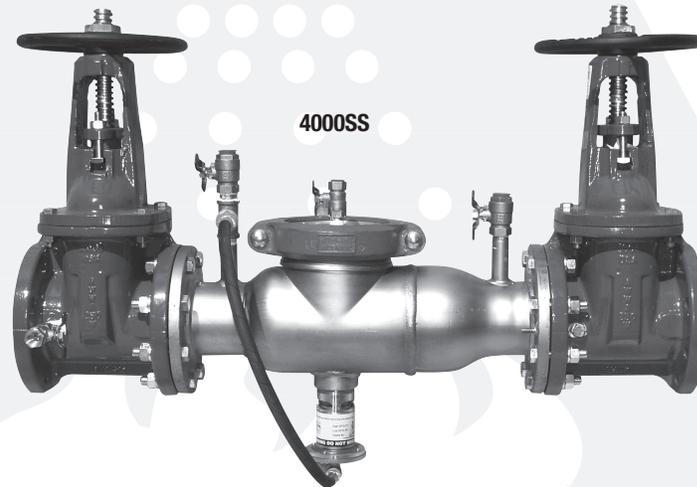


# Installation, Maintenance, & Repair

## Series 4000SS

Reduced Pressure Zone Assemblies

Sizes: 8" – 10" (200 – 250mm)\*\*



**SILVER BULLET**

### ⚠ 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.

### 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.

### Testing

For field testing procedure, refer to Ames installation sheets IS-A-ATG-1 found on [www.amesfirewater.com](http://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](http://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.

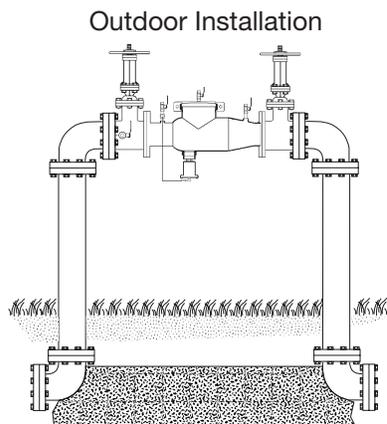
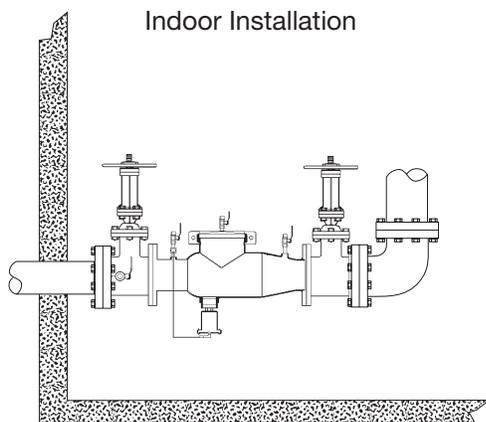
# Installation Guidelines

## NOTICE

Assembly body should not be painted.

## Please Read Prior to Installation:

1. Before installing any Ames assembly, Flush the Line thoroughly to remove all debris, chips and other foreign objects. Failure to do so may make the assembly inoperable.
2. The Ames 4000SS Reduced Pressure Backflow Preventers are approved by ASSE (American Society of Sanitation Engineers) to be installed in horizontal positions. Local water authorities must approve all installation configurations.
3. Allow sufficient clearance around the installed assembly to conduct testing, servicing, and inspection. Allow a minimum of 12" from the flood level to the bottom of the assembly.
4. The 4000SS is not recommended for pit installations. Where necessary, an Air Gap drain may be connected to the relief valve to minimize flooding of the surrounding area. Flooding may cause a cross-connection. Be sure to contact local code authorities for proper installations.
5. If installing on fire protection system, be sure to purge air from fire system. Fill system slowly with all inspectors test valves open.



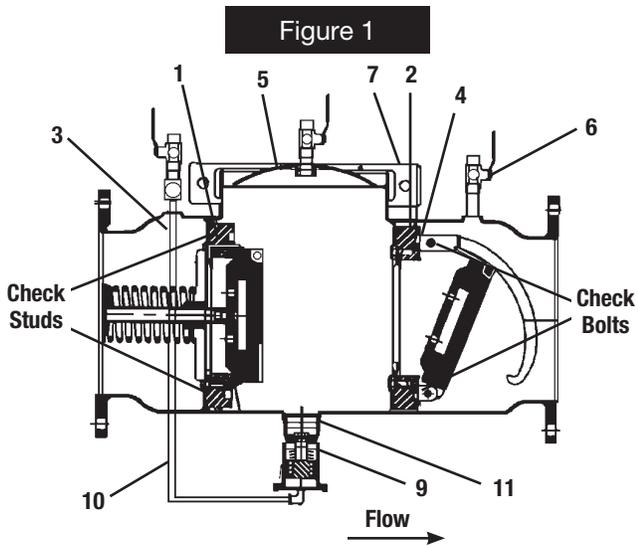
# Maintenance Instructions

**⚠ WARNING** Depressurize valve before servicing.

## Removing Cam-Checks

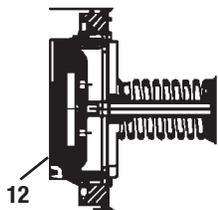
1. Shut down water system and lock out system if possible. Slowly open all ball valves to relieve air and water pressure. Loosen bolts on groove coupler and remove groove coupler and cover plate from valve body.
2. **#1 Check**  
Using a  $\frac{9}{16}$ " socket wrench or nut driver, remove the four nuts from the #1 check studs (See Fig. 1). Using two hands, place them at 12 o'clock and 6 o'clock, wiggle the check assembly free. Remove through access port with back of clapper first with spring end down. Pull check assembly out of main body. To inspect 1st check gear or to free 1st check of debris, see page 4.  
**#2 Check**  
After loosening bolts with a  $\frac{9}{16}$ " socket, remove bolts completely. Using the centerline access bar, spin the cam assembly from the 9 o'clock position to the 12 o'clock position, then (without letting go of the access bar) push the cam assembly slightly downstream so that the clapper is now parallel to the valve body. Now bring the cam assembly through the check retaining wall. Leave the cam assembly clapper parallel to the valve body. Pull the cam assembly through the access port.
3. Using a  $\frac{3}{8}$ " nut driver or a piece of small diameter pipe, place on the cam arm torsion spring and move away from and around the torsion spring retaining bracket so as to relieve the torsion spring tension. This will allow the cam arm to move freely, enabling you to inspect the clapper face and cam seat. Thoroughly clean the seat area and clapper sealing surfaces, cam arms, and O-rings for damage, nicks, and debris. If damaged, install a new check assembly and/or O-ring.
4. Before reinstallation of check assembly, thoroughly clean O-ring groove and lubricate with F.D.A. approved lubricant.

# Maintenance Instructions cont.

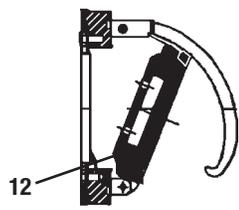


- | Item # | Part Description                     |
|--------|--------------------------------------|
| 1.     | #1 Cam-Check                         |
| 2.     | #2 Cam-Check                         |
| 3.     | #1 Cam-Check O-ring                  |
| 4.     | #2 Cam-Check O-ring                  |
| 5.     | Cover Plate                          |
| 6.     | Ball Valve                           |
| 7.     | Groove Coupler                       |
| 8.     | Groove Coupler Gasket<br>(not shown) |
| 9.     | Relief Valve (complete assembly)     |
| 10.    | Relief Valve Hose                    |
| 11.    | Relief Valve Body O-ring             |
| 12.    | Washer, Shutoff                      |

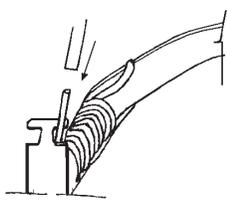
**Figure 2**  
#1 Cam-Check RP



**Figure 3**  
#2 Cam-Check DC & RP



**Figure 4**



# Maintenance Instructions to Inspect Seat & Clapper on 1st Check

**⚠ WARNING** Depressurize valve before servicing.

**⚠ WARNING**

Use extreme caution when servicing the first check.

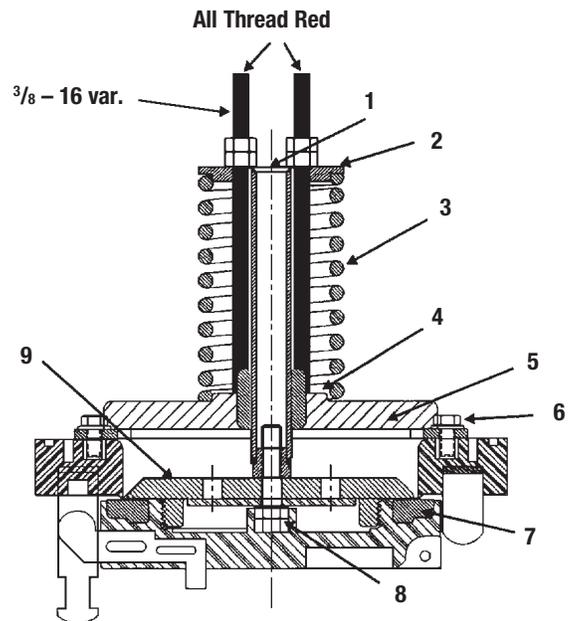
To inspect the seat and clean the seat and clapper washer:

1. After removing the first check from the backflow valve body, place on a flat surface with the coil spring facing up.
2. In order to gain access to the seat and clapper rubber ring, you must compress the spring (#3) that surrounds the clapper shaft (#1). To do so, you must place the  $\frac{3}{8}$ " all thread rod through two holes of the spring retaining plate #2.
3. After placing the  $\frac{3}{8}$ " all thread rod through the spring retaining plate, thread the all thread rod into the threaded holes (#4) at the base of spider (#5 next to shaft). Be sure to use two nuts on the all thread rod to tighten them into the thread holes. The depth of the threaded holes should be approximately  $\frac{1}{2}$ ". This operation will require you to use two pieces of all thread rod (see drawing on the right.)
4. Compressing the spring. To do so, you need to loosen the top  $\frac{3}{8}$ " nut and back it off without unthreading the all thread rod from the spider. Place a box end wrench or crescent wrench on the  $\frac{3}{8}$ " nut closest to the spring retaining plate and tighten (be sure to tighten both all thread and nut evenly; that is to say, put a few turns on one all thread rod nut and a few turns on the other.)
5. During compression, the clapper will slowly move up, away from the seat. To examine the seat, continue spring compression until the clapper has moved approximately 1" from the seat. This should allow debris to be removed and or the seat to be examined.
6. To unload the spring compression, loosen the all thread and then double nut the all thread and unscrew the all thread rod from the spider and shaft base.

To disassemble the first check, you will need the following:

- Two pieces of  $\frac{3}{8}$ " all thread rod (approximately 14" long)
- Four  $\frac{3}{8}$ " hex nuts
- Adjustable crescent wrench
- Pipe wrench or channel lock pliers

- |  |                          |
|--|--------------------------|
| 1. Shaft                                       | 5. Spider                |
| 2. Spring retaining plate                      | 6. Spider retaining bolt |
| 3. Spring                                      | 7. Seat ring             |
| 4. $\frac{3}{8}$ " threaded hole (maintenance) | 8. Clapper to shaft bolt |
|  | 9. Seat ring retainer    |



## Relief Valve Service Instructions

**⚠ WARNING** Depressurize valve before servicing.

The relief valve may be serviced while on or off the backflow preventer valve.

**NOTICE**

Do not use a pipe wrench to remove the relief valve assembly from the backflow preventer.

### Relief Valve Disassembly

1. Disconnect the relief valve hose from the elbow in the bottom flange cover at the swivel hose connection. Do not remove the elbow.
2. If the valve is to be removed from the backflow preventer for service, place a screw driver blade or flat bar across the edges of the 2 hex head screws in the bottom flange cover and turn counterclockwise to loosen the relief valve assembly.

3. Remove the 4 bottom bolts from the bottom of the relief valve assembly with a  $\frac{5}{16}$ " socket or open-end wrench. Remove the bottom flange cover.
4. Remove the piston assembly & sleeve from the relief valve body by placing your index fingers through the slots in the side of the body and pressing down on the top of the disc retainer in the top of the piston assembly. (See Figure 7.)
5. Pull the piston assembly free of the body by grasping the sleeve and pulling down.
6. Grip the sleeve and the piston assembly by the head of the hex head bolt. Pull up on the sleeve to extend the diaphragm. Slide the sleeve (Part #7013340) completely off of the diaphragm and inspect the diaphragm for tears, holes or excessive wrinkles. If the diaphragm is damaged, order a new piston/diaphragm assembly.

# Relief Valve Service Instructions (cont.)

## Relief Valve Reassembly

1. Thoroughly clean all inside surfaces of the relief valve body.
2. Inspect the relief valve body seat surface located at the top edge of the 3 discharge slots near the top of the body by rubbing the end of the index finger around the entire seat surface; access the seat surface through the slots or the bottom of the body. The seat must be free of nicks. If nicks are discovered, remove the body & install a new relief valve assembly.
3. Position the diaphragm on the piston assembly so that it is facing up as shown in Figure 8.
4. Now fold the top (ribbed) edge of the diaphragm inward, grasp the sleeve with the ribbed edge up and slide the sleeve down over the piston assembly as shown in Figure 8.
5. While still holding the sleeve, slide it up over the diaphragm and, using your thumb & index finger, position the bead of the diaphragm so that it wraps over the outside of the rib on the top of the sleeve so that the sleeve is held by the diaphragm. Now place the piston assembly on a flat, firm surface with diaphragm facing up as shown in Figure 9.
6. Cup your hand slightly to form an air trap and force the sleeve down over the piston assembly with a rapid slap (hard) on the open end of the diaphragm with your cupped hand. The trapped air in the diaphragm will force the diaphragm between the inside of the sleeve and the outside of the piston. Ensure that the diaphragm is fully seated by running the end of a dull "butter" knife in the formed diaphragm. If diaphragm is wrinkled, repeat previous step.
7. Slide the piston assembly and sleeve into the relief valve body with the hex head bolt entering the flanged end of the body first. Slide the piston assembly in until the diaphragm lip is smoothly seated in the machined groove in the flanged end of the body. By running your index finger around the outside of the diaphragm bead, you will ensure it is seated smoothly.
8. Position the bottom flange cover on the bottom of the relief valve body and secure by hand tightening the 4 bottom bolts.
9. Now tighten the 4 bottom bolts to approximately 15 ft.-lbs. with a  $\frac{5}{16}$ " socket or open-end wrench.
10. Reattach the relief valve hose to the elbow in the bottom flange cover.

Figure 7

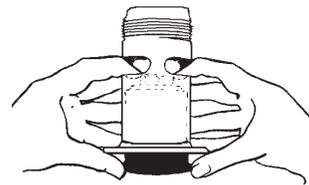


Figure 8

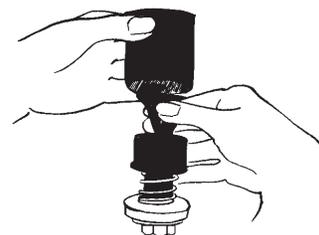


Figure 9

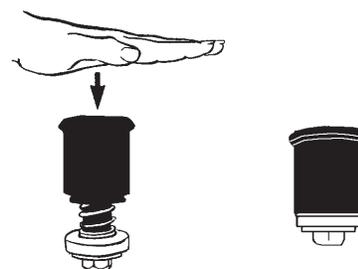


Figure 6

Relief Valve

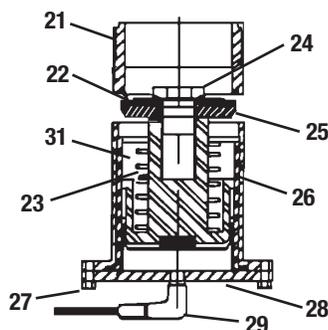


Figure 6

Item #	Part Description
21.	Relief Valve Body
22.*	Rubber Shut-Off Disc.
23.*	Piston Diaphragm Assembly
24.	Hex Head Bolt
25.	Disc. Retainer
26.	Sleeve
27.	Bottom Bolt
28.	Bottom Flange (w/St. Elbow)
29.	Elbow St 90 3/8
30.*	O-Ring Disk
31.	RV Spring

# 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.

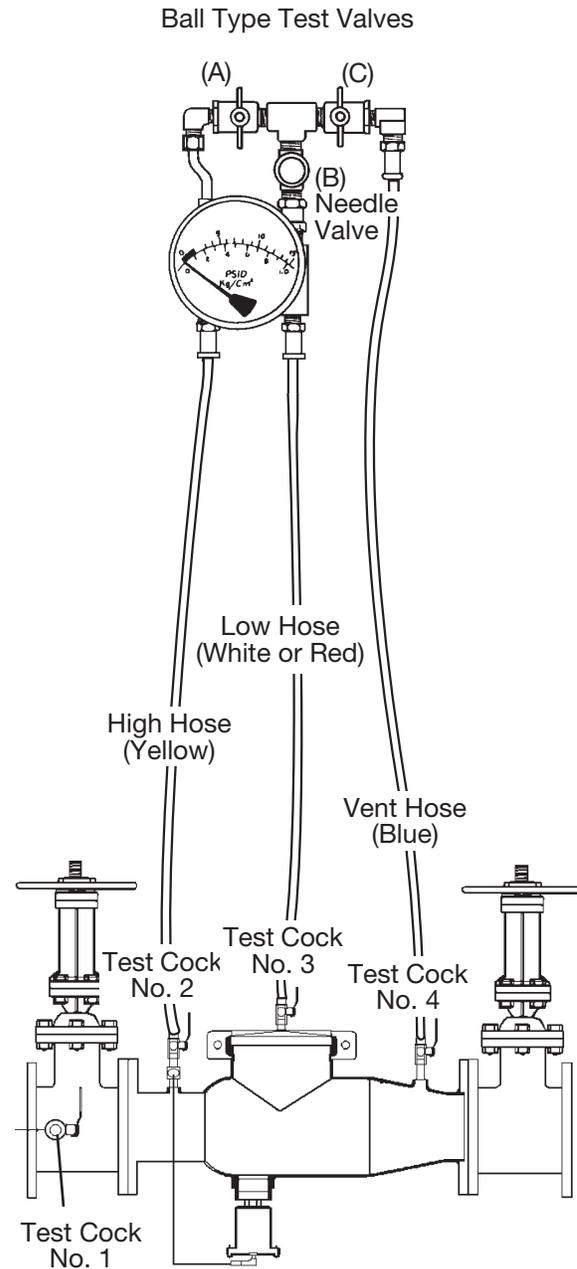
**Requirements:** The pressure differential relief valve must operate to maintain the 'zone' between the two check valves at least 2psi less than the supply pressure. Close 'vent' valve C. Open 'high' valve A. Open the 'low' valve B very slowly until the differential gauge needle starts to drop. Hold 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.

### CAUTION

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



# Troubleshooting Guide

PROBLEM	CAUSE	SOLUTION
A. Assembly discharges from differential relief valve during no flow condition.	Fouled first check Fluctuating inlet pressure Outlet pressure higher than inlet pressure & leak in No. 2 check valve Leak through diaphragm or around flange bolt holes of relief valve Pressure relief valve does not close	Disassemble and clean No. 1 check valve Control supply line water pressure Disassemble, clean #2 check valve & identify cause of back pressure. Service relief valve (page 4) See problem D
B. Assembly discharges from differential relief valve during a flow condition.	No. 1 check valve wedged open O-ring displaced from groove in 1st check Pressure relief valve does not close Fluctuating line pressure	Disassemble and clean No. 1 check valve Disassemble and replace See problem D
C. Differential pressure relief valve does not open during test due to leaking outlet gate valve.	Differential pressure across No. 1 check valve stays above 2psi due to leaking outlet gate valve Weak or broken relief valve spring Shut off seat tube bound in body Plugged hydraulic hose	Repair shut-off valves  Disassemble and replace relief valve spring Disassemble and repair Disassemble and repair
D. Pressure relief valve does not close	Debris on sealing surface Plugged hydraulic hose Damaged seat or rubber shut off disc Ruptured diaphragm Wrinkled or improperly installed diaphragm	Remove relief valve and clean Disassemble and clean Remove relief valve assembly and replace Disassemble and replace diaphragm Disassemble and properly position diaphragm

## Problem Identification Procedures

When using differential pressure gauge:	
A. Check differential across No. 1 check valve	
READING	PROBLEM
2 to 3 psid	Leak in No. 1 or No. 2 check valve
4 to 7 psid and steady	Malfunctioning pressure relief valve
2 to 7 psid	Inlet pressure fluctuation

Without using differential pressure gauge:	
A. Close gate valve No. 2	
RESULT	PROBLEM
If discharge stops	Leak in No. 2 check valve
If discharge does not stop	Go to B
B. Open No. 4 testcock to produce a flow greater than differential relief valve discharge	
RESULT	PROBLEM
If discharge stops	Leak in No. 1 check valve
If discharge does not stop	Malfunctioning pressure relief valve

For additional information, visit our web site at: [www.amesfirewater.com](http://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](http://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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