



# Automatic Control Valves

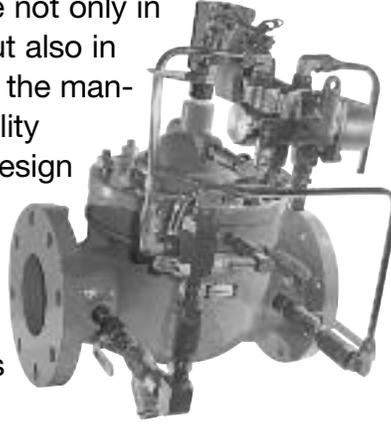
The Automatic  
Answer to  
Fluid Control



## INTRODUCTION

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Specifying Automatic Control Valves is a critical balancing act. On one hand, you must have the utmost confidence not only in the quality and performance of the valve, but also in the knowledge and “hands-on” expertise of the manufacturer. On the other hand, product reliability must be unquestioned, meeting the exact design parameters specified. Orders must be shipped as promised, keeping your job on track, and after-the-sale support is essential. You can count on Watts ACV to deliver the highest quality Automatic Control Valves available, and service second to none.



Our factory trained Representatives offer detailed specification assistance, analyzing system conditions to recommend the right valve for your application. System, material, and application considerations are reviewed, so the right control valve is selected for your project. You can be confident that Watts ACV and our local Representatives are ready and able to assist your design team.

With a long history of service in Commercial Plumbing, Municipal Waterworks, Fire Protection, Irrigation, Aviation Fueling, Marine, Theme Park, Decorative Fountain, Light Industrial, and Reclaimed Water markets, Watts ACV has the expertise and products to meet your needs. Since the 1960's, Watts ACV has kept pace with changing market requirements, developing and delivering quality Automatic Control Valves at affordable prices.

Our fusion bonded, epoxy coated, ductile iron Automatic Control Valves offer long life and minimal maintenance. And for harsh applications and environments, our Fabricated Stainless Steel Valves provide a cost effective solution.

Whether your application requires Pressure, Level, Pump, or Flow Control, Watts ACV is your best choice for Selection, Sales, and Service.

**Watts ACV. The Automatic Answer to Fluid Control.**

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# THE MORE YOU KNOW ABOUT AUTOMATIC CONTROL VALVES THE BETTER WATTS ACV LOOKS!



## Performance is standard

The design and innovative features incorporated into every Watts Automatic Control Valve means consistent, dependable, high performance, positive control and long life.

## Efficient design

The main valve, globe or angle pattern, is diaphragm actuated, hydraulically operated. It consists of only four major components. The body and cover plus interior seat and diaphragm/stem assembly, which is the only moving part in the main valve.

## Variable volume cover chamber

A synthetic rubber/nylon diaphragm, of FDA approved materials, is assembled between the valve body and cover. This creates a sealed chamber into which line fluid and pressure is introduced. Varying the amount of pressure accurately positions the stem assembly to open, close or modulate the valve as required.

## Precise alignment and stable throttling

A cover bearing and integral seat bearing guide the stem assembly for precise alignment with the seat. Coupled with the quad seal retainer plate, this alignment assures progressive opening/closing flows, stable throttling, low friction operation and positive closure.

## Drip tight seal

Watts ACV leads the automatic valve industry by being the first to incorporate the dynamic quad seal. The seat, retained on 3 1/2+ sides, provides positive closure while eliminating the need to "bite" into the seal, adding years to the valve's life. Each quad seal has two usable sides.

## Fused epoxy prolongs life

This coating is applied under rigorous preparation and application standards. It is non-porous, improving the flow coefficient of the valve and effectively sealing the casting from interaction with the controlled liquid. The coating also protects the valve from environmental attack. The finish prevents mineral buildup and rust (a major factor in control valve failure), simplifies maintenance, and prolongs the life of the valve.

## Multiple function performance

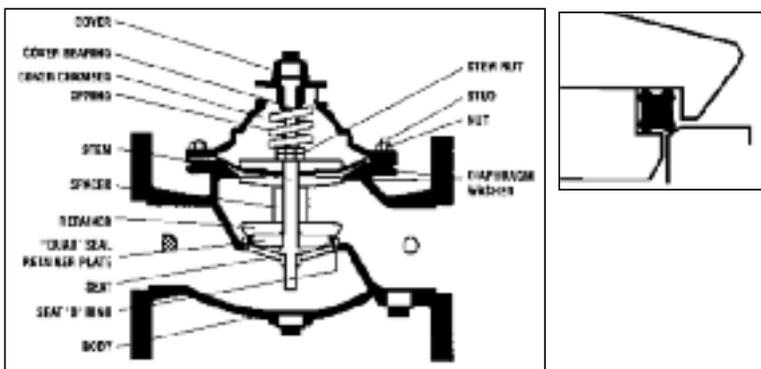
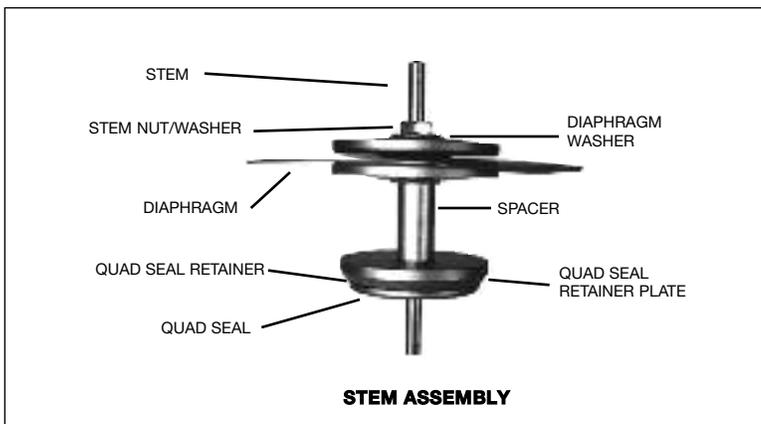
By varying the control/piping arrangement, the Watts ACV is able to perform a diversity of functions and applications. Multiple functions performed by a single valve can result in added system protection and lower cost to the user.

## Simplified Maintenance

The main valve and pilot system can be serviced without removing the valve from the line.

## Right valve, Right place, Right time

Watts ACV is committed to providing you with correct function and material to meet your application requirements and prides itself with accurate, calculated delivery schedules.



ACV 115  
PRESSURE REDUCING



ACV 116  
PRESSURE RELIEF/SUSTAINING



ACV 127-1  
ALTITUDE VALVE - ONE WAY FLOW

## COMPETITIVE CROSS-REFERENCE GUIDE

Watts ACV Model No.	Cla-Val Model No.	Description
114	40-01	Rate of Flow Control Valve
116	50-01	Pressure Relief Control Valve
116-5	50-01D	Pressure Sustaining and Check Valve
116-52	52-03	Surge Anticipator Control Valve
116-31	58-01	Pressure Sustaining and Solenoid Shutoff
513-5	60-11	Dual Chamber Booster Pump Control Valve
413-21	60-31	Single Chamber Booster Pump Control Valve
513-6	61-02	Deep Well Pump Control Valve
118-3	81-02	Non-Surge Check Valve (Opening / Closing Speed Controls)
115	90-01	Pressure Reducing Control Valve
115-3	90-01D	Pressure Reducing and Check Valve
115-2	92-01	Pressure Reducing and Pressure Sustaining Control Valve
115-4	93-01	Pressure Reducing and Solenoid Shutoff
110-14	124-01	On - Off Float Valve (6" and smaller)
110-14	124-02	On - Off Float Valve (8" and larger)
110-10	129-01	Modulating Float Valve
113-12	136-01A	Solenoid Control Valve (3" and smaller)
113-6	136-03ABC	Solenoid Control Valve (w/High Capacity Controls)
127-1	210-01	One Way Flow Altitude Control Valve
127-2	210-06	Two Way Flow Altitude Control Valve
127-11	210-03	One Way Flow Altitude Control Valve (delayed opening)

**Whatever You Need in Water Works  
Automatic Control Valves ...**



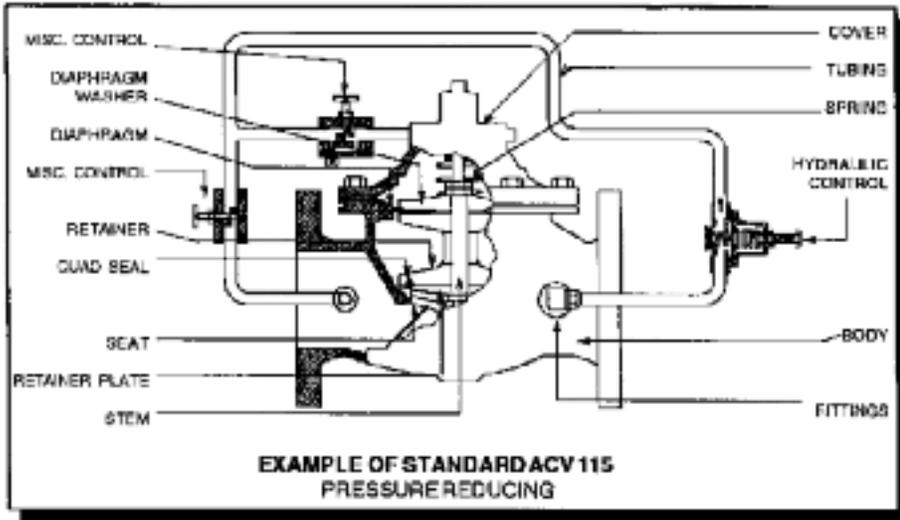
**Watts ACV Has It Now!**

Whether you need Altitude Valves with one-way flow for tank filling, or two-way flow for tank fill and discharge, or one-way flow for tank filling with delayed opening for adjustable tank draw-down, the Watts ACV 127E series will fill your bill. And, if your needs include booster pump controls with mechanical or hydraulic checks our Watts ACV Series 513 has you covered.

For more detailed information, call us at 1-713-943-0688 or visit our website at [www.wattsacv.com](http://www.wattsacv.com).

**WATTS®**

# SPECIFICATIONS



## WATTS ACV FEATURES

- Standard Production Valves:
- \* Wide range of sizes 1 1/4" - 24"
  - \* Fused epoxy coating 100% inside and out. (FDA and NSF approved, Meets AWWA standards)
  - \* Exclusive "QUAD SEAL"
    - retained on 3 1/2" + sides
    - positive drip-tight closure
    - longer life span (non-edged seat)
  - \* Diaphragm actuated (one moving part)
  - \* FDA approved diaphragm materials
  - \* Hydraulically operated (frictionless)
  - \* Top and bottom guided stem
  - \* Packless construction (less maintenance)

### BASIC VALVE

#### \* Body and Cover

Ductile Iron: ASTM A536 65-45-12  
Fused Epoxy Coated 100% inside/outside

- \* **Seat** - Stainless Steel - AISI 316 - 1 1/4" - 8"  
Bronze ASTM B62 - 10" - 24"  
Optional: Stainless Steel - AISI 316 - 10" - 24"

- \* **Stem** - Stainless Steel - AISI 303  
\* **Spring** - Stainless Steel - AISI 302

#### \* Elastomers

Diaphragm: Nylon reinforced BUNA-N (Nitrile)  
"Quad Seal": BUNA-N (Nitrile)  
Other materials available

### HYDRAULIC CONTROL PILOTS

- \* **Bodies:** ASTM B584, Alloy C84400  
\* **Internals:** Stainless Steel - AISI 303  
\* **Elastomers:** BUNA-N (Nitrile)

Other materials available

### MISCELLANEOUS CONTROL ACCESSORIES

- \* **Bodies:** Brass - ASTM B584, Alloy C84400  
\* **Internals:** Stainless Steel - AISI 303  
\* **Elastomers:** (where applicable): BUNA-N (Nitrile)  
Other materials available

### ELECTRICAL

- \* 120 VAC, 60 Hz, Optional voltage available  
\* **Body:** Brass, *Optional:* Stainless Steel  
\* **Enclosure:** General Purpose (NEMA Type 1, 2, 3, 3S, 4, 4X)  
*Optional:* Explosion proof (NEMA Type 3, 3S, 4, 4X, 6P, 7, 9)

### CONTROL CIRCUIT STRAINER

1 1/4"-3" In-line, Flo-clean, *Optional:* Isolation Cocks  
4-24" External, "Y" strainer + Isolation Cocks  
(unless noted on drawing)

### CONTROL TUBING/FITTINGS

- \* Copper, seamless annealed/Brass flared end  
*Optional:* Stainless Steel / Stainless Steel

### OPERATING TEMPERATURES (BUNA-N)

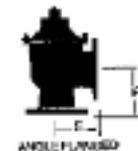
- \* Water: +32 degrees to 180 degrees F

### END CONNECTIONS/MAXIMUM

#### WORKING PRESSURE

**Ductile Iron:** 150# F.F. Flange: ANSI B16.42 / 250 PSIG  
300# R.F. Flange: ANSI B16.42 / 400 PSIG  
Threaded: ANSI B16.4 / 400 PSIG

VALVE SIZE	DIMENSION	GLOBE		ANGLE		GLOBE THREADED	ANGLE THREADED
		150#	300#	150#	300#		
1 1/4	A					7 1/4	
	E						3 1/4
	F						1 7/8
1 1/2	A	8 1/2	9			7.25	
	E			4	4 1/4		3 1/4
	F			4	4 1/4		1 7/8
2	A	9 3/8	10			9 3/8	
	E			4	4 1/4		4
	F			4	4 1/4		4
2 1/2	A	11	11 5/8			11	
	E			5 1/2	5 13/16		5 1/2
	F			4	4 5/16		4
3	A	12	13 1/4				
	E			5 3/4	6 1/8	A = 10 1/2	E = 5 1/4
	F			5 3/4	6 1/8		F = 5 1/4
4	A	15	15 5/8				
	E			6 3/4	7 1/8		
	F			6 3/4	7 1/8		
6	A	20	21				
	E			8 1/2	8 7/8		
	F			8 1/2	8 7/8		
8	A	25 3/8	26 3/8				
	E			11	11 1/2		
	F			11	11 1/2		
10	A	29 3/4	31 1/8				
	E			14 7/8	15 5/8		
	F			14 7/8	15 5/8		
12	A	34	35 1/2				
	E			17	17 3/4		
	F			17	17 3/4		
14	A	39	40 1/2				
	E			CONSULT	CONSULT		
	F			CONSULT	CONSULT		
16	A	41 3/8	43 1/2				
	E			CONSULT	CONSULT		
	F			CONSULT	CONSULT		
18	A	48	49 5/8	CONSULT	CONSULT		
	F			CONSULT	CONSULT		
20	A	48	49 5/8	CONSULT	CONSULT		
	F			CONSULT	CONSULT		
24	A	48 1/4	50	CONSULT	CONSULT		
	F			CONSULT	CONSULT		



# FLOAT CONTROL

## 110-10 (Globe) / 1110-10 (Angle) FLOAT CONTROL – MODULATING (CONSTANT LEVEL)

The ACV 110-10 maintains a constant level in storage tanks and reservoirs. Valve controlled flow into the tank is proportional to discharge flow, keeping the tank full.

**NOTE:**

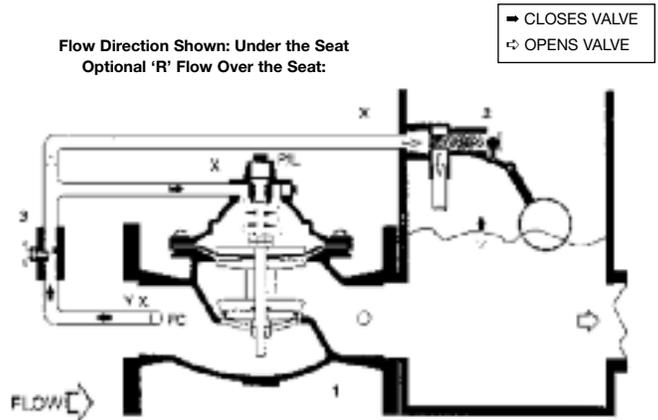
The modulating float control ACV 10-11, is remote mounted. A stilling well around the float should be installed if the liquid surface is subject to turbulence, ripples or wind.

**QUICK SIZING:**

Valve size same as fill line or one size smaller if discharge line is smaller than fill. Match size/capacity to discharge requirements.

**Points to consider:**

- Minimum differential pressure 5 psig
- Refer to table for maximum flow
- Inlet pressure vs. tank head pressure
- Pressure drop at required flow  
Refer to Engineering Data – Pressure Drop Chart
- If valve size required is smaller than line size, consider ACV 6110-10. Consult Watts ACV representative/factory



**VALVE FUNCTION**

- Maintains a constant liquid level in a tank.
- Remote mounted pilot is sensitive to slight changes in level and controls main valve:  
Opens when level drops  
Closes when level rises

**COMPONENTS**

1. Main Valve
2. Modulating Float Control
3. Adj. Closing Speed

**ACCESSORIES**

- Located as indicated  X - Isolation Cocks  FC - Flo-Clean Strainer
- Included as marked  Y - Y - Strainer  L - Limit Switch
- P - Position Indicator

## 110-14 (Globe) / 1110-14 (Angle) FLOAT CONTROL – ON/OFF (OPEN/CLOSE) ADJ. HI/LO LEVEL

The ACV 110-14 opens fully when the level reaches the preset low point and shuts off drip tight when the high level is reached. The rotary 3-port pilot is equipped with a vertical rod which allows the float to rise and lower to the adjustable upper and lower stops.

**NOTE:**

The pilot is remote mounted unless specified valve mounted. Standard equipped with brass rods and plastic float. Valve 2-6" standard with 2-12" rods. Valves 8-16" standard with 4-12" rods. Stainless steel rods and float are available. Provide a stilling well around float if liquid surface is subject to turbulence, ripples or wind.

**SPECIFY:**

Valve mounted pilot is required, and valve discharge horizontal or vertical.

**QUICK SIZING:** Valve size same as fill line or one size smaller.

**Points to consider:**

- Minimum differential pressure 5 psig
- Refer to Engineering Data – Flow Capacity Chart
- Inlet pressure vs. tank head pressure
- Pressure drop at required flow  
Refer to Engineering Data – Pressure Drop Chart
- If valve size is smaller than line size, consider ACV 6110-14  
Consult Watts ACV representative/factory

4" & Smaller

**VALVE FUNCTION**

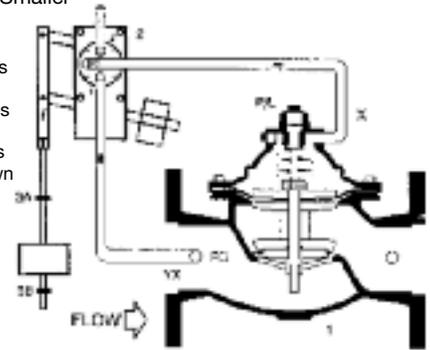
- Valve opens when float reaches lower level stop (adjustable)
- Valve closes when float reaches upper level stop (adjustable)
- High and low level adjustments allows for calculated draw down  
Opens when level drops  
Closes when levels rises

**COMPONENTS**

1. Main Valve
2. Float Pilot
3. Level Adjustment Stops  
3A – Upper Level  
3B – Lower Level

**ACCESSORIES**

- Located as indicated  X - Isolation Cocks  FC - Flo-Clean Strainer
- Included as marked  Y - Y - Strainer  L - Limit Switch
- P - Position Indicator



6" & Larger

**VALVE FUNCTION**

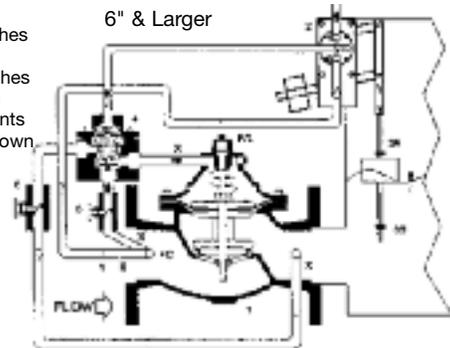
- Valve opens when float reaches lower level stop (adjustable)
- Valve closes when float reaches upper level stop (adjustable)
- High and low level adjustments allows for calculated draw down  
Opens when level drops  
Closes when levels rises

**COMPONENTS**

1. Main Valve
2. Float Pilot
3. Level Adjustment Stops  
3A – Upper Level  
3B – Lower Level
4. Accelerator
5. Adj. Closing Speed
6. Adj. Opening Speed

**ACCESSORIES**

- Located as indicated  X - Isolation Cocks  FC - Flo-Clean Strainer
- Included as marked  Y - Y - Strainer  L - Limit Switch
- P - Position Indicator



# SOLENOID CONTROL

## 113-12 (Globe) / 1113-12 (Angle)

### SOLENOID ON/OFF (OPEN/CLOSE) Sizes 1 1/4" - 4"

Operated by a 3-way solenoid, the main valve opens fully or closes drip-tight depending upon the actuation position of the solenoid, energized to open/energized to close. The valve may be remotely operated by timers, relays, probes or any triggered device to the solenoid.

**NOTE:**

Energized to open valve.

*Optional:* energized to close valve.

At time of order, advise factory actual system working pressure for correct solenoid selection.

110-120 VAC, 50-60 Hz standard

*Optional:* specify voltage required.

Enclosure General Purpose (NEMA 1, 2, 3, 3S, 4, 4X)

*Optional:* explosion proof (NEMA 3, 3S, 4, 4X, 6, 6P, 7, 9)

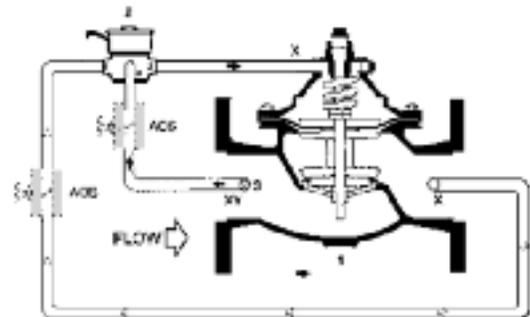
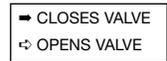
Manual operator standard

*Optional:* Opening and/or closing speed.

**QUICK SIZING:** Valve size same as line or one size smaller.

**Points to consider:**

- Refer to Engineering Data - Flow Capacity Chart
- Pressure drop at required flow
- Refer to Engineering Data - Pressure Drop Chart
- If valve size required is smaller than line size, consider ACV 6113-12
- Consult Watts ACV representative/factory



Flow Direction Shown: Under the Seat  
Optional 'R' Flow Over the Seat: 113-12R/1113-12R

**VALVE FUNCTION**

-Electrically operated on/off (open/close) control valve

**COMPONENTS**

1. Main Valve
2. 3-Way Solenoid
3. Flo-Clean Strainer

**ACCESSORIES**

- Located as indicated
- Included as marked
- X - Isolation Cocks
- Y - Y - Strainer (Eliminates Flo-Clean)
- ACS - Adj. Closing Speed
- ADS - Adj. Opening Speed

## 113-6 (Globe) / 1113-6 (Angle)

### SOLENOID ON/OFF (OPEN/CLOSE) WITH HIGH CAPACITY CONTROLS

A 3-way solenoid and auxiliary 3-port accelerator cause the main valve to open fully or close drip-tight depending upon the actuation position of the solenoid, energized to open/energized to close. The high capacity accelerator assures quick valve response to the solenoid signal regardless of the main valve size. The valve may be remotely operated by timers, relays, probes or any triggering device to the solenoid.

**NOTE:**

Energized to open valve.

*Optional:* energized to close valve.

At time of order, advise factory actual system working pressure for correct solenoid selection.

110-120 VAC, 50-60 Hz standard

*Optional:* specify voltage required.

Enclosure General Purpose (NEMA 1, 2, 3, 3S, 4, 4X)

*Optional:* explosion proof (NEMA 3, 3S, 4, 4X, 6, 6P, 7, 9)

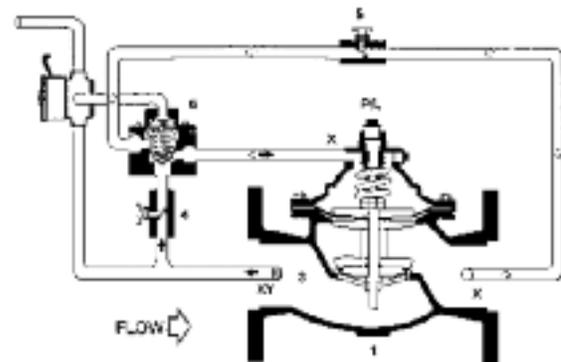
Manual operator standard

Standard with adjustable opening and closing speed.

**QUICK SIZING:** Valve size same as line or one size smaller.

**Points to consider:**

- Refer to Engineering Data - Flow Capacity Chart
- Pressure drop at required flow
- Refer to Engineering Data - Pressure Drop Chart
- If valve size required is smaller than line size, consider ACV 6113-12
- Consult Watts ACV representative/factory



Flow Direction Shown: Under the Seat  
Optional 'R' Flow Over the Seat: 113-6R/1113-6R

**VALVE FUNCTION**

- Electrically operated on/off (open/close) control valve
- High capacity control for fast response

**COMPONENTS**

1. Main Valve
2. 3-Way Solenoid
3. Flo-Clean Strainer
4. Adj. Closing Speed
5. Adj. Opening Speed
6. Accelerator Control

**ACCESSORIES**

- Located as indicated
- Included as marked
- X - Isolation Cocks
- Y - Y - Strainer (Eliminates Flo-Clean)
- L - Limit Switch
- P - Position Indicator

# PUMP CONTROL

## 113-46 (Globe) / 1113-46 (Angle) BOOSTER PUMP CONTROL (Valves 4" and smaller)

Solenoid operated pump control for controlled opening and closing on pump start-up and shut-down. Equipped with hydraulic check feature to close valve on pressure reversal and shut-off pump in event of pump failure. Valve and pump operations are interlocked by a limit switch assembly.

**NOTE:**

Energized to open valve.  
At time of order, advise factory actual system working pressure for correct solenoid selection.  
110-120 VAC, 50-60 Hz standard

*Optional:* specify voltage required.

Solenoid enclosure NEMA 1, 2, 3, 3S, 4, 4X  
Manual operator standard  
Limit switch enclosure general purpose  
Standard with adjustable opening and closing speed.

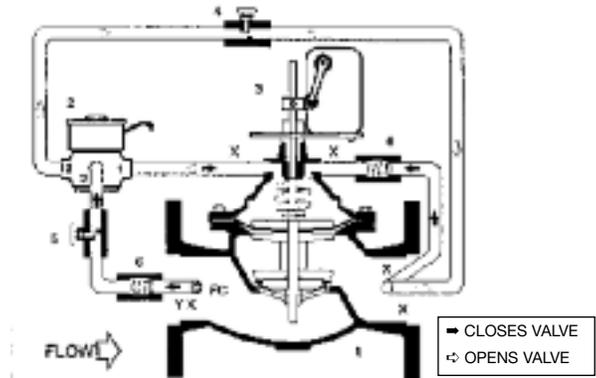
**Additional combinations:**

413-46 Pump Control/Lift-Check

**QUICK SIZING:** Valve size same as line.

**Points to consider:**

- Refer to Engineering Data - Flow Capacity Chart
- Pressure drop at required flow  
Refer to Engineering Data - Pressure Drop Chart



Flow Direction Shown: Under the Seat  
Optional 'R' Flow Over the Seat: 113-46R/1113-46R

**VALVE FUNCTION**

- Opens at a controlled rate on pump start-up (adjustable)
- Closes at a controlled rate on pump shut-off (adjustable)
- Valve and pump are electrically interlocked so that power is shut-off when the valve is in near closed position

**COMPONENTS**

- |                         |                          |
|-------------------------|--------------------------|
| 1. Main Valve           | 5. Adj. Closing Speed    |
| 2. 3-Way Solenoid       | 6. Check Valve           |
| 3. Fig. 51 Limit Switch | FC - Flow CLean Strainer |
| 4. Adj. Opening Speed   |                          |

**ACCESSORIES**

- Located as indicated      □ X - Isolation Cocks  
Included as marked      □ Y - Y - Strainer

## 113-21 (Globe) / 1113-21 (Angle) BOOSTER PUMP CONTROL (Valves 6" and larger)

Solenoid operated pump control for controlled opening and closing on pump start-up and shut-down. Equipped with hydraulic check feature to close valve on pressure reversal. Valve and pump operations are interlocked by a limit switch assembly.

**NOTE:**

Energized to open valve.  
At time of order, advise factory actual system working pressure for correct solenoid selection.  
110-120 VAC, 50-60 Hz standard

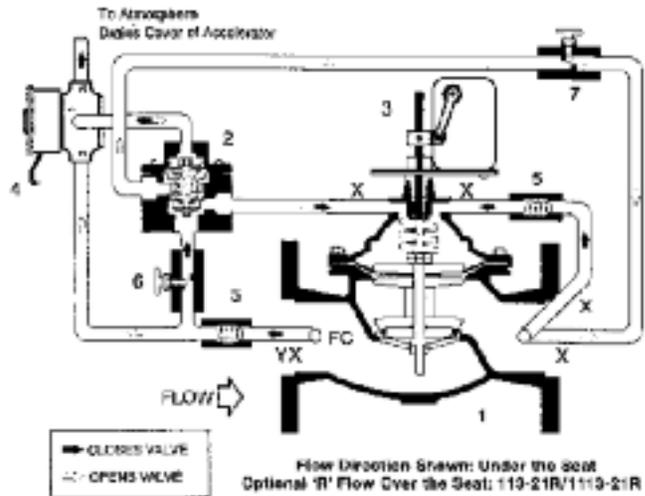
*Optional:* specify voltage required.

Solenoid enclosure NEMA 1, 2, 3, 3S, 4, 4X  
Manual operator standard  
Limit switch enclosure general purpose  
Standard with adjustable opening and closing speed.

**QUICK SIZING:** Valve size same as line.

**Points to consider:**

- Refer to Engineering Data - Flow Capacity Chart
- Pressure drop at required flow  
Refer to Engineering Data - Pressure Drop Chart



Flow Direction Shown: Under the seat  
Optional 'R' Flow Over the Seat: 113-21R/1113-21R

**VALVE FUNCTION**

- Opens at a controlled rate on pump start-up (adjustable)
- Closes at a controlled rate on pump shut-off (adjustable)
- Valve and pump are electrically interlocked so that power is shut-off when the valve is in near closed position
- Check feature closes valve when discharge pressure exceeds inlet pressure (power failure or pump failure)

**COMPONENTS**

- |                           |                       |
|---------------------------|-----------------------|
| 1. Main Valve             | 5. Check Valve        |
| 2. Accelerator Control    | 6. Adj. Closing Speed |
| 3. Figure 51 Limit Switch | 7. Adj. Opening Speed |
| 4. 3-Way Solenoid         |                       |

**ACCESSORIES**

- Located as indicated      □ X - Isolation Cocks      □ Y - Y - Strainer  
Included as marked      □ FC - Flo-Cleaner Strainer

# PUMP CONTROL

## 413-21 (Globe) / 1413-21 (Angle) BOOSTER PUMP CONTROL / MECHANICAL LIFT CHECK

Solenoid operated pump control for controlled opening and closing on pump start-up and shut-down. Equipped with mechanical lift-check feature to close valve the moment flow stops, preventing reverse flow. Valve and pump operations are interlocked by a limit switch assembly.

**NOTE:**

Energized to open valve.

At time of order, advise factory actual system working pressure for correct solenoid selection.

110-120 VAC, 50-60 Hz standard.

*Optional:* specify voltage required.

Solenoid enclosure NEMA 1, 2, 3, 3S, 4 4X.

Manual operator standard

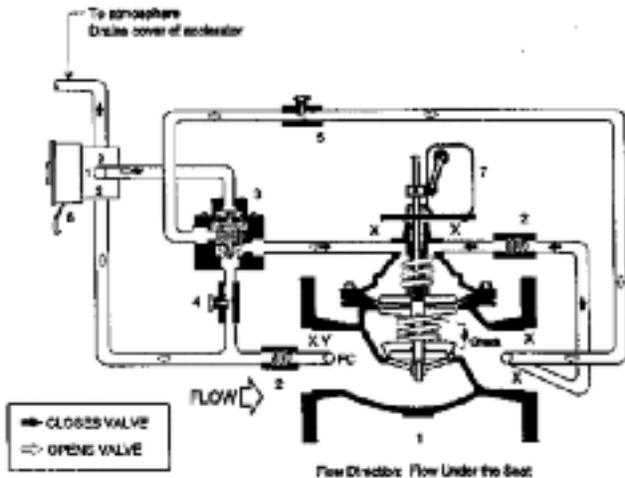
Limit switch enclosure general purpose

Standard with adjustable opening and closing speed.

**QUICK SIZING:** Valve size same as line.

**Points to consider:**

- Refer to Engineering Data - Flow Capacity Chart
- Pressure drop at required flow
- Refer to Engineering Data - Pressure Drop Chart



**VALVE FUNCTION**

- Opens at a controlled rate on pump start-up (adjustable)
- Closes at a controlled rate on pump shut-off (adjustable)
- Valve and pump are electrically interlocked so that power is shut-off when the valve is in a near closed position
- Mechanical lift-check provides quick closure of valve to prevent reverse flow

**COMPONENTS**

- |                        |                                           |
|------------------------|-------------------------------------------|
| 1. Main Valve          | 5. Adj. Opening Speed                     |
| 2. Check valve         | 6. 3-Way Solenoid (Energized opens valve) |
| 3. Accelerator Control | 7. Fig. 51 Limit Switch                   |
| 4. Adj. Closing Speed  |                                           |

**ACCESSORIES**

- Located as indicated
- X - Isolation Cocks
  - Y - Y - Strainer
  - FC - Flo-Clean Strainer
- Included as marked

## 513-5 (Globe) / 1513-5 (Angle) BOOSTER PUMP CONTROL / DUAL CHAMBER / LIFT CHECK

Solenoid operated pump control for controlled opening and closing on pump start-up and shut-down. Built on the dual chamber ACV 518 main valve. Equipped with mechanical lift-check feature to close valve the moment flow stops, preventing pressure reversal. Valve and pump operations are interlocked by a limit switch assembly.

**NOTE:**

Energized to open valve.

Max W.P. standard 10-125 psig

*Optional* 125-250 psig

110-120 VAC, 50-60 Hz standard.

*Optional:* specify voltage required.

Solenoid enclosure NEMA 1, 2, 3, 3S, 4 4X.

Manual operator standard

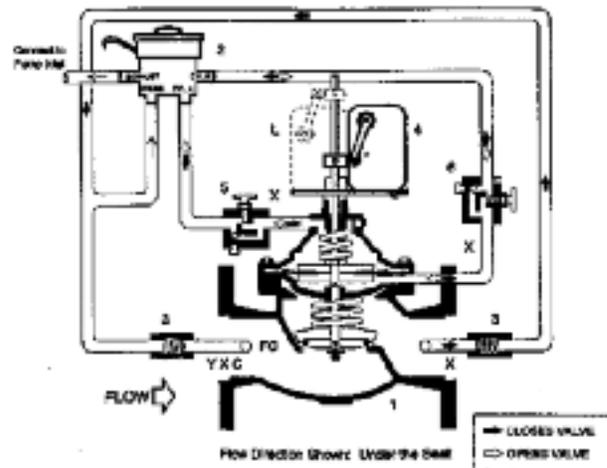
Limit switch enclosure general purpose

Standard with adjustable opening and closing speed.

**QUICK SIZING:** Valve size same as line.

**Points to consider:**

- Refer to Engineering Data - Flow Capacity Chart
- Pressure drop at required flow
- Refer to Engineering Data - Pressure Drop Chart



**VALVE FUNCTION**

- Opens at a controlled rate on pump start-up (adjustable)
- A Upper chamber connected to solenoid exhaust port
- B Lower chamber connected to valve inlet port (supply port)
- Closes at a controlled rate on pump shut-off (adjustable)
- A Upper chamber connected to valve inlet port (pressure port)
- B Lower chamber connected to solenoid exhaust port
- Valve and pump are electrically interlocked so that power is shut-off when valve is in a near closed position (adjustable with limit switch)
- Mechanical lift-check provides quick closure of valve to prevent reverse flow

**COMPONENTS**

- |                                       |                         |
|---------------------------------------|-------------------------|
| 1. Main Valve W/Mechanical Lift-Check | 4. Fig. 51 Limit Switch |
| 2. 4-Way Solenoid                     | 5. Adj. Opening Speed   |
| 3. Check Valve                        | 6. Adj. Closing Speed   |

**ACCESSORIES**

- Located as indicated
- FC - Flo-Clean Strainer
  - X - Isolation Cocks
  - Y - Y-Strainer
  - L - Second Limit Switch
- Included as marked

# PUMP CONTROL

## 513-6 (Globe) / 1513-6 (Angle) DEEP WELL PUMP CONTROL

The ACV 513-6 pump control valve starts in an open position during pump start-up, purging the deep well of air and debris to atmosphere. Controlled closing of the valve, opens the mainline check valve, gradually increasing line pressure. The valve reopens during shut-down cycle to gradually decrease line pressure and prevent shock. Valve and pump operations are interlocked by a limit switch assembly.

### NOTE:

Energized to close valve.

Max W.P. standard to 10-125 psig

*Optional:* 125-250 psig

110-120 VAC, 50-60 Hz standard.

*Optional:* specify voltage required.

Solenoid enclosure NEMA 1, 2, 3, 3S, 4, 4X

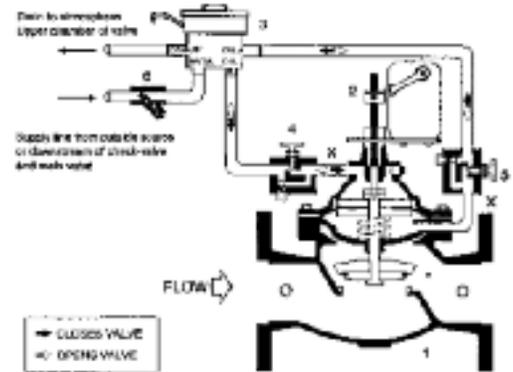
Manual operator standard

Limit switch enclosure general purpose

Standard with adjustable opening and closing speed.

**QUICK SIZING:** Valve size one to two sizes smaller than main line

**Points to consider:** – Refer to Engineering Data - Flow Capacity Chart  
– The deep well pump valve must be sized so it relieves atmosphere pump discharge pressure in excess of the normal system static pressure. This is necessary to prevent premature opening of the main line check valve. Refer to Engineering Data - Pressure Drop Chart. If flow velocity exceeds 45 feet per second use next larger valve  
– Pressure drop at required flow. Refer to Engineering Data - Pressure Drop Chart



### VALVE FUNCTION

- Discharges deep well air and debris by being in an open position on pump start-up.
- Closes at controlled rate (adjustable)
- Eliminating surges when pumping into main line (works in conjunction with controlled opening check valve in main line)
- Opens at a controlled rate (adjustable) eliminating surges upon pump shut-off
- Valve and pump are electrically interlocked so pump power is shut-off when valve is in near full open position (adjustable)

### COMPONENTS

- |                           |                       |
|---------------------------|-----------------------|
| 1. Main Valve             | 4. Adj. Opening Speed |
| 2. Figure 51 Limit Switch | 5. Adj. Closing Speed |
| 3. 4-Way Solenoid         | 6. Y-Strainer         |

### ACCESSORIES

Located as indicated  
Included as marked

□ X - Isolation Cocks

## 513-12 (Globe) / 1513-12 (Angle) BOOSTER PUMP / DUAL CHAMBER / HYDRAULIC CHECK

Solenoid operated pump control for controlled opening and closing on pump start-up and shut-down. Built on the dual chamber ACV 500 main valve. Equipped with hydraulic check feature to close valve on pressure reversal. Valve and pump operations are interlocked by a limit switch assembly.

### NOTE:

Energized to open valve.

Max W.P. standard to 10-125 psig

*Optional:* 125-250 psig

110-120 VAC, 50-60 Hz standard.

*Optional:* specify voltage required.

Solenoid enclosure NEMA 1, 2, 3, 3S, 4, 4X

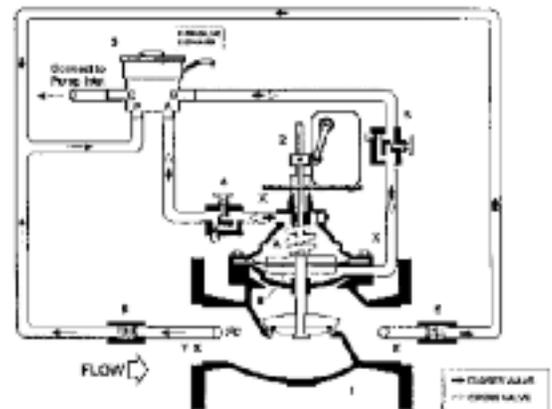
Manual operator standard

Limit switch enclosure general purpose

Standard with adjustable opening and closing speed.

**QUICK SIZING:** Valve size same as line.

**Points to consider:** – Refer to Engineering Data - Flow Capacity Chart  
– Pressure Drop at required flow  
Refer to Engineering Data - Pressure Drop Chart



### VALVE FUNCTION

- Opens at a controlled rate on pump start-up (adjustable)
  - Main valve upper chamber (A) connected to solenoid drain port
  - Main valve lower chamber (B) connected to valve inlet (supply) port
- Closes at a controlled rate on pump shut-off (adjustable)
  - Main valve upper chamber (A) connected to valve inlet (supply) port
  - Main valve lower chamber (B) connected to solenoid drain port
- Valve and pump are electrically interlocked so that power is shut-off when the valve is in near closed position (adjustable with limit switch)
- Check feature closes valve when discharge pressure exceeds inlet pressure (power failure)

### COMPONENTS

- |                           |                       |
|---------------------------|-----------------------|
| 1. Main Valve             | 4. Adj. Opening Speed |
| 2. Figure 51 Limit Switch | 5. Adj. Closing Speed |
| 3. 4-Way Solenoid         | 6. Check Valve        |

### ACCESSORIES

Located as indicated  
Included as marked

□ X - Isolation Cocks

□ Y - Y Strainer

□ FC - Flo-Clean Strainer

# RATE OF FLOW PRESSURE REDUCING

## 114R (Globe) / 1114R (Angle)

RATE OF FLOW ("R" indicates over the seat flow)

Maintains a constant flow rate, adjustable, regardless of fluctuations in line pressure. The rate of flow pilot senses the differential pressure across a thin edged orifice plate mounted in the valve inlet flange. It responds to changes in pressure and modulates the main valve to maintain the desired flow.

### SPECIFY:

Desired flow rate at time of order.

ACV 114R: flow over the seat (fail closed)

ACV 114: flow under the seat (fail open)

### Additional combination functions:

114-1R Rate of Flow / Solenoid On-Off

114-2R Rate of Flow / Pressure Reducing

114-8R Rate of Flow / Pressure Sustaining

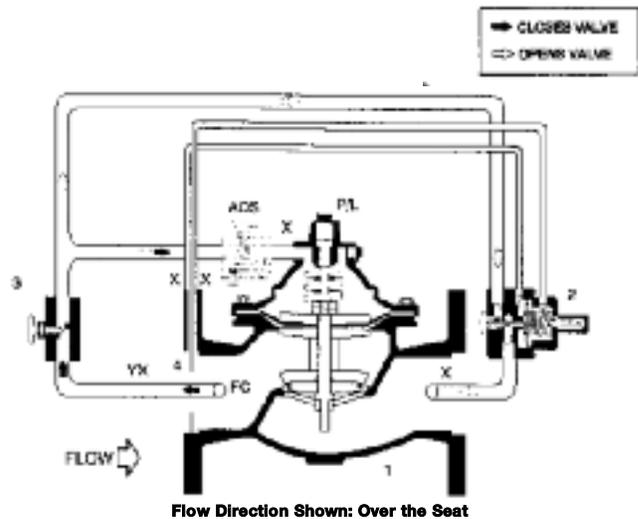
**QUICK SIZE:** Stay within parameters of capacity chart (below)

### Points to consider:

- Orifice plate sized per application and per your acceptable pressure drop - consult factory

**ACV 114 VALVE CAPACITY CHART**  
(Normal Continuous Flow Based on 20 ft/ per Second)

VALVE SIZE - INCHES	2	2 1/2	3	4	6	8	10	12	14	16
MINIMUM FLOW RATE GPM	15	35	35	50	115	200	300	400	500	850
MAXIMUM FLOW RATE GPM	208	460	460	800	1800	3100	4900	7000	8500	11000



### VALVE FUNCTION

- Limits flow rate to a constant preset maximum (adjustable)

### COMPONENTS

1. Main Valve
2. Flow Control Pilot
3. Needle Valve - Adj. Closing Speed
4. Orifice Plate

### ACCESSORIES

Located as indicated  
Included as marked

- AOS - Adj. Opening Speed
- X - Isolation Cocks
- Y - Y Strainer
- FC - Flo-Clean Strainer
- P - Position Indicator
- L - Limit Switch

## 115 (Globe) / 1115 (Angle)

PRESSURE REDUCING

Automatically reduces a higher inlet pressure to a constant lower outlet pressure regardless of changing flow rate and/or varying inlet pressure. Refer to ACV 115-7 for dead-end systems and/or systems using high demand, on-off equipment.

### NOTE:

Adjustment range:

Standard: 20-175 psig

Optional: 0-30 psig

100-300 psig

(stainless steel control)

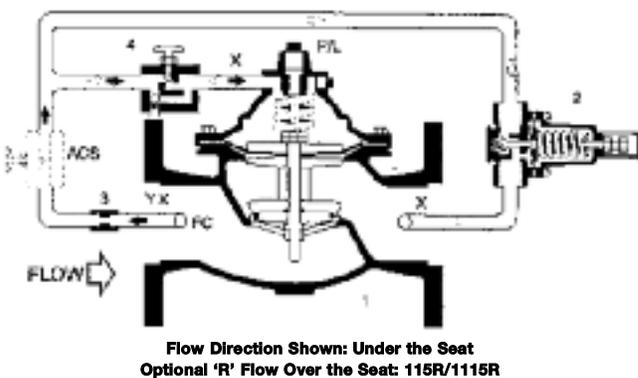
Remote sense: ACV 115-1

### QUICK SIZING:

Valve size one size smaller than line.

### Points to consider: -

- See Engineering Data - Pressure Reducing Sizing
  - Check maximum and minimum flow
  - Check pressure drop - pressure reducing valves or cavitation chart
  - If valve size required is smaller than line size, consider ACV 6115
- Consult Watts ACV representative/factory



Flow Direction Shown: Under the Seat  
Optional 'R' Flow Over the Seat: 115R/1115R

### VALVE FUNCTION

- Reduce higher inlet pressure to constant lower outlet pressure (adjustable)

### COMPONENTS

1. Main Valve
2. Pressure Reducing Control
3. Fixed Orifice
4. Adj. Opening Speed (3" and Smaller)

### ACCESSORIES

Located as indicated  
Included as marked

- X - Isolation Cocks
- Y - Y-Strainer
- P - Position Indicator
- FC - Flo-Clean Strainer
- L - Limit Switch
- ACS - Adjustable Closing Speed

# PRESSURE REDUCING

## 115-2 (Globe) / 1115-2 (Angle)

### PRESSURE REDUCING / SUSTAINING

Automatically reduces a higher inlet pressure to a constant lower outlet pressure regardless of changing flow rate and/or varying inlet pressure. Equipped with a pressure sustaining control which prevents the upstream pressure from dropping below a preset minimum.

**NOTE:**

Adjustment range:  
 Standard: 20-175 psig  
 Optional: 0-30 psig  
 100-300 psig  
 (stainless steel control)

**Additional Combinations:**

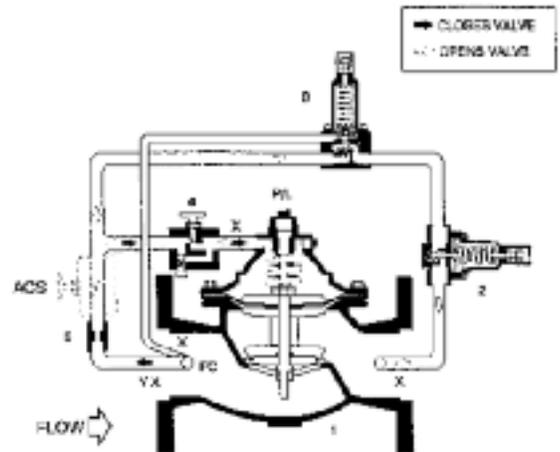
115-11 Reducing/Sustaining/Check  
 115-32 Reducing/Sustaining/Solenoid

**QUICK SIZING:**

Valve size one size smaller than line.

**Points to consider: -**

- See Engineering Data - Pressure Reducing Sizing
- Check maximum and minimum flow
- Check pressure drop - pressure reducing valves or cavitation chart
- If valve size required is smaller than line size, consider ACV 6115-2  
 Consult Watts ACV representative/factory



Flow Direction Shown: Under the Seat  
 Optional 'R' Flow Over the Seat: 115-2R/1115-12R

**VALVE FUNCTION**

- Reduce higher inlet pressure to constant lower outlet pressure (adjustable)
- Prevents upstream pressure from dropping below a preset minimum (adjustable)

**COMPONENTS**

1. Main Valve
2. Pressure Reducing Control
3. Sustaining Control
4. Adj. Opening Speed (3" and Smaller)
5. Fixed Orifice

**ACCESSORIES**

- Located as indicated  
 Included as marked
- X - Isolation Cocks
  - Y - Y-Strainer
  - L - Limit Switch
  - FC - Flo-Clean Strainer
  - P - Position Indicator
  - ACS - Adjustable Closing Speed

## 115-3 (Globe) / 1115-3 (Angle)

### PRESSURE REDUCING / CHECK

Automatically reduces a higher inlet pressure to a constant lower outlet pressure regardless of changing flow rate and/or varying inlet pressure. Equipped with a hydraulic check feature to prevent reverse flow on pressure reversal.

**NOTE:**

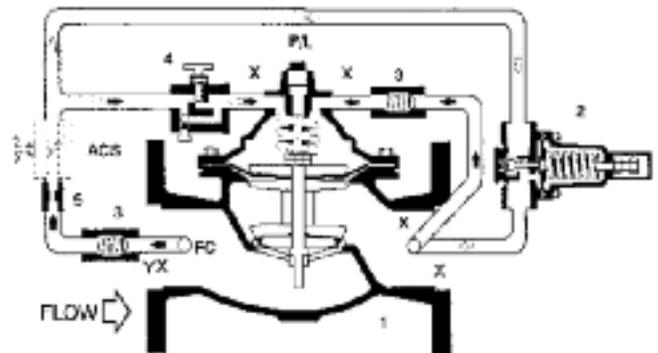
Adjustment range:  
 Standard: 20-175 psig  
 Optional: 0-30 psig  
 100-300 psig  
 (stainless steel control)

**QUICK SIZING:**

Valve size one size smaller than line.

**Points to consider: -**

- See Engineering Data - Pressure Reducing Sizing
- Check maximum and minimum flow
- Check pressure drop - pressure reducing valves or cavitation chart
- If valve size required is smaller than line size, consider ACV 6115-3  
 Consult Watts ACV representative/factory



Flow Direction Shown: Under the Seat  
 Optional 'R' Flow Over the Seat: 115-3R/1115-3R

**VALVE FUNCTION**

- Reduces higher inlet pressure to constant lower outlet pressure (adjustable)
- Close when outlet/downstream pressure exceeds inlet/upstream pressure

**COMPONENTS**

1. Main Valve
2. Pressure Reducing Control
3. Check Valve
4. Adj. Opening Speed (3" and Smaller)
5. Fixed Orifice

**ACCESSORIES**

- Located as indicated  
 Included as marked
- X - Isolation Cocks
  - Y - Y-Strainer
  - L - Limit Switch
  - FC - Flo-Clean Strainer
  - P - Position Indicator
  - ACS - Adjustable Closing Speed

# PRESSURE REDUCING

## 115-4 (Globe) / 1115-4 (Angle)

### PRESSURE REDUCING / SOLENOID ON-OFF

Automatically reduces a higher inlet pressure to a constant lower outlet pressure regardless of changing flow rate and/or varying inlet pressure. Equipped with a solenoid override feature allowing for electrical on-off operation of the valve.

#### NOTE:

Adjustment range:

Standard: 20-175 psig

Optional: 0-30 psig

100-300 psig (uses stainless steel control)

Solenoid max W.P.:

At time of order, advise factory actual system working pressure for correct solenoid selection.

(consult factory if over 150 psig).

Enclosure NEMA 1, 2, 3, 3S, 4, 4X

Optional: explosion proof NEMA 3, 3S, 4, 4X, 6, 6P, 7, 9

#### Additional combinations:

115-5 Pressure Reducing/Solenoid/Check

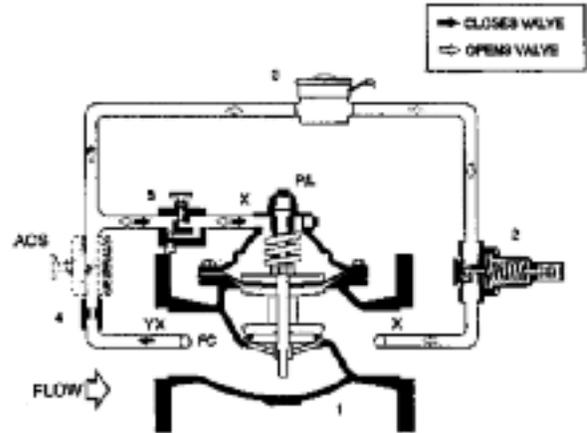
#### SPECIFY:

Energized to open or energized to close main valve.

**QUICK SIZING:** Valve size one size smaller than line.

#### Points to consider: -

- See Engineering Data - Pressure Reducing Sizing
- Check maximum and minimum flow
- Check pressure drop - pressure reducing valves or cavitation chart
- If valve size required is smaller than line size, consider ACV 6115-4  
Consult Watts ACV representative/factory



Flow Direction Shown: Under the Seat  
Optional 'R' Flow Over the Seat: 115-4R/1115-4R

#### VALVE FUNCTION

- Reduce higher inlet pressure to constant lower outlet pressure (adjustable)
- Electrical on/off override of reducing function

#### COMPONENTS

1. Main Valve
2. Pressure Reducing Control
3. 2-Way Solenoid
4. Fixed Orifice
5. Adj. Opening Speed (3" and Smaller)

#### ACCESSORIES

- Located as indicated
- Included as marked
- X - Isolation Cocks
  - Y - Y-Strainer
  - L - Limit Switch
  - FC - Flo-Clean Strainer
  - P - Position Indicator
  - ACS - Adjustable Closing Speed

## 115-7 (Globe) / 1115-7 (Angle)

### PRESSURE REDUCING / SURGE

Automatically reduces a higher inlet pressure to a constant lower outlet pressure regardless of changing flow rate and/or varying inlet pressure. Should flow rate decrease rapidly a pressure controlled surge pilot closes the valve to prevent downstream pressure buildup. Excellent in dead-end systems and/or systems using high demand, on-off equipment.

#### NOTE:

Adjustment range reducing/surge:

Standard: 20-175 psig

Optional: 0-30 psig

100-300 psig

(stainless steel control)

#### Additional combinations:

115-43 Reducing/Surge/Sustaining

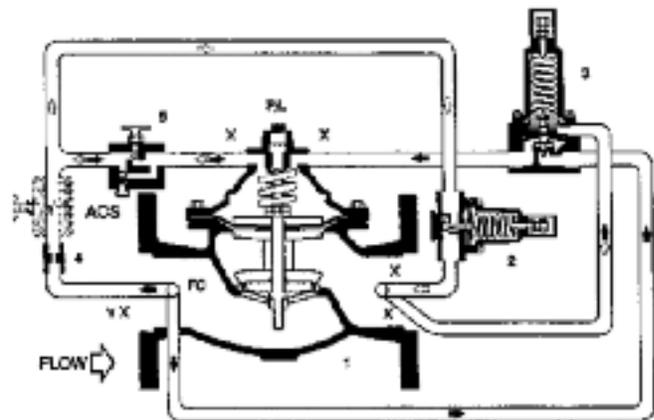
115-50 Reducing/Surge/Check

#### QUICK SIZING:

Valve size one size smaller than line.

#### Points to consider: -

- See Engineering Data - Pressure Reducing Sizing
- Check maximum and minimum flow
- Check pressure drop - pressure reducing valves or cavitation chart
- If valve size required is smaller than line size, consider ACV 6115-7  
Consult Watts ACV representative/factory



Flow Direction Shown: Under the Seat  
Optional 'R' Flow Over the Seat: 115-7R/1115-7R

#### VALVE FUNCTION

- Reduces higher inlet pressure to constant lower, outlet pressure (adjustable)
- Closes quickly when outlet exceeds set point of surge control (adjustable)

#### COMPONENTS

1. Main Valve
2. Pressure Reducing Control
3. Surge Control
4. Fixed Orifice
5. Adj. Opening Speed (3" and Smaller)

#### ACCESSORIES

- Located as indicated
- Included as marked
- X - Isolation Cocks
  - Y - Y-Strainer
  - L - Limit Switch
  - FC - Flo-Clean Strainer
  - P - Position Indicator
  - ACS - Adjustable Closing Speed

# 115-74 (Globe) / 1115-74 (Angle)

## PRESSURE REDUCING / LOW FLOW BY-PASS VALVE

Automatically reduces a higher inlet pressure to a constant lower outlet pressure regardless of changing flow rate and/or varying inlet pressure. Equipped with a low flow by-pass feature which bypasses the main valve pressure function for low flow conditions.

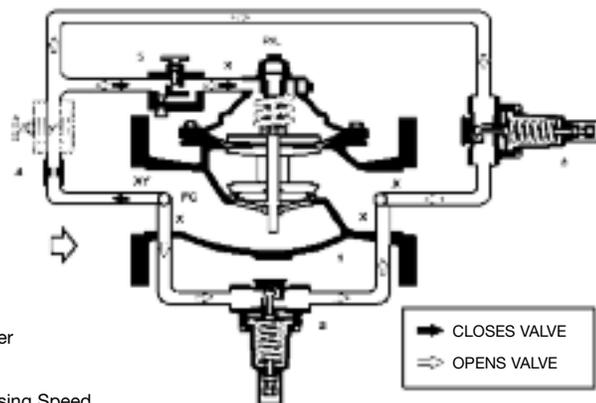
### ACCESSORIES

Located as indicated  
Included as marked

- X - Isolation Cocks
- Y - Y-Strainer
- FC - Flo-Clean Strainer
- P - Position Indicator
- L - Limit Switch
- ACS - Adjustable Closing Speed

### COMPONENTS

1. Main Valve
2. Low Flow By-Pass Control
3. Pressure Reducing Control
4. Fixed Orifice
5. Adj. Opening Speed (3" and Smaller)



## FIGURE PV20CB

### DIRECT RELIEF CONTROL

#### FUNCTION

- Normally closed position, opens when pressure reaches set-point.

#### FEATURES

##### - Responsive:

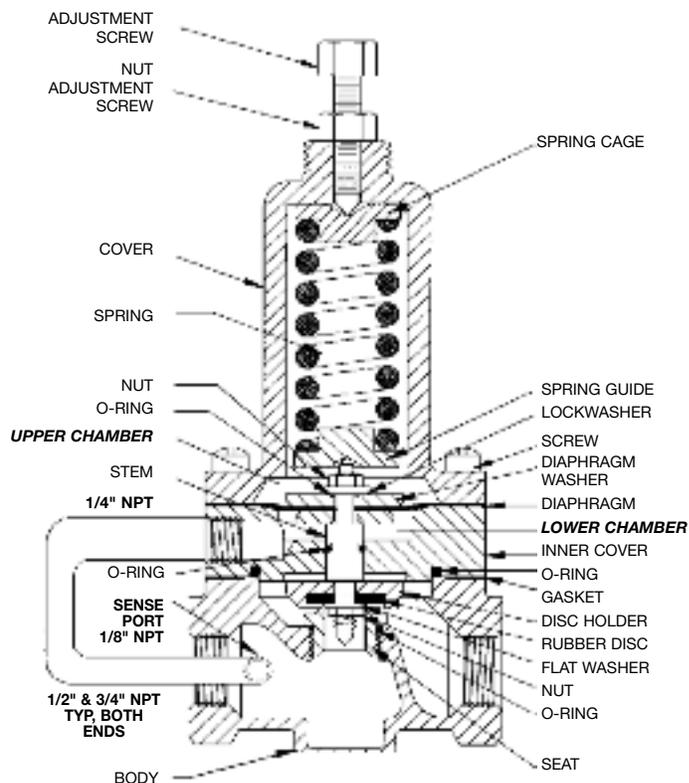
- Selectable spring ranges to allow for accurate, easy to adjust pressure setting.
  - Large diaphragm area
  - 1/2" and 3/4" ports.
  - Large seat area.

##### - Ease of Maintenance

- Can be serviced without removal from line.
- Replacement of elastomer parts is usually maximum required servicing.

#### OPERATION

The PV20CB is a normally closed, diaphragm actuated, spring loaded, direct acting regulator. The pressure set point is adjustable within the spring range. Upstream pressure is sensed under the diaphragm. As upstream pressure increases, the diaphragm pushes against the spring. The pilot stem/seat is pulled towards the open position, increasing flow through the pilot. As upstream pressure decreases under the diaphragm, the spring pushes the stem/seat towards the closed position restricting flow through the pilot. This sensitive spring/diaphragm interaction closely tacks and responds to changes in upstream pressure.



#### START-UP/ADJUSTMENT

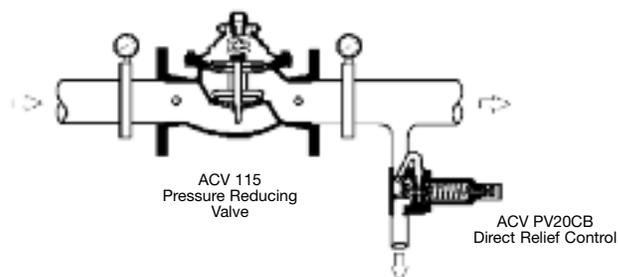
Follow the start-up procedures for the ACV function you have selected.

- 1 - Turn the screw Clockwise (IN) to increase the set-point you are controlling.
- 2 - Turn the screw Counterclockwise (OUT) to decrease the set-point you are controlling.

#### INSTALLATION

If the PV20CB is to be field installed, follow the steps below.

- 1 - Locate the flow arrow or bridge marking and install the control so the flow is under the seat.
- 2 - Typical application shown to the right:



# PRESSURE RELIEF / SUSTAINING

## 116 (Globe) / 1116 (Angle)

### PRESSURE RELIEF / SUSTAINING

Installed on a by-pass line, mainline pressure is accurately controlled by relief of excess pressure. Installed in a mainline it prevents upstream pressure from dropping below a preset minimum.

**NOTE:**

Adjustment range:

Standard: 20-200 psig

Optional: 0-30 psig

100-300 psig

**Additional relief/sustaining**

**functions:**

- 116FM/1116FM  
(U.L. listed/F.M. approved for fire pump relief service)
- 116-5 Pressure Sustaining / Check
- 116-25 Differential Pressure Sustaining
- 116-24 Differential Pressure Sustaining / Check

**116 RELIEF**

**QUICK SIZING:** Valve size one or two sizes smaller than main line.

**Points to consider:**

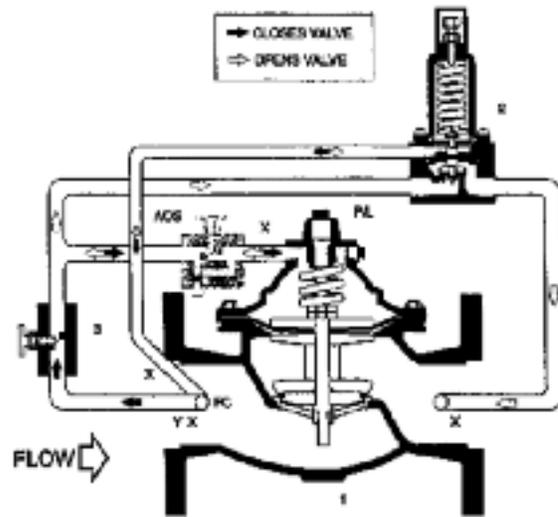
- Refer to Engineering Data - Flow Capacity Chart.
- If valve size required is smaller than line size, consider ACV 6116. Consult Watts ACV representative/factory.

**116 SUSTAINING**

**QUICK SIZING:** Valve size same as line.

**Points to consider:**

- Refer to Engineering Data - Flow Capacity Chart Pressure drop at required flow
- Refer to Engineering Data - Pressure Drop Chart



Flow Direction Shown: Under the Seat

**VALVE FUNCTION**

- Maintain constant upstream pressure (inlet to valve) by relieving excess pressure

**COMPONENTS**

1. Main Valve
2. Sustaining Control
3. Adj. Closing Speed

**ACCESSORIES**

Located as indicated  
Included as marked

- X - Isolation Cocks
- Y - Y Strainer
- P - Position Indicator
- FC - Flo-Clean Strainer
- L - Limit Switch
- AOS - Adj. Opening Speed

VALVE SIZE - INCHES	1 1/4	1 1/2	2	2 1/2	3	4	6	8	10	12	14	16
MAXIMUM CONTINUOUS FLOW RATE GPM (WATER)	93	125	208	300	460	800	1800	3100	4900	7000	8500	11000
MAXIMUM INTERMITTENT FLOW RATE GPM (WATER)	210	280	460	650	1000	1800	4000	7000	11000	16000	19000	25000

## 116-31 (Globe) / 1116-31 (Angle)

### PRESSURE SUSTAINING / SOLENOID ON-OFF

Installed in a mainline it prevents upstream pressure from dropping below a preset minimum. Solenoid override of the sustaining function allows for electrical on-off operation.

**NOTE:**

Adjustment range:

Standard: 20-200 psig

Optional: 0-30 psig, 100-300 psig

Solenoid max. W.P.:

At time of order, advise factory actual system working pressure for correct solenoid selection. (consult factory if over 150 psig.)

Enclosure: NEMA 1, 2, 3, 3S, 4, 4X

Optional: Explosion proof

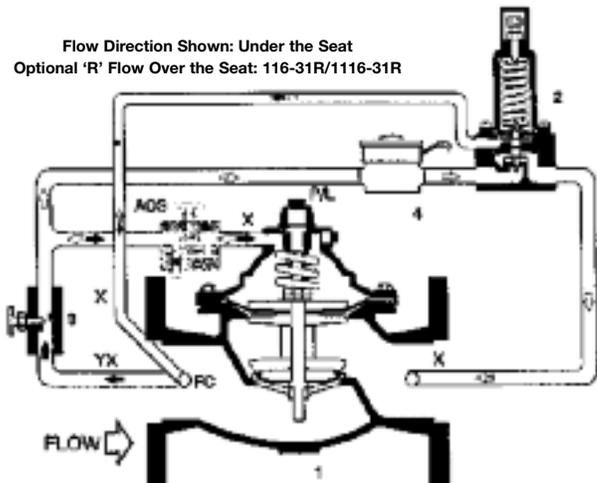
NEMA 3, 3S, 4, 4X, 6, 6P, 7, 9

Specify energized to open or energized to close main valve.

**QUICK SIZING:** Valve size same size as line.

**Points to consider: -**

- Refer to Engineering Data - Flow Capacity Chart
- Pressure drop at required flow
- Refer to Engineering Data - Pressure Drop Chart



Flow Direction Shown: Under the Seat  
Optional 'R' Flow Over the Seat: 116-31R/1116-31R

**VALVE FUNCTION**

- Maintain constant upstream pressure (inlet to valve) by relieving excess pressure  
- Solenoid provides electrical on/off override of relief/sustaining function

**COMPONENTS**

1. Main Valve
2. Sustaining Control
3. Adj. Restriction - Closing
4. 2-Way Solenoid

**ACCESSORIES**

Located as indicated  
Included as marked

- AOS - Adj. Opening Speed
- X - Isolation Cocks
- Y - Y Strainer
- L - Limit Switch
- P - Position Indicator
- FC - Flo-Clean Strainer

# SURGE RELIEF / CHECK

## 116-52 (Globe) / 1116-52 (Angle) SURGE ANTICIPATOR RELIEF / REMOTE SENSE

Used in pumping systems to protect equipment from damaging pressure surges or waves caused by rapid changes of flow within the pipeline. The 116-52 responds by opening at a preset low pressure setting, allowing for quick relief of the returning high pressure wave. The valve remains open as the integral accumulator is charged and then closes. This prevents possible excess system drainage should pressure not return to/above the low pressure setting. It is also equipped with a high pressure control pilot which allows for high pressure relief service.

**NOTE:**

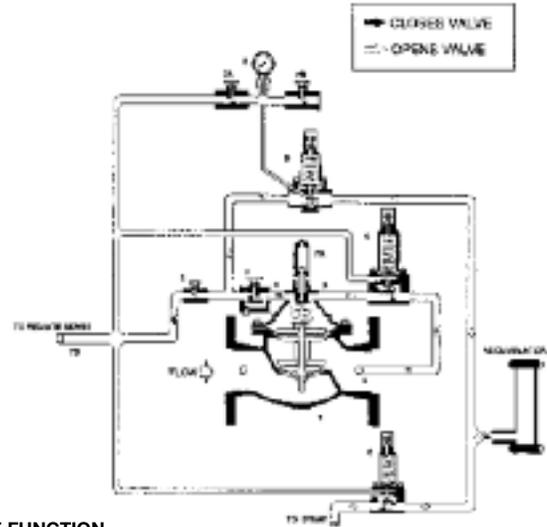
Adjustment range:  
 Low pressure: standard 20-200 psig, optional 0-30 psig.  
 High pressure: standard 20-200 psig, optional 0-30, 100-300 psig

**QUICK SIZING:**

Valve size one or two sizes smaller than main line.

**Points to consider:**

- Refer to Engineering Data - Flow Capacity Chart



**VALVE FUNCTION**

- Senses low pressure condition that precedes high pressure surge and opens to relieve high pressure
- Relieves high pressure build-up and protects system from over-pressure conditions

**COMPONENTS**

1. Main Valve
2. Adj. Closing Speed
3. Adj. Opening Speed
4. Relief Control
5. Low Pressure Control
6. Drain Valve
7. Test Valves
8. Pressure Gauge
- P. Position Indicator

**ACCESSORIES**

- Located as indicated Included as marked
- X - Isolation Cocks
  - Y - Y Strainer
  - L - Limit Switch

**FLOW CAPACITY CHART**

VALVE SIZE - INCHES	1 1/4	1 1/2	2	2 1/2	3	4	6	8	10	12	14	16
MAXIMUM CONTINUOUS FLOW RATE GPM (WATER)	93	125	208	300	460	800	1800	3100	4900	7000	8500	11000
MAXIMUM INTERMITTENT FLOW RATE GPM (WATER)	210	280	460	650	1000	1800	4000	7000	11000	16000	19000	25000

## 118-3R (Globe) / 1118-3R (Angle)

### CHECK VALVE W/ SEPARATE OPENING & CLOSING SPEED CONTROLS

Valves 4" & smaller (6" & Larger use 118-4R/6118-4R)

The ACV 118-3R permits flow when inlet pressure exceeds outlet pressure. Should pressure reversal occur the valve closes drip-tight. Opening and closing speeds are separately adjustable.

- 118-R - no speed control
- 118-1R - no closing speed (sizes 1 1/4-6)
- 118-2R - opening speed (sizes 1 1/4-6)
- 118-3R - separate adjustable opening and closing speed (4" & smaller)
- 118-4R - Separate opening and closing speed (6" & Larger)

**QUICK SIZING:**

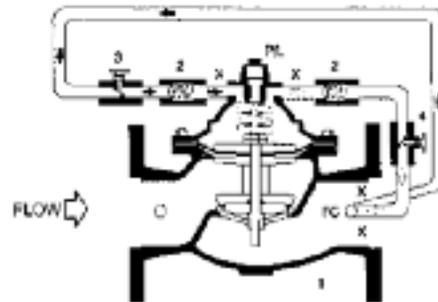
Valve size same as line.

**Points to consider:**

- Distribution flow:
- Refer to Engineering Data - Flow Capacity Chart
  - Pressure drop at required flow.
- Refer to Engineering Data - Pressure Drop Chart.

**Check Flow**

- If check flow velocity exceeds valve chart, consider adding a relief valve (ACV 116) to your system



**VALVE FUNCTION**

- Valve closes at a controlled rate (adjustable) when outlet/downstream pressure exceeds inlet/upstream pressure
- Valve opens at a controlled rate (adjustable) when inlet/upstream pressure exceeds outlet/downstream pressure

**COMPONENTS**

1. Main Valve
2. Check Valve
3. Adj. Closing Speed
4. Adj. Opening Speed

**ACCESSORIES**

- Located as indicated Included as marked
- X - Isolation Cocks
  - P - Position Indicator
  - L - Limit Switch

# ALTITUDE

## 127-1 (Globe) / 1127-1 (Angle)

### ALTITUDE VALVE - ONE WAY FLOW (TANK FILL)

Provides automatic filling of elevated tanks or reservoirs. When the altitude control senses a drop in level below the predetermined set-point the valve opens to fill tank. Supply pressure is greater than static head pressure. Discharge of the tank is by a separate line.

**NOTE:**

- Adjustment range: 5-20 FT.  
10-75 FT.  
50-200 FT.

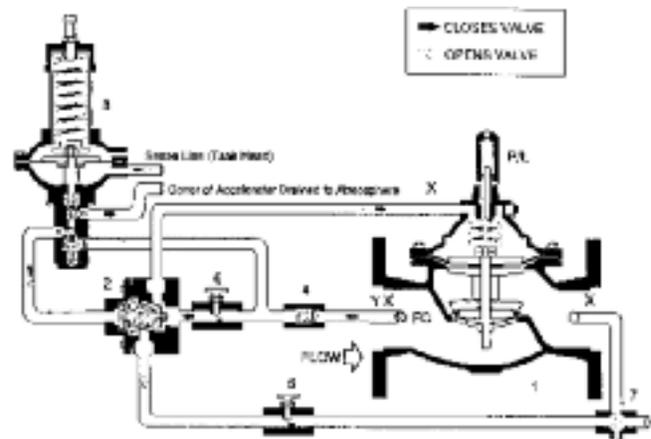
**Additional combination functions:**

127-11(Globe) / 1127-11(Angle) Altitude Valve - One Way Flow (Tank Fill) - Delayed Opening for Adjustable Tank Draw-Down  
Adjustment range delayed level drop: 2-15 FT.

**QUICK SIZING:** Valve size, line size or one size smaller.

**Points to consider:**

- Refer to Engineering Data - Flow Capacity Chart
- Pressure drop at required flow  
Refer to Engineering Data - Pressure Drop Chart
- Inlet pressure vs. tank height to fill
- If valve size required is smaller than line size, consider ACV 6127-1  
Consult Watts ACV representative/factory



Flow Direction Shown: Under the Seat  
Optional 'R' Flow Over the Seat: 127-1R/1127-1R

**VALVE FUNCTION**

- Opens when reservoir level drops below pilot setting (adjustable)
- Closes when reservoir level reaches pilot setting

**COMPONENTS**

1. Main Valve
2. Accelerator Control
3. Altitude Control
4. Check Valve
5. Adj. Opening Speed
6. Adj. Closing Speed
7. 3-Way Ball Valve
- P. Position Indicator
- FC - Flo-Clean Strainer

**ACCESSORIES**

- Located as indicated       X - Isolation Cocks  
Included as marked       Y - Y Strainer (Eliminates Flo-Clean)  
 L - Limit Switch

## 127-2 (Globe) / 1127-2 (Angle)

### ALTITUDE VALVE - TWO WAY FLOW (TANK FILL & DISCHARGE)

Provides automatic filling of elevated tanks or reservoirs. Supply pressure is greater than static head pressure. When the altitude control senses a drop in level below the predetermined set-point the valve opens to fill tank. The valve opens for tank discharge when tank head pressure is greater than valve inlet pressure.

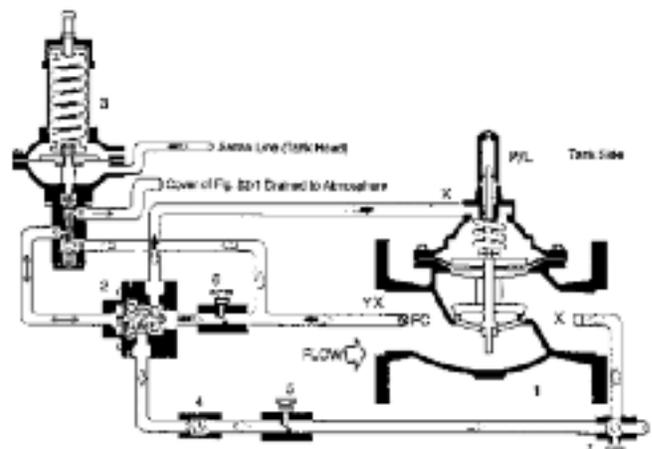
**NOTE:**

- Adjustment range: 5-20 FT.  
10-75 FT.  
50-200 FT.

**QUICK SIZING:** Valve size, line size or one size smaller.

**Points to consider:**

- Tank discharge flow requires valve inlet (system pressure) to be 2 psig less than tank head pressure
- Refer to Engineering Data - Flow Capacity Chart
- Pressure drop at required flow  
Refer to Engineering Data - Pressure Drop Chart
- Inlet pressure vs. tank height to fill
- If valve size required is smaller than line size, consider ACV 6127-2  
Consult Watts ACV representative/factory



**VALVE FUNCTION**

- Tank fill
  - Opens when head pressure drops below pilot setting (adjustable)
  - Closes when reservoir level reaches pilot setting
- Tank Discharge
  - Opens when valve inlet / system pressure is below tank head

**COMPONENTS**

1. Main Valve
2. Accelerator Control
3. Altitude Control
4. Check Valve
5. Adj. Opening Speed
6. Adj. Closing Speed
7. 3-Way Ball Valve
- P. Position Indicator

**ACCESSORIES**

- Located as indicated       X - Isolation Cocks       FC - Flo-Clean Strainer  
Included as marked       Y - Y Strainer       L - Limit Switch

# FIRE PROTECTION VALVES

**Whatever You Need in Fire Protection Automatic Control Valves ...**



**Watts ACV Has It Now!**

Whether you need UL-listed Pressure Reducing Valves, Factory Mutual System approved and UL-listed Fire Pump Relief Valves, Factory Mutual System approved Fire Pump Suction Control Valves or UL-listed Pneumatic, Hydraulic, or Electronically Actuated Deluge valves, Watts ACV has them in sizes from 3" through 10", in globe or angle pattern.

For more detailed information, call us at 1-713-943-0688 or visit our website at [www.wattsacv.com](http://www.wattsacv.com).

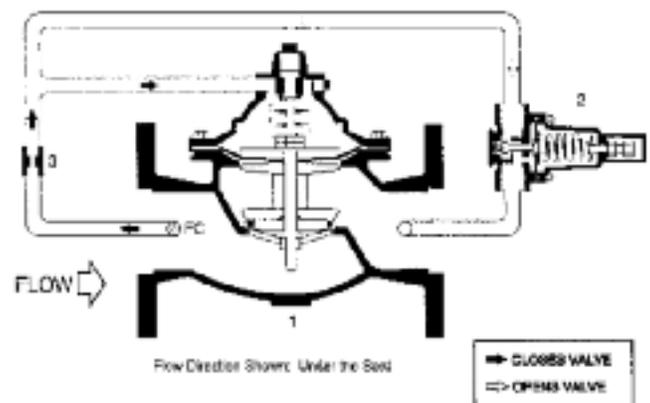
**WATTS**

## 115F Globe / 1115F Angle PRESSURE REDUCING VALVE - UL LISTED

The Watts ACV 115F (globe) and 1115F (angle) reducing valve meets all the requirements for UL Listed fire protection service. The Watts ACV valve goes "beyond the call of duty" by incorporating features to assure dependable, accurate control and long life.



**UL LISTED**  
8L00  
PRESSURE CONTROL  
VALVE



### VALVE FUNCTION

– Reduce higher inlet pressure to constant lower outlet pressure (adjustable)

### COMPONENTS

1. Main Valve
2. 263 Pressure Reducing Control
3. Fixed Orifice
- FC – Flo-Clean Strainer

UL Listed - 3", 4", 6", 8" Globe and Angle in 125#  
UL Listed - 3", 4", 6" Globe and Angle in 300#

# FIRE PROTECTION VALVES

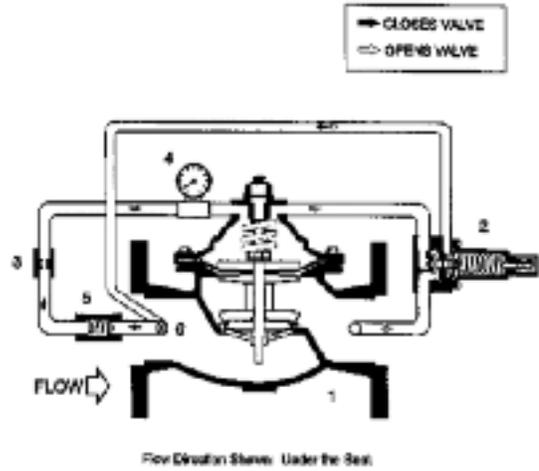
## 116FM (Globe) / 1116FM (Angle)

### FIRE PUMP RELIEF VALVE

The Watts ACV 116FM (globe) and 1116FM (angle) relief valve meets all the requirements for UL Listed, FM approved fire protection service. The design and features incorporated into the Watts ACV valve assure accurate control, dependable performance and long life.



**FM Approved - 4", 6", 8", Globe and Angle**  
**UL Listed - 3", 4", 6", 8" Globe and Angle in 125#**  
**UL Listed - 3", 4", 6" Globe and Angle in 300#**



#### VALVE FUNCTION

– Maintains constant inlet/upstream pressure by relieving excess pressure (adjustable)

#### COMPONENTS

1. Main Valve
2. PV20C Relief Control
3. Fixed Orifice
4. Pressure Gauge
5. Check Valve
6. Flow Clean Strainer

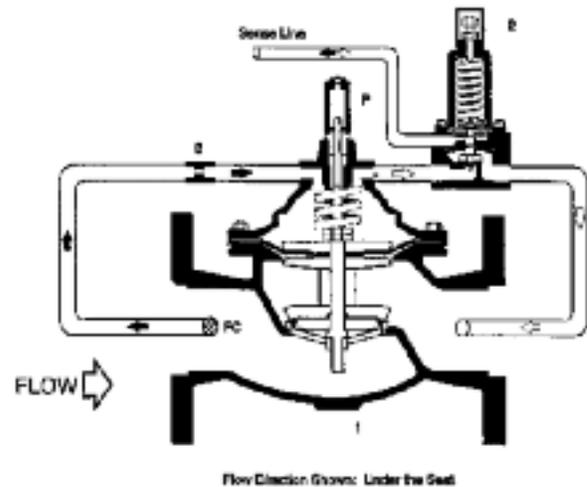
## 116-1FM (Globe) / 1116-1FM (Angle)

### FIRE PUMP SUCTION CONTROL

The Watts ACV 116-1FM Pump Suction Control Valve is designed for Fire Pump Control Service. The 116-1FM assures that the suction head pressure does not fall below the pre-set minimum, the valve modulates to keep the pump discharge in relation to the available suction head.



**FM Approved - 4", 6", 8", Globe and Angle**



#### VALVE FUNCTION

– Maintains constant upstream pressure (inlet to valve) by relieving excess pressure based on a remote signal (adjustable)

#### COMPONENTS

1. Main Valve
2. PV20C Sustaining Control
3. Fixed Orifice – Closing Speed
4. Position Indicator
- FC – Flow Clean Strainer

# FIRE PROTECTION VALVES

## 100D-A Globe

### DELUGE VALVE/PNEUMATIC - HYDRAULIC - UL LISTED

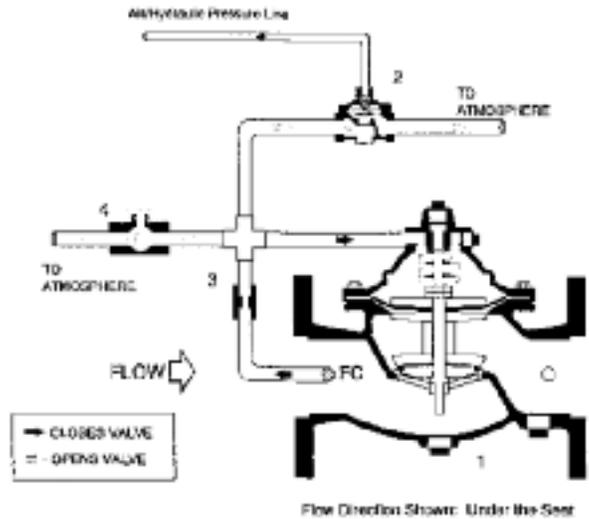
The Watts ACV 100D-A deluge valve meets all requirements for UL Listed, fire protection service. Valve opens on demand to provide water flow to the fire protection sprinkler system. Pilot system can be hydraulically, pneumatically or manually operated. Opening of valve is by loss of control pressure or by manual opening.



UL LISTED  
6M88

#### Valve sizes approved by UNDERWRITER'S LABORATORIES: 4", 6", 8", 10"

Available in Cast Iron 125# and Cast Steel 150#, with either Copper tubing and Brass fittings, or Stainless Steel tubing and fittings.



#### VALVE FUNCTION

- Valve closes when air / hydraulic pressure is applied to the cover of control 2
- Valve opens when air / hydraulic pressure is relieved from the cover of control 2
- Manual by-pass allows manual opening of the valve

#### COMPONENTS

- |                                       |                         |
|---------------------------------------|-------------------------|
| 1. Main Valve – Deluge                | 4. Ball Valve           |
| 2. 100M (Pneumatic/Hydraulic Control) | FC – Flo-Clean Strainer |
| 3. Fixed Orifice Restriction          |                         |

## 100D-B Globe

### DELUGE VALVE/ELECTRONICALLY ACTUATED (SOLENOID) - UL LISTED

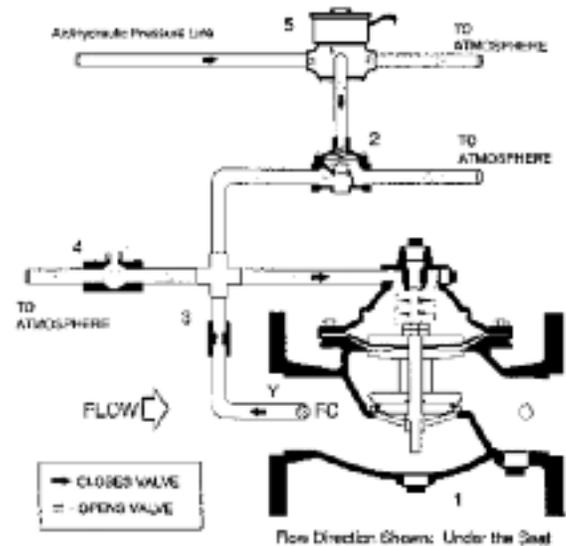
The Watts ACV 100D-B deluge valve meets all requirements for UL Listed, fire protection service. Valve opens on demand to provide water flow to the fire protection sprinkler system. Pilot system can be hydraulically, pneumatically or manually operated. Opening of valve is by electrical signal or by manual opening.



UL LISTED  
6M88

#### Valve sizes approved by UNDERWRITER'S LABORATORIES: 4", 6", 8", 10"

Available in Cast Iron 125# and Cast Steel 150#, with either Copper tubing and Brass fittings, or Stainless Steel tubing and fittings.



#### VALVE FUNCTION

- Valve opens when solenoid is energized
- Valve closes when solenoid is de-energized
- Manual by-pass provides manual override of controls

#### COMPONENTS

- |                                       |                            |
|---------------------------------------|----------------------------|
| 1. Main Valve – Deluge                | 4. Ball Valve              |
| 2. 100M (Pneumatic/Hydraulic Control) | 5. 3-Way Solenoid          |
| 3. Fixed Orifice Restriction          | 6. FC – Flo-Clean Strainer |

# FIRE HYDRANT RELIEF VALVE

## 1116FH

### FIRE HYDRANT RELIEF VALVE

#### VALVE DESCRIPTION

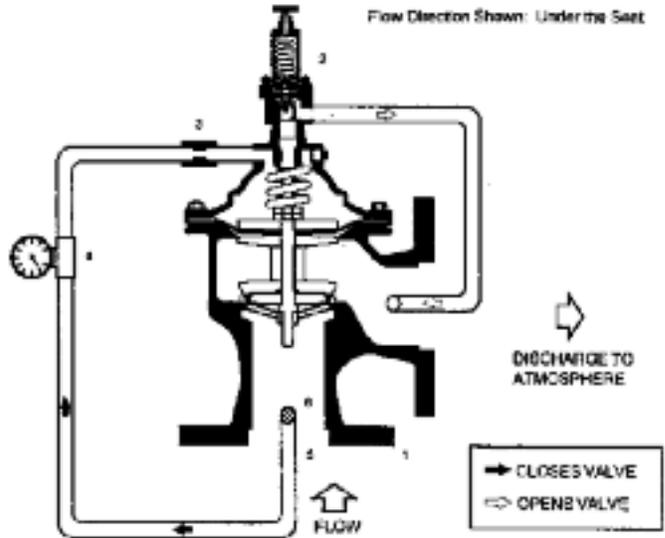
Provides temporary relief protection to a water system by attaching directly to a fire hydrant via 2-1/2" FNST swivel on the inlet of the Watts 1116FH Relief Valve.

#### VALVE APPLICATION

In municipal & rural water systems, elevated storage tanks provide outlets for system pressure surges. When these elevated tanks are out of service for inspection / repairs an overpressurization of the water transmission lines could occur. One or more 1116FH relief valves can easily be installed on fire hydrants through out the system for surge protection.

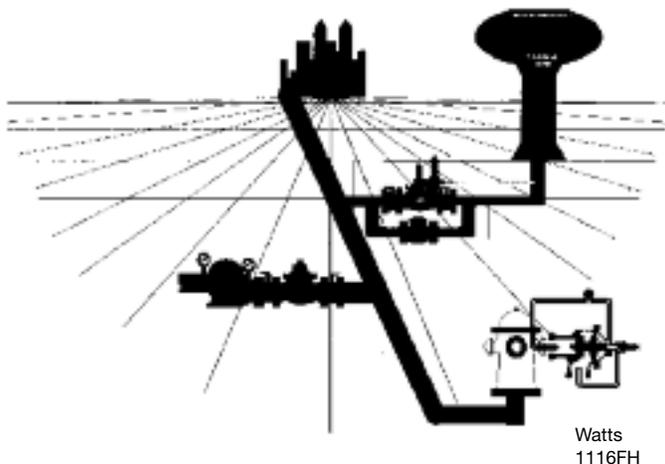
#### VALVE FEATURES

The 1116FH Relief Valve is light-weight, compact with high capacity. Utilizing the FNST Swivel on the valve inlet the 1116FH can be rotated 360 degrees and locked in any position. This allows surges to discharge safely to an area for watering or storm drain runoff.



#### COMPONENTS

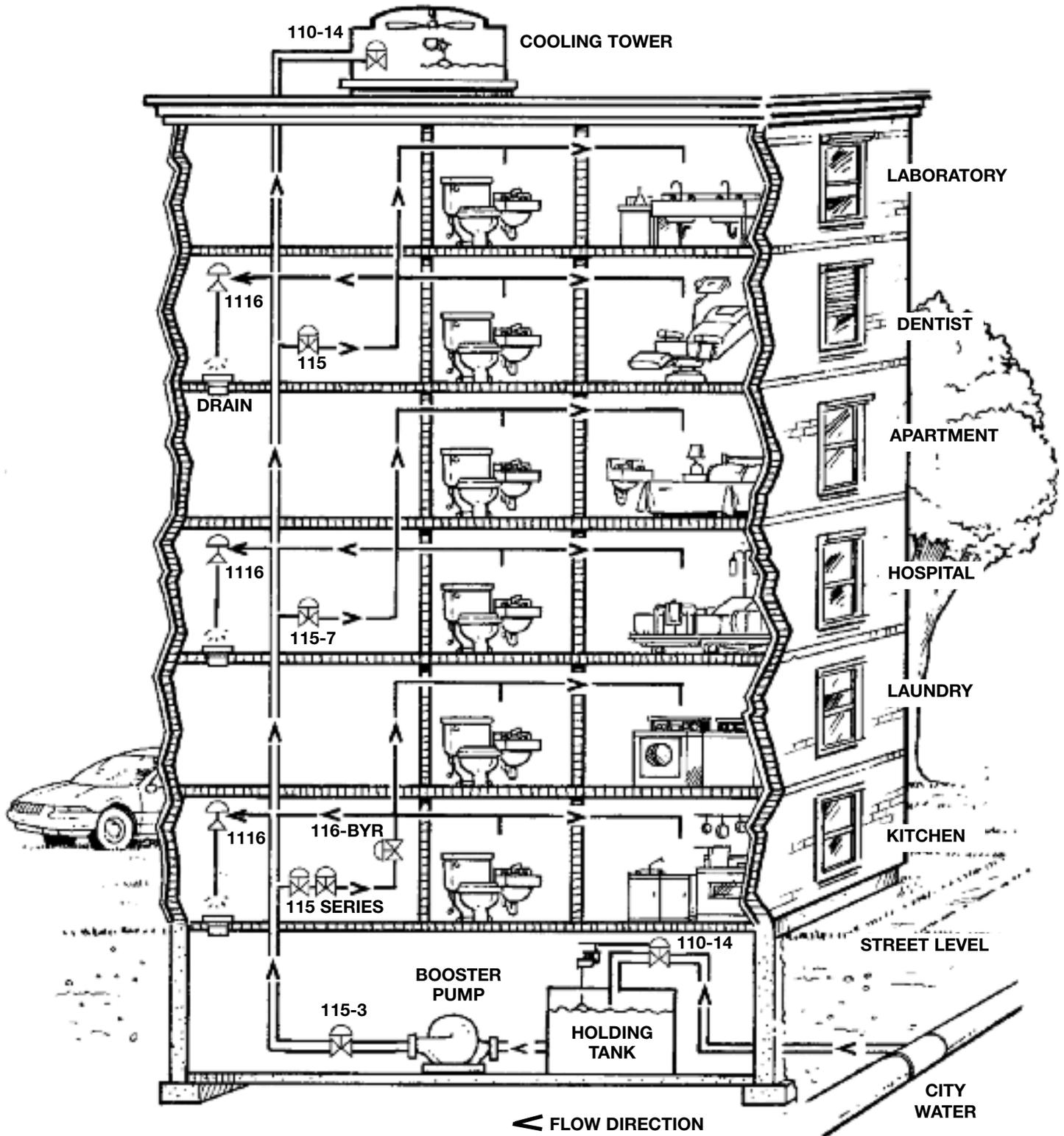
- 1 - Main Valve (Angle Pattern - 2" Threaded Ends Only)
- 2 - BP30 Relief Control - 20-175 PSI Range
- 3 - Fixed Orifice
- 4 - Pressure Gauge
- 5 - 2-1/2" FNST Swivel
- 6 - Flow Clean Strainer



#### Technical Data

- \* Body/Cover - Cast/Ductile Iron : ASTM A126 Class B
- \* Seat - Brass : ASTM B584, Alloy C84400
- \* Stem - Stainless Steel : AISI 303
- \* Diaphragm - Nylon reinforced Buna-N
- \* Seat Seal - Buna-N "Quad Seal"
- \* Pilot - Brass : ASTM B584, Alloy C84400
- \* Copper tubing & brass fittings
- \* Inlet connection - 2-1/2" FNST Swivel
- \* Pilot adjustment range - 20-175 psi
- \* Inlet pressure gauge - 0-300 psi
- \* Capacity - 500 gpm at 45 fps
- \* Weight - 35 lbs

# APPLICATIONS IN COMMERCIAL HIGH RISE - BUILDING



# HIGH PRESSURE SAFETY SHUT-OFF/ DOWNSTREAM EXPANSION RELIEF VALVE

## 116-BYR / 6116-BYR

### VALVE FUNCTION

- Valve is fully open when inlet pressure is below shut-off control set point
- Valve fully closes if inlet pressure exceeds shut-off control set point
- Can be equipped with a limit switch for signalling an alarm

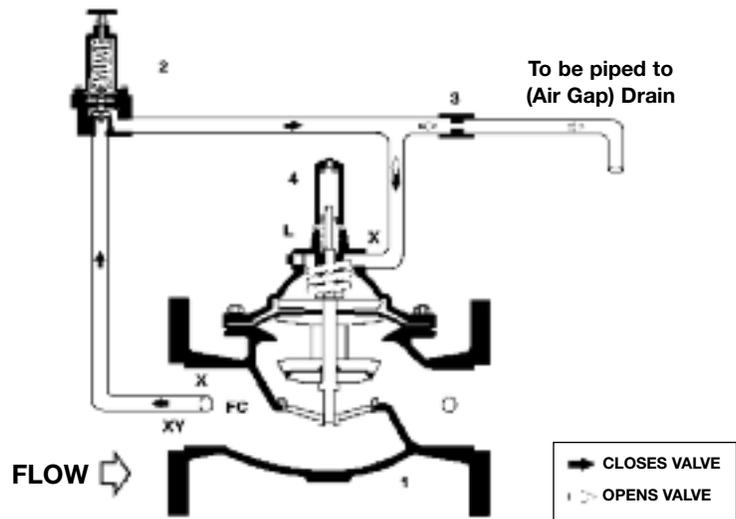
### COMPONENTS

1. Main Valve
2. BP30 Relief Control
3. Fixed Orifice
4. Position Indicator

### ACCESSORIES

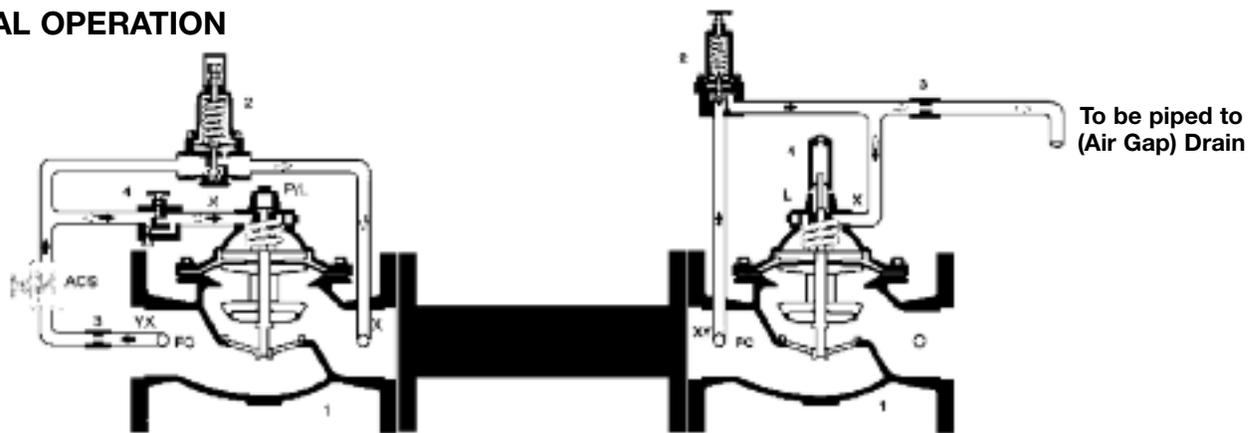
Located as indicated  
Included as marked

- X - Isolation Cocks
- Y - Y-Strainer
- FC-Flow Clean Strainer
- L - Limit Switch



Flow Direction Shown: "R" Flow Over the Seat  
Optional Flow Under the Seat: 116-BY/6116-BY

### NORMAL OPERATION

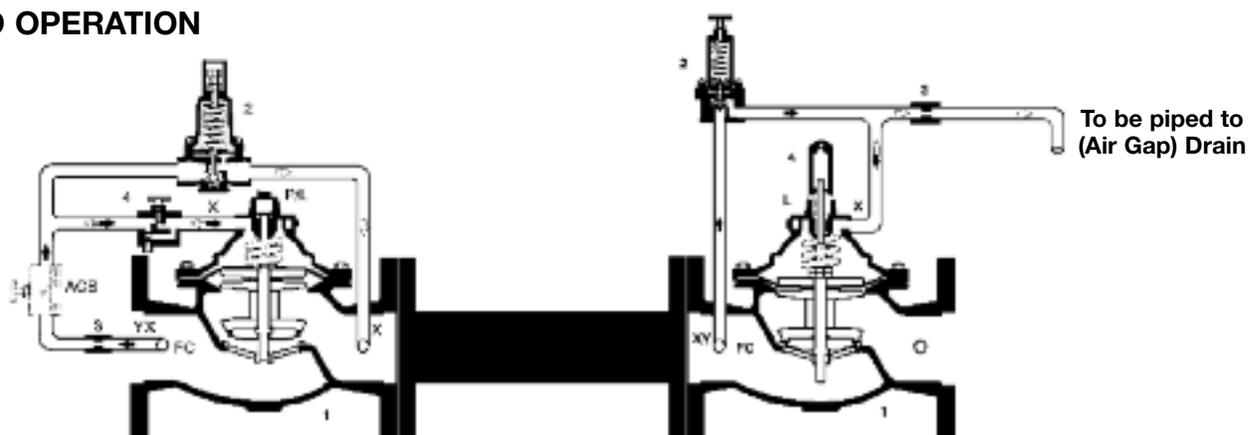


F115-PRV

FLOW →

F116-PRV-BYR - SAFETY SHUTDOWN

### FAILED OPERATION

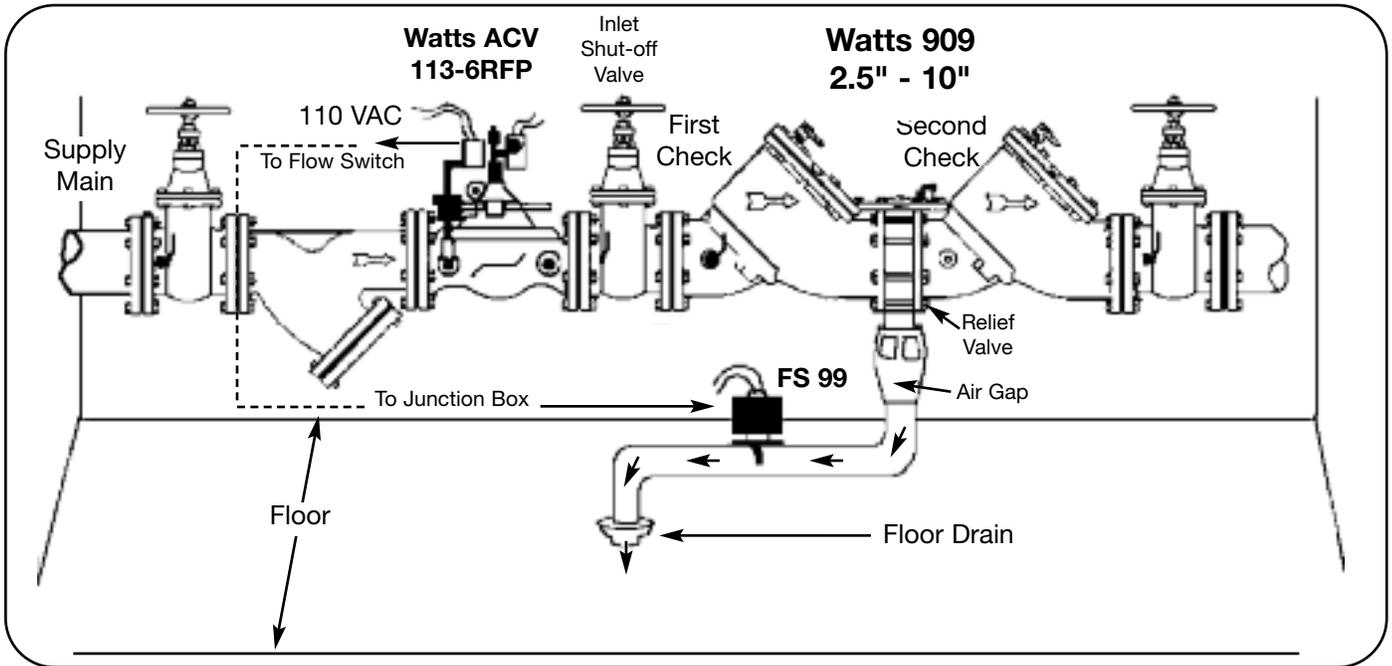


F115-PRV

FLOW →

F116-PRV-BYR - SAFETY SHUTDOWN

# WATTS ACV 113-6RFP FLOOD PROTECTION SHUTDOWN VALVE



## PROBLEM

Property damage due to relief valve discharge that can occur due to dirt and debris within the valve or a mechanical failure within the backflow prevention assembly. Typical conditions which can cause continuous relief valve discharge are: dirt/debris on first check seat of the reduced pressure backflow preventer, clogged relief valve sensing line, relief valve diaphragm failure, broken first check valve spring, and improper RPZ startup procedures.

## SOLUTION

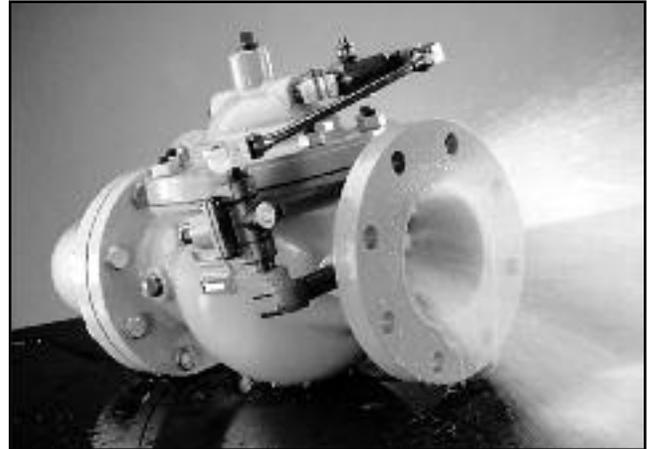
Watts has developed the 113-6RFP Flood Protection - Shutdown Valve. The 113-6RFP remains fully open under normal conditions. If the RPZ relief valve should open, excess flow through the drain pipe trips the flow sensor which energizes the solenoid on the 113-6RFP valve and it goes closed. Unlike a normal solenoid valve, the 113-6RFP cannot re-open if flow stops and / or the solenoid is de-energized. The Watts ACV solution to intermittent dumping is a time delay located in the JB113 Junction Box between the flow sensor and the 113-6RFP to keep the control valve solenoid from energizing until required. A valve mounted Fig. 51 Limit Switch is supplied which sends out a remote signal to sound an alarm, indicating that the valve is closed. The 113-6RFP is equipped with manual reset to restore flow after the RPZ is repaired by the building maintenance engineer or backflow technician.

# Watts ACV Industrial Control Valves

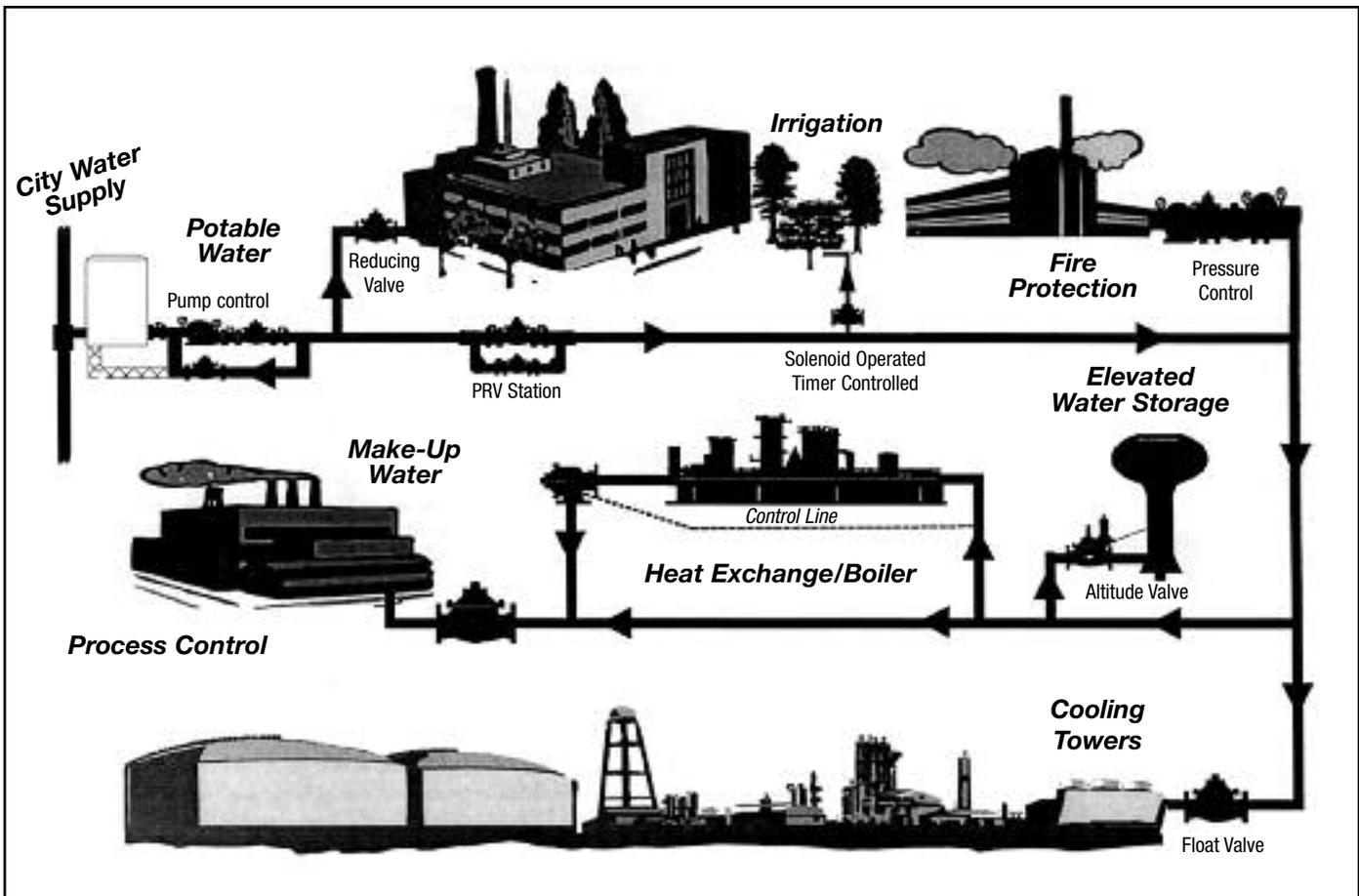
## WATTS ACV FEATURES

### Standard Production Valves:

- | Wide range of sizes 1-1/4" - 24"
- | Fused epoxy coating 100% inside and out. (FDA approved and meets NSF-61)
- | Exclusive "QUAD SEAL":
  - retained on 3 1/2 + sides
  - positive drip-tight closure
  - longer life span (non-edged seat)
- | Diaphragm actuated (one moving part)
- | FDA approved diaphragm materials
- | Hydraulically operated (frictionless)
- | Top and bottom guided stem
- | Packless construction (less maintenance)



## Applications for Industrial ACVs



# Watts Series 813

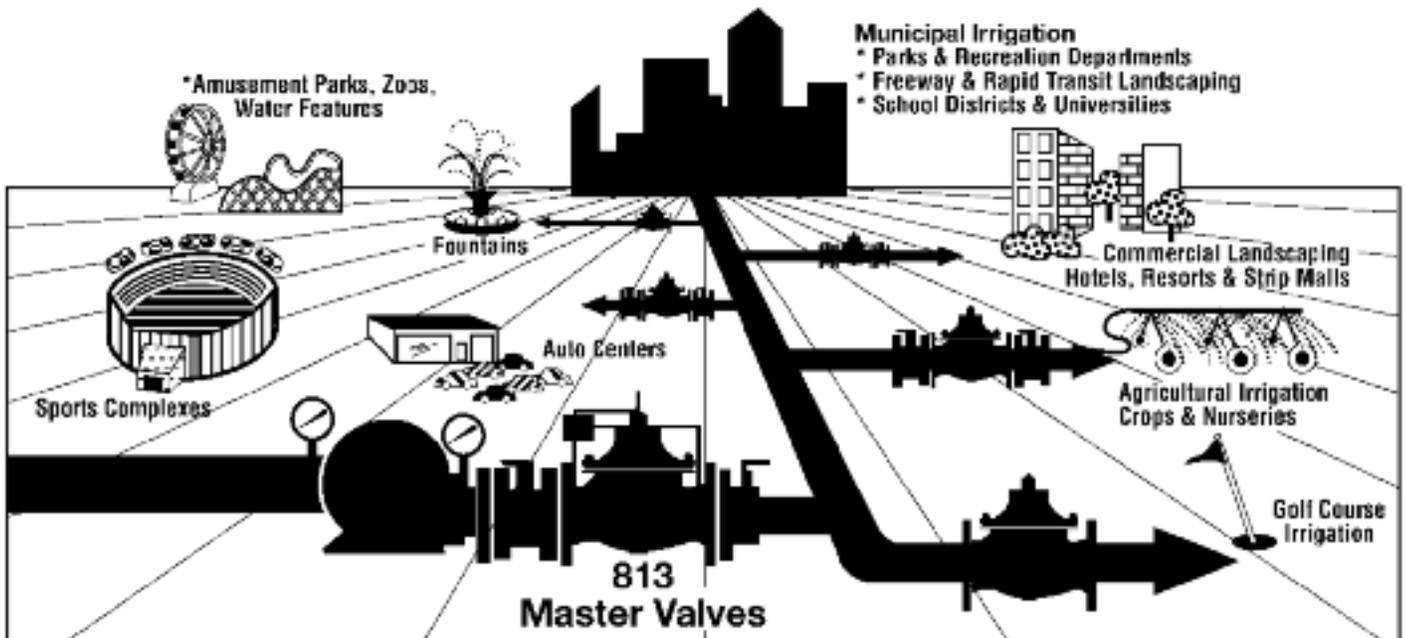
## Irrigation ACV Valves



### Features:

- ★ Competitively priced
- ★ Sizes 1¼" through 6"
- ★ Line Serviceable
- ★ Compact assembly
- ★ Full range of options
- ★ Anticorrosive pilot systems
- ★ Proven pilots, functions & design
- ★ Top & bottom guided stem for better control
- ★ Stainless steel braided flexible tubing is available
- ★ Non edge seat design eliminates wire drawn on low flows
- ★ Quick delivery through your local Watts distribution network
- ★ Worldwide service from the largest valve manufacturer - WATTS

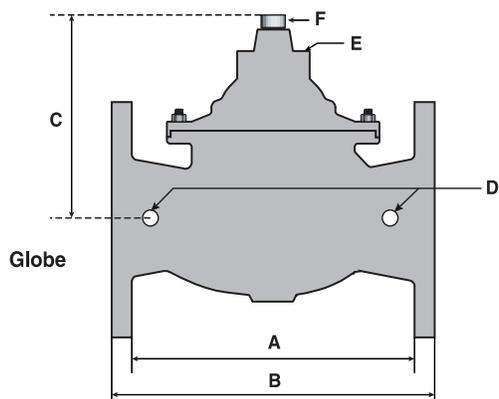
### Applications for Series 813



# IRRIGATION CONTROL VALVES

STANDARD MATERIALS	EPOXY COATED (EC) SERIES	BLACK GUARD (BG) SERIES
BODY AND COVER	DUCTILE IRON	DUCTILE IRON
COATINGS	BLUE NSF APPROVED EPOXY COATED 100% INSIDE & OUTSIDE	BLACK URETHANE EPOXY COATED 100% INSIDE & OUTSIDE
TRIM (SEAT & DISC GUIDE)	STAINLESS STEEL	STAINLESS STEEL (XYLAN COATED SEAT)
ELASTOMERS	BUNA-N	BUNA-N
STEM	STAINLESS STEEL	XYLAN COATED STAINLESS STEEL (SCALE RESISTANT)
COVER STUDS & NUTS	CADMIUM PLATED STEEL	STAINLESS STEEL

## Dimensions



	A	B	C	D	E	F	SHIPPING WEIGHTS*
VALVE SIZE	GLOBE THRD.	GLOBE 150#	COVER TO CENTER	PORT SIZE	PORT SIZE	PORT SIZE	
1-1/4	7-1/4		3-1/2	1/4	1/8	1/2	20
1-1/2	7-1/4	8-1/2	3-1/2	1/4	1/8	1/2	20
2	9-3/8	9-3/8	4-15/16	1/2	1/4	1/2	30
2-1/2	11	11	7	1/2	3/8	1/2	60
3	10-1/2	12	7	1/2	3/8	1/2	70
4		15	8-5/8	1/2	3/8	1/2	125
6		20	11-3/4	1/2	1/2	1	240

\* Estimated in lbs.

## Description:

Watts ACV 813 Series Irrigation Control Valves are specially designed for use in commercial irrigation systems. The EC Series utilizes standard components. BG Series valves offer upgraded materials and protective coatings for extended service. The materials chart above references the standards for each series.

**Operating Pressure:** Threaded = 400 psi / 150 Flanged = 250 psi

**Operating Temperature:** Buna-N: 160° Maximum

## Models:

813	Solenoid (On/Off) Control Valve
815	Pressure Reducing Control Valve
815SA	Pressure Reducing Control Valve with Surge Anticipation Relief Feature
815-4	Pressure Reducing Control Valve with Solenoid (On/Off) Feature
815-4SA	Pressure Reducing Control Valve with Solenoid (On/Off) and Surge Anticipation Relief Features
816	Pressure Relief or Sustaining Control Valve.
818	Hydraulic Check Valve

## Suffix Options:

EC	Blue NSF Approved Fusion Bonded Epoxy Coating 100% Inside and Outside
BG	Black Fusion Bonded Urethane Epoxy Coating 100% Inside and Outside
NC	Normally Closed: Power to Solenoid - Valve Opens
NO	Normally Open: Power to Solenoid - Valve Closes
T	Threaded (NPT) 1-1/4" thru 3"
F	ANSI 150 Flanged 1-1/2" thru 6"

**Note: MUST specify NO or NC, EC or BG prior to order**

# IRRIGATION CONTROL VALVES

## Flow Data - 813 Series Irrigation Control Valves

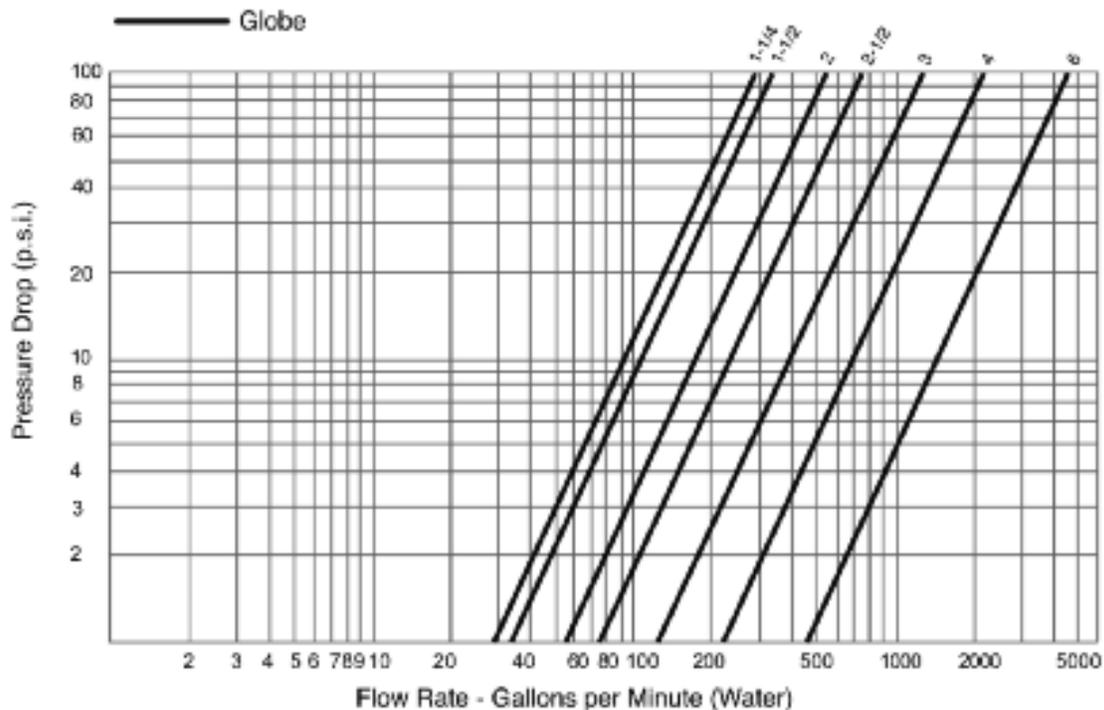
Valve Size - Inches	1-1/4	1-1/2	2	2-1/2	3	4	6
Maximum Continuous Flow Rate Gpm (Water)	93	125	208	300	460	800	1800
Maximum Intermittent Flow Rate Gpm (Water)	115	158	260	370	570	1000	2300
Cv Factor GPM (Globe)	29	34	55	75	125	220	460

Maximum continuous flow based on pipeline velocity of 20 ft. per second.  
 Maximum intermittent flow based on pipeline velocity of 25 ft. per second.  
 The  $C_v$  factor of a valve is the flow rate in US GPM at 60° F that will cause a 1 psi drop in pressure.  
 The factors stated are based upon a fully open valve.  
 $C_v$  factor can be used in the following equations to determine Flow (Q) and Pressure Drop ( $\Delta P$ ):

$$Q (\text{Flow}) = C_v \sqrt{\Delta P}$$

$$\Delta P (\text{Pressure Drop}) = (Q/C_v)^2$$

## Headloss



## Valve Cover Chamber Capacity

Valve Size (in)	1-1/4	1-1/2	2	2-1/2	3	4	6
fl. oz.	2.5	2.5	4	5	10	22	70

## Valve Travel

Valve Size (in)	1-1/4	1-1/2	2	2-1/2	3	4	6
Travel Length (in)	3/8	3/8	1/2	5/8	3/4	1	1-1/2

# ENGINEERING DATA / SIZING

## INSTALLATION RECOMMENDATIONS AND REQUIREMENTS

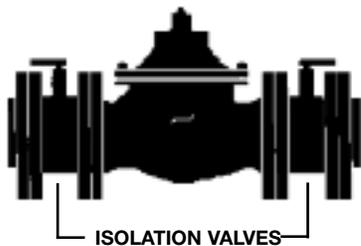
### VERTICAL INSTALLATIONS

Avoid mounting valves 6" and larger in a vertical discharge position (valve stem horizontal or cover pointed sideways). If your installation requires this mounting position consult the factory or specify at time of order.



### ISOLATION SHUT-OFF VALVES

Butterfly or similar type valves should be installed in the line upstream and downstream of the automatic control valve to allow for maintenance service. Installing isolation valves will allow you to perform maintenance service without draining the system or exposing service personnel to line pressures.



## SPECIAL CONSIDERATIONS

### FLOAT VALVES

- Installing valves over open tanks should be avoided due to possible servicing problems.
- Install stilling wells around floats to protect them from turbulence.
- Remote mounted float controls should be connected to the main valve with 3/8" size tubing.

### SOLENOID VALVES

- Electrical wiring should conform to NEMA codes to assure proper valve operation and longevity.

### RATE OF FLOW VALVES

- A butterfly isolation valve cannot be installed directly to the valve inlet flange, as the disc will contact the orifice plate. A gate or ball type valve can be used or the isolation valve can be installed further upstream.

### ALTITUDE VALVES

- Install the valve as close to the tank as possible, a maximum of 40 pipe diameters to assure accurate control.
- A sense line is required to connect the altitude control to the tank. To provide accurate reading of head pressure, the line should connect at the base of the water column. Minimum sense line size is 1/2". A shut-off valve should be installed in this line for service and start-up.

## VALVE SIZING — PRESSURE REDUCING

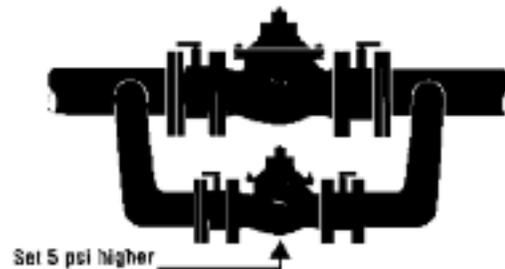
Selection of the correct size pressure reducing valve is a relatively simple process. Criteria for selection is minimum flow, normal flow, maximum flow and pressure drop across the valve. Following are explanations of the three types of PRV installations. These also apply to any functions combined with the reducing function, such as reducing/check and reducing/solenoid valves.



### SINGLE VALVE INSTALLATION

A single reducing valve can be applied if operating flow requirements are within the capacity of one size valve, and pressure drop is outside the Cavitation Zone.

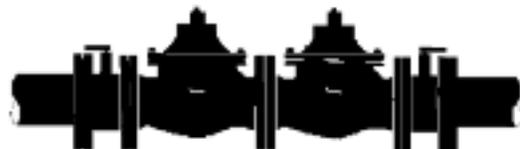
1. Select the valve size from SIZING CHART that is within the range of low to high flow. (Consider requirements of lowest demand equipment.)
2. Check Pressure Drop (inlet-outlet) to insure that desired outlet pressure is above the recommended lowest outlet setting to avoid cavitation conditions. (Check Cavitation Chart page 21.)



### PARALLEL INSTALLATION

If flow requirements fall outside the capacity of a single valve, an additional smaller valve installed in parallel may be required. In parallel installations, the larger valve handles the requirements for maximum flow down to its low flow capacity. The small valve extends to the sum of the maximum flow of both valves.

1. Select the valve size combinations from SIZING CHART that is within low to high flow system range.
2. Check Pressure Drop (inlet-outlet) to confirm desired outlet pressure is above index psig., or check Cavitation Chart.



### SERIES INSTALLATION

If pressure drop requirements cause the outlet pressure to be below the index psig., or fall in the Cavitation Zone, then two valves in series may be required. Each valve will function outside the cavitation zone to safely drop the high inlet pressure, in two steps, to the desired outlet pressure. Valve size is based upon the Minimum - Maximum flow ranges previously explained.

# VALVE SIZING

To properly size an automatic control valve you need to know the following:

- Highest and Lowest inlet pressures
- Outlet pressure
- Maximum flow requirements
- Minimum flow requirements

**Step 1:** Utilize the high flow chart and select the flow as found on the horizontal axis which corresponds with your **maximum flow requirements**.

**Step 2:** From this point draw a vertical line until you intersect with the horizontal line corresponding with the **minimum differential pressure**. (Your minimum differential pressure will be the **lowest inlet pressure** minus the **desired outlet pressure**, this is also known as the delta P.)

**Step 3:** From this point move right to the first valve size line. This will be the minimum valve size which should be used on **intermittent flow** of 25 ft./sec. If maximum flow is continuous, then do not exceed the GPM (20 FT./sec.) listed on the maximum continuous flow table.

**Step 4:** Utilize the flow chart and select the maximum differential pressure as

found on the vertical axis. (Your maximum differential pressure will be the **highest inlet pressure** minus the **desired outlet pressure**, this is also known as the delta P.)

**Step 5:** From this point draw a horizontal line until you intersect with the line corresponding to the valve size as selected in step 3.

**Step 6:** From this point draw a vertical line down to the horizontal axis. This will be the **minimum flow capabilities** of the valve based on these variables.

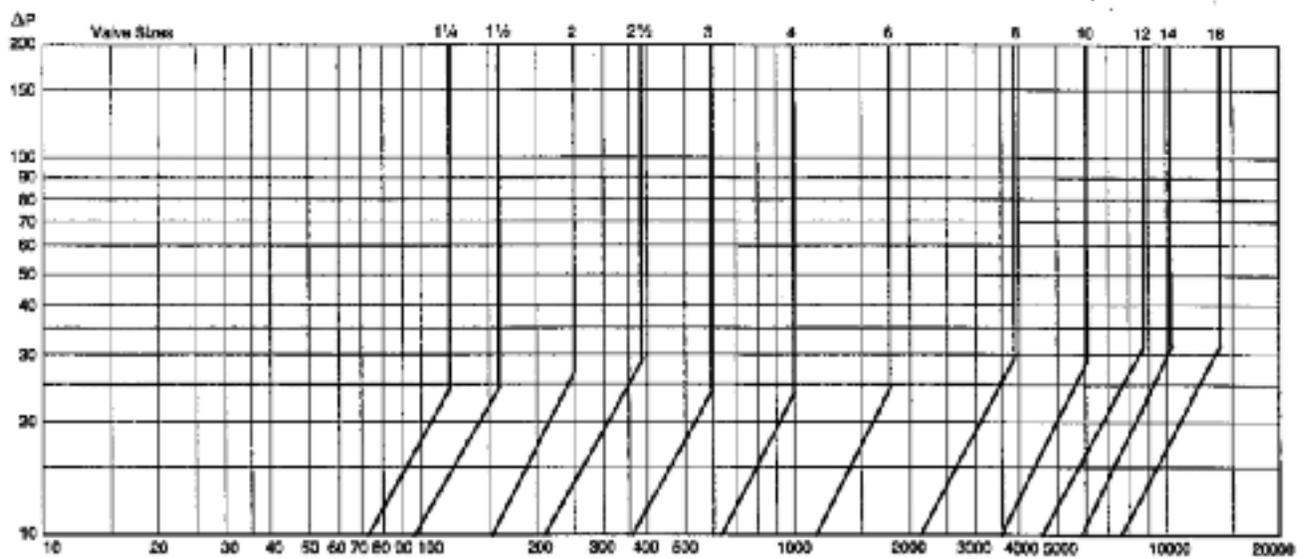
**Notes:** 1) If the **minimum flow capability** obtained from step 6 is above your actual **minimum flow requirements**, you should consider a **parallel installation**. Using the minimum flow capability, begin at step 1 to select the size you will need for this low-flow by-pass.

2) Use the **cavitation chart** and determine if the intersection of the inlet and outlet pressures falls in the shaded area. If so, you should consider a **series installation**. Both valves should be sized in accordance with the above steps.

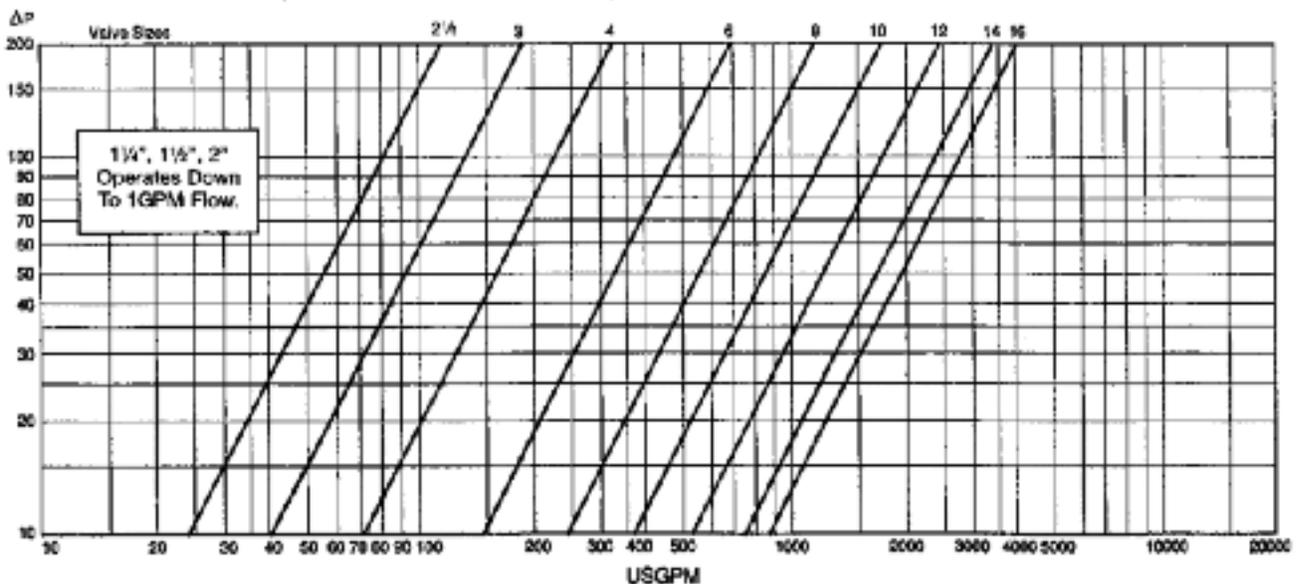
## MAXIMUM CONTINUOUS FLOW CHART

SIZE	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	6"	8"	10"	12"	14"	16"
FLOW (GPM)	93	93	210	300	460	800	1800	3100	4900	7000	8500	11000

## HIGH FLOW CHART (MAXIMUM INTERMITTENT FLOW)



## LOW FLOW CHART (MINIMUM INTERMITTENT FLOW)



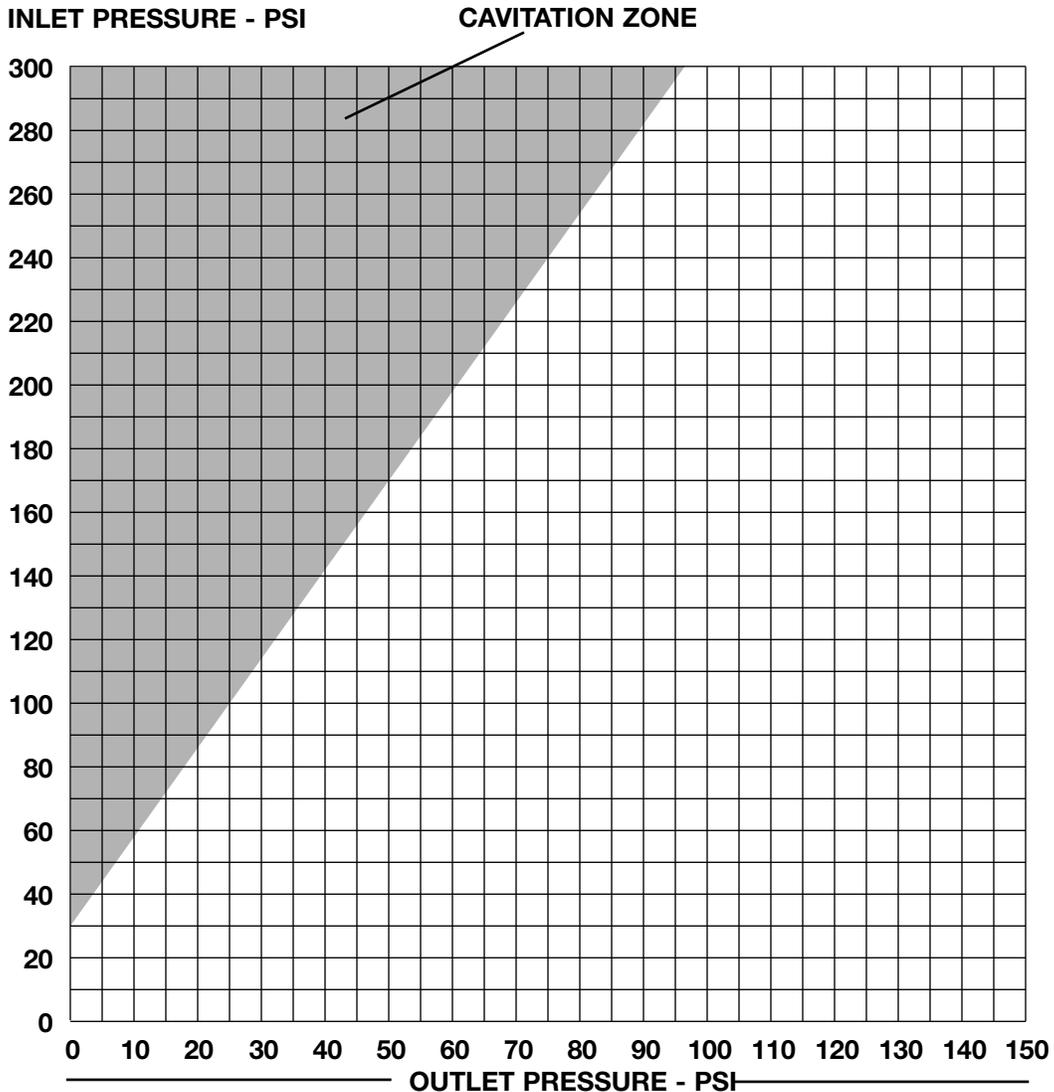
**PRESSURE DROP INDEX - PRESSURE REDUCING VALVES**

Calculate the pressure difference by subtracting the desired outlet pressure from the maximum inlet pressure. Find the number on the pressure difference line and note the outlet pressure index number. This is the lowest outlet pressure setting allowed without failing into the cavitation zone. Design of the WATTS Automatic Control Valve minimizes potential valve damage that can be caused by cavitation. Avoid continued operation within the cavitation zone.

PRESSURE DIFFERENCE (PSIG)													
10	20	30	40	50	60	70	80	90	100	125	150	200	
OUTLET PRESSURE INDEX (Lowest Outlet Setting, PSIG)													
0	0	0	3	8	14	20	25	31	37	51	65	79	93

**CAVITATION CHART**

After selecting valve size, locate inlet and outlet pressures on this chart. If the intersection point falls in the shaded area, cavitation can occur. Operation of valves continually in the cavitation zone should be avoided. Consult Watts ACV for alternatives.



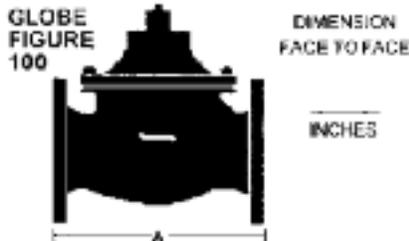
**AUTOMATIC CONTROL VALVE**

**SUBMITTAL / SPECIFICATION**

8550 HANSEN RD, HOUSTON, TEXAS 77075 / PH 713-943-0688, FAX 713-944-9445

DATE	WATTS ACV REFERENCE #	FIGURE #	ASSEMBLY #	SIZE	QUANTITY
PROJECT IDENTIFICATION		DESCRIPTION			
		TECHNICAL			

COMPONENT	SPECIFICATION
<b>MAIN VALVE</b>	
BODY / COVER	<input type="checkbox"/> DUCTILE IRON - ASTM A536 65-45-12
BODY PATTERN	<input type="checkbox"/> GLOBE <input type="checkbox"/> ANGLE
END CONNECTION	<input type="checkbox"/> 150# FLANGED ANSI B16.1 (Max. W.P. 250psi) <input type="checkbox"/> THREADED ANSI B 16.4 (Max. W.P. 400 psig) <input type="checkbox"/> 300# FLANGED ANSI B16.1 (Max. W.P. 400psi)
SEAT & STEM	<input type="checkbox"/> BRASS SEAT - ASTM B584, Brass Alloy C84400 / STAINLESS STEEL STEM - AISI 303 (standard) <input type="checkbox"/> COATED BRASS SEAT - ASTM B584, Brass Alloy C84400 / COATED STAINLESS STEEL STEM - AISI 303 *Anti-scale trim Xylan (TEFLON) coated seat and KOLENE coated stem <input type="checkbox"/> STAINLESS STEEL SEAT - AISI 303 / STAINLESS STEEL STEM - AISI 303 <input type="checkbox"/> COATED STAINLESS STEEL SEAT - AISI 303 / COATED STAINLESS STEEL STEM - AISI 303 *Anti-scale trim Xylan (TEFLON) coated seat and KOLENE coated stem
ELASTOMERS *	<input type="checkbox"/> BUNA-N (standard) <input type="checkbox"/> BUNA-N VULCANIZED (optional) <input type="checkbox"/> VITON VULCANIZED (optional) (2 1/2" 1-PLY, 3" & LARGER 2-PLY ASTM D 2000)
<b>COATINGS</b>	
MAIN VALVE	<input type="checkbox"/> FUSED EPOXY COATING - FDA Approved Regulation 21CFR 175.300, ASTM D3451-76 (Coated 100%), NSF Approved <input type="checkbox"/> MARINE EPOXY COATING - Flexcote Abranon Coated 100%
<b>FLOW DIRECTION</b>	<input type="checkbox"/> OVER THE SEAT ("R" Flow) <input type="checkbox"/> UNDER THE SEAT
<b>CONTROL PILOTS</b>	
BODY/HOUSING	<input type="checkbox"/> STAINLESS STEEL - ASTM A743/AISI 303 <input type="checkbox"/> BRASS - ASTM B584
TRIM	<input type="checkbox"/> STAINLESS STEEL - AISI 303
ELASTOMERS (diaphragm / seat / o-rings)	<input type="checkbox"/> BUNA-N (standard) ASTM D 2000 <input type="checkbox"/> VITON (incl. when main valve elastomer is VITON)
SPRING RANGE *	<input type="checkbox"/> 20-175 PSI (standard) <input type="checkbox"/> 0-30 PSI <input type="checkbox"/> 100-300 PSI <input type="checkbox"/> SELECT TANK HEIGHT
<b>TUBING AND FITTINGS</b>	<input type="checkbox"/> TUBING: STAINLESS STEEL AISI TYPE 316 ASTM A 312 <input type="checkbox"/> COPPER / BRASS (standard) <input type="checkbox"/> FITTINGS: STAINLESS STEEL AISI TYPE 316
<b>ACCESSORIES</b>	
STRAINER	<input type="checkbox"/> FLO-CLEAN-STAINLESS STL. Housing AISI 303 Screen Type 316 <input type="checkbox"/> Y-STRAINER - STAINLESS STEEL <input type="checkbox"/> FLO-CLEAN - BRASS <input type="checkbox"/> Y-STRAINER - BRASS
POSITION INDICATOR	<input type="checkbox"/> POSITION INDICATOR - STAINLESS STEEL <input type="checkbox"/> POSITION INDICATOR - BRASS
SPEED CONTROLS	<input type="checkbox"/> ADJUSTABLE OPENING SPEED (consult schematic) <input type="checkbox"/> ADJUSTABLE CLOSING SPEED (consult schematic) <input type="checkbox"/> FIXED RESTRICTION
OTHER	<input type="checkbox"/> ISOLATION COCKS
LIMIT SWITCH	<input type="checkbox"/> SINGLE SWITCH - Single Pole Double Throw <input type="checkbox"/> GENERAL / WEATHERPROOF NEMA Type 1, 2, 3, 3R/S, 4, 12 <input type="checkbox"/> DUAL SWITCH - Single Pole Double Throw <input type="checkbox"/> EXPLOSION PROOF NEMA Type 1, 7, 9
<b>SOLENOID</b>	
VOLTAGE	<input type="checkbox"/> STANDARD 110-120 VAC 50/60 Hz <input type="checkbox"/> OPTIONAL: <input type="checkbox"/> 24 VAC <input type="checkbox"/> 240 VAC <input type="checkbox"/> 480 VAC <input type="checkbox"/> SPECIAL: <input type="checkbox"/> 6 VDC <input type="checkbox"/> 12 VDC <input type="checkbox"/> 24 VDC <input type="checkbox"/> 120 VDC <input type="checkbox"/> 240 VDC
ENCLOSURE	<input type="checkbox"/> BRASS - NEMA TYPE 1, 2, 3, 3S, 4, 4X APPLIC. (incl. gen. purpose, weatherproof & watertight enclosure) <input type="checkbox"/> MANUAL OPERATOR (STD on 3-Way & 4-Way, OPTIONAL on 2-Way) <input type="checkbox"/> BRASS - NEMA TYPE 3, 3S, 4, 4X, 6, 6P, 7, 9 APPL. (incl. weatherproof, watertight, expl. proof & ignition proof enclosure) <input type="checkbox"/> STAINLESS STL. - NEMA TYPE 3, 3S, 4, 4X, 6, 6P, 7, 9 APPLIC. MAX TEMP T2D 419°F - MANUAL OPERATOR (STD)
ACTUATION	<input type="checkbox"/> POWER TO SOLENOID OPENS VALVE <input type="checkbox"/> POWER TO SOLENOID CLOSES VALVE



ENGINEERING APPROVAL SIGNATURE

DATE

**RECOMMENDED SPARE PARTS LIST FOR MAIN VALVE & PILOT CONTROL SYSTEMS**

DATE  FIGURE #  VALVE SIZE  PART #

The following indicated components are used on the WATTS ACV assembly listed above. Normal servicing can be accomplished by installation of elastomer repair kits. Controls may be replaced or overhaul kits installed as operating conditions require.

**Main Valve Kits:**

All rubber components (diaphragm, seat seal, stem O-rings (6" and larger valves), Buna-N material).

**Controls:**

Complete units are brass or stainless steel body, stainless steel trim components, Buna-N elastomers.

Controls spring ranges are noted.

Elastomer kits contain all rubber components (diaphragm, O-rings), Buna-N material.

Overhaul kits contain major replacement parts and also includes the elastomer kit.

MAIN VALVE KITS												
ELASTOMER KITS (Buna-N - all rubber parts) VALVE SIZE	<input type="checkbox"/>											
ORDER #	1 1/4	1 1/2	2	2 1/2	3	4	6	8	10	12	14	16
	5346-01	5346-01	5346-01	3313-01	3313-01	3302-01	3401-01	3352-01	5685-01	5686-01	5687-01	5688-01

CONTROLS - <i>Buna-N</i> (all rubber parts)	COMPLETE UNITS			ELASTOMER KITS	OVERHAUL KITS
	RANGE	BRASS	SS		
10 - ROTARY FLOAT CONTROL 1/8"		<input type="checkbox"/> 3108-02	<input type="checkbox"/> 3108-03	<input type="checkbox"/> 6391-01	N/A
14 - RATE OF FLOW CONTROL		N/A	N/A	<input type="checkbox"/> 3297-01	<input type="checkbox"/> 9686-01
16 - RELIEF/SUSTAINING CONTROL	5-20 PSI 20-250 PSI (STD) 100-500 PSI	<input type="checkbox"/> 6060-02 <input type="checkbox"/> 3031-02 <input type="checkbox"/> 6506-02	<input type="checkbox"/> 0166-02	<input type="checkbox"/> 4375-01	<input type="checkbox"/> 9687-01
27 - ALTITUDE CONTROL	5-20 FEET 10-15 FEET (STD) 50-225 FEET	<input type="checkbox"/> 8783-02 <input type="checkbox"/> 9010-02 <input type="checkbox"/> 5171-02	N/A	<input type="checkbox"/> 5610-01	<input type="checkbox"/> 9688-01
23 - PILOT ON FIG.27/17-1 3-PORT (LOWER UNIT)		<input type="checkbox"/> 5020-02	N/A	<input type="checkbox"/> 5699-01	<input type="checkbox"/> 9688-01
263 - PRESSURE REDUCING CONTROL	0-30 PSI 20-175 PSI (STD) 100-300 PSI	<input type="checkbox"/> 22940 <input type="checkbox"/> 22349 <input type="checkbox"/> 0339078	N/A	<input type="checkbox"/> 5138-05 <input type="checkbox"/> 0335110 VITON	N/A
263SS - PRESSURE REDUCING CONTROL	0-30 PSI 20-175 PSI (STD) 100-300 PSI	N/A	<input type="checkbox"/> 9831-01 <input type="checkbox"/> 9831-02 <input type="checkbox"/> 9831-03	<input type="checkbox"/> 5138-05 <input type="checkbox"/> 0335110 VITON	N/A
263RS - PRESSURE REDUCING CONTROL	0-30 PSI 20-175 PSI (STD) 100-300 PSI	N/A	<input type="checkbox"/> 9769-02 <input type="checkbox"/> 9769-01 <input type="checkbox"/> 9769-03	<input type="checkbox"/> 5138-05 <input type="checkbox"/> 0335110 VITON	N/A
75-2 CHAMBER MOUNTED FLOAT CONTROL		(ALUM/SS) <input type="checkbox"/> 8127-08	N/A	<input type="checkbox"/> 8863-01	<input type="checkbox"/> 2589-01
PV20 - PRESSURE RELIEF/SUSTAINING/SURGE	0-30 PSI 20-175 PSI (STD) 100-300 PSI	<input type="checkbox"/> 9751-18 <input type="checkbox"/> 9751-19 <input type="checkbox"/> 9751-20	<input type="checkbox"/> 2524-02 <input type="checkbox"/> 2524-01 <input type="checkbox"/> 2524-03	<input type="checkbox"/> 0864938	N/A
22 - ACCELERATOR 3-PORT W/ORIFICE SUPPLY		<input type="checkbox"/> 3202-02	<input type="checkbox"/> 7932-07	<input type="checkbox"/> 3298-01	<input type="checkbox"/> 7064-01
22-1 - ACCELERATOR 3-PORT		<input type="checkbox"/> 5353-02	<input type="checkbox"/> 5353-05	<input type="checkbox"/> 6971-01	<input type="checkbox"/> 7064-02
10-11 - MODULATING FLOAT CONTROL		<input type="checkbox"/> 780097	<input type="checkbox"/> 10204-13	N/A	N/A
17-2 EXCESS FLOW CONTROL		N/A	<input type="checkbox"/> 5918-09	<input type="checkbox"/> 7705-01	<input type="checkbox"/> 2590-01
200-1 AUXILIARY DRAIN VALVE		<input type="checkbox"/> 3117-02	(ALUM/SS) <input type="checkbox"/> 3117-17	<input type="checkbox"/> 3304-01	<input type="checkbox"/> 2593-01
65-8 FLOAT CONTROL		(ALUM/SS) <input type="checkbox"/> 7907-08	(STEEL/SS) <input type="checkbox"/> 7907-07	N/A	<input type="checkbox"/> 8272-07
201-1 AUXILIARY DRAIN VALVE		<input type="checkbox"/> 3129-02	N/A	<input type="checkbox"/> 7977-01	<input type="checkbox"/> 9689-01

## HOW TO ORDER

### To order the “right ACV” please provide the following:

Refer to valve specifications beginning on page 6 and the selected ACV # for detail list of standards/options.

#### ACV #

#### SIZE

#### Main Valve Material

- Ductile Iron / Epoxy
- Other

#### Body Type

- Globe
- Angle

#### End Connection

- Threaded
- Flanged 150#
- Flanged 300#
- Grooved

#### Trim (Seat)

- Brass (Standard)
- Stainless Steel

#### Elastomers

- Buna-N (Standard)
- Other

Options or accessories as noted.

### Additional information should be included for the following series of ACV's

#### ACV 110 Float Valves

- Pilot mounting
  - Valve mounted
    - Valve discharge vertical
    - Valve discharge horizontal
  - Remote mounted

#### ACV 113 Solenoid Valves and Solenoid Override on any ACV

- Voltage
- Actuation
  - Energized to open main valve
  - Energized to close main valve

#### ACV 113/413/513 Pump Control Valve

- Voltage

#### ACV 114 Rate of Flow Valve

- Desired flow rate
- Flow direction
  - Over the seat “R”
  - Under the seat

#### ACV 115 Pressure Reducing

- Desired outlet pressure

#### ACV 116 Pressure Relief/Sustaining

- Desired pressure setting

#### ACV 127 Altitude Valves

- Tank height (spring range)

### Individual Technical Bulletins are available for the ACV's listed in this catalog.

Information Includes:

- Operational statements
- Installation guidelines
- Start-up instructions

Numerous other functional combinations are available.

Consult your Watts ACV representative for application assistance.

### METRIC CONVERSIONS

These formulas will assist you in using our Engineering Data when your specifications are in metric.

#### Volume

$$\text{___ Liter} \times 0.264 = \text{___ U.S. Gallons}$$

$$\text{___ Cubic Meter (M3)} \times 264.2 = \text{___ U.S. Gallons}$$

#### Flow

$$\text{___ Liter/Sec} \times 15.85 = \text{___ GPM}$$

$$\text{___ Cubic Meter (M3)/Hr} \times 4.403 = \text{___ GPM}$$

#### Length

$$\text{___ Meter} \times 39.67 = \text{___ Inches}$$

$$\text{___ Meter} \times 3.28 = \text{___ Feet}$$

#### Pressure

$$\text{___ Kilo Pascal (kPa)} \times 0.145 = \text{___ PSIG}$$

$$\text{___ Kg/Cm2} \times 14.19 = \text{___ PSIG}$$

$$\text{___ Bar} \times 14.5 = \text{___ PSIG}$$

$$\text{___ Meter of Water} \times 3.28 = \text{___ Feet of Water (Head)}$$

$$\text{___ Meter of Water} \times 1.419 = \text{___ PSIG}$$



A Watts Water Technologies Company

**USA:** Tel: (713) 943-0688 • Fax: (713) 944-9445 • [Watts.com](http://Watts.com)

**Canada:** Tel: (905) 332-4090 • Fax: (905) 332-7068 • [Watts.ca](http://Watts.ca)

**Latin America:** Tel: (52) 81-1001-8600 • Fax: (52) 81-8000-7091 • [Watts.com](http://Watts.com)