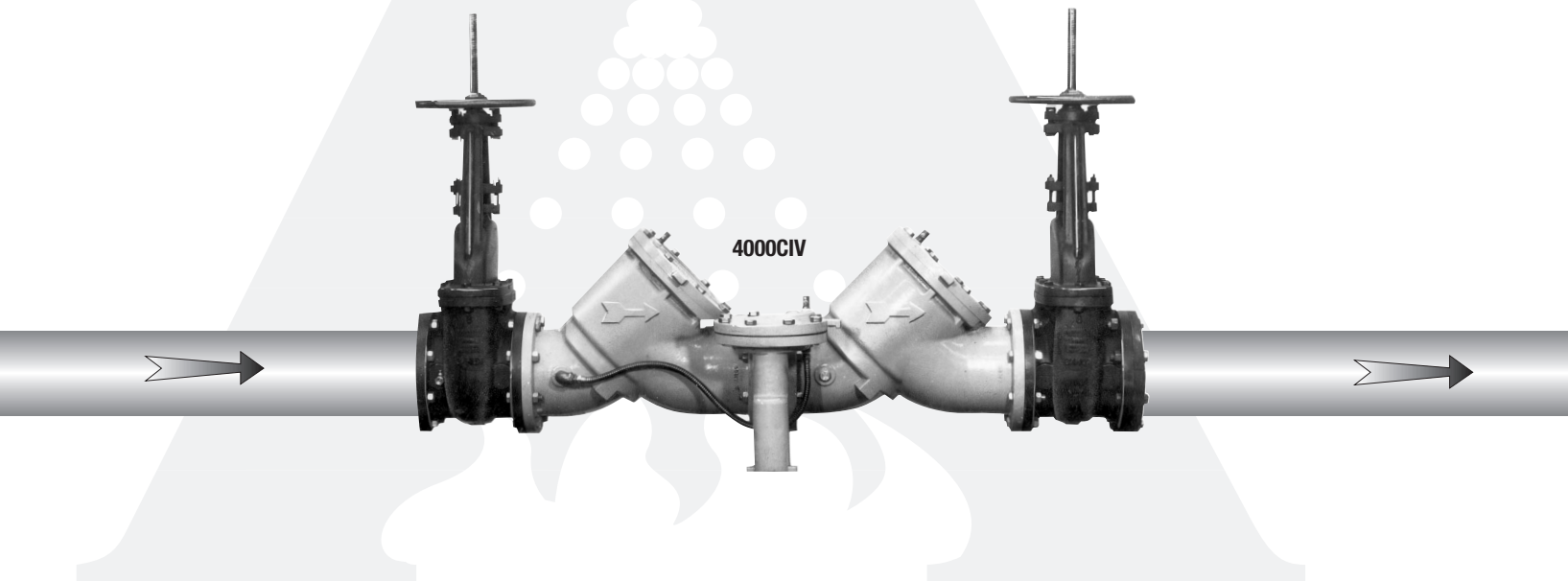




Reduced Pressure Zone Assemblies

Sizes: 2 1/2" – 10" (65 – 250mm)

- Installation
- Service
- Repair Kits
- Maintenance

For other repair kits and service parts, send for Ames Repair Parts Price List, PL-A-RP-BPD.

For technical assistance, contact your local Ames representative.

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.

For indoor installations, it is important that the valve be easily accessible to facilitate testing and servicing. Do not install in a concealed location.

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

It is important that Series 4000CIV be tested periodically in compliance with local codes, but at least once a year or more often depending upon system conditions.

IMPORTANT: Inquire with governing authorities for local installation requirements.

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

It is important that this assembly 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 sprinkler system, all mechanical checks, such as alarm checks and backflow preventers, should be flow tested and inspected internally in accordance with NFPA 13 and NFPA 25.

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.

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.**

CALIFORNIA PROPOSITION 65 WARNING

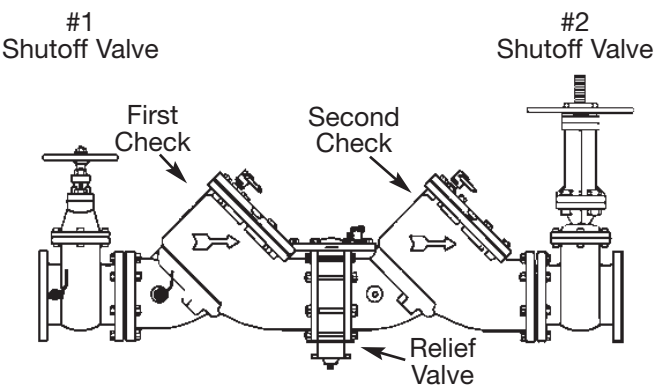
WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. (California law requires this warning to be given to customers in the State of California.)

For more information: www.watts.com/prop65



Basic Installation Instructions

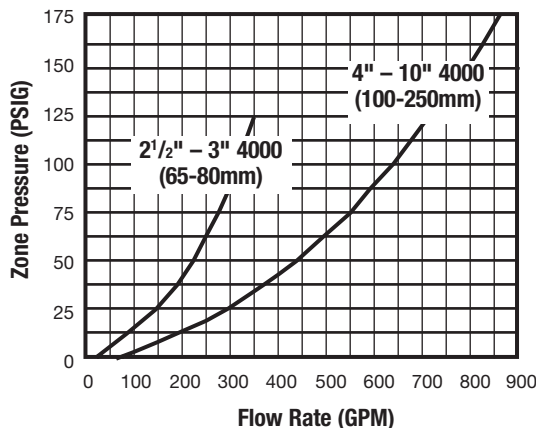
Figure No. 1



Ames 2 1/2" – 10" (65 – 250mm) 4000CIV 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, Ames 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. A strainer should be installed ahead of the backflow preventer to protect all internal components from unnecessary fouling.
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 an air gap fitting and a fabricated indirect waste line. Floor drains of the same size MUST be provided

Figure 1
Model 4000CIV Relief Valve Discharge Rates



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

- in case of excessive discharge. *Please refer to Figure No. 1 and Figure No. 2 for further information.
5. When a Series 4000CIV 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.
 6. The relief valve module on 2 1/2" – 10" (65 – 250mm) Series 4000CIV 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. This should be done by a licensed journeyman tradesperson, who is recognized by the authority having jurisdiction and only when space is critical for testing or repair.
 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 Figure No. 1. 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. **Installation procedures must comply with all state and local codes and must be completed by a licensed journeyman tradesperson who is recognized by the authority having jurisdiction.** Please see Page 3 for specific installation procedures.
 9. Prior to installation, thoroughly flush all pipe lines to remove any foreign matter.
 10. **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.
 11. **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.

*Consult local authorities regarding acceptance of vertical installations.

Figure 2

Valve size		Typical Flow Rates as sized by floor drain manufacturers	Drain size
in.	mm		
2 1/2	65	55 gpm	2
3	80	112 gpm	3
4	100	170 gpm	4
6, 8, 10	150-250	350 gpm	5

Installation Instructions

Installation

- 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 ensure 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.
- D. A strainer should be installed ahead of the assembly 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.

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.

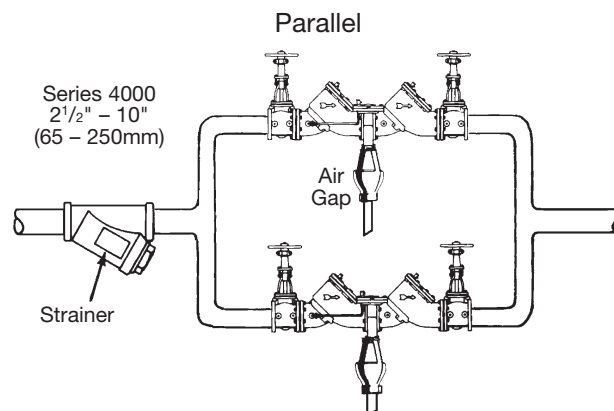
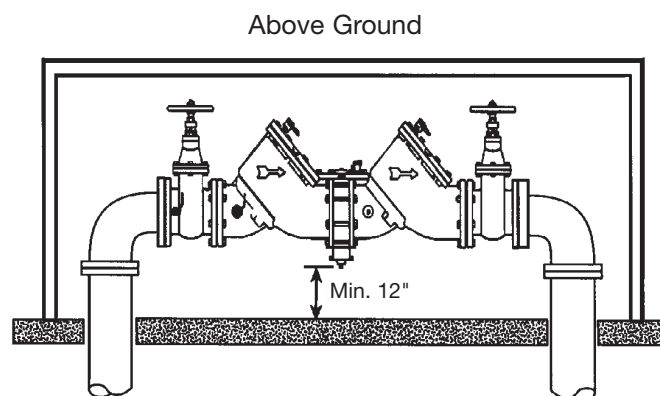
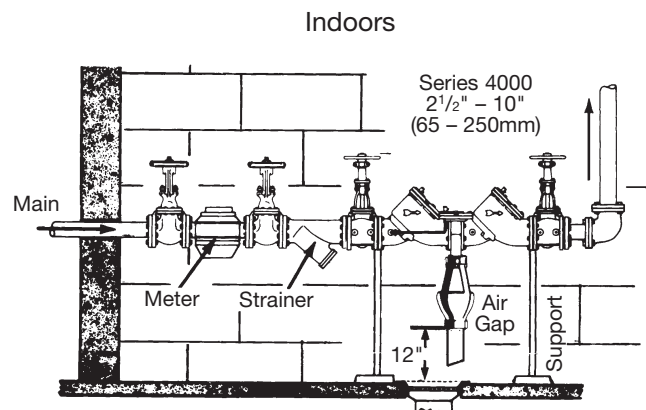


Table One — Capacity Required for System

50 gpm	100 gpm	150 gpm	200 gpm	250 gpm	350 gpm	450 gpm	640 gpm	1000 gpm	2000 gpm	3000 gpm	4000 gpm
Two ¾"	Two 1"	Two 1¼"	Two 1½"	Two 1½"	Two 2"	Two 2½"	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.

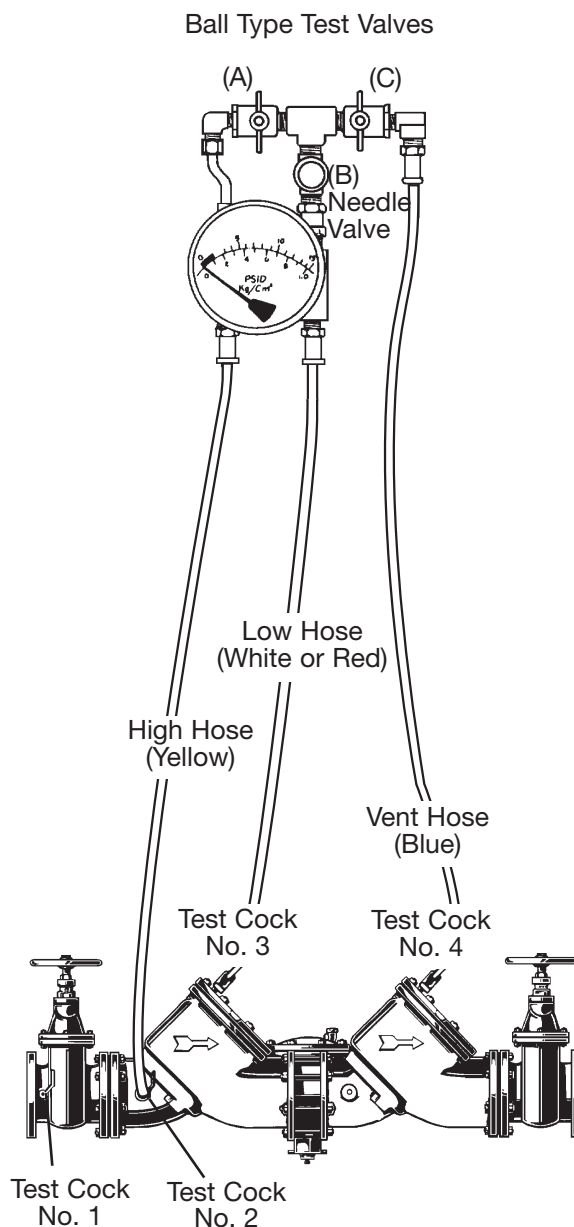
Requirements: Valve must be tight against reverse flow under all pressure differentials. Close 'high' valve A and open test cock #2. Close test cock #4. Disconnect vent hose at test cock #4. Open valves B and C, bleeding to atmosphere. Then closing valve B restores the system to a normal static condition. 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

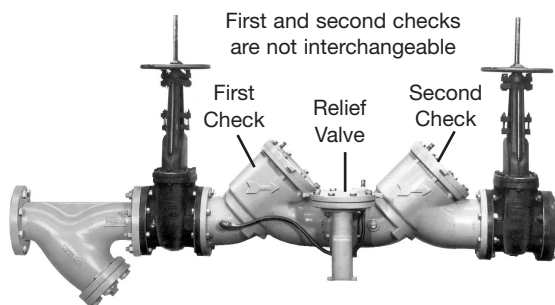
Purpose: To test operation of pressure differential relief valve.

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.

Note: 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.



Servicing First and Second Checks



Note: No special tools required to service 4000CIV

1. Remove the hatch cover bolts. **NOTE:** The 4000CIV is designed so that when the bolts are backed off $\frac{1}{2}$ " (15mm), all the spring load is released from the cover and retained by the check module.
- CAUTION:** 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 pulling out the two wire retainers on sizes 4" – 10" (100-250mm) while on sizes $2\frac{1}{2}$ " – 3" (65-80mm), one quarter turn twist removes seat. The wire retainers are 10" long. One is drawn out clockwise and the other is drawn out counterclockwise.
4. With the retainer wires removed, the seat ring can be lifted straight up and removed.
5. **CAUTION:** The check valve spring is in compression. The spring load is captured by the two spring retainers and the stem. The spring retainers are not to be removed for servicing. If there is a need to replace the spring, spring retainer or stem, an assembled module must be obtained from the factory. These modules are not interchangeable, be sure to replace the first check with a first check module and the second check with a second check module.
6. To replace the disc on sizes $2\frac{1}{2}$ " – 4" (65-100mm) simply remove the retaining nut or for sizes 6" – 10" (150-250mm) remove the allen head socket screws. Reverse this procedure to install the new disc.

Repair Kits

When ordering, specify Ordering Code, Kit Number and Valve Size.

ORDERING CODE	KIT NO.	SIZE	
		in.	mm

First Check Kits

7016206	ARK 4000CIV CK1	$2\frac{1}{2}$ -3	65-80
7016207	ARK 4000CIV CK1	4	100
7016208	ARK 4000CIV CK1	6	150
7016209	ARK 4000CIV CK1	8	200
7016210	ARK 4000CIV CK1	10	250

Second Check Kits

7016211	ARK 4000CIV CK2	$2\frac{1}{2}$ -3	65-80
7016212	ARK 4000CIV CK2	4	100
7016213	ARK 4000CIV CK2	6	150
7016214	ARK 4000CIV CK2	8	200
7016215	ARK 4000CIV CK2	10	250

Kit includes: Disc & Spring Assembly, Cover O-ring and Lubricant

ORDERING CODE	KIT NO.	SIZE	
		in.	mm

Seat Kits for Checks

7016226	ARK 4000CIV S	$2\frac{1}{2}$ -3	65-80
7016227	ARK 4000CIV S	4	100
7016228	ARK 4000CIV S	6	150
7016229	ARK 4000CIV S	8	200
7016230	ARK 4000CIV S	10	250

Kit includes: Seat, Seat O-ring, Cover O-ring, Retainer Wire and Lubricant

First Check Rubber Parts Kits

7016216	ARK 4000CIV RC1	$2\frac{1}{2}$ -3	65-80
7016217	ARK 4000CIV RC1	4	100
7016218	ARK 4000CIV RC1	6	150
7016219	ARK 4000CIV RC1	8	200
7016220	ARK 4000CIV RC1	10	250

Kit includes: Lower Stem O-ring (6" only), Check Disc, Cover O-ring and Lubricant

ORDERING CODE	KIT NO.	SIZE	
		in.	mm

Second Check Rubber Parts Kits

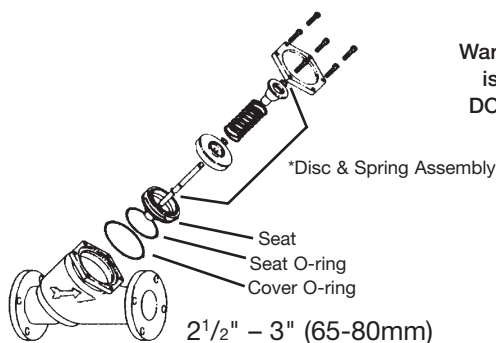
7016221	ARK 4000CIV RC2	$2\frac{1}{2}$ -3	65-80
7016222	ARK 4000CIV RC2	4	100
7016223	ARK 4000CIV RC2	6	150
7016224	ARK 4000CIV RC2	8	200
7016225	ARK 4000CIV RC2	10	250

Kit includes: Lower Stem O-ring (6" only), Check Disc, Cover O-ring and Lubricant

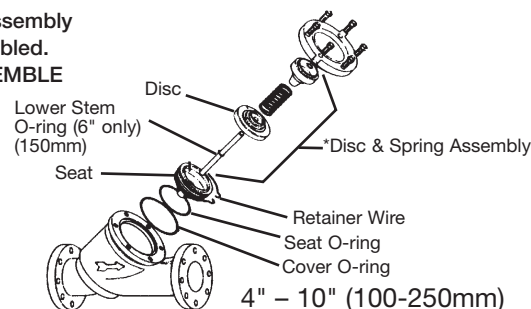
Complete Rubber Parts

7016231	ARK 4000CIV RT	$2\frac{1}{2}$ -3	65-80
7016232	ARK 4000CIV RT	4	100
7016233	ARK 4000CIV RT	6	150
7016234	ARK 4000CIV RT	8	200
7016235	ARK 4000CIV RT	10	250

Kit includes: RC1, RC2, RV



Warning: Spring assembly is factory assembled. DO NOT DISASSEMBLE



Servicing the Relief Valve

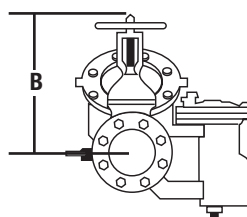
1. Remove the relief valve cover bolts. Note the 4000CIV is designed so that when the bolts are backed off 1/2" all the relief valve spring load is retained by the bottom plug spring module. **CAUTION:** Be sure to verify this before removing all the bolts.
2. Remove the cover and diaphragm. The relief 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. Note: 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 as retained on the bottom plug is highly loaded.

NO attempt should be made in the field to remove the spring. For replacement, a complete bottom plug assembly must be obtained from the factory.

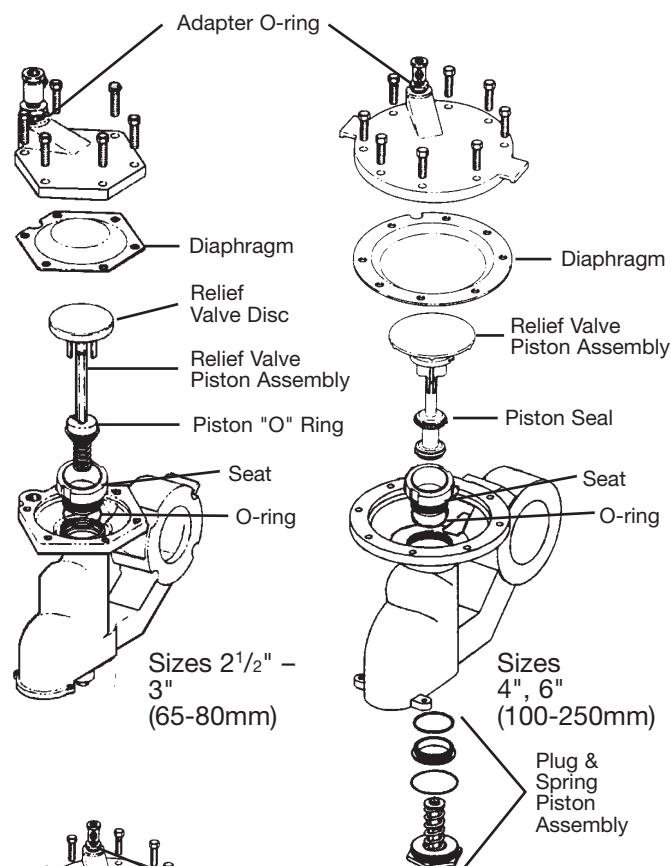
For further details contact your technical sales representative, see back page.

Relief Module



Clearance Required for Servicing

		A		B	
in.	mm	in.	mm	in.	mm
2 1/2 - 3	65 - 80	10	254	11	279
4	100	15	381	14	356
6	150	15	381	16	406
8	200	23	584	21	533
10	250	25	635	21	533



Repair Kits

When ordering, specify Ordering Code, Kit Number and Valve Size.

ORDERING CODE	KIT NO.	SIZE	
		in.	mm

Relief Valve Rubber Parts

7016266	ARK 4000CIV RV	2 1/2 - 3	65-80
7016267	ARK 4000CIV RV	4 - 6	100-150
7016268	ARK 4000CIV RV	8 - 10	200-250

Kit includes: Sleeve O-ring, Seat O-ring, Piston O-ring, Stem O-ring, RV Disc Assembly, Diaphragm, Piston Seal, Bottom Plug O-ring and Lubricant

Relief Valve Total

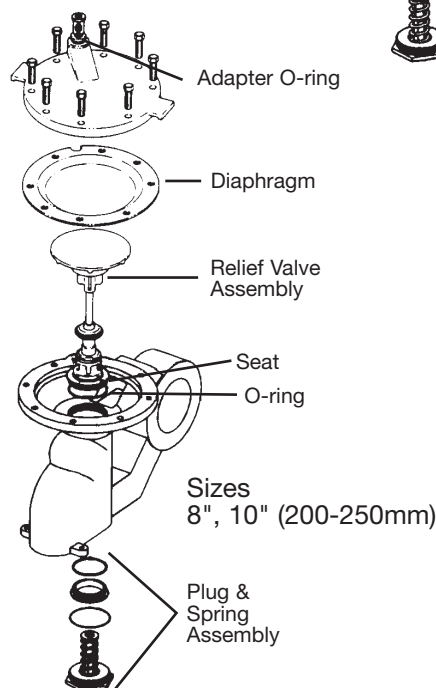
7016270	ARK 4000CIV VT	2 1/2 - 3	65-80
7016271	ARK 4000CIV VT	4 - 6	100-150
7016272	ARK 4000CIV VT	8 - 10	200-250

Kit includes: Adapter O-ring, Diaphragm, Disc & Piston Assembly Seat, Seat O-ring and Lubricant

Cover Kits

7016274	ARK 4000CIV C	2 1/2 - 3	65-80
7016275	ARK 4000CIV C	4	100
7016276	ARK 4000CIV C	6	150
7016277	ARK 4000CIV C	8	200
7016278	ARK 4000CIV C	10	250

Kit includes: Cover, Cover O-ring and Lubricant



Troubleshooting Guide

PROBLEM	CAUSE	SOLUTION
A. 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 close as possible to the shutoff valve.
B. 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.
	Damage 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 backpressure, freezing, or water hammer has distorted the second check.	Eliminate source of excessive backpressure or water hammer in the system downstream of the device. Use Watts Model 601 to dampen out backpressure and Model 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. Install dielectric unions 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 valve is disassembled during installation, caution must be exercised to install check springs in their proper location.
C. 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.
D. No water flows downstream of valve.	Valve installed backwards.	Install valve in accordance with flow direction arrow.
E. Valve does not test properly	Follow manufacturer's test procedure	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.
F. Valve quickly and repeatedly fouls following servicing.	Debris in pipe line is too fine to be trapped by strainer.	Install finer mesh strainer element in the strainer.
G. Winterization of backflow preventers.		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 eliminate any possible backflow.

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



www.amesfirewater.com



A Division of Watts Water Technologies, Inc.

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Control Valves- 18550 Hansen Road • Houston, TX 77075 • T: 713-943-0688 • F: 713-944-9445

Canada: 5435 North Service Rd. • Burlington, ONT. L7L 5H7 • T: 905-332-4090 • F: 905-332-7068

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