CD65 CE Certified

Operation and Service Manual

Lily Corporation

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Serial Number _____

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 product 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 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 CD65 can develop fluid pressures in excess of 2,000 pounds per-square-inch (psi). 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 Operators Manual is crucial to the safe operation of the CD65. Do not attempt to operate this system until thoroughly familiar with its contents. Phone Lily Corporation if clarifications are needed.

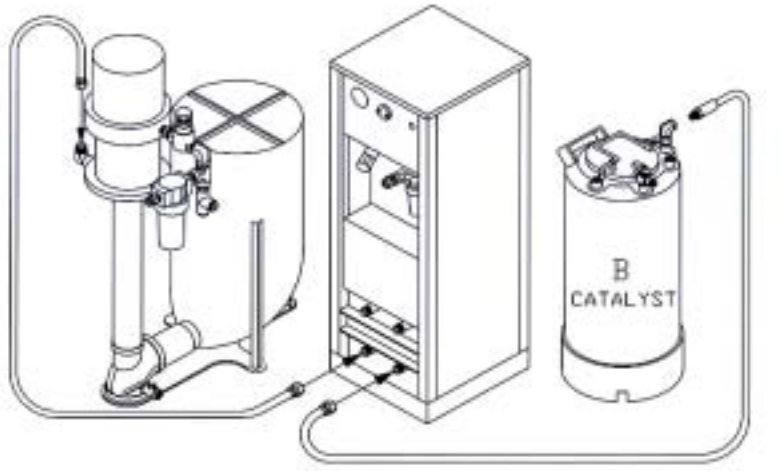
and finally:

Promptly – and thoroughly – inspect your shipment for damage and completeness. If any items are missing or damaged, immediately notify Lily Corporation. Claims for missing or damaged items must be timely and specific.

THE RESIN SUPPLY

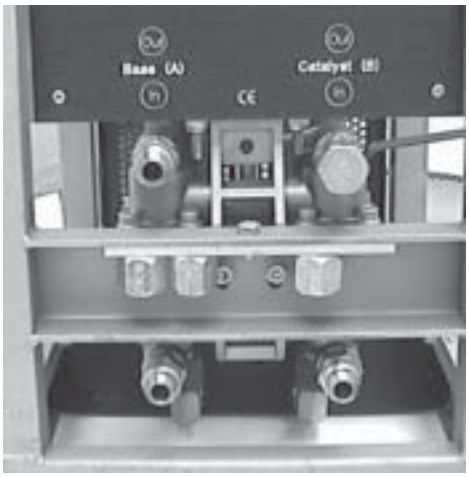
The Options

Both resin components must be delivered to the CD125 under pressure. Pumps such as that illustrated for the A component to the left are usually used for this purpose. However, if the material volume is relatively low, and the resin is thin, a pressure vessel such as that shown with the B component may be adequate.



Any pump able to pressurize material to 500 psi is usually suitable. However, sticky materials require higher pressures. Consult with Lily if in doubt. As a distributor for the Aro Products Division of Ingersoll Rand, Lily Corporation offers pumps and accessories for virtually every application.

The Connections



There are four 1/2" JIC fittings below the control panel. The lower fittings are the inlet ports, and the upper, the outlet ports. The base resin ports are on the left (facing the machine) and the catalyst on the right. They are also marked A (Base) and B (Catalyst).

Use a 7/8" wrench to remove the caps and connect the hoses. Some fluid may drip from the fittings. It is a harmless material used to test the equipment following manufacture, and does not need to be purged from the system before dispensing. Stow the caps on the magnetic flange of the channel.

Leave the inlet fluid fittings connected. Their disconnection and re-connection risks costly mis-connection.

The CD65 fluid valves are rated at 3,500 psi. Incoming fluid pressure must not exceed this, and should not approach it unless absoloutly necessary. The material flow can usually be increased by heating the material as most products thin dramatically with even minor temperature increases.

.....when using the Lily TH30 Hopper Assembly. Mount the pumps by carefully screwing them into the pipe elbows. Apply a teflon tape or other lubricant. Do not force the fit! Take care when starting the threads to avoid cross threading.

The fluid outlet fitting is the lower of the two ports on the pump. The air inlet is fitted with a pressure gauge and regulator. Only dry, filtered air should be used for the best performance and life. See the pump manual for lubrication of the pump rod seals before energizing.

Add material to the hopper slowly at first to check for leakage at the fittings. It is good practice to keep the hoppers nearly filled as it reduces the liklihood of running out of material, and makes the pump more efficient. When adding material initally, open the drain valve in the pipe elbow to vent air within the fitting. Leave it open until material appears. Then close it.

Requirements and Connections

The volumetric delivery rate of the dispenser is determined by the air pressure. An inadequate air supply will result in sluggish or sporadic delivery of material. A 75 cfm compressor is recommended for the combined operation of the dispenser and the supply pumps.

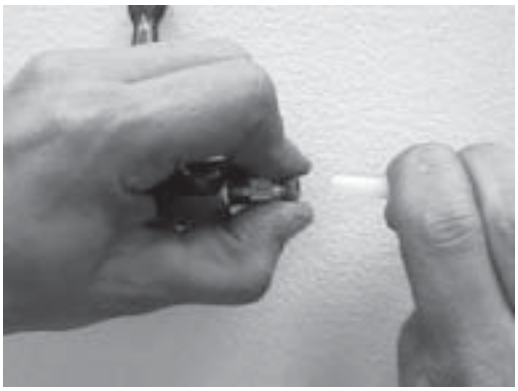
The air supply must be clean and dry. A coalescing filter is fixed to the dispenser, but it will not clean up contaminated air. Its function is to remove lubricants and additives likely to damage the seals. Inspect all filters frequently, and replace them when dirty.

Do not allow the air compressor to overheat! Carbon deposits due to overheated compressor oils will interfere with the function of the control valves.

Do not allow any additives to enter the air supply. Although many additives are beneficial to air tools, most will damage the seals in the CD65 control circuit. Never allow products such as WD-40 to enter the air supply. The periodic lubrication of the pneumatic components is dicussed on page 14.

Always blow out air hoses before connecting to the supply pumps or the dispenser. Filters and seperators cannot manage the large volumes of moisture that may accumulate in air hoses overnight.

The air fittings are the 'press-to-connect' variety. The connection is made by firmly inserting the nylon tubing end into the fitting. The tubing is released by pulling the fitting collar firmly back against the fitting body, while pulling the tube from the fitting.



The Connections

An air harness includes the connection to the dispenser as well as the gauges, regulators, fittings, and filter for the supply pumps. The pressure setting at the supply pumps should be adequate to meet the demands of the application, but no higher. Excessive pressures result in unnecessary stress on components throughout the system.

To Begin With

- Purge the air supply hose of water or other contaminants.
- Cabinet switch **off**.
- Energize the transfer pumps.
- Connect the hoses, manifold, or mixer at the material outlet fittings. Close the outlet valve.
- Reduce the dispenser air pressure to zero by turning the regulator counter clockwise until its spring is relaxed.
- Cabinet screens in place.
- Eye-wash at hand, and goggles on those nearby. Wear other protective gear as recommended by the resin supplier.
- If dispensing into a single line or a permanant mixer, take steps I and II under **Clean-up** on Page 8 before proceeding.

Dispensing

Connect the air supply, and switch the dispenser on. Increase the air pressure at the dispenser regulator until there is an audible mechanical shifting. This indicates the system has began to cycle. Slowly increase the pressure at the cabinet regulator to the maximum while watching for fluid or air leaks. This practice will identify any damaged tubing, seals, or fittings before the system is moved on site.

Following the high pressure check, reduce the pressure to that selected for the application at hand. The dispense pressure may be altered at any time by adjusting the regulator. Once the setting has been selected, the unit will continue to dispense at that pressure until the setting is changed.

Note: The dispenser pressure gauge will only register a reading during a dispense cycle. This is because it is reading the pressure to the main air cylinder on its dispense stroke. It is not that of the resin.

The resin pressure will be much higher than the main cylinder pressure. The chart to the right lists the approximate relationship between the regulated cylinder pressure and the resin pressure at various ratios. This data is usually not important unless dispensing into confined areas such as cracks.

Ratio	Factor	Cylinder Air Pressure	Resin Pressure
1:1	4.9	100 psi	490 psi
2:1	6.6		660
3:1	7.4		740
4:1	7.9		790
5:1	8.1		810
8:1	9.2		920

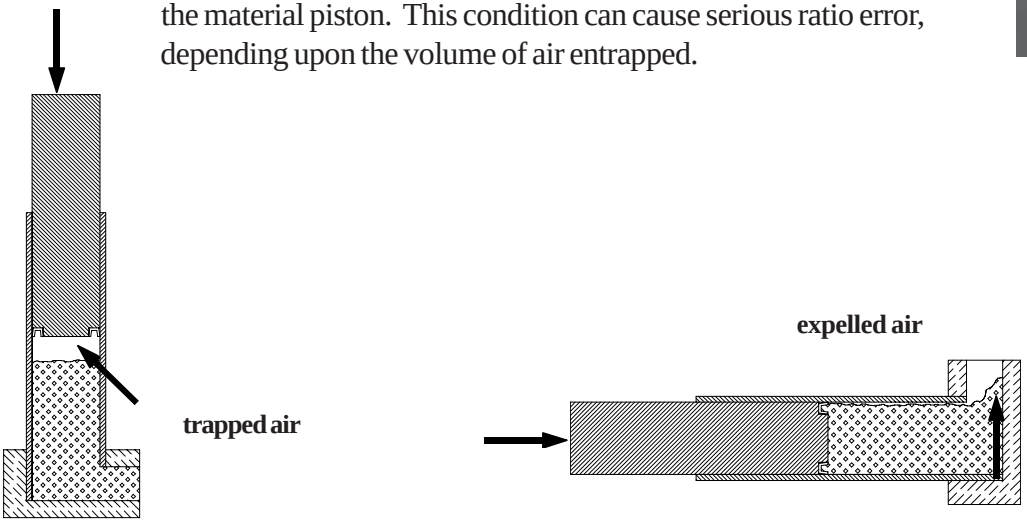
OPERATION

Shot Sizing

The CD65 dispenser is equipped with Shot Sizing. This feature allows the selection of exact dosages to be repeated.

The shot dosage is set using the friction knob located next to the sight gauge. To adjust the setting, loosen the nut and slide the valve up or down. Move the valve up in the slot to reduce the shot size, and down to increase the dosage. Once the proper volume is achieved, tighten the nut.

Warning: When using shot sizing , it is advisable to position the machine horizontal. If the dispenser operates vertically with the shot sizing engaged, any air that enters the material may become entrapped and accumulate beneath the material piston. This condition can cause serious ratio error, depending upon the volume of air entrapped.



When the unit is horizontal, any air that enters the metering chamber is promptly expelled before it can accumulate to adversely affect ratio. .

If it is not feasible to operate the dispenser horizontal on its back, steps must be taken to avoid entrapping air beneath the material piston, or allowing it to accumulate.

Air can easily be entrapped within a thick material if it is not handled carefully when transferring it from one one container to another. To avoid entrapping air , smoothly pour the material into the hopper or other container from which it is to be pumped. Do not dump it as a large mass lest air becomes entrapped in the crevices and pockets of the material already in the container.

If the material is to be pumped from its original container, move the pump to the next container before the material level allows the pump to cycle without sufficient product at its inlet. If this happens, the material cavitates, allowing air to enter the pump.

Purge the sytem periodically, and immediately if there is reason to believe air entered the supply pump. To purge the system, move the shot sizing setting to the bottom of its slot and dispense at least two full cycles. Carefully observe the color of the material dispensed during this process. It may need to be discarded due to poor proportioning if air was present. This procedure will purge the metering chambers of any air. Do this every hour or so even when entrapped air is not suspected.

OPERATION

Remote Trigger Assembly

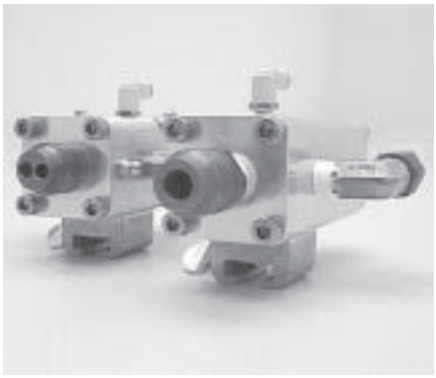
The Remote Trigger Assembly (RTA)controls the material flow from the dispense outlet. It is used with a TSO (Twin Shut Off) or SSO (Single Shut Off) Control Valve. An umbilical cord shuttles the control signals between the control valve and the dispenser.

To connect the umbilical, remove the cap located on the front of the machine. Take care not to lose the o ring seals beneath the cap.

Align the umbilical plug with its socket by matching the hole on the umbilical with the hole in the socket.

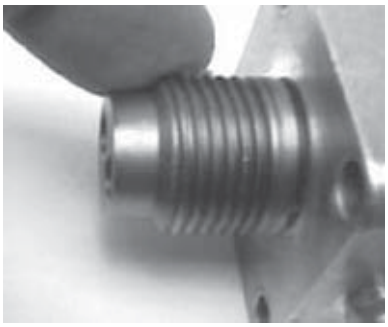
To begin dispensing, press the left button. Material will flow until the dispenser finishes its dispense stroke unless the right button is pressed to abort the shot.

There are two types of shut-off valves to serve different applications. The Twin Shut Off valve (TSO) controls the flow of components dispensed through twin hoses. The components are not joined until within an inexpensive static mixer. The Single Shut Off (SSO) dispenses joined components from a single hose. SSO dispensing requires the use of a Gusto purge tank for cleaning.



Use and care

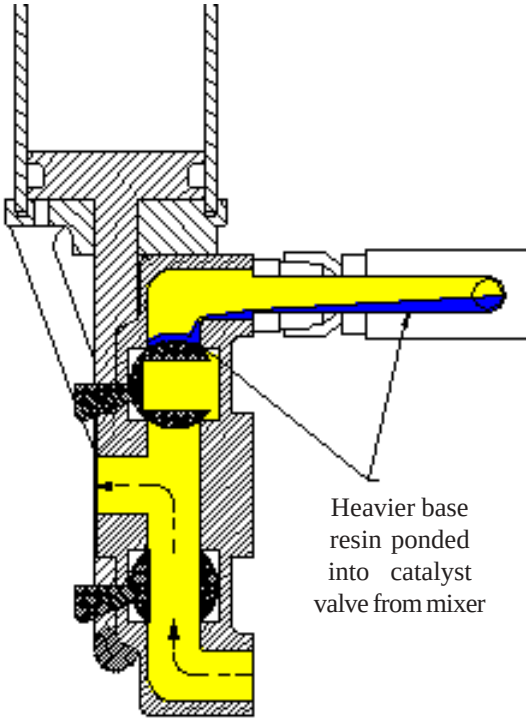
The TSO and SSO valves retain the dispense pressure within the hoses during refill cycles and after the dispenser is switched off as well. For safe disconnection of the hoses for cleaning, they must first be depressurized. To do so, reduce the dispense pressure to zero by turning the regulator knob counter-clockwise until the spring is relaxed. Then press the start button on the trigger assembly. The valves can be actuated back and forth during cleaning by alternating between the stop and start buttons.



Clean-up consists of the removal and discarding of the disposable mixer and inserting grease at the zerk fittings. One squeeze of the grease gun into the rear fittings is sufficient, while the forward fittings should be filled until grease flows from the nozzle.

It is wise to grease the threads of the mixer mounting nozzle each day before installing anew nozzle. The grease assures easy removal of the nut because it prevents epoxy from bonding to the threads.

Because the resin components are not joined within the dispenser, no internal clean-up is required. And unless you are using a single outlet hose with a SSO Control Valve, or a mixer that is not disposable, there is no external clean-up other than those minor tasks cited on Page 7, and you can proceed directly to Page 10 for further information. You do not need the information below. But if you are dispensing through a single hose or a non-disposable mixer, you need the following information.



Shut Down

Most epoxy resins can be left within a system indefinitely. 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 module. The procedure is called "burping".

Burping is necessary because the base and catalyst components of most thin resins have a much different specific gravity. Like vinegar and oil in salad dressing, one is heavier than the other, and quickly sinks to the bottom: the base component tends to sink beneath the catalyst. When the components hover together within a mixer or manifold fixed to the outlet valves, it is possible within a very few minutes for the base to pond out beneath the catalyst, entering the catalyst outlet valve with costly results as it hardens overnight.

To burp the unit, simply dispense a few ounces of material 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.

Clean-up

The Gusto Purge tank (Page #32) is used to clean hoses, mixers, hose manifolds, valves, and other components exposed to catalyzed resin. Complete steps 1 and 2 below to charge the Gusto Purge tank before starting injection. It is a precaution that allows clean-up in the event the air supply is lost due to compressor failure. With the Gusto Purge tank fully charged with air, there is sufficient energy within the tank to clean up the major components.

1. Vent the tank by rotating the selector valve so that it points away from the adapter block, and towards the bronze filter. Remove the lid and pour about one-half gallon of Acetone or Methyl Ethyl Ketone (MEK) solvent into the tank. Do not use petroleum based solvents such as toluol, xylol, mineral spirits or naptha, as they will destroy the lid seal. Do not fill the tank, as this will reduce the volume of air available for an emergency clean-up.

2. Replace the lid and secure it with its bale. Rotate the selector valve 90 degrees so that it is closed to the inlet and outlet. Connect the air supply and pressurize the tank at the maximum pressure available. Set the tank aside until time to clean up.

or

3. Disconnect the mixer or hose manifold block from the fluid outlet fittings and cap them with the caps secured at the magnetic bracket. Then secure the mixer or manifold block to the adapter block at the Gusto Purge tank. Make certain the fluid valves are closed. Disconnect the air supply from the dispenser, and connect it at the Gusto Purge air inlet. Rotate the selector valve to point to the mixer or hose manifold.

4. Put on goggles and or face shield.

5. Direct the outlet valve into an appropriate waste container able to arrest resin slobber and heavy solvent vapors. Open the valve to allow the air stream to purge most of the resin from the mixer or manifold and line. *Note that the Gusto Purge tank does not use a stem! The air enters and leaves the tank without disturbing the solvent*. Once the air stream is free of slobber, close the fluid outlet valve to allow the compressor to build up the maximum tank pressure available.

6. Assure the maximum air velocity available by using the shortest lines possible between the purge tank and the compressor. With the maximum pressure and volume available, open the fluid outlet valve and quickly shake the Gusto tank to splash small solvent bursts into the air stream. Space the bursts about five seconds apart. If a low viscosity resin is being used, five or six bursts are usually sufficient to clean the mixer and tubing. However, if a thick material must be purged, more bursts will be required. Keep the bursts as small as possible, for large dosages of solvent choke the air stream velocity, reducing the scouring effect. Continue until the exhausted solvent is clear.

It is nearlyimpossible to flush a hose thoroughly clean if the material is thick and sticky. But yet is important to do so, for any resin that remains will harden and break loose in flakes when the hose is flexed. These hard flakes will then lodge in the SSO valve or mixer. To thoroughly clean a hose it is often necessary to remove the valve or mixer, fish a wire through the hose, and then drag a brush segment back and forth through the bore until it is clean.

Ratio Assurance Procedures

WARNING! The CD65 contains moving parts which are by definition wearing parts. Critical components are wearing from the moment you energize the system. 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 will vary with the abrasiveness of the fillers within the product being dispensed, as well as the volume of resin 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 stage procedure.

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

1. Switch the dispenser "off". [This will open the inlet valves, and close the outlet valves.]
2. Energize the transfer system
3. Remove the mixer from the dispenser.
4. Wipe the outlet fittings. Wait two minutes and wipe the fittings again, and then place a paper towel beneath them.
5. Wait at least five minutes, and then observe the towel for any evidence of leakage from the fittings.

6a. If seepage occurred, regardless of how minute, replace the leaking seals.
6b. If no seepage occurred, go to stage II.

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

1. Turn the pressure regulator counterclockwise to the stop.
2. Flip the dispenser switch "on". [This will open the outlet valves and close the inlet valves.]
3. Repeat steps 4 and 5 from **Stage I.**

4a. If seepage occurred, regardless of how minute, replace the leaking seals.
4.b If no seepage has occurred, go to stage III.

Stage III: To determine if the Coco inlet valves are leaking in the direction opposite normal flow.

1. Tightly cap the outlet fittings.
3. De-energize the transfer assemblies.
4. Disconnect the material supply hoses at the dispenser.
5. Turn the dispenser pressure regulator knob clockwise to the maximum pressure available.
6. Wipe the inlet fittings, and place a paper towel beneath them.
7. Wait at least five minutes, and then observe the towel for any evidence of leakage from the fittings.

8a. If seepage occurred, regardless of how minute, replace the leaking seals.
8b. If no seepage occurred, the seals can be expected to deliver another week of satisfactory service in most circum-

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 diameter. 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 assemblies and disconnect the Catalyst (B) supply hose.

2. Remove the right hand and rear screens.

3. Grip the catalyst metering piston, and press it down until it is clear of the underside of the main air cylinder end cap. The material in the metering cylinder will be forced to flow back through the inlet fitting. Position a container to catch this material. If the piston does not go down easily, use a strap wrench to free it, and twist it as it is pressed downward. Do not use a sharp tool to pry the piston from its contact with the air cylinder. Please!

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 tool other than a strap wrench, as the chamber may be damaged by any uneven grasping force.

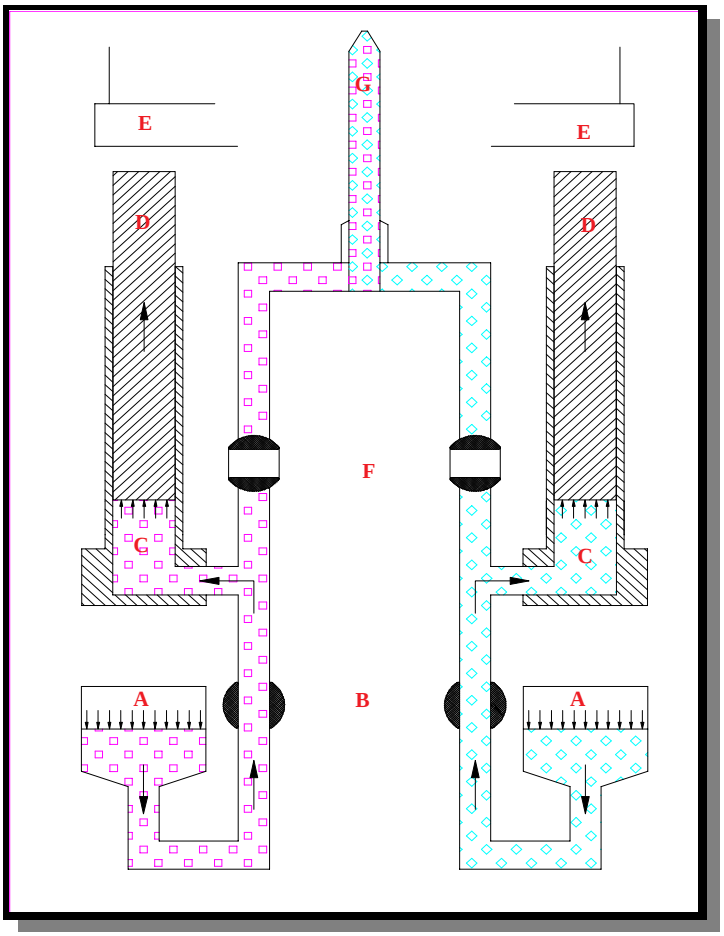
5. Use the seal pick to remove the base manifold o-ring. Clean the pocket thoroughly, and install a new o-ring in the lower groove.

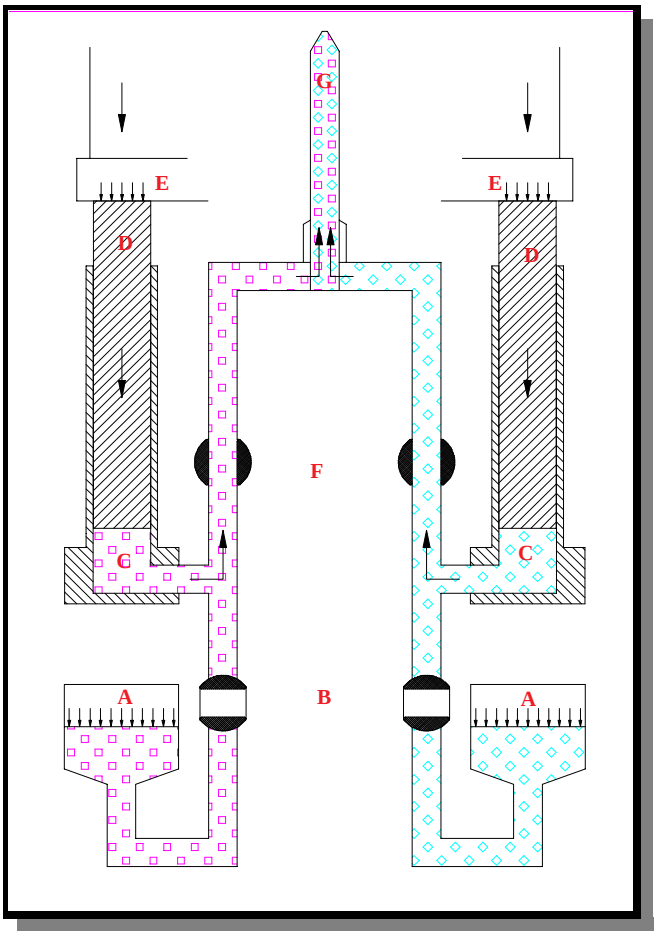
6. Lubricate the threads of the replacement metering asssembly with an anti-sieze compound or silicone lubricant. Thread the assembly into the manifold by turning it clockwise until it is seated. Do not overtighten. As the chamber bottoms out in the manifold you will feel a definite stop. Do not tighten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

THE SYSTEM, AND HOW IT WORKS

The Fluid Circuit

A thorough understanding of the CD65 operation will take the guess work out of trouble shooting, and provide a better appreciation of conditions which may adversley 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**).

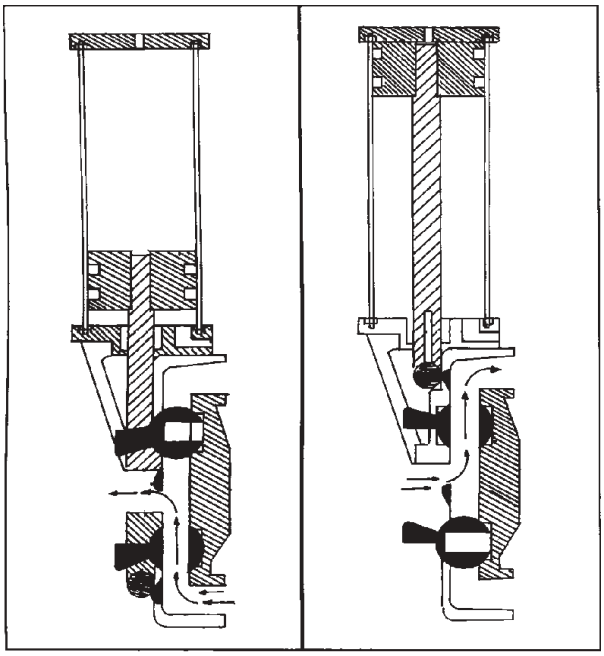
After both metering pistons are fully extended, the inlet valves (**B**) close, and the outlet valves (**F**) open.

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 receeds.

The metering pistons extend under fluid pressure

Coco Valve Module



The proper sequencing of the fluid valves is vital to the performance of the dispenser. If the valves open or close out of sequence, unmetered resin may pass, corrupting the ratio. The Coco module orchestrates the opening and closing of the inlet and outlet valves in precise sequence.

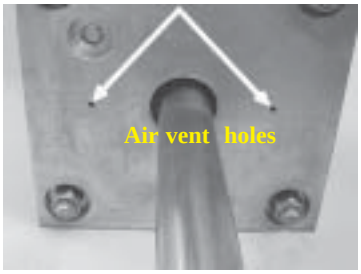
This is how COCO works: The inlet ball valves (A) are linked to a common flipper, and the outlet valves (B) are commonly linked to a second flipper. As a bar (cam pusher) (C) passes across the flippers, they are cammed to rotate 90 degrees, opening or closing their respective valves.

In Frame **A**, the COCO cylinder rod is fully extended, placing the cam pusher bar below the inlet valve flipper. In this position, the outlet valves are closed and the inlet valves are open, allowing the resin components to flow into their metering cylinders from a pressurized supply.

After both metering cylinders have filled, the air cylinder retracts the cam pusher. As the pusher retracts (Frame **B**), it cams the lower flipper 90° to close the inlet valves…and then continues its travel to cam the upper flipper to open the outlet valves.

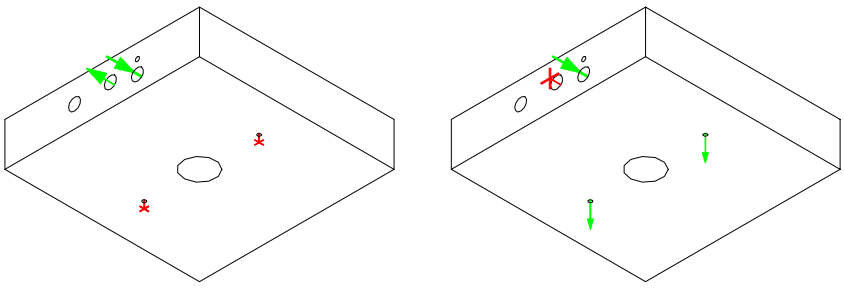
Following completion of the dispense stroke, COCO extends its pusher (Frame **A)** to close the outlet valves, and then continues on to open the inlet valves, allowing the metering cylinders to refill. Note that it is impossible for the inlet or outlet valves to open until after the opposite valves are closed. COCO cannot make a mistake.

The Fill Sensors



Sensors prevent the dispense cycle until both metering cylinders are completely filled. This is important, because if a dispense cycle occurs before both metering cylinders are filled, there will be a shortage of one component, and inadequate cure of the dispensed resin as a result.

The air signal that triggers the system to dispense is routed through a conduit within the main air cylinder end cap. This conduit is intersected by two holes which vent, and thereby erase, the signal if they are not plugged.



The vents are sealed off by the impingement of the ends of both of the metering pistons when fully extended. Once both of the vent holes are sealed, (confirming the arrival of both pistons) air pressure can then build to trigger the dispense cycle.

Urethane pads fixed to the ends of the metering pistons cushion the impact against the air cylinder end cap, and assure a tight seal at the vent holes.

The Pneumatic Control Circuit

The circuit does not need to be thoroughly understood, or understood at all for that matter, in order to operate the dispenser: no more so than there is a need to understand electricity in order to operate a toaster or television. Nevertheless, on page #24 in the Appendix, an air logic diagram is included and explained a bit for those who understand circuitry, or for those more curious than most as to how an air circuit functions.

SERVICING THE SYSTEM

If the CD65 is properly maintained, service will involve little more than replacement of dynamic seals exposed to the material being dispensed. The frequency of seal replacement will depend upon the volume and nature of 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 result in frequent seal replacement. Costly damage to metering cylinders and their pistons may also result. The CD65 is not a sand pump.

Lubrication

Periodic (twice a year) lubrication of the pneumatic components is recommended. To do so, de-energize the system and remove the right-hand -cover. Use a 9/16" open-end wrench to free the twin tube swivel compression fitting (P-093). It is not necessery to disconnect any tubing as the fitting body will swivel on its hex. .

Squeeze a generous dose (1/2 fluid ounce) of Lily Silicone Lube (P-315) into the bulkhead fitting (S-009) from which the compression fitting was removed. Reconnect the fittings. 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 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 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 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:

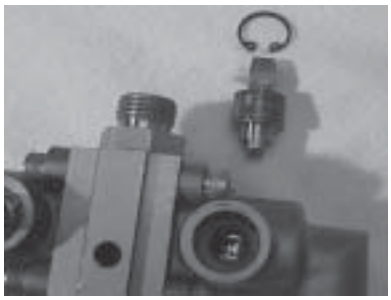
1. Use a 15/16" wrench to loosen the zero clearance fittings at the rigid tube segment (M-617). Remove the tube, taking care not to lose the seals within the fittings.

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

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

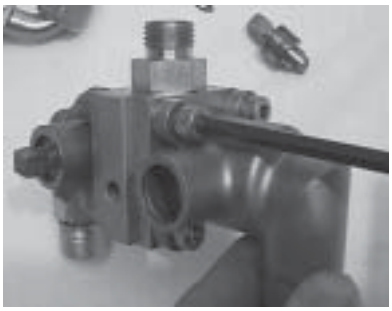
4. Use an 8-15 mm snap ring tool to remove the ring retaining the coupler shaft (M-581).

SERVICING THE SYSTEM cont.



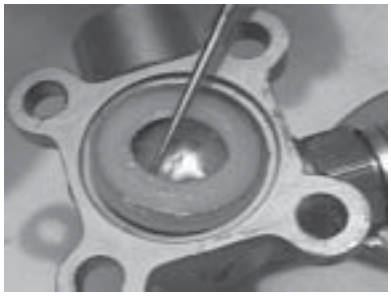
5. Grasp the coupler shaft (M-581) with a cushioned tool, and gently work it and its bushing (M-802) from the cavity.

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

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



9. Use a seal pick to remove the seal (S-332). Take care not to scratch the ball or the wall of the pocket.

10. Shake the ball (M-803) free from the valve body.

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

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.

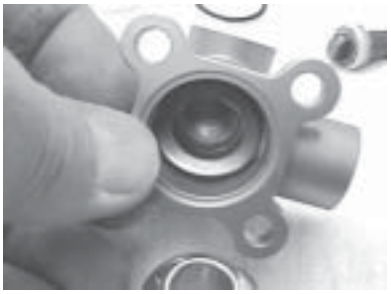
Inspection Carefully inspect each part. If possible, use a magnifier and light. Pay special attention to the balls and the valve sockets. If there is any blemish, replace the part. Flat and spring washers do not need to be replaced unless damaged.

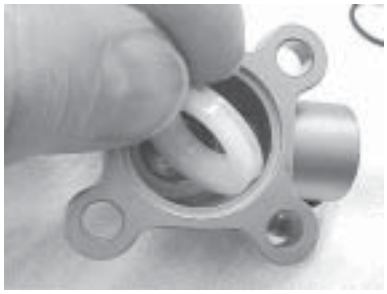
SERVICING THE SYSTEM cont.

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.

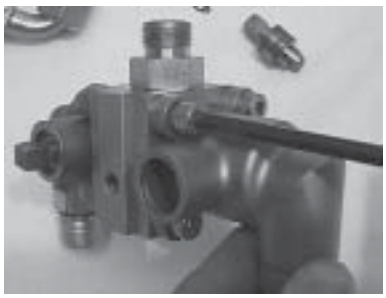
4. Nudge it into place with the fingers, and then press it firmly into the bottom of the pocket with the setting tool (M-806) from the seal kit.

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!!

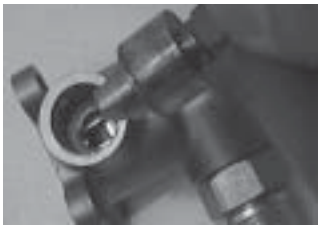
8. Press a new o-ring into the groove around the outside of the spring and washer. Use silicone lube to hold it in place.



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 step 16!**

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 cont.



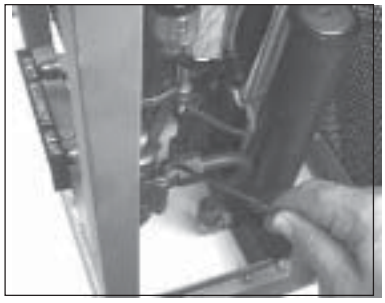
11. Carefully insert the coupler shaft (M-581), bronze bushing (M-802) and washer (P-469) into the housing.

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).



16. Attempt to fit the posts of the Coco Alignment Gage (M-037) into the outlet fittings. If the posts do not fit, the fittings are not aligned. To correct the alignment, nudge the valve bodies with a wood or plastic instrument to bring the fittings into alignment with the Gage. If the valve bodies will not yield, loosen the screws securing them (S-310). With the Gage in place, gradually tighten the screws securing the valve bodies (S-310), alternating diagonally between screws until they are all tight. Repeat the procedure at the outlet fittings.

And finally, conduct a ratio assurance check!

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 cylinder for service, turn the dispenser switch off, disconnect the air supply at the dispenser, rotate the selector valves on the material tanks to vent, remove the screens, and follow the steps below:

1. Grasp the metering piston and press it into its cylinder, thus purging the component back into its tank.

2. Loosen and remove the metering cylinder by rotating it counter-clockwise. 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!

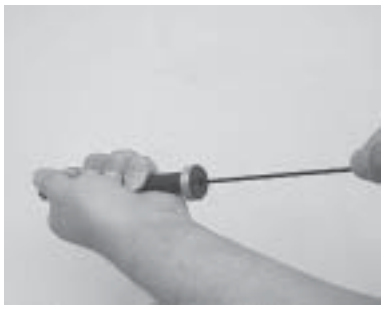
4. Clean the bore and piston thoroughly. Examine the cylinder. If it is scratched or otherwise damaged, it must be replaced.

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 towards the bottom of 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.



9. If the piston cap is larger than the piston diameter, it, and its pad, must be removed to insert the piston back into the cylinder.

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

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

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

13. Replace the screens.

Following seal replacement, slight leakage may be noticed between the piston and the cylinder. This will usually stop after dispensing a few gallons of resin.

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.

Check that right side screen is installed with alignment pin in slot.

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.

Leaking lid seal on pressure vessel preventing sufficient pressure build up. Vent the tank and re-seat or replace the seal.

TROUBLE SHOOTING

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).

Coco module is sluggish, stalls, or binds ..... Material contains too much abrasive. Change materials.

Low air supply pressure.

Misalignment in assembly of valve bodies. See step 16 on 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.

THE SYSTEM, AND HOW IT WORKS cont.

The Control Circuit

The CD65 is entirely pneumatic. It uses compressed air for its control circuit, as well as for energy to dispense. An air circuit is nearly as reliable as an electric circuit if the air supply is clean, dry, and free of lubricants and additives other than those applied by the manufacturer.

The **"Unregulated Air"** symbol is used to indicate the presence of unregulated air. Rather than use lines to show the tubing carrying unregulated air to energize various valves, the symbol avoids a maze of lines more likely to confuse rather than enlighten.

The **"Or"** (A-849) element relays an air signal arriving from either inlet port. If a signal arrives from one port "or" another, it is relayed.

S Port

The **"Stroke Sensor"** (P-182) sends an air signal from its port S whenever there is no pressure in the line in which it is installed. However, if the line is energized, port S is vented.

When the unit is swiched on, an air signal enter port **H** of the lower air cylinder end cap. It passes through the end cap, and emerges at port **O**. However, if either vent port of the sensor is not blocked by the metering pistons, the signal will escape.

Once both vents are blocked, the signal emerging at port **O** will enter port **A-4** of the Twin Valve to shift a signal from port **A-3** to **A-2**. The signal from port A-2 will shift the Coco Cylinder to close the inlet valves and open the outlet valves. At the same time, it will enter port B-4 to Shif a signal from port B-3 to port B-2.

The signal from port B-2 enter port X of the air cylinder lower end cap, pressurizing the cylinder to descend. En route to X, the signal is regulated, and the pressure indicated on the control panel. At the same time, the signal from B-2 passes through the umbilical to energize the start button of the Remote Trigger Assembly (RTA).

The material lines are now pressurized due to the descent of the main air cylinder on the material pistons. The system is poised to dispense, only awaiting the opening of the TSO Twin Shut-off Valve.

When the start button is depressed, the RTA shifts an unregulated air signal to open the TSO valve, allowing the dispense cycle. The dispense cycle will continue until:

√ The shot-sizer switch located on the screen delivers a signal when it reaches its setting.

√

√ The switch is turned off.

√ The main air cylinder completes its descent, or

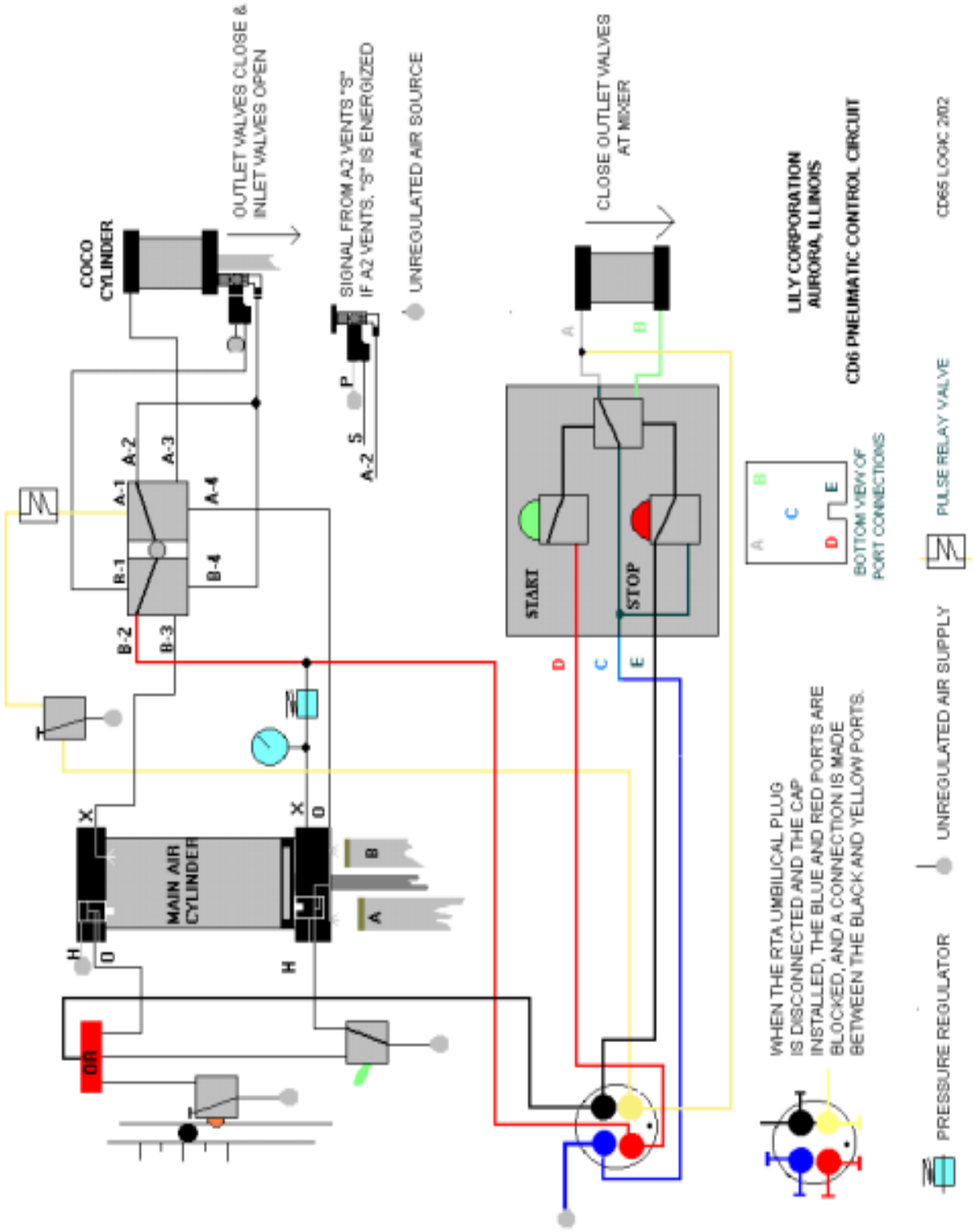
√ The Stop switch on the RTA is pressed.

Signals from the Shot Size switch, the on/off switch, and the main air cylinder all pass through the OR element. From there the signal travels to the RTA where it passes through the open STOP switch to close the outlet valves. The resultant signal from port B of the RTA travels to port A-1 to shift a signal from port A-2 to port A-3. The signal from A-3 closes the outlet material valves and opens the inlet valves.

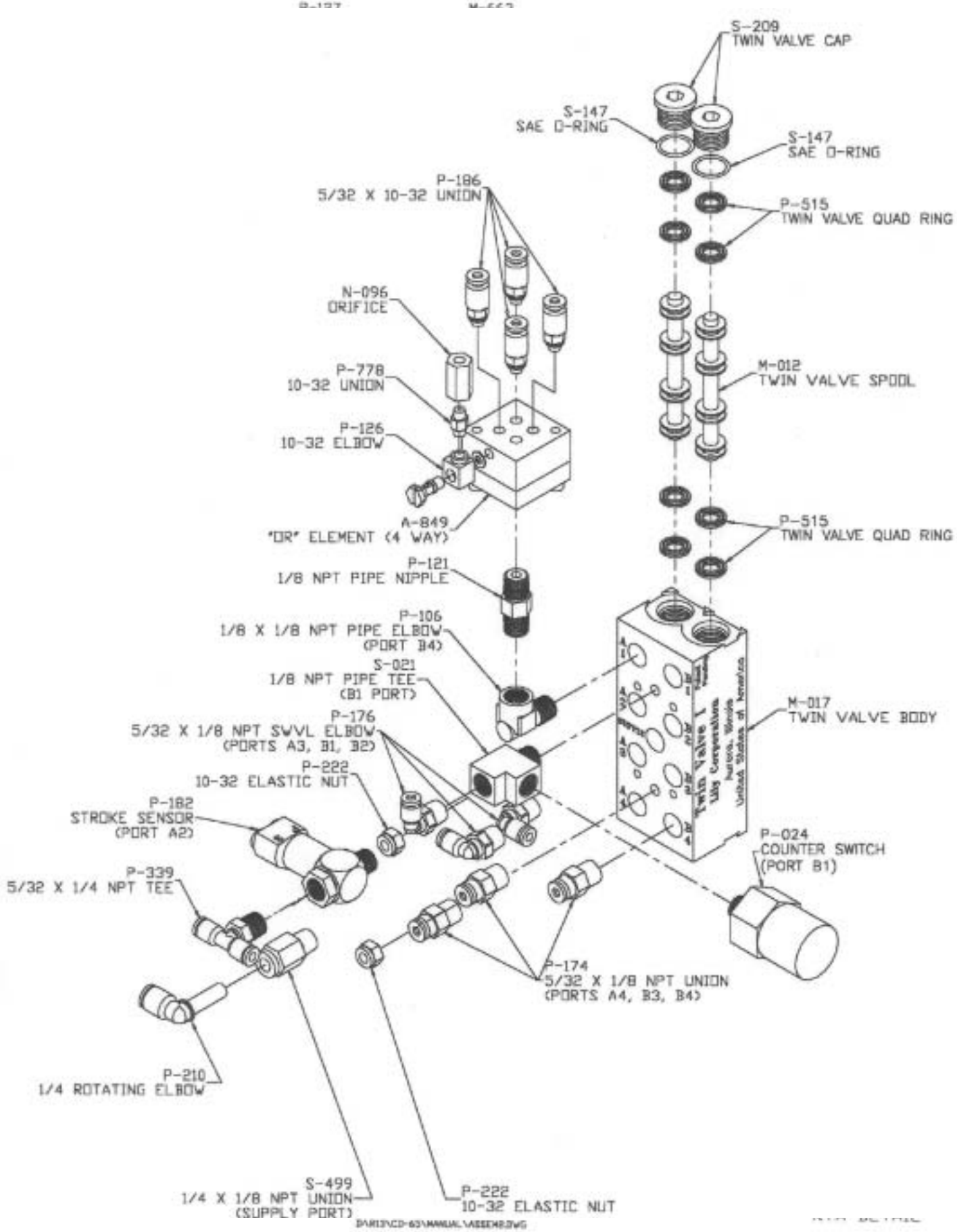
The relaxation of the signal at A-2 due to the shifting to A-3 triggers a signal from port S of the Stroke Sensor. The signal from port S energizes port B-1, shifting a signal from port B-2 to port B-3, elevating the main air cylinder.

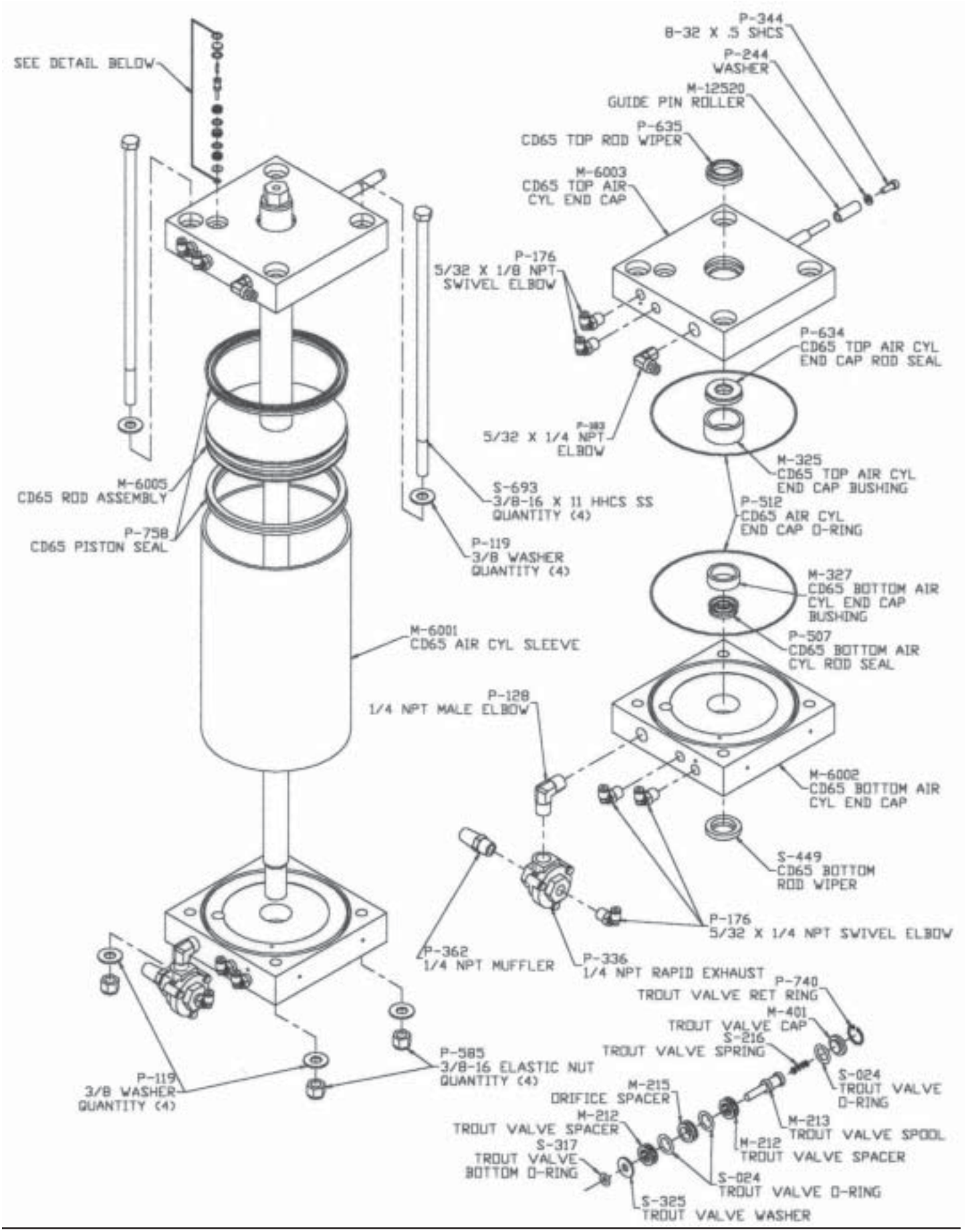
The cycle is repeated.

APPENDIX

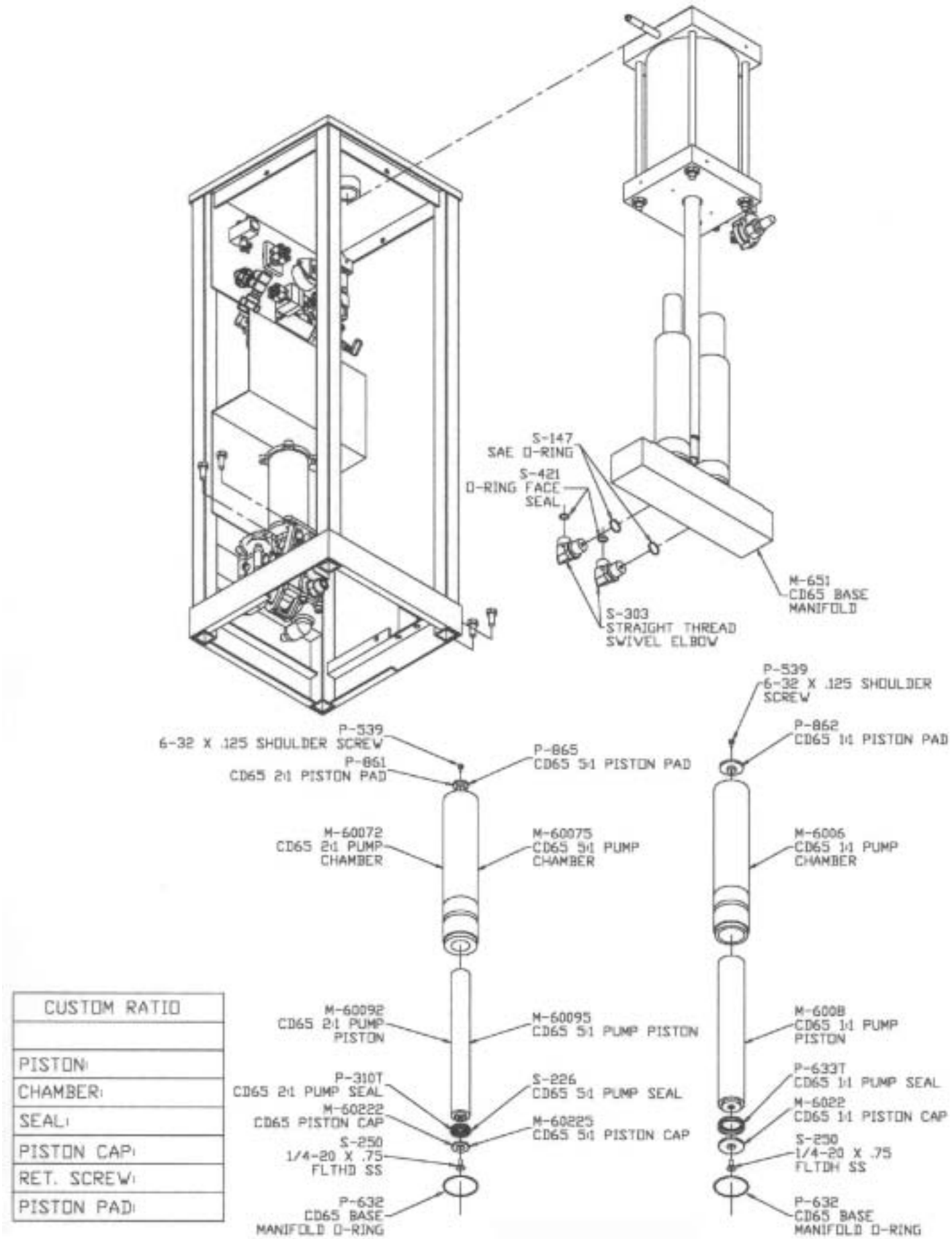

OUTLET VALVES CLOSE &
INLET VALVES OPEN
COCO
CYLINDER
SIGNAL FROM A2 VENTS "S"
IF A2 VENTS, "S" IS ENERGIZED
UNREGULATED AIR SOURCE
CLOSE OUTLET VALVES
AT MIXER
LILY CORPORATION
AURORA, ILLINOIS
CD6 PNEUMATIC CONTROL CIRCUIT
CD65 LOGIC 2002
START
STOP
MAIN AIR
CYLINDER
BOTTOM VIEW OF
PORT CONNECTIONS
PULSE RELAY VALVE
WHEN THE RTA UMBILICAL PLUG
IS DISCONNECTED AND THE CAP
INSTALLED, THE BLUE AND RED PORTS ARE
BLOCKED, AND A CONNECTION IS MADE
BETWEEN THE BLACK AND YELLOW PORTS.
PRESSURE REGULATOR
UNREGULATED AIR SUPPLY

APPENDIX

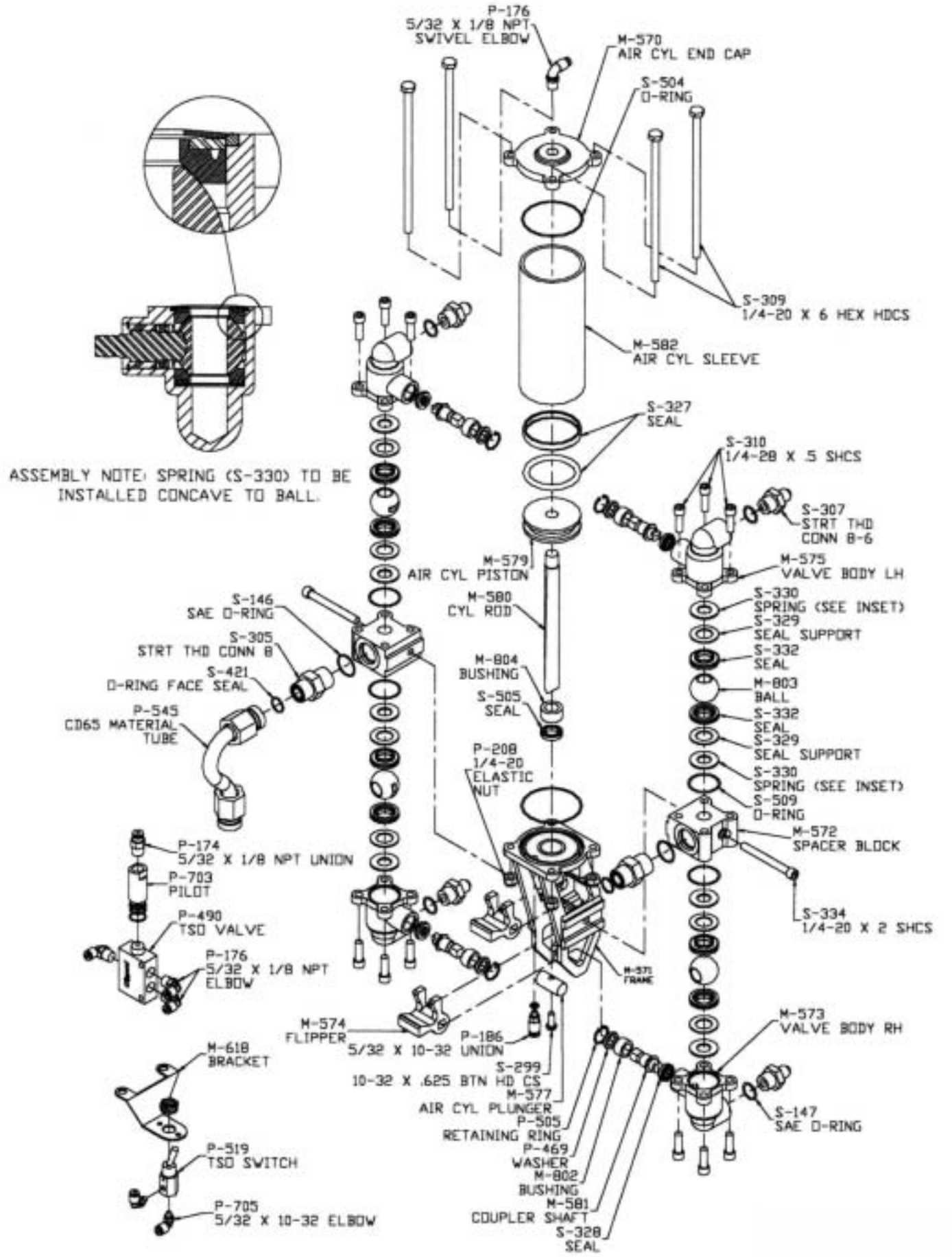

S-209
TWIN VALVE CAP
S-147
SAE O-RING
S-147
SAE O-RING
P-186
5/32 X 10-32 UNION
P-515
TWIN VALVE QUAD RING
N-096
ORIFICE
M-012
TWIN VALVE SPOOL
P-778
10-32 UNION
P-126
10-32 ELBOW
A-849
"OR" ELEMENT (4 WAY)
P-515
TWIN VALVE QUAD RING
P-121
1/8 NPT PIPE NIPPLE
P-106
1/8 X 1/8 NPT PIPE ELBOW
(PORT B4)
S-021
1/8 NPT PIPE TEE
(B1 PORT)
M-017
TWIN VALVE BODY
P-176
5/32 X 1/8 NPT SWVL ELBOW
(PORTS A3, B1, B2)
P-222
10-32 ELASTIC NUT
P-182
STROKE SENSOR
(PORT A2)
P-024
COUNTER SWITCH
(PORT B1)
P-339
5/32 X 1/4 NPT TEE
P-174
5/32 X 1/8 NPT UNION
(PORTS A4, B3, B4)
P-210
1/4 ROTATING ELBOW
S-499
1/4 X 1/8 NPT UNION
(SUPPLY PORT)
P-222
10-32 ELASTIC NUT


SEE DETAIL BELOW
P-344
8-32 X .5 SHCS
P-244
WASHER
M-12520
GUIDE PIN ROLLER
P-635
CD65 TOP ROD WIPER
M-6003
CD65 TOP AIR CYL END CAP
P-176
5/32 X 1/8 NPT SWIVEL ELBOW
P-634
CD65 TOP AIR CYL END CAP ROD SEAL
5/32 X 1/4 NPT ELBOW
M-325
CD65 TOP AIR CYL END CAP BUSHING
P-512
CD65 AIR CYL END CAP O-RING
M-6005
CD65 ROD ASSEMBLY
P-758
CD65 PISTON SEAL
S-693
3/8-16 X 11 HHCS SS
QUANTITY (4)
P-119
3/8 WASHER
QUANTITY (4)
M-327
CD65 BOTTOM AIR CYL END CAP BUSHING
P-507
CD65 BOTTOM AIR CYL ROD SEAL
M-6001
CD65 AIR CYL SLEEVE
P-128
1/4 NPT MALE ELBOW
M-6002
CD65 BOTTOM AIR CYL END CAP
S-449
CD65 BOTTOM ROD WIPER
P-176
5/32 X 1/4 NPT SWIVEL ELBOW
P-362
1/4 NPT MUFFLER
P-336
1/4 NPT RAPID EXHAUST
P-740
TROUT VALVE RET RING
M-401
TROUT VALVE CAP
S-216
TROUT VALVE SPRING
S-024
TROUT VALVE O-RING
M-215
ORIFICE SPACER
M-212
TROUT VALVE SPACER
M-213
TROUT VALVE SPOOL
M-212
TROUT VALVE SPACER
S-317
TROUT VALVE BOTTOM O-RING
S-024
TROUT VALVE O-RING
S-325
TROUT VALVE WASHER
P-585
3/8-16 ELASTIC NUT
QUANTITY (4)
P-119
3/8 WASHER
QUANTITY (4)

APPENDIX


S-147
SAE O-RING
S-421
O-RING FACE SEAL
M-651
CD65 BASE MANIFOLD
S-303
STRAIGHT THREAD SWIVEL ELBOW
P-539
6-32 X .125 SHOULDER SCREW
P-861
CD65 2:1 PISTON PAD
P-865
CD65 5:1 PISTON PAD
M-60072
CD65 2:1 PUMP CHAMBER
M-60075
CD65 5:1 PUMP CHAMBER
M-60092
CD65 2:1 PUMP PISTON
M-60095
CD65 5:1 PUMP PISTON
P-310T
CD65 2:1 PUMP SEAL
S-226
CD65 5:1 PUMP SEAL
M-60222
CD65 PISTON CAP
M-60225
CD65 5:1 PISTON CAP
S-250
1/4-20 X .75 FLTHD SS
P-632
CD65 BASE MANIFOLD O-RING
P-539
6-32 X .125 SHOULDER SCREW
P-862
CD65 1:1 PISTON PAD
M-6006
CD65 1:1 PUMP CHAMBER
M-6008
CD65 1:1 PUMP PISTON
P-633T
CD65 1:1 PUMP SEAL
M-6022
CD65 1:1 PISTON CAP
S-250
1/4-20 X .75 FLTDH SS
P-632
CD65 BASE MANIFOLD O-RING
CUSTOM RATIO
PISTON:
CHAMBER:
SEAL:
PISTON CAP:
RET. SCREW:
PISTON PAD:

APPENDIX


P-176
5/32 X 1/8 NPT
SWIVEL ELBOW
M-570
AIR CYL END CAP
S-504
O-RING
S-309
1/4-20 X 6 HEX HDCS
M-582
AIR CYL SLEEVE
S-327
SEAL
S-310
1/4-28 X .5 SHCS
S-307
STRT THD
CONN 8-6
M-575
VALVE BODY LH
S-330
SPRING (SEE INSET)
S-329
SEAL SUPPORT
S-332
SEAL
M-803
BALL
S-332
SEAL
S-329
SEAL SUPPORT
S-330
SPRING (SEE INSET)
S-509
O-RING
M-572
SPACER BLOCK
S-334
1/4-20 X 2 SHCS
M-573
VALVE BODY RH
S-147
SAE O-RING
M-579
AIR CYL PISTON
M-580
CYL ROD
M-804
BUSHING
S-505
SEAL
P-208
1/4-20
ELASTIC
NUT
S-146
SAE O-RING
S-305
STRT THD CONN 8
S-421
O-RING FACE SEAL
P-545
CD65 MATERIAL
TUBE
P-174
5/32 X 1/8 NPT UNION
P-703
PILOT
P-490
TSO VALVE
P-176
5/32 X 1/8 NPT
ELBOW
M-574
FLIPPER
P-186
5/32 X 10-32 UNION
S-299
10-32 X .625 BTN HD CS
M-577
AIR CYL PLUNGER
P-505
RETAINING RING
P-469
WASHER
M-802
BUSHING
M-581
COUPLER SHAFT
S-328
SEAL
M-618
BRACKET
P-519
TSO SWITCH
P-705
5/32 X 10-32 ELBOW
ASSEMBLY NOTE: SPRING (S-330) TO BE
INSTALLED CONCAVE TO BALL.