CD85
Operation and Service Manual

Lily Corporation

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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 in the event resin enters one's eyes. 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 it's contents. Phone Lily Corporation if clarifications are needed.

Operation

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 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.

CHECK THIS

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 clean-up is required. And, most epoxy resins can be left within the dispenser for quite a while. However, there is a very important step to be taken at shut-down if (A), a low viscosity resin is being used , and (B), a mixer or manifold is fixed directly to the outlet fittings of the COCO valve assembly. This is a procedure we also call “burping”. The burping is necessary because the base and catalyst components of most low viscosity resins have a much different specific gravity. Like vinegar and oil in a salad dressing, one is heavier than the other, and quickly sinks to the bottom. Until they are mixed, the base component tends to sink beneath the catalyst. When the components together within a mixer fixed to the outlet valves, it is possible within a very few minutes for the base component to settle and pond out beneath the catalyst. With sufficient time, it may enter the catalyst outlet valve with costly results as it hardens overnight. To burp the unit, simply dispense a few ounces into a waste container immediately after removing the mixer or manifold. This will flush any base resin which may have entered the catalyst fitting or valve.

If a manifold or static mixer is mounted directly to the outlet valves of the COCO valve assembly then the dispenser must be “burped” as mentioned in the previous section.

If static disposable mixers are used then clean-up is a matter of removing the mixer and disposing of it. The threads at the mounting nozzle for the static should be cleaned with solvent then have grease applied at this point also. This will prevent the mixer retaining nut from being glued in place.

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 static mixer from the outlet valves.
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. Reduce the Dispenser Pressure to Zero.

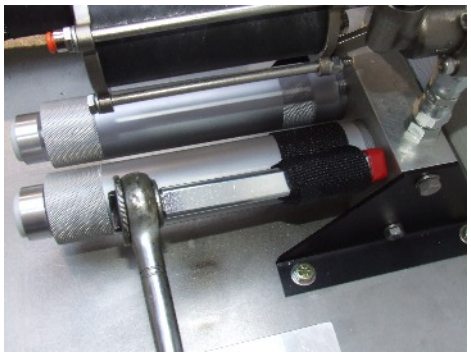
2. Switch the Dispenser to “On”.

3. Reduce the Transfer Pump pressures to zero.

4. Dispense a full shot or cycle. When the system re-sets, the metering pistons will remain within their metering cylinders because the material is no longer pressurized by the transfer pumps.

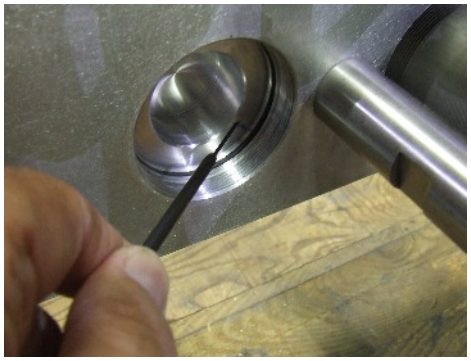
5. Remove the large side panels for access to the metering assemblies.

6. 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.



7. 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.

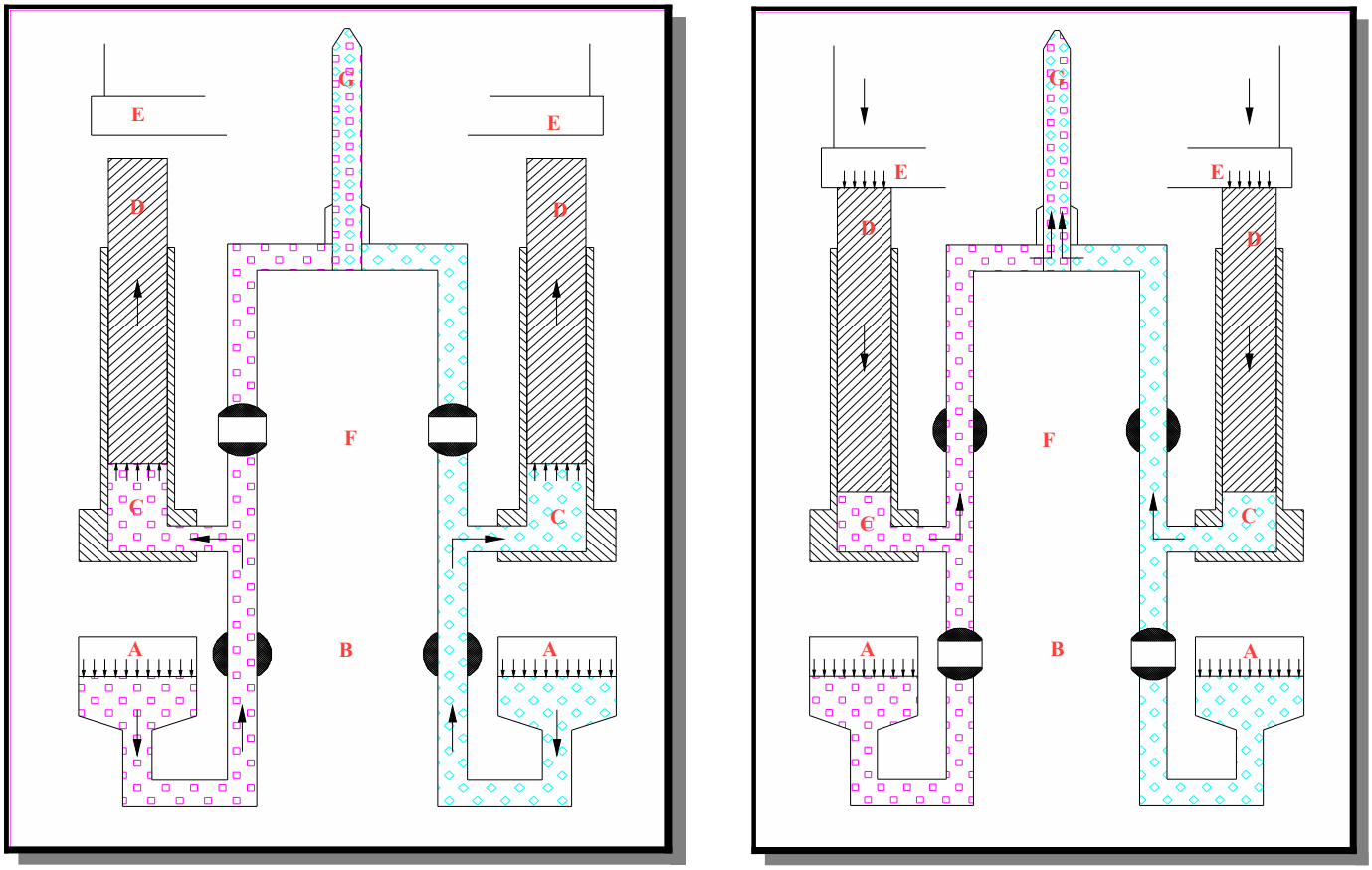
6. **Important!** Lubricate the threads of the replacement metering assembly with an anti-seize compound or silicone lubricant. Thread the assembly into the manifold by turning it clockwise until it is seated. Do not over-tighten. As the chamber bottoms out in the manifold you will feel a definite stop. Do not tighten further.



7. Replace the side panels.

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 CD125 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 (twice a year) 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

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 similarily 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 theball seals, and therefore easily replaced in the course of ball seal replacement.

When servicing the coco module, refer to the exploded parts view on page #30 as well as the illustrated steps below.

Disassembly

Turn the dispenser switch off. Vent the fluid tanks, and disconnect the air supply to the dispenser. Remove all three screens. Grasp the metering pistons and press them down into their cylinders. This will purge the cylinders of material, which will flow back into the tanks. Disconnect the material supply hoses at the Coco inlet fittings, and remove the mixer at the outlet fittings. Then, follow the steps below:

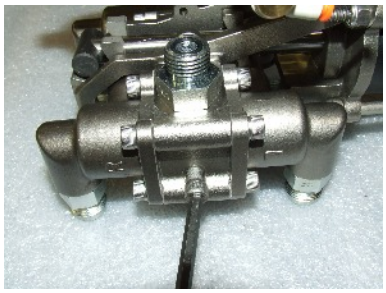
1. Using a 7/8" wrench, remove the inlet and outlet hose from their respective fittings at the COCO valve.

2. Remove the air lines from the COCO actuator.

DISASSEMBLY cont"d

3. Use a 7/8" wrench to loosen the fittings at the COCO spacer block. Do the same for the "A" and "B" sides.

4. Remove the COCO / Actuator assembly from the machine

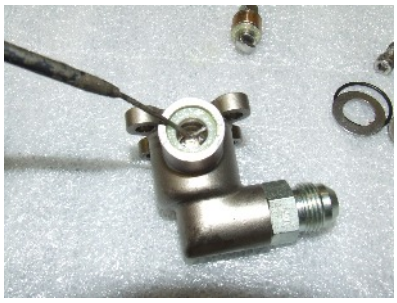


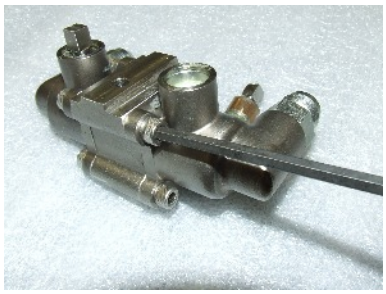
5. With a 3/16" Allen wrench, remove the bolt securing the spacer block to the frame module.

6. With a small pair of snap-ring pliers remove the internal snap ring that secures the coupler shaft in the ball valve housing.

7. Remove the coupler shaft along with it's bushing and set aside.

12. With a seal pick, remove the coupler shaft seal. Take care not to scratch the bore.





5. With a 3/16" Allen wrench, remove the four bolts that hold the ball valve body to the spacer block.

7. Remove the O-Ring (S-509) and the concave spring washer (S-330).

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.

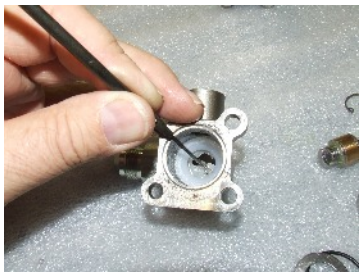
Inspection Carefully inspect each part. If possible, use a magnifier and light. Pay special attention to the balls and the valve sockets. If there is any blemish, replace the part. Flat and spring washers do not need to be replaced unless damaged.

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

11. Use the seal pick to gently remove the ball valve seal from its seat. Take care not to scratch the housing.

12. Now the ball can be removed from the housing. Inspect the ball looking for wear or scratches in the surface. Replace if needed.

13. Use the seal pick to remove the lower seal from it's seat. Take care not to scratch the seat.



14. Using the seal pick remove the flat washer

15. Finally, use the seal pick to remove the concave spring washer from the bottom of the ball valve housing.

Assembly

1. Fit the seal spring (S-330) into the pocket with its concave side toward the ball.12. Remove the lower

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.

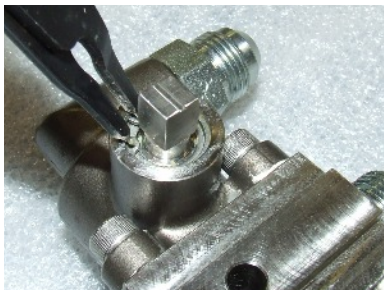
SERVICING THE SYSTEM

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.

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.

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.

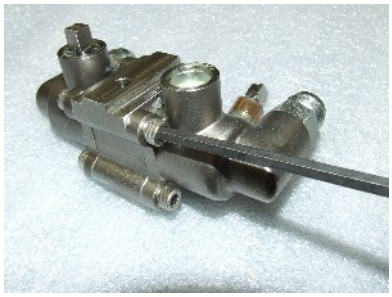


6. Install the exterior seal (S-332) with the spring groove facing away from the ball.

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. Install the concave spring washer with the concave side towards the ball!



9. Attach the valve body to the spacer 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. Bolt the valve assembly back to the frame. Be sure that the ball valves are oriented properly.

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 seisure of the piston within the cylinder.

To remove a metering assembly for service, turn the dispenser switch off, disconnect the air supply at the dispenser, and follow the steps below:

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

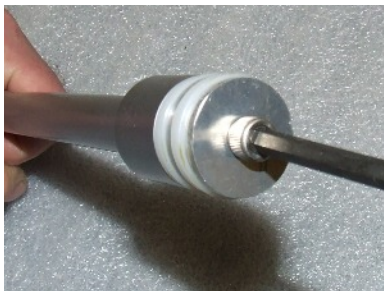
2. Remove the shoulder screww holding the piston pad in place. Be careful not to loose the springs located beneath the white plastic pad.

3. Remove the piston pad, springs, and piston pad holder from the metering piston. Be careful not to loose the springs.

4. Unscrew the metering piston retaining nut and remove.

5. Now the piston can be removed from the metering cylinder.

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

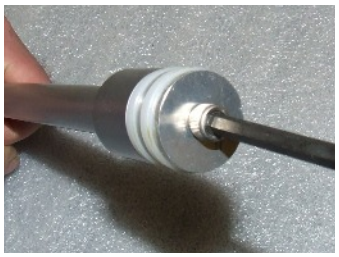


7. Seal spacer removed.

8. Layout showing the piston seals, spacer, end cap, retaining screw and piston.

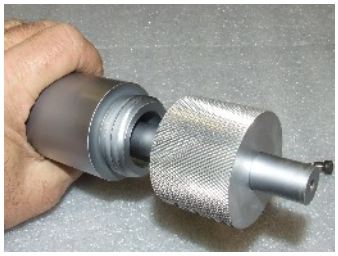
9. Be sure to install the seals with the metal springs facing out, towards the piston seal retainer.

10. Install the piston seal retainer and retaining nut.



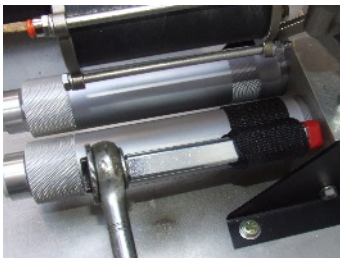
11. Slide the metering piston back into the metering cylinder, small end first.

12. Once the metering piston has been slid back into the metering cylinder then the retaining nut can be slid over the piston and tightened.



11. Install the piston pad holder then the springs and piston pad. The springs will locate in the small recesses machined into the pad and pad retainer. Use a small amount of grease to help hold the springs in place during assembly.

12. Install a new o-ring in the base manifold and then install the metering cylinder. Use a strap wrench only and tighten until the cylinder bottoms out (stops turning). Tightening any further is not necessary.



TROUBLE SHOOTING

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 resin ..... Check the resin tank for an air leak into the stem at its interior fitting.

Incorrect ratio ..... Conduct ratio assurance check to confirm valve performance. (Page #10)
Check compressibility of viscous components due to air content.

Sluggish flow ..... Disconnect 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 piston ..... Replace the piston seal(s). (Page #'s 18, 19).

Leakage of resin between flippers and valve bodies ..... Replace the COCO stem seals. (Page #14).

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 #'s 18, 19).
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 unresponsive ..... Check 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 #18, step 8)
Insufficient material pressure to firmly impinge the pads against the cap.

Coco module is sluggish or stalls. ..... Material contains too much abrasive filler**.** Change materials.
Low air supply pressure.
Misaligned inlet valve bodies. See Step 16 on page 17.

Main air cylinder return (ascent) is sluggish. ..... Defective Rapid Exhaust valve (P-336).

TROUBLE SHOOTING

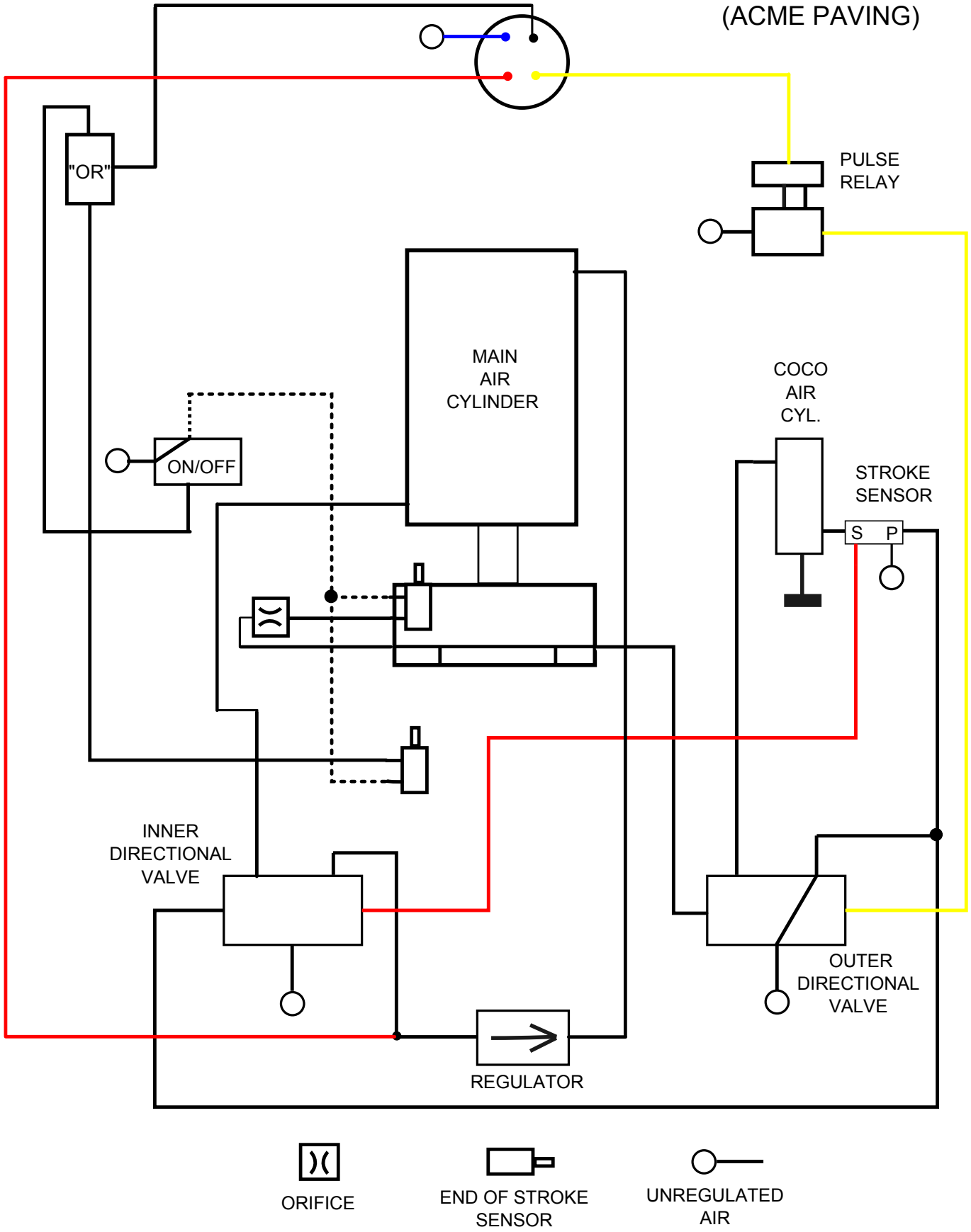
Coco module is sluggish, stalls, or binds ..... Material contains too much abrasive filler**.** Change materials.
Low air supply pressure.
Misalignment in assembly of inlet valve bodies. (Page #17)

Main air cylinder fails to return following full dispense stroke..... Malfunctioning sensor valve in upper end cap. Service the valve, replace the air filter element, and check on cleanliness of air supply.
"Or" element (A-849) not functioning. Verify by turning the switch off. If cylinder then returns, replace the "Or" element.

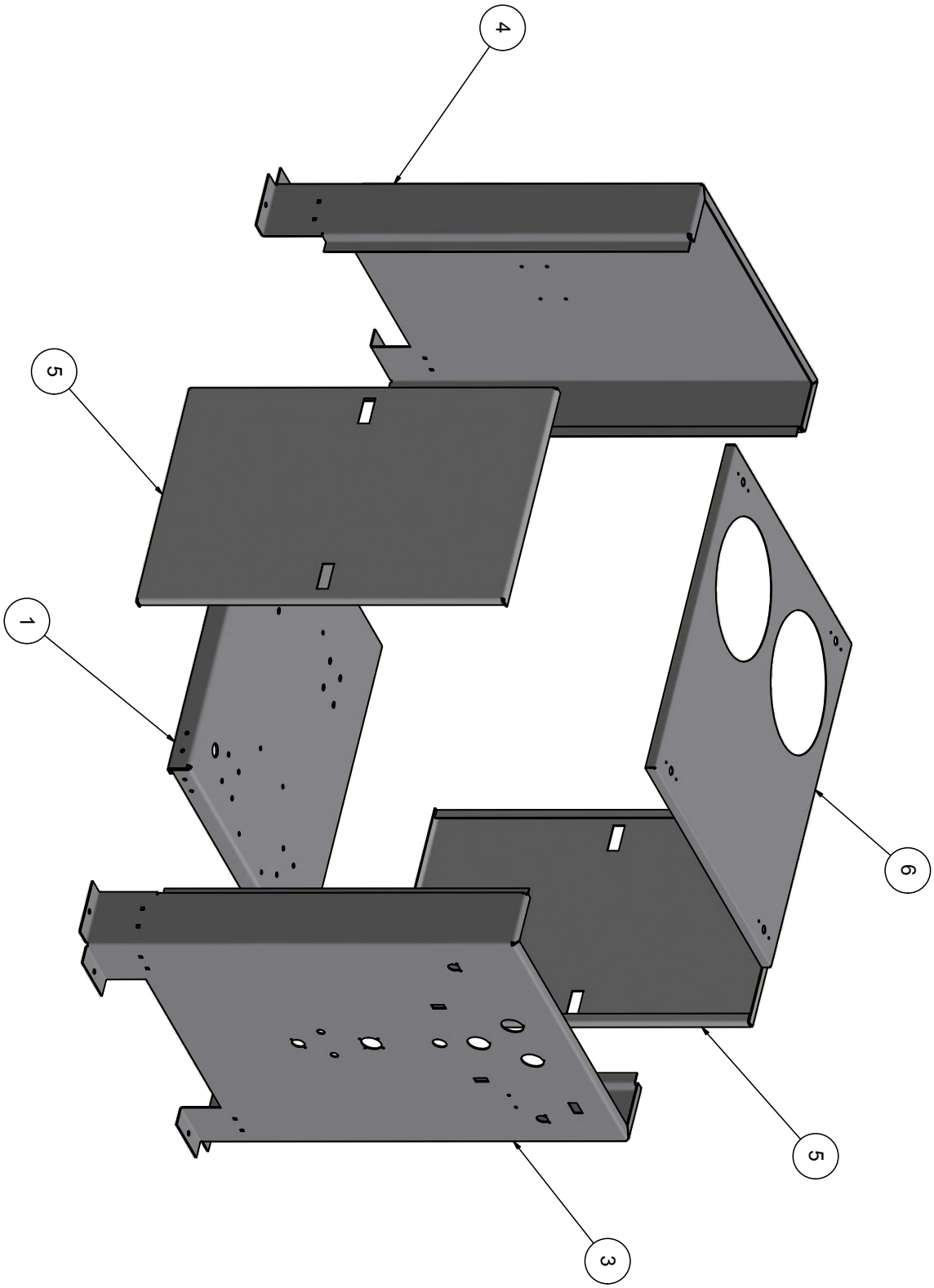
Switch to "off" does not return main air cylinder. ..... Twin valve (A-201) not shifting. Service the valve, replace the air filter element, and check on cleanliness of air supply.

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.

CD85 PROTOTYPE
WIRING DIAGRAM
(ACME PAVING)



Parts Diagrams

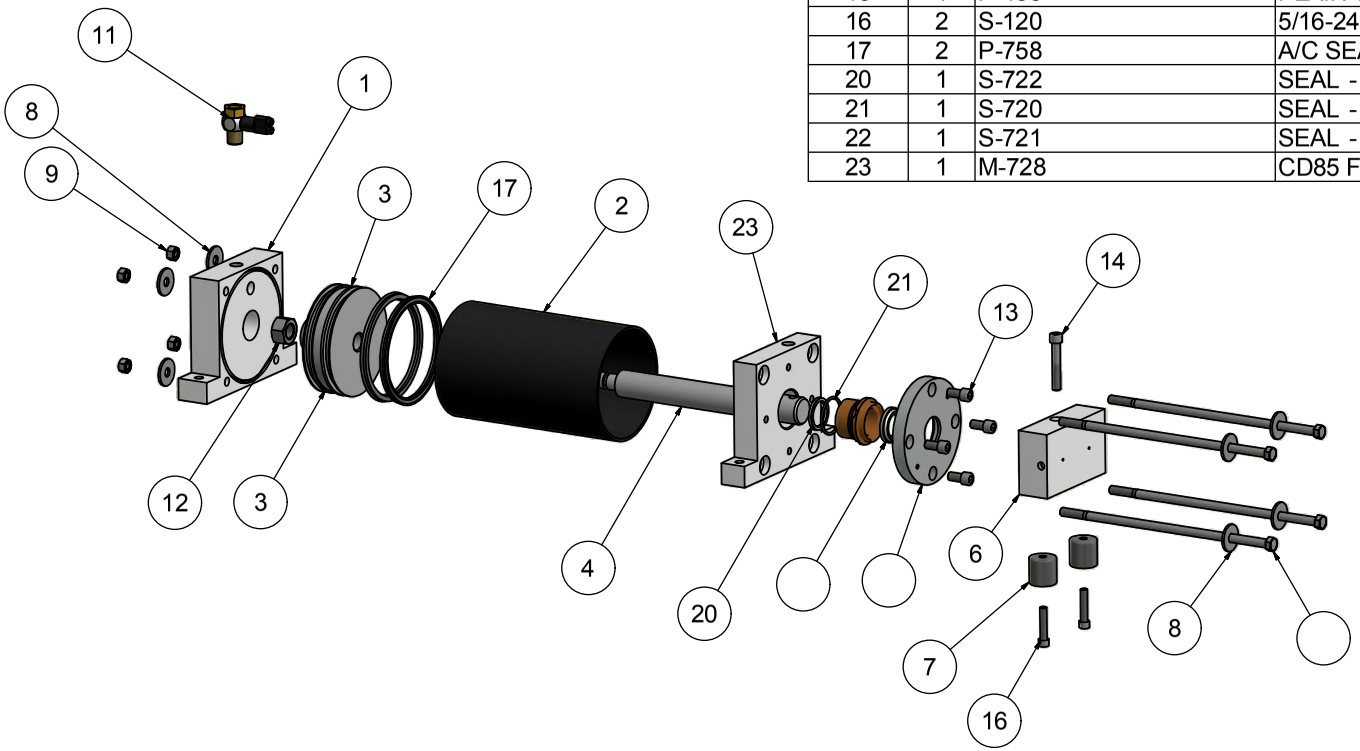


Parts List

ITEM	PART	DESCRIPTION
1	1 M-752	CD85 FRAME BASE
3	1 M-778	CD85 FRONT PANEL
4	1 M-753	CD85 REAR PANEL
5	2 M-710	CD85 SIDE PANEL
6	1 M-708	CD85 MAIN LID

Parts Diagrams

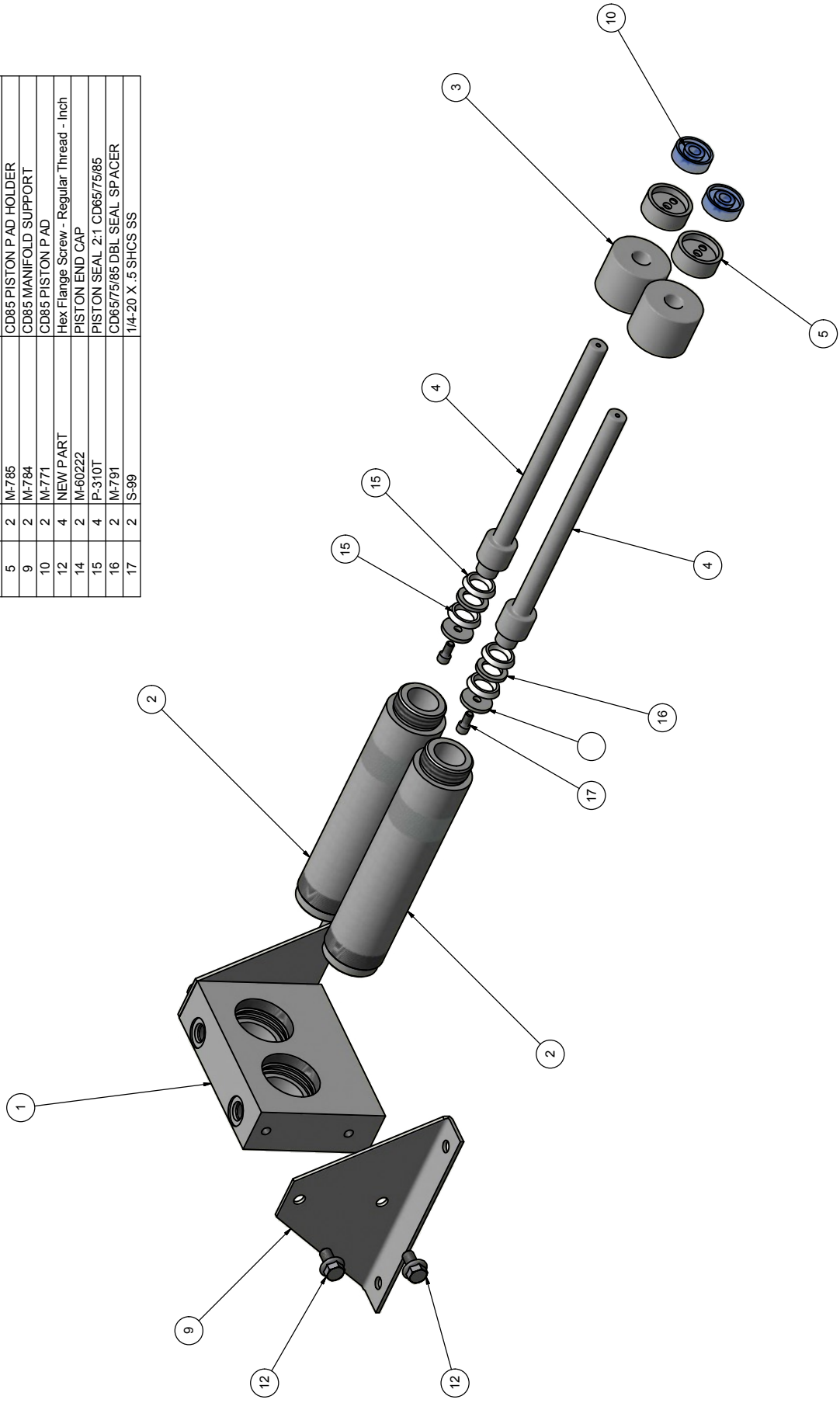
Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	M-727	CD85 REAR END CAP
2	1	M-6001	CD85 A/C SLEEVE
3	1	M-731	CD85 A/C PISTON
4	1	M736	CD85 A/C ROD
6	1	M-737	CD85 PUSHER BAR
7	2	M-738	CD85 GUIDE BUSHING
19	1	M-730	CD85 BUSHING RETAINER
18	1	M-729	CD85 END CAP BUSHING
17	1	M-728	CD85 FRONT END CAP
8	8	P-119	PLAIN WASHER 3/8"
9	4	P-472	3/8" HEX NUT
10	4	S-693	3/8-16 X 1 1 HEX HEAD BOLT GRADE 8
11	1	P-022	STROKE SENSOR
12	1	S-044	NUT - 3/4-10 GRADE 8
13	4	S-356	3/8-16 X 3/4 SHCS SS
14	1	S-164	3/8-16 X 2 1/4 SHCS
15	1	P-453	PLAIN WASHER 3/4"
16	2	S-120	5/16-24 X 1.5 SHCS
17	2	P-758	A/C SEAL - 5" PISTON
20	1	S-722	SEAL - U-CUP 1.25" DIA.
21	1	S-720	SEAL - O-RING
22	1	S-721	SEAL - WIPER 1.25" DIA.
23	1	M-728	CD85 FRONT A/C END CAP



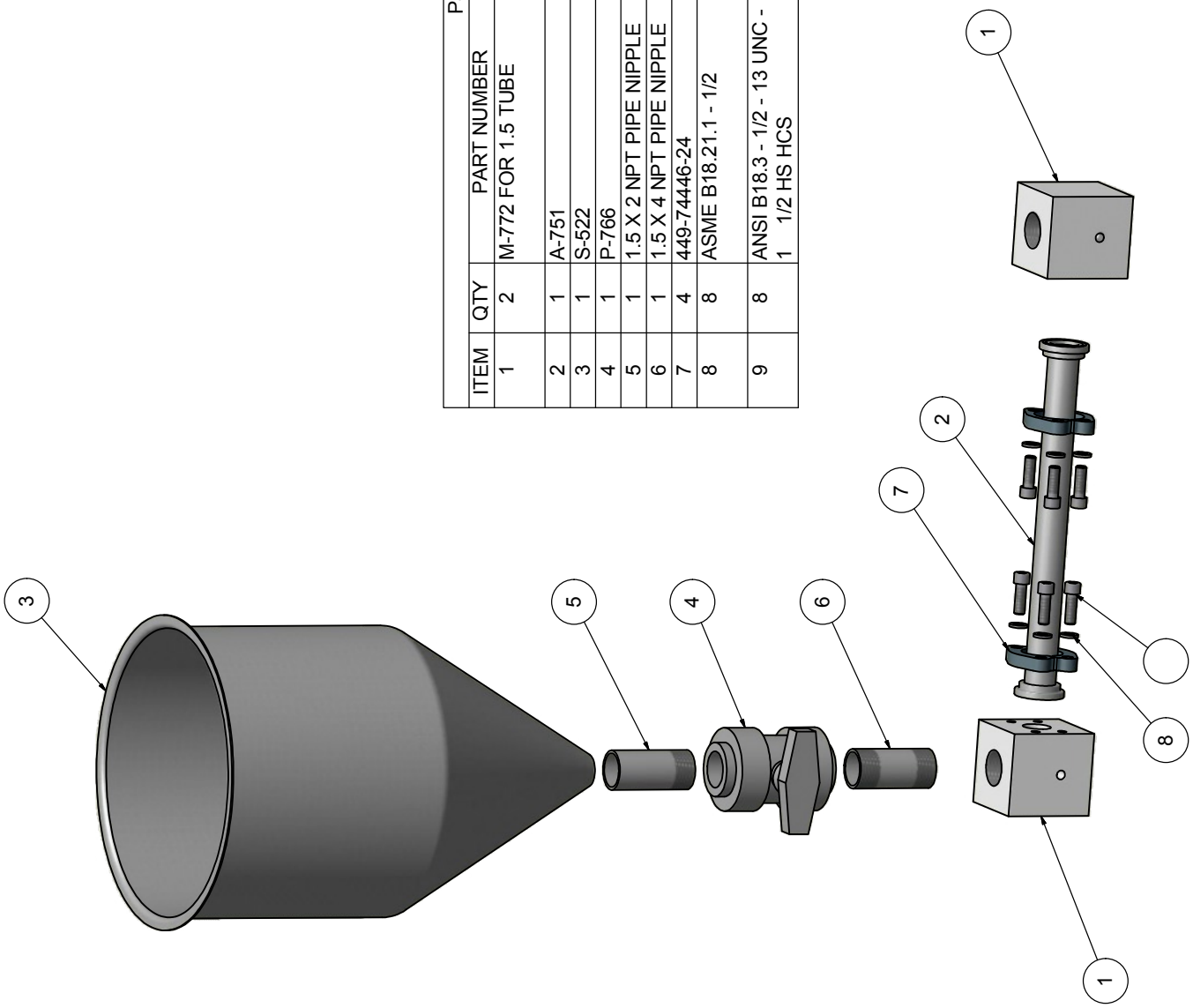
Parts Diagrams

Parts List

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	M-757	CD85 BASE MANIFOLD
2	2	M-788	CD85 2:1 METERING CYLINDER
3	2	M-787	CD85 2:1 METERING CYLINDER CAP
4	2	M-789	CD85 2:1 METERING PISTON
5	2	M-785	CD85 PISTON P AD HOLDER
9	2	M-784	CD85 MANIFOLD SUPPORT
10	2	M-771	CD85 PISTON P AD
12	4	NEW P ART	Hex Flange Screw - Regular Thread - Inch
14	2	M-60222	PISTON END CAP
15	4	P-310T	PISTON SEAL 2:1 CD65/75/85
16	2	M-791	CD65/75/85 DBL SEAL SP ACER
17	2	S-99	1/4-20 X .5 SHCS SS



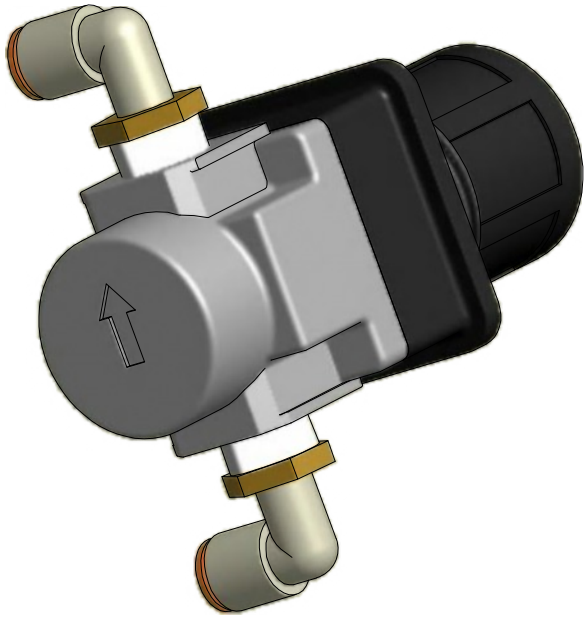
Parts Diagrams

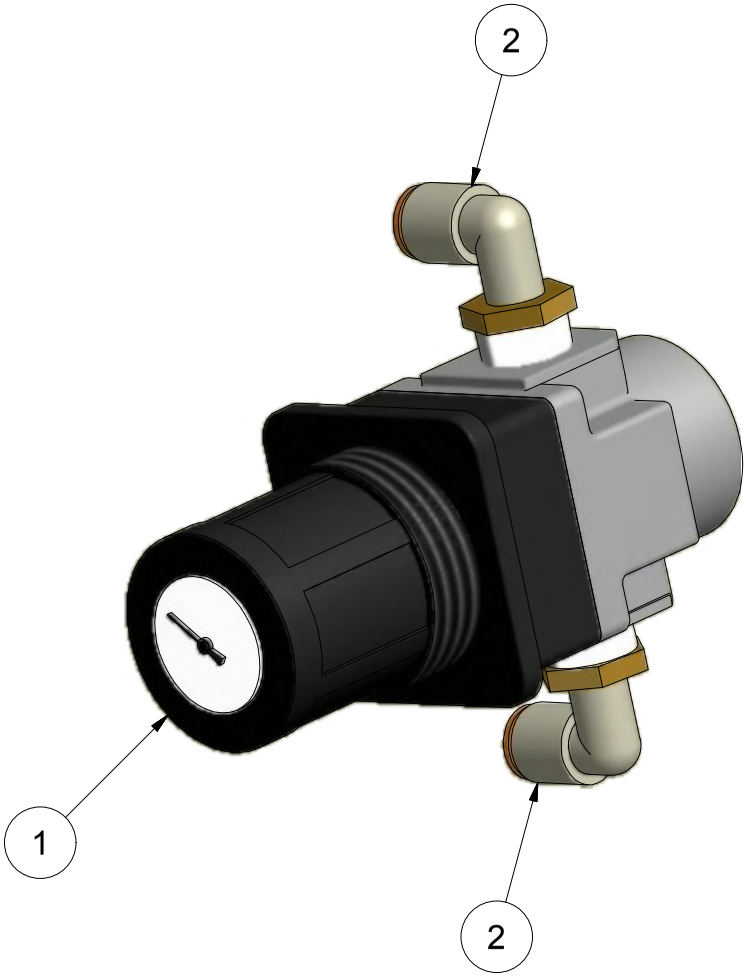


Parts List

ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	M-772 FOR 1.5 TUBE	CD85 MOUNTING BLOCK FOR HOPPER & TRANSFER PUMP
2	1	A-751	CD85 SUCTION TUBE
3	1	S-522	10.5 GALLON ROUND SS HOPPER
4	1	P-766	1 1/2 NPT HOPER BALL VALVE
5	1	1.5 X 2 NPT PIPE NIPPLE	
6	1	1.5 X 4 NPT PIPE NIPPLE	
7	4	449-74446-24	Split Flange Clamp -24
8	8	ASME B18.21.1 - 1/2	Regular Helical Spring Lock Washers(Inch Series)
9	8	ANSI B18.3 - 1/2 - 13 UNC - 1 1/2 HS HCS	Hexagon Socket Head Cap Screw

CD150 REGULATOR ASSEMBLY			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	P-089	AIR REGULATOR
2	2	P-933	3/8" X 3/8" NPT SWIVEL ELBOW





Parts Diagrams

Parts Diagrams

Parts Diagrams

Air Logic Diagram