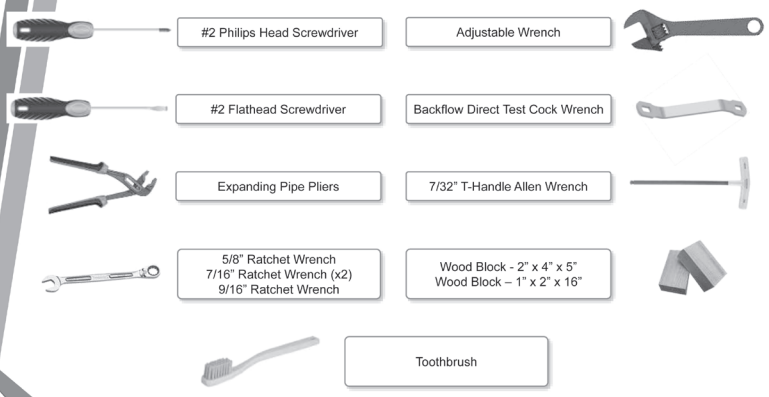
2½" – 4" Deringer 40/50 Maintenance Instructions

2½"- 4" Deringer 40/50 Maintenance Instructions

Tools Required: This list is the recommended tools for ease of installation. Other versions of the same tool can be used. For example, Allen Wrenches instead of Allen Drive Sockets.



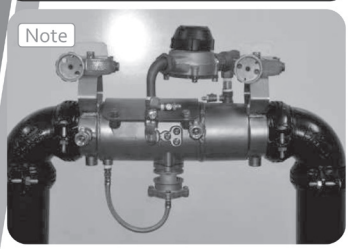
- #2 Philips Head Screwdriver
- #2 Flathead Screwdriver
- Expanding Pipe Pliers
- 5/8" Ratchet Wrench
  7/16" Ratchet Wrench (x2)
  9/16" Ratchet Wrench
- Adjustable Wrench
- Backflow Direct Test Cock Wrench
- 7/32" T-Handle Allen Wrench
- Wood Block - 2" x 4" x 5"
  Wood Block – 1" x 2" x 16"
- Toothbrush

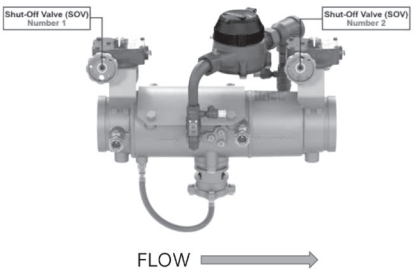
QUESTIONS: Please call us at 916-760-4524 M-F 8:00 AM – 4:30 PM PST or email us at techhelp@backflowdirect.com

2½"- 4" Deringer 40/50 Maintenance Instructions

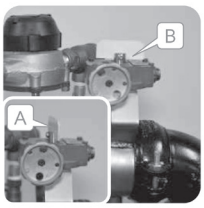
Closing Shut-Off Valves Prior to Maintenance

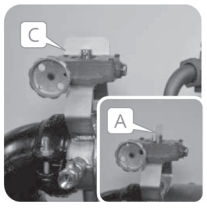
Note: When yellow/orange position indicator flags are parallel with the flow of water the shut-off valves are in the open position. Before doing any maintenance be sure the yellow or orange flow indicators (flags) are perpendicular to the flow of water valve body indicating shut-off valves are in the closed position (A).





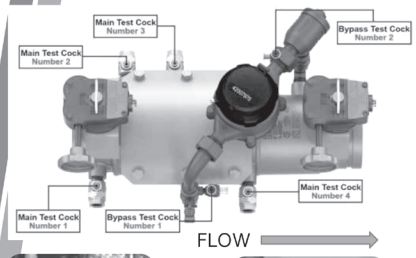
1. Slowly rotate Shut-Off Valve #2 Handle (B) clockwise to the closed position. Flag perpendicular to flow (A).
2. Slowly rotate Shut-Off Valve #1 Handle (C) clockwise to the closed position. Flag perpendicular to flow (A).

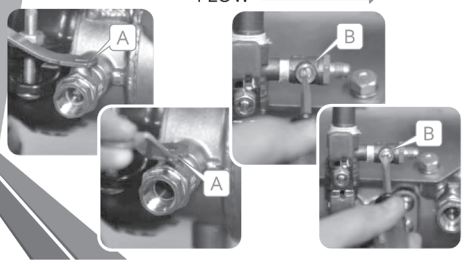




2½"- 4" Deringer 40/50 Maintenance Instructions

Opening Test Cocks and Bleeding All Pressure from the Line Before Maintenance



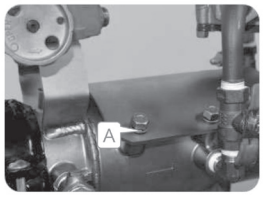


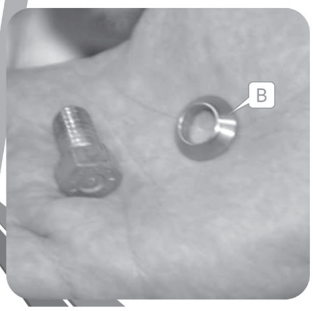
1. DO NOT OPEN Main Test Cock Number 1, as it is still subject to line pressure.
2. Using the Backflow Direct test cock wrench or a small adjustable wrench open (A) Main Test Cock Number 4. (Test Cock is open when wrench flats are parallel to water flow through test cock)
3. Using a #2 Flathead Screwdriver open Bypass Test Cock Number 2. (Test Cock is open when screwdriver slot is parallel to water flow through test cock (B))
4. Using the Backflow Direct test cock wrench or a small adjustable wrench open Main Test Cock Number 3.
5. Using a #2 Flathead Screwdriver open Bypass Test Cock Number 1.
6. Using the Backflow Direct test cock wrench or a small adjustable wrench open Main Test Cock Number 2.

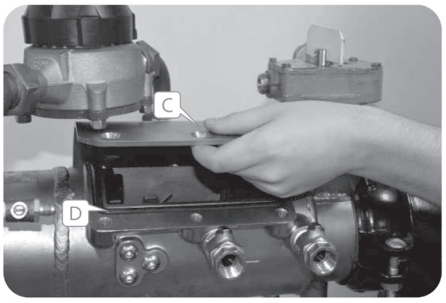
2½"- 4" Deringer 40/50 Maintenance Instructions

Removing Access Port Cover Plate

1. Using a 5/8" ratchet wrench loosen all six bolts on the access port cover plate (A).
2. Remove bolts and tapered washers (B) and store in a safe place. Be careful not to lose tapered washers as the access cover will not seal properly without the tapered washers.
3. Remove access port cover plate (C). Do not remove Access Port O-ring (D).

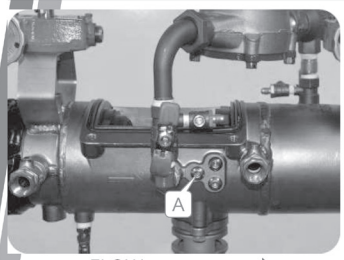


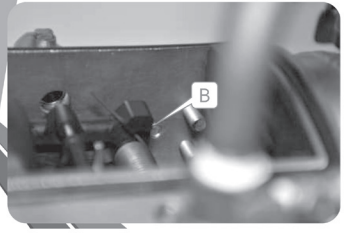




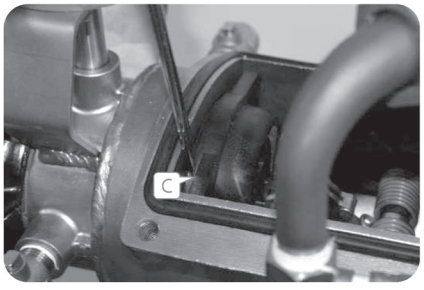
2½"- 4" Deringer 40/50 Maintenance Instructions

Removing the First Dual-Action Check Module



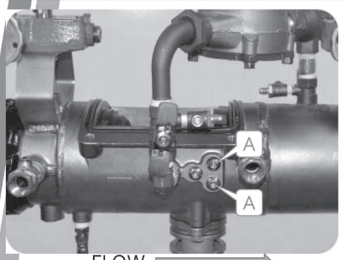


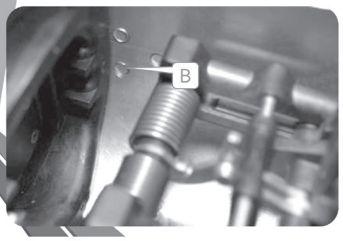
1. Use a 7/32" T-Handle Allen Wrench to loosen the check retainer bolts on both sides of the valve body (A). Do not completely remove check retainer bolts from valve body. Merely loosen the bolts until the ends of the bolts are flush with the inner wall of the valve body(B). This allows easy removal of Check Modules
2. Insert a flathead screwdriver between the inner valve body and the First Check Module Flange (C), gently coax the First Check Module in the downstream direction until the First Check Module can easily be removed from the access port by hand.



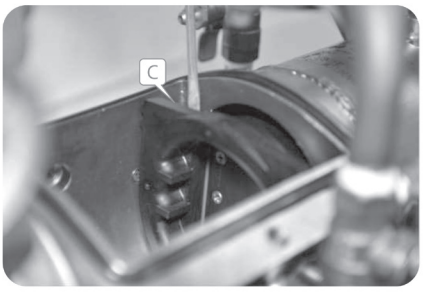
2½"- 4" Deringer 40/50 Maintenance Instructions

Removing the Second Dual-Action Check Module





1. Remove 1st check prior to removing 2nd check as described on page 6.
2. Use a 7/32" T-Handle Allen Wrench to loosen the Check Retainer Bolts on both side of the valve body (A). Do not completely remove check retainer bolts from valve body. Merely loosen the bolts until the ends of the bolts are flush with the inner wall of the valve body(B).
3. Insert a flathead screwdriver between the inner valve body and the Second Check Module Flange (C), gently coax the Second Check Module in the upstream direction until the Second Check Module can easily be removed from the access port by hand.

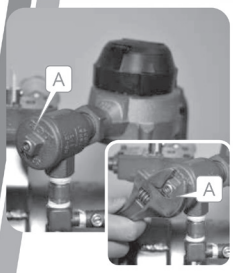


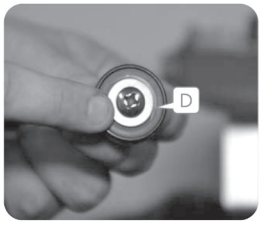
2½" – 4" Deringer 40/50 Maintenance Instructions

2½"- 4" Deringer 40/50 Maintenance Instructions

BACKFLOW DIRECT

Disassembly and Maintenance of By-Pass Check Valve



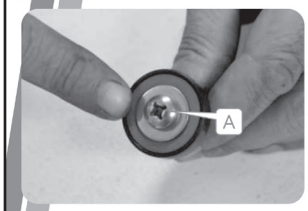


1. Use an adjustable wrench to rotate Check Cover (A) counterclockwise to remove.
2. Examine Cover Plate O-ring (B) for damage or fouling.
3. Remove Spring (C).
4. Remove Check Poppet Assembly (D) and examine for damage or fouling.
5. Examine seat cage for Seat Cage and examine for damage or fouling to the Sealing Seat. Do not remove unless the seat cage is being replaced.
6. Reverse the order of above instructions to reassemble By-Pass Check Valve.

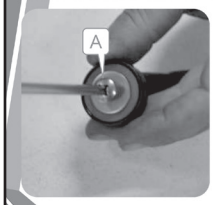
2½"- 4" Deringer 40/50 Maintenance Instructions

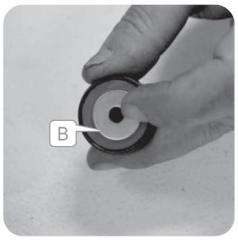
BACKFLOW DIRECT

Disassembly and Maintenance of By-Pass Check Valve (continued)



1. To replace a damaged Red Silicone Poppet Disk, use a #2 Philips Head Screwdriver to remove the Disk Retaining Screw (A).
2. Remove Disk Retaining Washer (B).
3. Use a Flathead Screwdriver to remove the gasket from Poppet Cavity (C).
4. Install new Red Silicone Poppet Disk (D).
5. Reverse the order of the above instructions to reassemble Check Poppet Assembly.
6. Reverse the order of the instructions on the previous page to reassemble Bypass Check Assembly.

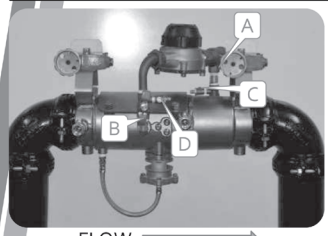




2½"- 4" Deringer 40/50 Maintenance Instructions

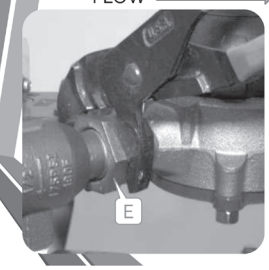
BACKFLOW DIRECT

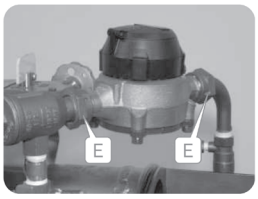
Removing Bypass Meter

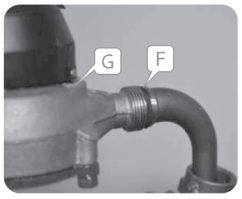


FLOW

1. Using the Ball Valve Handles close the #2 Bypass Ball Valve (A) and then #1 Bypass Ball Valve (B). (Ball Valve is closed when "T" handle is perpendicular to water flow through Ball Valve).
2. Using a #2 Flat Head Screw Driver open Bypass Test Cock #2 (C) and then open Bypass Test Cock #1 (D). (Test Cock is open when screw driver slot is parallel to water flow through Test Cock).
3. Using a large adjustable pliers or wrench unscrew and retract Bypass Meter Coupling Nuts (E) . Remove the Gaskets (F) on both sides of Bypass Meter.
4. Gently remove Bypass Meter (G) from line. It is OK if the bypass fittings move slightly during the removal process.
5. Reverse order of above instructions to reinstall Bypass Meter. Remember install Gaskets (F) before threading Meter Coupling Nuts into place.





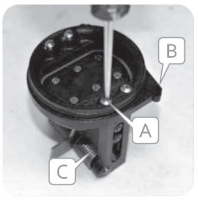


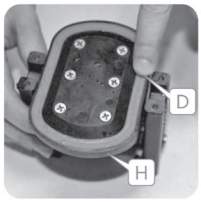
2½"- 4" Deringer 40/50 Maintenance Instructions

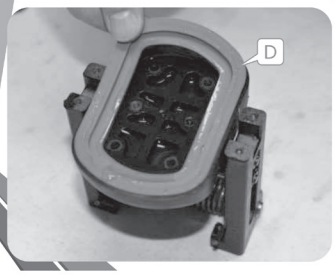
BACKFLOW DIRECT

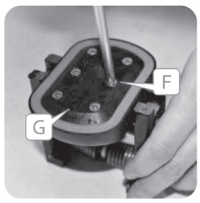
Maintenance of First True Seal Check Module

1. Use a #2 Philips Head Screwdriver to remove Tower Screws (A) from the First Check Seat (B) The Double Torsion Spring is captured (C) and does not need to be retained during maintenance.
2. After removing the Tower Screws (A) Examine the Elastomer Disk (D) and Check Seat (E) for fouling or damage.
3. Should Elastomer Disk (D) need replacement unscrew Disk Retainer Screws (F) and remove Disk Retainer (G). Carefully remove and replace Elastomer Disk (D). When replacing Elastomer Disk (D) be certain that no air, water or debris is trapped in the Clapper (H) cavity behind the Elastomer Disk (D).









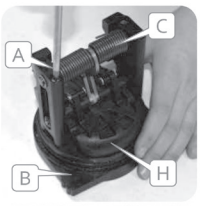
4. Reverse the order of the above instructions to reassemble check.
   - Elastomer Disk must be flat in Clapper (H) cavity before tightening Disk Retainer Screws (F).
   - Do not cross thread Disk Retaining Screws (F).

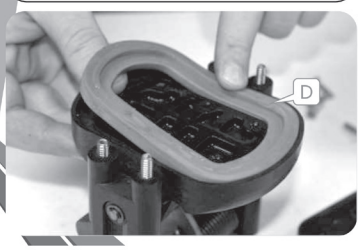
2½"- 4" Deringer 40/50 Maintenance Instructions

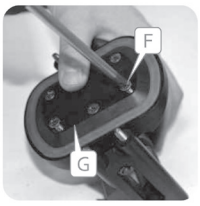
BACKFLOW DIRECT

Maintenance of Second Dual-Action Check Module

1. Use a #2 Philips Head Screwdriver to remove Tower Screws (A) from the Second Check Seat (B) The Double Torsion Spring is captured (C) and does not need to be retained during maintenance.
2. After removing the Tower Screws (A) Examine the Elastomer Disk (D) and Check Seat (E) for fouling or damage.
3. Should Elastomer Disk (D) need replacement unscrew Disk Retainer Screws (F) and remove Disk Retainer (G). Carefully remove and replace Elastomer Disk (D). When replacing Elastomer Disk (D) be certain that no air, water or debris is trapped in the Clapper (H) cavity behind the Elastomer Disk (D).







4. Reverse the order of the above instructions to reassemble check.
   - Elastomer Disk must be flat in Clapper (H) cavity before tightening Disk Retainer Screws (F).
   - Do not cross thread Disk Retaining Screws (F).

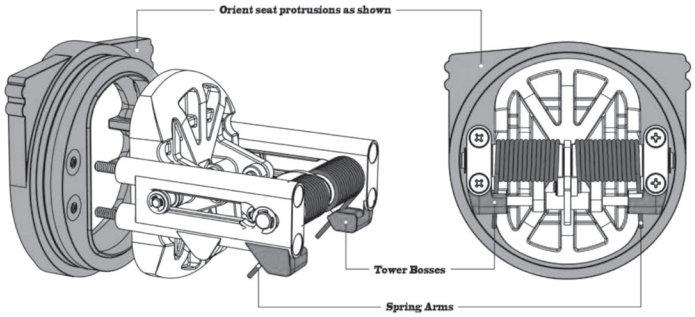
2½"- 4" Deringer 40/50 Maintenance Instructions

BACKFLOW DIRECT

Maintenance of Second Dual-Action Check Module

Note: The diagram below shows the correct orientation of the Second Dual-Action Check Module when being re-attached to the seat. In order to maintain the performance of the valve pay attention to the proper orientation of the check module.

Second Check Tower Bosses and Spring Arms Face Down.

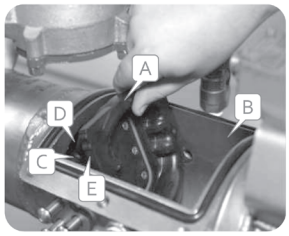


2½" – 4" Deringer 40/50 Maintenance Instructions

2½"- 4" Deringer 40/50 Maintenance Instructions

Installing Second Dual Action Check Module

1. Insert Second Check Module (A) into Access Port (B) with Second Check Towers (C) pointing downstream. Push Second Check Module (A) downstream into Valve Sealing Ring (D) until Check O-ring (E) rests against Valve Sealing Ring (D). Coax Second Check Module (A) into its fully seated position by hand.
2. Alternatively place 2"x4" piece of wood cut to 5" length (F) against the backside of the Second Check Seat Ring (G). Using a 1"x4" piece of wood cut to 16" length (H) as a lever between Access Port Wall the 2"x4" (F) gently coax the Second Check Module (A) into its fully seated position.
3. Be certain Second Check Module (A) is fully seated and Check O-ring (E) is NOT "fish mouthed" or damaged.
4. Tighten the Second Check Retaining Screws (I) ONLY AFTER the First Check Module (A) has been installed.



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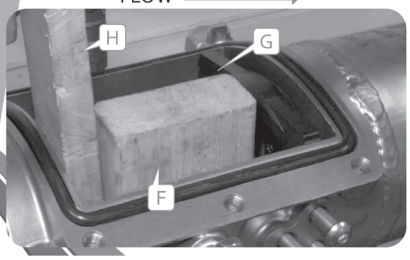


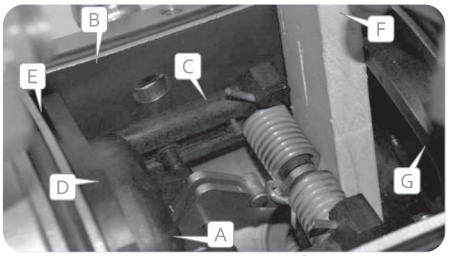
WARNING: *The Second Check Module must be fully seated to insure Retainer Screws do not bind against Check Seat. Binding Retainer Screws against Check Seat will result in permanent damage to Second Check Modules.*

2½"- 4" Deringer 40/50 Maintenance Instructions

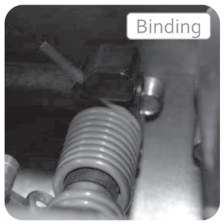
Installing First Dual-Action Check Module

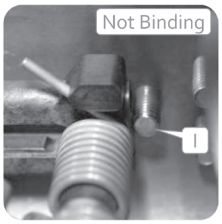
1. Insert First Check Module (A) into Access Port (B) with First Check Towers (C) pointing downstream. Push First Check Module (A) upstream into Valve Sealing Ring (D) until Check O-ring (E) is resting against Valve Sealing Ring (D). Gently coax First Check Module (A) into its fully seated position by hand.
2. Alternatively, using a piece of 1"x4" wood cut to 16" length (F) as a lever between the Second Check Seat (G) and the First Check Towers (C), coax the First Check Module (A) into its fully seated position.
3. Be certain First Check Module (A) is fully seated and Check O-ring (E) is NOT "fish mouthed" or damaged.
4. Now fully tighten the First and Second Check Retaining Screws (I) .

WARNING: *The First Check Module must be fully seated to insure Retainer Screws do not bind against Check Towers. Binding Retainer Screws against Check Towers will result in permanent damage to First Check Modules.*



FLOW

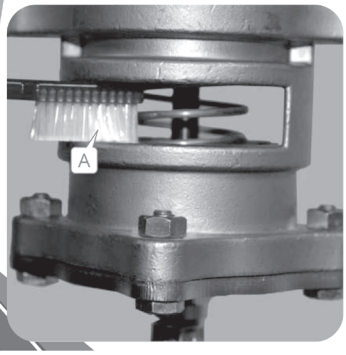


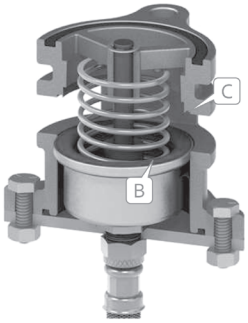


2½"- 4" Deringer 40/50 Maintenance Instructions

Maintenance of Relief Valve

Note: *Almost always, when a RP device is leaking from the relief valve, a fouled or damaged first check valve is the cause. Make sure the first check valve is functioning properly before assuming there is a problem with the relief valve. If the first check is found to be functioning properly, we recommend cleaning the relief valve piston (B) and seat (C). Use a toothbrush (A) to gently brush away any debris on the relief valve piston (B) or seat (C) that may be preventing the piston (B) from sealing properly against the seat (C). This should return the relief valve to proper working order without disassembly or the use of a repair kit.*



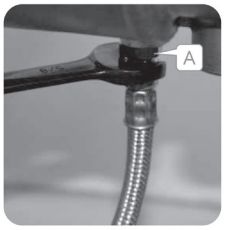


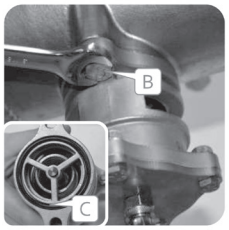
2½"- 4" Deringer 40/50 Maintenance Instructions

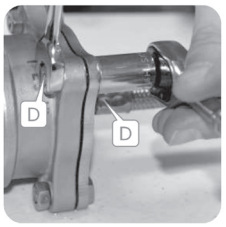
Maintenance of Relief Valve

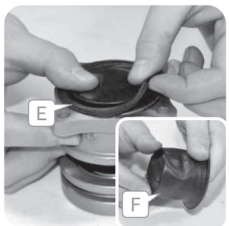
Note: *If one is certain that the Relief Valve requires maintenance proceed as follows.*

1. Using a 5/8" Box Wrench disconnect the Relief Valve Sensing Line from the Valve Body (A).
2. To remove the Relief Valve from the valve body disconnect the two Relief Valve Mounting Bolts (B) using a 9/16" wrench. When removing the Relief Valve be sure not to drop the top O-ring (C) as the Relief Valve Body uses this O-ring to seal against the valve body.
3. To access the relief valve remove the relief valve cover using two 7/16" wrenches to remove cover bolts (D).
4. Remove the Relief Valve Diaphragm (E) and check the diaphragm for tears, holes or debris (F).





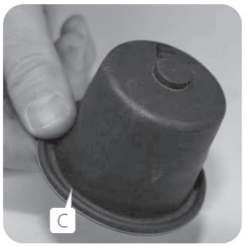




2½"- 4" Deringer 40/50 Maintenance Instructions

Maintenance of Relief Valve (continued)

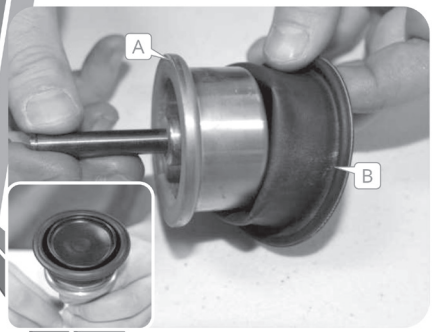
1. Check the rubber seal on the Relief Valve Piston Assembly (A) for fouling or damage by making sure the indentation of the seat in the rubber seal is present all the way around. (Confirm the Relief Valve Piston Assembly (A) sets flush on Relief Valve Seat (B).
2. Check Relief Valve Seat (B) for Fouling or damage before reinstalling the Relief Valve Piston Assembly (A).
3. Once the Relief Valve is ready to be reassembled, the first step is to reform and reattach the diaphragm to the piston.
4. Move the Diagram (C) to the fully open position making sure the embossed center is facing up.
5. While holding the diaphragm (C) with both hands, use your thumbs to gently push down on embossed center (D) so the diaphragm collapses into itself and forms a circle so that the bottom of the piston assembly can be inserted into the diaphragm and the embossed center can be pushed into the piston assembly groove.

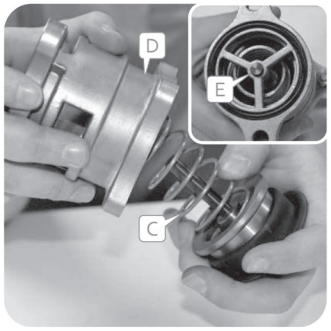


2½"- 4" Deringer 40/50 Maintenance Instructions

Maintenance of Relief Valve (continued)

1. Place the Piston Assembly (A) into the Diaphragm (B), Making sure the Diaphragm lays flush on the bottom of the Piston Assembly with no wrinkles or tears in the diaphragm.
2. Place the Relief Valve Spring (C) back onto the Relief Valve Assembly (A) and slide the Valve Assembly back into the Relief Valve Body (D). Make sure the Piston Assembly lines up to penetrate hole (E) in top side of Relief Valve.



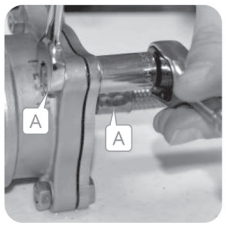


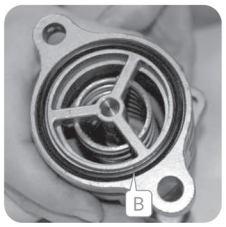
2½" – 4" Deringer 40/50 Maintenance Instructions

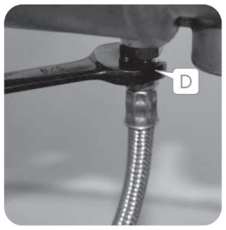
2½"- 4" Deringer 40/50 Maintenance Instructions

Maintenance of Relief Valve (continued)

1. Using two 7/16" wrenches (A) re-attach the relief valve cover.
2. Making sure the Relief Valve O-ring (B) is in the groove on the top of the Relief valve use a 9/16" wrench to re-attach the two Relief Valve Mounting Bolts (C).
3. Use a 5/8" Box Wrench re-connect the Relief Valve Sensing Line to the Valve (D).



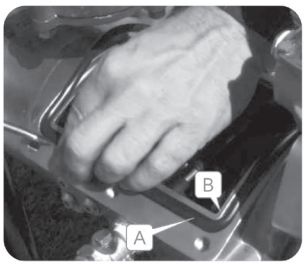


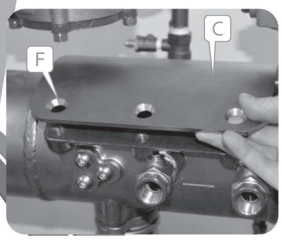


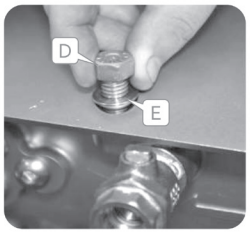
2½"- 4" Deringer 40/50 Maintenance Instructions

Installing Access Port Cover

1. It is best to never remove the Access Port O-ring (A). Should the Access Port O-ring (A) become dislodged, simply insert it back into Access Port Groove (B).
2. Slide the Access Port Cover (C) into place being certain that Access Port O-ring (A) does not become dislodged during the process.
3. Insert Cover Bolts (D) and Tapered Washers (E) into Tapered Cover Holes (F). Tapered Washers (E) must be properly installed or the Access Port Cover (C) will not seal under pressure.
4. Use Ratchet Wrench (G) to sequentially tighten all Cover Bolts (D) alternating from one side of the valve to the other.

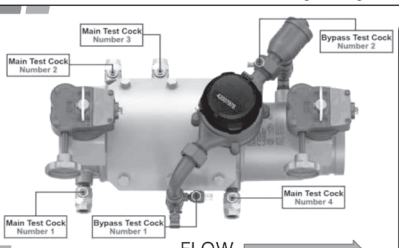




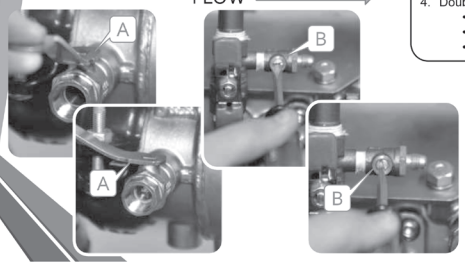


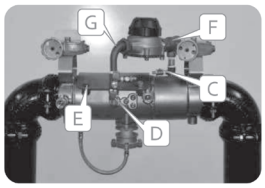
2½"- 4" Deringer 40/50 Maintenance Instructions

Close Test Cocks and Double Check all Closing/Sealing Mechanisms



1. Using the Backflow Direct Test Cock Wrench or a small adjustable wrench slightly close Main Test Cocks Number 2, 3 and 4 (A) to allow excess air to be released before closing the test cocks completely.
2. Using a #2 Flathead Screwdriver Close Bypass Test Cock Number 1 and 2 (B). (Test Cock is closed when screwdriver slot on stem is perpendicular to water flow through Test Cock)
3. Use the "T" handles to open bypass Ball Valve Number 1 (C) and then open bypass Ball Valve Number 2 (D). (Ball Valve is open when "T" handle is parallel to water flow through Ball Valve)
4. Double check to be certain of the following:
   - All Cover Bolts are Tightened (E)
   - Bypass Check Valve Cover is Tightened (F)
   - Bypass Meter Coupling Nuts are Tightened (G)





2½"- 4" Deringer 40/50 Maintenance Instructions

Open Shut-Off Valves to make Backflow Preventer Functional

1. Slowly rotate the Number 1 Shut-Off Valve Operation Handle (A) counter clockwise to the open position. (Shut-Off Valve is open when yellow/orange position indicator flags are parallel to the mainline water flow)
2. As the valve fills with water air will be pushed through the Test Cocks. Once a steady flow of water is released from the Test Cocks close in order (2, 3 Then 4. Test Cock is closed when wrench flats on stem are perpendicular to water flow through Test Cock).
3. Slowly rotate the Number 2 Shut-Off Valve Operation Handle (B) counter clockwise to the open position.

Note: Yellow/Orange Position Indicator Flags must be parallel to mainline water flow for Backflow Valve to be functional (C).