

Installation, Maintenance, & Repair

Series 4000CIV

Reduced Pressure Zone Assemblies

Sizes: 2½" – 10" (65-250mm)**

⚠ 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

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

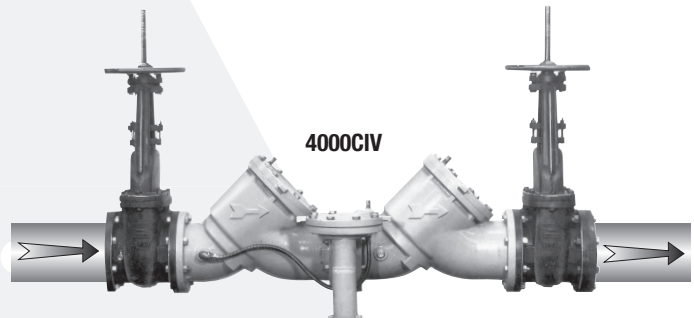
Testing

For field testing procedure, refer to Ames installation sheets IS-TK-DP/DL, IS-TK-9A, IS-TK-99E and IS-TK-99D found on www.amesfirewater.com.

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

For technical assistance, contact your local Ames representative.

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



Basic Installation Guidelines

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.

High Capacity Relief Series: Location and Installation Considerations

1. Backflow preventers must be installed in high-visibility locations in order 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.
2. Installing a backflow preventer in a pit or vault is not recommended. However, if this becomes necessary, Watts highly recommends that a licensed journeyman tradesperson, who is recognized by the authority having jurisdiction, be consulted to ensure that all local codes and required safety provisions are met. 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. *Please refer to Figure No. 1 for further information.
3. Pipe lines should be thoroughly flushed to remove foreign material before installing the unit. A strainer should be installed ahead of backflow preventer to prevent disc from unnecessary fouling. Install valve in the line with arrow on 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 (i.e. fire sprinkler lines). The strainer mesh could potentially become clogged with debris present in the water and cause water blockage during an emergency.

4. 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. *Please refer to Figure No. 1 and Figure No. 2 for further information.
5. When a 4000CIV Series backflow preventer is installed for dead-end service applications (i.e. 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. *Please see "Troubleshooting", Page 7, prior to installation.



Basic Installation Guidelines

Ames 2½" – 10" (65-250mm) 4000CIV High Capacity Relief Series: Location and Installation Considerations (cont.)

6. The relief valve module on 2½" – 10" (65-250mm) 4000CIV Series 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.

NOTICE

7. **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. Please see above. Failure to reassemble correctly will result in possible water damage due to excessive discharge from the relief port/vent and possible malfunction of the backflow preventer.
8. Prior to installation, thoroughly flush all pipe lines to remove any foreign matter.
9. **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 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.
10. **TEST:** The Series 4000CIV backflow preventer may be tested by a certified tester at the time of installation in order 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.

2½" – 10" (65-250mm)

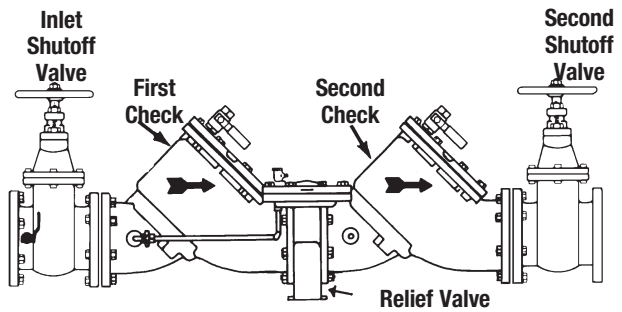


Figure 1
Model 4000CIV
Relief Valve Discharge Rates

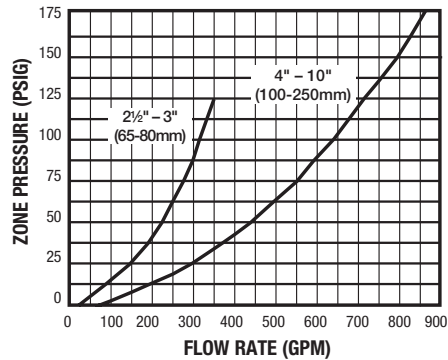


Figure 2

VALVE SIZE	TYPICAL FLOW RATES AS SIZED BY FLOOR DRAIN MANUFACTURERS	DRAIN SIZE
in.		in.
2½"	55 gpm	2
3"	112 gpm	3
4"	170 gpm	4
6", 8", 10"	350 gpm	5

Installation Instructions

- A. Series 4000CIV should be installed in a horizontal and upright position. 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 is to be mounted on the inlet side of the backflow preventer. The test cock is on the inlet side of the shutoff valve.
- B. The Series 4000CIV should always be installed in an accessible location to facilitate testing and servicing. Check the state and local codes to insure that the backflow preventer is installed in compliance, such as the proper height above the ground.
- 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 funneled through an air gap fitting piped to a floor drain.

CAUTION

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

- D. Ames recommends a strainer be installed ahead of Series 4000 assemblies to protect the discs from unnecessary fouling.
- E. Backflow preventers should never be placed in pits unless absolutely necessary and then only when and as approved by local codes. Consult your local or state plumbing or health inspector. Ames recommends installation indoors or above ground in an insulated enclosure.

Consult local authorities regarding acceptance of vertical installations.

Start Up

- F. The downstream shutoff should be closed. Open upstream slowly, fill the valve and bleed the air through Test cock 2, 3 and 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.
- G. 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. Do not reduce the size of the drain line from the air gap fitting.
- H. 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 judgement based on the operating conditions of a specific installation.

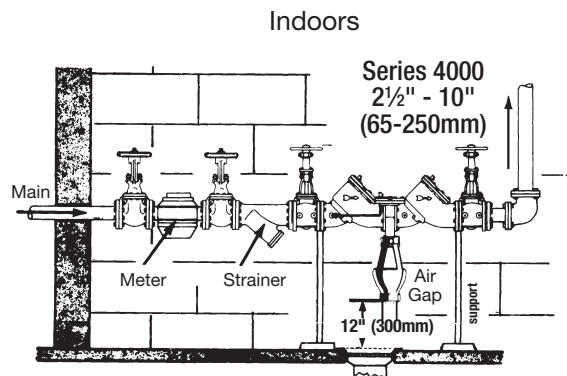
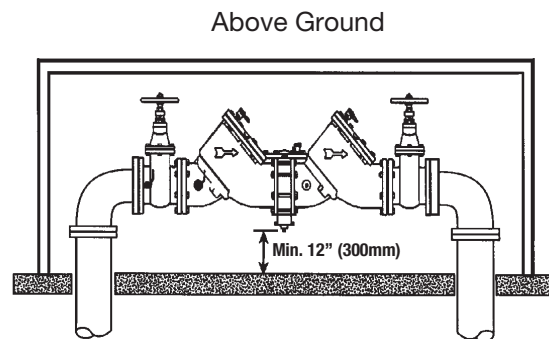


Figure 1



Now available, WattsBox Insulated Enclosures, for more information, send for ES-WB.

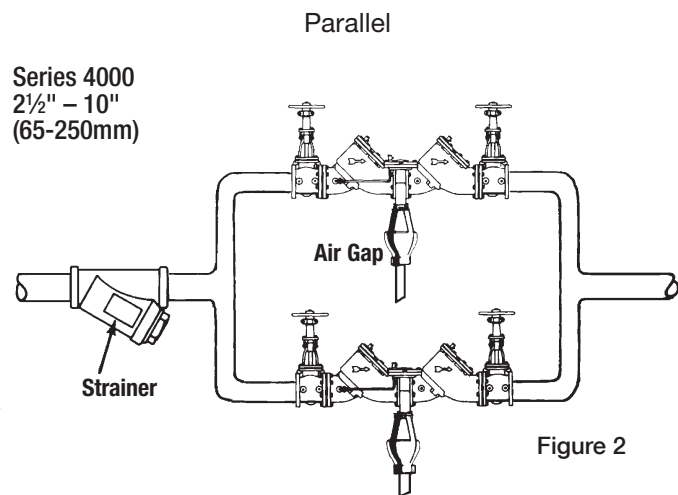


Figure 2

TABLE ONE - CAPACITY REQUIRED FOR SYSTEM

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 3/4"	Two 1"	Two 1 1/4"	Two 1 1/2"	Two 1 1/2"	Two 2"	Two 2 1/2"	Two 3"	Two 4"	Two 6"	Two 8"	Two 10"
Devices	Devices	Devices	Devices	Devices	Devices	Devices	Devices	Devices	Devices	Devices	Devices

Table shows total capacity provided with dual valve installations of various sizes.

Testing — Reduced Pressure Zone Assemblies

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'.

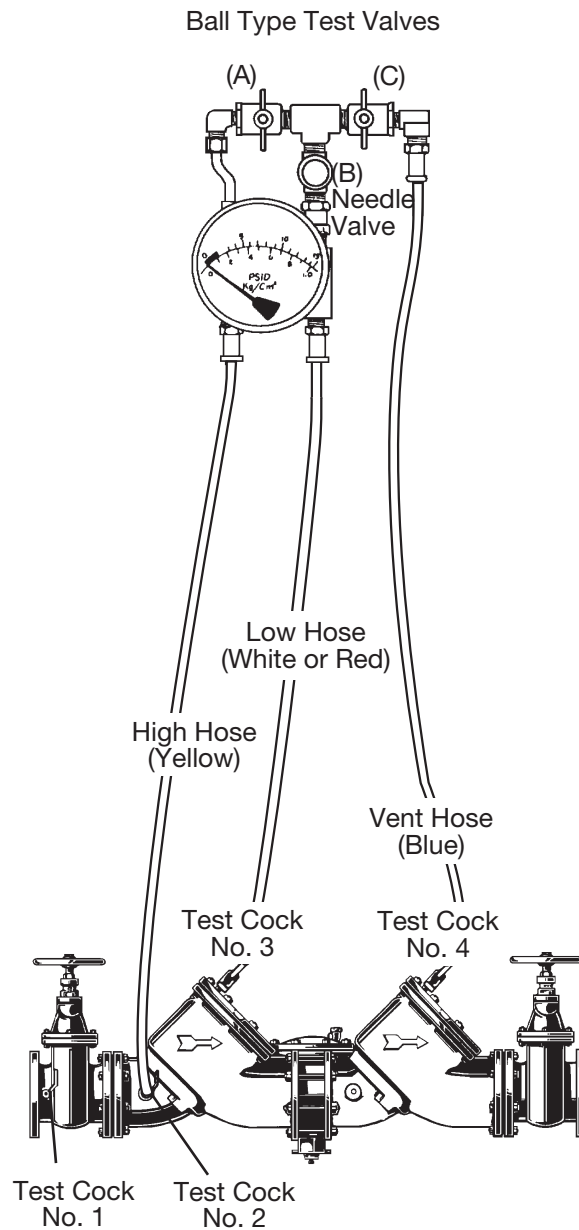
Test No. 4

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.



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

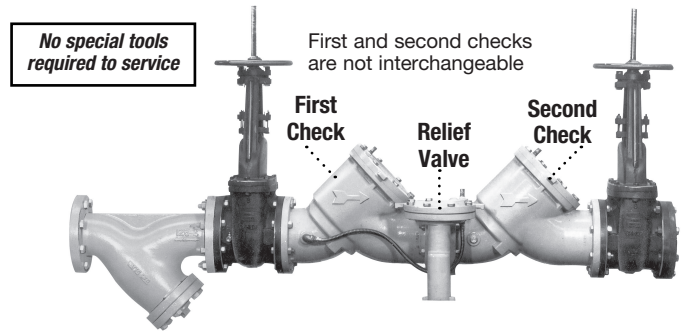
Servicing First and Second Checks

Sizes: 2½" – 10" (65-250mm)

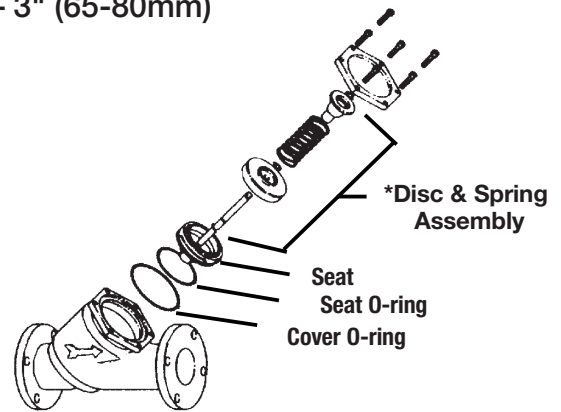
⚠ CAUTION

1. Remove the hatch cover bolts. The 4000CIV is designed so that when the bolts are backed off ½", all the spring load is released from the cover and retained by the check module. Be sure to 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. The seat ring may be removed and replaced by:
 Sizes 4" – 10" (100-250mm) pulling out the two wire retainers.
 Sizes 2½" – 3" (65-80mm) twisting one quarter-turn removes the seat.
- The wire retainers are 10" long. One is drawn out clockwise and the other is drawn out counterclockwise.
4. The seat ring can be lifted straight up and removed.
 5. To replace the disc on sizes 2½" – 4" simply remove the retaining nut or for sizes 6" – 10" remove the allen head socket screws. Reverse this procedure to install the new disc.

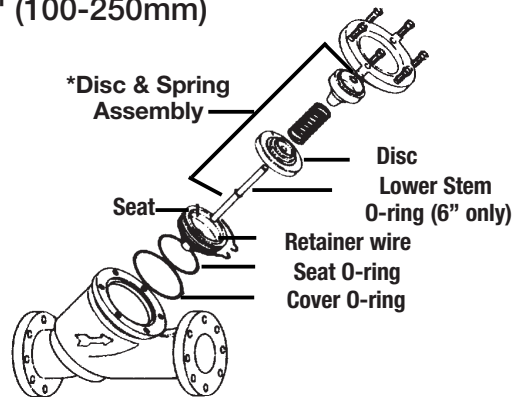
For further details contact your technical sales representative.



2½" – 3" (65-80mm)



4" – 10" (100-250mm)



⚠ WARNING

*Spring assembly is factory assembled. DO NOT DISASSEMBLE

Servicing the Relief Valve

Sizes: 2½" – 10" (65-250mm)

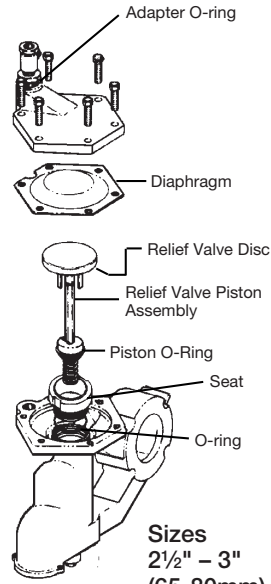
CAUTION

1. Remove the relief valve cover bolts. The 4000CIV is designed so that when the bolts are backed off ½" all the relief valve spring load is retained by the bottom plug spring module. Be sure to 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. It may be necessary to 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 is supplied as a disc holder assembly.
5. Removal of the bottom plug and spring assembly. During normal field service there is no need to remove the bottom plug spring assembly other than inspection. It can be removed by simply unscrewing with a large pipe wrench.

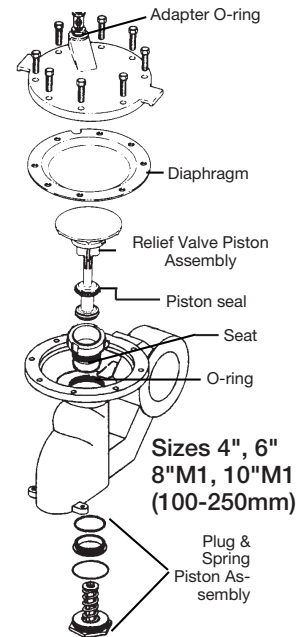
CAUTION

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

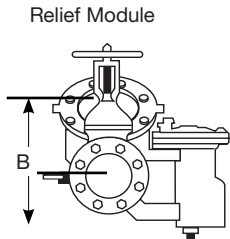
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Sizes
2½" – 3"
(65-80mm)

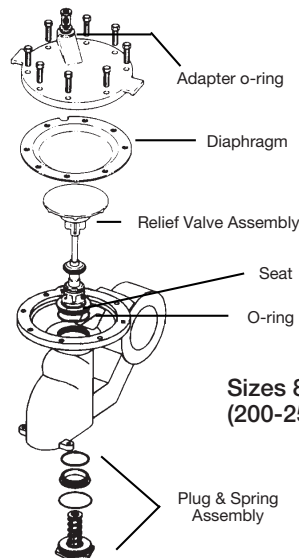


Sizes 4", 6"
8" M1, 10" M1
(100-250mm)



CLEARANCE REQUIRED FOR SERVICING

in.	A	B
2½ – 3	10"	11"
4	15"	14"
6	15"	16"
8	23"	21"
10	25"	21"



Sizes 8", 10"
(200-250mm)

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

Troubleshooting Guide

Problem	Cause	Solution
A. Valve spits periodically from the vent	A.1 Fluctuating supply pressure.	A.1 Install a soft seated check valve immediately upstream of the device.
	A.2 Fluctuating downstream pressure	A.2 Install a soft seated check valve downstream of the device close as possible to the shutoff valve.
B. Valve drips continually from the vent	B.1 Fouled first check	B.1 Flush valve. If flushing does not resolve problem, disassemble valve and clean or replace the first check.
	B.2 Damage or fouled relief valve seat.	B.2 Clean or replace the relief valve seat.
	B.3 Relief valve piston O-ring not free to move due to pipe scale, dirt or build up of mineral deposits.	B.3 Clean, grease or replace the piston O-ring.
	B.4 Excessive back pressure, freezing, or water hammer has distorted the second check.	B.4 Eliminate source of excessive backpressure 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.
	B.5 Electrolysis or relief valve seat or first check seats.	B.5 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.
	B.6 Valve improperly reassembled.	B.6 If valve is disassembled during installation, caution must be exercised to install check springs in their proper location.
C. Valve exhibits high pressure drop.	C.1 Fouled strainer.	C.1 Clean strainer element or replace.
	C.2 Valve too small for flows encountered.	C.2 Install proper size device based upon flow requirements.
D. No water flows downstream of valve.	D. Valve installed backwards.	D. Install valve in accordance with flow direction arrow.
E. Valve does not test properly	E.1 Follow manufacturer's test procedure	E.1 Clean or replace gate valve with full port ball valves or resilient wedge shutoff valves.
	E.2 Leaky downstream gate valve.	E.2 Clean or replace gate valve with full port ball valves or resilient wedge shutoff valves.
F. Valve quickly and repeatedly fouls following servicing.	F. Debris in pipe line is too fine to be trapped by strainer.	F. Install finer mesh strainer element in the strainer.
G. Winterization of back-flow preventers.		G. Electric heat-tape wrap closely together around valve body. Build a small shelter around the valve with a large light bulb installed and left on at all times. If 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.

For additional information, visit our web site at: www.amesfirewater.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: Ames Fire & Waterworks (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.

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