Installation, Maintenance, and Repair Manual

Series 850 Small, LF850 Small

Double Check Valve Assemblies

½" – 2"

⚠ 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. 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 and external components helps assure maximum life and proper product function.

⚠ WARNING

Freeze sensor solely provides alerts about a possible freeze event and cannot prevent a freeze event from occurring. User action is required to prevent freeze conditions from causing product and/or property damage.

NOTICE

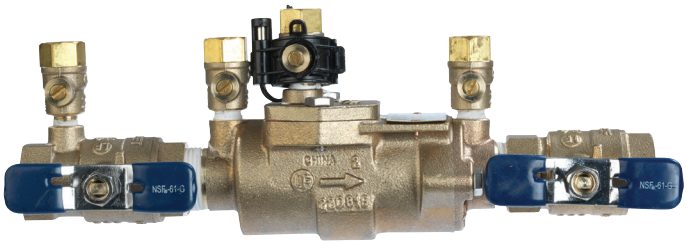
For Australia and New Zealand, line strainers should be installed between the upstream shutoff valve and the inlet of the backflow preventer.

Fittings such as end connectors intended to join alternative pipe systems made from other materials (such as plastics) shall also conform to the relevant dimensional and performance requirements of the appropriate Australian, New Zealand, or joint Australian–New Zealand Standard for the alternative pipe system.

Testing

Check the ASSE Series 5000 manual for an appropriate test method that is consistent with local codes of the area.

For Australia, refer to Australian standard AS/NZS 2845.3.



LF850 with Freeze Sensor

Series 850 Small Double Check Valve assemblies are designed for non-health hazard applications to protect drinking water supplies from dangerous cross-connections in accordance with national plumbing codes and water authority requirements for non-potable service applications such as irrigation, fire line, or industrial processing. Series LF850 Lead Free* Double Check Valve assembly is designed to prevent the backflow of polluted water from entering the potable water supply due to backsiphonage and or backpressure.

Both series include a freeze sensor that can be used to indicate when temperature nears the freezing point. (The sensor is installed on the assembly exterior and does not alter assembly functions or certifications.) The sensor relays a signal that triggers notification to facility personnel to take preventive action in cold temperatures, thus reducing or eliminating equipment replacement or repair.

NOTICE

An add-on connection kit is required to activate the freeze sensor. Without the connection kit, the sensor is a passive component that has no communication with any other device. (The kit can also be used to retrofit existing installations. For ordering details, see "Add-on/Retrofit Sensor Connection Kit."

NOTICE

Use of the freeze sensor and activation kit with FZ models does not replace the need to comply with all required instructions, codes, and regulations related to installation, operation, and maintenance of the double check valve assembly.

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

Contents

FEBCO®

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Installation Guidelines

These instructions apply to Series 850 and LF850 Small double check valve assemblies only. Each series consists of two independently operating, spring-loaded check valves. The pressure drop across the first check valve is approximately 1.0 psig with no flow. The pressure drop across the second check valve is also 1.0 psig with no flow. The assembly series includes two shutoff valves and four test cocks.

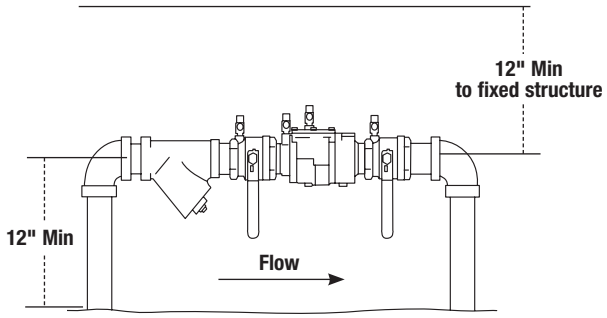
1. Install the valve only in the orientation/flow direction indicated by the arrow on the valve body.
2. Install the valve assembly where it is accessible for periodic testing and maintenance. (The recommended clearances shown in the installation views apply to the exterior, interior, and pit/vault installations. These minimums do not apply to removable protective enclosures.)
3. BEFORE INSTALLING THE VALVE INTO THE LINE, FLUSH THE SUPPLY LINE OF ALL FOREIGN MATERIAL. Failure to flush the supply line may cause the check valves to become fouled and require disassembly and cleaning.
4. After installation, SLOWLY fill the assembly with water and bleed air from the body using test cocks No. 3 and No. 4. Test the valve assembly to ensure correct operation.

NOTICE

All assemblies are tested at the factory for proper operation and leakage. If the valve does not pass the field test, a fouled check valve is the most likely cause. This is not covered by the factory warranty. The valve cover must be removed and the check seats inspected and cleaned. Any damage or improper operation caused by pipeline debris or improper installation/startup is not included in the factory warranty. In case of a possible warranty claim, contact your local supplier or FEBCO representative. DO NOT REMOVE THE VALVE ASSEMBLY FROM THE PIPELINE.

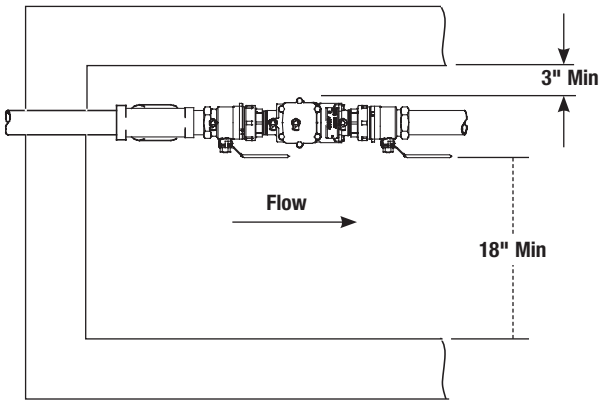
5. Protect the assembly from freezing and excessive pressure increases. Pressure increases can be caused by thermal expansion or water hammer. Eliminate these excessive pressure situations to protect the valve and system from possible damage.
6. Use the plastic test cock plugs and tethers provided, as necessary.

Figure 1



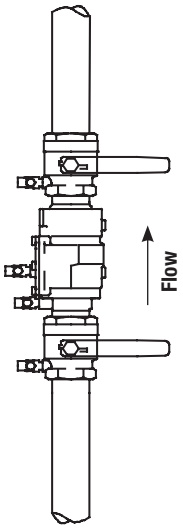
Horizontal Installation
850, LF850

Figure 2



Horizontal Installation (Top View)
850, LF850

Figure 3



Vertical Flow Up Installation
850, 850U

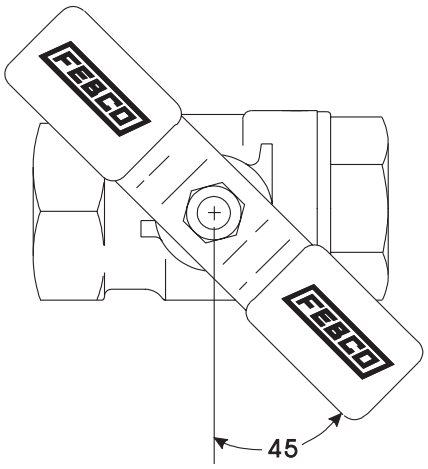
Vandalism Protection

Use these guidelines to protect and secure an assembly if the unit is installed where vandalism may be a problem.

- Remove the shutoff valve handles to discourage tampering.
- Install a protective enclosure over the unit to discourage vandals. If an enclosure is used, install it so that adequate clearance is available for maintenance and testing. Consult local codes before installing any type of protective enclosure.

Freeze Protection

The backflow prevention assembly may be subject to damage if the internal water is allowed to freeze. Protect the unit from freezing by using a heated enclosure, insulation heat tape, or other suitable means. The unit must always be accessible for testing and maintenance. If the system is shut down during freezing weather, use the following procedures to drain internal passages.



Main Valve Draining

1. Close the main shutoff valve.
2. Open the inlet drain.
3. Open the inlet and outlet ball valves 45 degree (half open/half closed).
4. Open all test cocks.
5. Open the outlet drain.
6. Remove the cover and the inlet check module until all water inside valve drains back through the inlet drain.
7. If compressed air is used to blow out the piping downstream of the assembly, complete the following step:
   a. Connect the air supply to the outlet drain and close the outlet ball valve.
   b. After clearing the system with air, partially open the outlet ball valve.
   c. Leave all drain valves, test cocks, and ball valves in the half open/half closed position for the winter season.

Ball Valve Shutoff Draining

If the assembly has been installed with ball valve shutoff valves, the ball valves must also be properly drained to prevent freeze damage. After the main valve draining procedure has been completed, position all ball valve shutoffs and test cocks in a half open/half closed, 45 degree position.

1. Open the ball valve approximately 45 degrees while draining the pipeline to allow water between the ball valve and valve body to drain.
2. Leave the ball valve in this position for winter to prevent freeze damage.

NOTICE

OPEN AND CLOSE BALL VALVES SLOWLY TO PREVENT DAMAGE TO THE SYSTEM CAUSED BY WATER HAMMER.

The ball valve must be fully closed before the system is repressurized.

Service Procedure

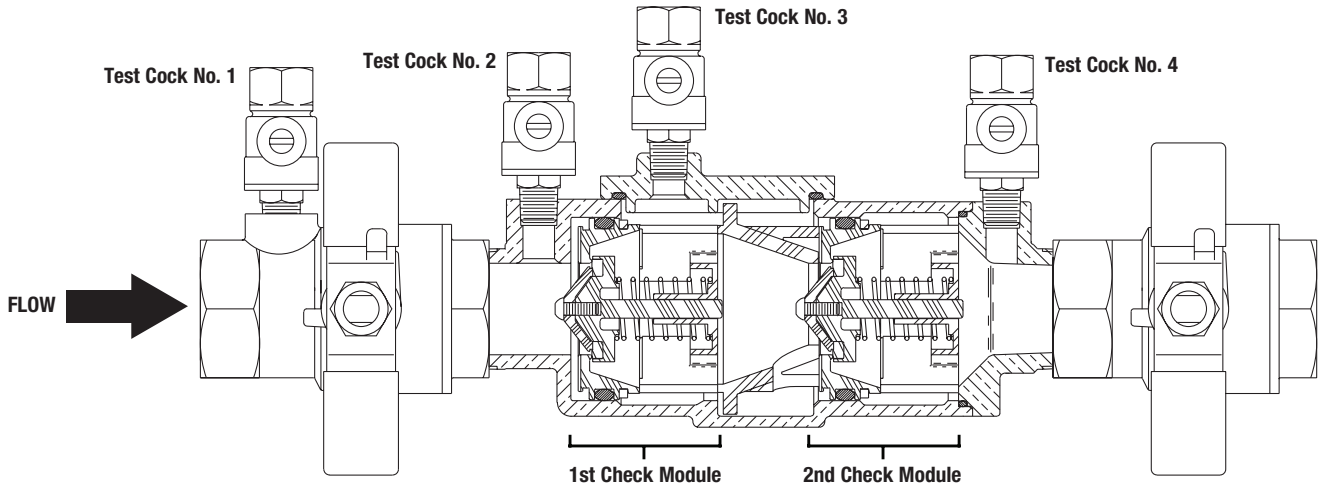
FEBCO backflow prevention assemblies are designed for ease of maintenance, in-line service, and repair with standard tools. For visual aid information, see the “Parts” section.

Suggested Tool Kit

- 1 crescent wrench
- 1 medium Phillips screw driver
- 1 medium standard screw driver
- Box/open end wrench
- Differential pressure test kit

1. Flush the line clean of debris before installation of the assembly. The most common cause of check fouling is dirt and debris in the seating areas.

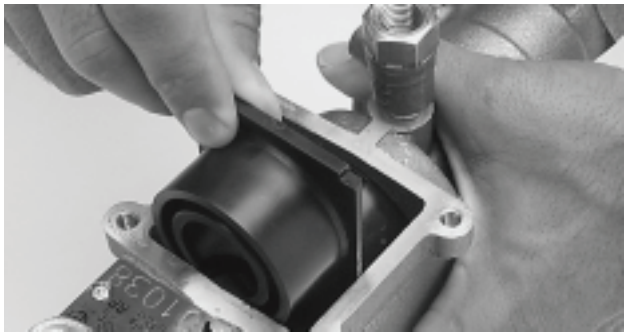
   To flush the line after installation of the assembly, slowly close the inlet shutoff valve, remove the cover and spring assemblies of both check valves, and open the inlet shutoff valve to allow sufficient flow of water through the assembly to clear all sand, debris, and other particles from the line. If debris in the water continues to cause fouling, install a strainer upstream of the assembly if permitted by local codes.
2. Rinse all parts with clean water before reassembly.
3. Do not use pipe dope, oil, grease, or solvent on any part unless instructed to do so. Use only food-grade petroleum jelly as a lubricant where directed.
4. Carefully inspect seals and seating surfaces for damage or debris. If the check valve seat disc has been severely cut at the seat ring diameter, the assembly has been subjected to extremely high and repeated backpressure. Either thermal water expansion or water hammer are the most likely causes. If backpressure persists, consider installation of a pressure relief valve downstream of the assembly.
5. Use caution to avoid damaging any guiding surfaces while handling parts. Do not force parts together. The O-ring seals used in FEBCO assemblies require only a small tightening force to ensure a positive seal.
6. Test the unit after servicing in accordance with locally approved test methods to assure proper operation.



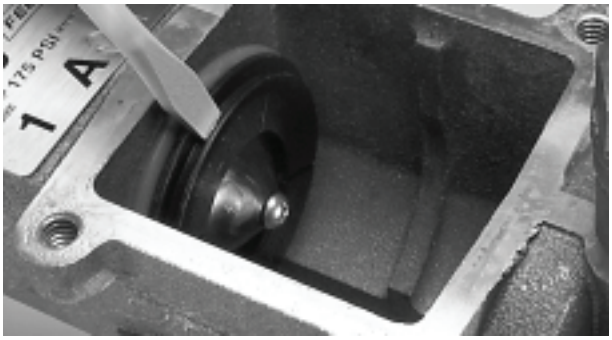
Note: Union end ball valves not shown.

Check Module Disassembly

1. Slowly close inlet and outlet ball valves. Bleed residual pressure by opening test cocks No. 2, No. 3, and No. 4. Allow the test cocks to remain open until the reassembling is completed. Test cock No. 1 should remain closed.
2. Remove the cover bolts (item 21) using the appropriate size wrench.
3. Remove spacer (item 8) by grasping the flanged end of the spacer and pulling straight up.



4. Remove the inlet check assembly by pulling it in the direction of flow out from the body bore until it is completely exposed then lift out of the body.
5. Remove the outlet check assembly by placing the tip of a medium size flat nose screwdriver in the slot of the seat (item 3) and prying the check assembly back until the red O-ring (item 3.1) is exposed. Then, using fingers, pull it out from the body bore until it is completely exposed then lift out of the body.



Seal Replacement

Both check assemblies are disassembled and reassembled in the same manner. To service the checks, replace the check modules with new ones by using check module assembly kits available from FEBCO. Or, replace the rubber components in the check modules by using the replacement rubber parts kits available from FEBCO.

1. To disassemble the check module, grasp the seat section (item 3) in one hand and the guide section (item 7) in the other hand, then rotate in a counterclockwise direction (approx. ⅛ turn) until the two parts disengage.

2. Remove the retaining screw (item 5.2) and disc retainer (item 5.1) so the rubber disc is fully exposed. Carefully pry out the rubber disc from the poppet. Be careful not to damage the poppet when removing the disc. Rinse the poppet in clean water and replace the old rubber disc with a new rubber disc. If the rubber disc is not damaged, it can be reversed and reinstalled when a new disc is unavailable. Rinse all other internal components with clean water. Replace the disc retainer and secure it with the retaining screw (item 5.2).

3. Reverse the preceding steps to reassemble the check module. Be sure to insert the poppet stem into the guide hole and keep fingers clear of the slots in the module.

Check Module Reassembly

Reverse the assembly procedure and the following special instructions to reassemble the check module.

1. Inspect the check module O-ring (item 3.1) for damage and replace if necessary. To ease assembly, apply a thin coating of FEBCO factory-supplied petroleum jelly (food grade) to the O-ring (item 3.1) before installing into the valve body.

⚠ CAUTION

Excess lubricant can cause foreign debris to collect on internal components. Accumulated debris could foul the check assembly and result in a test failure.

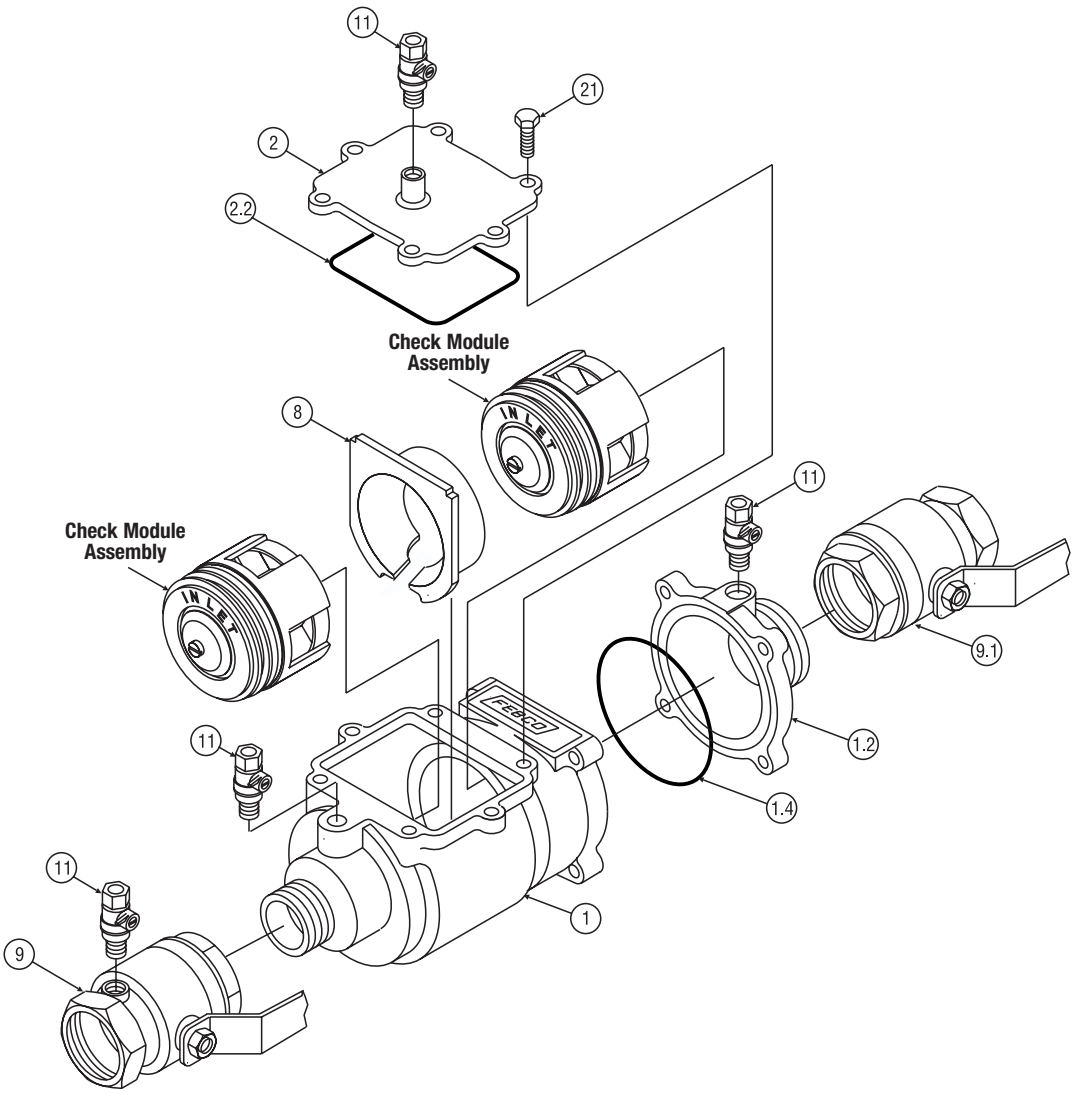
2. Ensure the end of each module inscribed with the word INLET faces the inlet of the valve.

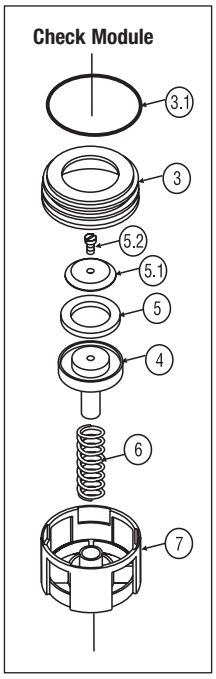
3. When replacing the spacer (item 8) between the two check assemblies, be sure that the flanged end of the spacer is touching the back side of the inlet check assembly so that the cover fits properly. Next, replace the cover making sure test cock No. 3 is on the upstream side. Do not overtighten the cover bolts. (Approximately 35 inch-pounds is sufficient.)
4. After reassembling, close test cock No. 2, No. 3, and No. 4. (Test cock No. 1 should already be closed.) Slowly open the inlet ball valve. Bleed air from the unit by opening and closing test cock No. 2, next No. 3, then No. 4.
5. Check for external leaks and repair if necessary. Slowly open the outlet ball valve.
6. Test the assembly in accordance with locally approved methods.

Troubleshooting

PROBLEM	CAUSE	SOLUTION
Check value fails to hold 1.0 psid minimum	Debris on sealing surfaces	Inspect and clean
	Leaking shutoff valve	Inspect and clean, or repair
	Damaged seat or seat disc	Disassemble and replace
	Spring stem not moving freely	Inspect for debris or damage
Chatter during flow conditions	Worn or damaged parts	Inspect and replace
Low flows passing through the mainline valve	Mainline check fouled	Inspect and clean, or repair

Parts





ITEM	DESCRIPTION	QUANTITY	½"	¾"	1"	1¼"	1½"	2"
1	Body	1	110134	110031	110032	110136	110027	110025
1.2	Tailpiece	1	110127	110040	110039	110138	110138	110037
1.4	O-ring	1	39603070	39603070	39603370	39604370	39604370	39604370
2	Cover	1	110041	110041	110035	110026	110026	110026
2.2	O-ring	1	39622470	39622470	39622970	39624070	39624070	39624070
3	Seat	2	500393	500393	500373	500358	500358	500358
3.1	O-ring	2	39612670	39612670	39622470	39633770	39633770	39633770
4	Poppet	2	500394	500394	500374	500357	500357	500357
5	Seat Disc	2	410127	410127	410134	410128	410128	410128
5.1	Disc Retainer	2	500396	500396	500391	500384	500384	500384
5.2	Round HD Screw	2	51653203	51653203	51653203	51951304	51951304	51951304
6	Spring	1	630177	630177	630173	630169	630169	630169
7	Guide	2	500395	500395	500375	500356	500356	500356
8	Retainer Spacer	1	500392	500392	500376	500366	500366	500366
9*	Ball Valve Tapped	1	781244	781053	781054	781055	781056	781057
	Union End BV Tapped	1	781287	781288	781289	781290	781291	781292
9.1*	Ball Valve	1	781047	781048	781049	781050	781051	781052
	Union End Ball Valve	1	781293	781294	781295	781296	781297	781298
11	Test Cock	4	781074	781074	781074	781075	781075	781075
12	Seat Ring - RV	1	500378	500378	500378	500368	500368	500368
21	Hex HD Cap Screw	10	51151306	51151306	51151306	51151406	51151406	51151406

*Union end ball valve not shown.

Repair Kits

Before contacting the local FEBCO parts distributor, write down the following information to have on hand when placing the order. The serial number located on the assembly ID plate can assist in ordering the proper kit.

- Item number and name. Locate the number and name of the item in the “Parts” section.
- Valve size. Verify the size of the valve that the item is to be used on.
- Model number. Record the full model number found on the assembly ID plate.
- Kit number. Use the tables below to find the number of the kit containing the item.

All sizes of each kit or assembly include the items listed.

RUBBER PARTS KIT	½"	¾"	1"	1¼"	1½"	2"
Part No.	905-342	905-342	905-343	905-344	905-344	905-344

Item	Description	Qty	Item	Description	Qty
2.2	O-ring	1	5	Seal Disc	2
3.1	O-ring	2			

CHECK MODULE ASSEMBLY	½"	¾"	1"	1¼"	1½"	2"
Part No.	905-347	905-347	905-349	905-351	905-351	905-351

Item	Description	Qty	Item	Description	Qty
3	Seal	1	5.1	Disc Retainer	1
3.1	O-ring	1	5.2	Round HD Screw	1
4	Poppet	1	6	Spring	1
5	Seal Disc	1	7	Guide	1

SINGLE POPPET KIT	½"	¾"	1"	1¼"	1½"	2"
Part No.	905-339	905-339	905-340	905-341	905-341	905-341

Item	Description	Qty	Item	Description	Qty
4	Poppet	1	5.1	Disc Retainer	1
5	Seal Disc	1	5.2	Round HD Screw	1

Add-on/Retrofit Sensor Connection Kit

ORDERING CODE	ADD-ON/RETROFIT KIT	DESCRIPTION
88009430	 FP-FBF-BMS/IMS-FZ BMS/IMS Freeze Sensor Connection Kit	Includes freeze sensor in mounting clip, activation module with mounting hardware, wire nuts (2), and power adapter. Use this kit to add an indicator of the freeze threshold for PVB assemblies in a BMS/IMS configuration.

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