Pressure Independent Control Valve

High Capacity

PICV PRODUCT SPEC

PICV

SIZES: 2 1/2 TO 10 INCHES

Warren Controls Pressure Independent Control Valve with the authority to maximize stability, efficiency and energy savings.

PICV_PS_RevM_0723

WARREN CONTROLS

2600 EMRICK BLVD • BETHLEHEM, PA 18020 • USA •800-922-0085 • WWW.WARRENCONTROLS.COM

DEPENDABLE, RUGGED, PRECISION CONTROL VALVES AND ACCESSORIES

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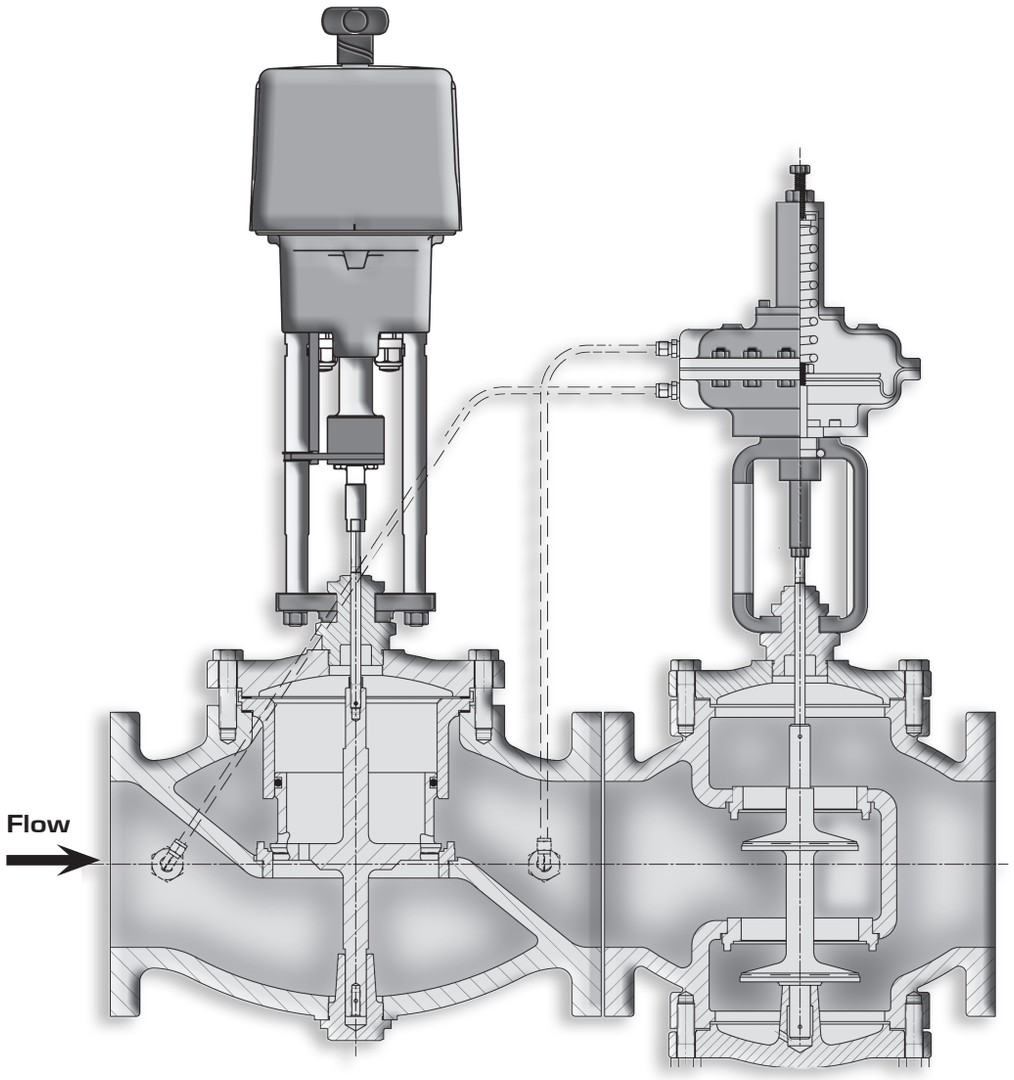
One of the primary factors that influence the flow of fluid through a control valve is the amount of pressure, or differential pressure across it. At any point in valve plug travel, flow through a valve will typically increase if differential pressure is raised, and decrease if it is lowered. A change in pumping pressure can therefore produce a change in rate of flow that is not related to the system controller's output signal. With pressure independence, the amount of water flowing through a valve and the controlled load (i.e. heat exchanger coil) is more accurately controlled as a function of the control signal, and is less dependent upon varying pump pressure. Stability in the control system is enhanced when pressure independence is provided, and the control valve's installed flow characteristic more closely resembles its inherent, or constant-pressure characteristic.

The Series PICV (Pressure Independent Control Valve) consists of two functional controlling segments. The first segment is a pressure-balanced control valve, actuated by a high-thrust electric motor actuator. The electric actuator provides precise positioning of the valve closure mechanism, and responds quickly and precisely to the electronic control signals supplied to them. The second segment is a differential pressure control valve that operates independently of the control valve segment. This segment is self-powered (self-operating) and does not burden or interact with the building automation control system. By quickly raising or lowering its own resistance to flow, the differential pressure control segment of the PICV regulates and stabilizes the pressure drop across the control valve segment by absorbing unused head pressure. This compensates for changes in pumping pressure resulting from pump switching or from varying flow demands in its own, or parallel flow paths and results in pressure independent operation.



CONTROL VALVE AUTHORITY

Control Valve Authority:

A mathematical representation for how a control valve will perform in circuit. In general terms, it is a ratio for what the full load pressure drop is on the control valve with respect to the full load pressure drop of the entire circuit including the control valve.

Valve authority should be in the general range of 0.2 - 0.5. If the value gets too low, the control valve looses its rangeability where low demand control performance suffers and nonlinearities throughout the control range are more dramatic. If the value is too high, the valve may be a bit small for the job and generally is not making efficient use of energy.

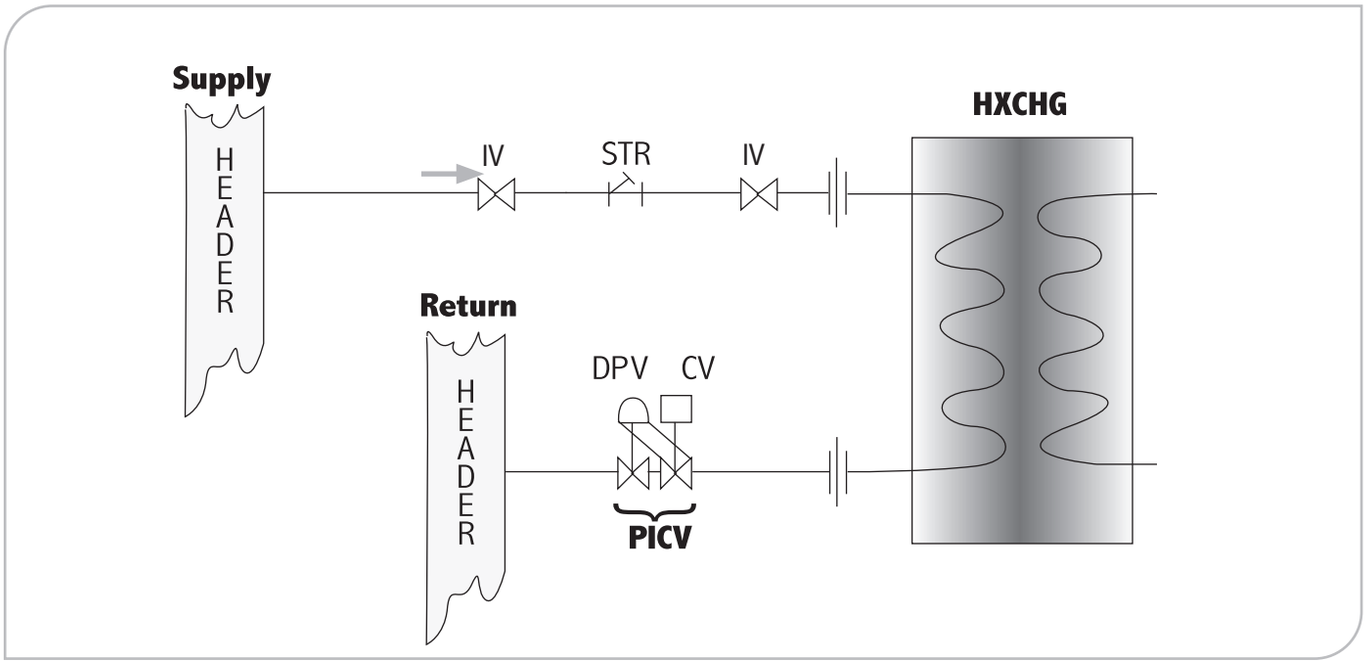
Control Valve Authority Can Be Expressed as:

$$N = \Delta Pcv / (\Delta Pcv + \Delta Prcc)$$

where **N** = Control Valve Authority

ΔPcv = Differential pressure of Control Valve Element when under full open - full load condition

ΔPrcc = Differential pressure of 'Remaining Control Circuit' under same full load condition.



IF YOU HAVE A SYSTEM THAT IS COMPLETELY CLOSED LOOP AND UNTO ITSELF, THEN ΔPRCC TRULY DOES REPRESENT EVERYTHING ELSE IN THE CIRCUIT.

HOWEVER…If the circuit is actually a sub circuit and part of a larger loop, whereby a degree of inherent pressure isolation exists from interaction with the main loop, largely due to the inherent size and capacity of the main loop, as is the case in say for a main on a district cooling loop,

THEN…ΔPrcc **may** only be calculated for elements upstream of the control valve back to the main loop as there will be no interactive influence by the control valve on the elements downstream, as would be realized on a truly closed loop system.

THEREFORE…A sub circuit of a district main can be considered open loop, and Valve Authority **may** be calculated against elements upstream of the control valve up to the supply header.

This is demonstrated in the diagram to the right, where ΔPrcc is defined as elements under the influence of the Control Valve up to the main header, upstream of the Control Valve element.

IT IS CLEAR THAT THE MAXIMUM ALLOWED PRESSURE DROP ACROSS INDIVIDUAL LOOPS WITHIN PLOTS OF LAND IS A FUNCTION OF THE:

- pump size
- distance of the plot from the cooling plants
- loop design within the plot, i.e. number of loops, pipe size, heat exchanger size
- control valves

MOUNTED IN HORIZONTAL PIPE ONLY WITH ACTUATORS ORIENTED VERTICALLY ABOVE THE VALVE

TYPICAL SPECIFICATION

THE PRESSURE INDEPENDENT CONTROL VALVE (PICV) SHALL CONSIST OF TWO FUNCTIONAL CONTROLLING SEGMENTS.

The first segment is an electrically actuated control valve, capable of responding to a control signal from a controller, not part of the PICV.

The second segment senses and regulates a preset adjustable flowing differential pressure across the control valve segment from 2 PSIG to 8 PSIG, depending on spring choice, factory preset to customer's specifications.

Both segments include pressure balancing control elements of industrial quality for optimum control performance in the presence of high system pressures and ensuring long life. Stainless steel trim shall be used when flowing differential pressures of the PICV exceed 100 PSID to a maximum of 150 PSID while bronze or stainless steel trim may be used for pressures under 100 PSID.

The electronic control valve segment shall accept all common control signals of 4-20 mA, 0 – 20 mA, 0 – 10 Vdc, 2 – 10 Vdc, shall be operated by a power supply of 24 VAC or 220 VAC, shall not exceed a power consumption of 25 VA, shall provide a minimum of ANSI Class III leakage in the shut position to a maximum shut off pressure of 150 PSID. The 24 VAC electric actuator shall be capable of Fail Open or Fail Closed operation, field selectable, with a wall mounted back-up control module.

The pressure independent control valve shall be manufactured in accordance with ISO 9001. Use Warren Controls #P__- 02___ -_____-____-___

- The Differential Pressure (DP) Segment combines Type 72 valve body assemblies with differential diaphragm actuators.
- CV and DP segments are bolted together, complete with sensing lines.
- Flange dimensions are in accordance with ANSI 125lb or DIN PN16 standards.
- Electric Actuators: All control valve electric actuators can close off against 150 PSI (10 BarG) minimum

CONFIGURATIONS

125FL/ PN16 CONFIGURATIONS

□□□□□□□-□□□□-□□□□□-□□

1. SELECTION Please make a selection from each table of OPTIONS below to make a complete model number string.

Control Valve Size	Control Valve Flange	Control Valve Profile	Control Valve Trim Size	Control Valve Trim Mat'l
P2 2.5″	**0** ANSI 125 Flanges	**22** Type of Control Valve Body (Sizes P8 & P1)	**F** Control Valve Trim Size Full	**S** Stainless Steel
P3 3″	**2** PN16 Flanges	**23** Type of Control Valve Body (Sizes P2-P6)	**X** Control Valve Trim Size Extended	**B** Bronze
P4 4″			**1** Control Valve Trim Size 1SR	
P5 5″			**2** Control Valve Trim Size 2SR	
P6 6″				
P8 8″				
P1 10″				

Control Valve Actuator	
E029	Fail-in-Place, 24 Vac
E031	Fail-Safe w/VMS Backup, 24 Vac
E047	1010 Lbf., 5.5 Secs/In, Fail-in-Place, 115 Vac
E048	1010 Lbf., 5.5 Secs/In, Fail-in-Place, 230 Vac
E049	1010 Lbf., 5.5 Secs/In, Fail-in-Place, 24 Vac
E050	1010 Lbf., 5.5 Secs/In, Fail-in-Place, 24 Vdc
E051	1010 Lbf., 5.5 Secs/In, Fail Safe, 115 Vac
E052	1010 Lbf., 5.5 Secs/In, Fail Safe, 230 Vac
E053	1010 Lbf., 5.5 Secs/In, Fail Safe, 24 Vac
E054	1010 Lbf., 5.5 Secs/In, Fail Safe, 24 Vdc
***E061**	1798 Lbf., 35 Secs/In, 2.5″ Travel, IP-67 End, Fail-In-Place, 230 Vac
***E062**	1798 Lbf., 35 Secs/In, 2.5″ Travel, IP-67 End, Fail-In-Place, 24 Vac
***E065**	1798 Lbf., 35 Secs/In, 2.5″ Travel, IP-67 End, Fail Safe, 230 Vac
***E066**	1798 Lbf., 35 Secs/In, 2.5″ Travel, IP-67 End, Fail Safe, 24 Vac

DPRV Size	DPRV Flange	DPRV Trim Material	DPRV Actuator
P2 2.5″	**0** ANSI 125 Flanges	**DS** DPRV w/ SS Trim	**2L** DPRV Actuator Cast Iron, w/ Low DP Spring
P3 3″	*NOTE: Must match control valve*	**DB** DPRV w/ Brz Trim	**2M** DPRV Actuator Cast Iron, w/ Medium DP Spring
P4 4″			
P5 5″			
P6 6″			
P8 8″			
P1 10″			

***E061 - E066 used exclusively on the 6″ and 10″ extended port PICV**

SPECIFICATIONS

VALVE BODIES

Body Material:	Cast Iron
End Connections:	ANSI 125 Lb. or PN16 FF Flanges
Trim Designs:	23 - Single Seat Cylinder Balanced, ANSI Class IV Leakage 22 and 72 - Double Seat Balanced, ANSI Class III Leakage
Trim Material:	Bronze or 300 Series Stainless Steel EPDM Seal (23 w/Bronze Trim) Fluoraz Seal (23 w/Stainless Steel Trim)
Fluid:	Chilled Water Typical, Water or Water/Glycol from 2°C - 82°C (35 °F- 180°F)
Trim Limits:	Stainless Steel: MAX Flowing Differential Pressure, 10.3 BARG (150 PSIG) Bronze: MAX Flowing Differential Pressure, 6.9 BARG (100 PSIG)
Packing:	Long-Life Multi-Stack EPDM Lip Packing - Water / Water-Glycol Service

Body Pressure Temperature Ratings

Temperature		Iron Body 125 FLG & PN16	
°F	°C	PSIG	BARG
35 to 180	1.7 to 82.2	150	10.20

E029 & E031: (Not Available for 58H40 and 58H43 Valve Series)

E029

Control Signal:	2-10 Vdc; (4-20 mAdc with 500 ohm resistor Kit KR500-supplied with motor)
Control Action, Loss of Signal:	Increasing Signal Opens Valve, Loss of Signal Closes Valve (Default) Reversible with Switch. Can be specified when ordering.
Feedback Signal:	2-10 Vdc
Power Supply:	24 VAC/DC
Loss of Power:	**E031** (E029 w/VMS-50 BCM, FAIL SAFE TO LOSS OF SIGNAL POSITION)
Running:	12W; **E029** / **E031** 6W (w/VMS.50 BCM)
Holding:	3W; **E029** / **E031** 3.5W (w/VMS.50 BCM)
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
Saftey Agency Listing:	CE, cUL

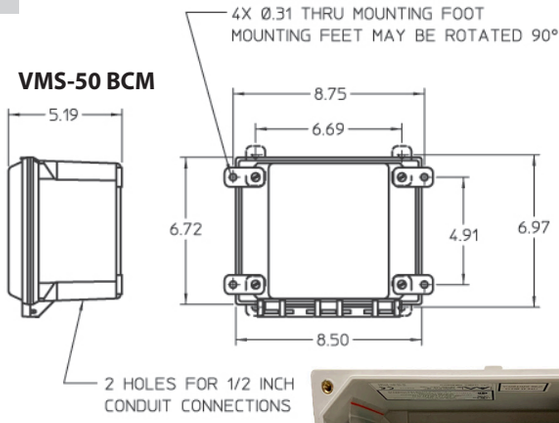
E031

(Includes: VMS-50 BCM)

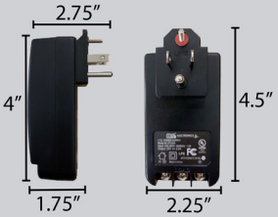
VMS-50 BCM SPECIFICATIONS

Actuator Usage:	Models E024, E029 or E031 *(NOTE: E031 is an E029 Actuator with a VMS-50-BCM. This does not include the VMS-50-PS.)*
Power Requirement:	24 Vdc 2.0 A from Separate External; Switching Power Supply
Power Output:	24 Vdc 48W Total
Number Actuators:	One, Two or Three
Construction:	Battery w/Circuit Board and Charger
Circuit Board Protection:	Fuse Littelfuse T6.3AH250VP
Enclosure Type:	NEMA 4X, IP66, UL 4X, CSA 4X
Flame Retardant:	UL 50
Construction:	UV Stabilized Fiberglass Reinforced Polyester, Polycarbonate Hinge and Closed Cell Neoprene Gasket
Connections:	Two 1/2 IN conduit with one plug
Number Batteries:	One
Initial Charge:	2-4 hours
Output Cycle Time:	6.0 Minutes from loss of power until circuit board times out
Battery Life:	Up to 5 years … Replacement battery model SP12-1.2 (12V1.4AH/T1)
Indication:	Red REPLACE BATTERY LED ON indicates Replace Battery (See REPLACE BATTERY LED Function)
Dimensions:	8.75" (W) x 6.97" (H) x 5.19" (D)
Mounting:	Feet for Wall Mount (4.91" x 8.75" centers)
Environmental:	Operating/ Storage: Ambient +32°F to +104°F (0 to +40°C) – due to battery
Weight:	4.15 lbs (1.9 kg)
Safety Agency Listing:	Not listed

VMS-50 BCM



VMS-50 PS SEPARATE EXTERNAL SWITCHING POWER SUPPLY



Usage:	VMS-50 BCM (VMS-50 BCM does not include VMS-50 PS)
Input:	115 VAC 50/60 Hz 1.5A
Indication:	Red LED ON indicates Input Line Voltage Present
Output:	24 Vdc 2.0 A
Input Connector:	Three Pin Input Plug
Construction:	Molded Plastic
Dimensions:	4.31" (L) x 2.16" (W) x 1.62" (H)
Environmental: *Operating/ Storage:*	Ambient +32°F to +113°F (0 to +45°C)/ -40°F to +185°F/(-40 to +85°C)
Weight:	0.5 lbs (0.2 kg)
Safety Agency Listing:	UL listed
Safety Agency Listing:	Two 1/2 IN conduit with one plug

E047-E054/E061-E066

High Quality, Modulating, Linear, Industrial Electric Valve Actuator

Feature rich and proven design with robust construction provides reliable, trouble free service.

No switching-over to manual operation needed. The hand wheel serves as an operation indicator and is always ready for operation

Vibration-proof potentiometer suspension

All common power supplies: single phase,and d.c. voltage. Suitable for control operations. Protection class IP65 is standard

Efficient motor for precise positioning and controlling with a long duty cycle

Friction clutch prevents damage

Compact, corrision resistant, sturdy and light-weigthed due to high-quality aluminum alloys with polycarbonate

IP65 ENCLOSURE POLYCARBONATE COVER

Precise valve setting:
- with fine adjustment of cams
- with stroke scale

Spring clutch between valve and actuator. Many valve connections are available

Electronic board

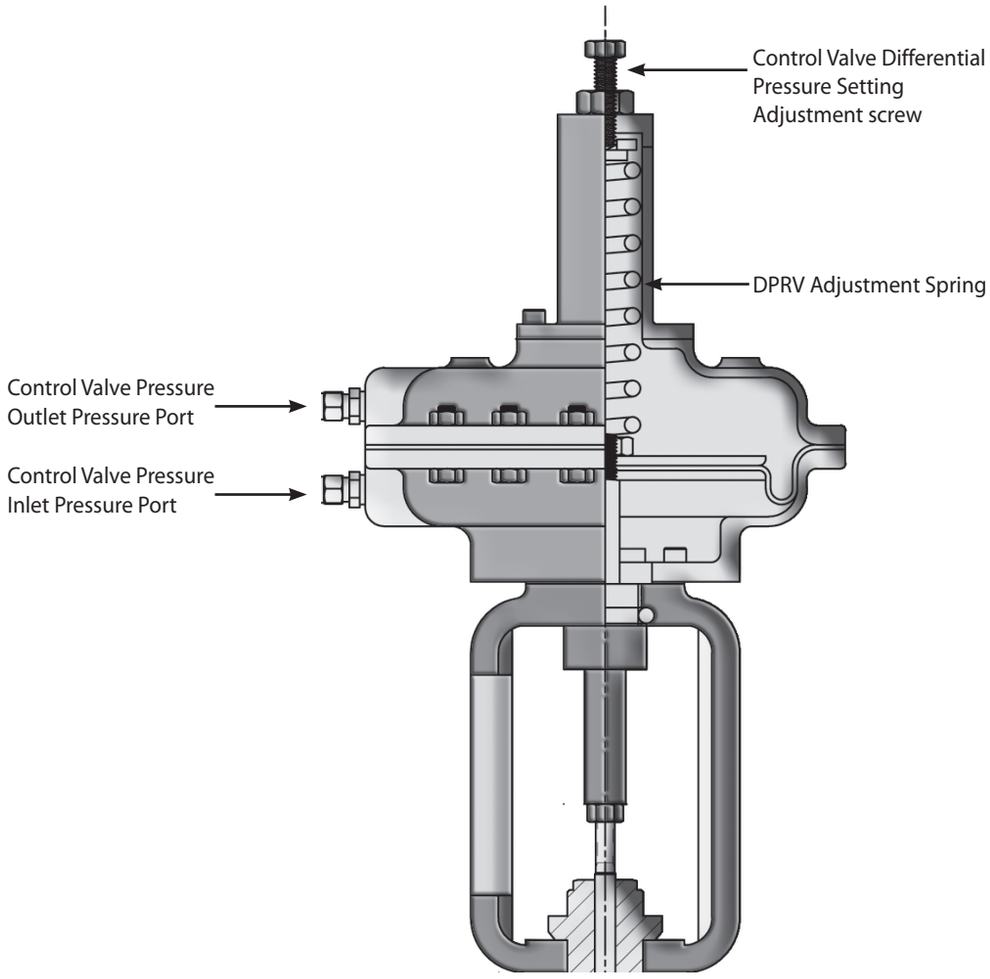
SPECIFICATIONS - ACTUATORS E047-E054/E061-E066

	MODELS	E049	E047	E048	E053	E051	E052	E062	E061	E066	E065
	UNITS										
Thrust/Force	(Lbf)	1010	1010	1010	1010	1010	1010	1798	1798	1798	1798
MAX Stroke	(inches)	1.675	1.675	1.675	1.675	1.675	1.675	2.188	2.188	2.188	2.188
Power Supply	(VAC)	24	115	230	24	115	230	24	230	24	230
Nominal Current	(Amps AC)	1.1	0.23	0.11	1.1	0.23	0.11	2.1	0.22	2.1	0.22
MAX Current	(Amps AC)	1.4	0.3	0.14	1.4	0.3	0.14	2.7	0.29	2.7	0.29
Power Consumption	(Watts)	18	19	19	18	19	19	35	38	35	38
Pillar Distance C to C (inches)	(inches)	4	4	4	4	4	4	4	4	4	4
Weight (Lbs)	(Lbs)	8	8	8	12.5	12.5	12.5	12	12	16.5	16.5
Stroke Speed	(Secs/inch)	11	11	11	11	11	11	36	36	36	36
Approximate Height	(inches)	18.9	18.9	18.9	18.9	18.9	18.9	23	23	23	23
Approximate clearance above to remove cover	(inches)	4	4	4	4	4	4	4.8	4.8	4.8	4.8
Fail-Mode, Loss of Power		Fail-In-Place	Fail-In-Place	Fail-In-Place	Fail-Safe	Fail-Safe	Fail-Safe	Fail-In-Place	Fail-In-Place	Fail-Safe	Fail-Safe
Enclosure Rating		IP-67	IP-67	IP-67	IP-67	IP-67	IP-67	IP-67	IP-67	IP-67	IP-67
Cover Material		Aluminum	Aluminum	Aluminum	Aluminum	Aluminum	Aluminum	Aluminum	Aluminum	Aluminum	Aluminum

GLOBAL SPECIFICATIONS For Actuator Models: E047 - E054 / E061 - E066	
Manual Override	Hand-knob (For use when unpowered)
Motor Protection	Electronic motor current monitoring with safety cutoff
Duty Cycle as per IEC 60034-1,8	S2 30min S4 50% ED @ 25 °C
Permitted Ambient Temperature	-20 °C to +60 °C
Binary Control	24 Vac to 230 Vac, for ON/OFF control (min. duration of pulse 1s)
Internal Fault Monitoring	Torque, set value, temperature, power supply, positioning deviation etc., adjustable
Overvoltage Category	II
Automatic Startup	Recognizing the end position(s) and autoscaling set and feedback values
Diagnostics Function	Stores cumulated operation data (motor and total running time, number of motor starts) and data sets of current values (set value, feedback value, torque, temperature and error messages)
Communcation Interface	Connecting to a USB port and a software, allows data reading and parmetrization
Control Signal & Feedback	Factory programmable, 0 (4) .. 20 mAor 0 (2) .. 10 Vdc, split range operation as well
Valve Positioner Function	Integrated positioner, deadband adjustable from 0.5 .. 5%, shut-off minimum
Mounting Position	Any position, except below horizontal
Conduit Entries	2 pcs. M20 x 1.5, 1 pc. M16 x 1.5
Fault Indication Relay	Potential-free opening contact provides a freely definable collective fault signal, programmable by a variety of combined faults and conditions
Additional Options	Local Controls Station, Heating Resistor, Limit Switches, Communications Options

DPRV DOUBLE ACTING DIAPHRAGM ACTUATOR WITH SPRING ASSIST (SERIES 2)

Control Signal:	Differential Pressure from Control Valve, 2 to 8 PISG (0.14 to 0.55 BARD) 150 PSIG (10.3 BARD) Max Static
Fluid:	Chilled Water Typical, Water or Water/Glycol from 35 °F- 180°F (2°C - 82°C)
Spring Pack:	Low DP Spring: Adjustable 2 to 6 PSIG (0.14-0.41 BARD) Medium DP Spring: Adjustable 5 to 8 PSIG (0.34-0.55 BARD)
Construction:	Cast Gray Iron Class G3000, epoxy coated, epoxy coated spring, SS components, Buna-N nylon reinforced diapragm.
Temperature Limits:	Ambient 32°F - 122°F (0°C - 50°C)
Mounting:	Factory Aligned, Vertical Above Centerline of Control Valve Consult factory for preconfigured alternate orientations



VALVE BODIES

Body Material:	Cast Iron
End Connections:	ANSI 125 LB FF Flanges or PN16 Flanges
Trim Designs:	23 - Single Seat Cylinder Balanced, ANSI Class IV Leakage 22 and 72 - Double Seat Balanced, ANSI Class III Leakage
Trim Material:	Bronze or 300 Series Stainless Steel EPDM Seal (23 w/Bronze Trim) Fluoraz Seal (23 w/Stainless Steel Trim)
Fluid:	Chilled Water Typical, Water or Water/Glycol from 35 °F- 180°F (2°C - 82°C)
Trim Limits:	Stainless Steel: MAX Flowing Differential Pressure, 150 PSIG (10.3 BARG) Bronze: MAX Flowing Differential Pressure, 100 PSIG (6.9 BARG)
Packing:	Long-Life Multi-Stack EPDM Lip Packing - Water / Water-Glycol Service

Body Pressure Temperature Ratings			
Temperature		Iron Body 125 FLG & PN16	
°F	°C	PSIG	BARG
35 to 180	1.7 to 82.2	150	10.20

SIZING & SELECTION

While it may be common in many tempered water loops to simply size valves on pipe size, all factors should be considered. Static pressure, close off pressure, flowing differential pressure, MIN and MAX flows and temperature to name a few. The Warren Controls Pressure Independent Control Valve (PICV) has a Rangeability of 50:1, meaning that good control performance can be achieved when the minimum flow requirement is as low as 1/50 of the maximum flowing GPM or L/S. Simply identify the desired Set Differential Pressure to identify Model and Size by Maximum Flow. Assuming the Minimum Flow is within 1/50 of the Maximum, the proper choice has been made.*

***NOTE:** The maximum differential pressure across the entire PICV is approximately 2 x (Set Differential Pressure) at max flow

PRODUCT MODEL (where 'x' is a configurable option)	LOW DP SPRING PERFORMANCE	MEDIUM DP SPRING PERFORMANCE
P2x23Fx-xxxx-P20Dx-2x 2 1/2" Standard Port	Set Differential Pressure (PSI) (BAR) 2.0 (.14) | 3.1 (.21) | 4.2 (.29) | 5.3 (.37) Maximum flow (GPM) (LPS) (LPS) 92 (5.8) | 114 (7.2) | 133 (8.4) | 150 (9.5)	Set Differential Pressure (PSI) (BAR) 5.7 (.39) | 6.5 (.45) | 7.2 (.05) | 8.0 (.55) Maximum flow (GPM) (LPS) (LPS) 155 (9.8) | 166 (10.5) | 174 (11.0) | 184 (11.6)
P3x231S-xxxx-P30Dx-2x 3" 1 Size Reduced Port SS Trim Only	Set Differential Pressure (PSI) (BAR) 2.0 (.14) | 3.1 (.21) | 4.2 (.29) | 5.3 (.37) Maximum flow (GPM) (LPS) 106 (6.7) | 132 (8.3) | 154 (9.7) | 173 (11.0)	Set Differential Pressure (PSI) (BAR) 5.7 (.39) | 6.5 (.45) | 7.2 (.05) | 8.0 (.55) Maximum flow (GPM) (LPS) 179 (11.3) | 191 (12.1) | 201 (12.7) | 212 (13.4)
P3x23Fx-xxxx-P30Dx-2x 3" Standard Port	Set Differential Pressure (PSI) (BAR) 2.0 (.14) | 3.1 (.21) | 4.2 (.29) | 5.3 (.37) Maximum flow (GPM) (LPS) 127 (8.1) | 158 (9.9) | 184 (11.6) | 207 (13.2)	Set Differential Pressure (PSI) (BAR) 5.7 (.39) | 6.5 (.45) | 7.2 (.05) | 8.0 (.55) Maximum flow (GPM) (LPS) 215 (13.5) | 229 (14.5) | 241 (15.3) | 255 (16.0)

PRODUCT MODEL (where 'x' is a configurable option)	LOW DP SPRING PERFORMANCE	MEDIUM DP SPRING PERFORMANCE
P4x232S-xxxx-P40Dx-2x 4″ 2 Sizes Reduced Port SS Trim Only	Set Differential Pressure (PSI) (BAR) 2.0 (.14) 3.1 (.21) 4.2 (.29) 5.3 (.37) Maximum flow (GPM) (LPS) 165 (10.5) 206 (12.9) 240 (15.1) 269 (17.1)	Set Differential Pressure (PSI) (BAR) 5.7 (.39) 6.5 (.45) 7.2 (.05) 8.0 (.55) Maximum flow (GPM) (LPS) 279 (17.6) 298 (18.9) 314 (19.9) 184 (20.8)
P4x231S-xxxx-P40Dx-2x 4″ 1 Size Reduced Port SS Trim Only	Set Differential Pressure (PSI) (BAR) 2.0 (.14) 3.1 (.21) 4.2 (.29) 5.3 (.37) Maximum flow (GPM) (LPS) 204 (12.9) 254 (15.9) 295 (18.6) 332 (21.0)	Set Differential Pressure (PSI) (BAR) 5.7 (.39) 6.5 (.45) 7.2 (.05) 8.0 (.55) Maximum flow (GPM) (LPS) 344 (21.6) 367 (23.2) 386 (24.5) 407 (24.7)
P4x23Fx-xxxx-P40Dx-2x 4″ Standard Port	Set Differential Pressure (PSI) (BAR) 2.0 (.14) 3.1 (.21) 4.2 (.29) 5.3 (.37) Maximum flow (GPM) (LPS) 240 (15.3) 299 (18.7) 348 (22.0) 391 (24.8)	Set Differential Pressure (PSI) (BAR) 5.7 (.39) 6.5 (.45) 7.2 (.05) 8.0 (.55) Maximum flow (GPM) (LPS) 406 (25.5) 433 (27.4) 456 (28.9) 481 (30.3)
P5x232x-xxxx-P50Dx-2x 5″ 2 Sizes Reduced Port	Set Differential Pressure (PSI) (BAR) 2.0 (.14) 3.1 (.21) 4.2 (.29) 5.3 (.37) Maximum flow (GPM) (LPS) 287 (18.2) 357 (22.4) 416 (26.3) 467 (29.7)	Set Differential Pressure (PSI) (BAR) 5.7 (.39) 6.5 (.45) 7.2 (.05) 8.0 (.55) Maximum flow (GPM) (LPS) 485 (30.5) 518 (32.7) 545 (34.5) 574 (36.2)
P5x231x-xxxx-P50Dx-2x 5″ 1 Size Reduced Port	Set Differential Pressure (PSI) (BAR) 2.0 (.14) 3.1 (.21) 4.2 (.29) 5.3 (.37) Maximum flow (GPM) (LPS) 335 (21.3) 417 (26.1) 486 (30.7) 546 (34.6)	Set Differential Pressure (PSI) (BAR) 5.7 (.39) 6.5 (.45) 7.2 (.05) 8.0 (.55) Maximum flow (GPM) (LPS) 566 (35.6) 604 (38.2) 636 (40.3) 670 (42.2)
P5x23Fx-xxxx-P50Dx-2x 5″ Standard Port	Set Differential Pressure (PSI) (BAR) 2.0 (.14) 3.1 (.21) 4.2 (.29) 5.3 (.37) Maximum flow (GPM) (LPS) 382 (24.3) 475 (29.7) 553 (34.9) 622 (39.5)	Set Differential Pressure (PSI) (BAR) 5.7 (.39) 6.5 (.45) 7.2 (.05) 8.0 (.55) Maximum flow (GPM) (LPS) 645 (40.5) 688 (43.5) 724 (45.9) 764 (48.1)
P6x232x-xxxx-P60Dx-2x 6″ 2 Sizes Reduced Port	Set Differential Pressure (PSI) (BAR) 2.0 (.14) 3.1 (.21) 4.2 (.29) 5.3 (.37) Maximum flow (GPM) (LPS) 389 (24.3) 484 (26.1) 564 (35.6) 633 (40.2)	Set Differential Pressure (PSI) (BAR) 5.7 (.39) 6.5 (.45) 7.2 (.05) 8.0 (.55) Maximum flow (GPM) (LPS) 657 (41.3) 701 (44.3) 738 (46.7) 778 (49.0)
P6x231x-xxxx-P60Dx-2x 6″ 1 Size Reduced Port	Set Differential Pressure (PSI) (BAR) 2.0 (.14) 3.1 (.21) 4.2 (.29) 5.3 (.37) Maximum flow (GPM) (LPS) 445 (28.3) 555 (34.7) 646 (40.8) 725 (46.0)	Set Differential Pressure (PSI) (BAR) 5.7 (.39) 6.5 (.45) 7.2 (.05) 8.0 (.55) Maximum flow (GPM) (LPS) 752 (47.3) 803 (51) 845 (54) 891 (56)
P6x23Fx-xxxx-P60Dx-2x 6″ Standard Port	Set Differential Pressure (PSI) (BAR) 2.0 (.14) 3.1 (.21) 4.2 (.29) 5.3 (.37) Maximum flow (GPM) (LPS) 509 (32.4) 634 (39.6) 738 (46.6) 829 (53)	Set Differential Pressure (PSI) (BAR) 5.7 (.39) 6.5 (.45) 7.2 (.05) 8.0 (.55) Maximum flow (GPM) (LPS) 859 (54) 918 (58) 966 (61) 1018 (64)

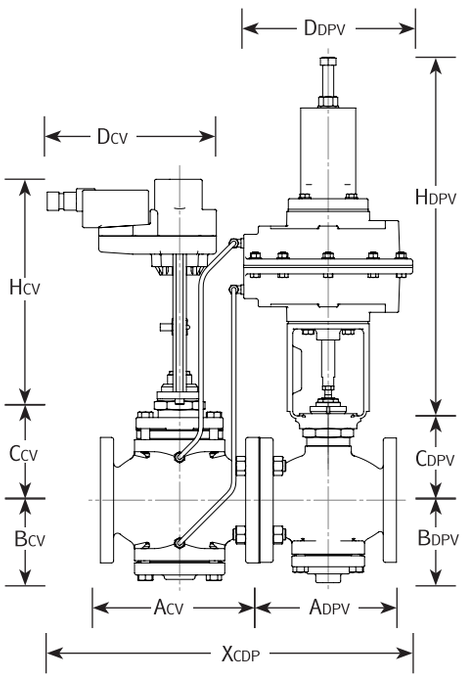
PRODUCT MODEL (where 'x' is a configurable option)	LOW DP SPRING PERFORMANCE	MEDIUM DP SPRING PERFORMANCE
P6x23Xx-xxxx-P60Dx-2x 6″ Extended Port	Set Differential Pressure (PSI) (BAR): 2.0 (.14) | 3.1 (.21) | 4.2 (.29) | 5.3 (.37) Maximum flow (GPM) (LPS): 594 (37.8) | 739 (46.2) | 861 (54) | 967 (61)	Set Differential Pressure (PSI) (BAR): 5.7 (.39) | 6.5 (.45) | 7.2 (.05) | 8.0 (.55) Maximum flow (GPM) (LPS): 1003 (63) | 1071 (68) | 1127 (71) | 1188 (75)
P8x222S-xxxx-P80Dx-2x 8″ 2 Sizes Reduced Port SS Trim Only	Set Differential Pressure (PSI) (BAR): 2.0 (.14) | 3.1 (.21) | 4.2 (.29) | 5.3 (.37) Maximum flow (GPM) (LPS): 735 (46.7) | 916 (57) | 1066 (67) | 1197 (76)	Set Differential Pressure (PSI) (BAR): 5.7 (.39) | 6.5 (.45) | 7.2 (.05) | 8.0 (.55) Maximum flow (GPM) (LPS): 1241 (78) | 1326 (84) | 1395 (88) | 1471 (93)
P8x221S-xxxx-P80Dx-2x 8″ 1 Size Reduced Port SS Trim Only	Set Differential Pressure (PSI) (BAR): 2.0 (.14) | 3.1 (.21) | 4.2 (.29) | 5.3 (.37) Maximum flow (GPM) (LPS): 841 (53) | 1048 (66) | 1219 (77) | 1370 (87)	Set Differential Pressure (PSI) (BAR): 5.7 (.39) | 6.5 (.45) | 7.2 (.05) | 8.0 (.55) Maximum flow (GPM) (LPS): 1421 (89) | 1517 (96) | 1597 (101) | 1683 (106)
P8x22Fx-xxxx-P80Dx-2x 8″ Standard Port	Set Differential Pressure (PSI) (BAR): 2.0 (.14) | 3.1 (.21) | 4.2 (.29) | 5.3 (.37) Maximum flow (GPM) (LPS): 962 (61) | 1197 (75) | 1394 (88) | 1565 (99)	Set Differential Pressure (PSI) (BAR): 5.7 (.39) | 6.5 (.45) | 7.2 (.05) | 8.0 (.55) Maximum flow (GPM) (LPS): 1623 (102) | 1734 (110) | 1825 (116) | 1923 (121)
P1x222S-xxxx-P10Dx-2x 10″ 2 Sizes Reduced Port SS Trim Only	Set Differential Pressure (PSI) (BAR): 2.0 (.14) | 3.1 (.21) | 4.2 (.29) | 5.3 (.37) Maximum flow (GPM) (LPS): 1039 (66) | 1294 (81) | 1506 (95) | 1692 (107)	Set Differential Pressure (PSI) (BAR): 5.7 (.39) | 6.5 (.45) | 7.2 (.05) | 8.0 (.55) Maximum flow (GPM) (LPS): 1755 (110) | 1874 (118) | 1972 (125) | 2079 (131)
P1x221S-xxxx-P10Dx-2x 10″ 1 Size Reduced Port SS Trim Only	Set Differential Pressure (PSI) (BAR): 2.0 (.14) | 3.1 (.21) | 4.2 (.29) | 5.3 (.37) Maximum flow (GPM) (LPS): 1188 (76) | 1479 (92) | 1721 (109) | 1934 (123)	Set Differential Pressure (PSI) (BAR): 5.7 (.39) | 6.5 (.45) | 7.2 (.05) | 8.0 (.55) Maximum flow (GPM) (LPS): 2005 (126) | 2142 (135) | 2254 (143) | 2376 (150)
P1x22Fx-xxxx-P10Dx-2x 10″ Standard Port	Set Differential Pressure (PSI) (BAR): 2.0 (.14) | 3.1 (.21) | 4.2 (.29) | 5.3 (.37) Maximum flow (GPM) (LPS): 1358 (86) | 1690 (106) | 1967 (124) | 2210 (140)	Set Differential Pressure (PSI) (BAR): 5.7 (.39) | 6.5 (.45) | 7.2 (.05) | 8.0 (.55) Maximum flow (GPM) (LPS): 2292 (144) | 2448 (155) | 2576 (163) | 2715 (171)
P1x22Xx-xxxx-P10Dx-2x 10″ Extended Port SS Trim Only	Set Differential Pressure (PSI) (BAR): 2.0 (.14) | 3.1 (.21) | 4.2 (.29) | 5.3 (.37) Maximum flow (GPM) (LPS): 1626 (103) | 2025 (128) | 2357 (149) | 2647 (167)	Set Differential Pressure (PSI) (BAR): 5.7 (.39) | 6.5 (.45) | 7.2 (.05) | 8.0 (.55) Maximum flow (GPM) (LPS): 2746 (173) | 2932 (185) | 3086 (195) | 3253 (205)

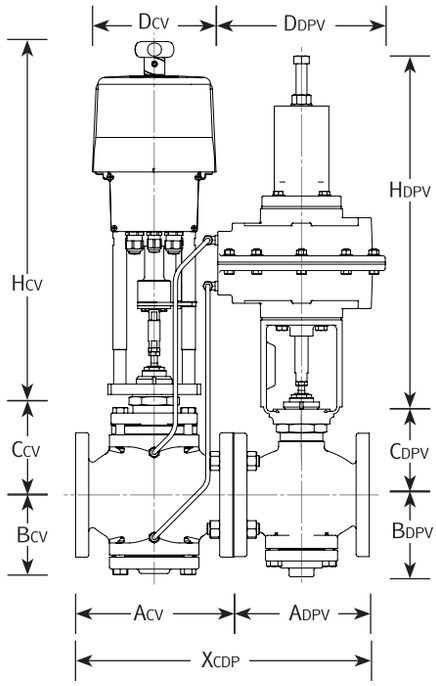
NOTE: All actuators have the ability to Close Off above the PICV Pressure Boundary Rating of 150 PSIG (10.2 BAR).

PICV WEIGHTS

MODEL	PICV SIZE	CONTROL VALVE ACT.	DPRV ACTUATOR	TOTAL WT (LBS)	TOTAL WT (KG)
P2023xx-E0xx-P20Dx-2L	2 1/2	E04x / E05x	2L	151.35	68.65
P2023xx-E0xx-P20Dx-2M	2 1/2	E04x / E05x	2M	154.60	70.13
P2023xx-E029-P20Dx-2L	2 1/2	E029	2L	142.80	64.77
P2023xx-E031-P20Dx-2L	2 1/2	E031	2L	148.10	67.18
P2023xx-E029-P20Dx-2M	2 1/2	E029	2M	146.05	66.25
P2023xx-E031-P20Dx-2M	2 1/2	E031	2M	151.35	68.65
P3023xx-E0xx-P30Dx-2L	3	E04x / E05x	2L	179.35	81.35
P3023xx-E0xx-P30Dx-2M	3	E04x / E05x	2M	179.60	81.47
P3023xx-E029-P30Dx-2L	3	E029	2L	170.80	77.47
P3023xx-E031-P30Dx-2L	3	E031	2L	176.10	79.88
P3023xx-E029-P30Dx-2M	3	E029	2M	171.05	77.59
P3023xx-E031-P30Dx-2M	3	E031	2M	176.35	79.99
P4023xx-E0xx-P40Dx-2L	4	E04x / E05x	2L	269.35	122.18
P4023xx-E0xx-P40Dx-2M	4	E04x / E05x	2M	272.60	123.65
P4023xx-E029-P40Dx-2L	4	E029	2L	260.80	118.30
P4023xx-E031-P40Dx-2L	4	E031	2L	266.10	120.70
P4023xx-E029-P40Dx-2M	4	E029	2M	264.05	119.77
P4023xx-E031-P40Dx-2M	4	E031	2M	269.35	122.18
P5023xx-xxxx-P50Dx-2L	5	E04x / E05x	2L	338.65	153.61
P5023xx-xxxx-P50Dx-2M	5	E04x / E05x	2M	341.90	155.08
P5023xx-E029-P50Dx-2L	5	E029	2L	330.10	149.73
P5023xx-E031-P50Dx-2L	5	E031	2L	335.40	152.13
P5023xx-E029-P50Dx-2M	5	E029	2M	333.35	151.21
P5023xx-E031-P50Dx-2M	5	E031	2M	338.65	153.61
P6023xx-xxxx-P60Dx-2L	6	E04x / E05x	2L	431.65	195.79
P6023xx-xxxx-P60Dx-2M	6	E04x / E05x	2M	434.90	197.27
P6023xx-E029-P60Dx-2L	6	E029	2L	423.10	191.91
P6023xx-E031-P60Dx-2L	6	E031	2L	428.40	194.32
P6023xx-E029-P60Dx-2M	6	E029	2M	426.35	193.39
P6023xx-E031-P60Dx-2M	6	E031	2M	431.65	195.79
P6023Xx-E06x-P60Dx-2L	6	E061 - E066	2L	440	199.6
P6023Xx-E06x-P60Dx-2M	6	E061 - E066	2M	443	200.9
P8022xx-E0xx-P80Dx-2L	8	E04x / E05x	2L	645.65	292.86
P8022xx-E0xx-P80Dx-2M	8	E04x / E05x	2M	648.90	294.34
P8022xx-E029-P80Dx-2L	8	E029	2L	637.10	288.98
P8022xx-E031-P80Dx-2L	8	E031	2L	642.40	291.39
P8022xx-E029-P80Dx-2M	8	E029	2M	640.35	290.46
P8022xx-E031-P80Dx-2M	8	E031	2M	645.65	292.86
P1022xx-E0xx-P10Dx-2L	10	E04x / E05x	2L	938.65	425.76
P1022xx-E0xx-P10Dx-2M	10	E04x / E05x	2M	941.90	427.24
P1022xx-E029-P10Dx-2L	10	E029	2L	930.10	421.89
P1022xx-E031-P10Dx-2L	10	E031	2L	935.40	424.29
P1022xx-E029-P10Dx-2M	10	E029	2M	933.35	423.36
P1022xx-E031-P10Dx-2M	10	E031	2M	938.65	425.76
P1022Xx-E06x-P10Dx-2L	10	E061-E066	2L	947	430.5
P1022Xx-E06x-P10Dx-2M	10	E061-E066	2M	950	431.8

CONVERSIONS: BAR X 14.504 = PSI LPS X 15.85 = GPM





CONTROL VALVE (LEFT)

MODEL LISTING	ACTUATOR	SIZE	Acv	Bcv	Ccv	Dcv	Hcv
P2023xx-E0xx-P20Dx-xx	**E04x / E05x**	**2 1/2**	9 in	4-3/4 in	5-3/4 in	7-1/8 in	20-1/4 in
P2023xx-E0xx-P20Dx-xx	**E029 / E031**	**2 1/2**	9 in	4-3/4 in	5-3/4 in	7-1/8 in	10-7/8 in
P3023xx-E0xx-P30Dx-xx	**E04x / E05x**	**3**	10 in	5-3/8 in	6-5/8 in	7-1/8 in	20-1/4 in
P3023xx-E0xx-P30Dx-xx	**E029 / E031**	**3**	10 in	5-3/8 in	6-5/8 in	7-1/8 in	10-7/8 in
P4023xx-E0xx-P40Dx-xx	**E04x / E05x**	**4**	13 in	6-3/8 in	7-3/4 in	7-1/8 in	20-1/4 in
P4023xx-E0xx-P40Dx-xx	**E029 / E031**	**4**	13 in	6-3/8 in	7-3/4 in	7-1/8 in	10-7/8 in

Acv +/- 1/16 in (0.16 cm)All other dimensions are maximum Allow 6 in (15.24 cm) above actuator for removal service

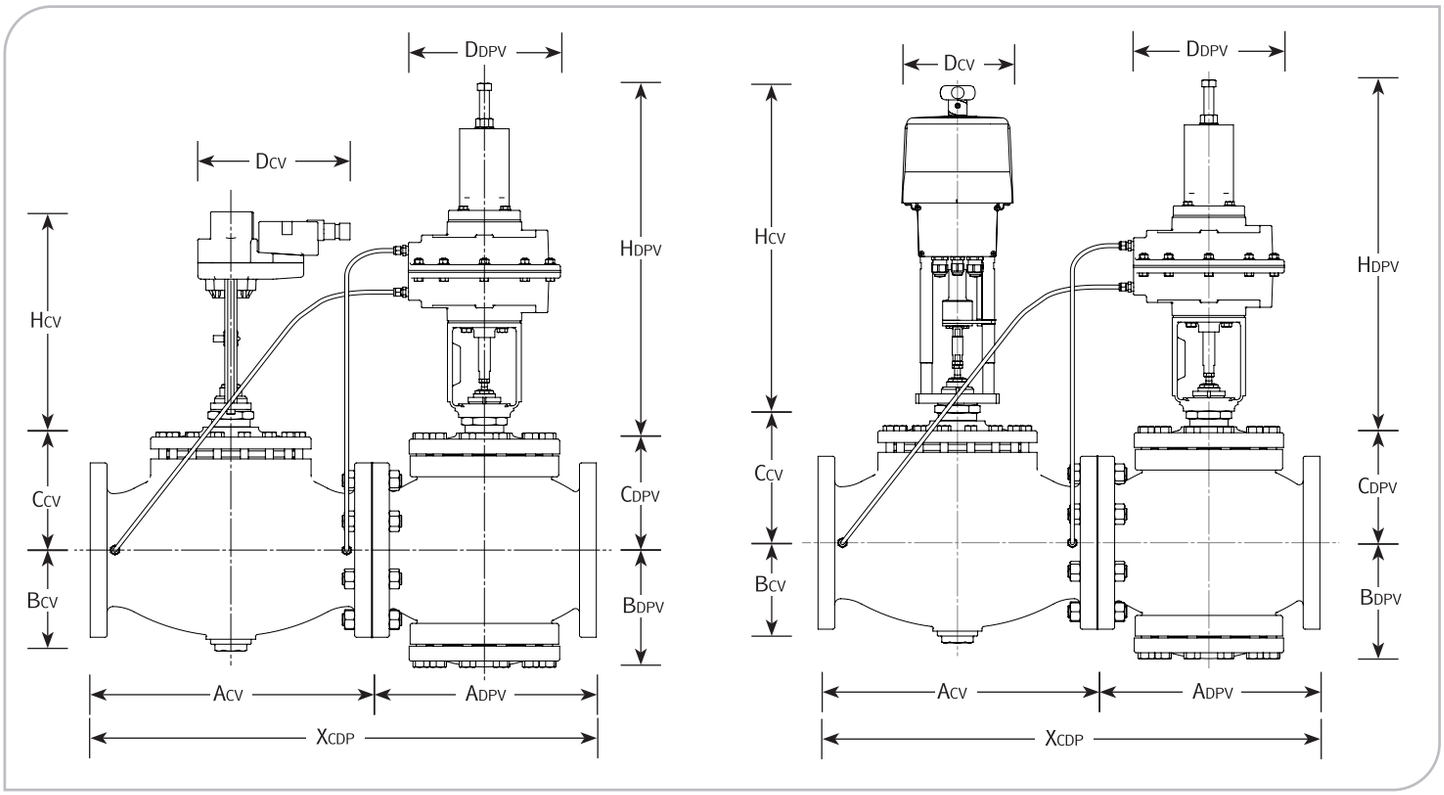
CONVERSION
inches X 2.54= cm

DIFFERENTIAL PRESSURE VALVE (RIGHT)

MODEL LISTING	ACTUATOR	SIZE	Adpv	Bdpv	Ccpv	Ddpv	Hdpv	Total combined* Xcdp
P2023xx-E0xx-P20Dx-2L	**E04x / E05x**	**2 1/2**	7-3/4 in	4-7/8 in	4-1/8 in	9-3/4 in	22-1/8 in	16-13/16 in
P2023xx-E0xx-P20Dx-2M	**E04x / E05x**	**2 1/2**	7-3/4 in	4-7/8 in	4-1/8 in	9-3/4 in	26-3/4 in	16-13/16 in
P2023xx-E0xx-P20Dx-2L	**E029 / E031**	**2 1/2**	7-3/4 in	4-7/8 in	4-1/8 in	9-3/4 in	22-1/8 in	16-13/16 in
P2023xx-E0xx-P20Dx-2M	**E029 / E031**	**2 1/2**	7-3/4 in	4-7/8 in	4-1/8 in	9-3/4 in	26-3/4 in	16-13/16 in
P3023xx-E0xx-P30Dx-2L	**E04x / E05x**	**3**	9 in	5-1/8 in	4-3/8 in	9-3/4 in	22-1/8 in	19-1/16 in
P3023xx-E0xx-P30Dx-2M	**E04x / E05x**	**3**	9 in	5-1/8 in	4-3/8 in	9-3/4 in	26-3/4 in	19-1/16 in
P3023xx-E0xx-P30Dx-2L	**E029 / E031**	**3**	9 in	5-1/8 in	4-3/8 in	9-3/4 in	22-1/8 in	19-1/16 in
P3023xx-E0xx-P30Dx-2M	**E029 / E031**	**3**	9 in	5-1/8 in	4-3/8 in	9-3/4 in	26-3/4 in	19-1/16 in
P4023xx-E0xx-P40Dx-2L	**E04x / E05x**	**4**	11-3/8 in	6-3/8 in	5-1/4 in	9-3/4 in	22-1/8 in	24-7/16 in
P4023xx-E0xx-P40Dx-2M	**E04x / E05x**	**4**	11-3/8 in	6-3/8 in	5-1/4 in	9-3/4 in	26-3/4 in	24-7/16 in
P4023xx-E0xx-P40Dx-2L	**E029 / E031**	**4**	11-3/8 in	6-3/8 in	5-1/4 in	9-3/4 in	22-1/8 in	24-7/16 in
P4023xx-E0xx-P40Dx-2M	**E029 / E031**	**4**	11-3/8 in	6-3/8 in	5-1/4 in	9-3/4 in	26-3/4 in	24-7/16 in

* Includes gasket between Control Valve and Differential Pressure Valve
Adpv +/- 1/16 in (0.16 cm) Xcdp +/- 1/8 in (0.32 cm) All other dimensions are maximum
Allow 6 in (15.24 cm) above actuator for removal service

DIMENSIONS - PICV SIZES: 5-6 IN



CONTROL VALVE (LEFT)

MODEL LISTING	ACTUATOR	SIZE	Acv	Bcv	Ccv	Dcv	Hcv
P5023xx-E0xx-P50Dx-xx	**E04x / E05x**	**5**	15-3/4in	5-3/4 in	8-1/4 in	7-1/8 in	20-1/4 in
P5023xx-E0xx-P50Dx-xx	**E029 / E031**	**5**	15-3/4in	5-3/4 in	8-1/4 in	7-1/8 in	10-7/8 in
P6023xx-E0xx-P60Dx-xx	**E04x / E05x**	**6**	15-3/4in	5-3/4 in	8-7/8 in	7-1/8 in	20-1/4 in
P6023xx-E0xx-P60Dx-xx	**E029 / E031**	**6**	15-3/4in	5-3/4 in	8-7/8 in	7-1/8 in	10-7/8 in
P6023Xx-E0xx-P60Dx-xx	**E061 / E062**	**6 EXT.**	15-3/4in	5-3/4 in	8-7/8 in	7-1/8 in	24-3/8 in

Acv +/- 1/16 in (0.16 cm)All other dimensions are maximum

Allow 6 in (15.24 cm) above actuator for removal service

CONVERSION

inches X 2.54= cm

DIFFERENTIAL PRESSURE VALVE (RIGHT)

								Total combined*
MODEL LISTING	ACTUATOR	SIZE	Adpv	Bdpv	Ccpv	Ddpv	Hdpv	Xcdp
P5023xx-E0xx-P50Dx-2L	**E04x / E05x**	**5**	12 in	6-1/2 in	7-5/8 in	9-3/4 in	22-1/8 in	27-13/16 in
P5023xx-E0xx-P50Dx-2M	**E04x / E05x**	**5**	12 in	6-1/2 in	7-5/8 in	9-3/4 in	26-3/4 in	27-13/16 in
P5023xx-E0xx-P50Dx-2L	**E029 / E031**	**5**	12 in	6-1/2 in	7-5/8 in	9-3/4 in	22-1/8 in	27-13/16 in
P5023xx-E0xx-P50Dx-2M	**E029 / E031**	**5**	12 in	6-1/2 in	7-5/8 in	9-3/4 in	26-3/4 in	27-13/16 in
P6023xx-E0xx-P60Dx-2L	**E04x / E05x**	**6**	14-1/8 in	6-1/2 in	8-1/2 in	9-3/4 in	22-1/8 in	31-15/16 in
P6023xx-E0xx-P60Dx-2M	**E04x / E05x**	**6**	14-1/8 in	6-1/2 in	8-1/2 in	9-3/4 in	26-3/4 in	31-15/16 in
P6023xx-E0xx-P60Dx-2L	**E029 / E031**	**6**	14-1/8 in	6-1/2 in	8-1/2 in	9-3/4 in	22-1/8 in	31-15/16 in
P6023xx-E0xx-P60Dx-2M	**E029 / E031**	**6**	14-1/8 in	6-1/2 in	8-1/2 in	9-3/4 in	26-3/4 in	31-15/16 in
P6023Xx-E0xx-P60Dx-2L	**E061 - E066**	**6 EXT.**	14-1/8 in	6-1/2 in	8-1/2 in	9-3/4 in	22-1/8 in	31-15/16 in
P6023Xx-E0xx-P60Dx-2M	**E061 - E066**	**6 EXT.**	14-1/8 in	6-1/2 in	8-1/2 in	9-3/4 in	26-3/4 in	31-15/16 in

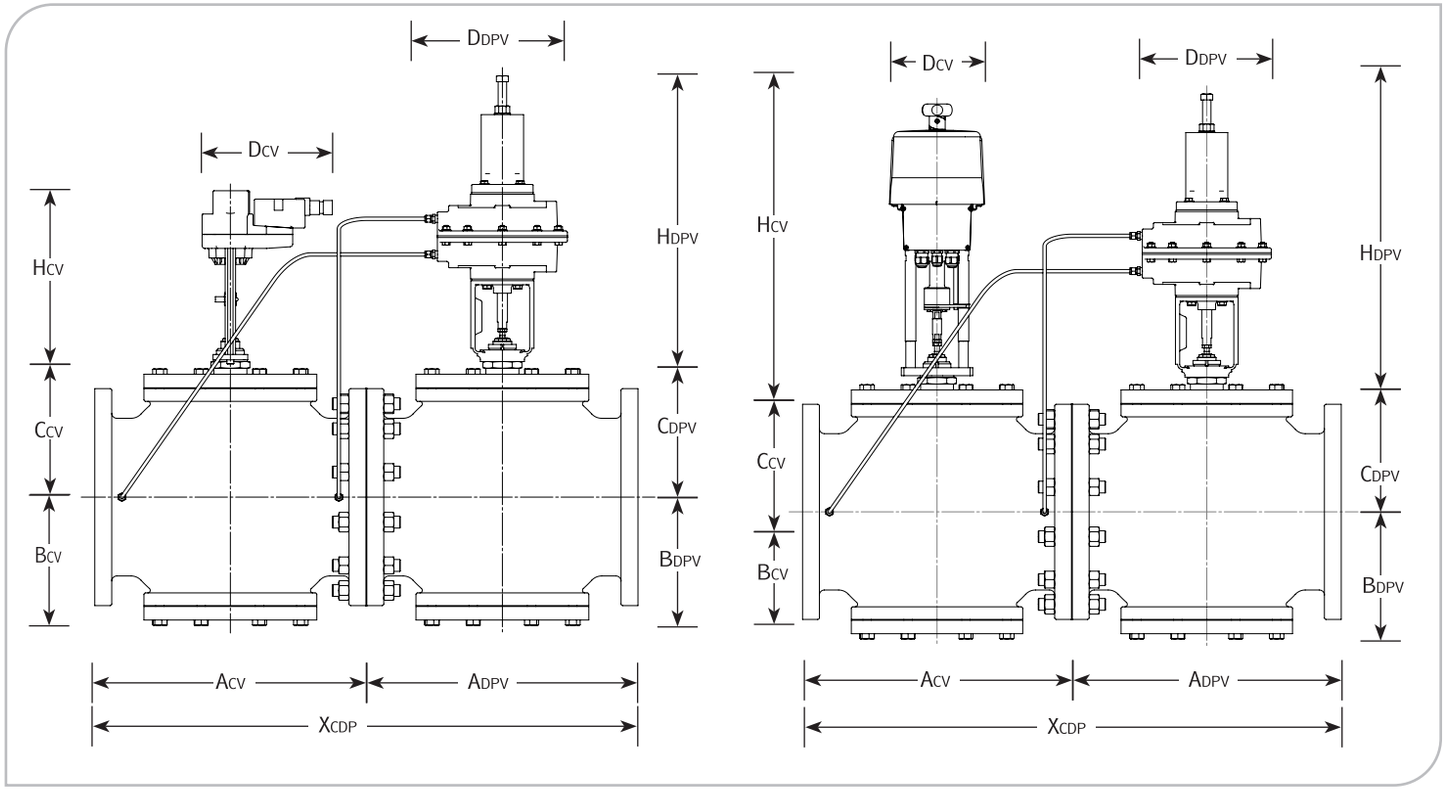
* Includes gasket between Control Valve and Differential Pressure Valve

Adpv +/- 1/16 in (0.16 cm)

Xcdp +/- 1/8 in (0.32 cm)

All other dimensions are maximum

Allow 6 in (15.24 cm) above actuator for removal service



CONTROL VALVE (LEFT)

MODEL LISTING	ACTUATOR	SIZE	Acv	Bcv	Ccv	Dcv	Hcv
P8022xx-E0xx-P80Dx-xxx	**E04x / E05x**	**8**	16-1/4in	8-7/8 in	9-5/8 in	7-1/8 in	20-1/4 in
P8022xx-E0xx-P80Dx-xxx	**E029 / E031**	**8**	16-1/4in	8-7/8 in	9-5/8 in	7-1/8 in	10-7/8 in
P1022xx-E0xx-P10Dx-xxx	**E04x / E05x**	**10**	20 in	9-5/8 in	10-1/8 in	7-1/8 in	20-1/4 in
P1022xx-E0xx-P10Dx-xxx	**E029 / E031**	**10**	20 in	9-5/8 in	10-1/8 in	7-1/8 in	10-7/8 in

Acv +/- 1/16 in (0.16 cm)All other dimensions are maximum Allow 6 in (15.24 cm) above actuator for removal service

CONVERSION

inches X 2.54= cm

DIFFERENTIAL PRESSURE VALVE (RIGHT)

MODEL LISTING	ACTUATOR	SIZE	Adpv	Bdpv	Ccpv	Ddpv	Hdpv	Total combined* Xcdp
P8022xx-E0xx-P80Dx-2L	**E04x / E05x**	**8**	16-1/4in	8-7/8 in	9-5/8 in	9-3/4 in	22-1/8 in	32-9/16 in
P8022xx-E0xx-P80Dx-2M	**E04x / E05x**	**8**	16-1/4in	8-7/8 in	9-5/8 in	9-3/4 in	26-3/4 in	32-9/16 in
P8022xx-E0xx-P80Dx-2L	**E029 / E031**	**8**	16-1/4in	8-7/8 in	9-5/8 in	9-3/4 in	22-1/8 in	32-9/16 in
P8022xx-E0xx-P80Dx-2M	**E029 / E031**	**8**	16-1/4in	8-7/8 in	9-5/8 in	9-3/4 in	26-3/4 in	32-9/16 in
P1022xx-E0xx-P10Dx-2L	**E04x / E05x**	**10**	20 in	9-5/8 in	10-1/8 in	9-3/4 in	22-1/8 in	40-1/16 in
P1022xx-E0xx-P10Dx-2M	**E04x / E05x**	**10**	20 in	9-5/8 in	10-1/8 in	9-3/4 in	26-3/4 in	40-1/16 in
P1022xx-E0xx-P10Dx-2L	**E029 / E031**	**10**	20 in	9-5/8 in	10-1/8 in	9-3/4 in	22-1/8 in	40-1/16 in
P1022xx-E0xx-P10Dx-2M	**E029 / E031**	**10**	20 in	9-5/8 in	10-1/8 in	9-3/4 in	26-3/4 in	40-1/16 in

* Includes gasket between Control Valve and Differential Pressure Valve

Adpv +/- 1/16 in (0.16 cm) Xcdp +/- 1/8 in (0.32 cm) All other dimensions are maximum

Allow 6 in (15.24 cm) above actuator for removal service

Fluid Quality and Service Life Guide Lines: The purpose of these guidelines is to avoid valve and water systems problems caused by poor water quality in HVAC systems. While all cooling and heating systems are susceptible to problems, closed chilled water systems, including those containing brine or glycol, are especially prone to system and valve problems. To achieve the satisfactory operation and maximum life of your Warren Controls valve, it is important that the following recommendations are adhered to and that a water treatment, filtration and control specialists be consulted before the system start-up.

WATER QUALITY RECOMMENDED PARAMETERS

Chilled Water, Closed Loops, and Hot Water Systems up to 212°F (100° C).

	8.0	<	**pH**	<	10.3
			Conductivity	<	3000 MMHS
			Iron	<	0.5 ppm
			Copper	<	0.5 ppm
Chilled Systems →	100 ppm	<	**Molybdenum** *(Mild Steel Corrosion Inhibitor)*	<	150 ppm
Hot Systems →	200 ppm	<	**Molybdenum** *(Mild Steel Corrosion Inhibitor)*	<	250 ppm
	400 ppm	<	**Nitrite** *(Mild Steel Corrosion Inhibitor)*	<	1000 ppm
			Azole *(Yellow Metal Inhibitor)*	>	5 ppm free and available
			Bacteria	<	1000 cells/ml (when system is cool)

CAUTION

The use of hydrazine can result in the formation of ammonia and must be controlled to prevent stress corrosion and embrittlement, which can lead to fracture of some brass alloys.

Water hardness should be less than 100 ppm of hard water ions (Ca++, Mg++), where 17.1 ppm = 1 Grain Hardness. Additionally, levels of chloride and sulfate should remain less than 25 ppm. When water hardness is at unacceptable levels, a water softener expert should be consulted.

ANTIFREEZE SOLUTIONS-GLYCOLS

The commonly used heat transfer glycol fluids are, either ethylene glycol or propylene glycol. Glycol concentrations of <25% often do not provide sufficient corrosion inhibiting properties and at levels <20% can actually provide a food source for bacteria. As bacteria consume the food and die off, a highly acidic condition can result. The recommended concentration for popular glycol based solutions is 25% to 60%.

NOTES

QAS INTERNATIONAL
ISO 9001
REGISTERED FIRM
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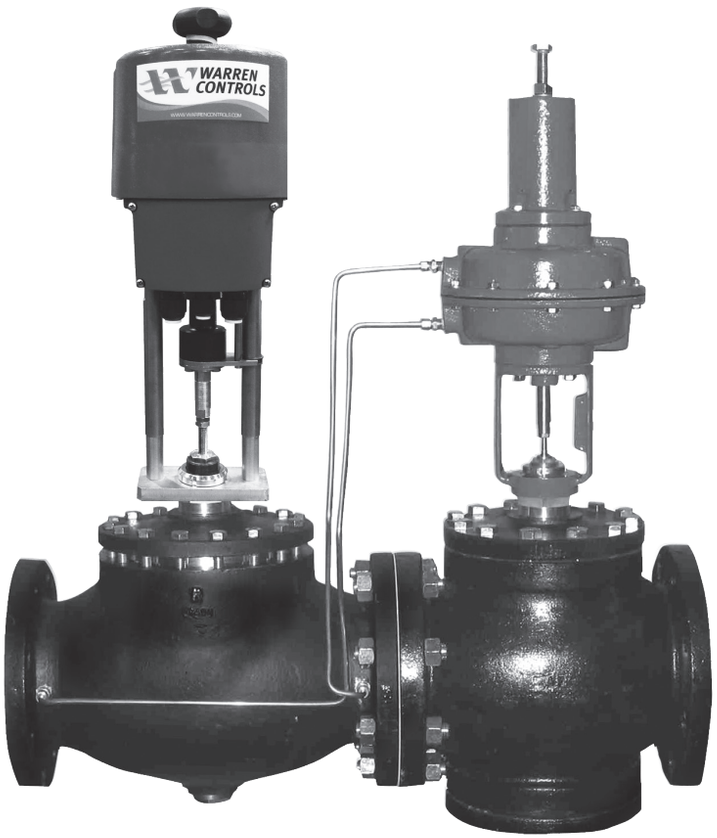
PICV PRODUCT SPECIFICATION



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WARREN CONTROLS

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