

Application

The WILKINS Model ZW209BP Pilot Operated Pressure Reducing Valve with Low Flow By-pass is designed for many applications where the reduction of high inlet pressures to a safe and stable outlet pressure is required. The pilot assembly reacts to changes in downstream pressure, allowing the main valve to modulate between the open and closed position, ensuring a constant downstream set pressure. Once the downstream pressure reaches the pilot setting, the main valve will seal shut. When the main valve closes, the low flow bypass is set to a slightly higher pressure, which allows it to handle very low flows up to 10 GPM when there is off-peak demand. (An additional bypass may be needed to handle flows between the bypass and main valve minimum flow.) In addition, the Model ZW209BP comes standard with blue epoxy coating internally and externally for corrosion protection as well as isolation valves and pressure gauges for quick and easy maintenance or repair. *The closing speed control (optional) on this valve should always be open at least three (3) turns off its seat.



Standards Compliance

- ANSI/AWWA C530
 - Meets the requirements of NSF/ANSI/CAN 61 and 372*
- *(0.25% MAX. WEIGHTED AVERAGE LEAD CONTENT)

Materials

Main Valve Body	Ductile Iron ASTM A536
Diaphragm	Nylon Reinforced Buna-N
Disc	Buna-N Rubber
Disc Guide	Stainless Steel
Main Valve Bonnet	Ductile Iron ASTM A536
Seats	Stainless Steel
Springs	Stainless Steel
Stems	Stainless Steel

Features

Blue Epoxy Coated, FDA Approved

Pilot Assembly

- "Wye" Type Strainer
- Opening Speed Control (sizes 1-1/4" - 4")
- Isolation Valves

Inlet and Outlet Pressure Gauges

ANSI Class 150 Flanges

Copper Tubing and Brass Fittings

Low-Flow By-Pass Valves

1/2" PRXL (sizes 1-1/4" - 3")

3/4" NR3XL-BP (size 4")

Temperature Rating

Water 33°F to 140°F

Pilot Spring Range

15-120 psi

BODY CONFIGURATIONS		GLOBE STYLE BODY		ANGLE STYLE BODY
END CONNECTION	PRESSURE RATING	FULL PORT	REDUCED PORT	
Threaded	400 psi max.	1 1/4"-3"	n/a	1 1/4"-3"
	ANSI Class 150, 250 psi max.	1 1/2"-4"	3"-6"	1 1/2"-4"
Flanged	ANSI Class 300, 400 psi max.	1 1/2"-4"	n/a	1 1/2"-4"
	300 psi max.	1 1/2"-4"	n/a	1 1/2"-4"
Grooved	300 psi max.	1 1/2"-4"	n/a	1 1/2"-4"
MINIMUM INLET PRESSURE 10 PSI				

Schematic Diagram

Item	Description of Standard Features
1	Main Valve
2	850XL Isolation Valve
3	SXL "Wye" Type Strainer
4	Pressure Gauge
5	Restriction Fitting
6	PRXL Pressure Reducing Control
7	PRXL Pressure Reducing Control By-Pass



4" ZW209BP

Options (Suffixes can be combined)

Function

- **C** 40XL2 Hydraulic Check with Insolation Valve
- **L** SC1 Closing Speed Control
- **O** SC1 Opening Speed Control (Standard 1-1/4" -4")

Body / Connection

- **A** Angle Style Body
- **R** Reduced Port Body
- **G** Grooved Connections
- **TH** NPT Threaded
- **Y** ANSI Class 300 Flanged Connections

Main Valve Options

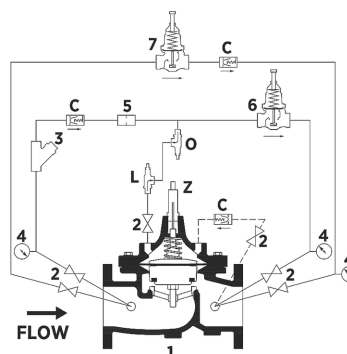
- **V** Viton Rubber Internals rated 180°F (1-1/4"-6"), only available w/ "LP" or "HP" Option)
- **Z** ZPI Visual Position Indicator

Pilot System

- **HP** 30-300 PSI High Pressure Range PV-PRD Pilot
- **SP** All Stainless Steel Pilotry (replaces all brass fittings, pilot valve and copper tubing. "GL" Option included)
- **SH** Stainless Steel Braided Hoses (only replaces Copper Tubing)
- **GL** Liquid Filled Gauge

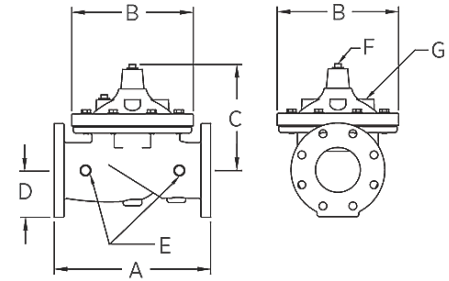
Accessories

- [ACV Main Valve Repair Kits](#)
- [ACV Repair Kits](#)
- [Automatic Control Valve Fittings](#)
- [NR3XL Repair Kits](#)
- [38 - PRXL Repair Kits](#)
- [12&34-PV-PRD Repair Kits](#)
- [38-PV-PRD Repair Kits](#)

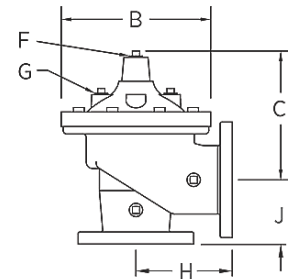


Globe and Angle Main Valve Dimensions

DIM	FULL PORT	VALVE SIZE INCHES (mm)					
		1 1/4 (32)	1 1/2 (38)	2 (50)	2 1/2 (65)	3 (80)	4 (100)
A	Threaded	7 1/4	7 1/4	9 7/16	11	12 1/2	
	Class 150 Flange		8 1/2	9 3/8	11	12	15
	Class 300 Flange		9	10	11 5/8	13 1/4	15 5/8
	Grooved		8 1/2	9	11	12 1/2	15
B	Diameter	5 5/8	5 5/8	6 3/4	8	9 3/16	11 11/16
C	Max.	5 3/4	5 3/4	6 3/16	7 3/8	8	10 3/16
D	Threaded/Grooved	1 3/8	1 3/8	1 3/4	2 1/8	2 9/16	3 7/16
	Class 150 Flange		2 1/2	3	3 1/2	3 3/4	4 1/2
	Class 300 Flange		3	3 1/4	3 3/4	4 1/8	5
E	NPT Body Tap	3/8	3/8	3/8	1/2	1/2	3/4
F	NPT Cvr. Plug Tap	1/2	1/2	1/2	1/2	1/2	3/4
G	NPT Cover Tap	3/8	3/8	3/8	1/2	1/2	3/4
H	Threaded	3 1/4	3 1/4	4 3/4	5 1/2	6 1/4	
	Class 150 Flange		4	4 3/4	5 1/2	6	7 1/2
	Class 300 Flange		4 1/4	5	6	6 7/16	8
	Grooved		4 7/16	4 3/4	5 1/2	6	7 1/2
J	Threaded	1 15/16	1 15/16	3 1/4	4	4 1/2	
	Class 150 Flange		4	3 1/4	4	4	5
	Class 300 Flange		4 1/4	3 1/2	4 5/16	4 7/16	5 5/16
	Grooved		3 3/16	3 1/4	4	4 1/4	5
Valve Stem Internal Thread		10-32	10-32	10-32	10-32	1/4-20	1/4-20
Stem Travel (in)		7/16	7/16	3/4	7/8	1	1 3/16
Approx. Wt. (lbs)		22	26	36	55	70	130



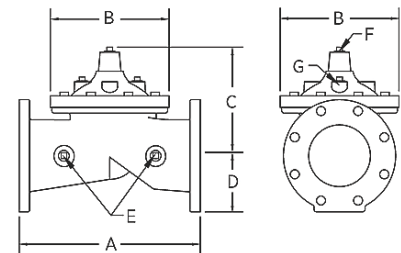
Globe Style Body



Angle Style Body

Reduced Port Main Valve Dimensions

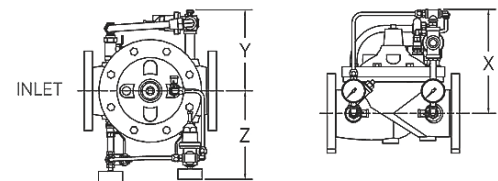
DIM		VALVE SIZE INCHES (mm)		
		3" (80)	4" (100)	6" (150)
A	Class 150 Flange	10 1/4	14	17 3/4
	Class 300 Flange	11	14 1/2	18 11/16
B	Dia	6 3/4	9 3/16	11 11/16
C	Max	6 3/8	8 7/16	12 5/16
D	Class 150 Flange	3 3/4	4 1/2	5 1/2
	Class 300 Flange	4 1/8	5	6 1/4
E	NPT Body Tap	3/8	1/2	3/4
F	NPT Cvr. Plug Tap	3/8	1/2	3/4
G	NPT Cvr. Tap	3/8	1/2	3/4
Valve Stem Internal Thread		10-32	1/4-20	1/4-20
Stem Travel (in)		3/4	1	1 1/5
Approx. Wt. (Lbs)		35	80	140



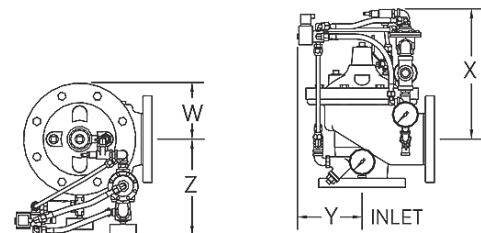
Reduced Port Body

Pilot System Dimensions

PILOT SYSTEM DIMENSIONS			VALVE SIZE INCHES (mm)						
	DIM		1-1/4 (32)	1-1/2 (40)	2" (50)	2-1/2" (65)	3" (80)	4" (100)	6" (150)
Full Port Body	X	Max. (inches)	9 1/4	9 1/4	9 1/2	9 1/2	9 3/4	12	
	Y	Max. (inches)	9	9	7 1/2	7	7 1/2	9 1/2	
	Z	Max. (inches)	9 1/4	9 1/4	9 1/2	9 1/4	9 3/4	10 1/2	
Reduced Port Body	X	Max. (inches)					9 1/2	9 3/4	12
	Y	Max. (inches)					7 1/2	7 1/2	6
	Z	Max. (inches)					9 1/2	10	10
Angle Body	W	Max. (inches)	9	9	7 1/2	7	7 1/2	9 1/2	
	X	Max. (inches)	9 1/4	9 1/4	9 1/2	9 1/2	9 3/4	12	
	Y	Max. (inches)	5	5	5	5	5	6	
	Z	Max. (inches)	9 1/4	9 1/4	9 1/2	9 1/4	10	10 1/2	

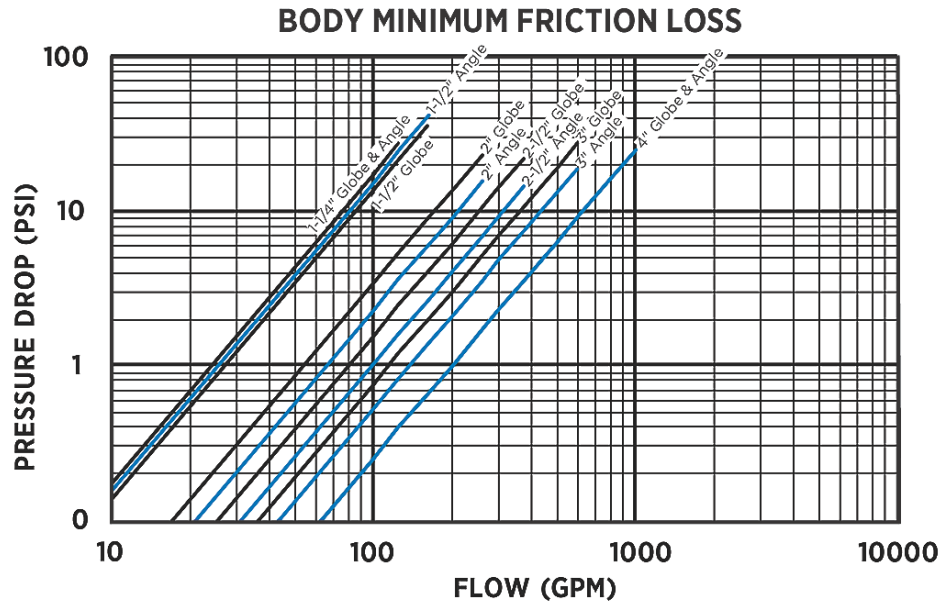


Pilot System Dimensions



Angle Pilot System Dimensions

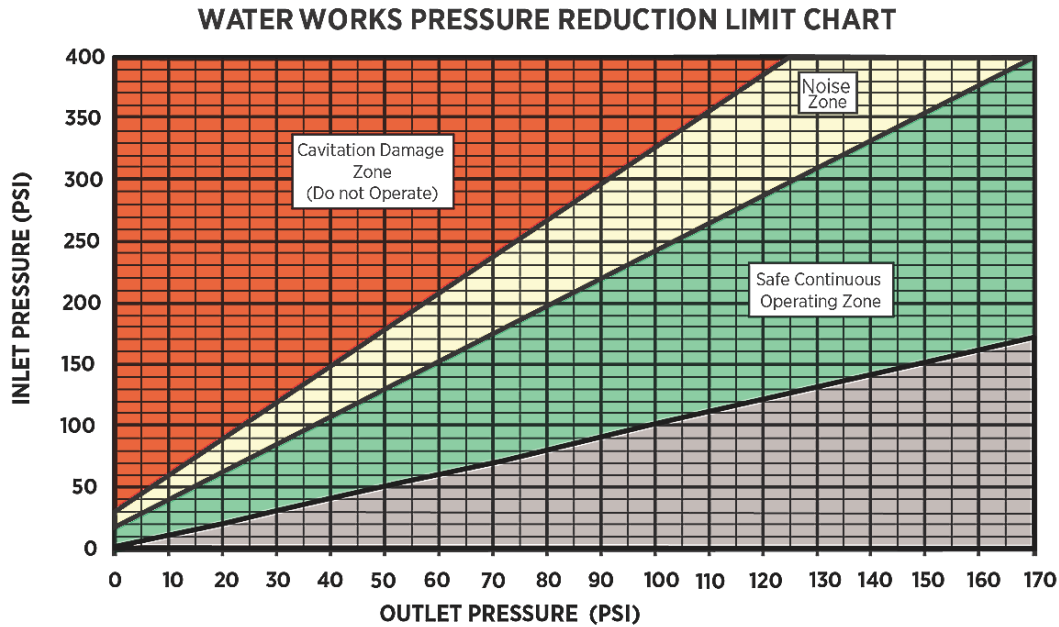
Flow Characteristics



*** Notes for Body Minimum Friction Loss Chart:**

Minimum inlet pressure is 10 psi higher than set point or the additional body friction loss intended flow, whichever is higher. (friction loss may be important at flows above 20 ft/s)

Example: A 6" valve intended to flow 2000 GPM at 120 psi has a friction loss of 20 psi at 2000 GPM. The minimum inlet pressure would be 120 + 20 = 140 psi. When inlet pressure is below set point, the outlet pressure will be the pressure at the inlet minus the friction loss.



Notes for Pressure Reduction Limit Chart: Determine if the outlet reduced flowing pressure is within the safe operating zone for your Wilkins Automatic Control Valve. First, find the system inlet pressure on the left axis and draw a horizontal line from that point across the chart. Then find the outlet reduced flowing pressure on the bottom axis and draw a vertical line up to where it meets the first line. The point where the lines intersect should be in the green "Safe Continuous Operating Zone" below and to the right of the yellow "Noise Zone". If the operating point is in the area labeled "Noise Zone" or "Cavitation Damage Zone", the valve seal ring, plunger, or body may be damaged. The lifespan of the valve will be reduced. Damage from cavitation to internal components may cause high pressure downstream and/or external leaks. To move out of the cavitation or noise zone you will need to place two valves in series in order to safely reduce pressure. Use the chart to pick an intermediate pressure in the green zone that you will set the first valve in series to. The intermediate pressure you pick will then become the inlet pressure for the 2nd valve and you can verify it will be in the green zone using the chart.

Flow Characteristics

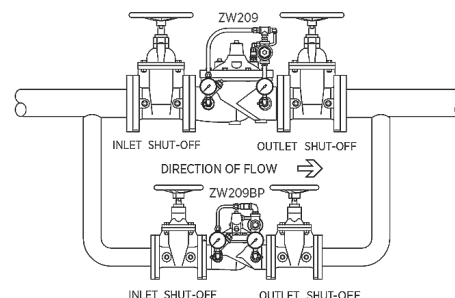
Full Port Globe and Angle Valve Size	inches (mm)	1 1/4" (32)	1 1/2" (40)	2" (50)	2 1/2" (65)	3" (80)	4" (100)
Reduced Port Globe Valve Size	inches (mm)			3" (80)		4" (100)	6" (150)
Main Valve Flow (GPM)	Max. Continuous	93	125	210	300	460	800
	Max. Intermittent	120	160	260	375	600	1000
	Min. Continuous	10	10	15	20	30	50
*By-Pass Flow (GPM)	Min/Max	1-10	1-10	1-10	1-10	1-10	1-20
Main Valve Flow (L/s)	Max. Continuous	6	8	13	19	29	50
	Max. Intermittent	7.6	10	16.4	23	37	62
	Min Continuous	.06	.06	.9	1.3	1.9	3.2
By-Pass Flow (L/s)	Min/Max	.06-.63	.06-.63	.06-.63	.06-.63	.06-.63	.06-1.26
*Suggested Extra By-Pass	Valve sizes	-	-	1" Model 500XL	1-1/4" Model 500XL	1-1/2" Model 500XL	2" Model 500XL

*Adding an extra by-pass bridges the gap between the flow range of by-pass and main valve.

Valve Size	inches (mm)	6" (150)	8" (200)	10" (250)	12" (300)	14" (350)	16" (400)
Low Flow Bypass Required		112-ZW209BP	2-ZW209BP	212-ZW209BP	3-ZW209BP	4-ZW209BP	4-ZW209BP

The ZW209BP is not a substitute for a low flow by-pass in all cases. The valve is commonly used in buildings where 1-15 GPM low flows are common in off peak usage. Many factors should be considered in sizing a pressure reducing valve: inlet pressure, outlet pressure, and flow rates. The sizing of additional low flow by-pass valves are based on a minimum of a 50 psi differential between the inlet and set outlet pressure. To develop a smooth seamless flow response, it may be necessary to add an additional low flow by-pass valve to the ZW209BP installation to compensate for a range of anticipated flows below the minimum continuous flow rate. To control the opening point of the additional by-pass valves, set the valve you want to open first 5 psi higher in static downstream set pressure.

Typical Installation



Caution: The recommended installation orientation for ACVs is horizontal, with the valve cover up. 6" and larger valves should only be installed horizontally, with the valve cover up, due to the difficulty of properly bleeding air out of the cover and performing maintenance on valves installed in the vertical orientation.

[Installation and Maintenance Instructions - Model PRXL](#)

[Installation and Maintenance Instructions - ZW209 & ZW209BP](#)

Specifications

The Pressure Reducing Valve shall be a diaphragm actuated, pilot controlled valve. The main valve body shall be ductile iron ASTM A 536. The stem of the basic valve shall be guided top and bottom. The diaphragm shall not be used as a seating surface. All internal and external ferrous surfaces shall be coated with a high quality, fusion epoxy coating. The pilot control shall be field adjustable from 15 psi to 150 psi. The valve shall be certified to NSF/ANSI/CAN 61 and 372. The Pressure Reducing Valve with by-pass shall be a WILKINS Model ZW209BP.