Technical Bulletin

LEAD FREE*

M116FM Globe / M1116FM Angle

Fire Pump Relief Valve

Sizes: 1½ " - 8"

The WATTS M116FM (Globe) and M1116FM (Angle) Relief Valve meets all requirements for UL listed, FM Approved fire protection service. Automatically maintains a constant pressure in the fire protection system by relieving excess pressure.

Models

Model M116FM: Globe Pattern Single Chamber Relief Valve

Model M1116FM: Angle Pattern Single Chamber Relief Valve

M116FM (Globe)

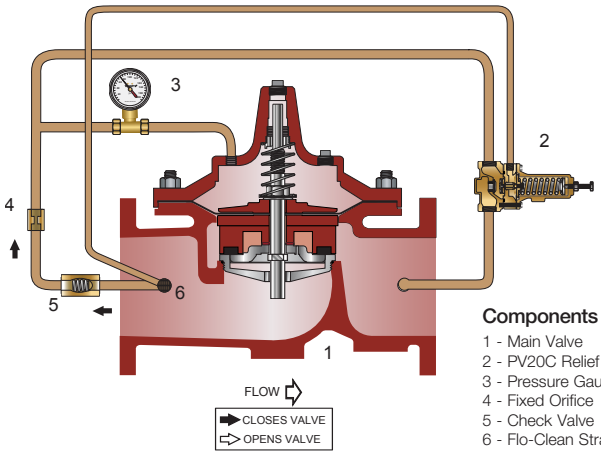
M1116FM (Angle)

Materials

Body & Cover:	• Ductile Iron ASTM A536 65-45-12 • Fused Red Epoxy inside and out
Seat (Trim):	Stainless Steel AISI 316 - Xylan Coated
Stem:	Stainless Steel S30400 - Xylan Coated
Spring:	Stainless Steel AISI S30200
Elastomers:	Buna-N
Pressure Relief Pilot:	Body: Copper Silicon Alloy Internals: Stainless Steel Elastomers: BUNA-N (Nitrile)
Pilot System:	Strainer Flo-Clean: Brass or Stainless Steel Body, Monel Screen Fittings: Lead Free* Brass or Stainless Steel Control Tubing: ¼" - ⅝" Copper or Stainless Steel

Operating Pressure

150# Flanged:	ANSI B16.42, Max WP 175psi
300# Flanged:	ANSI: B16.42, Max WP 300psi
Pilot Spring Range:	20-200 (150# Class) 100-300 (300# Class)



Components

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

Valve Sizes Available in Angle and Globe

Style	Globe 150# Flanged	Globe 300# Flanged	Angle 150# Flanged	Angle 300# Flanged	Angle 300# X 150# Flanged	Globe 300# Flanged	Angle 300# Flanged	Angle 300# X 150# Flanged
Size	1½" - 8"	2" - 8"	2" - 8"	2½" - 8"	3" - 8"	2" - 8"	2½" - 8"	3" - 8"
Range	20-200	20-200	20-200	20-200	20-200	100-300	100-300	100-300

UL LISTED ULC LISTED FM APPROVED

Operation

The WATTS ACV Model M116FM 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.

***The wetted surface of this product contacted by consumable water contains less than 0.25% of lead by weight.**

WATTS®

Fire Pump Relief Valve

Flow Data - ACV M116FM (Globe) / M1116FM (Angle)

	Valve Size - Inches	1¼	1½	2	2½	3	4	6	8
Suggested	Maximum Continuous Flow Rate Gpm (Water)	95	130	210	300	485	800	1850	3100
	Maximum Intermittent Flow Rate Gpm (Water)	119	161	265	390	590	1000	2300	4000
	Minimum Flow Rate Gpm (Water)	3	5	6	9	15	16	17	25
C_v	CV Factor GPM (Globe)	26	26	48	75	110	185	440	770
	CV Factor GPM (Angle)	26	27	57	91	125	215	571	990

- Maximum continuous flow based on velocity of 20 ft. per second.
- Maximum intermittent flow based on velocity of 25 ft. per second.
- Minimum flow rates based on a 20-40 psi pressure drop.
- The C_v Factor of a value is the flow rate in US GPM at 60°F that will cause a 1psi drop in pressure.
- C_v factor can be used in the following equations to determine Flow (Q) and Pressure Drop (ΔP):

  Q (Flow) = $C_v\sqrt{\Delta P}$ **ΔP (Pressure Drop) = $(Q/C_v)^2$**

- The C_v factors stated are based upon a fully open valve.
- Many factors should be considered in sizing control valves including inlet pressure, outlet pressure and flow rates.
- For sizing questions including cavitation analysis consult Watts with system details.

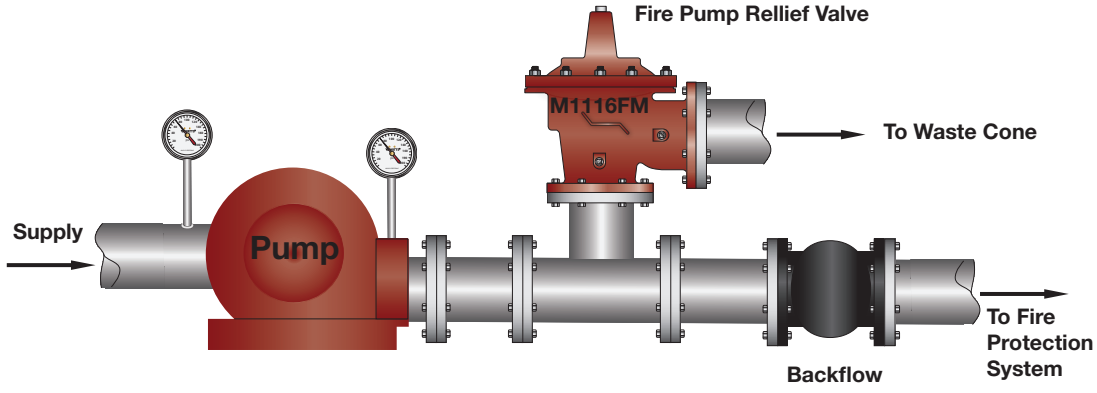
Installation and Start-up

Start-up of an Automatic Control Valve requires following proper procedures. 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.

NOTICE: Avoid mounting valves in a vertical discharge postion (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 the fitting on valve tubing.

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.
2. Loosen a tube fitting at a high point on the valve. This allows the cover to vent trapped air during initial filling of the valve.
3. Start the pump to supply fluid/pressure to the valve.
4. Tighten the tubing when all air is vented from the cover as indicated by continual flow of fluid.
   NOTICE: THE RELIEF SET-POINT SHOULD BE LOWER THAN DESIRED AT THIS TIME.
5. Turn the Relief Control adjustment screw clockwise (in) slowly, allowing time for the pressure to gradually increase to the desired set-point.



NOTICE

The information contained herein is not intended to replace the full product installation and safety information available or the experience of a trained product installer. You are required to thoroughly read all installation instructions and product safety information before beginning the installation of this product.

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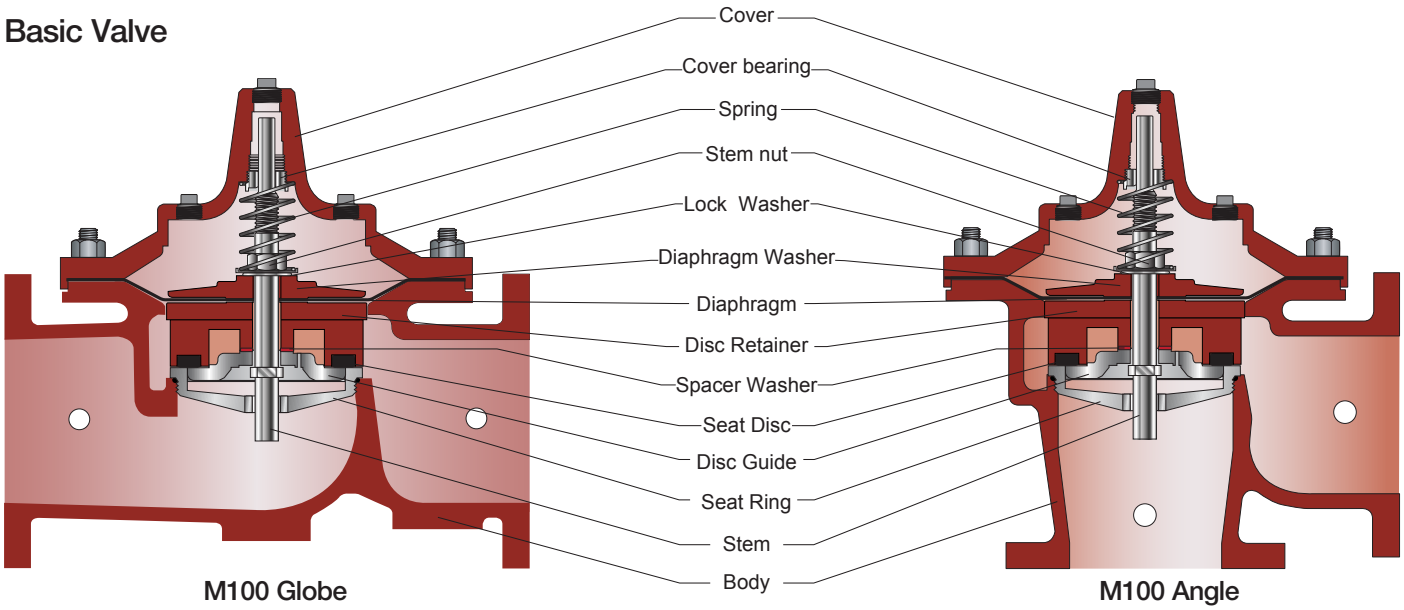
Fire Pump Relief Valve

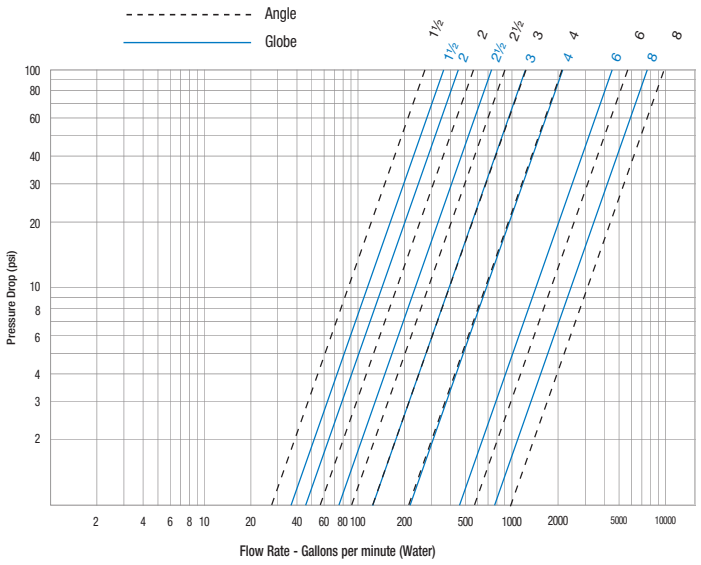
Basic Valve



Maintenance

The basic valve normally requires a minimum of maintenance, due to a packless construction and no required lubrication. 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 any substance entrained in the fluid, such as dissolved minerals and/or suspended particles, vary between installations. In areas subject to freezing, remove the body cover drain plugs for winter drain-down.

Headloss



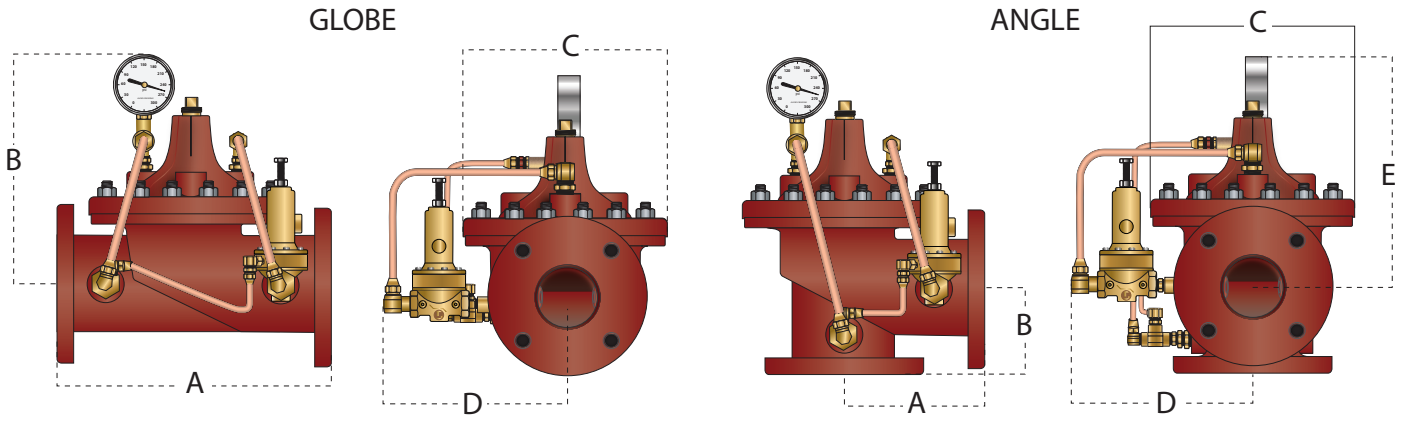
Disassembly/Assembly

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

To replace the diaphragm and/or the Seat Disc:

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 Seat Disc for wear or damage. Do not disassemble unless replacement is indicated.
5. To replace the diaphragm, Seat Disc 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 washer, diaphragm, etc., in the proper sequence.
7. Check all surfaces, seat, O-ring grooves 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.

Fire Pump Relief Valve



Dimensions

Valve Size		150 #		300 #							
		A		A		B		C		D	
in.	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*
1½	40	8½	216	9	229	9⅛	232	5¹¹⁄₁₆	144	7³⁄₁₆	183
2	50	9⅜	238	10	254	10	254	6¾	171	7⅝	194
2½	65	11	279	11⅝	295	11¼	286	8⅛	205	8⅝	219
3	80	12	305	13 ¼	337	10 7⁄8	276	9¼	235	8¹⁵⁄₁₆	227
4	100	15	381	15 5⁄8	397	13¼	337	11⅝	295	9⅞	251
6	150	20	508	21	533	14½	368	15¼	387	11⁷⁄₁₆	291
8	200	25 3⁄8	645	26 3⁄8	670	16⅞	429	20⅛	510	12⅛	306

Dimensions (Angle)

Valve Size		150 #		300 #		150 #		300 #				150 #			
		A		A		B		B		C		D		E	
in.	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*
2	50	4¾	121	5	127	3¼	83	3½	89	6¾	171	7⅝	194	10	254
2 1/2	65	5½	140	5⅞	149	4	102	4⁵⁄₁₆	110	8⅛	205	8⅝	219	11¼	286
3	80	6	152	6⅜	162	4	102	4⅜	111	9¼	235	8¹⁵⁄₁₆	227	10⅞	276
4	100	7½	191	7⅞	200	5	127	5⁵⁄₁₆	135	11⅝	295	9⅞	251	13¼	337
6	150	10	254	10½	267	6	152	6½	165	15¼	387	11⁷⁄₁₆	291	14½	368
8	200	12¾	324	13¼	337	8	203	8½	216	20⅛	510	12⅛	306	16⅞	429

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