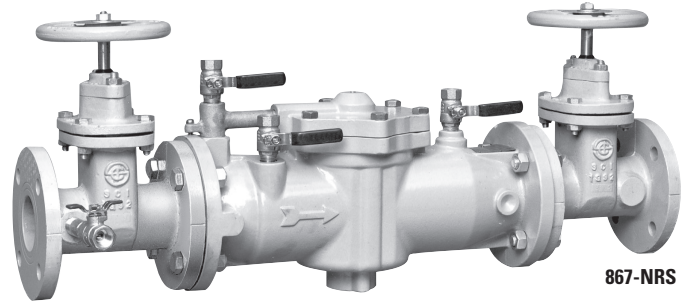


INSTALLATION INSTRUCTIONS

Series 867

Reduced Pressure Zone Assemblies

2½" – 3" (65 – 80mm)**



867-NRS

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⚠ 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

You are required to consult the local building and plumbing codes prior to installation. If the information in this manual is not consistent with local building or plumbing codes, the local codes should be followed. Inquire with governing authorities for additional local requirements.

⚠ 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

The flange gasket bolts for the gate valves should be retightened during installation as the bolts may have loosened due to storage and shipping.

NOTICE

Inquire with governing authorities for local installation requirements

Testing

For field testing procedure, refer to FEBCO installation sheets IS-F-TK-1 found on www.FEBCOonline.com.

For other repair kits and service parts, refer to our Backflow Prevention Products Repair Kits & Service Parts price list PL-FEBCO found on www.FEBCOonline.com.

For technical assistance, contact your local FEBCO representative.

** Metric Dimensions are nominal pipe diameter. This product is produced with ASME/ANSI flanged end connections.



Installation Guidelines

Indoors – Figure 1

For indoor installations, it is important that the assembly be easily accessible to facilitate testing and servicing. If it is located in a line close to a wall, be sure the test cocks are easily accessible. A drain line and air gap should be piped from the relief valve connection as shown, where evidence of discharge will be clearly visible and so that water damage will not occur. Therefore, never install in concealed locations.

Outside – Figure 2

In an area where freezing conditions do not occur, Series 867 can be installed outside. The most satisfactory installation is above ground and should be installed in this manner whenever possible.

In an area where freezing conditions can occur, Series 867 should be installed above ground in an insulated enclosure.

Series 867 must be installed in an accessible location to facilitate testing and servicing. A discharge line should be piped from the air gap at the relief valve connection making sure that there is adequate drainage. Never pipe the discharge line directly into a drainage ditch, sewer or sump. Series 867 should never be installed where any part of the unit could become submerged in standing water.

It is generally recommended that backflow preventers never be placed in pits unless absolutely necessary and then only when approved by local codes. In such cases, a modified pit installation is preferred.

Parallel – Figure 3

Two or more smaller size assemblies can be piped in parallel (when approved) to serve a large 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 judgement based on the operating conditions of a specific installation.

For parallel valve installations, the total capacity of the assemblies should equal or exceed that required by the system.

NOTICE

The flange gasket bolts for the gate valves should be retightened during installation as the bolts may have loosened due to storage and shipping.

Figure 1

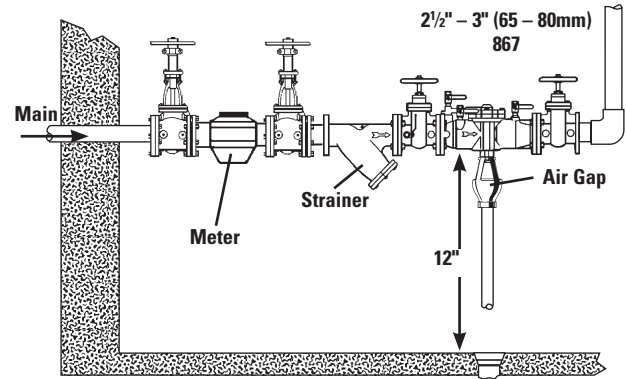


Figure 2

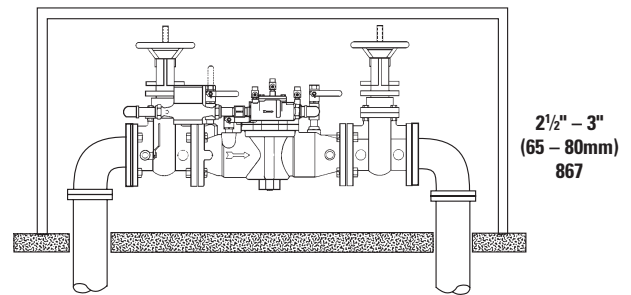
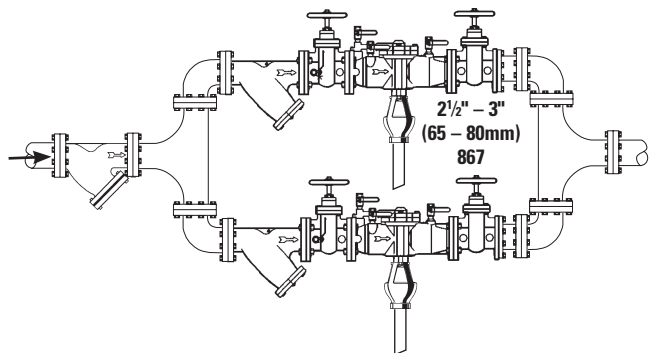


Figure 3



Installation Guidelines

NOTICE

Shutoff Valves: When shutoff valves are removed and reassembly is necessary, the shutoff valve with the test cock is to be mounted on the inlet side of the backflow preventer.

- A. The 867 should always be installed in an accessible location to facilitate testing and servicing (See page 2). **Check the state and local codes to ensure that the backflow preventer is installed in compliance, such as the proper height above the ground.**
- B. We recommend a strainer be installed ahead of 867 series assemblies to protect the internal components from unnecessary fouling.

CAUTION

Do not install with strainer when backflow preventer is used on seldom-used water lines which are called upon only during emergencies, such as fire sprinkler lines.

Start Up: The downstream shutoff should be closed. Open upstream slowly and fill valve while bleeding air from test cocks 3 and 4. When valve is filled, close test cocks, open the downstream shutoff slowly and fill the water supply system. This is necessary to avoid water hammer or shock damage.

- C. 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 terminated approximately 12" above the ground or through an air gap piped to a floor drain.

NOTICE

Relief Valve Discharge Rates

The installation of an air gap with the drain line terminating above a floor drain will handle 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. Please refer to Figure No. 1 for maximum relief valve discharge rates, size and capacity of typical floor drains.

NOTICE

Do not reduce the size of the drain line from the air gap fitting. Pipe full line size.

- D. After initial installation, a discharge from the relief valve opening may occur due to inadequate initial flushing of pipe lines to eliminate dirt and pipe compounds. If flushing will not clear, remove the first check valve and clean thoroughly.

NOTICE

Periodic relief valve discharge may occur on dead end service applications, such as boiler feed lines or cooling tower makeup lines due to fluctuating supply pressure during a static or no flow condition. To avoid this discharge, install a spring-loaded rubber seated check valve ahead of the backflow assembly to "lock-in" the downstream pressure.

- E. Backflow preventers should never be placed in pits unless absolutely necessary and then only when and as approved by local codes. In such cases, provision should be made to always vent above flood level or for a pit drain to ensure an adequate air gap below the relief port.
- F. It is important that Series 867 backflow preventers be inspected periodically for any discharge from the relief valve which will provide a visual indication of need for cleaning or repair of check valves. Also testing for proper operation of the device should be made periodically in compliance with local codes, but at least once a year or more often, depending upon system conditions.

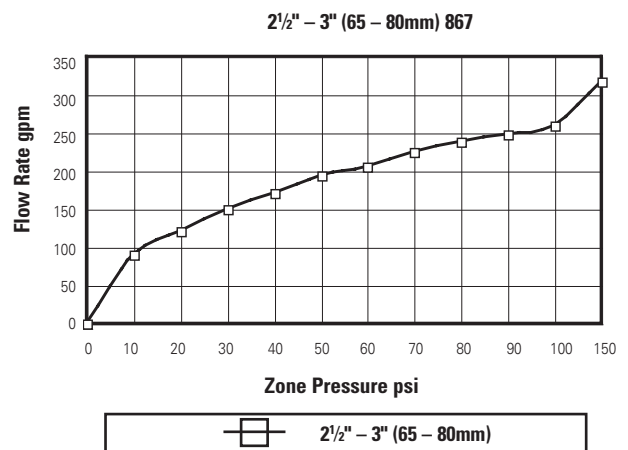
Relief vent will discharge water when, during no-flow periods, (1) the first check valve is fouled or (2) the inlet pressure to the device drops sufficiently due to upstream pressure fluctuations to affect the required operating differential between the inlet pressure and reduced pressure zone. Otherwise, such relief (spitting) can occur when the second check is fouled during emergency backflow or resulting from a water hammer condition.

NOTICE

Special considerations are necessary when testing assemblies installed on Fire Prevention Systems.

Fire Protection System Installations: The National Fire protection Agency (NFPA) Guidelines require a confirming flow test be conducted whenever a "main line" valve such as the shutoff valves or a backflow assembly have been operated. Certified testers of backflow assemblies must conduct this confirming test.

Figure 1



Typical Flow Rates as sized by floor drain manufacturers:

in	mm	GPM	in.	mm	GPM
2"	50	55	5"	125	350
3"	80	112	6"	150	450
4"	100	170	8"	200	760

Servicing the Relief Valve

1. Remove the four or six relief valve cover bolts while holding the cover down.
2. Lift the cover straight off. The stem and diaphragm assembly will normally remain with the cover as it is removed. The relief valve spring will be free inside the body at this point.
3. The relief valve seat is located at the bottom of the body bore and can be removed, if necessary, for cleaning. The disc can be cleaned without disassembly of the relief valve module. If it is determined that the relief valve diaphragm and/or disc should be replaced, the relief valve module can be readily disassembled without the use of special tools.

NOTICE

The disc rubber is molded into the disc holder and is supplied as a disc holder assembly.

4. To reassemble the relief valve, press the seat firmly into place in the body, center the spring on the seat, and insert the cover and relief valve module as a unit straight into the bore. Press down on the cover to assure proper alignment. Insert and tighten bolts.

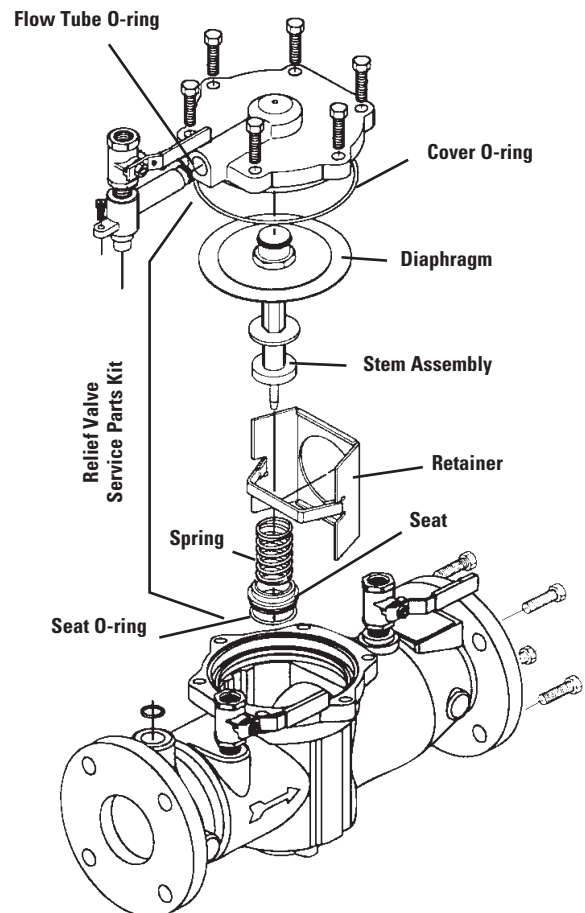
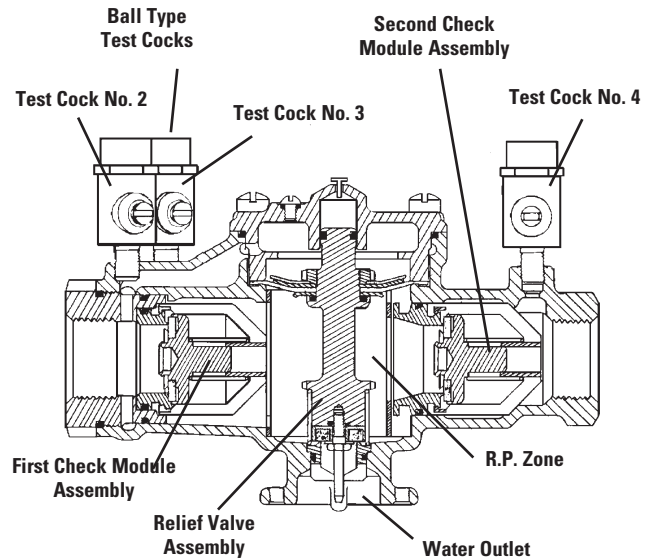
CAUTION

If cover will not press flat against body, stem assembly is crooked and damage can result. Realign stem and cover before bolts are inserted.

NOTICE

No special tools required to service Series 867 2½" – 3" (65 – 80mm).

For repair kits and parts, refer to our Backflow Prevention Products Repair Kits & Service Parts price list PL-FEBCO found on www.FEBCOonline.com.



Servicing First & Second Check Valves

1. Remove the relief valve assembly as outlined on page 5.
2. Remove the retainer from the body bore. The check valve modules can now be removed from the valve by hand or with a screwdriver.

NOTICE

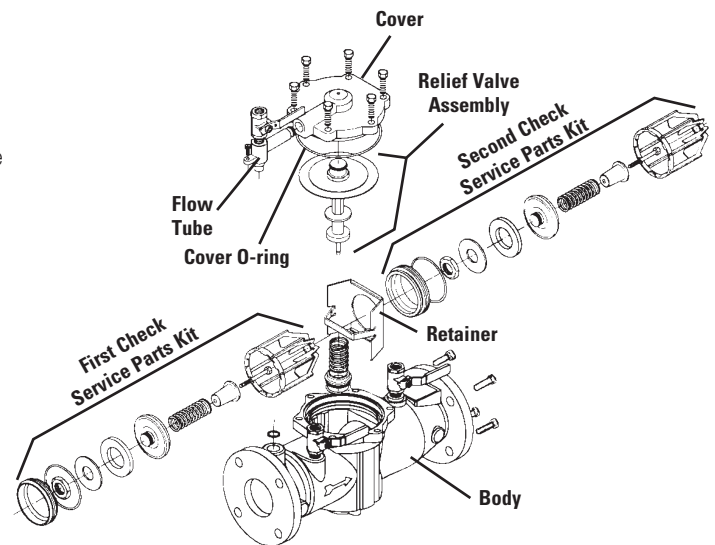
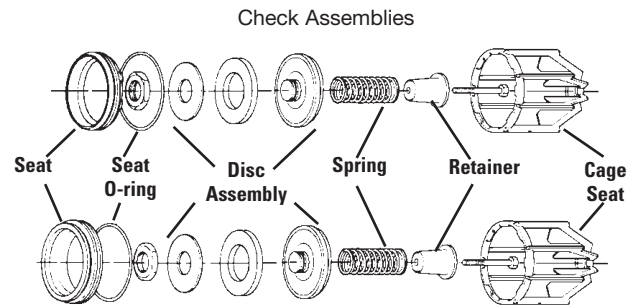
The seats and springs of the first and second check modules are not interchangeable. The heavier spring and smaller diameter seat belong with the first check module.

3. The check seats are attached to the cage with a bayonet type locking arrangement. Holding the cage in one hand, push the seat inward and rotate counterclockwise against the cage. The seat, spring cage, spring and disc assembly are now individual components.
4. The disc assembly may now be cleaned and reassembled or, depending on its condition, may be discarded and replaced with a new assembly from the repair kit. O-rings should be cleaned or replaced as necessary and lightly greased with the FDA approved silicon grease. For more information refer to repair parts price list.
5. Reassemble the check valve modules. Check modules are installed in the valve body with the seat facing the valve inlet. The modules must be securely in place before the retainer can be replaced. Replace relief valve assembly.

NOTICE

No special tools required to service Series 867 2½" – 3" (65–80mm)**.

For repair kits and parts, refer to our Backflow Prevention Products Repair Kits & Service Parts price list PL-FEBCO found on www.FEBCOonline.com.



Test Procedures for Reduced Pressure Zone Assemblies

Reduced Pressure Zone Assemblies must be inspected and tested periodically, in accordance with local codes, to ensure proper operation of check valves within the unit.

A differential pressure gauge is recommended for Test No. 1 rather than a manometer for the following reasons: It utilizes minimum time to perform the test. It eliminates the necessity of closing the inlet ball valve which could release pipe scale and foreign matter into the backflow preventer. Only a slight amount of water is 'spilled' in test. A mercury manometer could cause a pollution hazard.

Test Set Up

Reduced Pressure Zone Assembly

- Close Valves A, B and C on Test Kit.
- Connect high side hose to test cock #2
- Connect low side hose to test cock #3. Close shutoff #2.
- Open test cocks #2 and #3.
- Open vent valve C.
- Open 'high' valve A and bleed to atmosphere until all the air is expelled.
- Close valve A. Open 'low' valve B and bleed to atmosphere until all air is expelled. Close 'low' valve B. Close 'vent' valve C.
- Connect vent hose to test cock #4.

Test Procedure

Reduced Pressure Zone Assembly

- Field Test Equipment Required
- Reduced Pressure Zone Backflow Preventer Test Kit

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 cock #4. Indicated pressure differential will decrease slightly. If pressure differential continues to decrease (until the vent opens) check valve #2 is reported as 'leaking'.

Test No. 2

Purpose: To test shutoff #2 for tightness.

Requirements: After passing Test No. 1, continue to Test No. 2 by closing test cock #2. The indicated pressure differential will decrease slightly. If pressure differential continues to decrease (approaching "zero"), shutoff #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 #2. Close test cock #4. Disconnect vent hose at test cock #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".

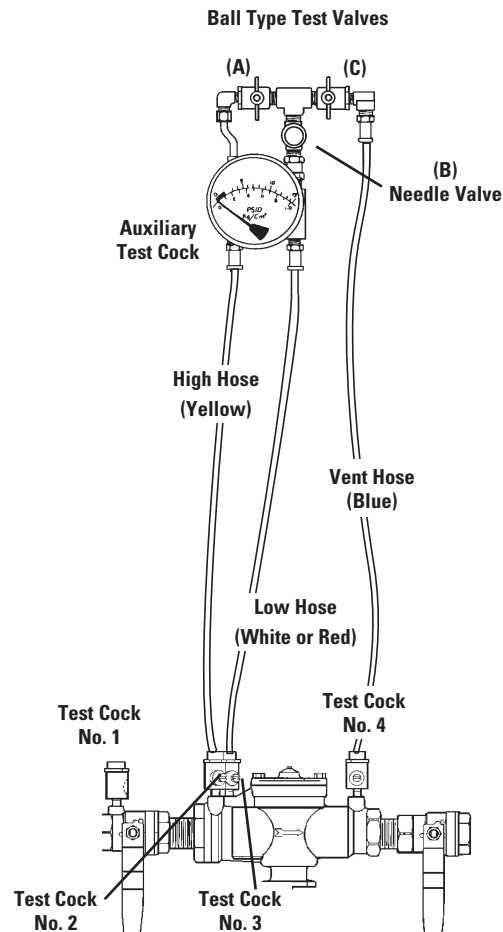
Test No. 4

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 2psi 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 at the moment the first discharge is noted from the relief valve. Record this as the opening differential pressure of the relief valve.

NOTICE

It is important that the differential gauge needle drops slowly. Close test cocks #2 and #3. Use 'vent' hose to relieve pressure from test kit by opening valves A, B and C. Remove all test equipment and open shutoff #2.



Caution: To prevent freezing, hold Test Kit vertically to drain differential gauge and hoses prior to placing in case.

For additional information, visit our web site at: www.FEBCOonline.com

WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.
For more information: www.watts.com/prop65

Limited Warranty: FEBCO 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.

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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.

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