

CD150

Operation and Service Manual



Lily Corporation

240 S. Broadway
Aurora, Illinois 60505-4205
United States of America
Ph: 630-892-0860
Fax: 630-892-5623
www.lilycorp.com

Product Warranty and Disclaimer	2
Safety Precautions	

The Air Supply

Requirements and Connections	3
------------------------------	---

The Resin Supply

Fluid Connections	4
-------------------	---

Operation

To Begin With	5
Dispensing	5
Clean - Up	6
Ratio Assurance Check	7
Changing Ratio	8

The System and How It Works

The Fluid Circuit	9
-------------------	---

Servicing the System

Lubrication	10
COCO Module	10-13
Metering Cylinders	14-15
Trouble - Shooting	16-17
Parts Diagrams	18-31
Air Logic Diagram	32

EXPRESS WARRANTY AND DISCLAIMER OF IMPLIED WARRANTIES

Lily Corporation unconditionally guarantees its products to be free of defects in material or workmanship and further warrants that, for a period of three months from date of factory shipment, its products will meet the performance criteria stated in Lily Corporation's publications.

There are no other warranties, expressed or implied, including those of merchantability and fitness for particular purposes.

Lily Corporation cautions the users of its products that epoxies must be metered at the correct ratio and thoroughly mixed to achieve their formulated strength. The user is further cautioned that thorough mixing within a static mixing device can only occur with uniform flow of the two components.

Transmission of the two components through separate hoses to a remote mixer may result in uneven flow of the components due to swelling and contracting of the hoses, or different compressibility of the material components due to air content or chemistry.

Warning and Safety Precautions

The CD150 can develop fluid pressures in excess of 1000 pounds per square inch. Everyone within 25 feet should wear eye protection when the system is energized. Mechanical members are actuated under forces of up to 500 psi. Maiming injuries can be incurred. Do not energize the system unless all screens are in place, and fingers, tools, and other objects are outside of the frame of the machine.

Become thoroughly acquainted with first-aid procedures recommended by your resin supplier. If solvents are to be used for cleaning, personnel should become thoroughly acquainted with their characteristics. Most solvents are hazardous under all circumstances and extremely dangerous in non-ventilated areas, or at elevated temperatures.

A thorough understanding of the Operator's Manual is crucial to the safe operation of the CD150. Do not attempt to operate this system until thoroughly familiar with its contents. Phone Lily Corporation if clarifications are needed.

Requirements

The volume of dispensed resin is determined by air pressure. An inadequate supply of air will result in sluggish performance. 18 SCFM of air at 50 psi should be the minimum required for proper operation of the CD150 Dispenser. The maximum air pressure to the CD150 Dispenser should not exceed 125 PSI. For the air requirements of the transfer pumps, please refer to the manufacturers operators manual.

As shown in the pictures below, the air line from the compressor is connected to the fitting labeled “ Main Air Inlet” on the back of the CD150 Dispenser. There are fittings on the back of the CD150 Dispenser for connecting the air supply hoses that go to their respective transfer pumps also. The air pressure to the transfer pumps is controlled by the regulators on the front of the machine.



The air supply must be clean and dry. Built into the CD150 Dispenser is a moisture separator and a coalescing micro filter. Both of these units are auto draining and will drain when the air pressure is removed from the system. Both of these filters have a nylon tube attached to allow the drained fluid to be directed into a container if desired. The micro air filter also has an indicator located on the top of the housing to indicate when it needs to be serviced.

Always blow out air hoses before connecting them to the machine to remove any accumulated moisture and debris, preventing it from entering the dispenser. The air connections used on the CD150 are the Chicago, or claw style fittings.



Fluid Connections

Connect the material supply hoses from the transfer pump outlet fittings to the material inlet fittings at the rear of the CD150 Dispenser. The material inlet fittings are labeled “A” and “B” while the transfer pumps are identified as “A” and “B” also. The fluid fittings are 5/8” JIC.

If you are using 55 gallon drums then attach the suction hose to the inlet of the transfer pumps and insert the steel pipe, “Stick” into the 2” opening on the top of the drum. There will also be a tee at the outlet of the transfer pump with a section of hose and a valve. This valve should be mounted to the 3/4” opening on the top of the drum. This is the re-circulation valve and is used after moving the “Stick” from one drum to the next. It’s used to get rid of any air that may have been picked up during the move. During normal operation this re-circulation should be closed. To re-circulate open the valve and run the transfer pump for a couple of minutes. This should remove any air that might have been picked up when the “Stick” was moved from one drum to another.

If you are using totes the suction hose is attached to the inlet at the bottom of the transfer pumps. The 2” cam lock is then attached to the outlet of the tote. Be sure to open the valve at the outlet of the tote as well as opening the lid on the top of the tote.



The dispense hoses are attached to the fittings at the front of the CD150 Dispenser. They are labeled “A” and “B”. For the initial setup it doesn’t matter which fittings are used. Once the dispenser has been used though care must be taken to insure that the hoses don’t get mixed up!

To Begin With

- Purge the air hose from the compressor of water or other contaminants.
- Be sure that the cabinet On/Off switch is in the “Off” position.
- Reduce the dispenser air pressure to zero by turning the regulator counter-clockwise until it stops turning.
- Attach the dispense hoses or valve assembly to the outlet fittings.
- Make sure all cabinet covers are in place.
- Energize the transfer system.

Dispensing

Connect the air supply, energize the transfer pumps and switch the dispenser “On”. Slowly increase the air pressure at the dispenser regulator until the system begins to dispense material. Continue increasing the pressure to approximately 100 psi while looking for fluid or air leaks. Following this test reduce the air pressure to that required for the application at hand. The dispense pressure may be altered at any time by adjusting the regulator. Once the pressure setting has been made the unit will continue to dispense at that pressure until the setting is changed. *NOTE: The dispense pressure gauge will only register a reading during a dispense cycle*

The regulator at the control panel regulates the air pressure only to the main air cylinder when on its dispense stroke. The pressure it exerts on the metering pistons determines the pressure at which the resin exits the dispenser. However, the air cylinder pressure is never the same as that of the resin pressure. The resin pressure will vary with the ratio for which the dispenser is set. The following chart shows the relationship between the regulated cylinder pressure at various ratios.

RATIO	MULTIPLIER
1:1	4.9
2:1	6.6
3:1	7.4
4:1	7.9
5:1	8.1
18:1	9.2

Clean Up

Because the resin components are not joined together within the dispenser, no flushing of the inside of the unit is required. And, most epoxy resins may be left in the unit for a period of time with no problems. Daily cleaning of the system includes the disposal of the static mixer and cleaning the threads on the dispense nozzle and mixer retaining nut with solvent. After cleaning, an application of grease should be applied to the threads to prevent the epoxy from bonding the components, making future cleaning and removal of the nut much easier. Both metering pistons, inside the unit, should also be wiped down with solvent and grease applied to them as well.

Although the resin components within the unit are not mixed they will crystallize over time. Therefore for extended shutdowns it is recommended that the entire system be flushed with Acetone or Methyl Ethyl Ketone to remove accumulations of resin from the unit. The solvent should then be followed with hydraulic fluid. The hydraulic fluid will not evaporate or crystallize, keeping the system well lubricated until required again.

If a manifold or static mixer is mounted directly to the outlet valves of the COCO valve assembly then the dispenser must be “burped”. To burp the dispenser, turn the machine Off. Remove the manifold or static mixer and place a waste bucket or container under the outlet fittings of the machine. Make sure the dispense pressure regulator is turned down to zero and turn the machine ON. Now increase the dispense pressure until the machine starts to dispense resin from the outlet fittings. 1-2 complete cycles is all that is need to “burp” the machine.

Ratio Assurance Test

WARNING! The CD150 contains moving parts which are by definition wearing parts. Critical components are wearing from the moment the system is energized. It is absolutely essential that this wear be anticipated and monitored to assure proper ratio dispensing. Key personnel must become familiar with the following procedure for monitoring the wear of metering seals, for if it does not become routine, improperly metered material will result.

The frequency with which the performance of the seals should be checked varies with the abrasiveness of the fillers within the product being dispensed, as well as the volume of resin being dispensed. Normally, once each week of operation is sufficient to detect any ratio error before it becomes significant. However, if the results are critical, monitoring should be more intense. The ratio check is a three step procedure.

Stage I: To determine if the COCO outlet valve seals are leaking in the direction of normal flow.

1. With air connected to the dispenser, switch the dispenser “OFF”. (This will open the inlet valves and close the outlet valves)
2. Energize the transfer system.
3. Remove the dispense hoses or Hydrant Valve from the outlet fittings at the front of the dispenser.
4. Wipe the outlet fittings and place a towel or rag beneath them.
5. Wait at least five minutes and observe the fittings for any indication of leakage.
6. If seepage has occurred, replace the leaking seals. (This would indicate failure of the outlet valve seals.)
7. If no seepage has occurred then move on to Stage II
- 8.

Stage II: To determine if the COCO inlet valve seals are leaking in the direction of normal flow.

1. Turn the pressure regulator counterclockwise until it stops.
2. Flip the dispenser switch to the “ON” position. (This will open the outlet valves and close the inlet valves)
3. Repeat steps 4 and 5 from **Stage I**.
4. If seepage has occurred replace the leaking seals. (This would indicate failure of the inlet valve seals.)
5. If no seepage has occurred move to **Stage III**.

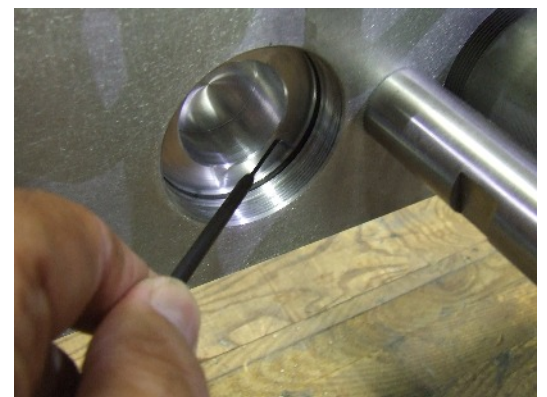
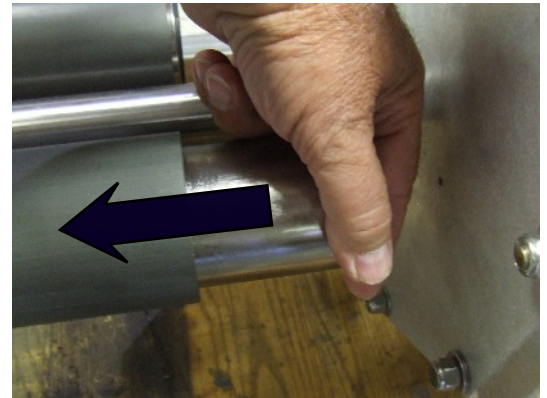
Stage III: To determine if the COCO inlet seals are leaking in the direction opposite of normal flow.

1. Tightly cap the outlet fittings
2. De-energize the transfer system.
3. Disconnect the material supply hoses from the dispenser.
4. Turn the dispenser regulator knob clockwise to the maximum pressure available.
5. Wipe the inlet fittings clean and place a towel beneath them.
6. Wait at least five minutes and observe the fittings for any indication of leakage.
7. If seepage has occurred, replace the leaking seals. (This would indicate failure of the inlet seals.)
8. If no seepage has occurred, the ratio assurance check is complete.

Changing Ratio

Ratio is determined by the relative diameters of the catalyst and base pistons. If the ratio is 1:1, both metering pistons will be the same. However, with any other ratio, the catalyst metering piston will be of a smaller diameter. Ratio is therefore changed by exchanging one catalyst metering assembly for another. A metering assembly consists of a metering cylinder, a metering piston, and the seals, etc. component to them. Metering assemblies for alternate ratios are available from Lily. A few simple steps are required to change ratio:

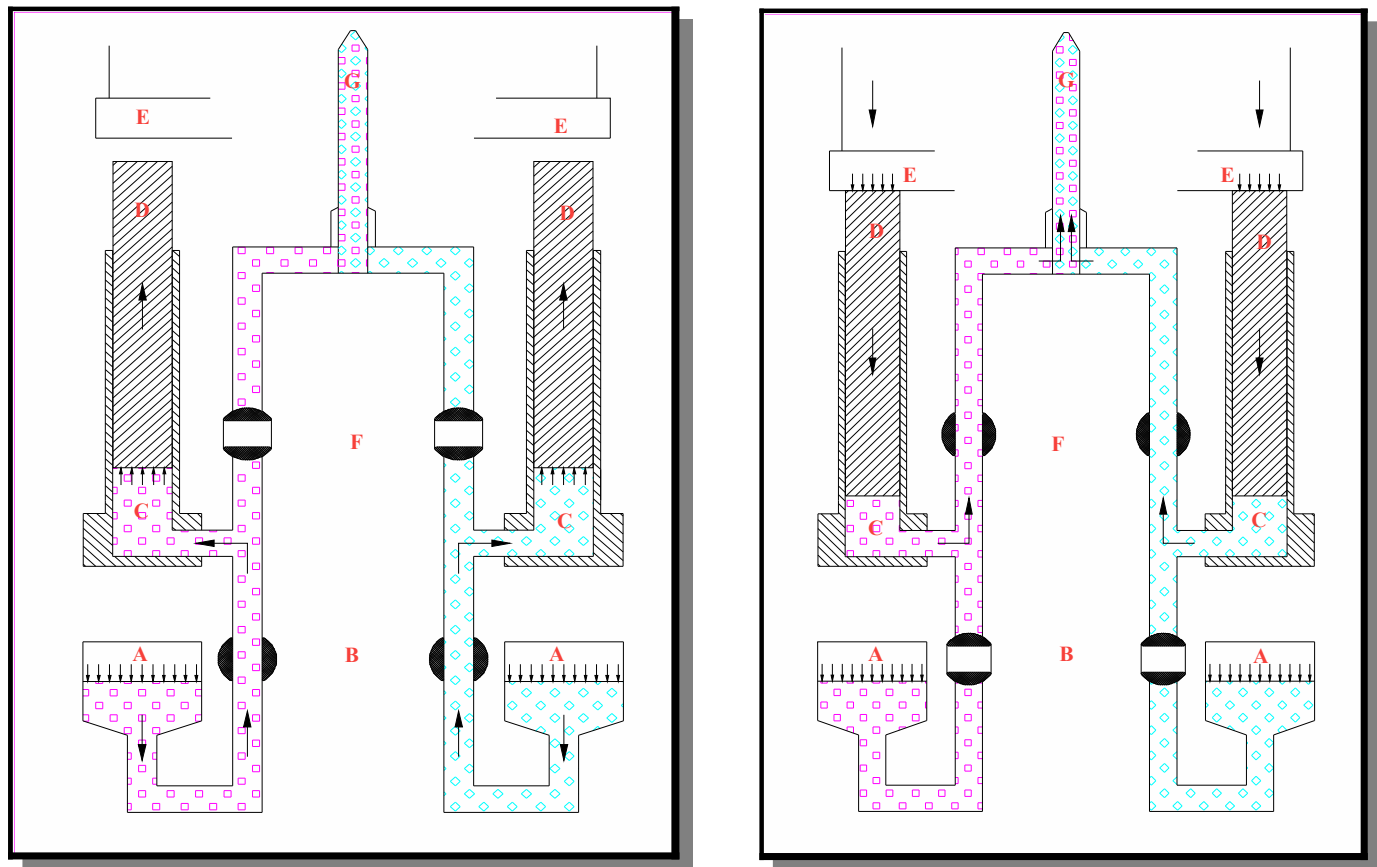
1. De-energize the transfer pumps by turning their respective regulators to “0 PSI”. With air connected to the CD150 Dispenser, turn the dispenser “Off”. This will open the inlet ball valves and close the outlet valves and send the main air cylinder to the “Park” position.
2. Remove the right and left side panels.
3. Disconnect the catalyst (B) supply hose from the transfer pump. Grip the catalyst metering piston and press it in until it is all the way into the metering cylinder. The material in the metering cylinder will be forced to flow back through the inlet fitting. If the piston does not go down easily, use a strap wrench to free it and twist it as it is pressed in.
4. Use a strap wrench to turn the catalyst metering assembly counter-clockwise until it is free. Do not attempt to remove the assembly with any other tool than a strap wrench, as the chamber may be damaged by any uneven grasping force.
5. Use the seal pick to remove the base manifold o-ring. Clean the pocket thoroughly and install a new o-ring in the proper groove.
6. **Important!** Lubricate the threads of the replacement metering assembly with an anti-seize compound or silicone lubricant. Thread the assembly into the manifold by turning it clockwise until it is seated. Do not over-tighten. As the chamber bottoms out in the manifold you will feel a definite stop. Do not tighten further.



THE SYSTEM AND HOW IT WORKS

The Fluid Circuit

A thorough understanding of the CD150 operation will take the guess work out of trouble shooting, and provide a better appreciation of conditions which may adversely affect its performance.



The resin components are pressurized within vessels (A) or by pumps. Pressurized, the components flow through open inlet valves (B) to enter their respective metering cylinders (C).

The metering pistons (D) are extended by the resin pressure until they bear against the main air cylinder end cap (E).

After both metering pistons are fully extended, the inlet valves (B) close, and the outlet valves (F) open.

The resin components then exit under the pressure exerted by the main air cylinder (E) descending against the metering pistons (D).

The components merge at a mixer (G). When the dispense stroke is completed, the outlet valves (F) close, the inlet valves (B) open to allow the metering cylinders to refill, as the main air cylinder ascends.

SERVICING THE SYSTEM

If the CD150 is properly maintained, service will involve little more than routine replacement of dynamic seals exposed to material being dispensed. The frequency of seal replacement will depend upon the material dispensed. Thousands of gallons of non-abrasive resin with good lubricity may be dispensed with little, if any, service; while the use of an abrasive – and usually inexpensive – material is likely to necessitate frequent seal replacement. Costly damage to metering cylinders and their pistons may also result from the use of an abrasive product.

Lubrication

If the air supply is properly maintained, the system will deliver literally millions of trouble-free cycles. However, in the real world, that is not always possible. Therefore, periodic lubrication of the air circuitry is recommended. To do so, deenergize the system and remove the right cover. Free the four way air fitting (P-189) fixed to the bulkhead fitting (S-009) by pressing the collar of the elbow down. Also disconnect the 1/4" tubing next to the four way air fitting. Squeeze a generous dose of Lily Lube (P-315) into the rigid leg of the four-way fitting and the 1/4" tube. Reconnect the fitting and tube. No other lubrication is needed. Never use WD-40 or similar products in the air circuit.

The COCO Module

When a ratio assurance check reveals a need for seal replacement at the Coco module, it is not necessary to replace all of the seals within the module. Rather, replace only those seals metering the same component. Resin components differ dramatically in terms of their abrasiveness, so the wear of the seal managing one component is seldom an indication that the seals on the opposite side are similarly worn.

It is good practice to replace the coupler shaft seals (S-328) when replacing the ball seals. They are exposed to the same product, so the wear is comparable. Besides, the seals are exposed during the course of replacing the ball seals, and therefore easily replaced in the course of ball seal replacement.

When servicing the coco module, refer to the exploded parts view as well as the illustrated steps below.

Disassembly

Turn the dispenser switch off and de-energize the transfer pumps. Remove the supply hoses from the rear of the dispenser and then disconnect the air supply to the dispenser. Remove both side panels. Grasp the metering pistons and press them down into their cylinders. This will purge the cylinders of material, which will flow out of the fittings at the rear of the machine. Disconnect the material supply hoses at the Coco inlet fittings, and the dispense hoses at the outlet fittings. Then, follow the steps below:



1. Use a 15/16" wrench to loosen the zero clearance fittings at the rigid tube segment (M-617). Remove the tube, taking care not to lose the seals within the fittings.

2. Remove the bolt (S-334) securing the spacer block to the frame module (M-571).



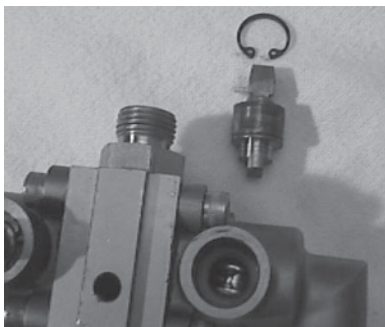
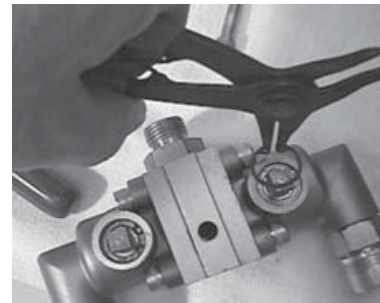
SERVICING THE SYSTEM

DISASSEMBLY cont'd



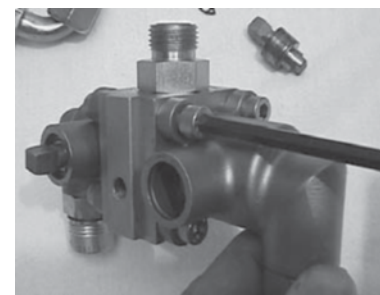
3. Pull the assembly from the frame. If it is not free, use a plastic, wood, or rubber instrument to urge it loose.

4. Use an 8-15 mm snap ring tool to remove the ring retaining the coupler shaft (M-581).



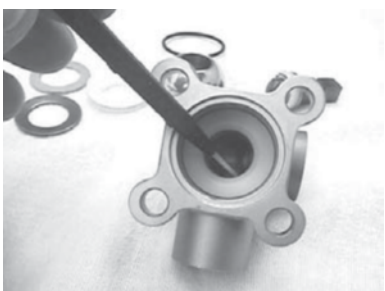
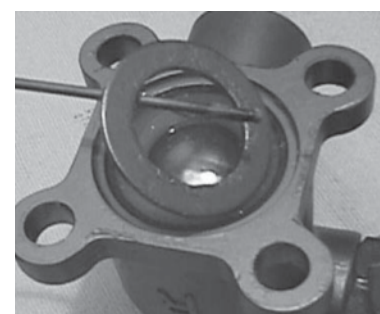
5. Grasp the coupler shaft (M-581) with a cushioned tool, and gently work it and its bushing (M-802) from the cavity.

6. Use a 3/16" allen wrench to remove the four screws securing the valve to the spacer block. If they do not separate easily, tap them apart. Use a plastic mallet.



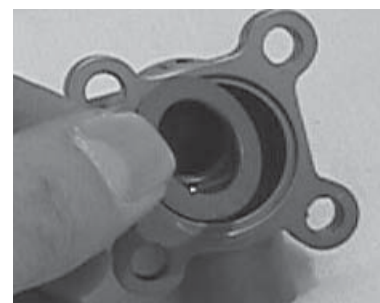
7. Remove the ORing (S-509) and the seal spring (S-330) (concave washer).

8. Remove the remaining washer (S-329).



11. Use the seal pick to gently urge the lower seal from its seat. Take care not to scratch the housing.

12. Remove the lower washer and spring. Take care not to scratch the housing.



Cleaning Clean the components thoroughly, but do not use steel bristle brushes or instruments likely to scratch or gouge. Most solvents and cleaning agents can be used without damage to the stainless steel parts.

Inspection Carefully inspect each part. If possible, use a magnifier and light. Pay special attention to the balls and the valve sockets. If there is any blemish, replace the part. Flat and spring washers do not need to be replaced unless damaged.

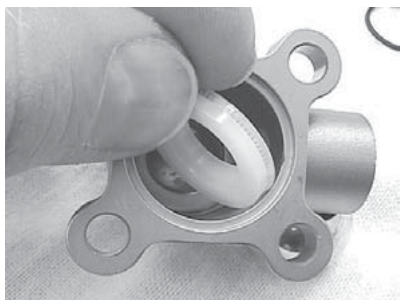
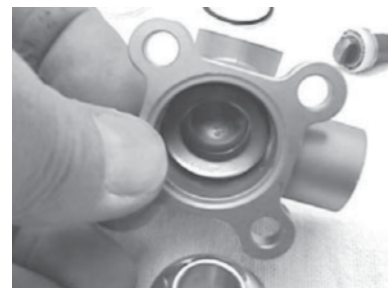
SERVICING THE SYSTEM

Assembly



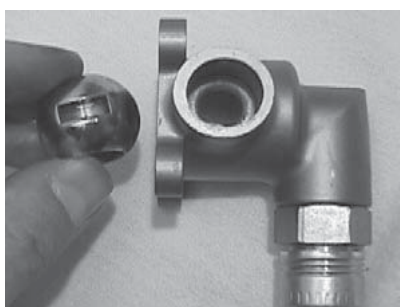
1. Fit the seal spring (S-330) into the pocket with its concave side toward the ball.

2. Place the washer (S-329) over the spring. Nudge it to be certain that both it and the spring are fully seated.



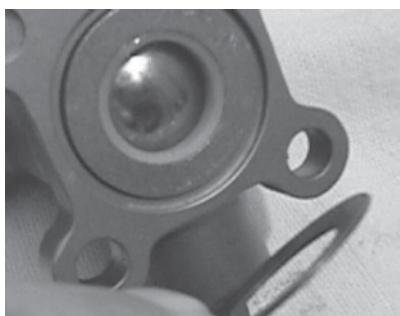
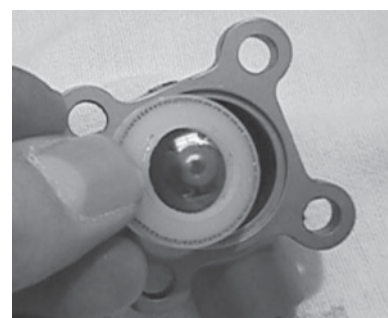
3. Insert the seal perpendicular to the bore until it is within the pocket. Then, twist it flat so that the spring side of the seal is facing down.

4. Nudge it into place with the fingers, and then press it firmly into the bottom of the pocket with the setting tool (M-806) from the seal kit.



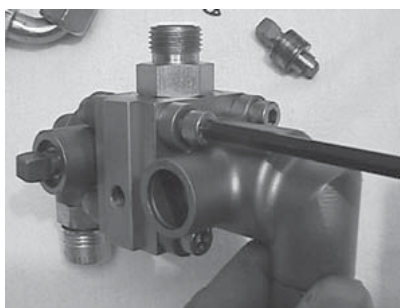
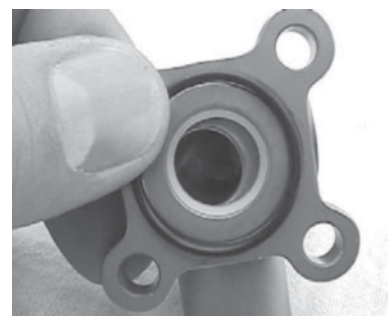
5. Slide the ball into the pocket with the detent (slot) facing the coupler pocket. Use the tang of the coupler shaft (M-581) to squarely align the ball slot.

6. Install the exterior seal (S-332) with the spring groove facing away from the ball.



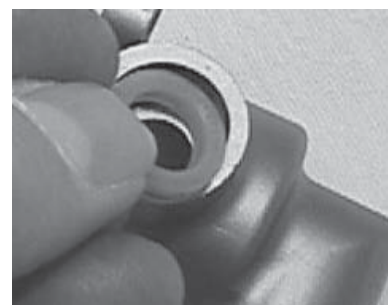
7. Install the flat washer over the seal, and apply silicone lube to hold it in place. Install the spring, concave side to the ball!!

8. Press a new o-ring into the groove around the outside of the spring and washer. Use silicone lube to hold it in place.

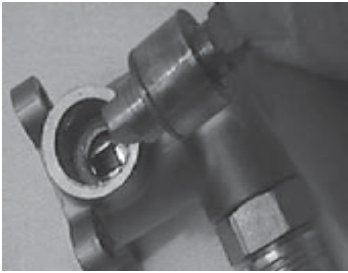


9. Attach the valve body to the block. Take care not to distort the o ring seal. Snug, but do not tighten, the bolts until after the coupler shaft is installed.

10. Insert the seal (S-328) into the coupler shaft bore. To avoid damage to the seal edges, start it perpendicular to the bore, and then flatten it into place with the spring toward the ball.

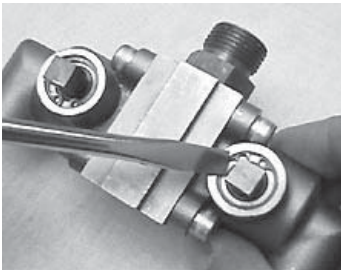
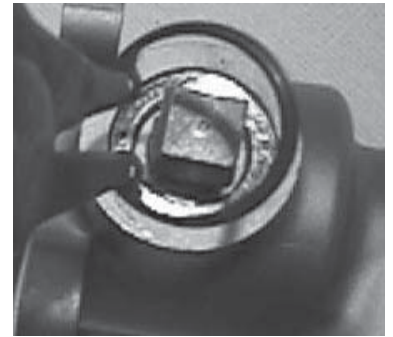


SERVICING THE SYSTEM



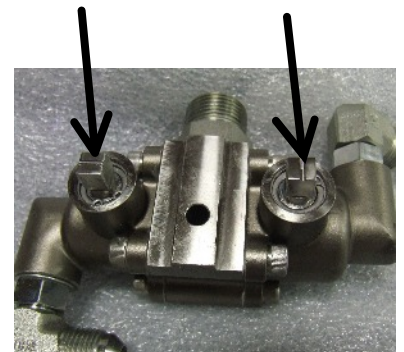
11. Carefully insert the coupler shaft (M-581), bronze bushing (M-802) and washer (P-469) into the housing.

12. Install the retaining ring (P-505). Note that one side of the ring has slightly rounded edges, while the other side has a sharp square edge. The sharp edge of the snap ring must face away from the ball. Use an 8-15mm snap ring tool to insert the ring.



13. Make certain the ring is fully engaged in its groove.

14. Before bolting the valve assembly to the frame, be certain that the valve positions are oriented properly. Presuming the Coco air cylinder rod (M-580) is fully extended at the time of re-assembly (normal position if the dispenser was switched off before disassembly), the inlet valves (the bottom valves) should be open, and the upper outlet valves closed. If for some reason, the unit is reassembled with the rod retracted, the valve orientation should be the opposite. The valves are easily opened or closed by grasping the coupler shaft (M-581) with a cushioned tool, and rotating it. Blow through the valve if in doubt about its position.



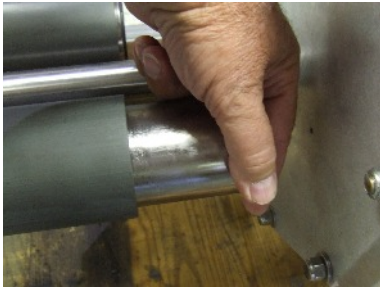
15. Secure the valve assembly to its frame. Apply an anti-seize compound to the threads of the mounting screw (S-334).

SERVICING THE SYSTEM

The Metering Cylinders

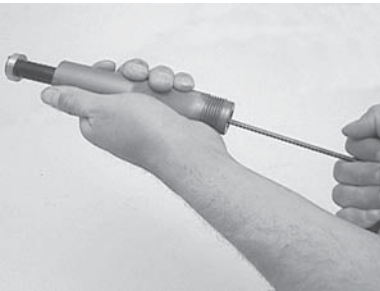
The frequency of service will depend upon the abrasive content of the material being dispensed, and to a lesser degree, the abrasive atmosphere common to many construction sites. The need for metering assembly service is recognized by leakage between the metering piston and its cylinder, sluggish extension of the piston, or by seizure of the piston within the cylinder.

To remove a metering cylinder for service, turn the dispenser switch off, disconnect the air supply at the dispenser, remove the side panels, disconnect the material supply hoses from the dispenser, and follow the steps below:



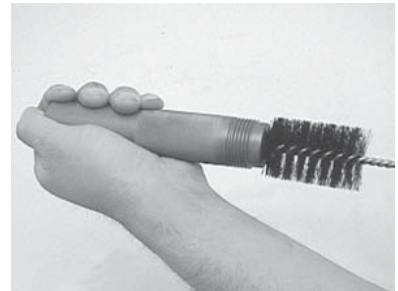
1. Grasp the metering piston and press it into its cylinder, thus purging the component back through the outlet fittings. Be prepared to collect this fluid.

2. Loosen and remove the metering cylinder by rotating it counterclockwise. Do not use a pipe wrench! Use a strap wrench.



3. Press the metering piston from the cylinder bore. If it is seized, phone Lily or visit a machine shop for assistance. Do not damage the bore!

4. Clean the bore and piston thoroughly. Examine the cylinder. If it is scratched or otherwise damaged, it must be replaced.



5. If the piston is scratched or marred, polish its surface with an abrasive cloth until no burr remains to damage the metering sleeve.

6. To replace the piston seal, remove the screw in the cap retaining the seal. Then remove the cap and the seal.



7. Replace the seal with its spring groove away from the piston.

8. Inspect the piston pad. If it is torn or worn, replace it by removing its retaining screw. Apply a drop of blue Loctite thread seal or equal to the screw at reassembly.



SERVICING THE SYSTEM



9. Lubricate the piston and chamber with silicone grease and insert the piston pad end first into the bottom (threaded end) of the metering cylinder.

10. Use the seal pick (P-457) to remove the base manifold o-ring seal. Clean the pocket thoroughly before installing a new seal.



11. Apply an an anti-seize compound to the cylinder threads, and then screw it into the manifold. Do not overtighten!

TROUBLE SHOOTING

Troubleshooting

Spurts of air, or air

bubbles in the material..... Check the material level. Some air may enter the resin as it cavitates just before it is depleted. This is especially true of viscous material.

Air bubbles in the resinCheck the supply side for loose hose clamps or fittings allowing air to be drawn into the system.

Incorrect ratio Conduct ratio assurance check to confirm valve performance. (Page #7)
Check compressibility of viscous components due to air content.

Sluggish flowDisconnect the outlet fittings and observe the resin flow from the outlet ports. If the flow is unrestricted, replace the mixer or other restriction in the exterior plumbing.
If the material is viscous (thick) due to chemistry or temperature, heat the material to 100°F. Anticipate a shorter working life!

Leakage of resin at

material pistonReplace the piston seal(s). (Page #'s 14).

Leakage of resin between

flippers and valve bodiesReplace the COCO stem seals. (Page #11-13).

Metering piston fails

to extend, or extends

slowly Disconnect the material inlet hose at the dispenser and check the flow. If the flow is restricted, check for an obstruction in the material supply line, or insufficient delivery from the pressure vessel or transfer pump.
If the material supply is adequate, remove the Metering Assembly, and check for freedom of piston movement within the cylinder. If the piston is seized or binding, service the assembly. (Page # 14).
With the piston fully extended, turn the switch off and wipe the piston with soap and water or a solvent. Lubricate as well.
Material contains abrasive fillers, or is too thick.

System begins to dispense, but cannot complete a

dispense cycle Obstruction in material outlet lines or metering cylinder.

System is unresponsiveCheck the air supply.

System does not make dispense stroke. Audible

air leak at sensor ports. Metering pistons not sealing off sensor ports due to worn or damaged pads. Replace the pads. (Page #14, step 8)
Insufficient material pressure to firmly impinge the pads against the cap.

Coco module is sluggish or

stalls.Low air supply pressure.
Misaligned inlet valve bodies.

Main air cylinder return

is sluggish.Defective Rapid Exhaust valve (P-336).

TROUBLE SHOOTING

Troubleshooting

Coco module is sluggish,

stalls, or bindsMaterial contains too much abrasive filler. Change materials.
Low air supply pressure.
Misalignment in assembly of inlet valve bodies. (Page #17)

**Main air cylinder fails to
return following full dispense
stroke.....**

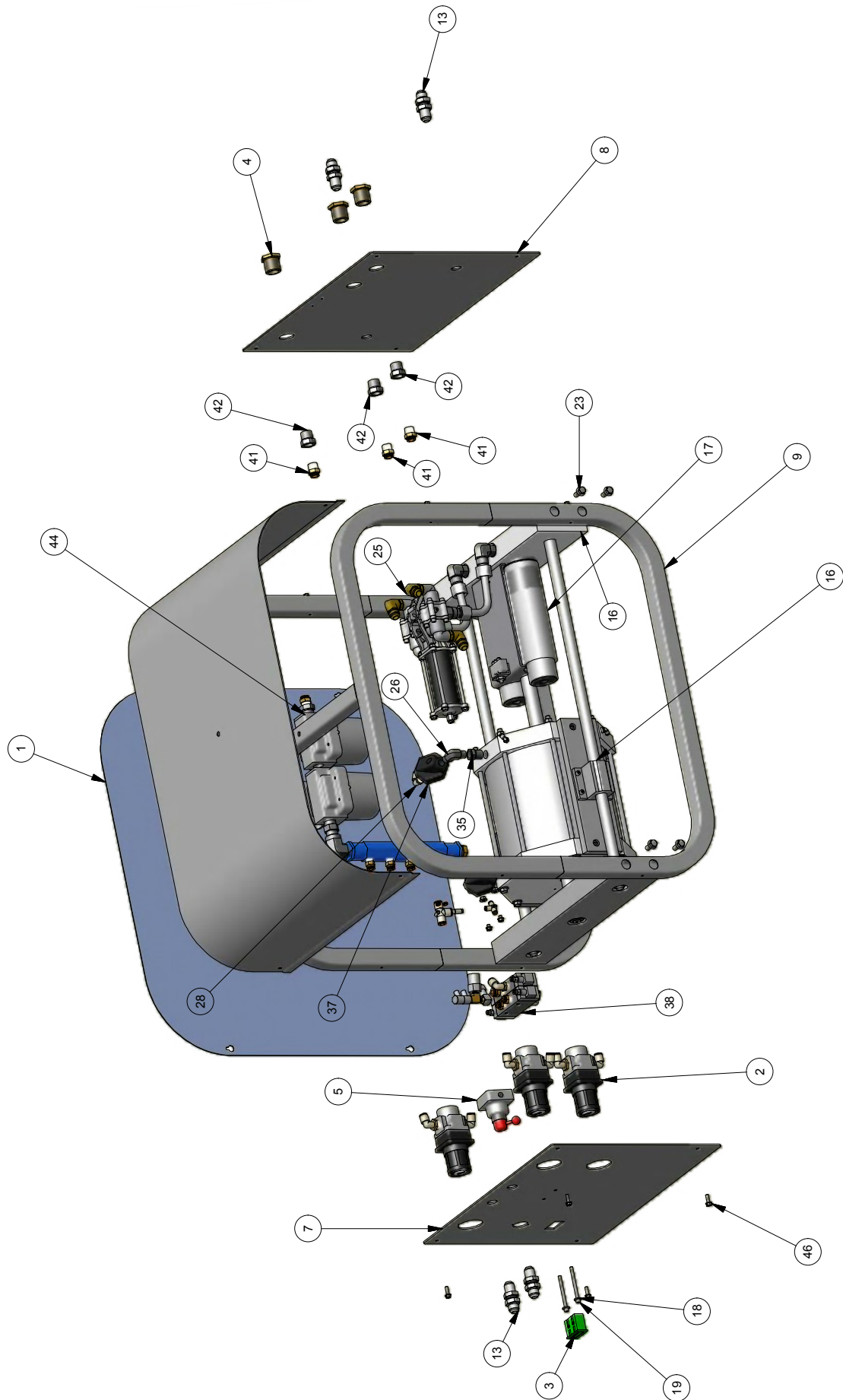
Malfunctioning "End Of Stroke" valve (P-217). Check for proper adjustment of valve. If valve adjustment is good replace valve. "Or" valve (P-794) not functioning. Verify operation by turning On/Off switch "Off". If the main air cylinder returns to the "Park" position then replace "Or" valve.

**Switch to "off" does not
return main air cylinder.**

"Or" valve not functioning. Remove the air line from the Or valve that comes from the On/Off switch to verify the presence of air pressure. If air pressure is present then connect the air line you removed back to the Or valve and remove the output air line from the Or. If no air pressure from the Or valve the replace the Or valve. If air pressure is present then the Parker directional valve is not functioning. The Parker directional valve can be disassembled and rebuilt. Call Lily for seal kit for this valve.

**If you cannot correct the problem,
contact Lily Corporation with an exact description of how the various components are responding.
If possible, phone with the unit, air, tools, and resin information at hand.**

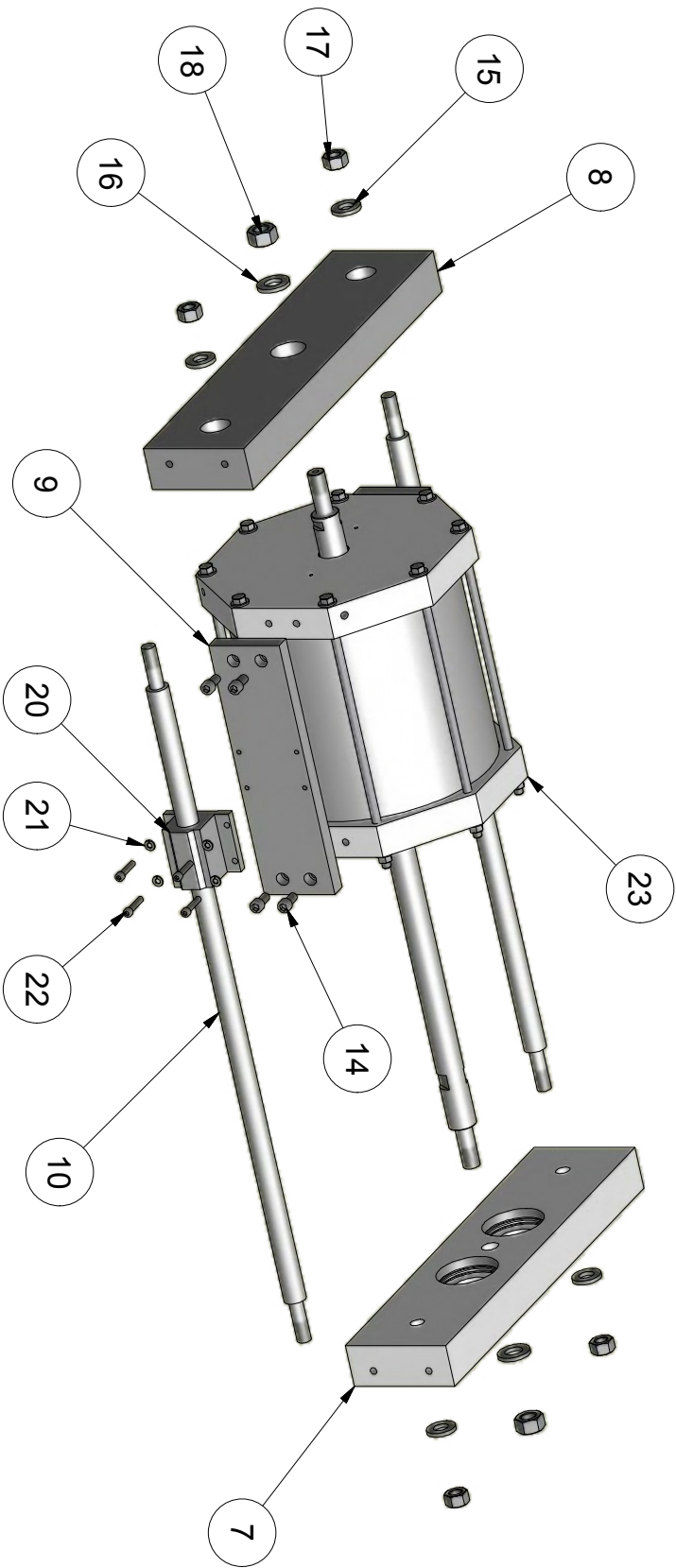
Parts Diagrams



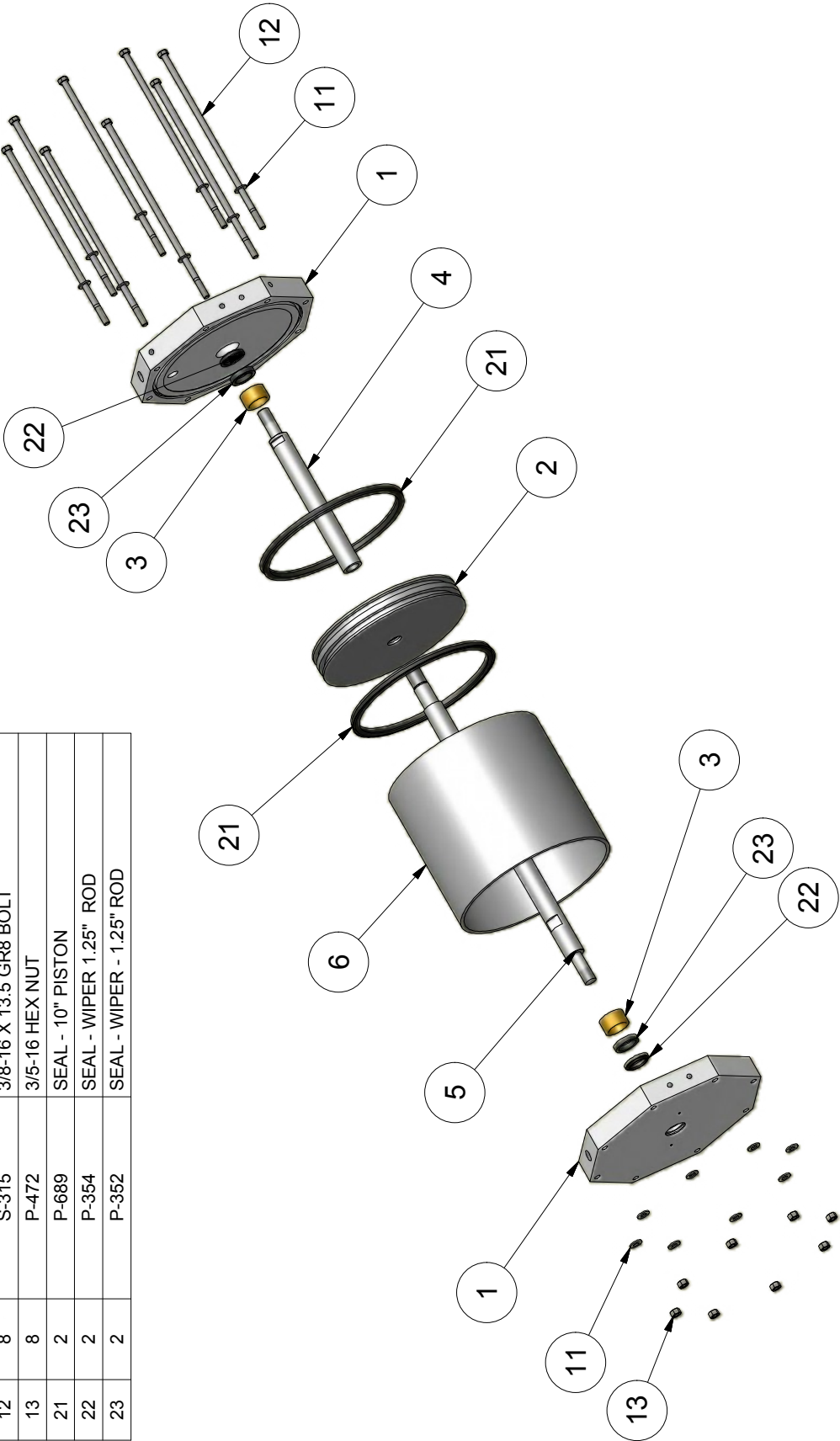
Parts Diagrams

CD150 MAIN ASSEMBLY PARTS VIEW			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	M-739	CD150 SIDE PANELS
2	3	REGULATOR ASSY	CD150 REGULATOR ASSEMBLY
3	1	P-299	COUNTER - ELECTRIC
4	3	P-068	BULKHEAD FITTING
5	1	ON/OFF SWITCH ASSY	ON / OFF SWITCH ASSEMBLY
7	1	M-774	CD150 DASHBOARD FRONT
8	1	M-775	CD150 DASHBOARD REAR
9	2	CD150 FRAME ASSY	CD150 FRAME ASSEMBLY
13	4	P-931	5/8" JIC BULKHEAD FITTING
16	1	CD150 MAIN AIR CYLINDER ASSY	CD150 MAIN AIR CYLINDER ASSEMBLY
17	2	A-240	1:1 METERING ASSEMBLY
18	7	S-038	1/4" FLAT WASHER
19	2	P-208	1/4-20 HEX NUT
22	2	S-244	1/4-20 X 2.5 SS SHCS
23	4	S-194	3/8-16 X .75 Hex Flange Screw
25	4	CD150 COCO BALL VALVE AND TUBING ASSY	CD150 COCO BALL VALVE AND TUBING ASSEMBLY
38	2	S-260	AL - PARKER DIRECTIONAL VALVE
41	3	P-995	COMP. FTG. 1/2" X 1/2" NPT UNION
42	3	P-729	REDUCING BUSHING 3/4" X 1/2"
44	1	CD150 AIR FILTER ASSY	CD150 AIR FILTER ASSEMBLY
35	2	P-647	REDUCING BUSHING 1/2" X 3/8"
26	2	P-203	PIPE ELBOW - 3/8" NPT MALE
37	2	S-909	3/8" NPT RAPID EXHAUST
28	2	S-930	3/8" X 3/8" NPT SWIVEL ELBOW
46	8	S-884	1/2-20 X .75 Hexagon Head Screw 18-8 SS
47	1	END OF STROKE VALVE HOLDER	
48	1	CD150 COVER	

CD150 MAIN AIR CYLINDER ASSEMBLY			
ITE	QTY	PART NUMBER	DESCRIPTION
7	1	M-828	CD150 BASE MANIFOLD
8	1	M-872	CD150 UPPER A/C SUPPORT
9	2	M-773	CD150 PILLOW BRG. MOUNT
10	2	M-873	CD150 AIR CYLINDER SUPPORT ROD
14	8	S-174	3/4-16 X 3/4 BLACK OXIDE SHCS
15	4	P-569	5/8 FLAT WASHER
16	2	S-179	3/4" SPLIT LOCKWASHER
17	4	P-117	5/8 11 HEX NUT
18	2	S-176	3/4-10 HEX NUT
19	4	S-372	1/4-20 X 7/8 SS SHCS
20	2	S-057	LINEAR BEARING CD250
21	4	S-177	1/4" Regular Helical Spring Lock Washer
22	4	S-372	1/4-20 X 7/8 SS SHCS
23	1	CD150 MAIN AIR CYLINDER ASSEMBLY	CD150 MAIN AIR CYLINDER ASSEMBLY

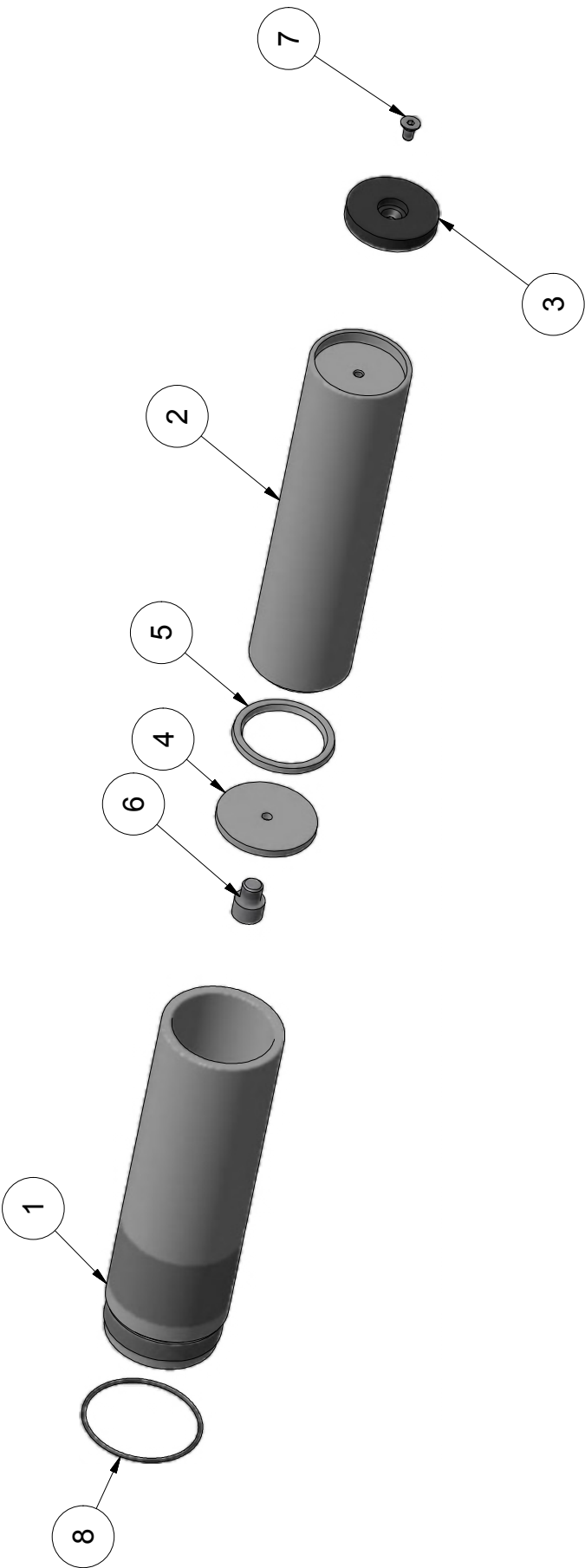


Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	M-25008	AC - CAP - REAR
2	1	M-25000	A/C PISTON CD250
3	2	M-320	BUSHING - 1.75 X 2.0 X 1.0
4	1	M-870	CD250 SHAFT "B" SECTION
5	1	M-871	CD250 SHAFT "A" SECTION
6	1	M-12001	AC - SLEEVE - 10"
11	16	P-119	3/8" FLAT WASHER
12	8	S-315	3/8-16 X 13.5 GR8 BOLT
13	8	P-472	3/5-16 HEX NUT
21	2	P-689	SEAL - 10" PISTON
22	2	P-354	SEAL - WIPER 1.25" ROD
23	2	P-352	SEAL - WIPER - 1.25" ROD

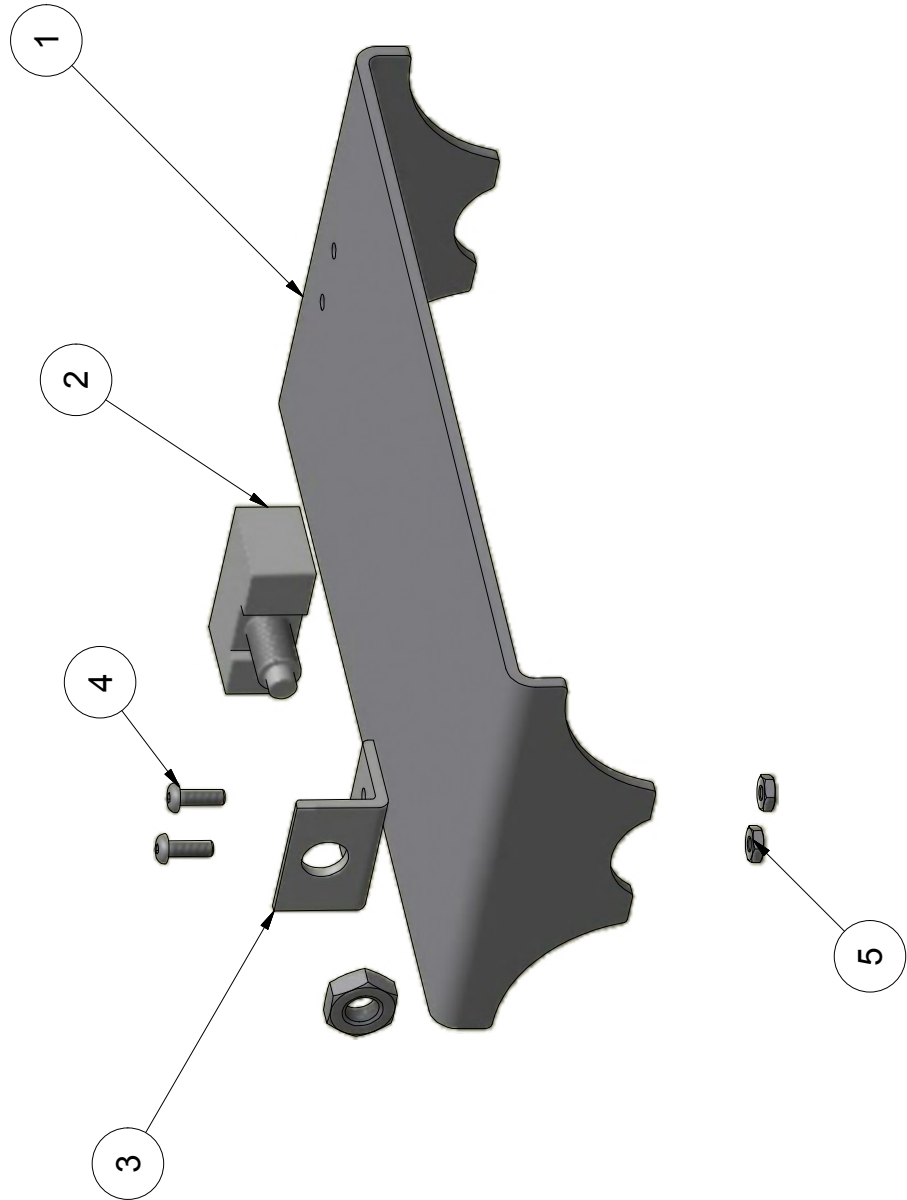


1:1 METERING ASSY

1:1 METERING ASSEMBLY			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	M-12008	METERING CYLINDER 1:1
2	1	M-25016	METERING PISTON 1:1 CD250
3	1	M-25001	PISTON PAD 1:1 CD250
4	1	M-12012	CAP - PISTON 1:1
5	1	S-220	PISTON SEAL 1:1
6	1	S-99	1/4-20UNC X 1/2 SOCKET HEAD CAPSCREW
7	1	S-250	1/4 - 20 X .5 HexSocket Flat Head Cap Screw
8	1	P-357	SEAL O-RING

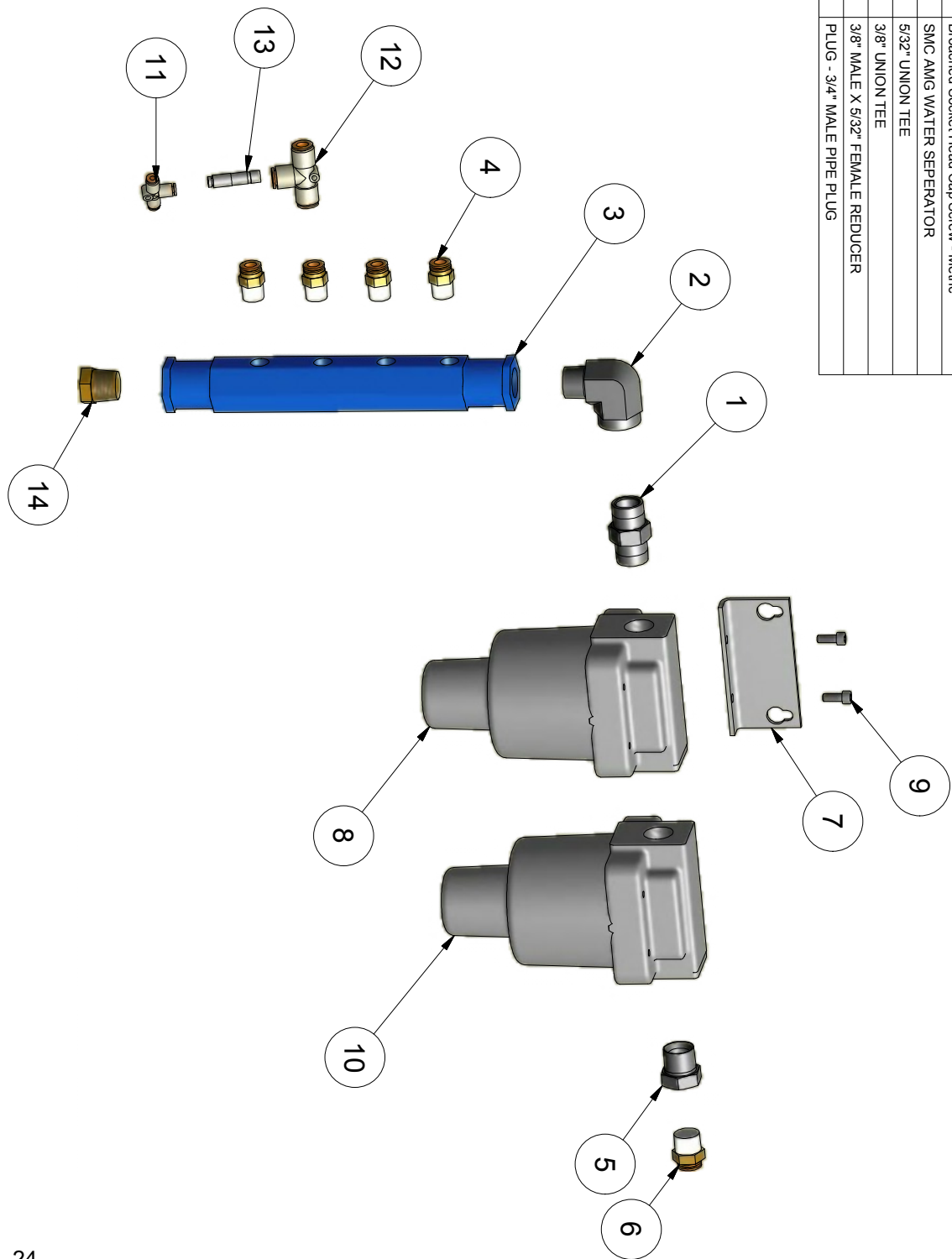


END OF STROKE VALVE AND VALVE HOLDER				
ITEM	QTY	PART NUMBER	DESCRIPTION	
1	1	M-816	END OF STROKE VALVE HOLDER	
2	1	P-217	END OF STROKE VALVE	
3	1	M-706	VALVE BRACKET	
4	2	S-242	8-32 X 1/2 BHCS 18-8 SS	
5	2	P-538	8-32 HEX NUT 18-8 SS	



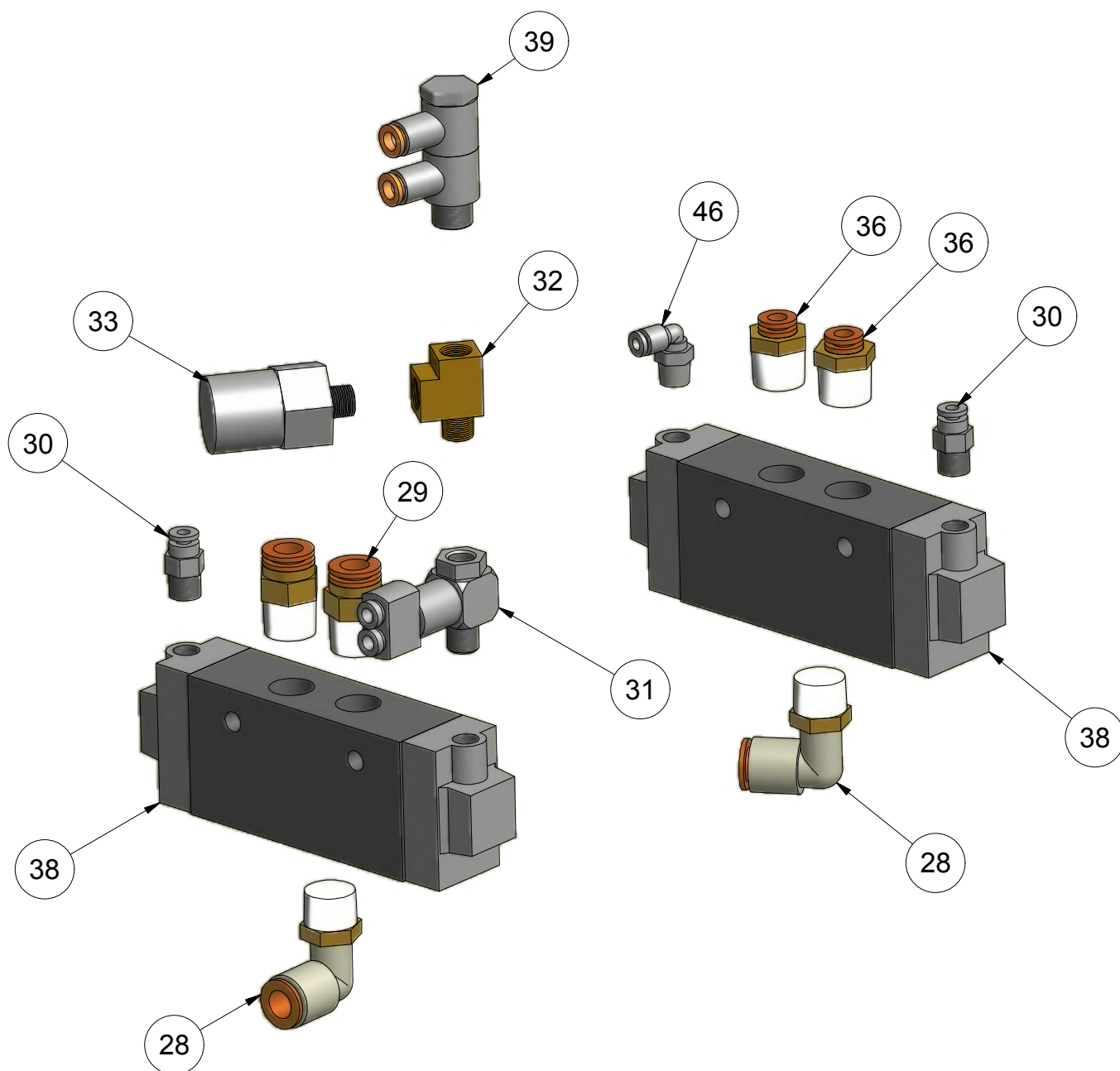
Parts Diagrams

CD150 AIR FILTER ASSEMBLY			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	P-724	PIPE FTG. 3/4 X 3/4 NPT STEEL NIPPLE
2	1	P-723	PIPE FTG. 3/4 NPT STEEL ELBOW
3	1	S-770	AIR DISTRIBUTION MANIFOLD
4	4	P-940	COMP. FTG. 3/8 TUBE X 3/8 NPT UNION
5	1	P-729	PIPE FTG. 1/2 X 3/4 NPT REDUCER
6	1	P-995	COMP. FTG. 1/2" TUBE X 1/2" NPT UNION
7	1	SMC BRACKET AM-BM104	AIR FILTER MTG. BRACKET
8	2	S-450	SMC AMH PRE-FILTER
9	2	M6 X 6 X 16	Broached Socket Head Cap Screw - Metric
10	1	S-451	SMC AMG WATER SEPERATOR
11	1	P-422	5/32" UNION TEE
12	1	S-921	3/8" UNION TEE
13	1	S-580	3/8" MALE X 5/32" FEMALE REDUCER
14	1	P-996	PLUG - 3/4" MALE PIPE PLUG

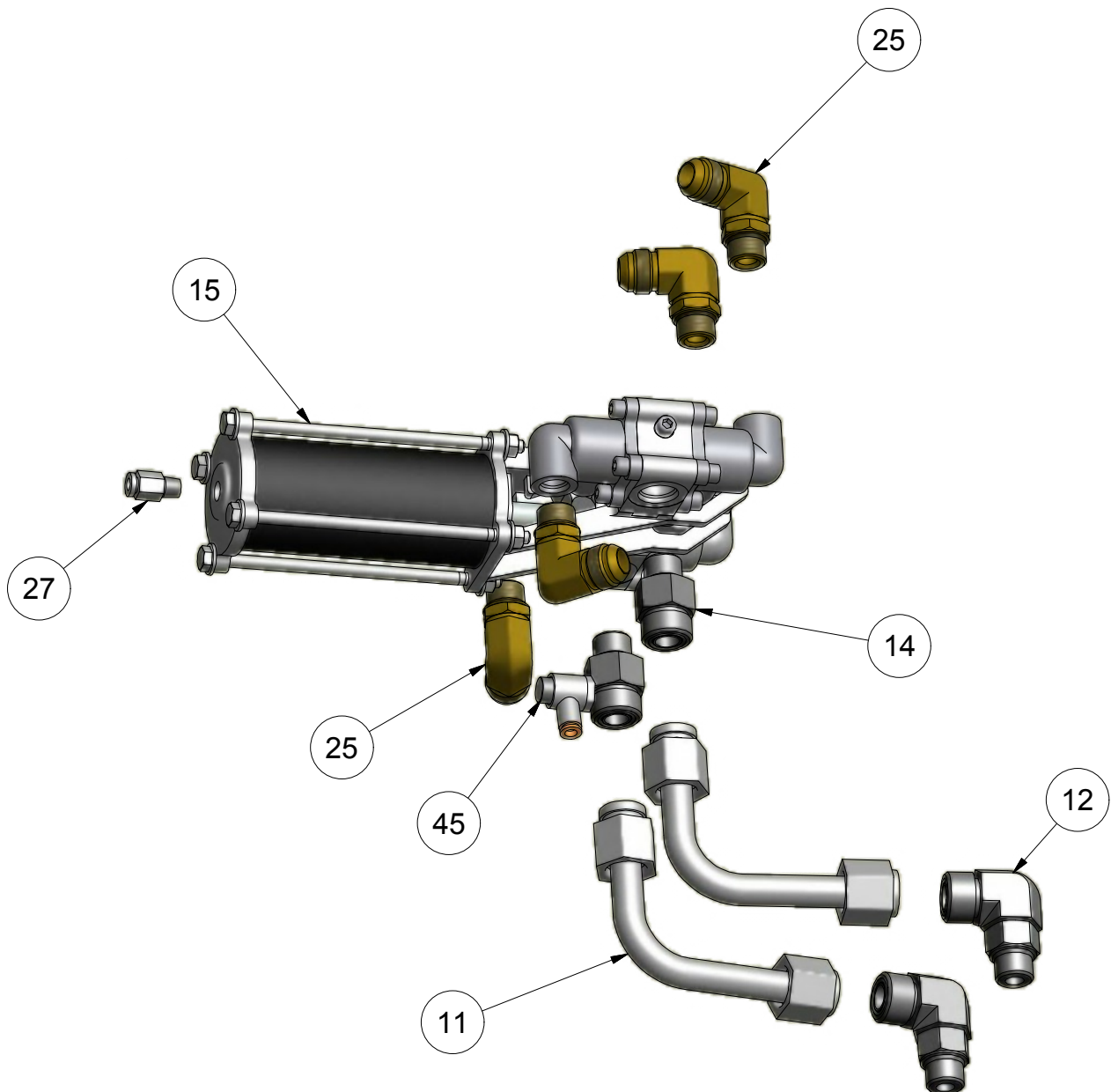


Parts Diagrams

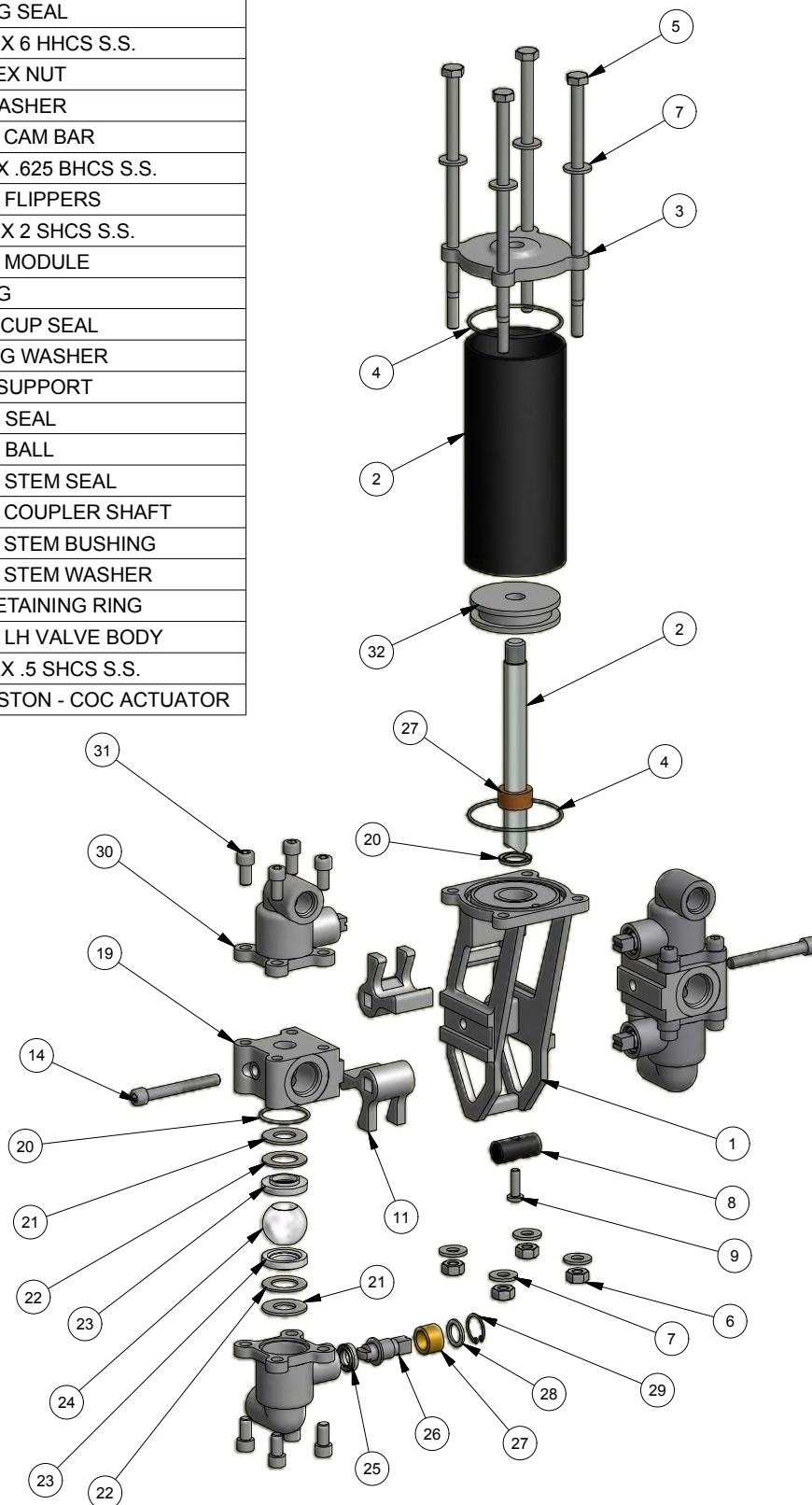
CD150 DIRECTIONAL VALVES			
ITEM	QTY	PART NUMBER	DESCRIPTION
28	2	S-930	3/8 TUBE X 3/8 NPT
29	2	P-940	3/8 TUBE X 3/8 NPT UNION
30	2	P-174	1/8 NPT X 5/32 UNION
31	1	P-182	AL - STROKE SENSOR 1/8 NPT
32	1	S-021	PIPE TEE 1/8 NPT BRASS
33	1	P-024	PRESSURE TRANSDUCER
36	2	N-335	1/4" X 3/8" NPT MALE UNION
38	2	S-260	AL - PARKER DIRECTIONAL VALVE
39	1	P-021	1/4" X 1/8" NPT DOUBLE BANJO
46	1	P-176	5/32 X 1/8 NPT SWIVEL ELBOW



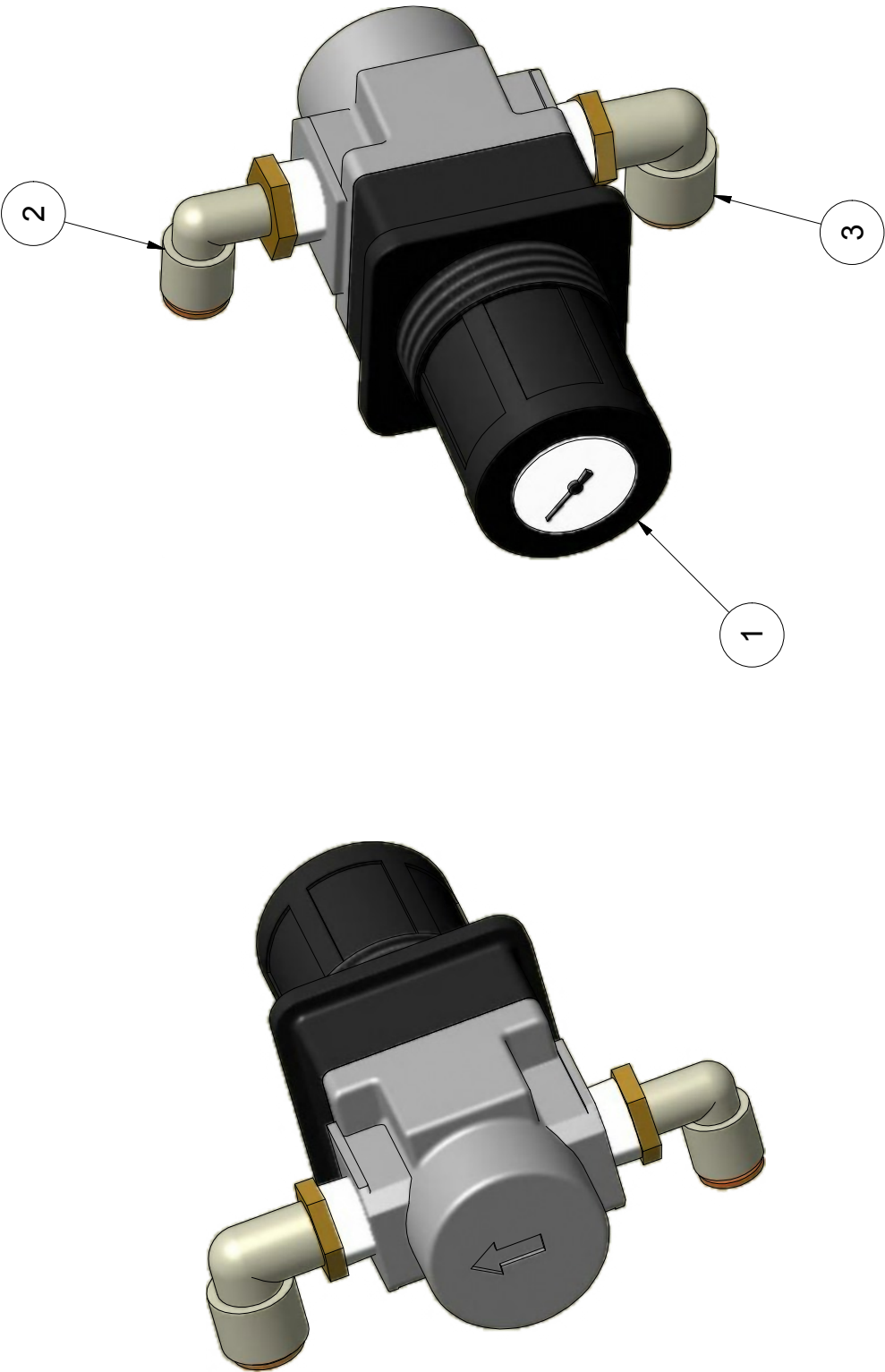
CD150 COCO VALVE ASSEMBLY			
ITEM	QTY	PART NUMBER	DESCRIPTION
11	2	M-12519	TUBE ASSY - RIGID
12	2	S-336	SEAL LOK - STRAIGHT THREAD ELBOW #10
14	2	S-324	SEAL LOK - STRAIGHT CONN. #10
15	1	A-160-6 CD150	CD150 COCO ASSEMBLY
25	4	P-495	JIC ELBOW - 3/8 X 1/2 JIC
27	1	S-499	CF SFT - 1/4 X 1/8 NPT UNION MALE
45	1	P-866	BANJO FTG. 1/4" TUBE X 1/8" NPT



CD150 COCO VALVE PARTS			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	M-571	COCO FRAME
2	1	M-580	COCO A/C ROD
3	1	M-570	COCO A/C END CAP
4	2	S-504	O-RING SEAL
5	4	S-309	1/4-20 X 6 HHCS S.S.
6	4	P-208	1/4" HEX NUT
7	8	S-415	1/4" WASHER
8	1	M-577	COCO CAM BAR
9	1	S-299	10-32 X .625 BHCS S.S.
11	2	M-574	COCO FLIPPERS
14	2	S-334	1/4-20 X 2 SHCS S.S.
19	2	M-572	COCO MODULE
20	4	S-509	O-RING
20	1	S-505	1/2" U-CUP SEAL
21	8	S-330	SPRING WASHER
22	8	S-329	SEAL SUPPORT
23	8	S-332	COCO SEAL
24	4	M-803	COCO BALL
25	4	S-328	COCO STEM SEAL
26	4	M-581	COCO COUPLER SHAFT
27	4	M-802	COCO STEM BUSHING
28	4	P-469	COCO STEM WASHER
29	4	P-505	5/8" RETAINING RING
30	4	M-575	COCO LH VALVE BODY
31	16	S-310	1/4-28 X .5 SHCS S.S.
32	1	M-579	A/C PISTON - COC ACTUATOR



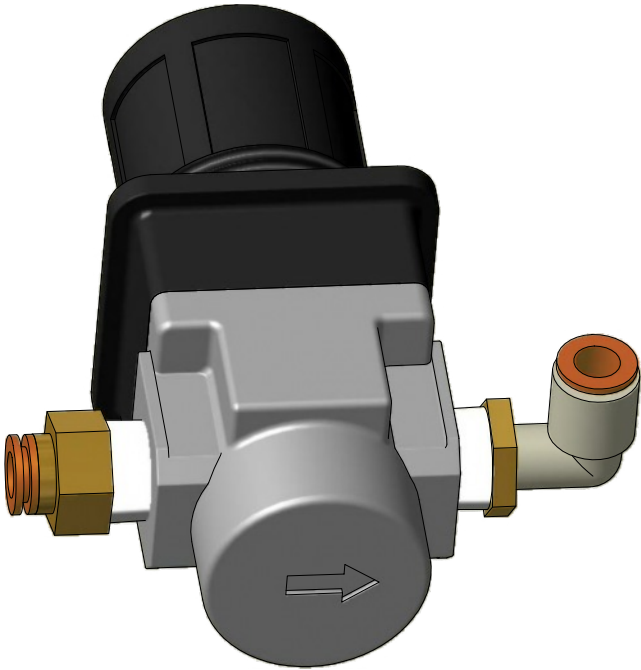
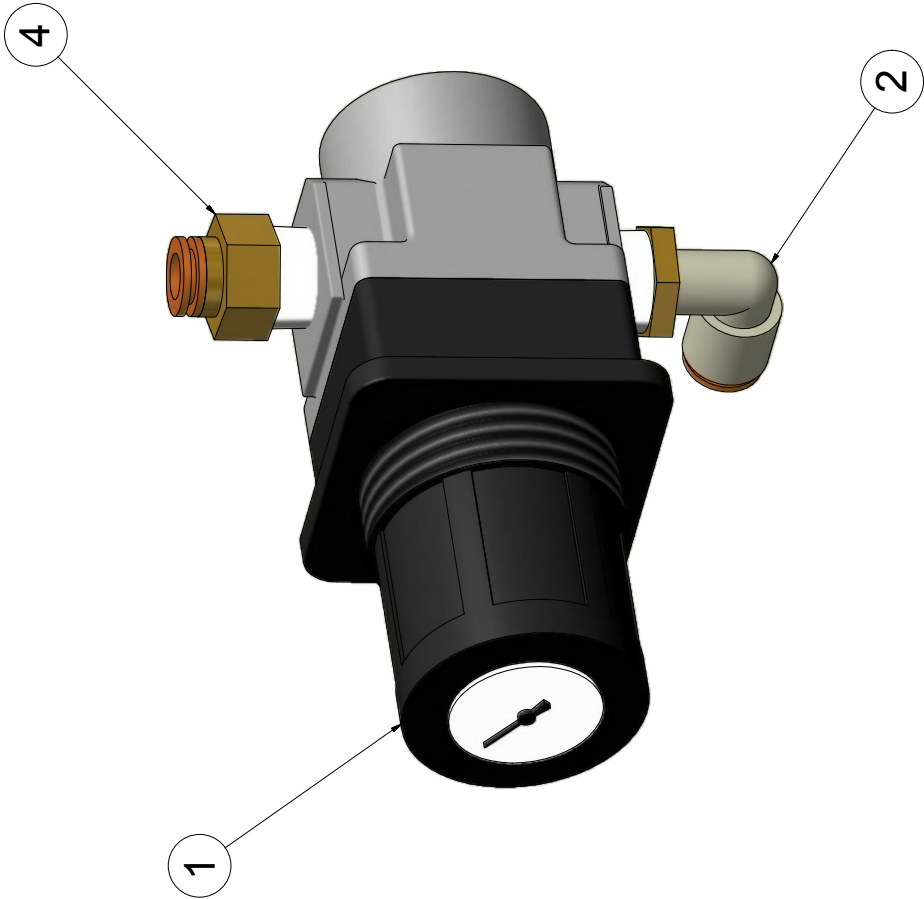
CD150 TRANSFER PUMP REGULATOR ASSEMBLY				
ITEM	QTY	PART NUMBER	DESCRIPTION	
1	1	P-979	AIR REGULATOR	
2	1	P-933	3/8" X 1/2" NPT SWIVEL ELBOW	
3	1	P-994	1/2" X 1/2" NPT SWIVEL ELBOW	





CD150 AIR CYLINDER REGULATOR ASSY

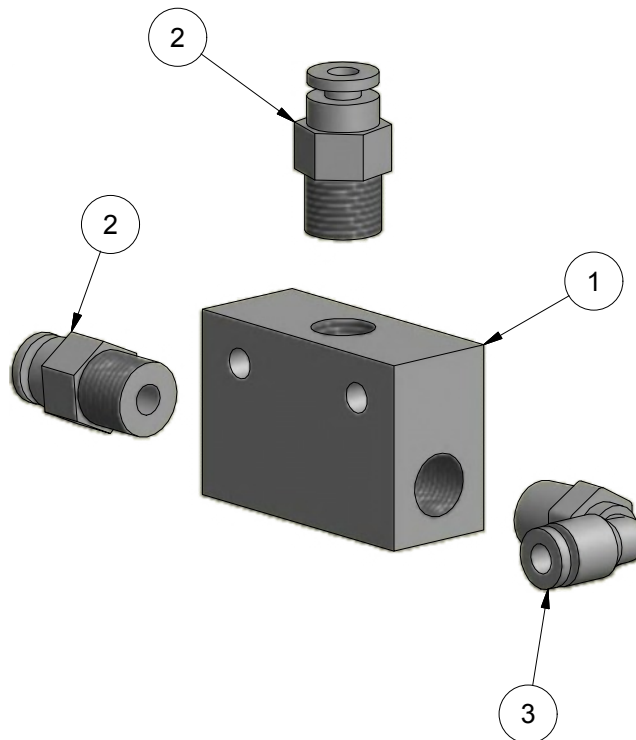
ITEM	QTY	PART NUMBER	DESCRIPT
1	1	P-979	AIR REGULATOR
2	1	S-933	3/8" X 1/2" NPT SWIVEL ELBOW
4	1	P-940	3/8" X 3/8" NPT UNION



Parts Diagrams

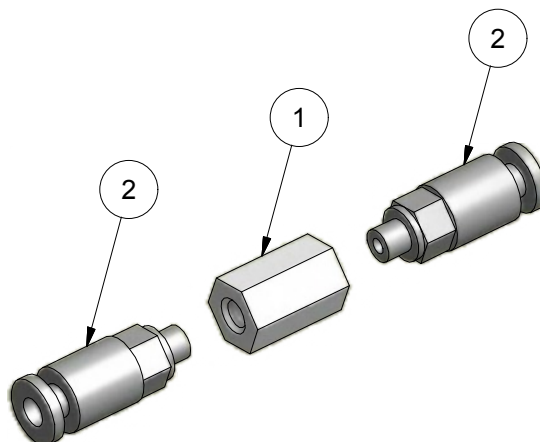
Parts List

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	P-794	AL - VALVE - "OR" ELEMENT
2	2	P-174	1/8 NPT X 5/32 UNION
3	1	P-176	5/32 X 1/8 NPT SWIVEL ELBOW



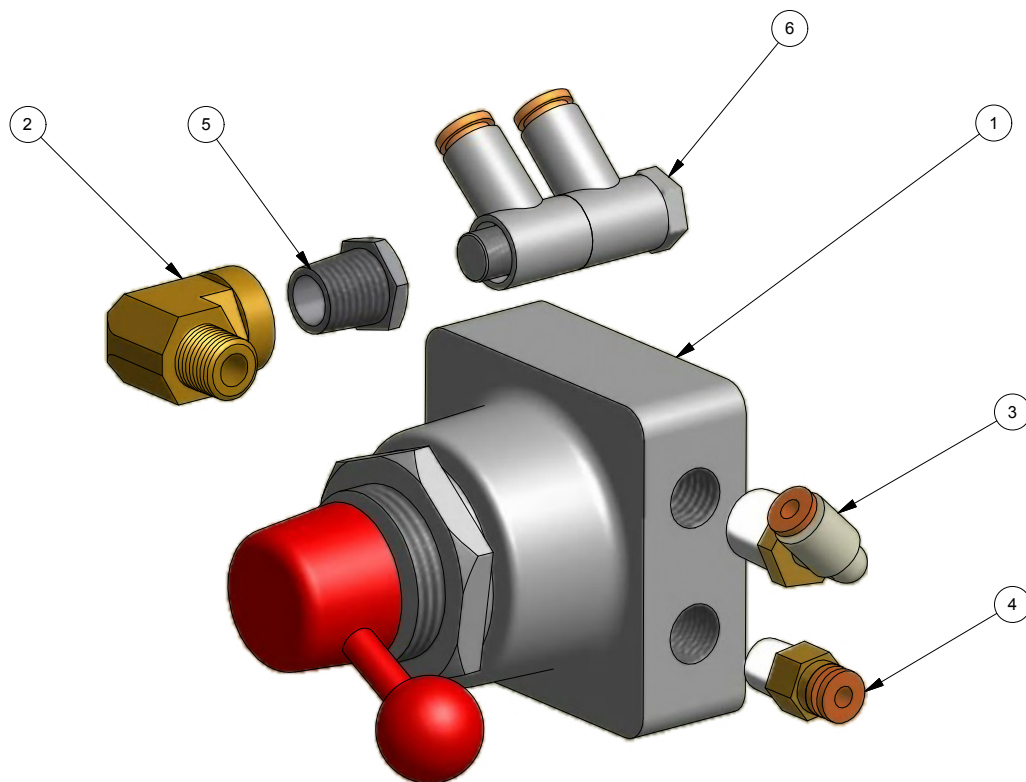
Parts List

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	M-503	AIR LOGIC ORIFICE
2	2	P-186	SEAL LOK - STRT THD UNION 1/2"



Parts Diagrams

Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	P-745	ON/OFF SWITCH
2	1	S-007	1/4" NPT STREET ELBOW
3	1	P-242	5/32 X 1/4" NPT SWVL ELBOW
4	1	P-384	5/32 X 1/4" NPT UNION
5	1	P-154	1/4" X 1/8" NPT PIPE BUSHING
6	1	P-065	5/32 X 1/8" NPT BANJO FTG



CD 150 AIR LOGIC

