODY
10	1	LOWER SEAT RING
9	1	PLUG
8	1	UPPER SEAT RING
7	1	GROOVE PIN
6	A/R	HEX HEAD CAPSCREW
5	1	FLOW ARROW PLATE
4	2	DRIVE SCREW NO 4 x 1/4 LG
3	1	BONNET
2	1	PACKING SUBASSEMBLY
1	1	VALVE STEM

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

- 2) PRESS GUIDE BUSHING (ITEM 12) FLUSH WITH END OF
GUIDE POST ON BOTTOM GUIDE COVER (ITEM 14) AND BONNET (ITEM 3).
1) SECURE FLOW ARROW PLATE (ITEM 5) TO VALVE BODY
USING 2 DRIVE SCREWS (ITEM 4).

NOTES:

MON_DP_IOM_RevD_0721



WARREN CONTROLS

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