

# Lily Corporation

## Model CD75

### 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 and workmanship, and further warrants that, for a period of six 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.**

## WARNING AND SAFETY PRECAUTIONS

The CD75 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 7,500 psi. Maiming injuries can be incurred. Do not energize the system unless all covers are in place, and fingers, tools, and other objects are outside of the frame of the machine.

Beware of heating elements. The element temperatures are over **450 degrees Fahrenheit**. Serious burns can be inflicted.

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 Model CD75. Do not attempt to operate this system until thoroughly familiar with its contents. Phone Lily Corporation for clarifications or additional information.

*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.

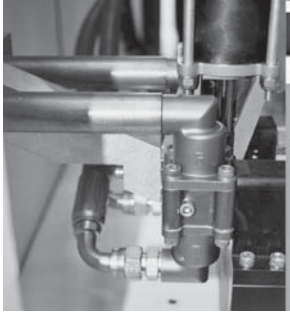
# THE RESIN SUPPLY

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## Material

The CD75 is not a sand pump. If the resin contains abrasive fillers, seal wear will be accelerated and machined surfaces will be damaged. Products with a PH of greater than 10 or less than 1 may require modification of certain dispenser components. If in doubt as to the suitability of a product, send a sample to Lily Technical Service for appraisal.

## Fluid Connections



Some fluid may drip from the fittings when the caps are removed following purchase or factory service. It is a harmless product used to test the equipment. There are four fluid fittings. The lower fittings are inlet ports, and the upper fittings are outlet ports. They are marked A (Base) and B (Catalyst). The lower inlet connections are 1/2" JIC. JIC fittings usually require a high torque for initial tightening, and thereafter, a snug fit will usually seal.



The outlet fittings are also JIC, fixed externally on the two extensions. There is a flat on the extension to hold it from rotating when disconnecting the fitting or material hose.

## Delivery

Both resin components must enter the fluid inlet connections under a pressure of 80 to 2,500 psi, depending upon the viscosity of the material. The thicker and stickier the product, the higher the pressure required to move it into the metering cylinders. Pumps are necessary to deliver most products, although pressurized vessels suffice if the demand is not high and the material is thin. It does not matter if one component enters more quickly or at a higher pressure than the other.

The fluid valves are rated at 3,500 psi. Incoming fluid pressure must not exceed this and should not approach it unless absolutely necessary. The use of pressures in excess of 1,500 psi can usually be avoided by warming the material.

# THE AIR SUPPLY

## Requirements

The volume of resin delivered is determined by the air pressure. An inadequate air supply will result in sluggish delivery of material. An 8 hp (17 cfm at 120 psi) compressor is the minimum requirement for the operation of the CD75 system. Although the unit may operate at much lower pressures, the inlet air pressure should be a minimum of 100 psi. Pressures of up to 150 psi can be used. The higher the pressure, the higher the production.

## Quality

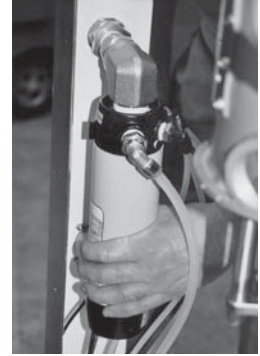
The CD75 is not a jackhammer. Although many additives are beneficial to such air tools, most will damage the seals in the CD75 control circuit. Never allow products such as WD-40 to enter the air supply. The periodic lubrication of the pneumatic components is discussed on page 12.

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 the elements when dirty.

## The Filter

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

Moisture droplets in the air supply will scour lubrication from pneumatic control valve components. If the humidity is high, and the air is hot, extraordinary measures may be needed to remove the moisture. Large volume tanks (30 gallons or better) and moisture separators help.



Because “automatic” moisture separators do not automatically dump accumulated moisture unless the air supply is vented, it is advisable to manually vent the air supply when the humidity is high. This is done by grasping the nylon drain tube and pressing it into its connection.

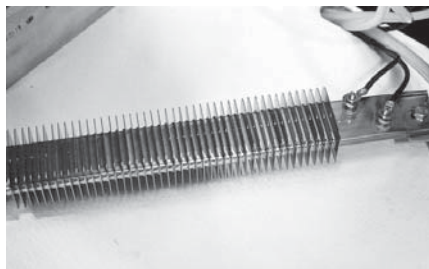
The filter element should be replaced annually, or after 6,000 hours of operation. To do so, grasp the body of the filter and rotate it counter clockwise to unlock it from the cap. Then work it free.

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

## HEATING

### Thermostat and Elements

Two electric heating elements are located on the floor within the cabinet. A thermocoupling is positioned between them. Because heat rises, the coupling will sense the coolest temperature within the cabinet. The temperature at the ceiling may be much warmer than that at the thermostat on the floor. But because the highest thermostat setting possible is 100° Fahrenheit, the ceiling temperature is not likely to exceed a safe limit. Nevertheless, use the thermometer on the front of the cabinet to monitor the interior temperature.



The heating element surfaces are **HOT**, reaching temperatures of 500° Fahrenheit. The electrical terminals are exposed. Severe shock and burns can result if the elements are touched. Never approach these elements unless the electrical source is disconnected and the elements have cooled for at least fifteen minutes.

### Insulation

The interior surfaces of the cabinet are coated with a ceramic to reflect and contain the heat. Although it is a durable coating, it can be raked from a surface. If the coating is abraded, it can be touched up to avoid heat loss.

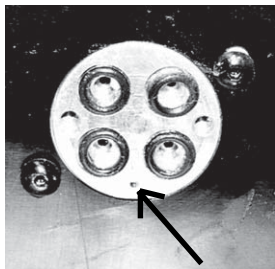
# THE REMOTE TRIGGER ASSEMBLY (RTA)

## Remote Trigger Assembly

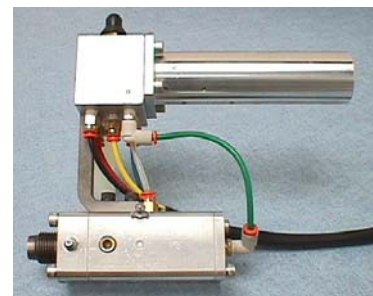
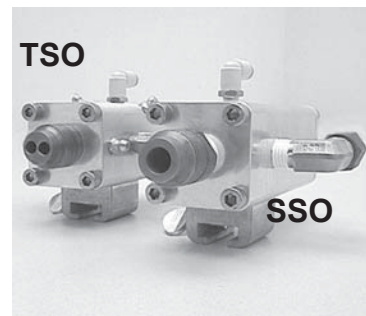
The Remote Trigger Assembly (RTA) controls the material outlet valve(s). It is used with a TSO (Twin Shut Off) or SSO (Single Shut Off) Control Valve. The SSO valve is used with a single material dispense hose and the TSO is used with twin hoses.

The RTA consists of a handle and two switches. The left switch opens the material valves and the right switch closes the valves. When the left switch is used, the flow will continue until the system finishes its dispense cycle unless the right hand switch is used to abort the cycle. When the right switch is used to abort a cycle, the system will reset the dispenser for a full cycle.

The RTA and the outlet valve can be mounted together as shown , or by means of a stem that allows the operator to remain erect when filling sockets in paving for example.



An umbilical cord shuttles pneumatic signals between the trigger and the dispenser. When connecting the umbilical at the dispenser, align its plug so that the indexing holes in the plug and socket are aligned.



When using twin lines, the components are not joined until within a disposable static mixer. SSO dispensing requires the use of a Gusto purge tank for cleaning.

## OPERATION

### To Begin With

For cool weather operation, set the thermostat temperature and add material to the hoppers at least four hours before use.

Set all three pressure regulators to zero. (Counterclockwise to the stop.)

If the cycle counter is to be used, press the bar below the window to reset it to zero.

Purge the air supply hose of water or other contaminants and then make the connection.

Don protective gear as recommended by the resin supplier.

Install the mixer, manifold, or hoses at the outlet fittings.

Increase the air pressure to the two transfer pumps until they cycle, and then increase the pressure by 20 psi.

## Dispensing

Switch the dispenser on. There will be an audible mechanical shifting as the Coco module shifts to close the inlet valves and open the outlet valves. Open the outlet valve and slowly increase the pressure at the cabinet regulator until material flows from the outlet.

If a single line is being used with a SSO valve, priming of the hose requires the left switch on the RTA to be held down until material flows from the valve after a few cycles. The hose should be primed before installing shot-sizing spacers.

Then close the valve and slowly increase the pressure to the maximum while closely monitoring all fluid fittings for leakage.

Following the high pressure check, reduce the pressure for the application at hand. The dispense pressure may be altered at any time. Once a setting is selected, the unit will continue to dispense at that pressure unless reset.

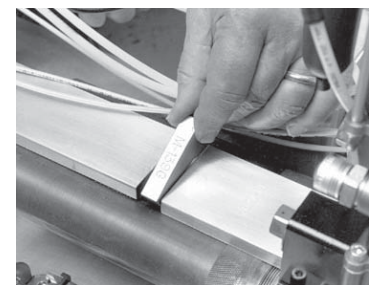
*Note: The dispenser pressure gauge will only register a reading during a dispense cycle. This is because it reads the pressure to the main air cylinder on its dispense stroke. It is not that of the resin.*

Following each dispense cycle, there will be a slight pause while the metering cylinders refill. To minimize this delay, increase the pressure of the base resin delivery (presuming the base is the thickest component) to the maximum pressure available. Adjust the catalyst pressure so that its metering pistons extends at the same rate as that of the base resin. This can be observed by opening the side panel.

## Shot Sizing

This feature allows you to set a dosage that can be repeated. The dosage is set by inserting, or removing, spacer blocks that limit the distance the metering pistons can be driven into their respective chambers.

A master block contains a sensor valve that returns the system. Spacer blocks are inserted to nudge the master block closer to the air cylinder in order to shorten its travel. This shortens the travel of the metering pistons as well, thereby reducing the volume of resin. The larger the spacers, the shorter the dosage. A brief period of trial and error will enable you to arrive at the ideal dosage. For the maximum volume, do not install any spacers.



To adjust the spacers, turn the switch off to fully return the main air cylinder and **disconnect the air supply**. Then, remove the side panel to adjust the spacer deck. Finally, close the panel, reconnect the air, turn the switch back on, and cycle the unit to appraise the adjusted dosage.

## Clean up

Unless the components are merged into a single line, there is no cleanup required. Simply discard the disposable mixer at the end of the day. This is because the resin components are not joined until within the disposable mixer. Grease the threads of the mixer mounting nut when installing a new nozzle. The grease assures easy removal of the nut because it prevents the resin from bonding to the threads.



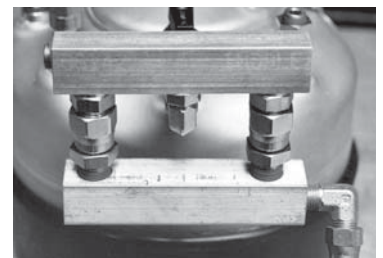
But if the components are merged into a single line, it is necessary to clean the hose, SSO valve, and manifold block. If twin lines are being used, continue on the next page. If a single line is being used, continue below.

### **Single Line Clean Up**

A purge tank is provided for cleaning of the dispense line and outlet valve. Charge the tank with a non-petroleum base solvent such as Acetone and pressurize the tank. The volume of solvent required for cleaning will vary, depending upon the length of hose and the product. Take the following steps:

Reduce the dispense pressure to zero.

- Press the start button on the RTA trigger assembly. This will open the valve and relieve the pressure within the hose.
- Disconnect the JIC outlet hose fittings to free the manifold block.
- Attach the block to the mating fittings on the purge tank.
- Direct the SSO nozzle into a suitable container to arrest bursts of resin, solvent, and vapors. Personnel should wear appropriate skin and eye protection.
- Pressurize the purge tank and rotate its directional valve to point to the block. Resin will flow from the outlet valve, followed by air. No solvent will flow because the stem of the tank is plugged. The air enters and leaves the tank without disturbing the solvent.
- Once the air is free of slobber, shake the vessel to splash bursts of solvent into the air outlet fitting. This will introduce solvent bursts to scour the hose clean. Stretch the hose out and move it about as the solvent bursts are introduced. To clean the interior of the SSO valve, trigger it on and off under the air/solvent flow.
- And finally, Insert grease at the SSO 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.



## Ratio Assurance Procedures

**WARNING!** The CD135 contains moving parts - by definition, wearing parts. Therefore, critical components are wearing from the moment the system is energized. It is absolutely essential that this wear be anticipated and monitored. Operating personnel must become familiar with the following procedure for monitoring the wear of metering seals. If monitoring does not become routine, an improperly proportioned product will result.

A check once each week of operation is usually sufficient to detect seal wear before it becomes significant. The frequency required will vary with the abrasiveness of the product being dispensed, as well as the volume of resin dispensed. But if the application is especially critical, monitoring should be more intense. The ratio check is a three stage procedure.

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

1. Switch the dispenser "off". (This will open the inlet valves, and close the outlet valves.)
2. Disconnect the outlet hoses at the dispenser.
3. Place a pan beneath the outlet fittings and increase both transfer pump pressures to the maximum.
4. Wait five minutes. If there is a continuous drool, no matter how slight, replace the Coco valve seals for that component.
5. If there is no seepage, continue below.

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

1. Reduce the dispenser pressure to zero.
2. Switch the dispenser on. This will open the outlet valves and close the inlet valves. There will be a short burst of each component from the outlet fittings.
4. Wait five minutes. If there is a continuous drool, no matter how slight, replace the Coco valve seals for that component.
5. If there is no seepage the Coco seals are still tight.

Following a seal check, it is usually safe to presume the seals will provide adequate service for at least another week unless the product being dispensed is abrasive, or if the application is critical. Then, it is wise to take the precaution of a ratio check daily.

**Caution:** The above procedure is the only one that assures ratio accuracy. Random volumetric comparisons taken at low pressures or high flow rates do not reveal the condition of the seals. Only an extended and significant fluid pressure can accurately reflect their condition.



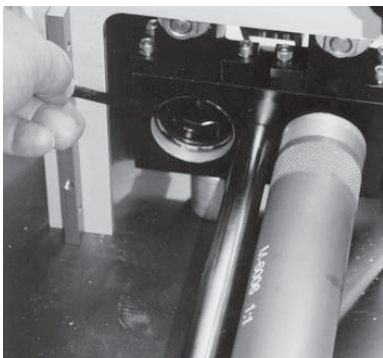
## Changing Ratio

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, at any other ratio, the catalyst metering piston will be of a lesser diameter. Ratio is changed therefore by exchanging one catalyst metering assembly for another.

The metering assembly consists of the metering cylinder, metering piston, seal, and seal support. Metering assemblies for alternate ratios are available from Lily.

To change the ratio:

1. Switch the dispenser on.
2. Reduce the transfer pump pressures to zero.
3. Dispense a full 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.
4. Disconnect the air supply and then remove the Metering Assembly Access Door. For better access, remove the side panel. See page #13 for panel removal instructions.
5. Use a strap wrench to rotate 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 lest the Metering Cylinder be damaged by the uneven grasp.



6. Use the seal pick (From the Seal Kit) to remove the base manifold o-ring from the bottom of the cylinder socket. Clean the socket thoroughly, lubricate a new o-ring (S-153), and install it in the groove behind the threads.

7. Lubricate the threads of the replacement metering assembly with an anti-seize compound or silicone lubricant. Carefully thread the assembly clockwise into the manifold until it is seated. Do not over-tighten! When the chamber bottoms out in the manifold you will feel a definite stop. If in doubt, compare the thread consumption with the

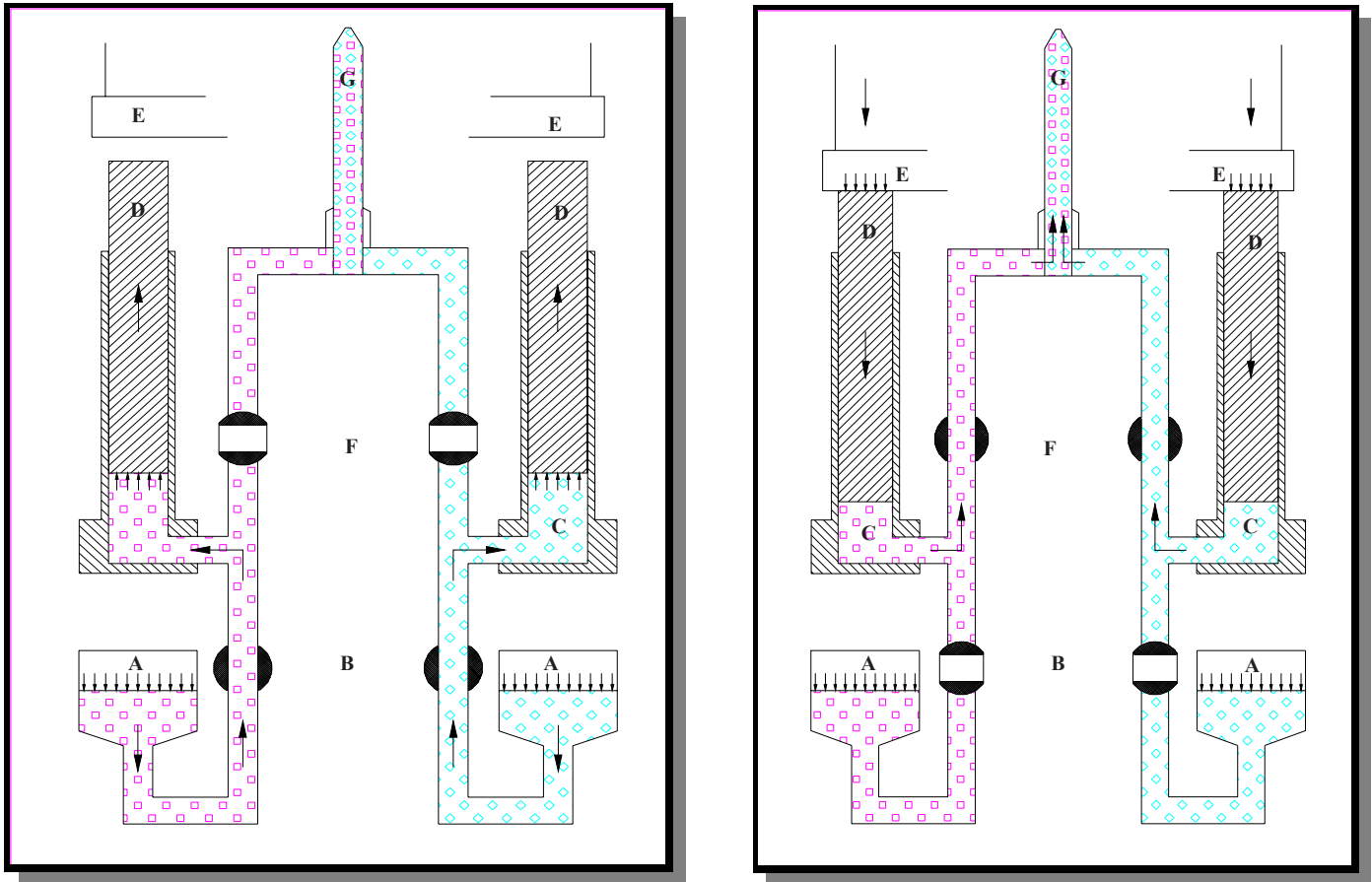
base resin cylinder. They should be exactly the same. Do not attempt to tighten beyond the firm stop.

8. Replace the access door.

# THE SYSTEM, AND HOW IT WORKS

## The Fluid Circuit

A thorough understanding of the CD75 operation will take the guess work out of trouble shooting, and provide a better appreciation of conditions which may adversely affect its performance.



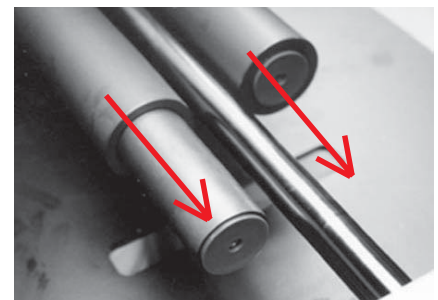
The resin components are pressurized within vessels (A) or by pumps. Pressurized, the components flow through open inlet valves (B) to enter their respective metering cylinders (C).

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 at the urging of the metering pistons (D) under pressure from the main air cylinder (E).

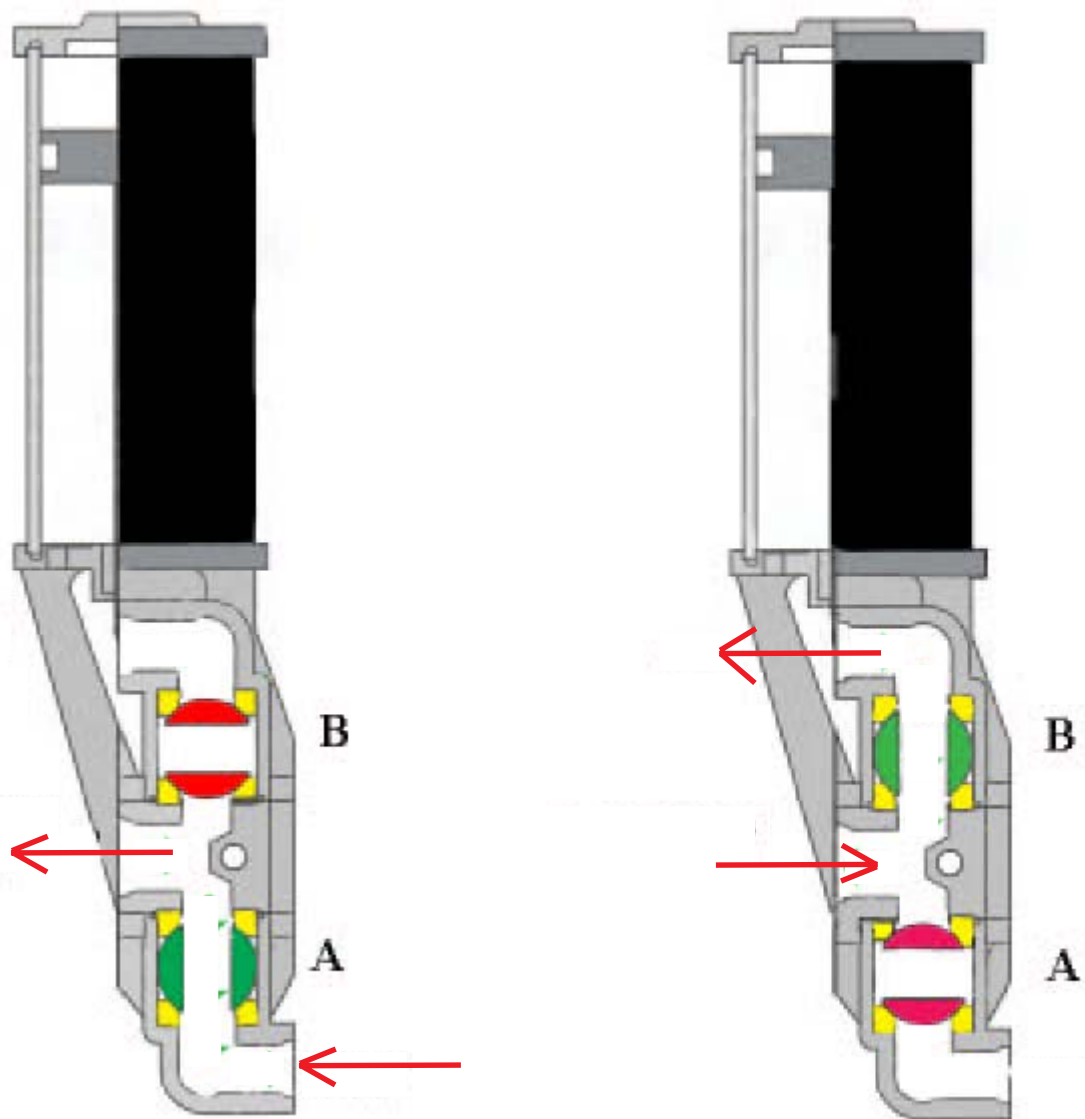
The components merge at a mixer (G). When the dispense stroke is completed, the outlet valves (F) close, the inlet valves (B) open to allow the metering cylinders to refill, as the main air cylinder recedes.



The metering pistons extend under fluid pressure

# THE SYSTEM, AND HOW IT WORKS

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## Coco Valve Module

Proper sequencing of the fluid valves is vital to the performance of a dispenser. If the valves open or close out of sequence, unmetered resin will 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 base and catalyst inlet ball valves (A) are linked to a common flipper, and the outlet valves (B) are commonly linked to a second flipper. A reciprocating rod cams the valves open and closed in sequence.

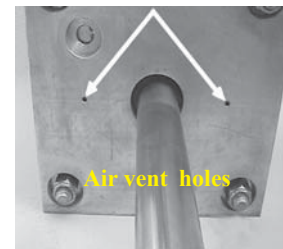
To begin, the valves are positioned as shown in the left frame. The resin enters the lower entry port, passing through the open ball valve to fill the metering cylinder. When both metering cylinders are filled, the rod retracts to first close the inlet valves, and continue to open the outlet valves as shown in the frame to the right. The linkage makes it virtually impossible for the outlet valves to open until the inlet valves have been closed.

With the valves positioned as shown in the right frame, the resin will flow from the metering cylinders to the exit ports. The sequence repeats itself.

## The Pneumatic Control Circuit

With the exception of the fill sensors, the Pneumatic Control 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, 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. It appears on pages 33 and 34.

Two sensors in the bottom of the main air cylinder end cap are integral parts of the pneumatic circuit. They sense the filling of the material cylinders, preventing the dispenser from cycling until both metering cylinders are filled. This is important, because if a cycle occurs prematurely, the ratio will be corrupted due to a shortage of one component.



To prevent cycling before both cylinders are filled, the signal that triggers the system 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 can only be sealed off by the impingement of the ends of both of the metering pistons when they are fully extended. Urethane pads fixed to the ends of the metering pistons assure a tight seal. Once both of the vent holes are sealed, confirming the arrival of both pistons, air pressure builds to trigger the dispense cycle.

## SERVICING THE SYSTEM

Service of the CD135 involves little more than replacement of seals exposed to resin. The frequency of replacement depends upon the volume and nature of the material dispensed. Thousands of gallons of nonabrasive resin with good lubricity may be dispensed with little, if any, service; while the use of an abrasive material is likely to result in frequent seal replacement. Costly damage to metering cylinders and pistons may also result. Remember, the CD75 is not a sand pump.

### Lubrication



Monthly lubrication of the transfer pumps and pneumatic circuit is recommended. To lubricate the transfer pumps, shift the slide valve to de-energize the system and then open the control panel. Disconnect the two nylon tubes that enter the top of the pressure regulators and squirt twenty to thirty drops of a high quality SAE #10 non-detergent oil into each tube.

To lubricate the pneumatic circuit, remove the cabinet cover and left side panel. Disconnect the two black tubes at the air filter and then squeeze a 1" stream of Lily silicone lube into each tube. No

other lubrication is needed. **Never put WD-40 or similar anti-seize products in the air circuit.**

### The Coco Module

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

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 a Coco module, refer to the exploded parts view on page #29 and the steps that follow.

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## The Control Circuit

The CD75 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 supplied by the manufacturer.

To understand an air circuit, it is necessary to understand the symbols used:

The “**Unregulated Air**” symbol indicates 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**” element relays an air signal arriving from either inlet port. If a signal arrives from one port “or” another, it is relayed.

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 switched on, an air signal enters 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 is not blocked by an extended metering piston, 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 Shift 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:

1. The shot-sizer switch located on the screen delivers a signal when it reaches its setting.
2. The switch is turned off.
3. The main air cylinder completes its descent, or
4. 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.

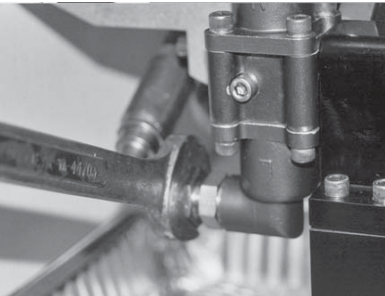
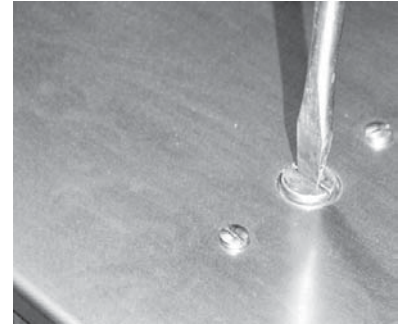
# SERVICING THE SYSTEM

## Disassembly of the Coco Module



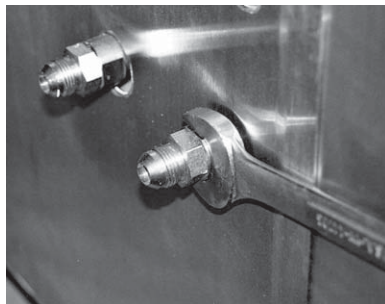
1. Reduce the dispense pressure to zero and switch the dispenser off. This will open the inlet fluid valves.

2. Turn the four lid locks counterclockwise to free the lid, loosen the panel retaining screws, and lift the side panel from the side to be serviced.



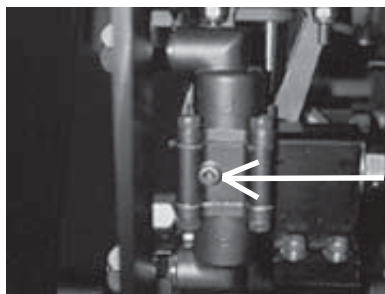
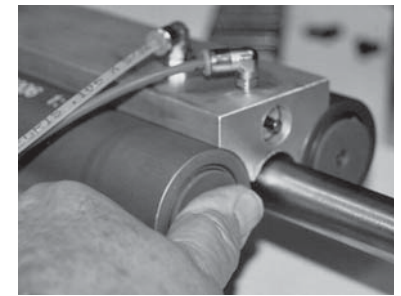
3. Place a pan beneath the inlet hose fitting and disconnect it.

4. Use an Allen wrench to loosen the set screw in the top of the pipe, relaxing the grip on the pipe extension so that it can rotate.



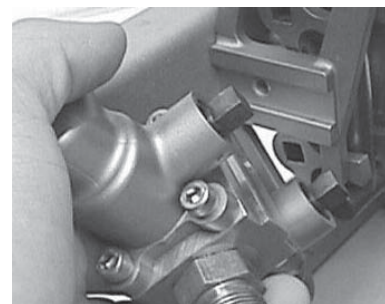
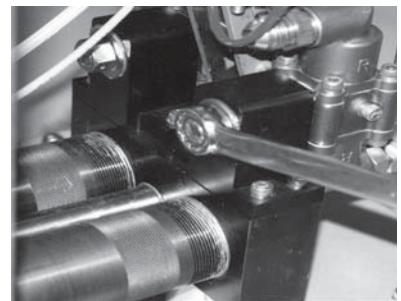
5. Use a 7/8 in. wrench on the pipe extension flats to unscrew the extension from the Coco module.

6. Grasp the metering piston and press it back into the cylinder. This will purge the material into the pan.



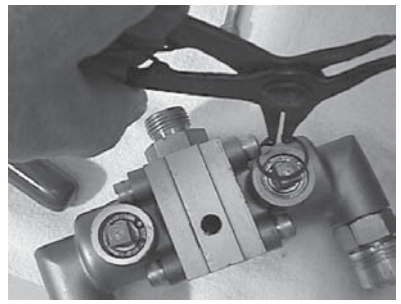
9. Remove the bolt (S-334) securing the spacer block to the frame module (M-571).

10. Loosen the Banjo Bolt until it has disengaged the Coco spacer block.



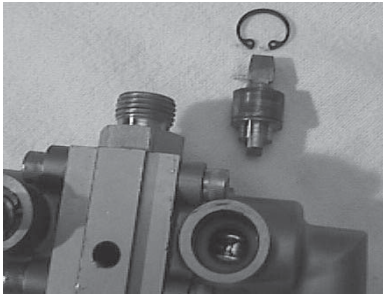
11. Work the assembly loose from the manifold. If is not free, use a plastic, wood, or rubber instrument to urge the module loose.

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



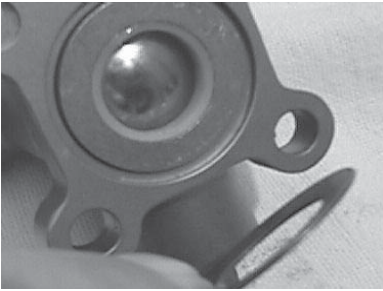
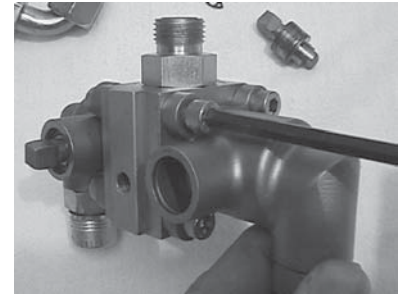
# SERVICING THE SYSTEM

## Disassembly of the Coco Module



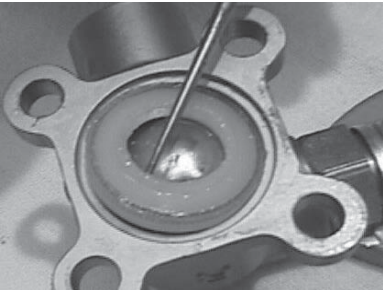
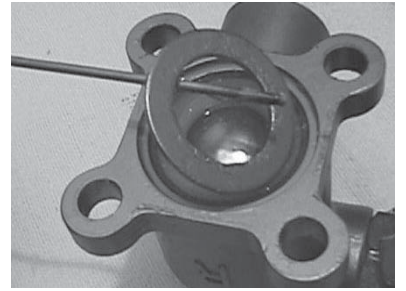
5. Grasp the coupler shaft (M-581) with a cushioned tool, and gently work it and its bushing (M-802) from the cavity.

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.



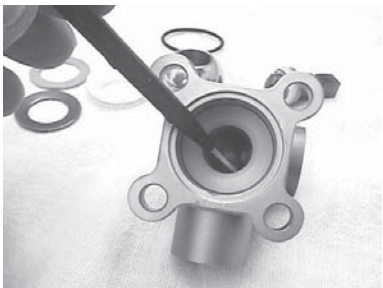
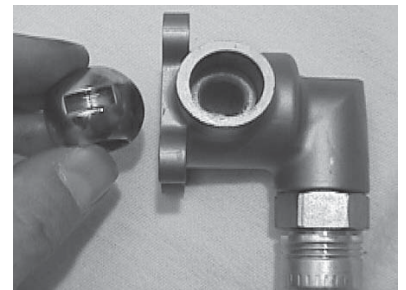
7. Remove the O-Ring (S-509) and the seal spring (S-330) (concave washer).

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.



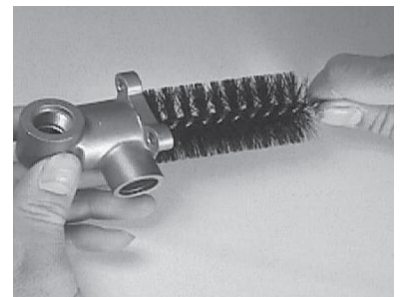
11. Using the seal pick, gently urge the bottom seal from its seat. Take care not to scratch the housing.

12. Lift the lower washer and spring from the body. Take care not to scratch the housing.



**Cleaning** Clean the components thoroughly, but avoid steel bristles or instruments likely to scratch or gouge. Brass or nylon bristles work well. Most solvents and cleaning agents can be used without damage to the 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.

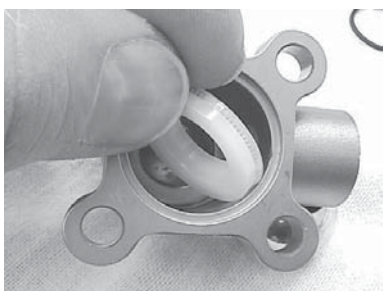
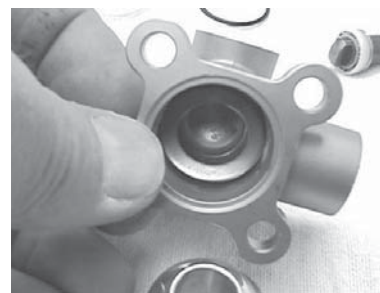


## Assembly of the Coco Module



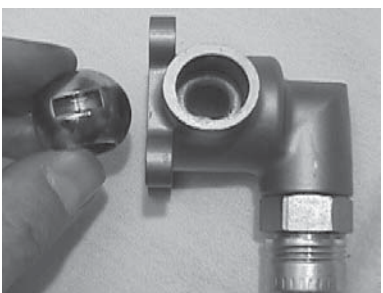
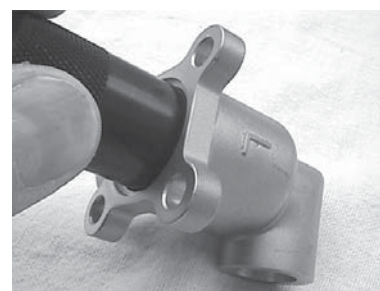
1. Fit the seal spring (S-330) into the pocket with its concave side toward the ball.

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



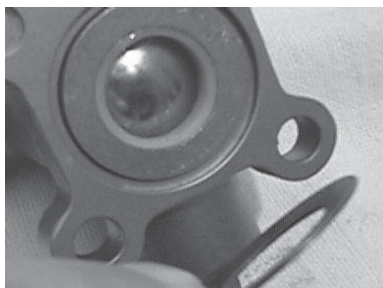
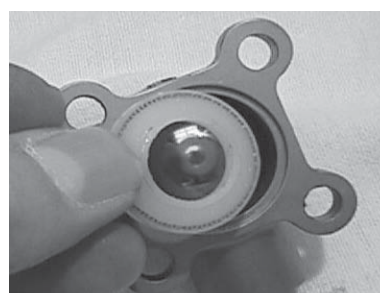
3. Insert the seal perpendicular to the bore until it is within the pocket. Then, twist it flat so that the spring side of the seal is facing down.

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.



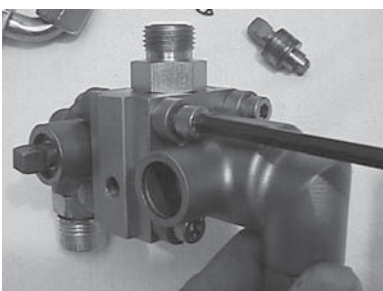
5. Slide the ball into the pocket with its detent (slot) open to the coupler pocket. Use the tongue of the coupler (M-581) to align the ball detent.

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. Fit a new o-ring into the groove around the washers. Apply a dollop of silicone lube in the groove to hold the seal in place.



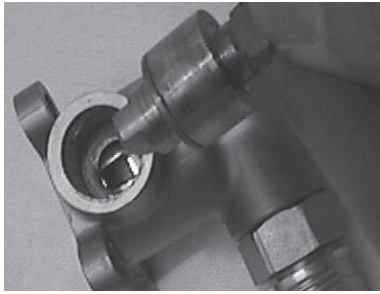
9. Attach the valve bodies to the center block. Take care not to distort the o ring seal. Snug, but do not tighten, the bolts.

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.



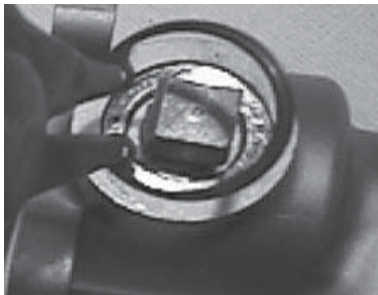
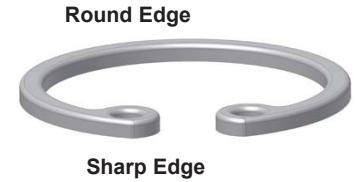


## Assembly of the Coco Module



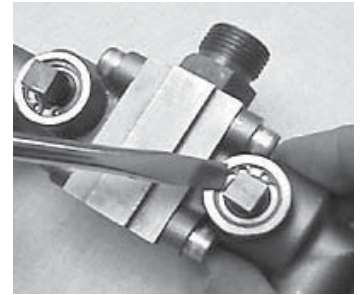
11. Carefully insert the coupler shaft (M-581), bronze bushing (M-802) and washer (P-469) into the housing.

Before installing the Retaining Ring (P-505) note that one edge of the ring is sharp and the other round.

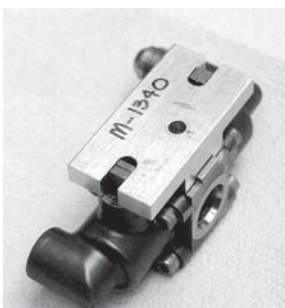


Install the retaining ring with the round edge inward, toward the ball. This orientation is important.

Nudge the ring to make certain it is seated with the groove around its entire circumference. Round edge of the ring toward the ball!

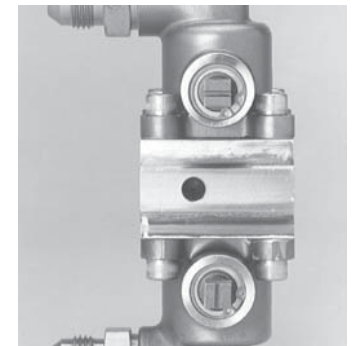


Orient the valves so that the inlet (lower) valve is open and the outlet (upper) valve is closed when the Coco air cylinder rod (M-580) is fully extended. The valves are opened or closed by grasping the square end of the coupler shaft (M-581) with a cushioned tool and turning it 90 degrees. Slots in the stems indicate the valve positions. If the slot is perpendicular to the flow the valve is closed. If the slot is in line with the flow, the valve is open.



The Coco valve bodies must be precisely aligned with the center block before tightening the 8 bolts. A special fixture (M-1340) holds the assembly while the bolts are tightened. Make sure the bolts are loose before beginning the following procedure.

Align the coupler shafts with each other. Use the forks of the fixture to tweak the stem shafts until both forks are seated on the shafts.



Then turn the fixture over and work its spline into the groove of the center block. Bolt the fixture with to the center block and then tighten the 8 bolts.

Resecure the valve assembly to its frame with bolt S-334.

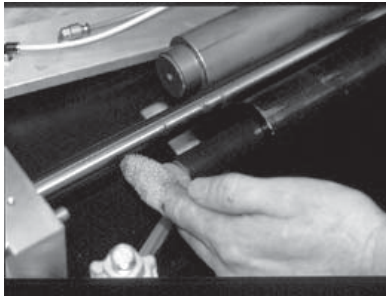


**And finally, conduct a ratio assurance check!**

## The Metering Cylinders

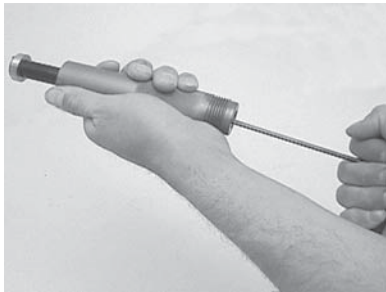
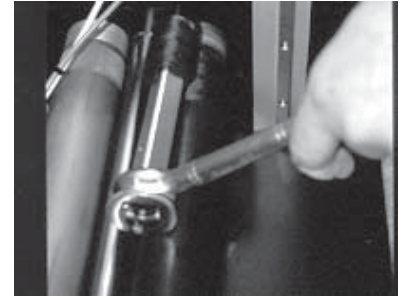
The frequency of service will depend upon the abrasive content of the material being dispensed and, to some degree, the abrasive atmosphere common to many construction sites. The need for metering assembly service is recognized by leakage between the metering piston and its cylinder, sluggish extension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

To remove a metering cylinder for service, follow steps 1 through 6 on page 9, and then continue with the steps below:



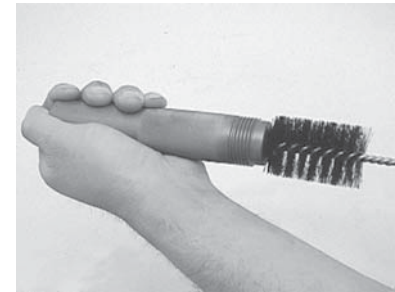
1. Grasp the metering piston and press it into its cylinder, purging the component back through the inlet fittings.

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



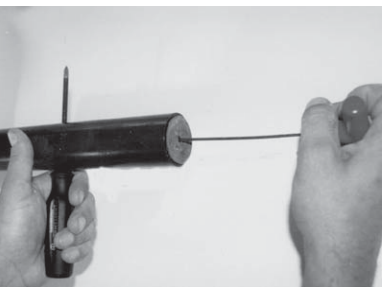
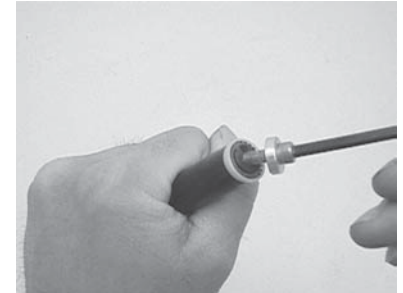
3. Press the piston from the cylinder bore. If it is seized, call Lily or visit a machine shop for assistance. Do not damage the bore!

4. Clean the bore and piston thoroughly. Examine the cylinder. If its bore is scratched or pitted, it should be replaced.



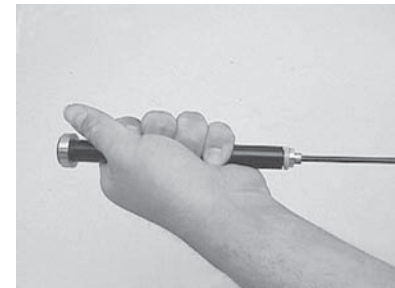
5. If the piston is scratched or marred, polish its surface with an abrasive cloth until no burr remains to damage the metering cylinder.

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

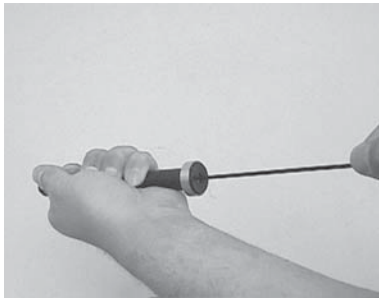


7. When removing or tightening pad or seal retaining screws, secure the piston from rotation by inserting a rod or screwdriver through the hole in the piston body. This will enable you to apply significant torque without using a clamping device.

8. Replace the seal with its spring groove towards the bottom of the piston.



## The Metering Cylinders Cont.



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 to the screw at reassembly.

Lubricate the piston and its chamber with silicone and insert the pad end into the threaded end of the cylinder.



**Continue with steps 7 and 8 on Page 9.**

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

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## **Spurts of air, or air bubbles in the material**

Check the material level. Even though some material remains, the pump can draw some air through the resin as it cavitates just before it is depleted. This is especially true of viscous material.

## **Air bubbles in a thin resin when using pressure vessels.**

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

## **Incorrect ratio**

Ratio assurance check to confirm valve performance.

## **Sluggish flow**

Disconnect the outlet fittings and observe the resin flow from the outlet ports. If the flow is unrestricted, look for an obstruction in the mixer, hose, or other 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).

## **Leakage of resin between flippers and valve bodies**

Replace the COCO stem seals.

## **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 transfer pump or vessel.

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. If the Graco President pump is not delivering as it should, refer to the trouble shooting chart on page 8 of the Graco manual.

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.

Insufficient material pressure to press the pads firmly against the sensor ports.

# TROUBLE SHOOTING

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## **Coco module is sluggish or stalls.**

Material contains too much abrasive filler. Change materials.

Low air supply pressure.

Misaligned inlet valve bodies.

## **Main air cylinder return 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.

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

Malfunctioning sensor valve in master spacer. 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.**

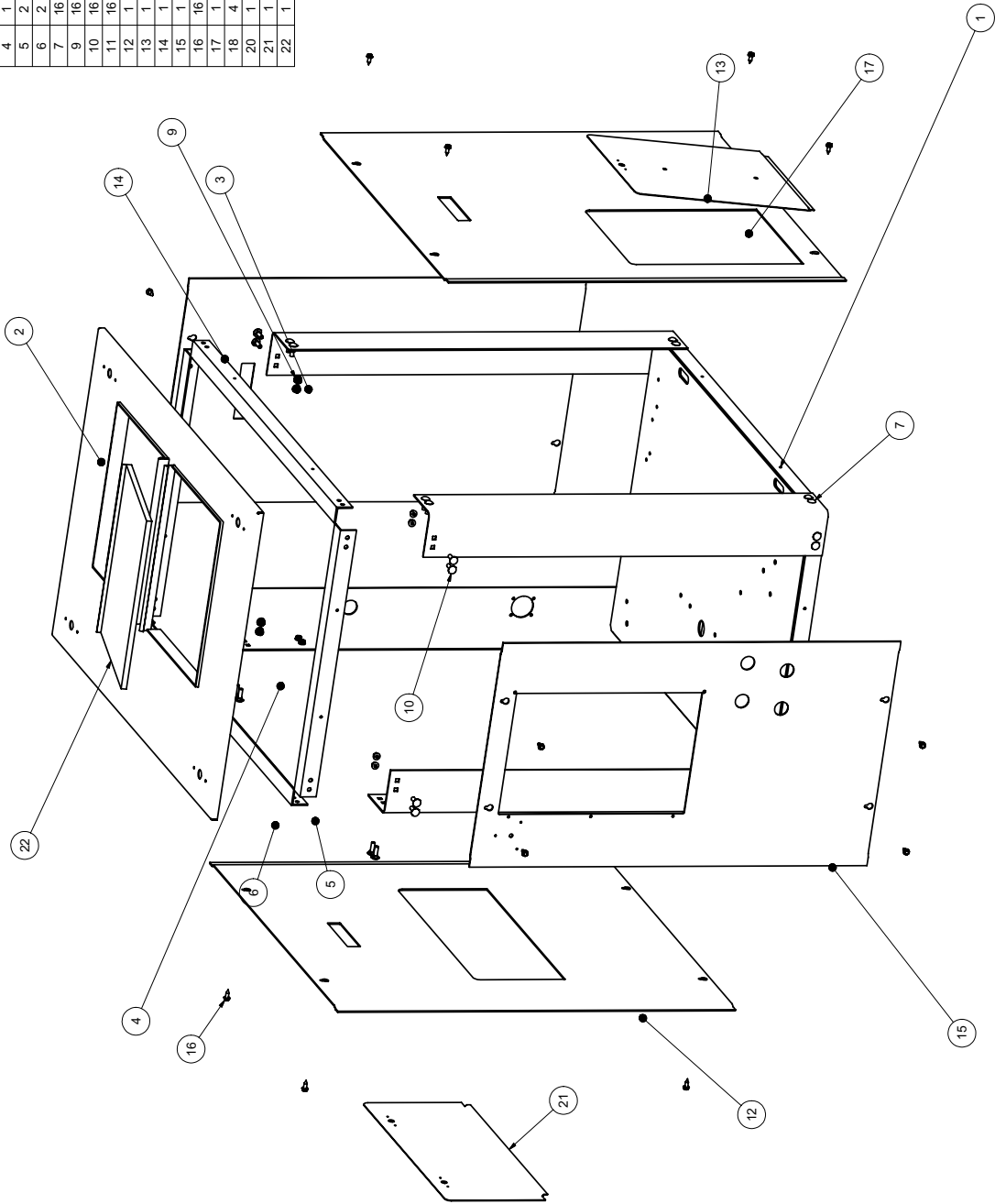
Twin valve (A-201) not shifting. Service the valve, replace the air filter element, and check on cleanliness of air supply.

If you cannot correct the problem,  
contact Lily Corporation with an exact description of how the various components are responding.

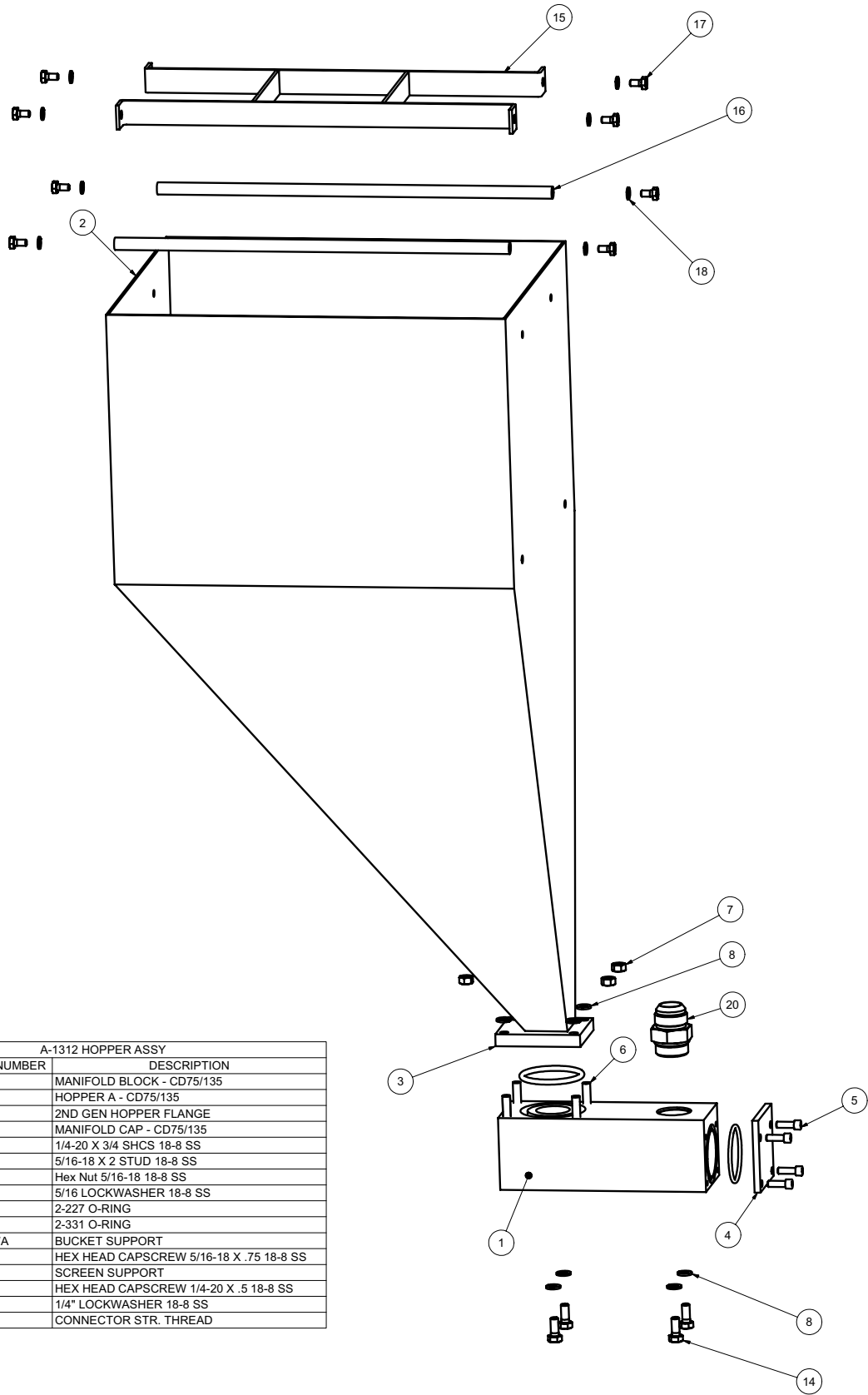
If possible, phone with the unit, air, tools, and resin information at hand.

# FRAME AND PANEL ASSEMBLY.

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	A-1338	FRAME AND PANEL ASSY
2	1	A-1337	FRAME BASE ASSY
3	3	M-1300	CORNER SUPPORT CD75/135
4	1	M-1301	CROSS SUPPORT CD75/135 SHORT
5	2	M-1302	CROSS SUPPORT CD75/135 LONG
6	2	M-1303	5/16-18 X 2 CARRIAGE BOLT 18-8 S.S.
7	16	S-258	5/16-18 HEX NUT 18-8 S.S.
8	16	P-477	5/16-18 X 1 CARRIAGE BOLT 18-8 S.S.
9	16	S-256	5/16-18 HEX NUT 18-8 S.S.
10	16	P-477	5/16-18 X 1 CARRIAGE BOLT 18-8 S.S.
11	1	M-1324	SIDE PANEL CD75/135
12	1	M-1321	END PANEL - SHOT SIZER CD75/135
13	1	M-1323	END PANEL CD75/135
14	1	M-1322	END PANEL DASH CD75/135
15	1	M-1322	1/4-20 X 1 HEX FLANGE BOLT 18-8 S.S.
16	16	S-884	METERING ASSY ACCESS DOOR CD75/135
17	1	M-1320	LID LATCH
18	4	P-650	ACCESS DOOR LATCH
19	1	P-652	ACCESS DOOR
20	1	M-1337	HOPPER COVER
21	1	M-1327	
22	1		







A-1312 HOPPER ASSY			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	M-1325	MANIFOLD BLOCK - CD75/135
2	1	M-1312	HOPPER A - CD75/135
3	1	M-1310	2ND GEN HOPPER FLANGE
4	1	M-1326	MANIFOLD CAP - CD75/135
5	4	P-687	1/4-20 X 3/4 SHCS 18-8 SS
6	4	S-255	5/16-18 X 2 STUD 18-8 SS
7	4	P-477	Hex Nut 5/16-18 18-8 SS
8	8	P-075	5/16 LOCKWASHER 18-8 SS
12	1	S-051	2-227 O-RING
13	1	S-052	2-331 O-RING
15	1	M-399WA	BUCKET SUPPORT
14	4	S-246	HEX HEAD CAPSCREW 5/16-18 X .75 18-8 SS
16	2	M-1328	SCREEN SUPPORT
17	8	S-100	HEX HEAD CAPSCREW 1/4-20 X .5 18-8 SS
18	8	P-074	1/4" LOCKWASHER 18-8 SS
20	1	P-088	CONNECTOR STR. THREAD

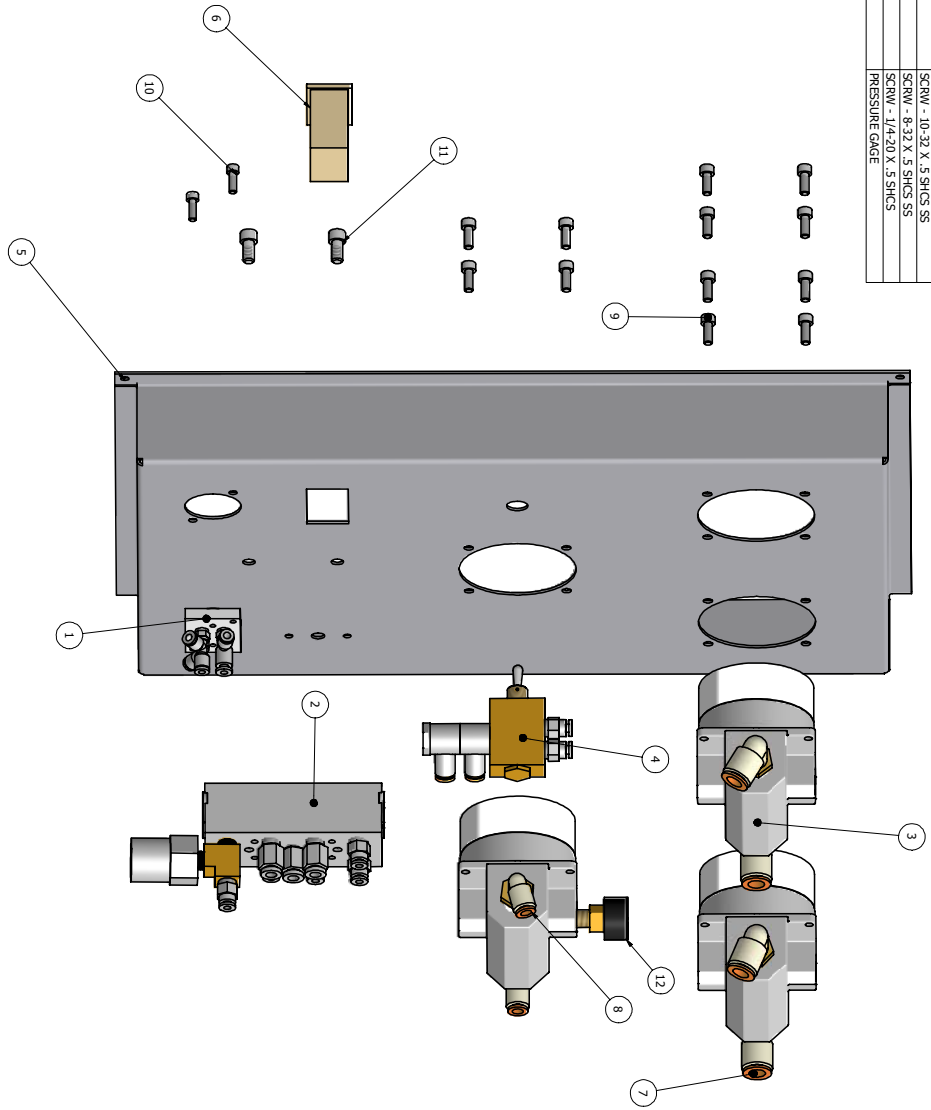
## A-1312 HOPPER MANIFOLD ASSY

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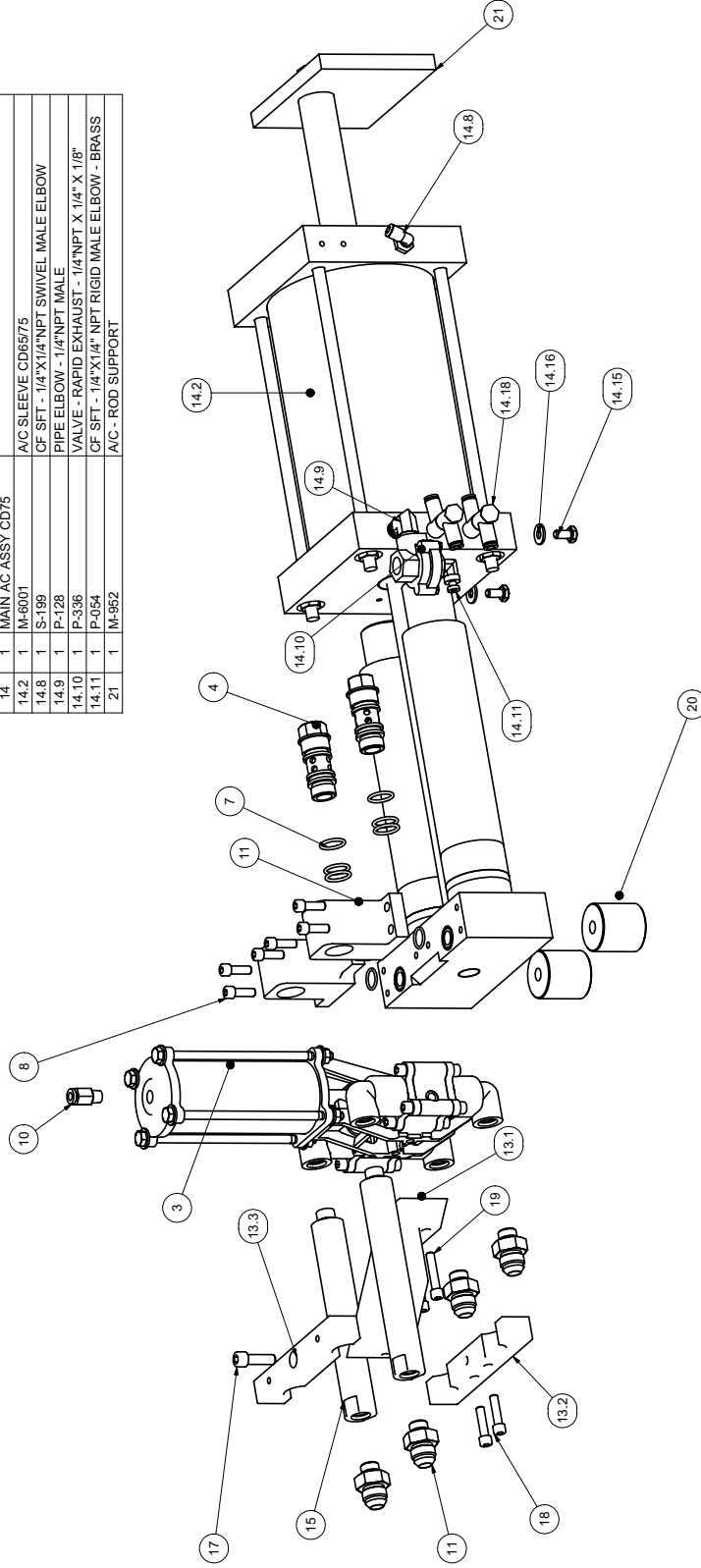
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	UMBRLCAL ASSY	UMBRLCAL CONNECTION ASSY
2	1	TWIN VALVE ASSY	CONTROL VALVE ASSY
3	3	P-809	AIR REGULATOR
4	1	P-707 ON OFF ASSY	MACHINE ON/OFF SWITCH
5	1	M-1314	DASH BOX
6	1	P-299	COUNTER - ELECTRIC
7	4	S-930	CF SFT - 3/8 X 3/8 NPT ELBOW
8	2	S-755	CF SFT - 1/4 X 3/8 NPT ELBOW
9	12	S-666	SCRNV - 10-32 X .5 SHCS SS
10	2	P-344	SCRNV - 8-32 X .5 SHCS SS
11	2	S-99	SCRNV - 1/4-20 X .5 SHCS
12	1	P-810	PRESSURE GAGE

# DASHBOARD ASSY



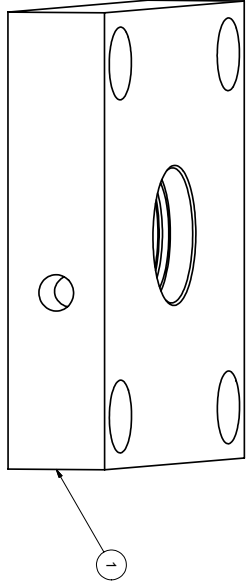
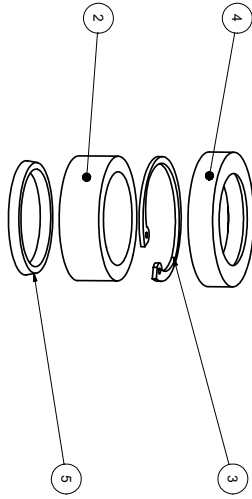
### MAIN A/C - MANIFOLD - COCO ASSY

ITEM	QTY	PART NUMBER	DESCRIPTION
7	6	S-146	O-RING 3-908
4	2	M-405	BANJO ASSY
8	6	P-687	1/40-020 X 20 SHCS SS
9	2	S-420	SEAL O-RING
10	1	S-499	CF SFT - 1/4" X 1/8" NPT UNION MALE
12	1	M-734	COCO MANIFOLD ADAPTER
11	1	M-735	COCO MANIFOLD ADAPTER
13	1	M-1308	BRACKET COCO EXTENSION CD75/135
13.1	1	M-1308	BRACKET CD75 COCO EXT
13.2	1	M-1307	CD75 COCO EXT CLAMP BOTTOM
13.3	1	M-1306	CD75 COCO EXT CLAMP
15	2	M-1304	CD75 COCO EXT
11	4	S-307	SEAL LOK - STRT THD UNION 1/2"
17	1	P-288	5/16 - 18 X 1 SHCS SS
18	2	S-037	1/4 - 20 X 1 SHCS SS
19	2	S-418	1/4 - 20 X 1 1/4 SHCS SS
3	1	A-160-6	COCO ASSY
20	2	M-953B	CD70/75/ACE SPACER BLOCK
14	1	MAIN AC ASSY CD75	
14.2	1	M-8001	A/C SLEEVE CD6/75
14.8	1	S-199	CF SFT - 1/4"X1/4"NPT SWIVEL MALE ELBOW
14.9	1	P-128	PIPE ELBOW - 1/4"NPT MALE
14.10	1	P-336	VALVE - RAPID EXHAUST - 1/4"NPT X 1/4" X 1/8"
14.11	1	P-054	CF SFT - 1/4"X1/4" NPT RIGID MALE ELBOW - BRASS
21	1	M-952	A/C - ROD SUPPORT



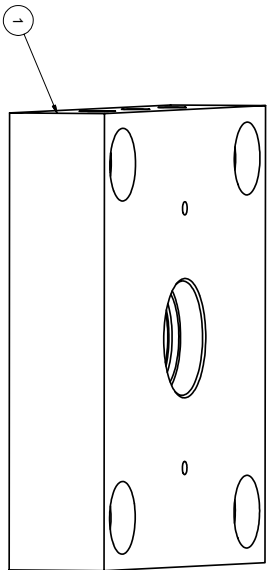
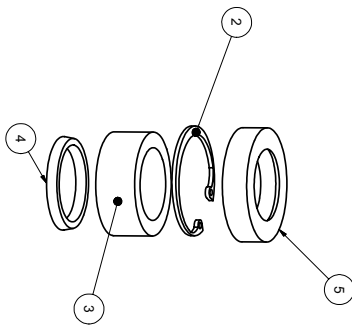
## ASSY # A-7003

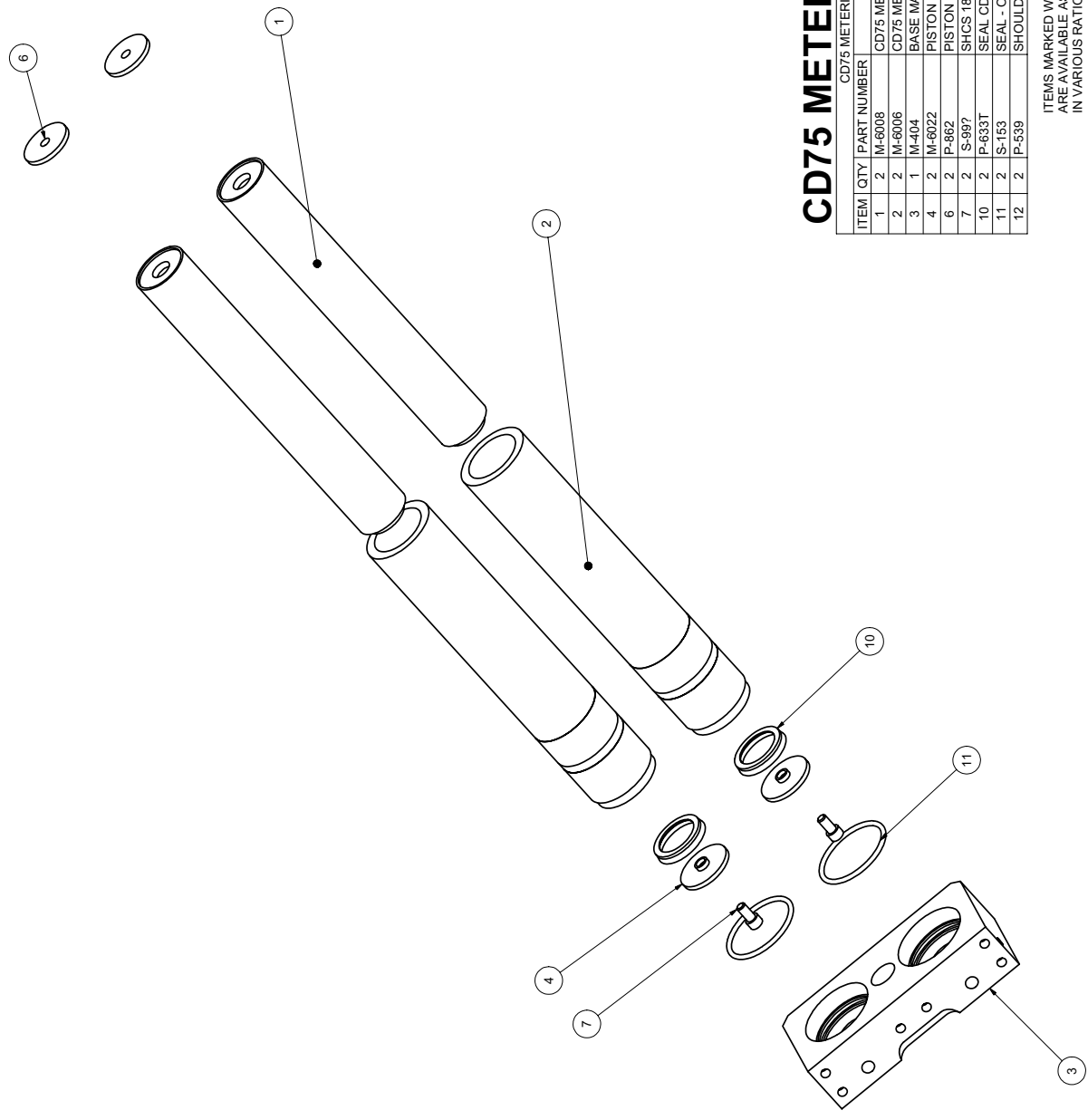
A-7003 ASSY			DESCRIPTION
ITEM	QTY	PART NUMBER	
1	1	M-7003	A/C END CAP CD70
2	1	M-531	BUSHING
3	1	P-586	RETAINING RING
4	1	S-431	WIPER SEAL
5	1	P-634	SEAL - A-C ROD



## ASSY # A-8002

A-8002 ASSY			DESCRIPTION
ITEM	QTY	PART NUMBER	
1	1	M-8002	A/C END CAP CD70
2	1	P-567	INTERNAL RETAINING RING 1 1/4
3	1	M-530	BUSHING - OD66/75
4	1	P-507	SEAL - WIPER - 7/8 ROD
5	1	S-432	SEAL - U-CUP 7/8 ROD





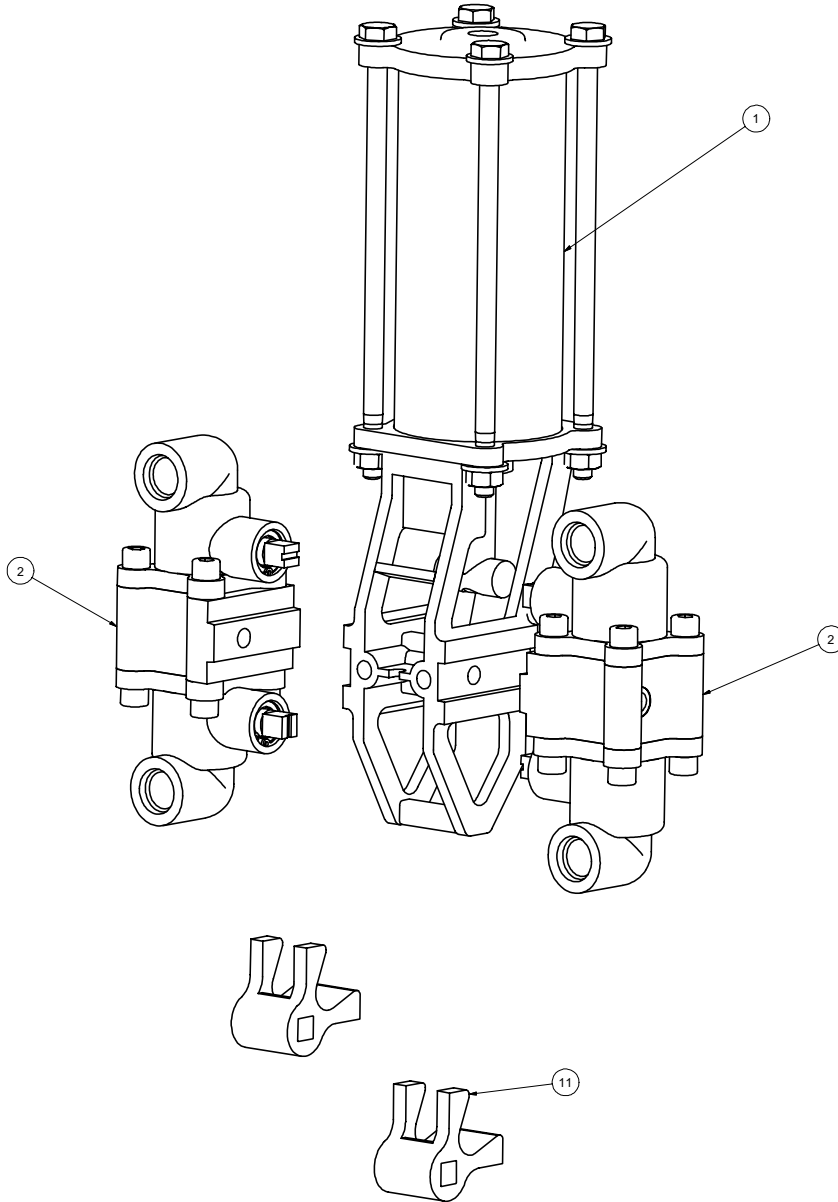
## CD75 METERING ASSY

ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	M-6008	CD75 METERING PISTON 1:1 *
2	2	M-6006	CD75 METERING CYLINDER 1:1 *
3	1	M-404	BASE MANIFOLD
4	2	M-6022	PISTON CAP 1:1 *
6	2	P-962	PISTON CAP 1:1 *
7	2	S-997	SHCS 18-8 SS 1/4-20 X .5 *
10	2	P-633T	SEAL CD6575 1:1 *
11	2	S-153	SEAL - O-RING 2-225
12	2	P-539	SHOULDER SCREW - NOT SHOWN!!

ITEMS MARKED WITH AN ASTERISK  
ARE AVAILABLE AS AN ASSEMBLY  
IN VARIOUS RATIOS.

**(1:1 RATIO !)**

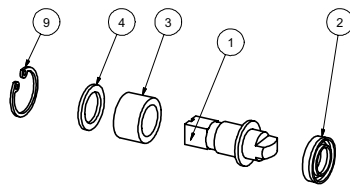
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## A-160 COCO ASSY

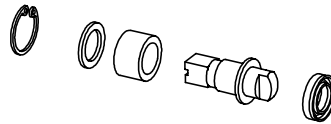
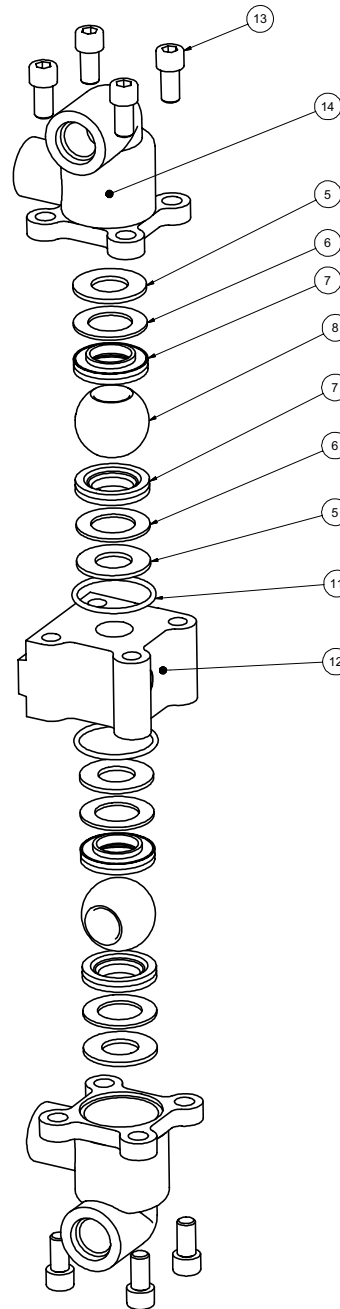
A-160 COCO ASSY			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	A-013	COCO FRAME ASSY
2	2	A-160-3	COCO BALL VALVE ASSY HALF
11	2	M-574	COCO FLIPPER

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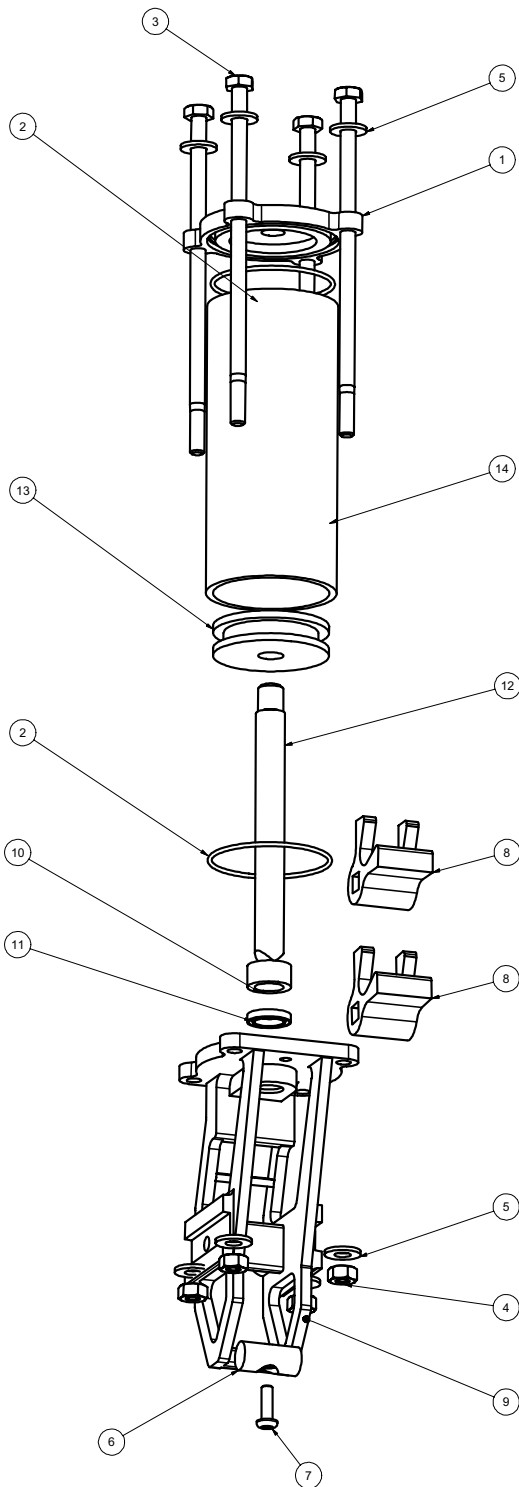


### A-160-3

A-160-3 ASSY			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	M-581	COUPLER SHAFT - COCO
2	2	S-328	SEAL - COCO STEM
3	2	M-802	BUSHING - COCO STEM
4	2	P-469	WASHER - COCO STEM
5	4	S-330	SPRING WASHER
6	4	S-329	SEAL SUPPORT
7	4	S-332	SEAL - COCO
8	2	M-803	BALL - COCO
9	2	P-505	5/8" RETAINING RING
10	1	M-573	VALVE BODY RH
11	2	S-509	O-RING
12	1	M-572	MODULE - COCO
13	8	S-310	1/4-28 X .5 SHCS SS
14	1	M-575	VALVE BODY LH



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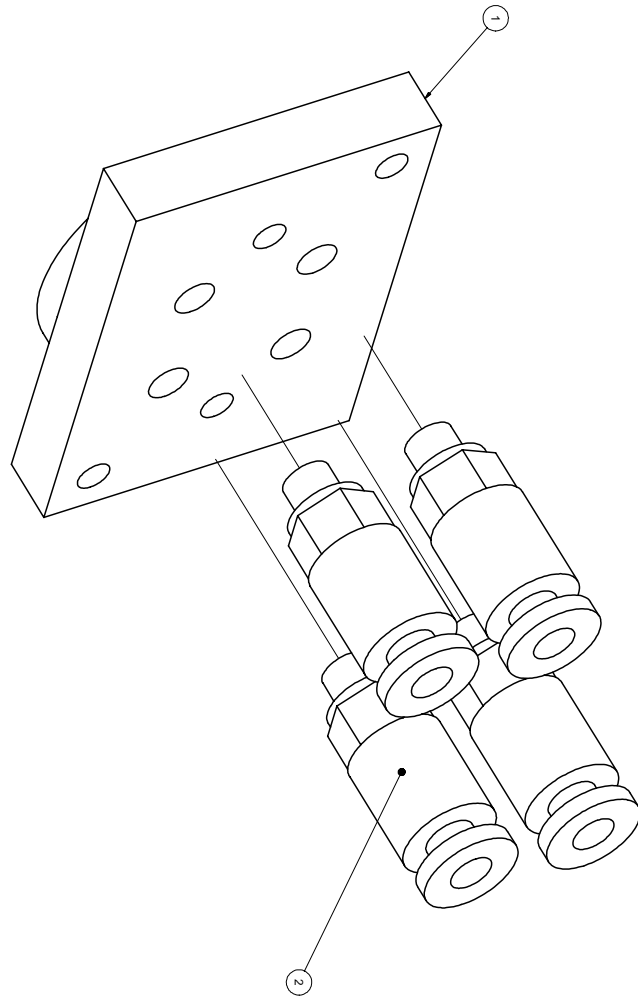


### A-013 ASSY

A-013 ASSY			
ITEM	QTY	PART NUMBE	DESCRIPTION
1	1	M-570	A/C END CAP COCO CYLINDER
2	2	S-504	SEAL - O-RING
3	4	S-309	1/4-20 X 6 HHCS S.S.
4	4	P-208	1/4-20 HEX NUT S.S.
5	8	S-415	WASHER 1/4"
6	1	M-577	A/C CAM BAR
7	1	S-299	10-32 X .625 BHCS S.S.
8	2	M-574	COCO FLIPPERS
9	1	M-571	FRAME COCO
10	1	M-804	BUSHING COCO FRAME
11	1	S-505	SEAL COCO FRAME
12	1	M-580	SHAFT COCO A/C
13	1	M-579	PISTON COCO A/C
14	1	M-582	A/C SLEEVE COMPOSITE

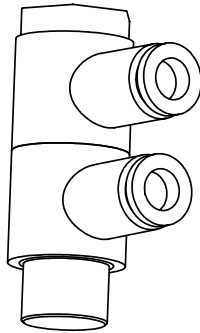
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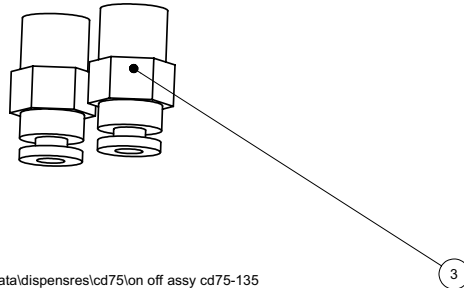
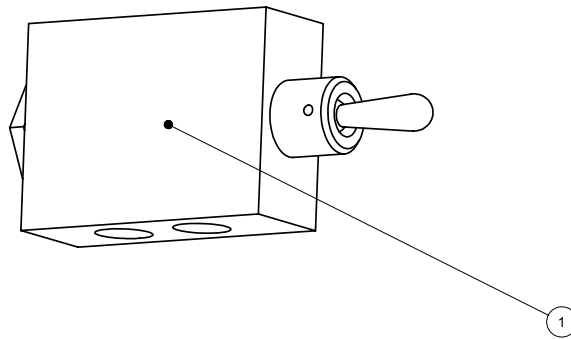
UMBILICAL CONNECTION ASSY		
ITEM	QTY	PART NUMBER
1	1	IM-850
2	4	IP-196
		SOCKET - UMBILICAL CONTROL
		5/32 X 10-32 UNION



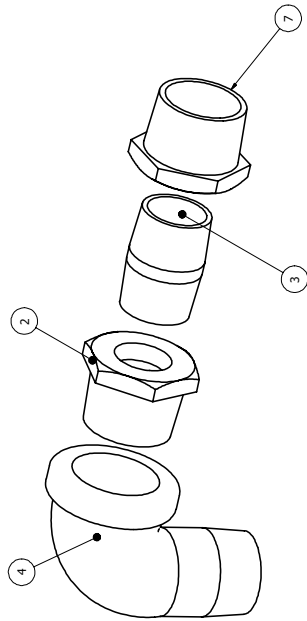


## A-018 ON/OFF SWITCH ASSY

A-018 ON/OFF ASSY			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	P-707	ON/OFF SWITCH
3	2	P-174	1/8 NPT X 5/32 UNION
4	1	P-021	

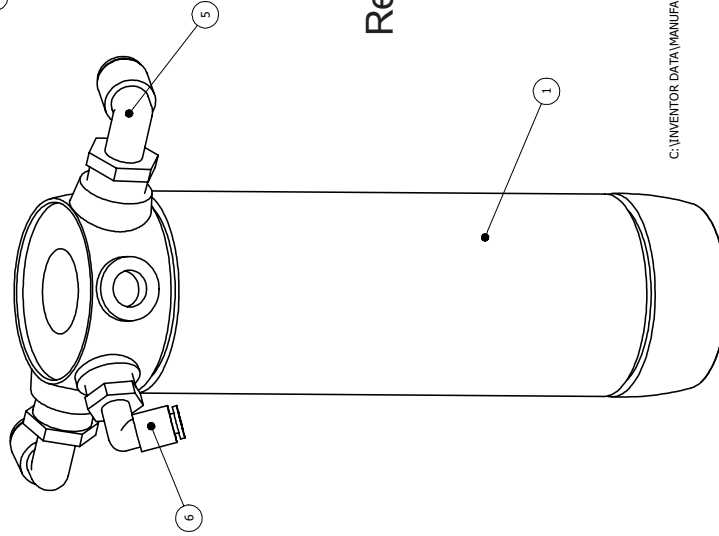


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## AIR FILTER ASSY CD75/135

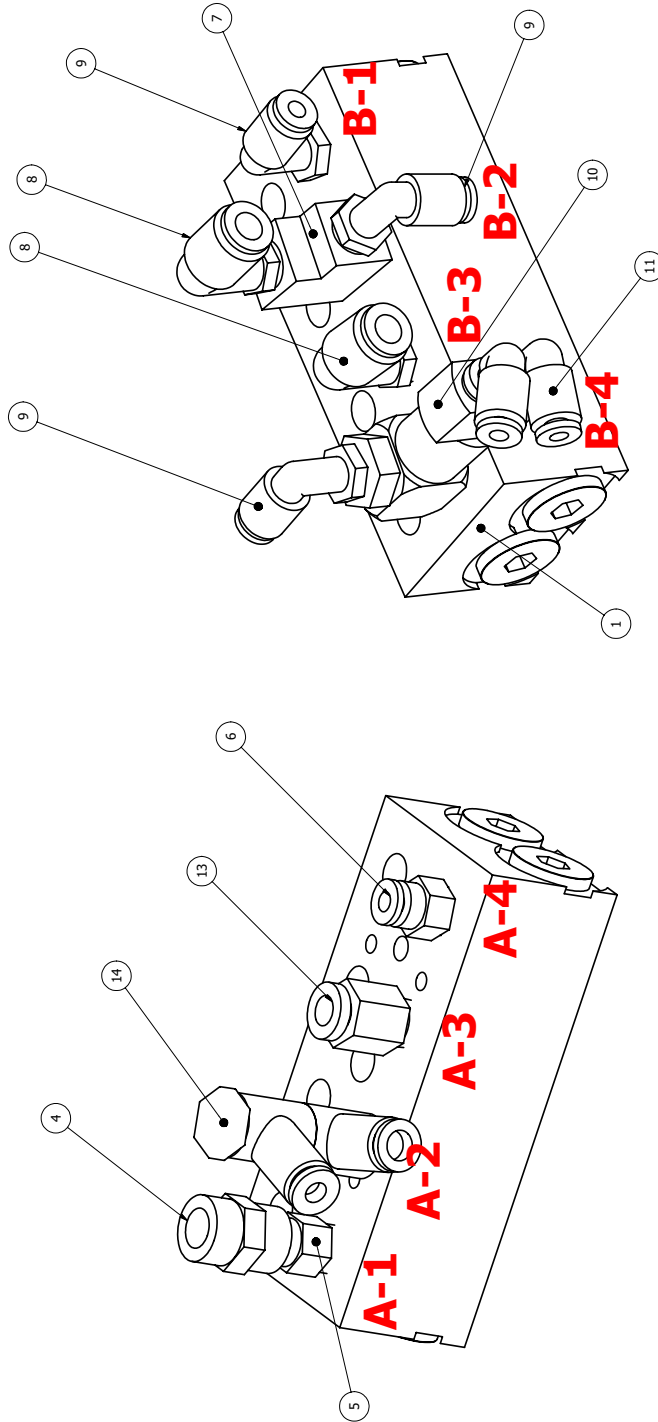
AIR FILTER ASSY CD75-135		
ITEM	QTY	PART NUMBER DESCRIPTION
1	1	P-589 FILTER - P.L.P.
2	1	P-648 REDUCING BUSHING - 1" X 3/4" STEEL
3	1	P-724 3/4" NIPPLE STEEL
4	1	P-722 1" STREET ELBOW STEEL
5	2	S-692 3/8 X 1/2" NPT MALE SWIVEL ELBOW
6	1	S-755 1/4 X 3/8" NPT MALE SWIVEL ELBOW
7	1	P-068 BULKHEAD FTG



Replacement air filter element: P-592

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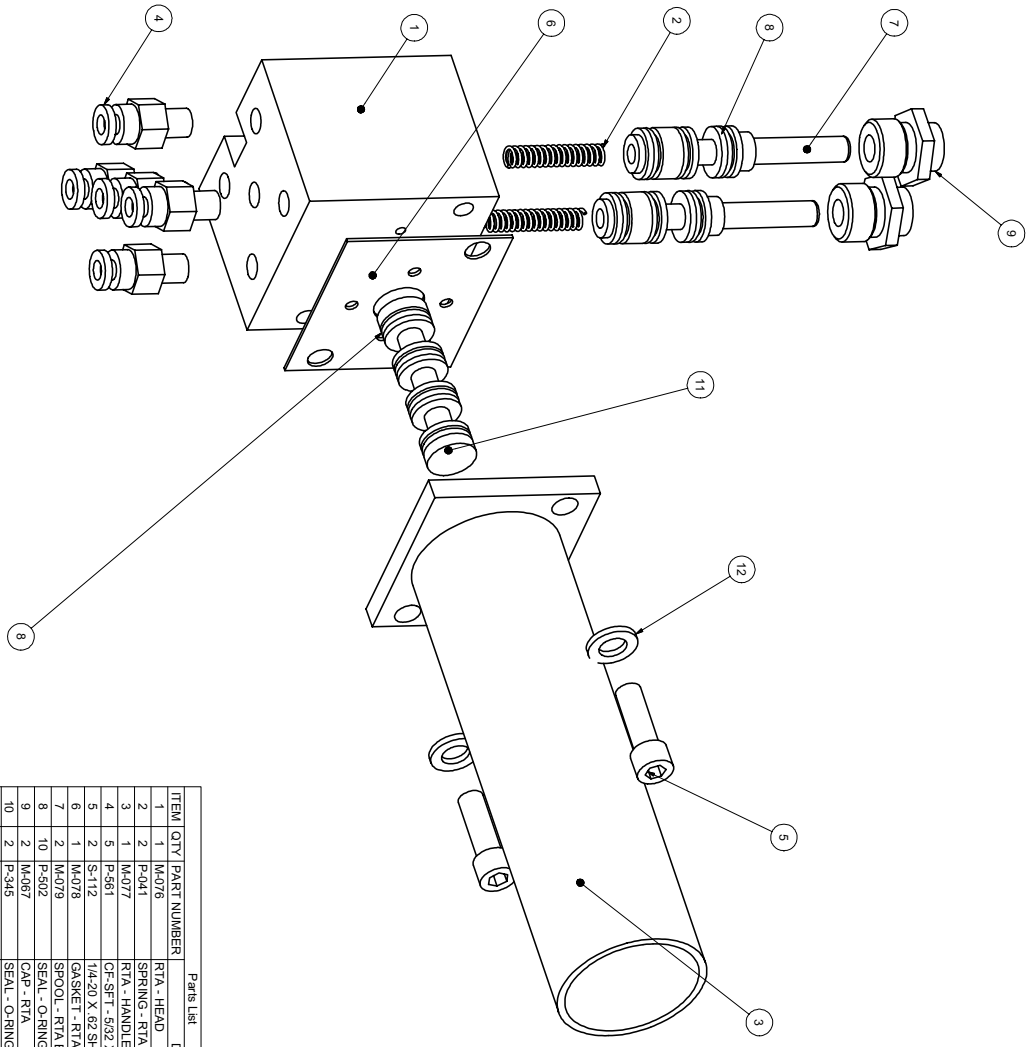
# TWIN VALVE ASSY CD75



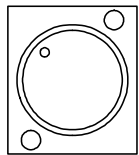
Parts List		
ITEM	QTY	PART NUMBER DESCRIPTION
4	1	P-083 PIPE CPLG 1/8 NPT BRASS
5	1	P-257 PIPE NIPPLE 1/8 NPT BRASS
6	1	P-174 1/8 NPT X 5/32 UNION
13	1	S-499 CF SFT - 1/4 X 1/8 NPT UNION MALE
14	1	P-066 DBL BANDU 5/32 X 1/4" NPT

Parts List		
ITEM	QTY	PART NUMBER DESCRIPTION
1	1	M-017 TWIN VALVE BODY
7	1	S-021 PIPE TEE 1/8 NPT BRASS
8	2	S-188 CF SFT 1/4 X 1/8 NPT SWWL ELBOW
9	3	P-176 CF SFT 5/32 X 1/8 NPT SWWL ELBOW
10	1	P-182 AL - STROKE SENSOR 1/8 NPT
11	2	P-209 5/32 ROTATING ELBOW

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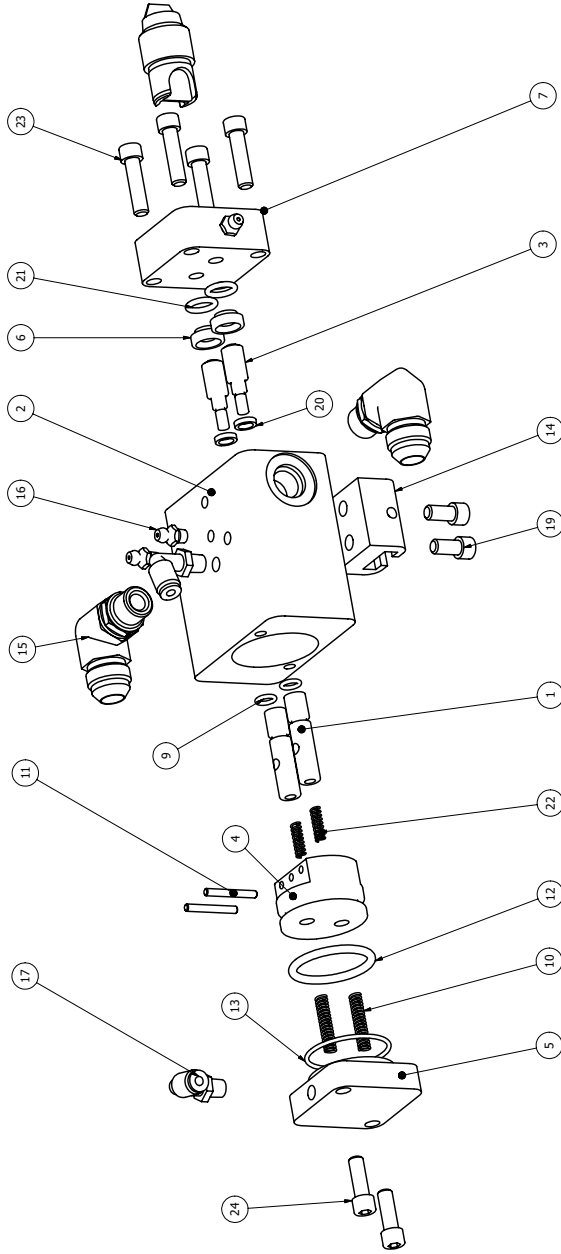


ITEM	QTY	PART NUMBER	Description
1	1	M-076	RTA - HEAD
2	2	P-041	SPRING - RTA BLOCK
3	1	M-077	RTA - HANDLE
4	5	P-561	CF-SFT - 5/32 X 1/16 NPT UNION
5	2	S-112	1/4-20 X .82 SHCS S.S
6	1	M-078	GASKET - RTA HANDLE
7	2	M-079	SPOOL - RTA BLOCK
8	10	P-502	SEAL - O-RING
9	2	IM-067	CAP - RTA
10	2	P-345	SEAL - O-RING
11	1	IM-080	SPOOL - RTA HANDLE
12	2	S-415	WASHER



# TSO ASSEMBLY

Parts List		
ITEM	QTY	PART NUMBER DESCRIPTION
1	2	M-025 TSO - PLUNGER
2	1	M-027 TSO - BODY
3	2	M-029 STOPPER
4	1	M-032 TSO - PISTON
5	1	M-048 TSO - CAP PISTON SIDE
6	2	M-051 SEAT TSO
7	1	M-052 TSO - CAP MATERIAL SIDE
8	1	M-509 NOZZLE - PRESS TO FIT
9	2	S-024 SEAL O-RING - 2.010 N70
10	2	P-321 SPRING - TSO VALVE
11	2	P-323 PIN - RETAINING
12	1	S-423 SEAL O-RING 2-218
13	1	S-424 O-RING
14	1	M-053 TSO - RAIL MOUNT
15	2	P-495 ELBOW - 3/8 X 1/2 JIC
16	4	P-563 1/4 UNF 5T Z6K
17	2	P-565 CF 5FT - 5/32 X 1/16" NPT ELBOW
18	2	S-99 SCRV - 1/4-20 X .5 SHCS
19	2	S-419 SEAL - U-CUP TSO PLUNGERS
20	2	S-425 SEAL O-RING 2-110
21	2	P-484 SPRING - TSO VALVE
22	4	S-037 1/4 - 20 X 1 SHCS 18-8 SS
23	2	P-687 1/4 - 20 X .75 SHCS 18-8 SS



NOTE: ITEM NOS. 15 & 14 ARE AVAILABLE OPTIONS DEPENDING ON APPLICATION REQUIREMENTS.

