BISON PUMPS
The Power of Water in Your Hands

Maintenance Kit Manual

Deep Well Pump 2” Stacked Cylinder

Cylinder Revision Level: D

Rev D-2

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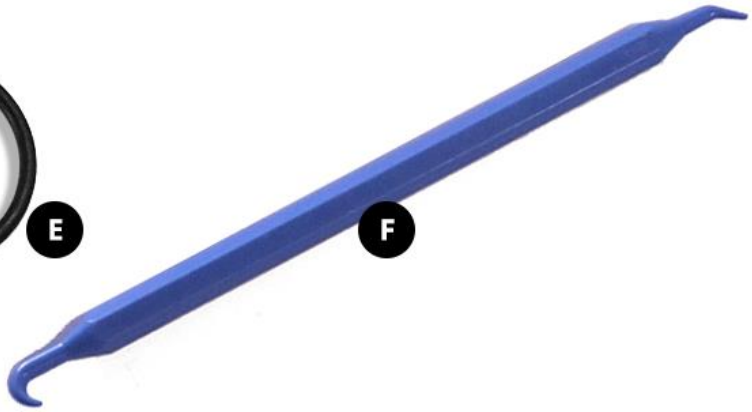


Maintenance Kit Components

55-204-2-24-01

Description	Quantity	Bison Part Number
2" Stacked Cylinder:		
A) #6 x 3/8” Phil Pan S.M.S. 304 Stainless Steel	12	04-000-1-45-22
B) Hex Lock Nut	6	04-000-1-50-20
C) Check Valve	2	04-000-5-75-01
D) Piston Cup Seal	2	04-002-3-71-03
E) Internal Retaining Ring Stainless Steel	2	04-022-1-68-01
F) End Cap O-Ring	4	04-103-3-70-02
G) Seal Pick Tool	1	55-001-0-07-00

Before you begin

In the instructions there will be letter references such as “Seal Pick Tool (G)”. The letter refers to the identifier of the item listed in one of two locations: The Components Section of the Maintenance Kit or in Required Tools. The contents section lists all items included in your Maintenance Kit.

There will also be item number references such as “Check Valve (Item 4)”. The item number refers to the assembly number of the item listed and can be found in both Detail A: Assembly Views and Detail B: Part Listing. All Maintenance Kit contents are included in these details except the items listed under Required Tools.

Please read and understand all instructions. If help is needed or you have questions regarding your product, you can call our Toll-Free Number 1-800-339-2601.

Required Tools:

1) One (1) Philips Screwdriver with a small tip
2) One (1) Pair of Adjustable Pliers or Pipe Strap Wrench
3) One (1) Pipe Wrench
4) One (1) Pair of Internal Snap-Ring Pliers with .078 Tips
5) One (1) Bench Vice
6) One (1) pair of Safety Goggles
7) One (1) 8” Slender Shank Small Flat Blade screwdriver
8) One (1) can Extra Virgin Olive Oil
9) One (1) Seal Pick Tool (G) (included)

Instructions:

Step 1: Removing the Tie Rods

Note: See Detail A for a visual step-by-step of the tie rod removal process.

1) With your cylinder assembly outside your well, loosen and remove both hex lock nuts (Item 2) on the outside ends of the tie rod (Item 14).
2) Thread the hex nut (Item 3) on the bottom end (the end with longer threads) all the way towards the middle of the tie rod. (See Photo 1)

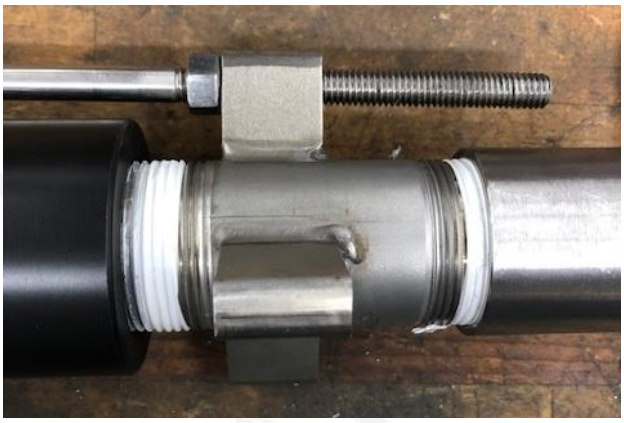


Photo 1 – Longer Threaded End of Tie Rod

3) Slide the tie rod down as shown in Photo 1 until you can remove the hex nut on the top end of the tie rod.
4) Loosen and remove the hex nut on the top end of the tie rod.
5) Slide the tie rod up until you can remove the hex nut on the bottom end of the tie rod.
6) Loosen and remove the hex nut on the bottom end of the tie rod.
7) Remove the tie rod by sliding it completely out of the tie rod spacers (Item 13).

Note: Continue with the removal of the other two tie rods following the same process. Set aside all (3) tie rods.

Note: You can dispose of the (6) hex lock nuts (Item 2) as they will be replaced with new hex lock nuts in the maintenance kit. Keep the (6) hex nuts (Item 3) as they will be reused.

Step 2: Removing the Tie Rod Nipples

1) Using a pipe wrench loosen and remove the tie rod nipple (Item 6) attached to the bottom end cap (Item 11).
2) Remove the tie rod nipple attached to the top end cap (Item 10) in the same fashion.

3) Remove the Teflon tape on the threads of each tie rod nipple and apply fresh Teflon tape.
4) Set aside both tie rod nipples. Keep the tie rod coupling (Item 7) attached to the top tie rod nipple.

Step 3: Removing the Bottom End Cap

1) Remove the Six (6) Philips Sheet Metal Screws (Item 1) holding the Bottom End Cap to the Cylinder Body (Item 9). With the screws removed, place the Bottom End Cap in a Bench Vice. Verify that none of the Cylinder Body is in the vice to prevent damage. Grasp the Cylinder Body and slowly pull while moving slightly side to side until the Bottom End Cap comes free from the end of the Cylinder Body. (See Photo 2)

Photo 2 – Bottom End Cap Removal

2) Remove the Bottom End Cap from the Bench Vice. Using the Seal Pick Tool (G) pry under the O-ring (Item 8) and work it off the Bottom End Cap and dispose of the used O-ring. (See Photo 3) Repeat the same process for the second O-ring.

Photo 3 – O-ring Removal

3) Put on Safety Goggles before attempting to remove the Internal Snap Ring (Item 5). Insert the tips of the Internal Snap Ring Pliers into the two holes of the Internal Snap Ring. Squeeze the pliers together and pull outward removing the Internal Snap Ring that is holding in the Check Valve (Item 4) and dispose of the used snap ring. (See Photo 4)
4) Turn the Bottom End Cap over and place on a hard surface leaving room for the check valve to be removed. Using the 8" flat head screwdriver or a rod roughly 1 ¼" in diameter, push the check valve out of the cavity and dispose of the used check valve.
5) Thoroughly clean the Bottom End Cap with fresh water paying close attention to the Check Valve cavity, Internal Snap Ring groove and O-ring grooves.

Photo 4 – Internal Snap Ring Removal

Step 4: Replacing Bottom End Cap O-Ring

1) Place a new O-Ring over the Bottom End Cap. Using the Seal Pick Tool work the O-ring into the End Cap's O-ring Groove. Maneuver the O-ring so that it is seated inside the groove and not twisted. Be careful not to stretch the O-ring. (See Photo 5)

Photo 5 – O-Ring Placement

Step 5: Replacing Bottom End Cap Check Valve & Snap Ring

1) Coat the outer body of the Check Valve (C) with Extra Virgin Olive Oil. It is very important that the Check Valve is inserted into the Bottom End Cap with the correct orientation of flow. The end of the check valve with the O-ring should go in first (See Photo 6).
2) Firmly push the Check Valve into the cavity until it is seated. The Check Valve should be completely past the Internal Snap Ring groove (See Photo 7). If any of the ring groove is covered by the Check Valve continue to press it into the cavity. It is not properly seated until the ring groove is completely exposed. Test the Check Valve by depressing the bottom and quickly releasing it. If the movement is clean and crisp the Check Valve is properly seated.

Photo 6 – Check Valve Orientation

3) Put on Safety Goggles before attempting to install the Internal Snap Ring. Insert the tips of the Internal Snap Ring Pliers into the new Internal Snap Ring and squeeze the handle together. Insert the ring into its groove inside the cavity and release the handle. Verify that the Internal Snap Ring is completely seated inside the groove. Use a flathead screwdriver and push down on the snap ring. The snap ring should not freely spin when fully inside the groove. (Reference Photo 4)

Photo 7 – Check Valve Placement

Step 6: Replacing Top End Cap O-Ring

1) Remove the Six (6) Philips Sheet Metal Screws holding the Top End Cap to the Cylinder Body in the same manner as the Bottom End Cap. With the screws removed, place the Top End Cap in a Bench Vice. Verify that none

of the Cylinder Body is in the vice to prevent damage. Grasp the Cylinder Body and slowly pull while moving slightly side to side until the Top End Cap comes free from the end of the Cylinder Body. (Reference Photo 2)

2) Remove the Top End Cap from the Bench Vice. Using the Seal Pick Tool pry under the O-ring and work it off the Top End Cap and dispose of the used O-ring. (Reference Photo 3) Repeat the same process for the second O-ring.
3) Thoroughly clean the Top End Cap with fresh water paying close attention to the O-ring grooves.
4) Place a new End Cap O-Ring over the Top End Cap. Using the Seal Pick Tool work the O-ring into the Top End Cap's O-ring Groove. Maneuver the O-ring so that it is seated inside the groove and not twisted. Be careful not to stretch the O-ring. (Reference Photo 5)
5) Set the Top End Cap aside until time to reinstall.

Step 7: Removing used Piston Cup Seals (D) and Check Valve (C)

1) Grasp the Piston Lift Rod and pull the Piston Assembly (Item 12) straight out of the Cylinder Body. (See Photo 8)

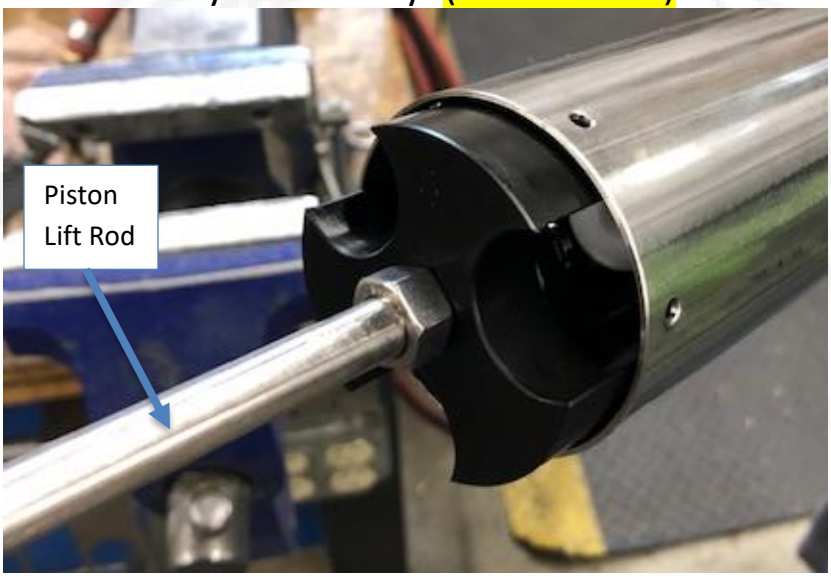


Photo 8 – Piston Assembly Removal

2) Slide the tip of the O-Ring Pick Tool under the Piston Cup Seal (Item 15) and work it off the end of the piston (See Photo 8.1). Repeat the process for the second cup seal.

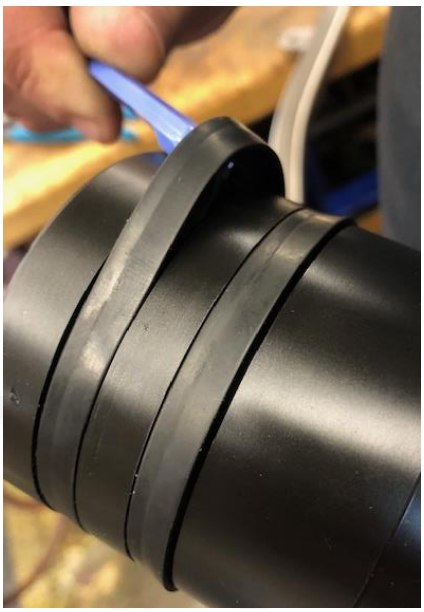


Photo 8.1 - Cup Seal Removal

3) Put on Safety Goggles before attempting to remove the Internal Snap Ring. Using the Internal Snap Ring Pliers with .078 Tips, insert the tips into the two holes of the Internal Snap Ring. Squeeze the pliers together and pull outward removing the Internal Snap Ring that is holding the Piston Check Valve (Item 4) and dispose of the used ring. (See Photo 8.2)

Photo 8.2 –Piston Snap Ring Removal

4) Turn over the piston assembly and place the piston on a hard surface leaving room for the check valve to be removed. Using the 8” flat head screwdriver, push the Check Valve out of the cavity and dispose of the used Check Valve. See Photo 8.3

Photo 8.3 –Piston Check Valve Removal

5) Thoroughly clean the Piston with fresh water paying close attention to the Check Valve cavity, Internal Snap Ring groove and Cup Seal grooves.

Step 8: Replacing Piston Check Valve

1) Coat the outer body of the new Check Valve with Extra Virgin Olive Oil. It is very important that the Check Valve is inserted into the Piston with the correct orientation of flow. The end with the O-ring should be facing out (See Photo 9). Be sure to depress the four (4) tabs on the Check Valve before inserting into the Piston Body. (See Photo 10) Some tabs may break in this process. This will not affect the function or fit of the check valve.

Photo 9 – Piston Check Valve Orientation

Depressed Tabs

2) Firmly push the Check Valve into the cavity until it is seated. The Check Valve should be completely past the Internal Snap Ring groove. Reference Photo 8.2. If any of the ring groove is covered by the Check Valve continue to press it into the cavity. It is not properly seated until the ring groove is completely exposed. Test the Check Valve by depressing the bottom and quickly releasing it. If the movement is clean and crisp the Check Valve is properly seated.

3) Put on Safety Goggles before attempting to install the Internal Snap Ring. Insert the tips of the Internal Snap Ring Pliers into the new Snap Ring and squeeze the handle together. Insert the ring into its groove inside the cavity and release the handle. Verify that the Internal Snap Ring is completely seated inside the groove. Use a flathead screwdriver and push down on the snap ring. The snap ring should not freely spin when fully inside the groove. (Reference Photo 8.2)

Step 9: Replacing Piston Cup Seals

1) Place a new Cup Seal over the end of the Piston and work it into the Cup Seal groove. Make sure the Cup Seal Lips are facing towards the Piston Lift Rod (See Photos 11 & 11.1). Repeat the process for the second Cup Seal.

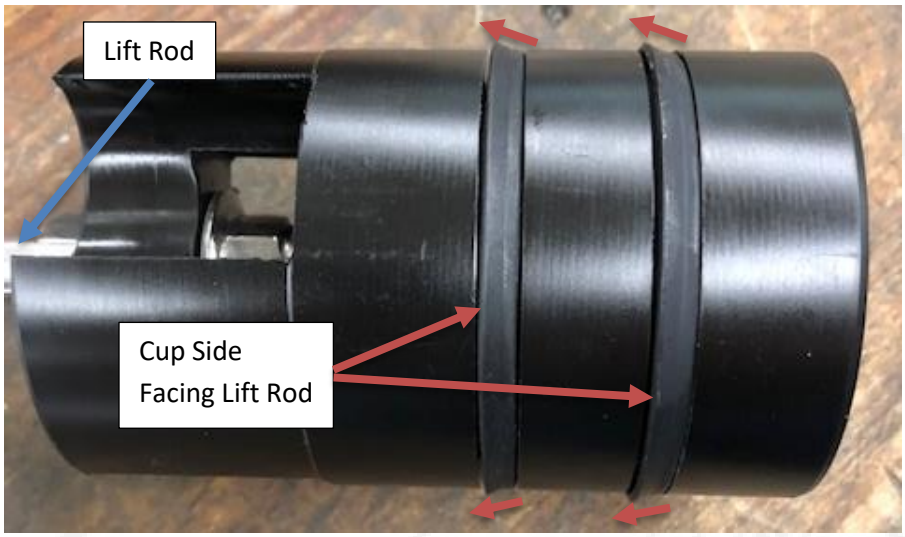


Photo 11 – Piston Cup Seal Orientation

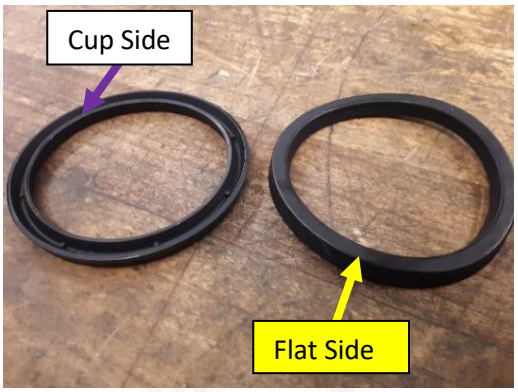


Photo 11.1 – Piston Cup Seal

Step 10: Reassembling the Cylinder

1) Clean the Cylinder Body with fresh water.
2) Insert the Bottom End Cap into the Cylinder Body and align the holes. Screw in the Six (6) Philips Sheet Metal Screws. (Reference Photo 2)
3) Lightly lubricate the inside of the Cylinder Body and the Piston Cup Seals with Extra Virgin Olive Oil.
4) Insert the Piston Assembly into the top of the Cylinder Body leaving 8-9 inches of the Lift Rod exposed. (Reference Photo 8)
5) Insert the Top End Cap into the Cylinder Body and align the holes. Screw in the Six (6) Philips Sheet Metal Screws.
6) Thread the tie rod nipple (with coupling) into the top end cap and tighten using a pipe wrench. Repeat with the other tie rod nipple (no coupling) into

the bottom end cap. Be careful not to overtighten as it may damage the threads on the end caps.

Note: Be sure that the holes of the tie rod spacers on both ends are aligned. One or both nipples might have to be slightly loosened to accomplish this.

Step 11: Reassembling the Tie Rods

Note: Use Detail A in the reverse order (starting with step #7) for a visual step-by-step of the tie rod reassembly process.

1) Slide the tie rod through the top tie rod spacer with the longer threaded end facing towards the bottom end of the cylinder.
2) With the tie rod through the first tie rod spacer, thread the hex nut (Item 3) all the way towards the middle of the tie rod on the bottom end (the end with longer threads). (Reference Photo 1)
3) Slide the longer threaded end of the tie rod through the bottom tie rod spacer until you can add the hex nut on the top end. (Reference Photo 1)
4) Thread this hex nut fully onto the tie rod.
5) Slide the tie rod up through the top tie rod spacer.
6) Center the tie rod so that an equal number of threads are sticking out both ends of the tie rod spacers.
7) Attach the new hex lock nuts onto both ends of the tie rods and tighten at the same time. Then tighten both hex nuts.

Note: Continue this process for the reassembly of the other two tie rods.

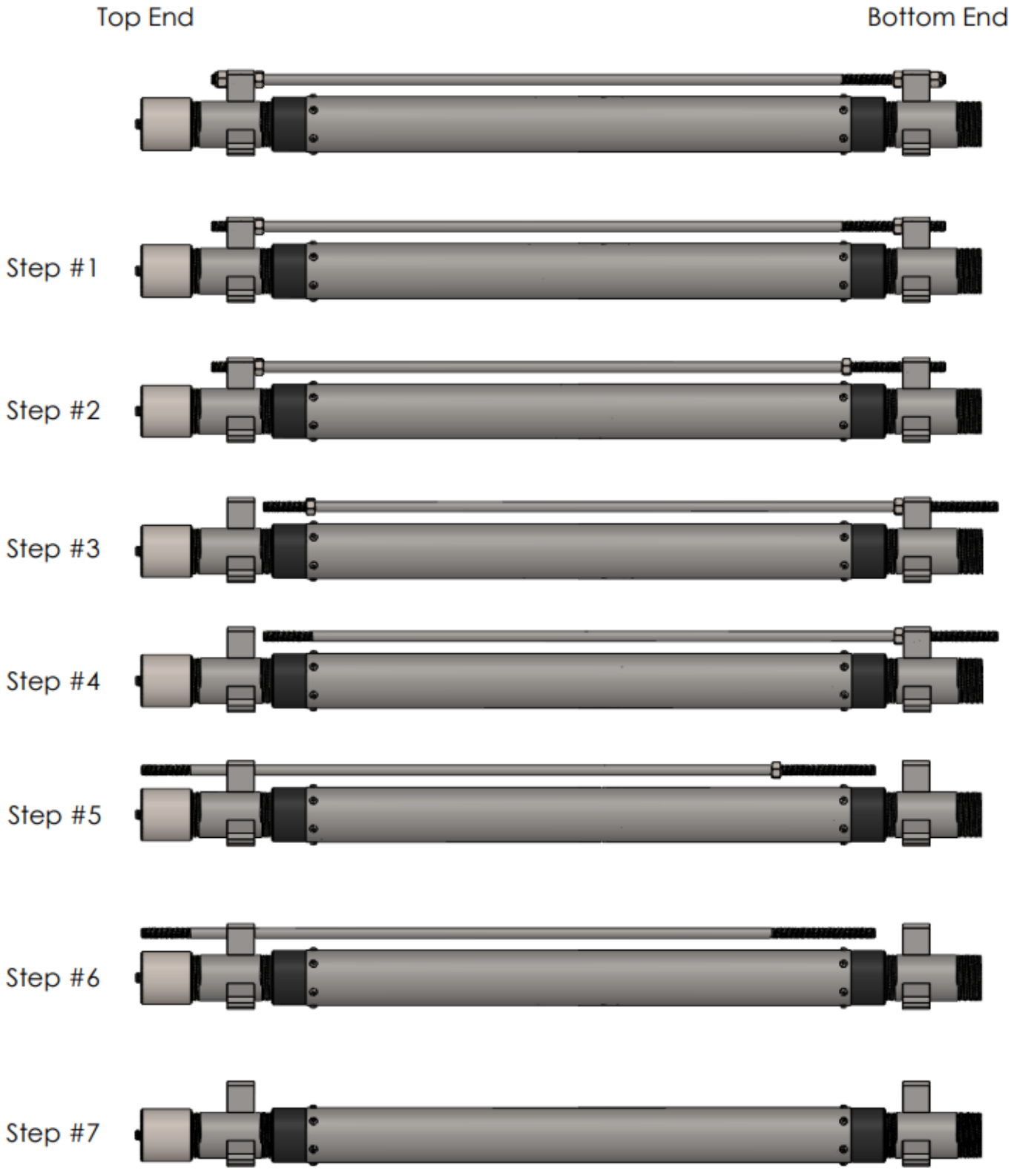
Step 12: Test the Pump Cylinder

1) Grasp the Piston Lift Rod and pull up and down. Listen for the “Burp” of the check valves. As the Lift Rod is pulled upward you will hear the Bottom End Cap Check Valve Burping. When the Lift Rod is pushed downward you will hear the Piston Check Valve Burping.

*For Technical Help call our Toll-Free Number 1-800-339-2601

Appendix

Detail A: Tie Rod Removal



Detail B: Assembly Views

Detail C: Part Listing

Item No.	Part Number	Description	Quantity
1	04-000-1-45-22	Philips Sheet Metal Screws	12
2	04-000-1-50-20	Hex Lock Nut	6
3	04-000-1-50-22	Hex Nut	6
4	04-000-5-75-01	Check Valve	2
5	04-022-1-68-01	Internal Snap Ring	2
6	04-029-0-76-03	Tie Rod Nipple	2
7	04-029-1-74-06	Tie Rod Coupling	1
8	04-103-3-70-02	O-ring	4
9	51-200-2-01-02	Cylinder Body	1
10	51-200-2-01-03	Top End Cap	1
11	51-200-2-01-04	Bottom End Cap	1
12	51-200-5-02-01	Piston Assembly	1
13	51-200-5-03-02	Tie Rod Spacer	6
14	51-200-5-03-04	Tie Rod	3
15	04-002-3-71-03	Piston Cup Seal	2