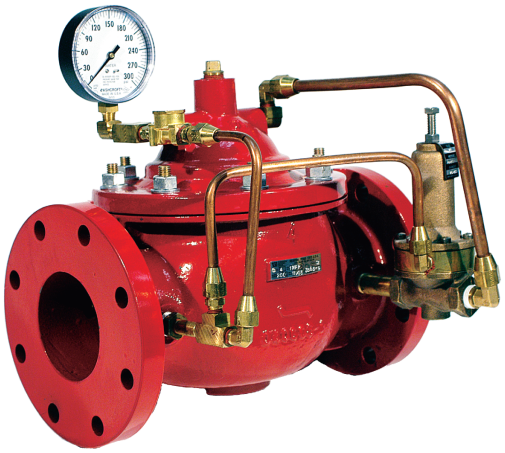
Technical Bulletin
Model 116FM (Globe)
Fire Pump Pressure Relief Valve

Function

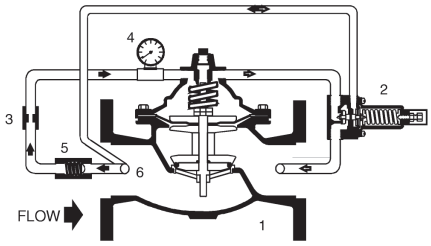
Automatically maintains a constant pressure in the fire protection system by relieving excess pressure.



Features

The WATTS ACV 116FM (globe) relief valve meets all requirements for UL listed, FM Approved fire protection service. The design and features incorporated in the WATTS ACV valve assure accurate control, dependable performance and long life.

Model 116FM: Globe Pattern Single Chamber Relief Valve
Model 1116FM: Angle Pattern Single Chamber Relief Valve



Flow Direction Shown: Under the Seat

COMPONENTS
1 - Main Valve (Globe Pattern)
2 - PV20C Relief Control
3 - Fixed Orifice
4 - Pressure Gauge
5 - Check Valve
6 - Flow Clean Strainer

116FM

Specifications

Body and Cover: Ductile Iron - ASTM A536 Fusion Bonded Epoxy Coated
Seat (trim): Stainless Steel CF8M-Xylan Coated
Internals: Stainless Steel AISI 303 or Ductile Iron - ASTM A536 Fusion Bonded Epoxy Coated
Stem: Stainless Steel AISI 303 - Xylon Coated
Spring: Stainless Steel AISI 302
Elastomers: BUNA-N
Control Tubing: Copper
Fittings: Brass
Pressure Relief Control Body: Bronze

SIZES / APPROVALS:

20 - 175 PSI Relief Service
100 - 300 PSI Relief Service

Valve Sizes Available in Angle and Globe

3”	4”	6”	* 8”
UL	UL / FM	UL / FM	UL / FM

* 20 - 175 Relief Service Only

UL Listed

FM APPROVED

Operation

The WATTS ACV Model 116FM PRESSURE RELIEF VALVE is controlled by a Pressure Relief Control. The Pressure Relief Control is normally closed, held closed by an adjustable spring setting to maintain a constant inlet pressure to the main valve.

When upstream pressure increases above the relief set-point, the Relief Control throttles open, increasing flow through the control tubing. Pressure is decreased in the main valve cover chamber, causing the main valve to modulate towards open, relieving excess upstream pressure. The desired system pressure is maintained.

As the upstream pressure decreases below the relief set-point, the Relief Control throttles closed, restricting flow through the control tubing. Pressure is increased in the main valve cover chamber, causing the main valve to modulate towards closed, maintaining the desired upstream pressure. Should upstream pressure drop below and remain below the set-point, the main valve closes drip tight.

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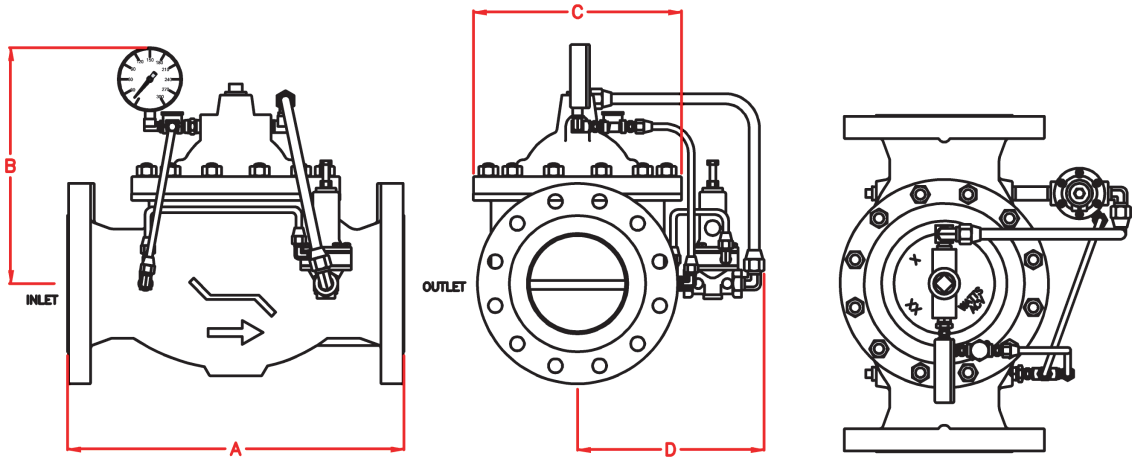
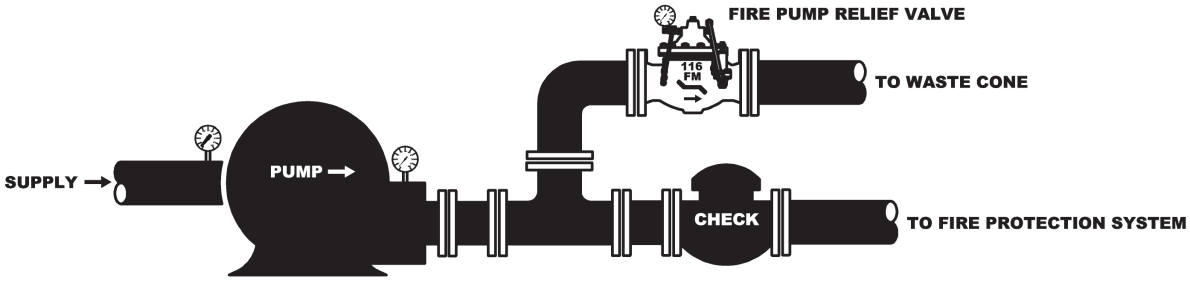
DIMENSIONS - ACV 116FM (Globe)



Valve Size Inch - MM	A 150	A 300	B	C	D
3" - 80	12	13.25	10.125	7.875	9.75
4" - 100	15	15.63	10.5	9.97	10
6" - 150	20	21	15	13.22	11.5
8" - 200	25.38	26.38	18.5	16	13



Installation / Start-up

Start-up of an Automatic Control Valve requires that proper procedures be followed. Time must be allowed for the valve to react to adjustments and the system to stabilize. The objective is to bring the valve into service in a controlled manner to protect the system from damaging overpressure.

NOTE: *Avoid mounting valves in a vertical discharge position (valve stem horizontal or cover pointed sideways.) Valves mounted in this position may not perform as tested and approved.*

- Clear the line of slag and other debris.
- Install the valve so that the FLOW ARROW marked on the valve body matches the flow through the line.
- Install pressure gauge (supplied) in fitting on valve tubing.

Step 1: Turn the Relief Control adjustment screw counterclockwise (out). This lowers the initial relief set-point, allowing the set-point to be increased to the desired setting.

Step 2: Loosen a tube fitting at a high point on the valve. This is to allow the cover to vent trapped air during initial filling of the valve.

Step 3: Start the pump to supply fluid / pressure to the valve.

Step 4: Tighten the tubing when all air is vented from the cover as indicated by continual flow of fluid.
NOTE: THE RELIEF SET-POINT SHOULD BE LOWER THAN DESIRED AT THIS TIME.

Step 5: Turn the Relief Control adjustment screw clockwise (in) slowly, allowing time for the pressure to gradually increase to the desired set-point.

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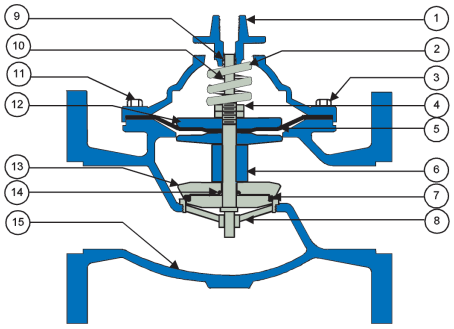
WATTS ACV

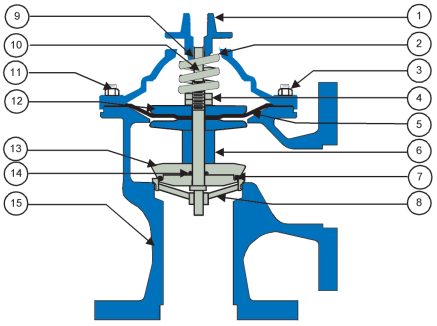
The Automatic Answer to Fluid Control

MAINTENANCE DISASSEMBLY ASSEMBLY

Model F100 (Globe) or F1100 (Angle)



ITEM #	DESCRIPTION
1	COVER
2	SPRING
3	COVER NUT
4	STEM NUT
5	DIAPHRAGM
6	SPACER
7	SEAT DISC
8	SEAT
9	COVER BEARING
10	STEM
11	COVER STUD
12	DIAPHRAGM WASHER
13	DISC RETAINER
14	STEM 0-RING
15	BODY



Globe

Angle

Maintenance

The basic valve, being of packless construction and requiring no lubrication, normally requires a minimum of maintenance. However, it is suggested that a periodic inspection schedule be established to determine how the fluid is affecting the efficiency of the valve. Fluid velocity as well as substances occurring in them such as dissolved minerals and suspended particles, vary in every installation. In areas subject to freezing, remove the body cover drain plugs for winter drain-down.

NOTE: The following method will determine if there is a damaged diaphragm without removing the valve cover. Put pressure into the valve and close all control lines to the valve cover chamber. Remove a fitting on the valve cover. If there is a continuous flow our of the cover chamber through this opening, the diaphragm is damaged or the diaphragm assembly on the stem is loose. CAUTION: The valve will be wide open during this procedure. Omit if the fully open valve could result in system damage.

Disassembly / Assembly

Inspection or maintenance can be accomplished without removal from the line.

To replace the diaphragm and / or the quad ring:

1. Remove fitting nuts where necessary to release the valve cover from the controls or control lines.
2. Remove the cover and spring.
3. Remove the diaphragm and stem assembly taking care not to damage the diaphragm when removing over studs.
4. With the assembly removed, examine the diaphragm and quad ring for wear or damage. Do not disassemble unless replacement is indicated.
5. To replace the diaphragm, quad ring and / or stem o-ring, hold the stem in a vise or with wrench on the flats at the bottom end of the stem. Remove the nuts.
6. Remove the diaphragm wisher, diaphragm, etc. in proper sequence.
7. Check all surfaces, seat, o-ring groves and diaphragm clamping surfaces for damage and / or foreign particles.
8. To reassemble, reverse the order of disassembly. Tighten stem nuts securely to ensure proper clamping of the diaphragm. To assure positive and even clamping of the diaphragm between the body and the cover, gradually tighten the cover nuts diametrically opposite each other.

Flow Data - ACV 100 (Globe) / 1100 (Angle)

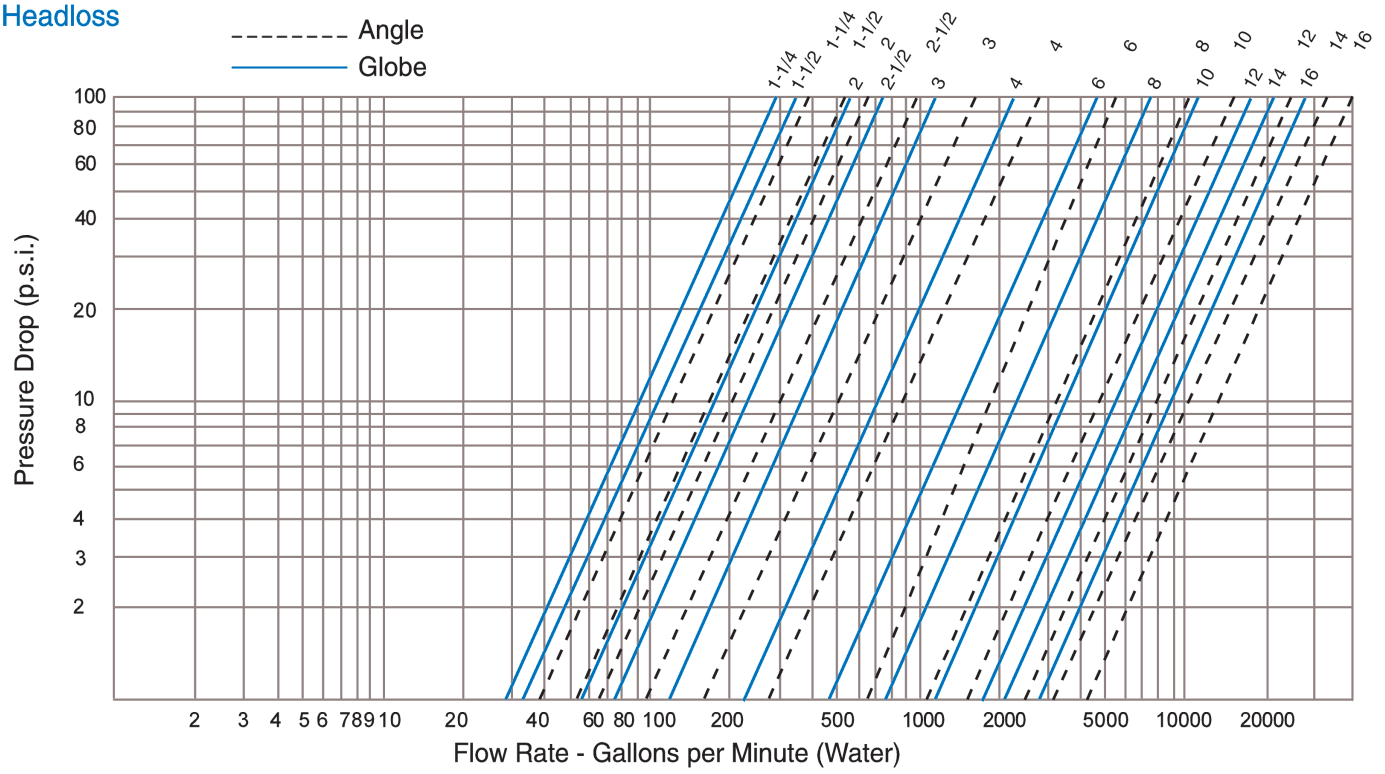
Valve Size - Inches	1-1/4	1-1/2	2	2-1/2	3	4	6	8	10	12	14	16
Maximum Continuous Flow Rate Gpm (Water)	93	125	208	300	460	800	1800	3100	4900	7000	8500	11000
Maximum Intermittent Flow Rate Gpm (Water)	115	158	260	370	570	1000	2300	3900	6000	8600	10500	14000
C_V Factor GPM (Globe)	29	34	55	75	125	220	460	775	1200	1730	2100	2800
C_V Factor GPM (Angle)	39	53	66	99	170	280	650	1100	1600	2500*	3060*	4210*

* *Estimated*

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 ($\triangle$P):

$Q\ (Flow) = C_V \sqrt{\triangle P}$ $\qquad$ $\triangle P\ (Pressure\ Drop) = (Q/C_V)^2$

Headloss



Valve Cover Chamber Capacity

Valve Size (in)	1-1/4	1-1/2	2	2-1/2	3	4	6	8	10	12	14	16
fl. oz.	4	4	4	10	10	22	70					
U.S. Gal								1-1/4	2-1/2	4	6-1/2	9-1/2

Valve Travel

Valve Size (in)	1-1/4	1-1/2	2	2-1/2	3	4	6	8	10	12	14	16
Travel (in)	3/8	3/8	1/2	5/8	3/4	1	1-1/2	2	2-1/2	3	3-1/2	4