

Installation, Maintenance, and Repair Manual

Series 909, LF909, 909RPDA

Reduced Pressure Zone Assemblies
Reduced Pressure Detector Assemblies

2½" – 10"

⚠ WARNING



Read this Manual **BEFORE** using this equipment.
Failure to read and follow all safety and use information can result in death, serious personal injury, property damage, or damage to the equipment.
Keep this Manual for future reference.



⚠ WARNING

Local building or plumbing codes may require modifications to the information provided. You are required to consult the local building and plumbing codes prior to installation. If the information provided here is not consistent with local building or plumbing codes, the local codes should be followed. This product must be installed by a licensed contractor in accordance with local codes and ordinances.

⚠ WARNING

Need for Periodic Inspection/Maintenance: This product must be tested periodically in compliance with local codes, but at least once per year or more as service conditions warrant. If installed on a fire suppression system, all mechanical checks, such as alarms and backflow preventers, should be flow tested and inspected in accordance with NFPA 13 and/or NFPA 25. All products must be retested once maintenance has been performed. Corrosive water conditions and/or unauthorized adjustments or repair could render the product ineffective for the service intended. Regular checking and cleaning of the product's internal components helps assure maximum life and proper product function.

⚠ WARNING

The installation and maintenance of backflow assemblies should be performed by a qualified, licensed technician. Failure to do so may result in a malfunctioning assembly.

NOTICE

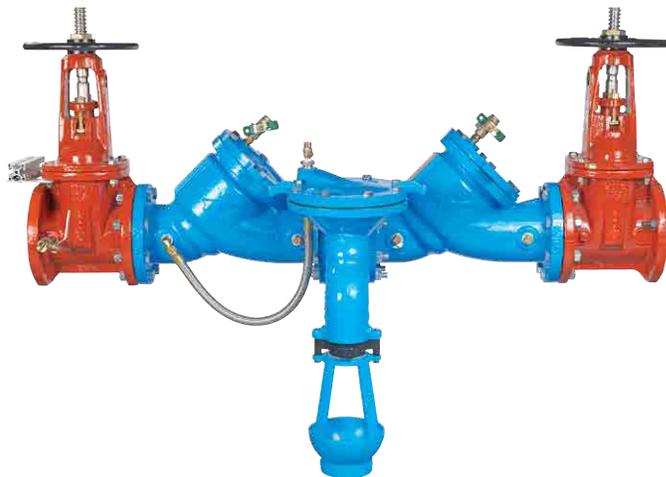
For *Australia* and *New Zealand*, line strainers should be installed between the upstream shutoff valve and the inlet of the backflow preventer.

Testing

For field testing procedure, refer to Watts installation sheets IS-TK-DL, IS-TK-9A, IS-TK-99E, and IS-TK-99D at watts.com.

For other repair kits and service parts, refer to Backflow Prevention Products Repair Kits & Service Parts PL-RP-BPD price list at watts.com.

For technical assistance, contact your local Watts representative.



LF909 with flood sensor and air gap

Series LF909 and 909RPDA each include a flood sensor on the relief valve to detect water discharge and trigger notification of a potential flood event.

NOTICE

An add-on connection kit is required to activate the flood sensor. Without the connection kit, the flood sensor is a passive component that does not communicate with any other device. (See "Sensor Connection Kits," for ordering details.)

NOTICE

Use of the flood sensor does not replace the need to comply with all required instructions, codes, and regulations related to installation, operation, and maintenance of this product, including the need to provide proper drainage in the event of a discharge.

Watts is not responsible for the failure of alerts due to connectivity issues, power outages, or improper installation.

Considerations

NOTICE

The flange gasket bolts for the gate valves can loosen in storage and shipment. Retighten the bolts during installation to align the valves.

- Backflow preventers must be installed in high-visibility locations to allow for immediate notice of telltale discharge or other malfunction. This location should also facilitate testing and servicing, and protect against freezing and vandalism.
- Installing a backflow preventer in a pit or vault is not recommended. However, if this becomes necessary, Watts highly recommends that a licensed journeyman, who is recognized by the authority having jurisdiction, be consulted. This type of installation and other installation procedures must comply with all state and local codes and meet the required safety provisions. An air gap below the relief port must be maintained so as to avoid flooding and submersion of the assembly, which may lead to a cross connection. Figure 1 shows the primary components of Series 909/LF909.
- Pipelines should be thoroughly flushed to remove foreign material before installing the unit. A strainer should be installed ahead of the backflow preventer to prevent the disc from unnecessary fouling. Install the valve in line with the arrow on the valve body, pointing in the direction of flow.

CAUTION

Do not install a strainer ahead of the backflow preventer on seldom-used, emergency water lines such as fire sprinkler lines. The strainer mesh could potentially become clogged with debris present in the water and cause water blockage during an emergency.

- Normal discharge and nuisance spitting are accommodated by the use of a Watts air gap fitting and a fabricated indirect waste line. Floor drains of the same size MUST be provided in case of excessive discharge. See the relief valve discharge rates in Figure 2 and the typical flow rates per valve and drain sizes in Table 1.
- When a Series 909/LF909 backflow preventer is installed for dead-end service applications (such as boiler feed lines, cooling tower makeup, or other equipment with periodic flow requirements), discharge from the relief vent may occur due to water supply pressure fluctuation during static no-flow conditions. A check valve may be required ahead of the backflow preventer. Before installation, see "Troubleshooting."
- The relief valve module on 2½" - 10" Series 909/LF909 assemblies may be turned to discharge to the opposite side. To do so, unbolt the relief valve and turn the relief valve discharge port to the opposite side. Mount the high pressure hose on the opposite side. This should be done by a licensed journeyman, who is recognized by the authority having jurisdiction, and only when space is critical for testing or repair.
- **ASSEMBLY:** If the backflow preventer is disassembled during installation, it MUST be reassembled in its proper order. The gate valve with the test cock is to be mounted on the inlet side of the backflow preventer. The test cock must be on the inlet side of the wedge. Failure to reassemble correctly can result in water damage due to excessive discharge from the relief port/vent and possible malfunction of the backflow preventer.

- **START UP:** At initial installation and after servicing, the downstream shutoff should be closed. Slowly open upstream shutoff and allow the backflow preventer to fill slowly. Bleed air at each test cock. When the backflow preventer is filled, slowly open the downstream shutoff and fill the water supply system. This is necessary to avoid dislodging O-rings or causing damage to internal components.
- **TEST:** Series 909/LF909 backflow preventer may be tested by a certified tester at the time of installation to ascertain that the assembly is in full working order and may be relied upon to protect the safe drinking water as per applicable standard.

Figure 1. Series 909/LF909

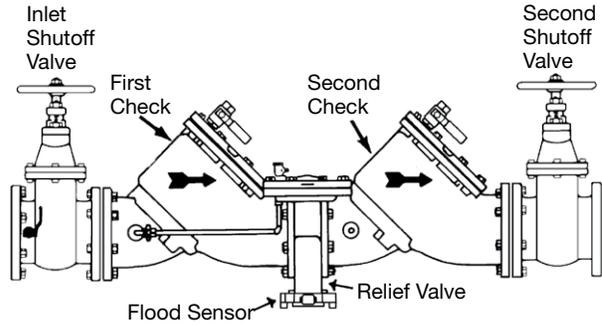


Figure 2. Series 909/LF909 Relief Valve Discharge Rates

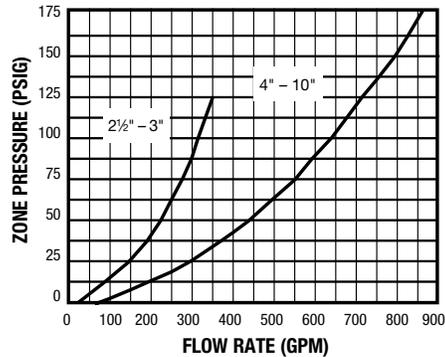


Table 1. Drain Size for Typical Flow Rates per Valve Size

VALVE SIZE	TYPICAL FLOW RATE	DRAIN SIZE
2½"	55 gpm	2"
3"	112 gpm	3"
4"	170 gpm	4"
6", 8", 10"	350 gpm	5"

Installation Guidelines

Series 909/LF909 can be installed in various way in various settings, as shown in Figure 3. Observance of these installation guidelines is important for each configuration.

- Series 909/LF909 should be installed in a horizontal position with the relief valve port aimed downward. This positions the relief valve below the first check valve, enabling the zone to drain through the relief valve outlet. The shutoff valve with the test cock should be mounted on the inlet side of the backflow preventer. The test cock is on the inlet side of the shutoff valve.
- Series 909/LF909 should always be installed in an accessible location to facilitate testing and servicing. Check the state and local codes to ensure that the backflow preventer is installed in compliance, such as the proper height above the ground.
- **Water discharge from the relief valve should be vented in accordance with code requirements. The relief valve should never be solidly piped into a drainage ditch, sewer, or sump. The discharge should be funneled through a Watts air gap fitting piped to a floor drain.**
- Watts recommends installation indoors or above ground in an insulated enclosure.

NOTICE

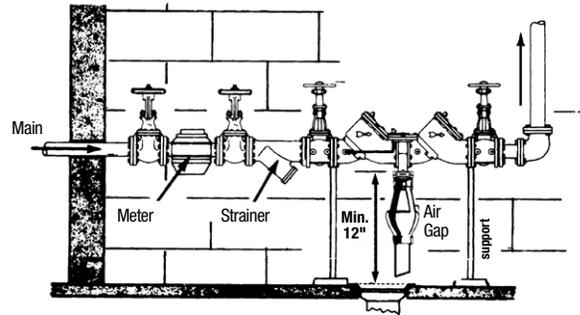
Consult local authorities regarding acceptance of vertical installations.

- At startup, the downstream shutoff should be closed. Open upstream slowly, fill the valve, and bleed the air through Test cock No. 2, No. 3, and No. 4. When valve is filled, open the downstream shutoff slowly and fill the water supply system. This is necessary to avoid water hammer or shock damage.
- The installation of a Watts air gap with the drain line terminating above a floor drain handles any normal discharge or nuisance spitting through the relief valve. However, floor drain size may need to be designed to prevent water damage caused by a catastrophic failure condition. Do not reduce the size of the drain line from the air gap fitting.
- Two or more smaller size valves can be piped in parallel (when approved) to serve a larger supply pipe main. This type of installation is employed where increased capacity is needed beyond that provided by a single valve and permits testing or servicing of an individual valve without shutting down the complete line.

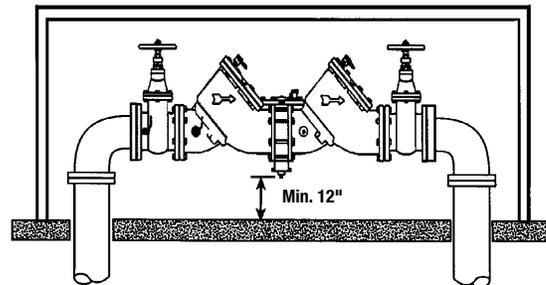
The number of assemblies used in parallel should be determined by the engineer's judgment based on the operating conditions of a specific installation.

Figure 3. Series 909/LF909 in Different Installations,

Indoors



Above Ground



WattsBox Insulated Enclosures; for more information, download ES-WB at watts.com.

Parallel

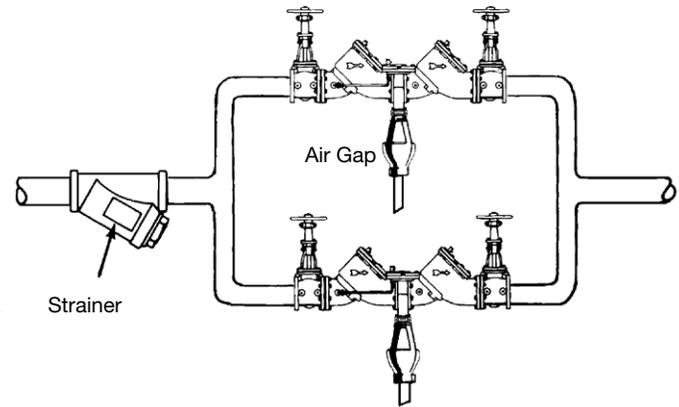


Table 2. Total Capacity with Dual-valve Installations of Various Sizes

50 GPM	100 GPM	150 GPM	200 GPM	250 GPM	350 GPM	450 GPM	640 GPM	1000 GPM	2000 GPM	3000 GPM	5000 GPM
Two ¾" devices	Two 1" devices	Two 1¼" devices	Two 1½" devices	Two 1½" devices	Two 2" devices	Two 2½" devices	Two 3" devices	Two 4" devices	Two 6" devices	Two 8" devices	Two 10" devices

Testing Reduced Pressure Zone Assemblies

Follow the requirements of each test when performed to ensure successful installation, operation, and maintenance of the backflow preventer.

Test No. 1

Purpose: To test check valve No. 2 for tightness against reverse flow.

Requirements: Valve must be tight against reverse flow under all pressure differentials. Slowly open the 'high' valve A and the 'vent' valve C, and keep the 'low' valve B closed. Open test No. 4. Indicated pressure differential is expected to decrease slightly. If pressure differential continues to decrease (until the vent opens) check valve No. 2 is reported as 'leaking.'

Test No. 2

Purpose: To test shutoff No. 2 for tightness.

Requirements: After passing test No. 1, continue to test No. 2 by closing test cock No. 2. The indicated pressure differential is expected to decrease slightly. If pressure differential continues to decrease (approaching 'zero'), shutoff No. 2 is reported to be 'leaking.'

Test No. 3

Purpose: To test check valve No. 1 for tightness.

Requirements: Valve must be tight against reverse flow under all pressure differentials. Close 'high' valve A and open test cock No. 2. Close test cock No. 4. Disconnect vent hose at test cock No. 4. Open valves B and C, bleeding to atmosphere. Then closing valve B restores the system to a normal static condition. Observe the pressure differential gauge. If there is a decrease in the indicated value, check valve No. 1 is reported as 'leaking.'

Test No. 4

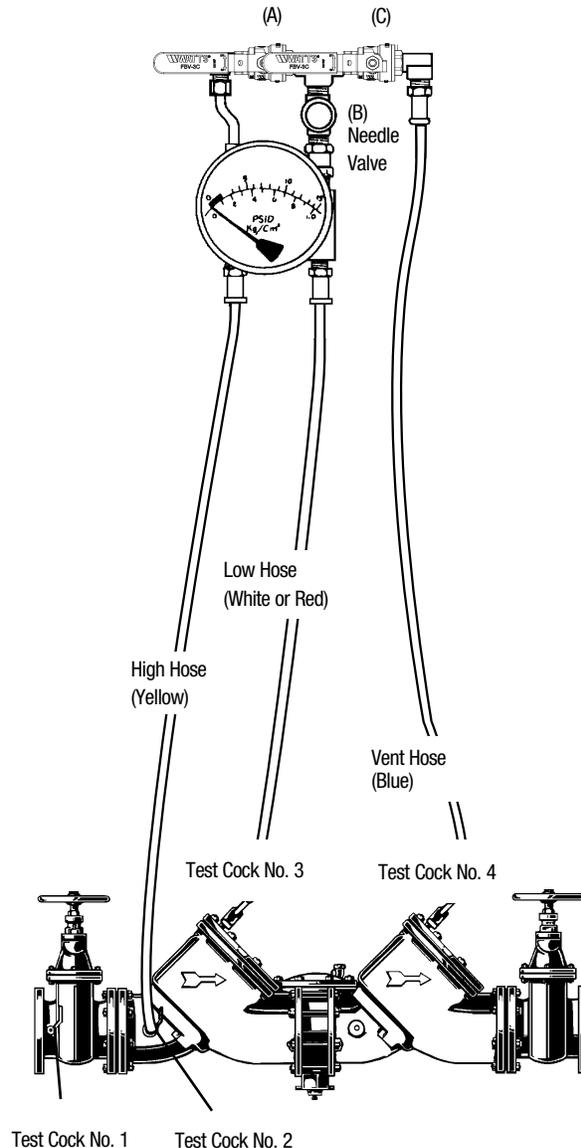
Purpose: To test operation of pressure differential relief valve.

Requirements: The pressure differential relief valve must operate to maintain the 'zone' between the two check valves at least 2 psi less than the supply pressure. Close 'vent' valve C. Open 'high' valve A. Open the 'low' valve B very slowly until the differential gauge needle starts to drop. Hold the valve at this position and observe the gauge reading when the first discharge is noted from the relief valve. Record this as the opening differential pressure of the relief valve.

NOTICE

The differential gauge needle **MUST** drop slowly. Close test cocks No. 2 and No. 3. Use 'vent' hose to relieve pressure from the test kit by opening valves A, B, and C. Remove all test equipment and open shutoff No. 2.

Figure 4. Ball Type Test Valves



Servicing First and Second Checks

NOTICE

Removal of the flood sensor is not required for periodic inspection and maintenance or servicing checks.

CAUTION

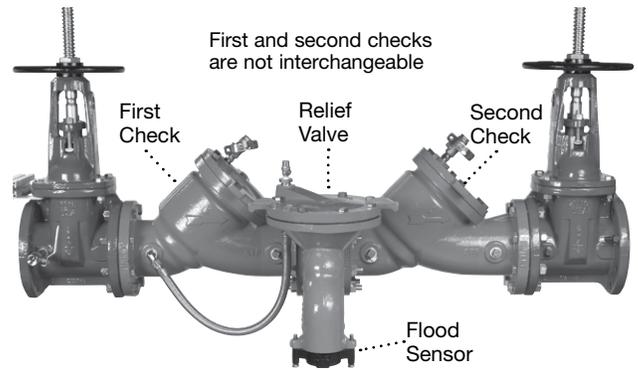
The spring assembly is an essential part of a check unit. Use care when servicing the first and second checks. The units are factory assembled and should never be disassembled in a field installation.

1. Remove the hatch cover bolts. Series 909/LF909 is designed so that when the bolts are loosened by $\frac{1}{2}$ ", all the spring load is released from the cover and retained by the check module. Verify this before removing all the bolts.
2. Lift the check valve module straight out taking care not to hit and damage the seating.
3. Remove and replace the seat ring as directed by size:
 Sizes 4" to 10", pull out the two wire retainers.
 Sizes 2½" to 3", turn the seat by one quarter to remove it.
 One wire is drawn out clockwise; the other, counterclockwise.
4. Lift the seat ring straight up to remove it.
5. To replace the disc on sizes 2½" to 4", remove the retaining nut.
 For sizes 6" to 10", remove the Allen head socket screws.
 Reverse this procedure to install the new disc.

For further details contact your technical sales representative.

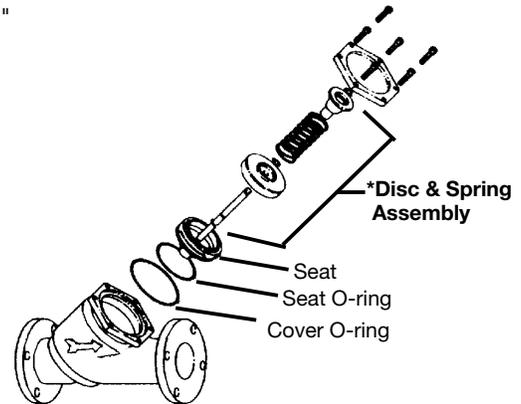
NOTICE

No special tools required to service.

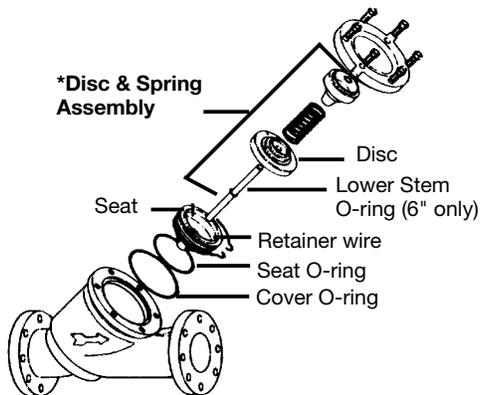


909/LF909-OSY with flood sensor

Figure 5. Disc & Spring Assembly by Valve Size
 2½" – 3"



4" – 10"



WARNING

*Spring assembly is factory assembled. DO NOT DISASSEMBLE.

Servicing the Relief Valve

CAUTION

Use the clearance recommendations referenced below for servicing relief valve assemblies according to valve size. Figure 6 shows the differences between the assemblies by valve size.

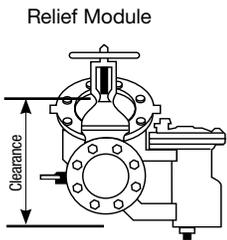
1. Remove the relief valve cover bolts. Series 909/LF909 is designed so that when the bolts are loosened by 1/2" all the relief valve spring load is retained by the bottom plug spring module. Verify this before removing all the bolts.
2. Remove the cover and diaphragm. The relief valve piston assembly can be lifted straight up and out.
3. Replace the wiper seal and piston O-ring and apply grease to the O-ring.
4. To replace the relief valve disc, hold the upper guide fin and unscrew the diaphragm pressure plate. If necessary, lightly tap the cast webs and the pressure plate to loosen. Replace with a new disc holder assembly and O-ring. The disc rubber is molded into the disc holder and supplied as a disc holder assembly.
5. Inspect the bottom plug and spring assembly. During normal field service there is no need to remove this assembly other than inspection. Unscrew the assembly with a large pipe wrench.

CAUTION

The spring is retained on the bottom plug and is highly loaded. NO attempt should be made in the field to disassemble the bottom plug and spring piston assembly. For replacement, a complete bottom plug assembly must be obtained from the factory.

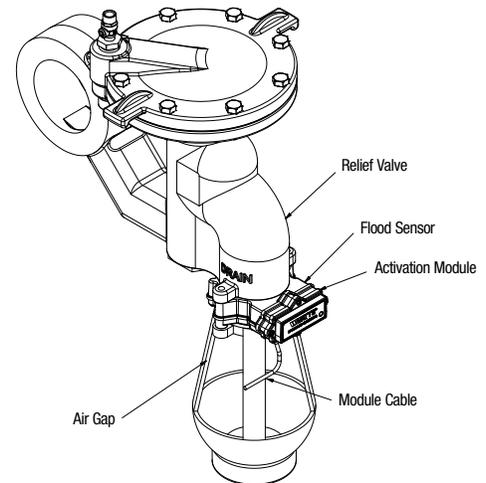
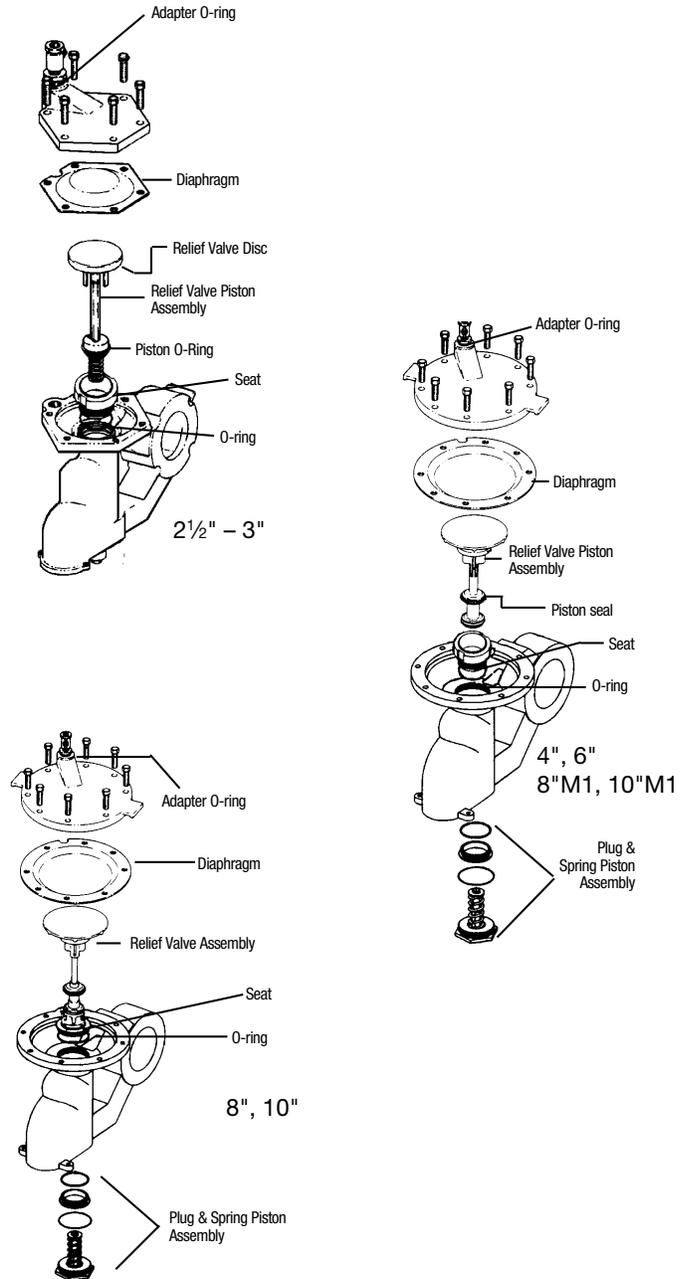
For further details contact your technical sales representative.

Clearance Recommended for Servicing



CLEARANCE REQUIRED FOR SERVICING	
Valve Size	Clearance
2 1/2" - 3"	11"
4"	14"
6"	16"
8"	21"
10"	21"

Figure 6. Relief Valve Assemblies by Valve Size



Relief valve with flood sensor

Troubleshooting

PROBLEM	CAUSE	SOLUTION
Valve spits periodically from the vent.	Fluctuating supply pressure.	Install a soft seated check valve immediately upstream of the device.
	Fluctuating downstream pressure.	Install a soft seated check valve downstream of the device as close as possible to the shutoff valve.
Valve drips continually from the vent.	Fouled first check.	Flush valve. If flushing does not resolve problem, disassemble valve and clean or replace the first check.
	Damaged or fouled relief valve seat.	Clean or replace the relief valve seat.
	Relief valve piston O-ring not free to move due to pipe scale, dirt, or build up of mineral deposits.	Clean, grease, or replace the piston O-ring.
	Excessive back pressure, freezing, or water hammer has distorted the second check.	Eliminate source of excessive back pressure or water hammer in the system downstream of the device. Use Watts No. 15 to eliminate water hammer. Replace defective second check assembly. In case of freezing, thaw, disassemble, and inspect internal components. Replace as necessary.
	Electrolysis or relief valve seat or first check seats.	Replace relief valve seat or inlet cover. Electrically ground the piping system and/or electrically isolate the device with plastic pipe immediately upstream and downstream of the device.
	Valve improperly reassembled.	If the valve is disassembled during installation, exercise caution when installing check springs in their proper location.
Valve exhibits high pressure drop.	Fouled strainer.	Clean strainer element or replace.
	Valve too small for flows encountered.	Install proper size device based upon flow requirements.
No water flows downstream of valve.	Valve installed backward.	Install valve in accordance with flow direction arrow.
Valve does not test properly.	Manufacturer's test procedure not followed.	Clean or replace gate valve with full port ball valves or resilient wedge shutoff valves.
	Leaky downstream gate valve.	Clean or replace gate valve with full port ball valves or resilient wedge shutoff valves.
Valve quickly and repeatedly fouls following servicing.	Debris in pipeline is too fine to be trapped by strainer.	Install finer mesh strainer element in the strainer.
Performance of backflow preventers affected during winter season.	Cold temperatures.	Electric heat-tape wrap closely together around the valve body. Build a small shelter around the valve with a large light bulb installed and left on at all times. If the supply line is not used during the winter, removal of the complete body is the best. This would create an air gap to eliminate any possible backflow.

Sensor Connection Kit for Building Management Systems

ORDERING CODE		ADD-ON KIT	DESCRIPTION
88009418		FP-BF-BMS BMS Sensor Connection Kit Series LF909, 909RPDA Sizes 2½" to 10"	Includes a sensor activation module with cable, power adapter, and ground wire. Use this kit to activate the flood sensor and enable flood detection capabilities for the relief valve to work with a third-party BMS control box (not included).

Sensor Connection Kit for Cellular Network Communication

ORDERING CODE		ADD-ON KIT	DESCRIPTION
88009420		FP-BF-CFS Cellular Sensor Connection Kit Series LF909, 909RPDA Sizes 2½" to 10"	Includes a sensor activation module with cable, Cellular Gateway with mounting kit, power adapter, and ground wire. Use this kit to activate the flood sensor and enable flood detection capabilities and e-mail, text, and voice notifications.

Limited Warranty: Watts Regulator Co. (the "Company") warrants each product to be free from defects in material and workmanship under normal usage for a period of one year from the date of original shipment. In the event of such defects within the warranty period, the Company will, at its option, replace or recondition the product without charge.

THE WARRANTY SET FORTH HEREIN IS GIVEN EXPRESSLY AND IS THE ONLY WARRANTY GIVEN BY THE COMPANY WITH RESPECT TO THE PRODUCT. THE COMPANY MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED. THE COMPANY HEREBY SPECIFICALLY DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

The remedy described in the first paragraph of this warranty shall constitute the sole and exclusive remedy for breach of warranty, and the Company shall not be responsible for any incidental, special or consequential damages, including without limitation, lost profits or the cost of repairing or replacing other property which is damaged if this product does not work properly, other costs resulting from labor charges, delays, vandalism, negligence, fouling caused by foreign material, damage from adverse water conditions, chemical, or any other circumstances over which the Company has no control. This warranty shall be invalidated by any abuse, misuse, misapplication, improper installation or improper maintenance or alteration of the product.

Some States do not allow limitations on how long an implied warranty lasts, and some States do not allow the exclusion or limitation of incidental or consequential damages. Therefore the above limitations may not apply to you. This Limited Warranty gives you specific legal rights, and you may have other rights that vary from State to State. You should consult applicable state laws to determine your rights. **SO FAR AS IS CONSISTENT WITH APPLICABLE STATE LAW, ANY IMPLIED WARRANTIES THAT MAY NOT BE DISCLAIMED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO ONE YEAR FROM THE DATE OF ORIGINAL SHIPMENT.**



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