



Upstream Documents:	Clark Pump Assembly SOP
---------------------	-------------------------

Follow-up Documents:	
----------------------	--

Applies to the following products:	7%, 10%, and 20% Clark Pumps
------------------------------------	------------------------------

Installation Location:	Clark Pump remanufacturing area
------------------------	---------------------------------

Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	1/74

Welcome

This guide will walk a technician through the rebuilding of a Clark Pump. The goal of this process is to provide the customer with a rebuilt and upgraded pump that carries one-year warranty, backed by Katadyn.

During the remanufacturing process we will replace all degradable parts, such as O-rings, springs, and seals, as well as any parts that show damage or wear.

The Clark Pump has been consistently refined and improved over the years, so during remanufacturing we will also bring older pumps up to current standards, wherever possible. Stainless steel elbows and compression fittings will be replaced with nickel-bronze fittings to eliminate crevice corrosion, which can crack plastic components. We replace PET end caps, which have a limited lifespan, with Delrin. We replace older end cap rings, which occasionally failed, with a newer, thicker design. Even if the older parts are in good condition, these replacements will mean a longer life for the pump, and better reliability.

The photos and part numbers referenced in this guide are for a 7% Clark Pump, with key measurements and tolerances given for 10% and 20% displacements. The process and many of the part numbers are identical for 10% and 20% models. A few key parts will of course be different, but these differences should be obvious with notations and the parts in front of you.

Only a handful of 15% Clark Pumps were built. Rebuilding them is straightforward, and Katadyn maintains an inventory of replacement parts, but we recommend consulting with Katadyn, or returning the unit to Katadyn for remanufacturing.

Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	2/74

Outline

1. Advanced inspection, notation, and disassembly.
2. Inspection and truing.
3. Rebuilding the center block.
4. Rebuilding the valve block.
5. Rebuilding the end blocks.
6. Join end blocks to valve block to form top end. Join top end to center block.
7. Rebuilding the cylinders and pistons.
8. Attach cylinders to center block.
9. Testing.
10. Finishing and fittings check.

Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	3/74

The following parts are ALWAYS replaced when remanufacturing a Clark Pump:

Part Number	Description	Quantity
HP-CB-CV	CHECK VALVE	4
HP-CB-CVR	CHECK VALVE RETAINER	4
HP-CB-CVS	CHECK VALVE SEAT	4
HP-CB-PVS	PILOT VALVE SPOOL	1
HP-CB-PPS	PILOT VALVE PIN	2
HP-CB-PVCR	PILOT VALVE CLIP RING	10
HP-CB-PVPS	PILOT VALVE PIN SEAL	2
HP-CYL-SST	STAINLESS TUBE	2
HP-TB-AR	ANNULAR RING	2
HP-TB-VS10	REV. VALVE SPOOL 1 PC 10%	1
HP-TB-VSP	REV. VALVE SPOOL PISTON	2
HP-TB-VSS	REV. VALVE SPOOL SEAL	2
PL-MTE-3/4S1/2B	3/4"-16S X 1/2" TUBE 90DEG. AL-BRZ	2
PL-MTS-3/8X1/2B	3/8"NPT X 1/2" TUBE FITTING ST BZ	4
PT-STK-23SP	SPECTRA STICKER 1.5" X 5.5" BLK.	1
SO-FT-STF	3/4-16 STRAIGHT THREAD O-RING	2
SO-HPP-AR1	ANNULAR RING O-RING (VITON)	4
SO-HPP-CT	CONNECTOR O-RING	4
SO-HPP-CVP1	CHECK VALVE PORT (VITON)	4
SO-HPP-CVS	CHECK VALVE SEAT SEAL	4
SO-HPP-ECCB	END CAP CENTER BLOCK SEAL	4
SO-HPP-PLP	PILOT PORTS SEAL	8
SO-HPP-PR7	3/4" PISTON ROD SEAL	2
SO-HPP-PS	PIN SEALS	2
SO-HPP-PV	PILOT VALVE SEAL	4
SO-HPP-Q	QUAD SEAL	2
SO-HPP-RV	RELIEF VALVE SEAL	1
SO-HPP-SP	SPOOL PISTON SEAL	2
SO-HPP-VB	VALVE BORE SEAL	2
SO-HPP-VP	VALVE PORT SEAL	6

The following items are unique to the 20% Clark Pump, and are ALWAYS replaced:

HP-CB-SPR	CHECK VALVE SPRING	4
HP-CYL-PTB20	PISTON BUSHING (20%)	4
HP-CYL-PTS20	PISTON SEAL (20%)	2

Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	4/74

The following parts MAY be replaced, at the discretion of the technician, as part of a standard Clark Pump remanufacture.

Part Number	Description	Quantity
HD-CPS-3/824175	3/8"-24 X 1 3/4" CAPSCREW	8
HD-CPS-5/162.75	5/16" X 2 3/4" CAPSCREW	8
HD-CPS-5/16X3	5/16"-18 X 3 1/4" CAPSCREW	4
HD-WSH-3/8X5/8S	3/8" X 5/8" O.D. SS. FLAT WASHER	8
HP-CB-INS	CENTER BLOCK INSERT	4
HP-CYL-3/4R	PISTON ROD (7%)	1
HP-CYL-7/8R	PISTON ROD (10%)	1 or 2
HP-CYL-EC	CYLINDER END CAP	2
HP-CYL-PT	PISTON	2
HP-CYL-PT20	PISTON(20%)	2
HP-CYL-R	CYLINDER END RING	2
HP-TB-BV	BLEED VALVE	1
HP-TB-EBP	END BLOCK PLUG	2
HP-TB-SR	SPACER RING	2
HP-TB-VS10	REV. VALVE SPOOL 1 PC 10%	1
HP-TB-VSP	REV. VALVE SPOOL PISTON	2
HP-TB-VS20	REV. VALVE SPOOL (20%)	1
HP-TB-VSP1.O	REV. VALVE SPOOL PISTON 1"	2

Any other damaged parts, including cylinders, center block, valve block, end blocks, or mounting hardware, incur additional charges for replacement.

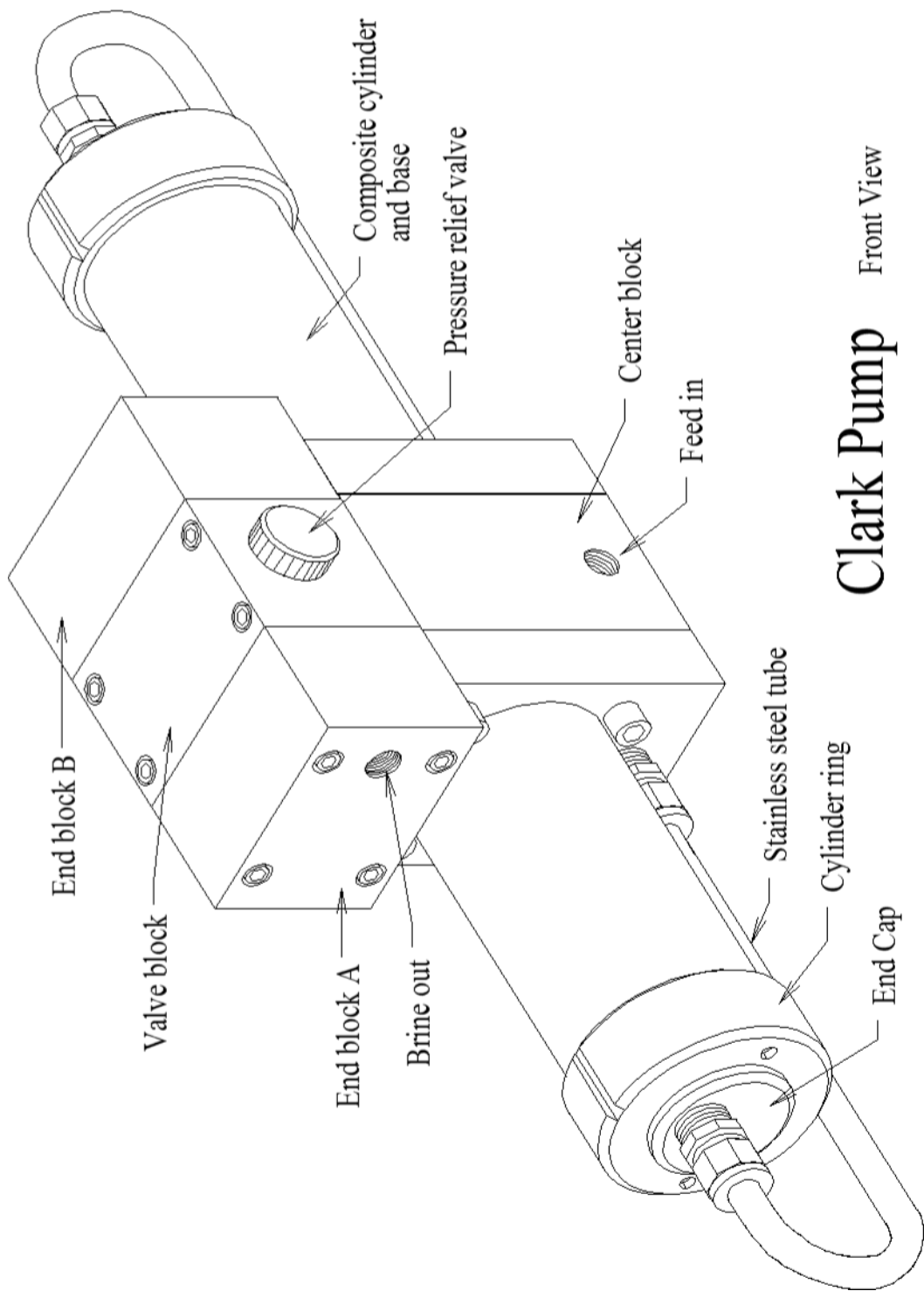
Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	5/74

Clark Pump Remanufacturing SOP

Tools:	1/4-inch Allen wrench or drill attachment
Small flashlight	Two 5/16-inch Allen wrenches
Small drill bit	7/8, 13/16, and 15/16-inch end wrenches
Dental pick	Piston assembly tool, including base, cylinder, and horn.
Piston rod installation tool (a section of 7% piston rod with a rounded end)	Annular ring installation tool
Forceps	Socket wrench with 1/4" Allen wrench and 1/2" sockets
Wire cutter	Mar-proof hammer
Silicon oil	Ring wrench.
Mechanical press	

Consumables:	Teflon tape
Silicone grease (Molykote 111)	Corrosion Blocker grease
Silicone oil	

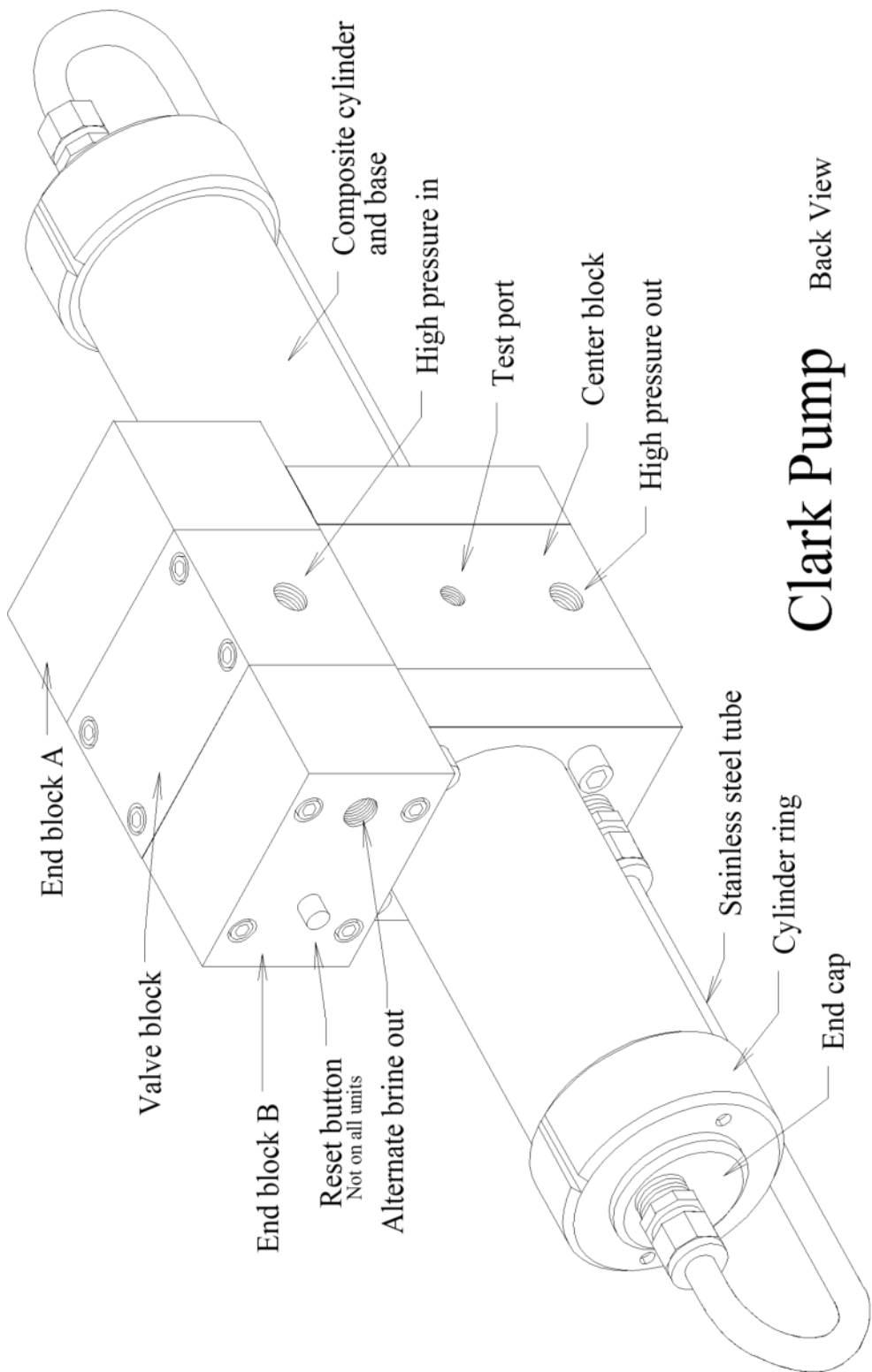
Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	6/74



Front View

Clark Pump

Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	7/74



Clark Pump Back View

Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	8/74

Clark Pump Remanufacturing SOP

1.1. Each Clark Pump sent to the factory for remanufacturing should bear a green tag with the Clark Pump’s RMA number and the received date.



1.2. On the back side of the green tag will be a sticker with arrows pointing to four possible locations for accessories. Note these accessories before disassembly so that we are sure to return the Clark Pump configured exactly the same way. There may be various fittings on either or both of the brine discharge ports, there may be a variety of fittings in the feed water inlet port, and there may be one of several types of mounting base, or none at all. Also, many older systems used a stroke sensor with a magnet embedded in one of the reversing valve pistons. The presence of the magnet should be noted on the sticker on the top of the Clark Pump, but the sticker may be missing and the magnet must be noted during disassembly. Note all of these details carefully on the back of the tag before proceeding.

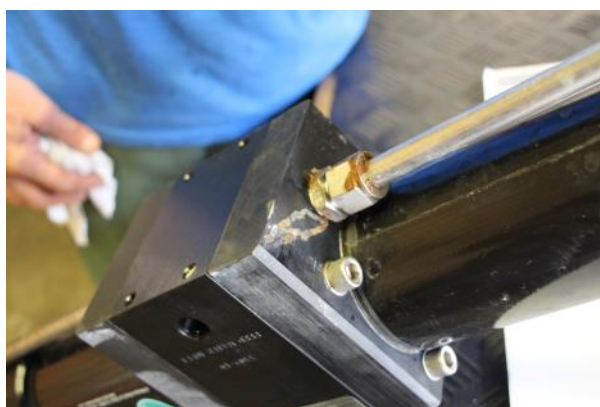


Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	9/74

1.3. Before disassembling, check the Clark Pump for damage and defects. This valve block is cracked from over tightening its mounting screws, and will need to be replaced.



1.4. This cylinder base fitting shows evidence of prolonged leaking. This fitting and the J-tube will need to be replaced.



1.5. Begin by removing all the external elbows, the test port plug, and the pressure relief valve. The two high pressure elbows, if stainless steel, should be discarded to be replaced with nickel-bronze.



Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	10/74

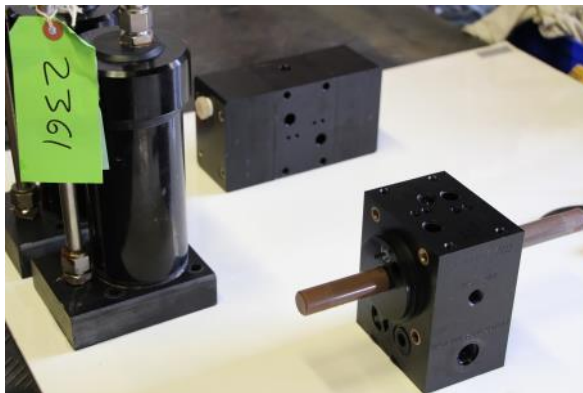
1.6. Remove the valve block and end blocks from the center block by removing the four mounting bolts.



1.7. Remove the cylinders from the center block using two 5/16-inch Allen wrenches.



1.8. Wipe down each component and inspect carefully as disassembly continues.



Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	11/74

1.9. The check valve retaining washers can be removed from the center block using two O-ring picks, or an O-ring pick and a small screwdriver.

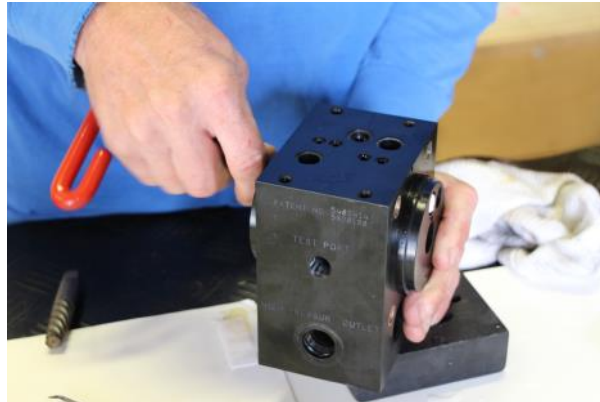


1.10. Remove the pin valve assemblies by gripping with a pair of pliers. Alternatively, they can be blown out of the center block using compressed air. Place a rag over the back side of the center block to keep the other pin valve in place. Plug the hole shown with your thumb while injecting air into the other.

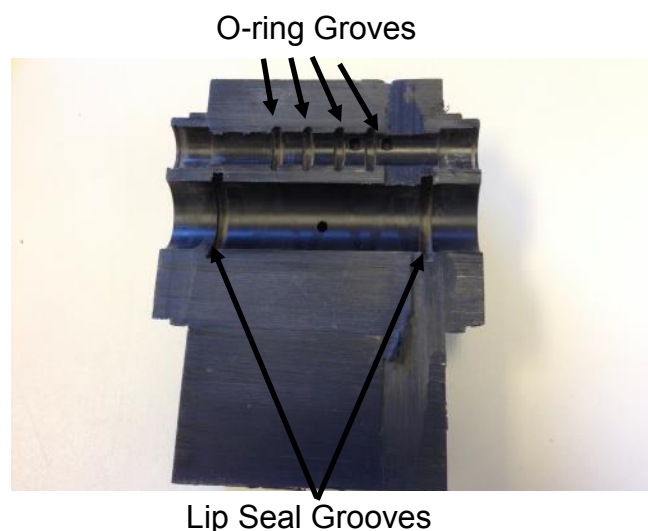


Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	12/74

1.11. The pilot valve spool, and the pin valve assembly on the other side, can now be pushed out with an appropriate tool. The pin valve assemblies should be discarded and replaced.



1.12. This cutaway view shows the races for both the piston rod lip seals, and the pilot valve spool O-rings.



1.13. Remove the piston rod lip seals with forceps or a dental pick. Take care not to scratch the block or O-ring groove.



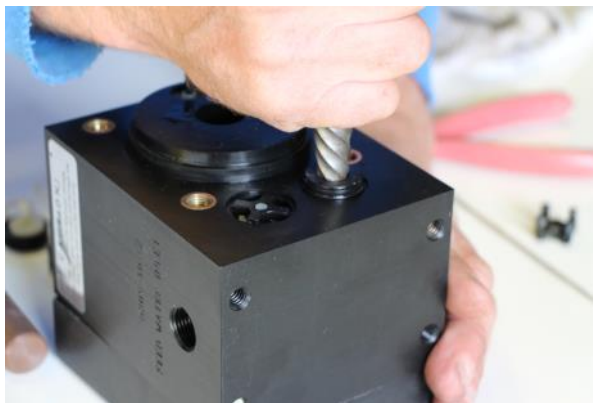
Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	13/74

Clark Pump Remanufacturing SOP

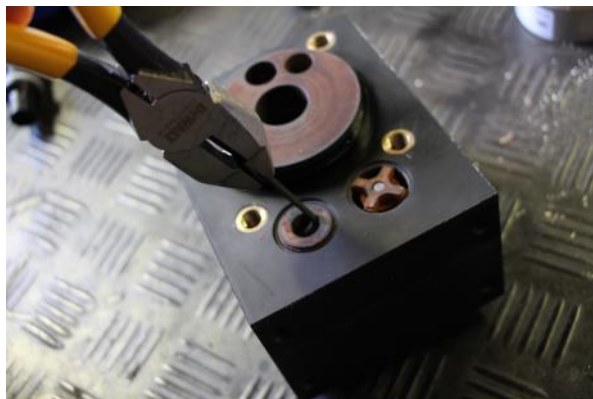
1.14. Likewise, remove pilot valve spool seals from the pilot valve bore. This is the most difficult part of disassembly, especially with old, stiff O-rings. Use a variety of dental picks and forceps.



1.15. A #6 Easy-Out may be used to remove the valve seats. This may damage the seats, but they are normally replaced.



1.16. Alternatively valve seats can be removed with a small Allen wrench and pliers, taking care not to score the side of the valve port.



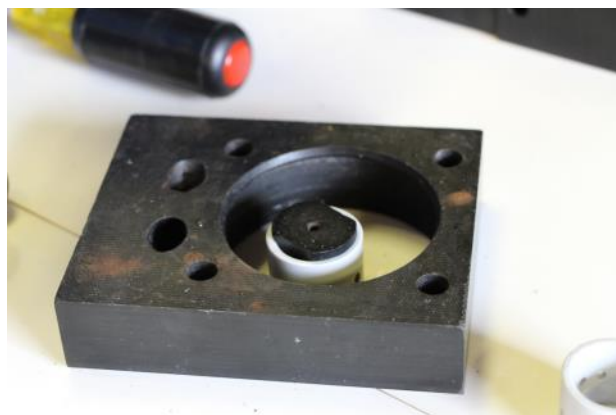
Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	14/74

Clark Pump Remanufacturing SOP

1.17. On some older units the check valve springs were stainless steel. These can be discarded and replaced with Nylon. Stainless springs are only used in new 20% displacement pumps, while all 7% and 10% pumps use a Nylon spring.



1.18. Using the annular ring removal tool (shown, part number HDW-TL-AR) press out the annular rings from the valve block. Used annular rings should be discarded and replaced.



1.19. Pressing an annular ring out the other side of this valve block:



Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	15/74

1.20. Using 7/8 and 13/16-inch wrenches, loosen the compression nut on the end cap.



1.21. Loosen the compression nut on the base and remove the stainless steel tube. Remove the compression fittings from the bases and end caps.



1.22. Using a ring wrench or strap wrench, remove the cylinder ring and end cap. If it is difficult to remove, mild heating (150°F, 65°C) will help loosen it. PET end caps on older models must be discarded and replaced with Delrin.



Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	16/74

2.1. Check the piston rod for scoring. It should be smooth and straight. If a piston rod has swelled beyond tolerance over time, it must be replaced. 7% rods should be no larger than .75" (19.05mm), 10% no larger than .875" (22.23mm).



2.2. With the piston rod lip seals removed, the piston rod should have .003" (.076mm) of clearance in the center block bore and slide back and forth with no resistance. If there is any resistance, the center block will need to be honed or bored, or the rod replaced.



2.3. A center block can slightly compress and change shape over time. If this leaves the nickel-brass inserts protruding slightly, they must be shortened, or else they will interfere with good sealing upon reassembly.



Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	17/74

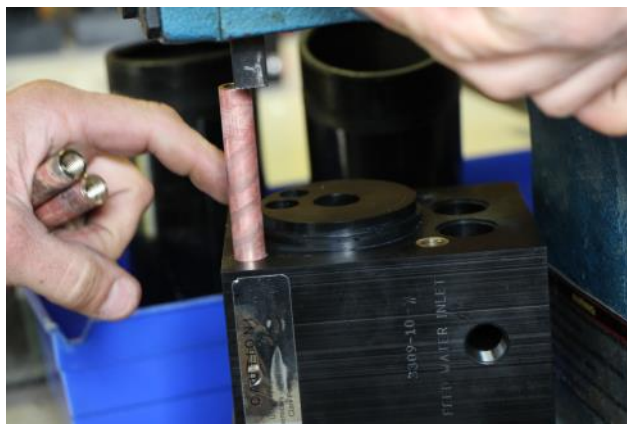
2.4. If the nickel-brass inserts protrude, use a mechanical press and a spare bolt to press the nickel-brass inserts out of the center block.



2.5. Using a lathe or grinder, shorten the inserts by the required amount.

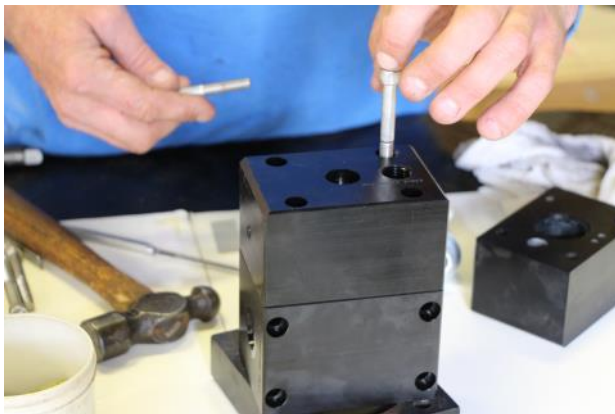


2.6. Press the shortened inserts back into the center block.

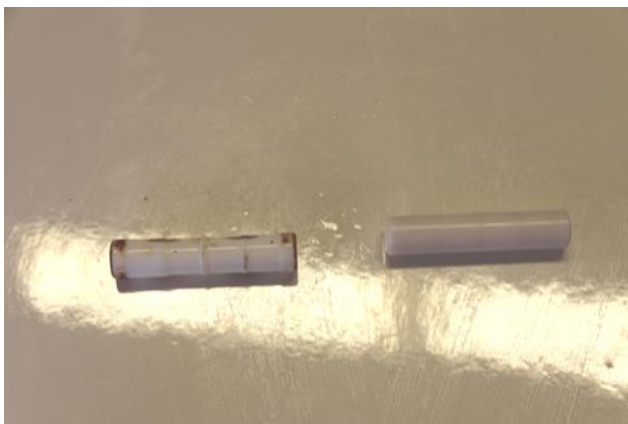


Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	18/74

2.7. Likewise, bolt holes can become constricted over time. Drill out any tight bolt holes.



2.8. Inspect the pilot valve spool for wear. If it is in good condition, it can be reused. The pilot valve spool on the right is used, but still in good condition. If it shows any ridges like the one of the left (an extreme example) it must be replaced.



2.9. Note that some older units use a slightly shorter pilot valve spool. If the unit uses a shorter spool, and the spool needs to be replaced, it **MUST** be replaced with an identical pilot valve spool. Spectra maintains an inventory of the older-style pilot valve spools.



Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	19/74

2.10. Likewise, there is some variation in reversing valve spools for different units. Ensure that if you replace the spool it's with a like spool. Some older spools have multiple pieces and should be replaced with one-part spools.



2.11. Older end cap rings (shown on right) should be replaced with the new, thicker end cap rings (shown on left). The older rings have two circular indentations on top.



Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	20/74

2.12. Inspect cylinders for wear and deep grooves (this one retains a smooth finish and is in good shape).



2.13. This cylinder has pronounced grooves. Any grooves you can feel with your fingernail need to be addressed.

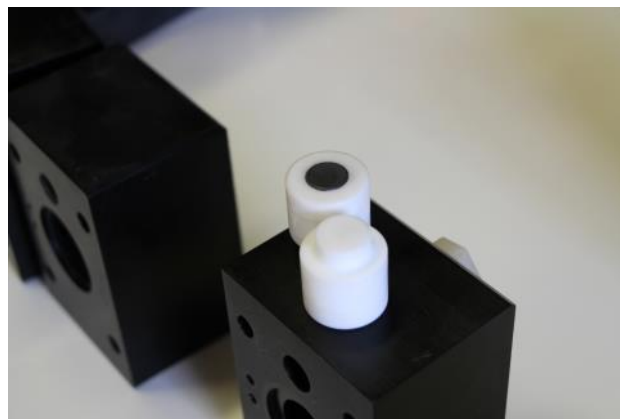


Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	21/74

2.14. Minor grooves can be carefully removed with a wet 2-3/4-inch hone.



2.15. Check spool pistons for excessive wear. If in good condition, they can be reused. Some models have a stroke counter, which senses a magnet embedded in one of the spool pistons. This magnet will need to stay in place, on the side with the sensor. If replaced, it must be with like parts.



2.16. Inspect pistons for wear and snug fit in the cylinders. If pistons remain in good condition, and still seal snugly in the cylinder, they can be reused.



Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	22/74

2.17. Only reuse J tubes and fittings that show no signs of pitting or leakage. This ferrule is pitted and won't reseal again:



2.18. Note that you can see the sealing surface where the ferrule contacts the fitting. This compression fitting is pitted, and must be discarded.



2.19. This compression fitting still looks good. If it is a stainless fitting for an end cap, it must be replaced with nickel-bronze, even if the stainless fitting is in good condition. Stainless fittings can react with the Delrin end caps over time.



Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	23/74

2.20. Stainless fittings can be reused in bases, but only if in excellent condition. There is no compatibility problem between stainless and the fiberglass base.



2.21. On even a fairly routine rebuild, many parts should be discarded and replaced:



Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	24/74

Center Block Reassembly

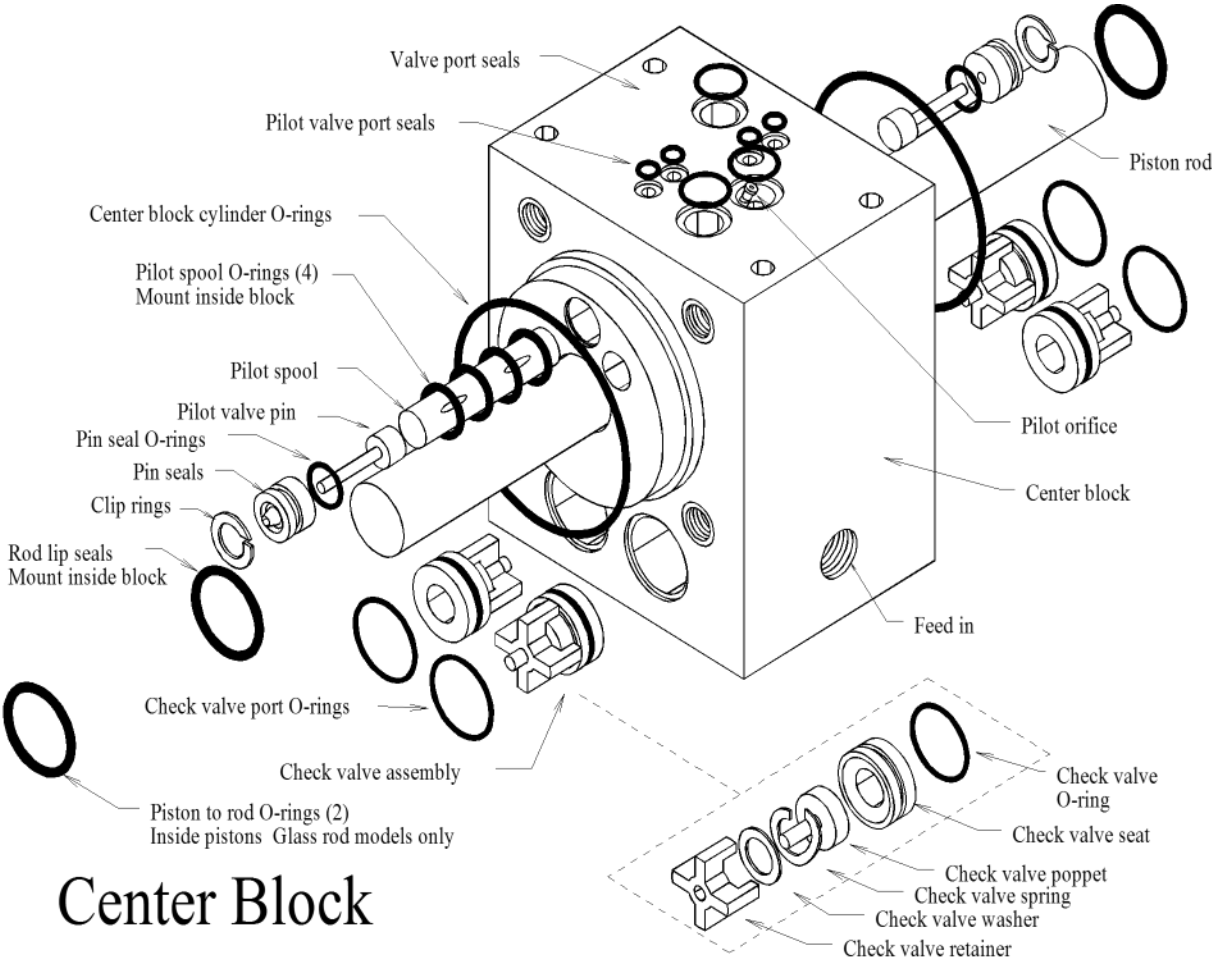
7% Center Block (part number HP-CB-CB7):



10% Center Block (part number HP-CB-CB10)



20% Center Block (part number HP-CB-CB20)



Center Block

Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	25/74

3.1. Place O-ring (SO-FT-STF, size 3-908) over threads on a nickel-bronze elbow (PL-MTE-3/4S1/2B). Take care not to cut the O-ring on the threads. Reminder: stainless steel elbows should be replaced with nickel-bronze.



3.2. Lightly coat threads with silicon grease (Molykote 111).



3.3. Screw the nickel-bronze elbow into the enter block's high pressure outlet. Leave the elbow loose, because it will be reoriented and tightened later, during testing.



Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	26/74

Clark Pump Remanufacturing SOP

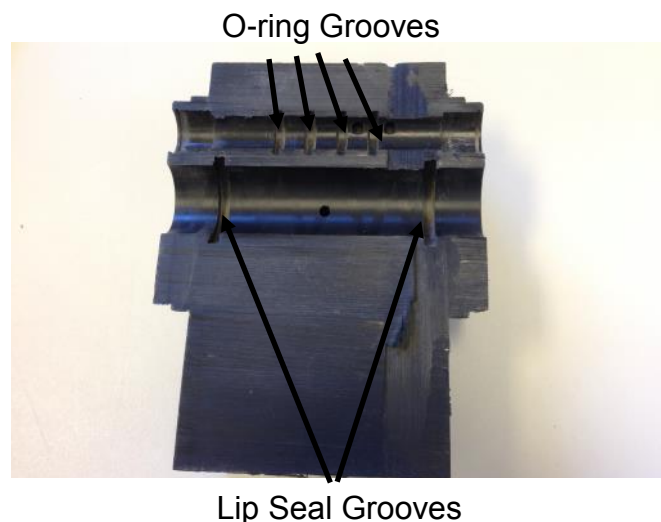
3.4. Wrap six turns of Teflon tape around the threads of a 3/8" x 5/8" Nylon elbow (PL-HBE-3/8x5/8). For 20% Clark Pumps, see note in next step.



3.5. Screw the Nylon elbow into feed water inlet. Leave the elbow finger tight, as it will be reoriented and tightened later, during testing. Note: On 20% Clark Pumps instead of the Nylon elbow, this will be another bronze elbow (PL-MTE-3/4S1/2B) with an O-ring (SO-FT-STF, size 3-908), just like the two fittings installed in the previous steps.



Again, cutaway view shows the races for the piston rod lip seals and the pilot valve spool seals in the following steps.



Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	27/74

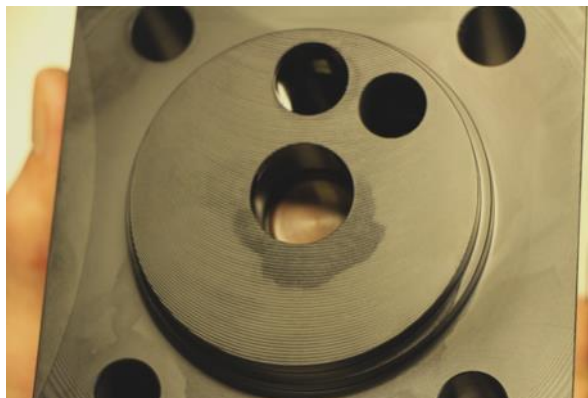
3.6. The two piston rod lip seals go in the large (3/4-inch or 7/8-inch) center block bore. Begin by inspecting the grooves in the bore for debris from manufacturing, as any contamination can interfere with the seals. Remove the debris with a dental pick or compressed air. Note: on 20% pumps there will be two 10% piston rods and two sets of seals.



3.7. Use the Piston Rod (HP-CYL-PT for 7%; HP-CYL-7/8R for 10%) to aid installation of the seals.

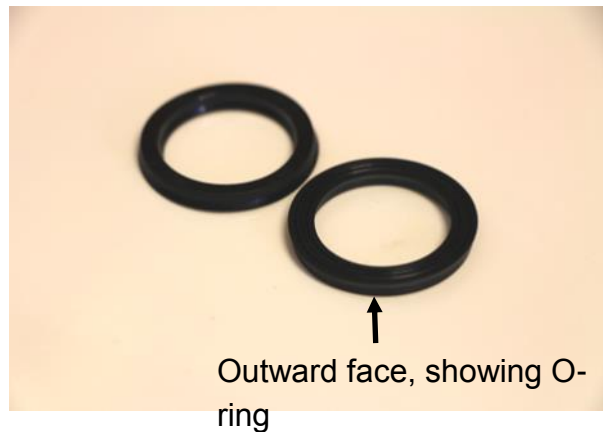


3.8. Insert Piston Rod into the bore until even with the grooves for the seal.



Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	28/74

3.9. The lip seals must face out, and the O-ring within the lip seal must stay in place.



3.10. Place lip seal in valve bore, facing out.



3.11. Use forceps to position the lip seal in groove. Repeat on other side of the center block. The rod, if lubricated, will slide past a seal going from the inside out. It is more difficult, and there is a risk of damaging the seal, going from the outside in. Feel around the periphery of both seals with your finger to smooth and check for lumps or twists.



Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	29/74

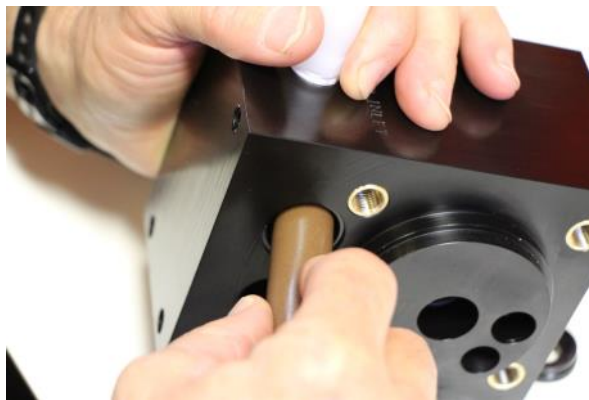
3.12. Roll all four check valve seat seals (SO-HPP-CVS, size 2-018) onto the check valve seats.



3.13. Insert check valve seats into the check valve bores on the INLET SIDE (the side of the center block that says "Feed Water Inlet" and now has the Nylon elbow).



3.14. With a constant, even pressure, use your finger or the piston rod to push in the check valve seats until bottomed out.



Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	30/74

3.15. Check for aberrations in manufacturing on the check valve retainers (HP-CB-CVR), especially additional material on the ends of the legs. Trim as necessary with an X-Acto knife.



3.16. The two check valve retainers for the inlet side must be notched with clippers to ensure a secure fit in the check valve bores, otherwise they will fall out of their bores during assembly.

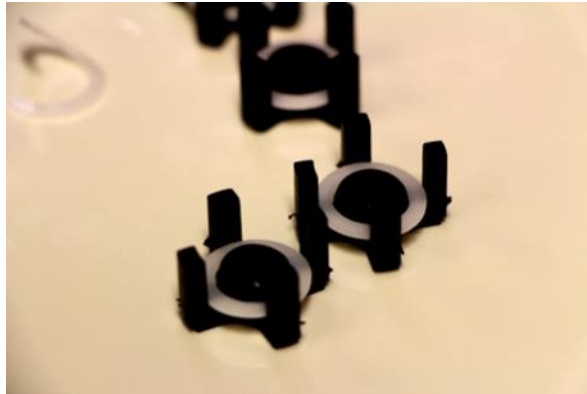


3.17. Notch the top of each leg of the check valve retainer legs, leaving pronounced burrs.

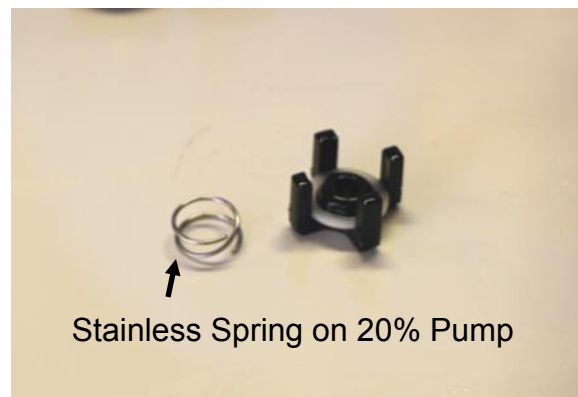


Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	31/74

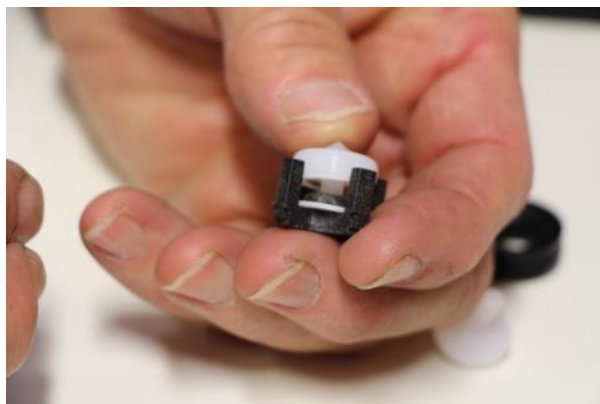
3.18. Place Nylon check valve washers (HP-CV-CVSW) on all four check valve retainers.



3.19. Place Nylon check valve springs (HP-CB-SPRP) on top of the check valve washers. Note: On 20% pumps, stainless steel springs (HP-CB-SPR) will be used instead.



3.20. Check valves (HP-CB-CV) can be reused if in good condition. Insert check valves into check valve retainers and check for free movement.



Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	32/74

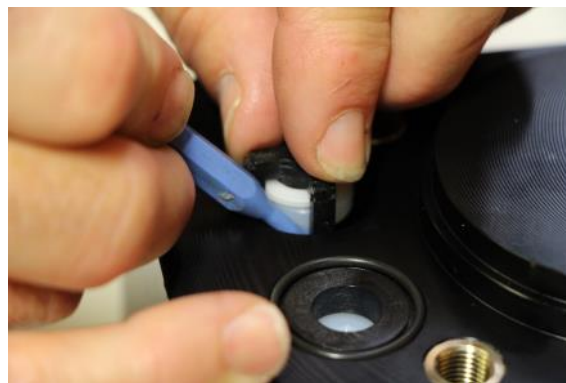
3.21. Insert check valve assemblies and remaining two check valve seats into the bores on the outlet side (the side with the bronze fitting) of the center block.



3.22. To ease installation, loop the valve seat over the forceps, face down, then grip one of the legs of the valve retainer. Hold the valve down with the forceps as you press in the valve seat. Once installed, press on the valve to check for free operation.

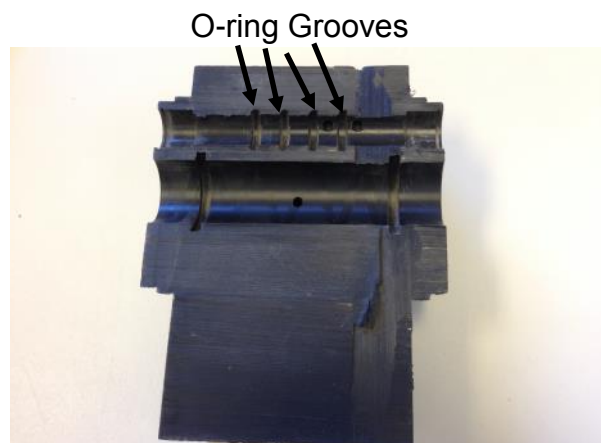


3.33. Insert the two check valve assemblies (with notched legs) on the inlet side (side with Nylon elbow). Hold the valve in compression with the dental pick while sliding the assembly into place.



Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	33/74

3.34. This cutaway view shows the grooves for the four pilot valve spool O-rings:



3.35. You can use pilot valve spool (HP-CB-PVS) as a guide to install the four pilot valve spool seals.



3.36. Insert pilot valve spool in pilot valve bore (the uppermost bore on the face).

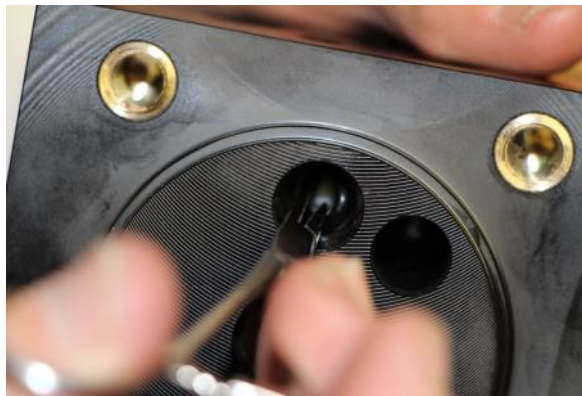


Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	34/74

3.37. Move pilot valve spool through bore until it is even with the groove for one of the inner seals.



3.38. Using forceps or blunt tool, insert a new O-ring (SO-HPP-PS, size 2-013) and maneuver into groove. Repeat for all four O-rings, then inspect for even seating. Note: This is the most difficult part of assembling the Clark Pump, and requires patience and dexterity.



3.39. Once all four seals are in place, lubricate the pilot valve spool with silicon grease and insert it into the pilot valve bore, where it will stay.



Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	35/74

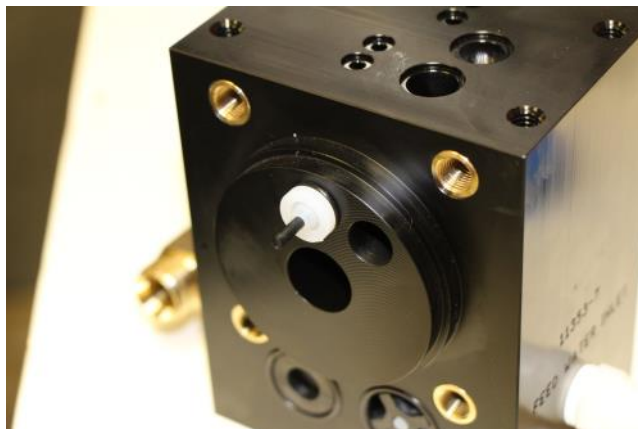
3.40. Put new O-rings (SO-HPP-PS, size 2-013) around both new pilot valve pin seals (HP-CB-PVPS), seating them into the grooves.



3.41. Insert new pilot valve pins (HP-CB-PPS) into the pilot valve pin seals.

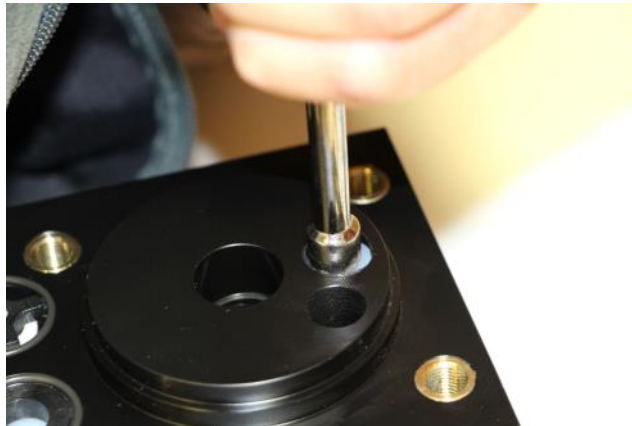


3.42. Apply a layer of silicon grease to the outside of the pilot valve pin seal, and insert into the pilot valve bore.



Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	36/74

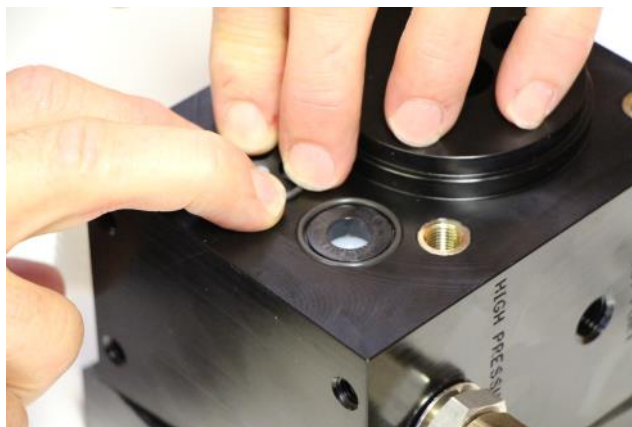
3.43. Press the pilot valve pin assembly into place using nut driver or similar tool, taking care not to damage the pin. Repeat on opposite side.



3.44. Make a split washer by cutting a small section out of a Nylon check valve seat washer (HP-CB-PVCR). Insert the cut washer into the groove over the pin seal. Ensure smooth and even seating by rotating the check valve retaining washer in its groove with an O-ring pick.

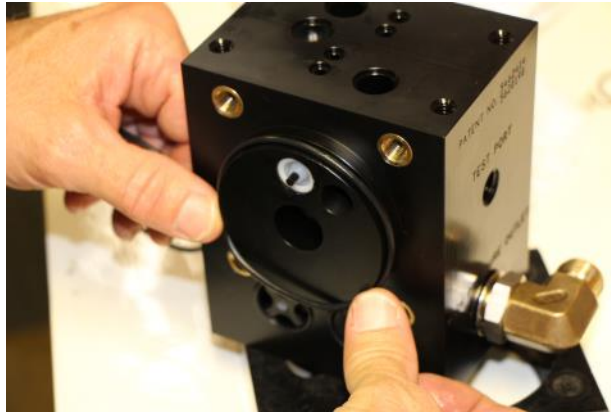


3.45. Place new O-rings (SO-HPP-CVP1, size 2-020) over all four valve ports. If the O-rings don't stay in place, gently stretch them for a better fit.



Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	37/74

3.46. Lubricate new center block seals (SO-HPP-ECCB, size 2-145) with silicon grease and position around faces on both sides of the center block.



3.47. Place four new pilot port seals (SO-HPP-PLP, size 2-008) over the four pilot ports.

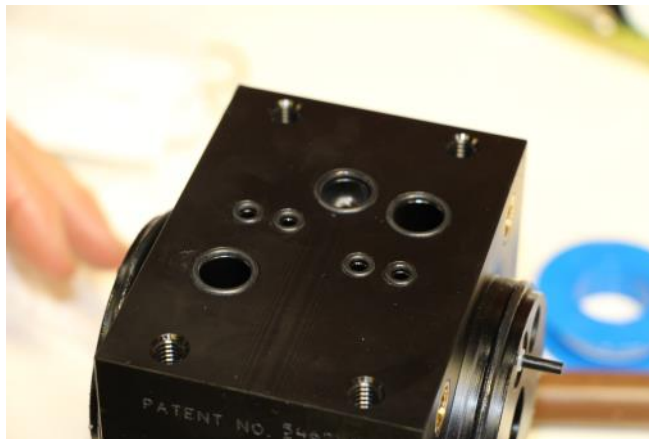


3.48. Place three new valve port seals (SO-HPP-VP, size 2-114) over the three valve ports.

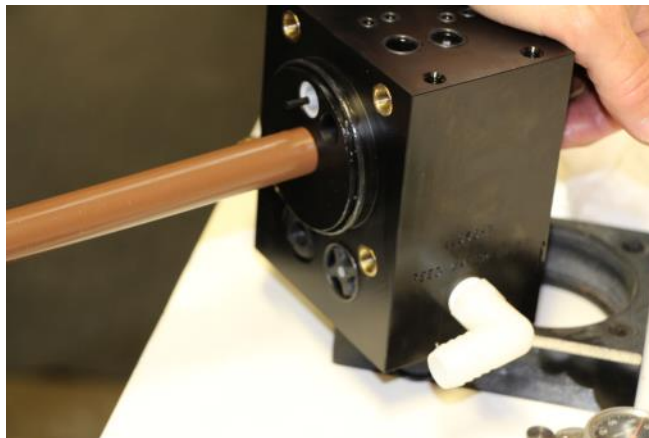


Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	38/74

3.49. All upper seals shown in place:



3.50. Lubricate the piston rod (HP-CYL-PT) with silicon oil. Use a piston rod installation tool, or carefully twist and insert the rod the piston rod bore, past the seals, taking care not to damage or dislodge the seals.



3.51. Check for smooth movement of the piston rod in the piston rod bore.

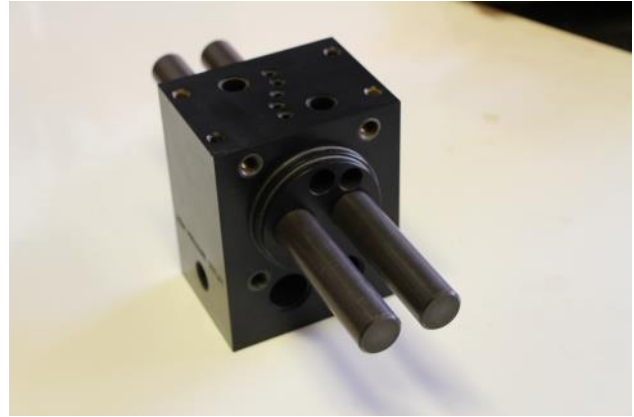


Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	39/74

3.52. This completes the center block assembly.

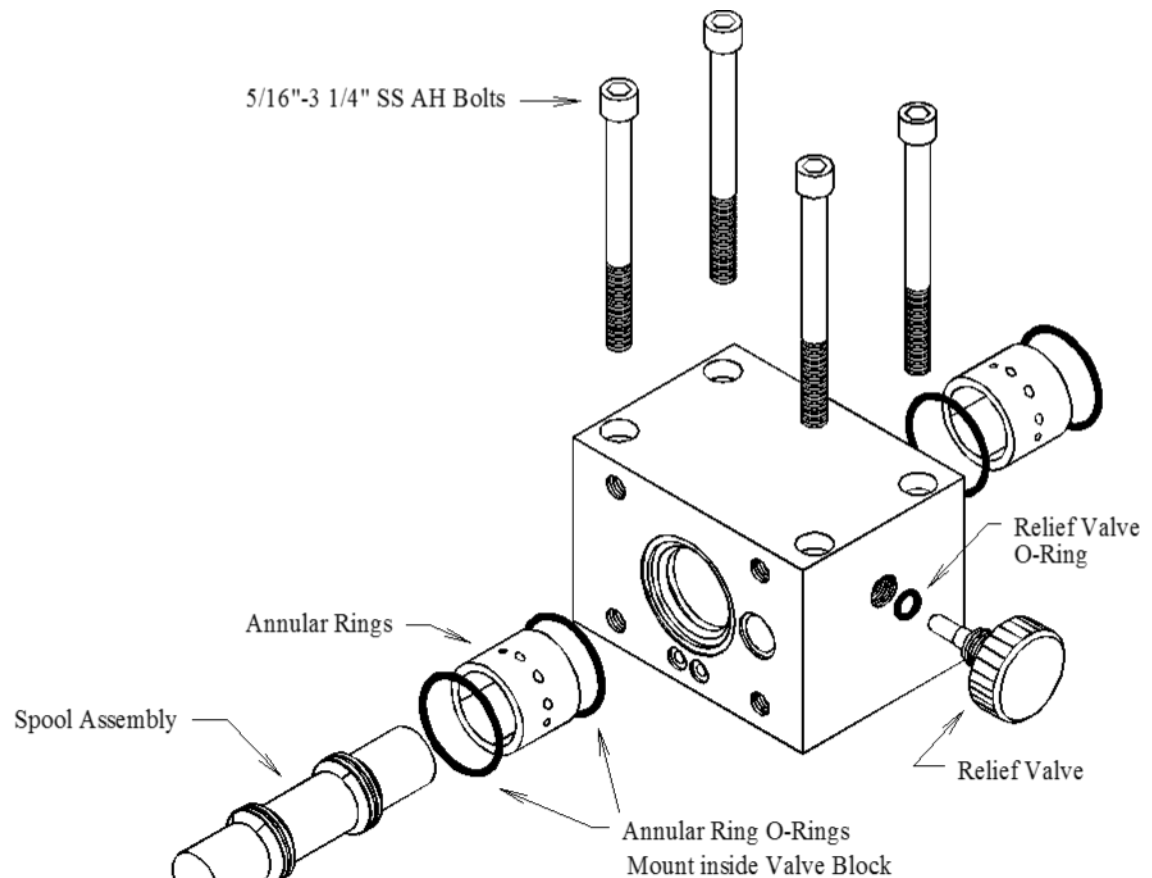


7% Center Block



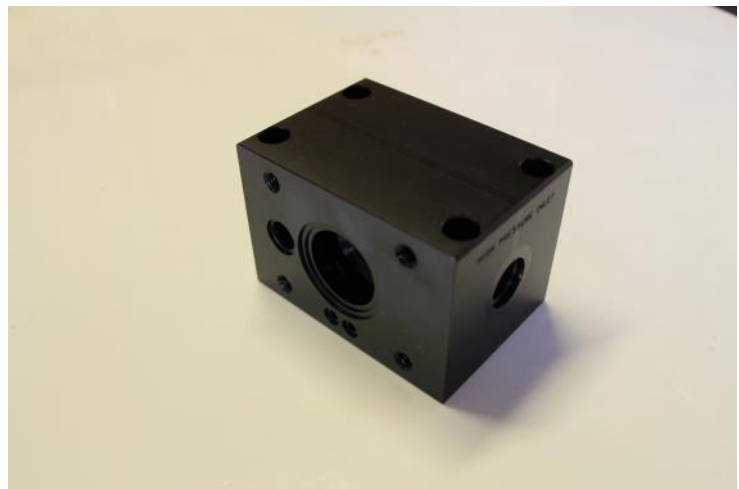
20% Center Block

Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	40/74



Valve Block

- The valve body is inscribed with “pressure relief valve” on one side, and “high pressure inlet” on the other. The valve body is the same on 7%, 10%, and 20% Clark Pumps.



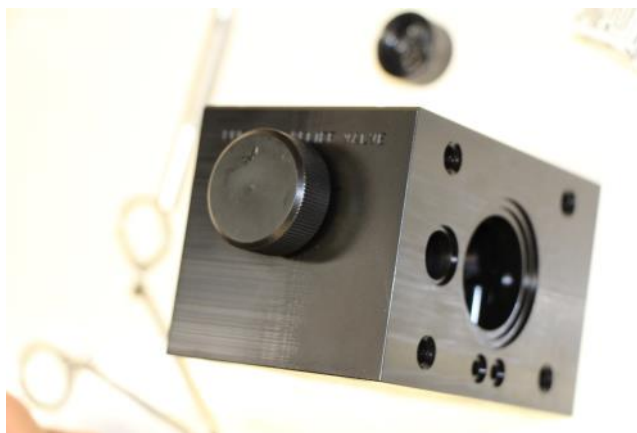
Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	41/74

Clark Pump Remanufacturing SOP

4.1. Fit a new orange O-ring (SO-HPP-RV) to the relief valve (HP-TB-BV) and smear silicon grease on the threads.



4.2. Screw the relief valve into the Pressure Relief Valve port.



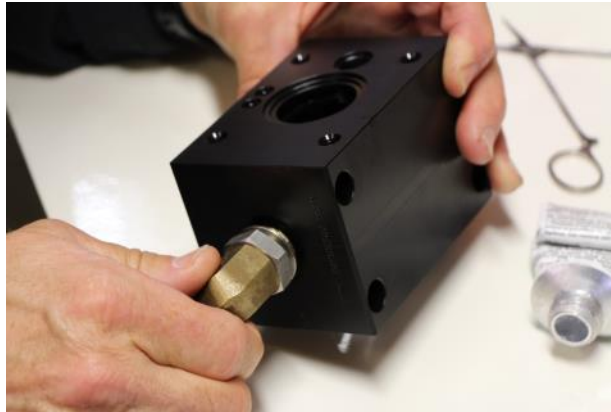
4.3. Place a new O-ring (SO-HPP-RV) size 2-108) over the threads on a nickel-bronze elbow (PL-MTE-3/4S1/2B) and grease the threads with silicon grease. Reminder: Stainless steel elbows should be replaced with nickel-bronze.



Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	42/74

Clark Pump Remanufacturing SOP

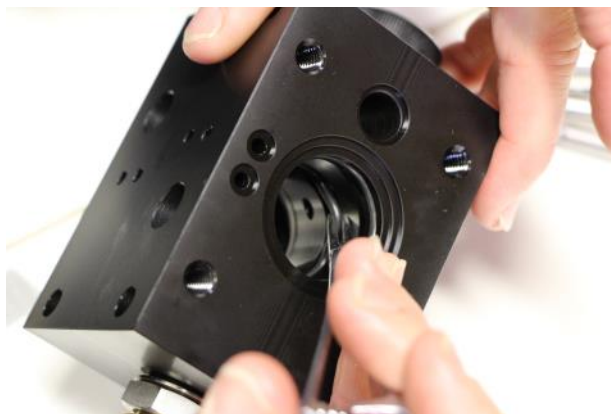
4.4. Screw a nickel-bronze elbow (PL-MTE-3/4S11/2B) into the high pressure inlet port. Leave the elbow loose, as it will be adjusted and tightened during testing.



4.5. Seat four new annular ring O-rings (SO-HPP-AR) in the four grooves along the large bore in the valve block.



4.6. Forceps may aid installation of the two inner annular ring O-rings.



Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	43/74

4.7. Seat the annular ring installation tool in one of the two new annular rings (HP-TB-AR).



4.8. To prepare for installation, lubricate both the annular rings and the valve block with silicon grease and soapy water.



4.9. Using the annular ring installation tool, press the annular ring into the valve block until bottomed out. Repeat on both sides of the valve block. If you don't have a mechanical press, they can be carefully tapped in with a hammer.



Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	44/74

***Shown below are the steps Spectra uses at the factory to put the seals on the valve spool. The seals can be carefully installed on the valve spool by hand (without the installation tools shown below), and you should receive completed valve spools (with seals already installed) in rebuild kits from Spectra. ***

4.10. A reversing valve spool, if in good condition, can be reused. Remove the old seals. Place the spool in the base of the assembly tool. Note: the reversing valve spool for 20% is slightly different, part number HP-TB-VS20.



4.11. Place the horn over the valve spool. Lubricate the horn with silicon oil to prevent the seal from rolling during installation. Slide a new black quad seal (SO-HPP-Q) down the horn and into the groove on the spool.



Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	45/74

4.12. Leaving the horn in place, next slide on a new white UHMW polyethylene reversing valve spool seal (HP-TB-VSS).



4.13. Use the installation tool cylinder to press the reversing valve spool seal down the horn and into the groove, over the quad seal.



4.14. Repeat the installation of both the quad seal and reversing valve spool seal on the other side of the spool.



Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	46/74

4.15. Once the quad seals and reversing valve spool seals are in place, compress and seat them by passing the horn, followed by the spool, through the installation tool cylinder.



4.16. Lubricate the annular rings with silicone grease and soapy water, then press the spool assembly into the valve block.

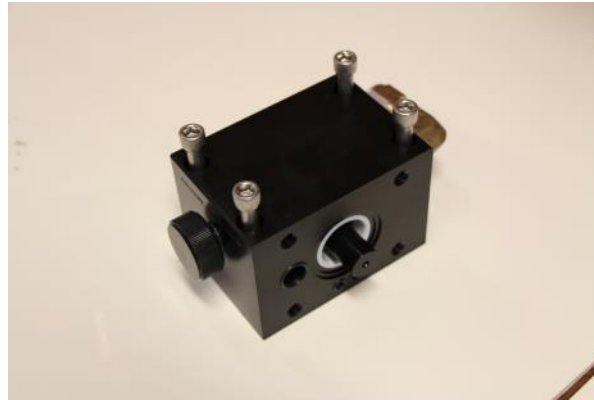


4.17. Place new pilot port O-rings (SO-HPP-PLP, size 2-008) and new brine port O-rings (SO-HPP-VP, size 2-014) on both sides of the valve block.

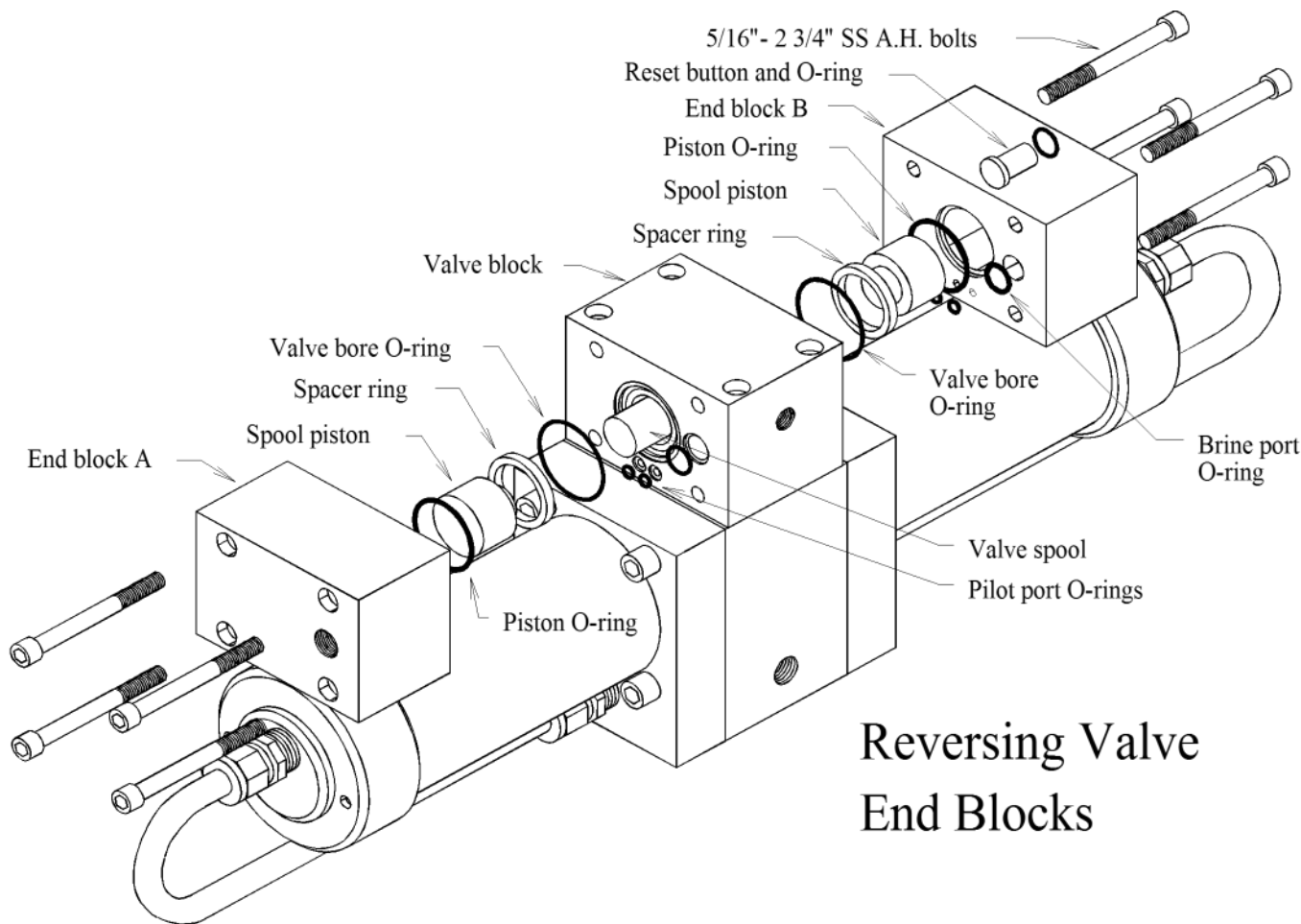


Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	47/74

4.18. Four 5/16" x 3-1/4" stainless steel bolts (HD-CPS-5/16x3) will attach the valve block to the center block. Clean bolts, in good condition, can be reused. This completes the valve block assembly.



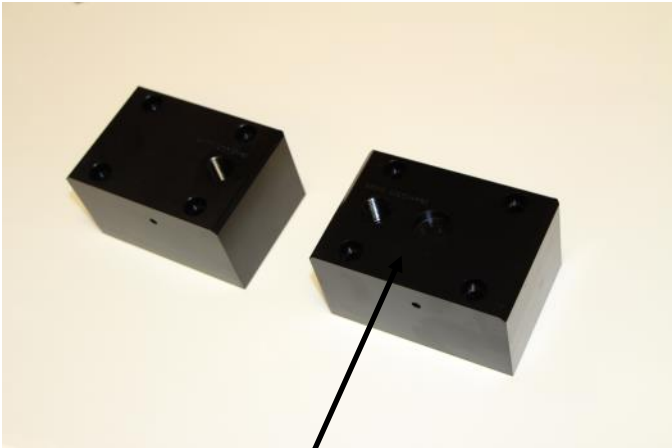
Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	48/74



Reversing Valve
End Blocks

The A and B end blocks are mirror images. The B side has an indentation that the A side does not have.

7% and 10% Clark Pumps use end blocks with a 1-1/4-inch bore (HP-TB-VEB-A1 and HP-TB-VEB-B1). 20% Clark Pumps use end blocks with a 1-inch bore (HP-TB-VEB-A and HP-TB-VEB-B).



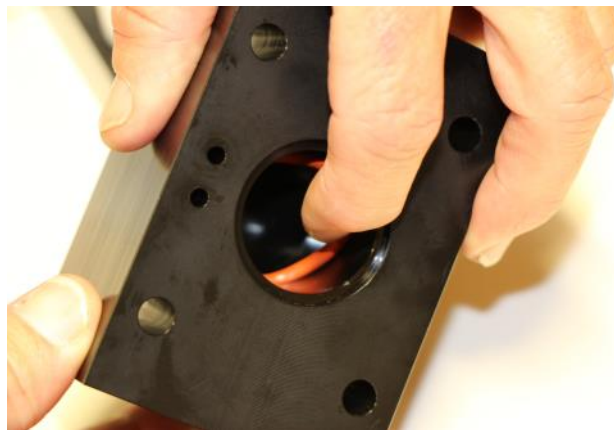
Indentation

Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	49/74

5.1. Inspect both end blocks and check the O-ring groove for debris with an O-ring pick, being careful not to scratch the groove.

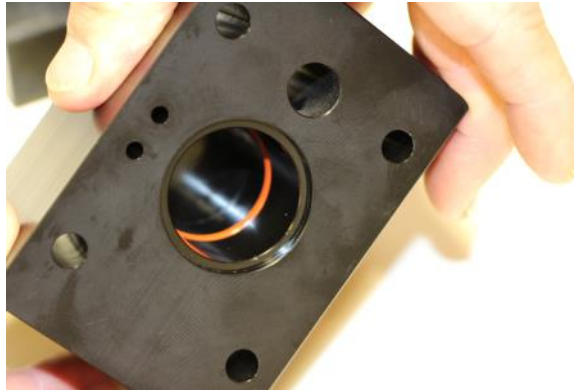


5.2. Insert new orange reversing valve piston O-rings (SO-HPP-SP) and seat them into their grooves.

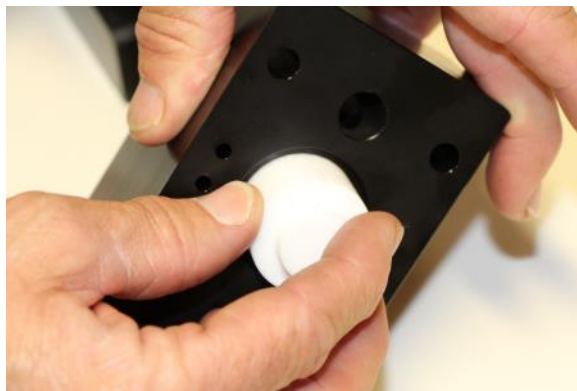


Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	50/74

5.3. Reversing valve piston O-ring in place:



5.4. Reversing valve spool pistons showing any wear should be replaced. Load the spool piston (HP -TB-VSP) into both end blocks. Note: If the model has a stroke sensor with a magnet embedded in one of the spool pistons, ensure replacement of the magnet on the B side.



5.5. Press in until bottomed out.

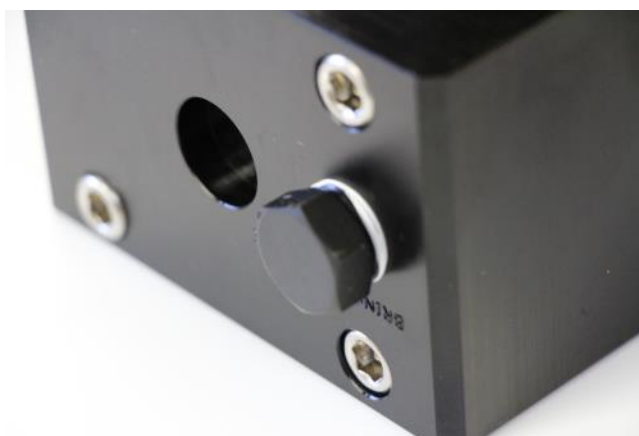


Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	51/74

5.6. Install fitting into the brine discharge port on the A side (In some cases this will be reversed.) This may be a straight Nylon hose barb (PL-HBS-3/8 x 5/8) or a quick-connect fitting, wrapped with Teflon tape. This fitting will not be adjusted later, so it can be tightened for final use.

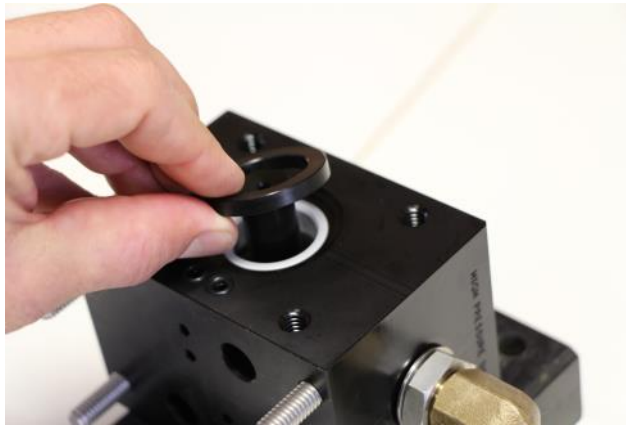


5.7. Screw a black 3/8" plug (PL-HP-3/8N), wrapped with Teflon tape, into the brine discharge port on the B side. This plug will be removed later for testing, but should still be snug. (Again, the A and B discharges may be reversed in some cases.)

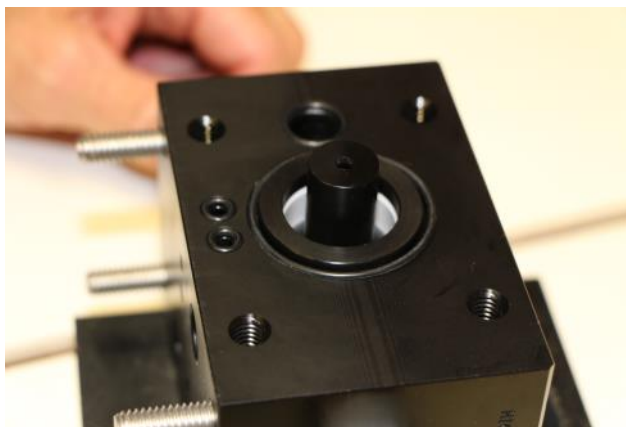


Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	52/74

5.8. Spacer rings (HP-TB-SR) can be reused. Place spacer ring on valve bore.



5.9. Lubricate a new valve bore O-ring (SO-HPP-VB) with silicon grease and seat around the spacer ring and into valve block.



5.10. Press end block B down on valve block, ensuring spacer ring and all O-rings stay in place.



Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	53/74

Clark Pump Remanufacturing SOP

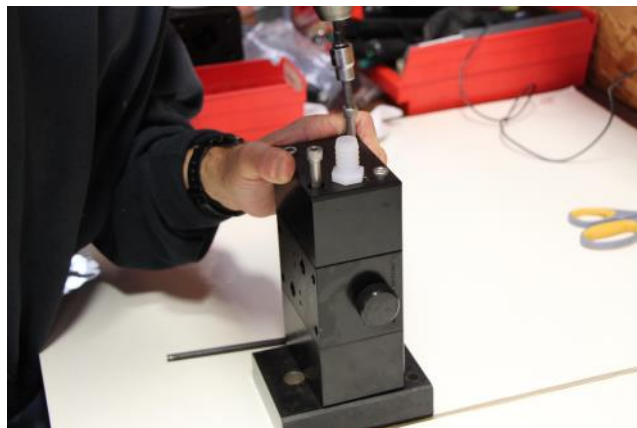
5.11. Set four 5/16"x 2-3/4" bolts (HD-CPS-5/162.75) in the four corner holes. With a 1/4" Allen wrench, tighten in an X pattern for even seating. Since these bolts thread into plastic, tighten them carefully, using an electric driver only on its gentlest setting.



5.12. Final tightening should be by hand, to approximately 40 inch-pounds of torque (snug but not tight).



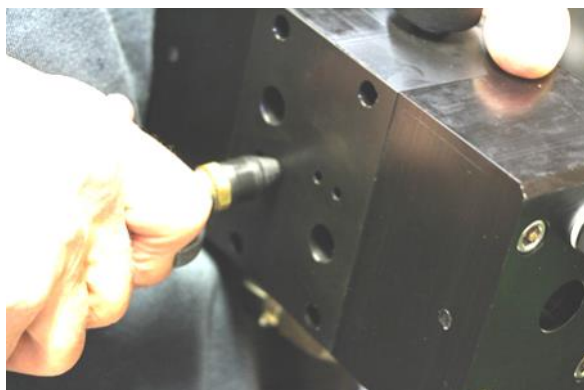
5.13. Repeat for attachment of the A side, with an additional spacer ring and new valve bore O-ring.



Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	54/74

Clark Pump Remanufacturing SOP

5.14. To check operation of the spool piston, you may inject compressed air alternately into the two ports shown. You should hear the spool piston move back and forth each time, and the sound should be the same in either direction. If not, this indicates excessive friction or an error in assembly.



5.15. The valve blocks and valve body are now ready to be joined to the center block with four 5/16" x 3-1/4" bolts.

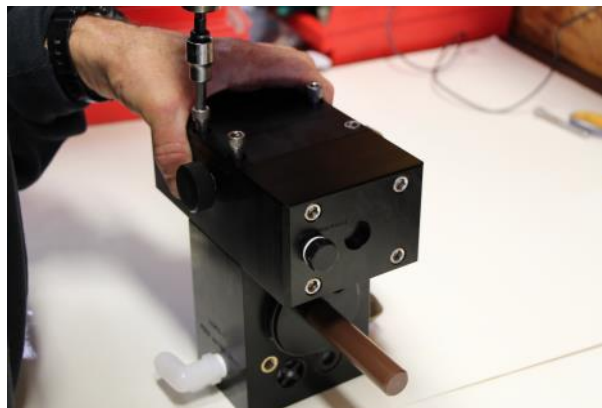


Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	55/74

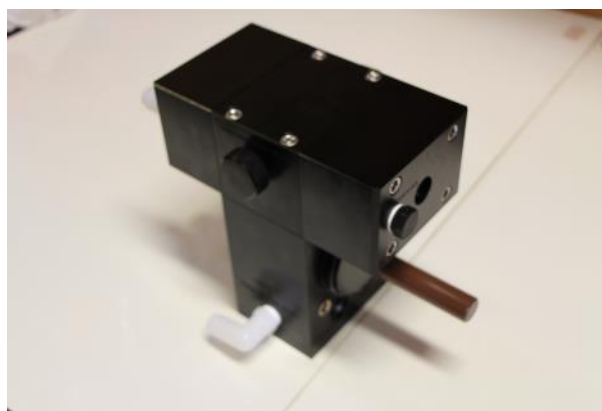
6.1. Place the valve and end block assembly on the center block, noting that the pressure relief valve on the valve block goes on the same side as the feed water inlet on the center block. Make sure all O-rings are in position on the center block.



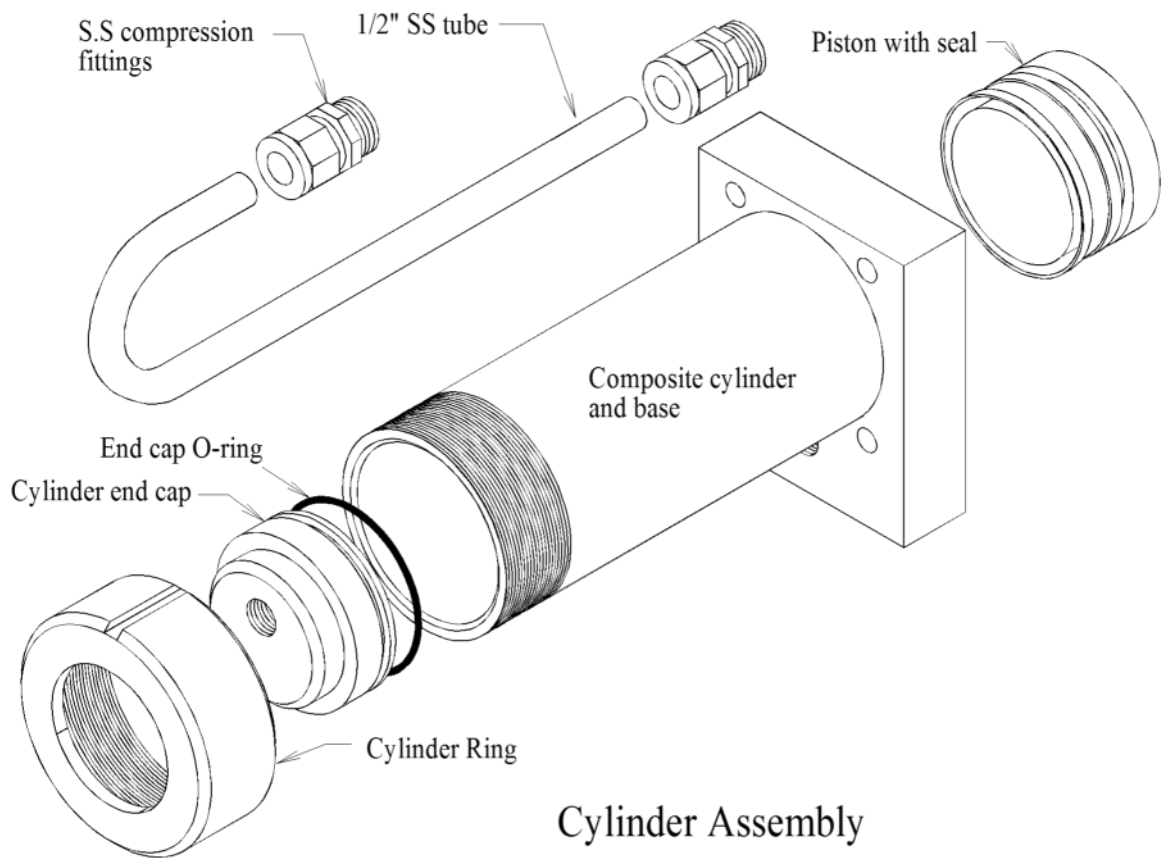
6.2. Tighten the bolts in an X pattern, again only using an electric driver on its gentlest setting. Finishing by hand to a torque of approximately 40 inch-pounds.



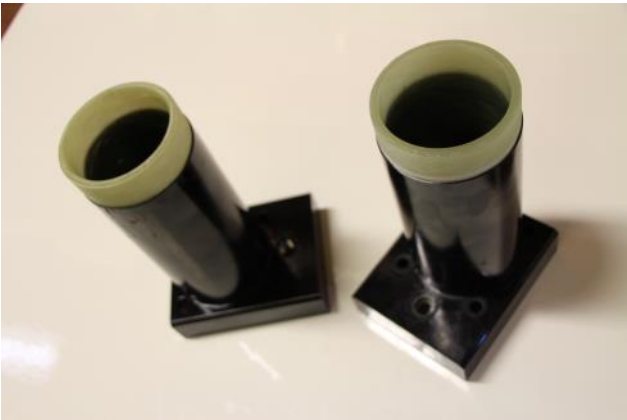
6.3. Leave the pressure relief valve open several turns. It will be closed during testing. This completes the joining of the valve and end block assembly with the center block.



Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	56/74



Check both cylinder and base assemblies for defects. All models use the same cylinders.



Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	57/74

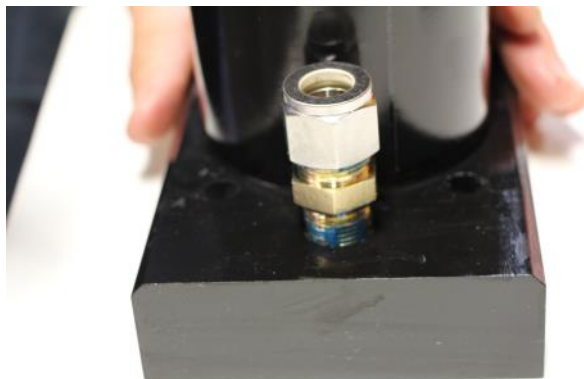
7.1. Assemble four nickel-bronze compression fittings (PL-MTS-3/8x1/2S), two for each cylinder. First place a new O-ring (SO-FT-STF, size 3-908) on the pipe thread side of each fitting. Reminder: existing stainless fittings can be reused in bases. End cap fittings must be nickel-bronze.



7.2. Add a stainless steel ferrule, with the cone down.



7.3. Grease all threads, replace the nut over the ferrule, and screw the fitting into the base.



Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	58/74

Clark Pump Remanufacturing SOP

7.4. Place the cylinder in a tight vice, taking care to pad the jaws to avoid scratching. Tighten the bronze fitting firmly until the O-ring is compressed.



7.5. Some older cylinders may have 3/8-inch NPT threads and no O-ring. In this case, wrap the fitting with ten or more turns of Teflon tape and tighten firmly. Be sure to clean the old threads of any old Teflon tape and detritus.



Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	59/74

7.6. Apply silicon grease to a new end cap O-ring (SO-HPP-ECCB) and place on the cylinder end cap (HP-CYL-EC). Reminder: Older PET end caps should be replaced with new, Delrin end caps.



7.7. Insert the end cap with O-ring into the cylinder, keeping the threaded hole at twelve o'clock, opposite the fitting on the base.



Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	60/74

7.8. Apply a generous layer of silicon grease to the cylinder ring (HP-CYL-R). Reminder: Older cylinder rings should be replaced with the new, thicker model.



7.9. Spray both the cylinder ring and the threads on the cylinder with soapy water, then screw the cylinder ring onto the cylinder.

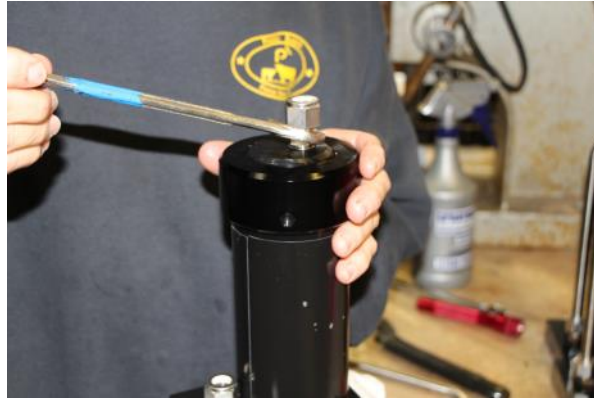


7.10. Tighten cylinder ring firmly with a ring wrench or strap wrench.

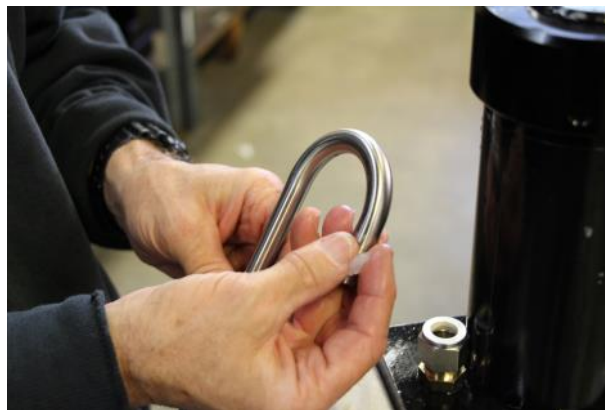


Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	61/74

7.11. Screw a nickel-bronze fitting into the cylinder end cap. Since the end cap is Delrin, tighten enough to compress the O-ring, but take care not to over-tighten or damage the end cap.



7.12. Coat both ends of the 1/2" stainless steel J-tube (HP-CYL-SST) with silicone grease.



7.13. Insert the J-tube into fittings, giving it a tap with a mar proof hammer to ensure complete seating. Tighten nuts finger tight, then tap again.



Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	62/74

7.14. Tighten the compression nut while holding the base nut in place with a second wrench. Do not allow the fitting to spin while tightening the compression nut. The compression nut must compress the ferrule around the tube to create a high pressure seal.



7.15. The stainless steel tube should line up with the cylinder. If not, it can be tapped into place with a mar-proof hammer, even after the compression nuts are tight.



Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	63/74

7.16. Spray both pistons and cylinders with soapy water.



7.17. On 7% and 10% Clark Pumps, press a Nylon piston (HP-CYL-PT) into each cylinder.



Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	64/74

The following 3 steps are for preparation of the 20% piston only. The piston for the 7% and 10% Clark Pumps, shown on the previous page, is one-piece Nylon and requires no assembly.

7.18. 20% PUMPS ONLY: Looking at the 20% piston (HP-CYL-PT20) you will see the deepest groove will receive an orange 2-229 O-ring (SO-HPP-PT20).



7.19. 20% PUMPS ONLY: Over the orange O-ring, put a piston seal (HP-CYL-PTS20).

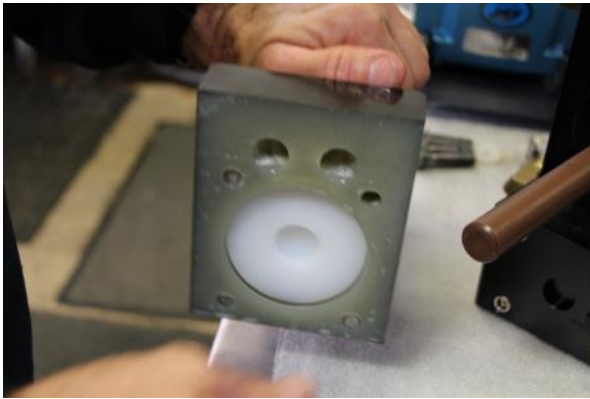


7.20. 20% PUMPS ONLY: In the two remaining grooves, place two piston bushings (HP-CYL-PTB20).



Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	65/74

7.21. The indentation for the piston rod(s) should be facing out.



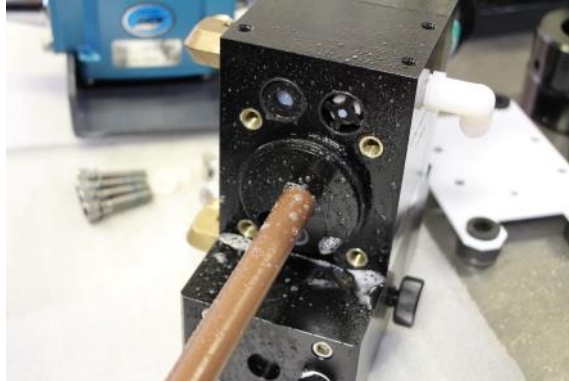
7% and 10% pumps



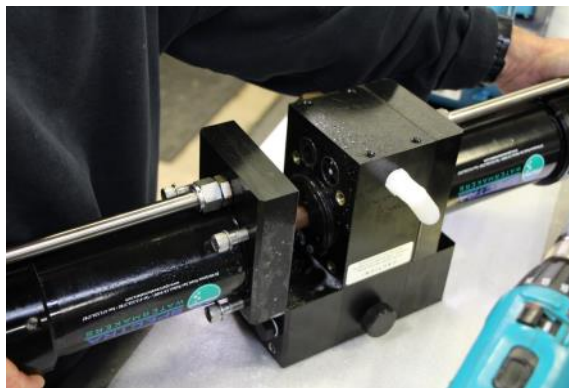
20% pump

Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	66/74

8.1. Turn the center block assembly upside down. Spray both the center block and the cylinder base with soapy water to lubricate.



8.2. Seat the cylinder and base, taking care that the O-rings and valve assemblies stay in place on the center block.



8.3. Snug four 3/8" x 1-3/4" bolts (HD-CPS-3/824175) with washers (HD-WSH-3/8x5/8S). Use the gentlest setting on a power driver, as uneven tightening could dislodge the nickel-brass inserts in the center block. Final tightening will be by hand.



Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	67/74

Clark Pump Remanufacturing SOP

8.4. Place the Clark Pump upside down in a vice and tighten the opposing cylinder bolts at the same time using two 5/16" Allen wrenches. Tighten gradually and repeatedly in an X pattern until all eight bolts are as very tight, approximately 200 inch-pounds of torque. Again, uneven tightening could shift one of the nickel-bronze inserts. This completes reassembly of the Clark Pump.



Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	68/74

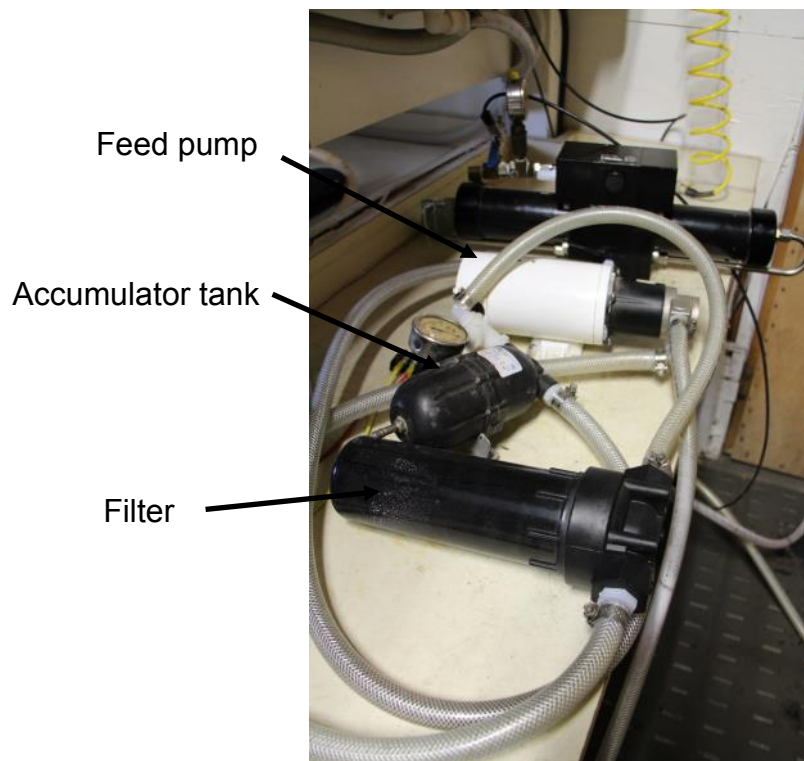
Clark Pump Remanufacturing SOP

9.1. Each Clark Pump should be tested for a minimum of four hours before returning to a customer.



9.2. At the Spectra factory we have a large test bench (above) with a 100-gallon tank of fresh water, fed by large centrifugal pumps, where we can test up to sixteen Clark Pumps at the same time. A simple test bench for a single Clark Pump can be made as shown below:

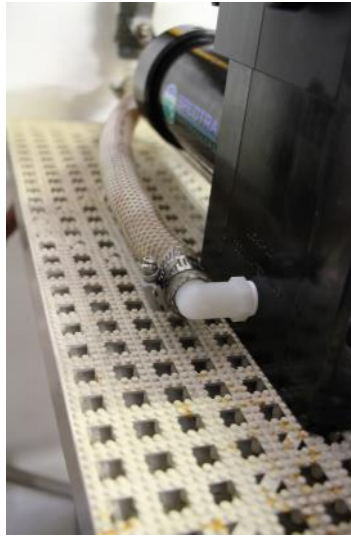
The feed pump should be able to supply 80 PSI to test a 7% Clark Pump, and over 160 PSI for a 20% pump. Include a 20 micron filter to protect the Clark Pump from contamination, and an accumulator tank between the feed pump and Clark Pump will shield the feed pump from shocks.



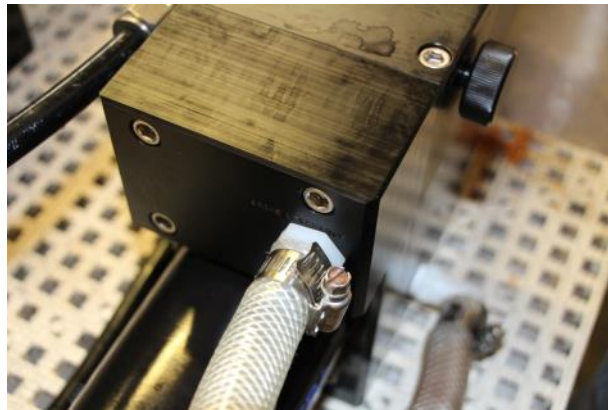
Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	69/74

Clark Pump Remanufacturing SOP

9.3. First connect the feed water inlet from the test bench or feed pump and tighten the hose clamp.



9.4. Connect the brine discharge, and tighten the hose clamp.



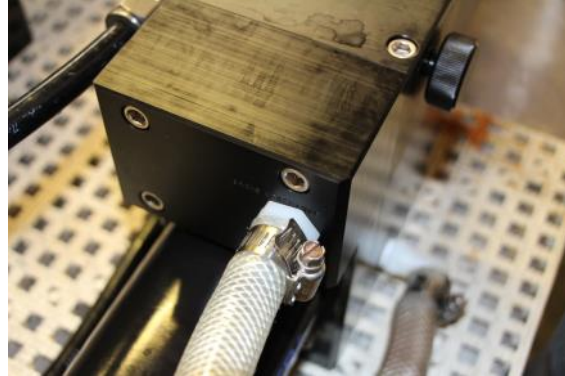
9.5. The two high pressure fittings connect to the dummy load (HDW-TC-CPHPTK), which imitates and exceeds the back pressure created by a membrane. Attach the two high pressure lines and snug down the compression nuts. Tighten the nuts on the high pressure fittings, so that the O-rings are compressed to the blocks.



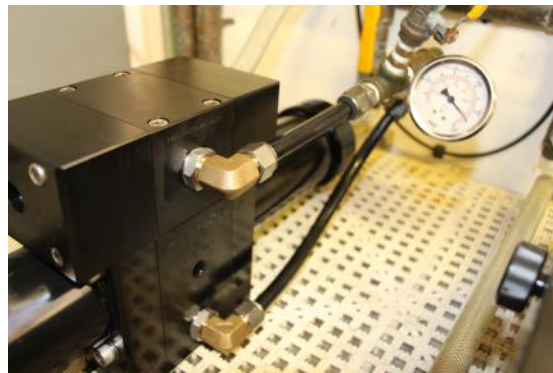
Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	70/74

Clark Pump Remanufacturing SOP

9.6. Open the pressure relief valve one turn. Turn on the feed pump. When the brine discharge is free from bubbles, gradually close the pressure relief valve on the Clark Pump, which will bring it up to pressure.



9.7. The pressure gauge on the dummy load should read at least 800 PSI during testing. This is higher than standard operating pressure, and a good test to ensure the new parts were installed properly.



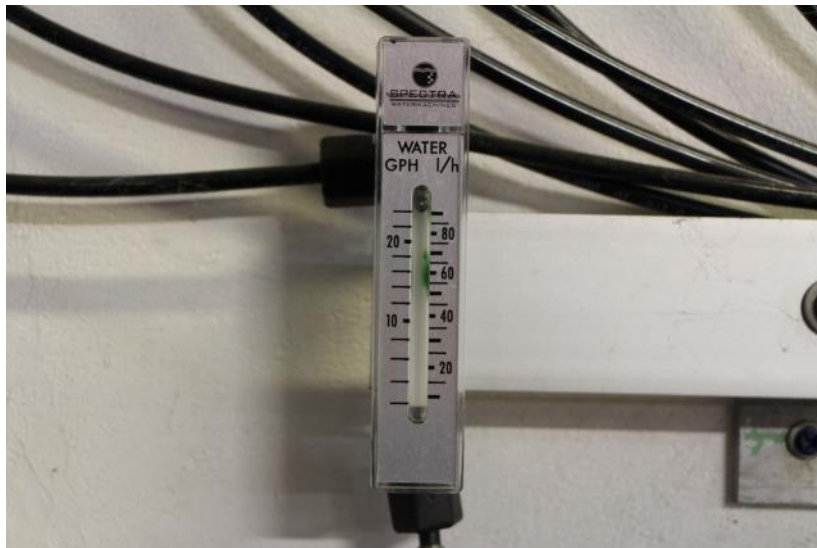
9.8. The pressure may be adjusted by turning the fitting on the dummy load (with the caution sticker).



Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	71/74

9.9. A product output gauge should read equally on each cycle of the Clark Pump: Uneven readings indicate a problem on one side of the pump.

- Listen for smooth operation.
- Look for leaks anywhere on the Clark Pump. If found, the pump must be disassembled and repaired.
- An occasional drip from the test port is acceptable, but any spray or flow is not.



Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	72/74

Clark Pump Remanufacturing SOP

10.1. After four hours of testing, screw a brass 1/4" countersunk hex plug (PL-HP-1/4BR), wrapped with Teflon tape, into the test port.



10.2. Refer to the sticker on the back of the green tag, and ensure that the fittings on the brine discharge ports, feed water inlet, and mounting base are exactly the same as when the Clark Pump arrived. Also, double-check if the Clark Pump uses a stroke sensor and needs an internal magnet. The Clark Pump is now ready for return to the customer.



Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	73/74

[illegible]

Created:	Date and Initials	Current Issue:	4.7.15
Released:	Date and Initials	Replaces Edition:	
Location:	N: Katadyn SOP/Clark Pump Remanufacturing SOP.pub	Page:	74/74