

# Lily Corporation

## Model CD135

### Operation and Service Manual



# Lily Corporation

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Serial Number \_\_\_\_\_

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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 CD135 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 CD135. 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.

## Material Selection

Many resins used in the construction industry are not suitable for proportioning dispensers due to the abrasive nature of the fillers. Although a dispenser may manage an abrasive product, wear of seals and machined surfaces will be accelerated. Products containing such fillers are less expensive, but the trade off in down time and parts replacement should be carefully weighed. To obtain the best performance with this system,

make it clear to your vendor that you require an abrasive-free product. The CD135 is not a sand pump.



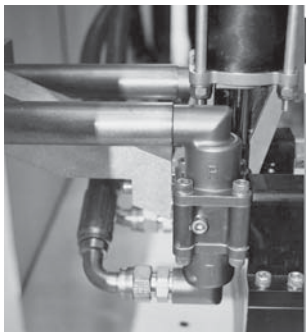
If in doubt as to the presence of abrasives, massage a dollop of the product between your thumb and forefinger. If it feels gritty, forget it! If in doubt, send a sample to Lily for assay.

The use of products with a PH greater than ten or less than one should also be avoided. The use of such corrosive products will probably necessitate modification of certain dispenser components.

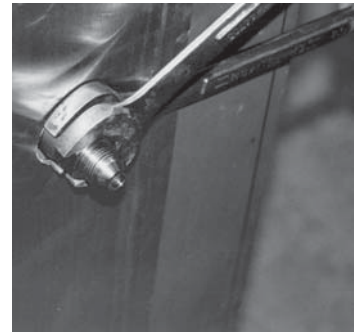
Another important consideration is viscosity. The use of thick materials will significantly reduce production. Although the viscosity of thick materials can be dramatically reduced by heating, the selection of winter grade products offered by many manufacturers may be a wiser choice. They are thinner in order to flow at cool temperatures. A trade off is that the winter grade products are generally more costly.

## Connections

Some fluid may drip from the outlet fluid 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. They are marked A (Base) and B (Catalyst). The lower fittings are inlet ports that are supplied by the Graco pumps. The upper fittings that extend from the cabinet are the outlet ports. A short hose extension from the outlet ports places 1/2" JIC fittings at the exterior of the cabinet where the material hoses or other connection are easily made.



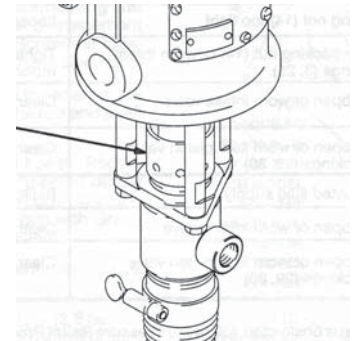
To make the outlet connection, grip the JIC male component with a 7/8" open end wrench while tightening the mating female end with a similar wrench.

## Delivery

Both resin components enter the fluid inlet connections under a pressure of 80 to 1,500 psi. The thicker and stickier the product, the higher the pressure required to move it into the metering cylinders. But, it is good practice to use the lowest pressure necessary to get the desired results. Higher pressures than needed result in premature wear of seals and packings.

Graco President pumps deliver the components at a ratio of 11:1. If the air inlet pressure is 80 psi, the fluid pressure will be 880 psi. (80 x 11). It will not affect the ratio of the dispenser if one component is delivered more quickly or at a higher pressure than the other. To obtain the optimum pressure setting for the pumps, set the pressure for the pump with the thickest material first. It will probably be the maximum available. Then set the other pump pressure so that the two metering pistons extend at approximately the same rate. This tweaking will have to wait until the system is dispensing.

Before placing the pump in service, squirt a few ounces of Graco Throat Seal Liquid into each of the pump cups. This manual does not contain any further instructions pertaining to the Graco President pumps, so be certain to study the Graco Operation and Maintenance Manual in the Operator's Manual jacket.



Graco President pumps will deliver hundreds of hours of trouble free service only if they are properly maintained.

## THE AIR SUPPLY.

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### Requirements

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 CD135 system. Although the unit will function at lower pressures, the inlet air pressure should be sustained at a minimum of 100 psi. Pressures of up to 150 psi can be used. The higher the pressure, the higher the production.

The regulator dial sets the desired pressure which will be maintained so long as the air source is up to the setting. There is no reference to a separate gauge.

### Quality

The CD75 is not a jackhammer. Although many additives are beneficial to such tools, most will damage the seals in the CD135 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 13.

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 Inlet Valve

A slide valve controls the air flow into the unit. When it is shifted up, the system is energized. When it is shifted down, the air flow is stopped and the system vents. The venting is a great safety feature because all pneumatic components are immediately deenergized. Should an emergency shut-down be required, forget the other switches. Use the Slide Valve!



## The Air Filter

Moisture droplets in an 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 ) and moisture separators help.



Because “automatic” moisture separators do not dump accumulated moisture unless the air supply is vented, the slide valve should be periodically shifted. Allow the pressure to thoroughly subside before shifting the valve back to the open mode. Moisture can also be dumped by grasping the nylon drain tube and pressing it into its connection.

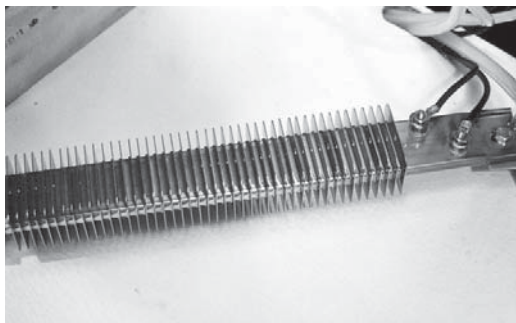
The filter element should be replaced annually, or after 6,000 hours of operation. To do so, grasp the body of the filter and rotate it counter clockwise to unlock it from the cap. Then work it free.

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



Within the cabinet there are two electric heating elements and a thermocouple. The thermocouple is positioned between the heating elements on the floor. Because heat rises, the temperature at the ceiling will be warmer than that at the thermostat on the floor. So, although the maximum thermostat setting is 100° Fahrenheit, the actual



temperature within the cabinet may be significantly higher in the upper reaches. Although the temperature is not likely to exceed a safe limit, monitor the thermometer on the front of the cabinet to avoid any surprises.

The heating element surfaces are **exposed and HOT**, reaching temperatures of 500° Fahrenheit. Severe shock and burns can result if the elements are touched. Never approach these elements unless the electrical source is unplugged 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 the coating is durable, it can be raked from a surface. If the coating is abraded, it can be touched up. The coating is available from Lily Corporation.

## To Begin With

Lubricate the transfer pump seals per the instructions in the Graco Service Manual.

Fill the material hoppers. **A is Base and B is Catalyst.**

(B does not stand for Base!)

For heated operation, fill the hoppers and set the thermostat at least five hours beforehand.

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

If the cycles are to be recorded, press the bar below the window of the counter to set 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, faucet, or hoses at the outlet fittings.

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

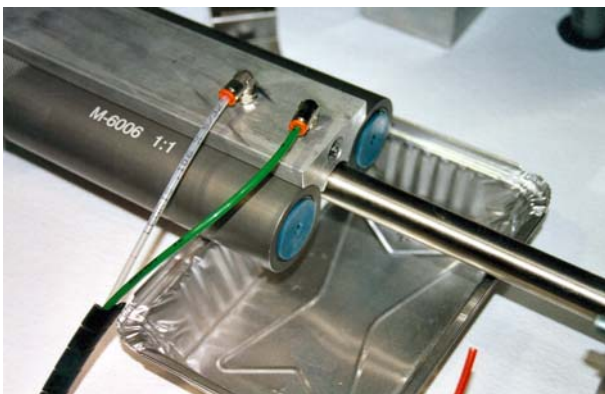
Switch the dispenser on. There will be an audible mechanical shifting as the Coco module shifts to close the inlet valves and open the outlet valves.

Open the outlet valve and slowly increase the pressure at the cabinet regulator until material flows.

Then close the valve and slowly increase the dispense 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.

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 piston extends at the same rate as that of the base resin. This can be observed by opening the side panel. **BUT DO NOT REACH INTO THE CABINET.**



Velcro tape secures a metal pan beneath the metering pistons to catch occasional drippings. The wetting of the pistons is normal, and as a piston is wiped by the cylinder, droplets develop. Should the dripping become steady, the piston seal should be replaced.

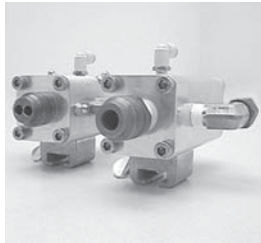
An aluminum foil liner within the pan is a convenient way to dispose of drippage accumulations.

## Dispensing

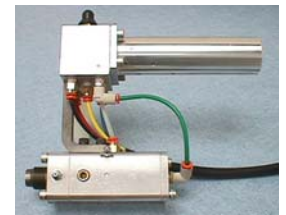
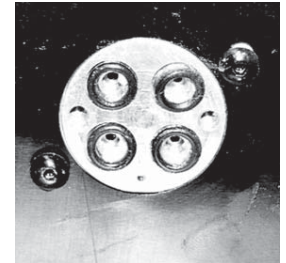
The outlet fluid valve, or valves, are opened and closed manually or by means of a Remote Trigger Assembly (RTA).

**Manual valves** are mounted at the cabinet as a faucet, or fixed at the hose outlet. To set the rate of flow, switch the dispenser on, open the valve, and adjust the material pressure at the Dispenser Pressure Regulator. The flow rate of the resin is determined by the air pressure setting; the higher the pressure, the greater the flow. Adjust the pressure at the dispenser regulator only. Do not attempt to control the material flow rate by adjusting the compressor setting as it has no influence over the flow of the material. . Once a setting is selected, the system will maintain that rate of flow.

To use **RTA (Remote Trigger Assembly)**, the umbilical line must first be connected to the plug at the cabinet. It shuttles pneumatic control signals between the trigger and the dispenser. To connect the umbilical at the dispenser, remove the cap and replace it with the umbilical plug. Orient the plug so that indexing holes in the socket and plug align.



The RTA is used with the TSO (Twin Shut Off) Valve or SSO (Single Shut Off) Valve, depending upon whether twin lines or a single fluid line is used. The left switch opens the valves and the flow continues until the system finishes its dispense cycle unless the right hand switch is used to abort the cycle. If the right switch aborts, the system resets for a full cycle.



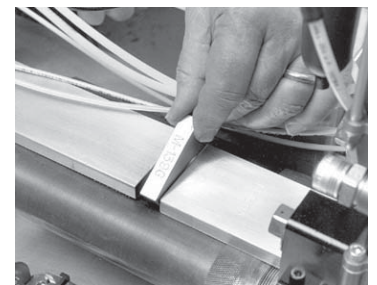
When priming a single clean hose, it is necessary to hold the left start button down through repeated cycles until the material appears at the outlet. This procedure is only necessary when priming at start-up with a clean hose. It is not necessary when using twin lines.

## 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 **shift the Slide Valve to fully vent the system**. 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 a single dispense hose is used, no cleanup is required because the resin components are not joined until within a disposable mixer. Simply discard the mixer. To assure easy removal, grease the threads of the mixer mounting nut when installing a new nozzle. The grease prevents the resin from bonding to the threads.



If a single dispense hose is used, continue below with the clean up procedure. Otherwise, continue with **Ratio Assurance Procedures** on the next page.

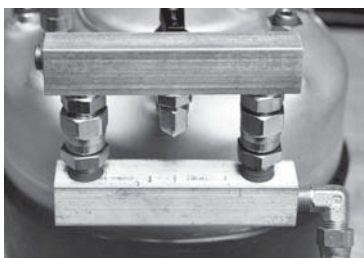
### **Single Line Clean Up**

Charge the purge tank with a non-petroleum base solvent such as Acetone or MEK and then take the following steps:

Reduce the Dispense Pressure to zero.

Press the start button on the RTA trigger assembly to open the outlet valve, relieving any material pressure in the hose.

Allow a minute or so for the hose to drool and then disconnect the JIC outlet hose fittings to free the manifold block at the cabinet.



Fix the manifold block to the mating fittings on the purge vessel.

Close the directional valve and pressurize the tank. Do not disconnect the air supply from the dispenser. Use a separate air source.

Direct the SSO nozzle into a suitable container to arrest bursts of resin, solvent, and vapors. Personnel must wear appropriate skin and eye protection.



Rotate the directional valve to point to the manifold block. Resin will flow from the outlet valve, followed by slobber and 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 at least a dozen very small bursts of solvent into the air outlet fitting. Thick, sticky resins will require more cleaning than thinner products. The bursts should be small and vaporized in the air stream so as not to choke the flow of air. The solvent should act as an abrasive to scour the hose clean. Stretch the hose out and whip it about as the solvent bursts are introduced.

Clean the interior of the SSO valve by triggering it on and off under the air/solvent flow.

And finally, Insert grease at the SSO zerk fittings. A small squirt grease in each of 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. Critical components are wearing from the moment the system is energized. Personnel must be familiar with the following procedure for monitoring the wear of those seals that assure metering accuracy. If this procedure does not become routine, a defective product will result.

A check once each week of operation is usually sufficient to detect seal wear before it becomes significant. If the resin contains abrasive fillers, or if the application is especially critical, monitoring should be more intense. The ratio check is a three stage procedure.

But before proceeding, it is first necessary to relieve the fluid pressure in the outlet hoses and then disconnect them. If the outlet valve is manual, open it, allow it to drain until drool free, and then disconnect the hose or hoses.



If the Remote Trigger Assembly (RTA) is used, it is not quite so simple: Switch the dispenser on, set the dispenser pressure at zero, and press the left RTA switch to open the outlet valves, Allow the drool to subside, and then disconnect the hoses at the dispenser.

**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. Place a napkin beneath the outlet fittings and increase both the A and B pump pressures to the maximum.
3. Wait five minutes. If there is a continuous drip, no matter how slight, replace the inlet and outlet Coco valve seals for that component.
4. If there is no sustained dripping, 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. Increase pressure for **A & B** transfer pumps to normal operating pressures.
3. Switch the dispenser on. This will open the outlet valves and close the inlet valves. Be ready to catch a short burst of material from the outlet fittings.
4. Place a clean towel or rag beneath the outlet fittings. Wait five minutes. If there is no seepage then the Coco valves seals are good. If there is any drool from the outlet fittings then the Coco ball valve seals need to be replaced.

## Ratio Assurance Procedures

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

1. Tightly cap the fluid outlet fittings.
2. Switch the dispenser on. This will shift the Coco module to close the inlet valves and open the outlet valves.
3. Reduce the pressure at the Transfer and Dispense pressure regulators to zero.
4. Remove the top and left side covers.
5. Direct the Supply Bypass Valves into a pan.
6. Increase the Dispense pressure to the maximum. Open the Supply Bypass Valves.
6. Wait five minutes. If there is a continuous drool, no matter how slight, replace the Coco valve seals for that component.



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.

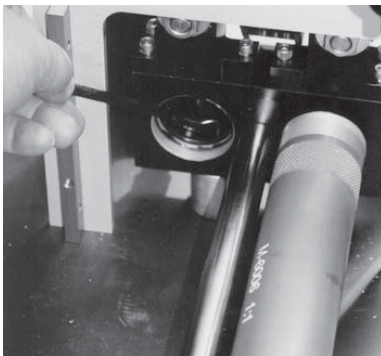
## Changing Ratio

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.

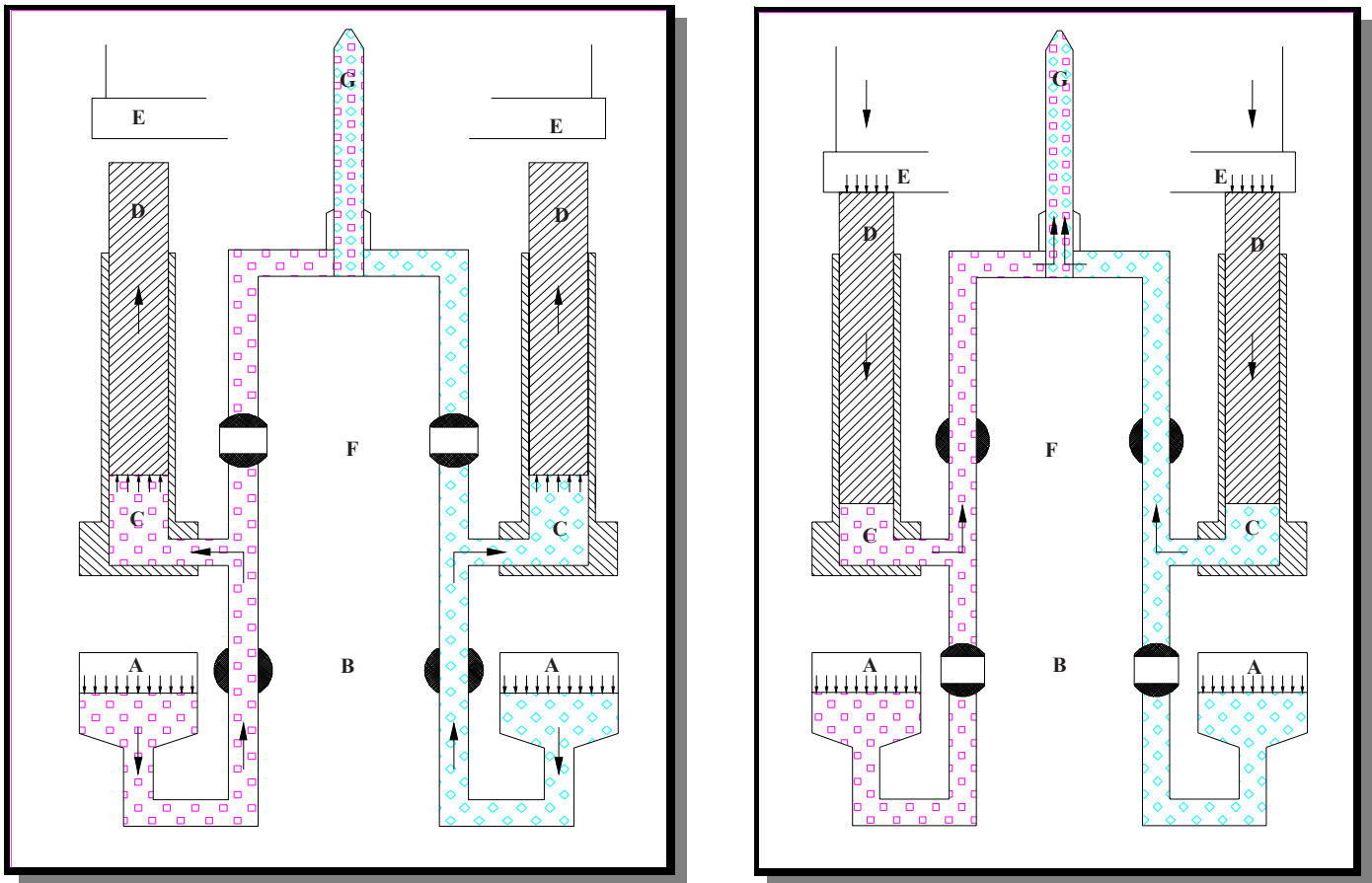
7. Lubricate the threads of the replacement metering assembly with an anti-seize compound or silicone lubricant. Carefully thread the assembly clockwise into the manifold until it is seated. Do not over-tighten! When the chamber bottoms out in the manifold you will feel a definite stop. If in doubt,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

A thorough understanding of the CD135 operation will take the guess work out of trouble shooting, and provide a better appreciation of conditions which may adversely affect its performance.



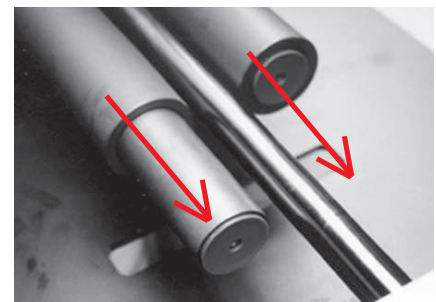
The resin components are pressurized within vessels (A) or by pumps. Pressurized, the components flow through open inlet valves (B) to enter their respective metering cylinders (C).

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

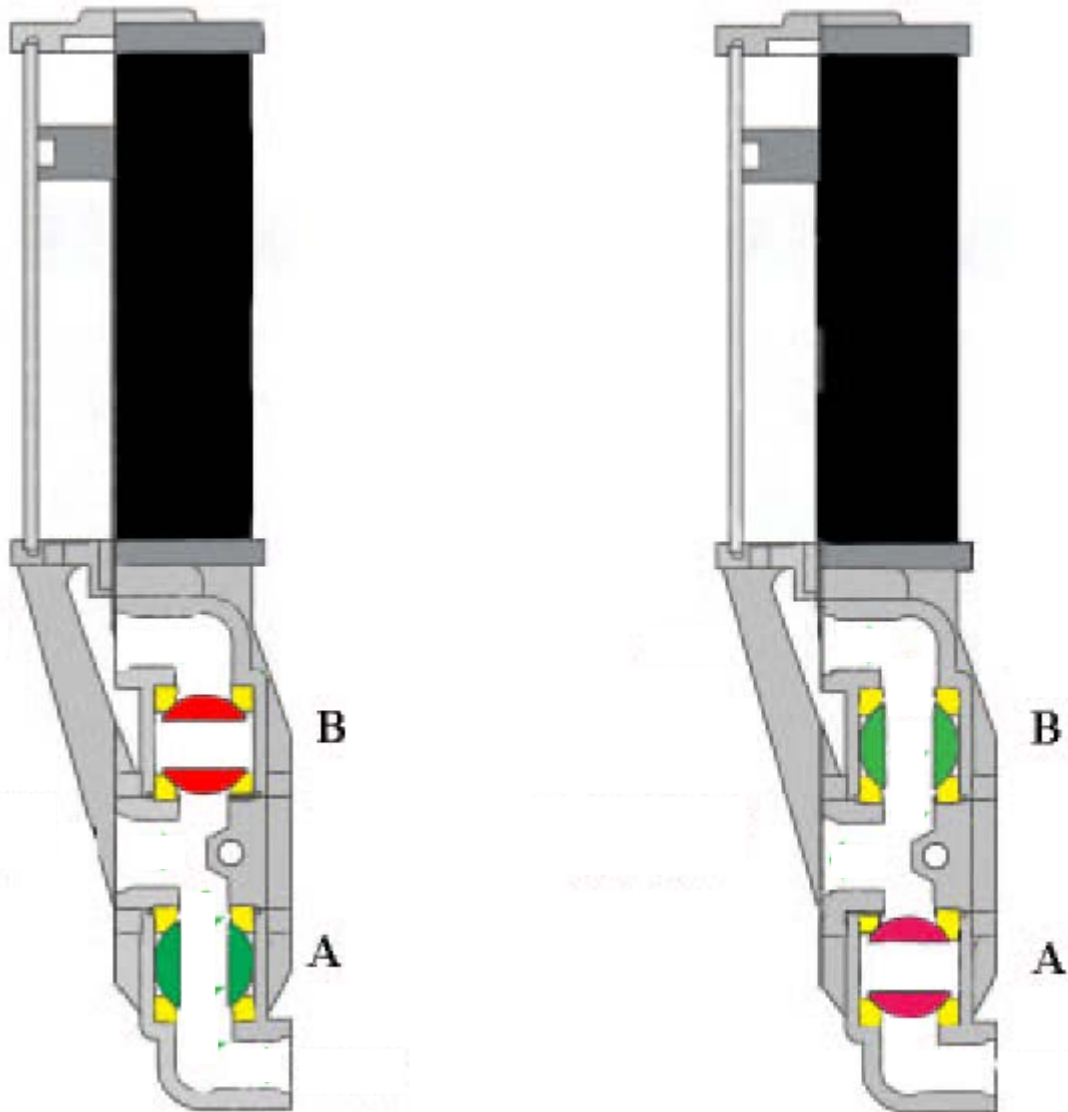
After both metering pistons are fully extended, the inlet valves (B) close, and the outlet valves (F) open.

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



## 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 31 and 32.

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

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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.

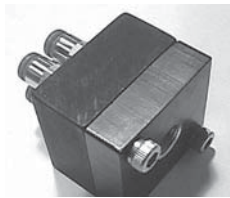
Replace the coupler shaft seals (S-328) when replacing the ball seals. They are exposed to the same product, so the wear is comparable. The seals are exposed during the course of replacing the ball seals, and therefore easily replaced in the course of ball seal replacement. When servicing a Coco module, refer to the exploded parts view on page #29 and the steps that follow.

## 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.

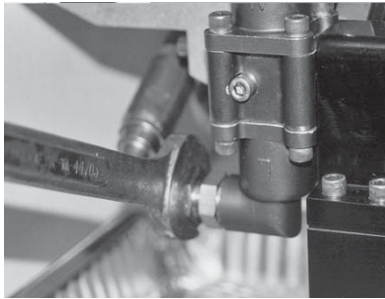
The relaxation of the signal at **A-2** due to the shifting to **A-3** triggers a signal from port **S** of the Stroke Sensor. The signal from port **S** energizes port **B-1**, shifting a signal from port **B-2** to port **B-3**, elevating the main air cylinder. The cycle is then repeated.

## Disassembly of the Coco Module



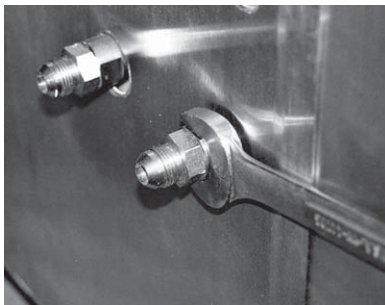
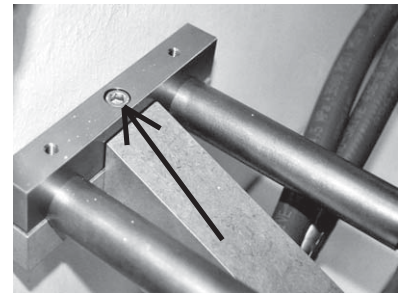
1. Reduce the dispense pressure to zero and switch the dispenser off. This will open the inlet fluid valves.

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.



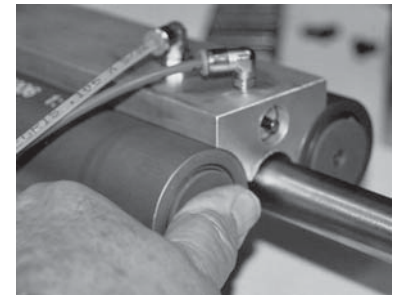
3. Place a pan beneath the inlet hose fitting and disconnect it.

4. Use an Allen wrench to loosen the set screw in the top of the upper pipe clamp. This will relax the grip on the pipe extension so that it can rotate.



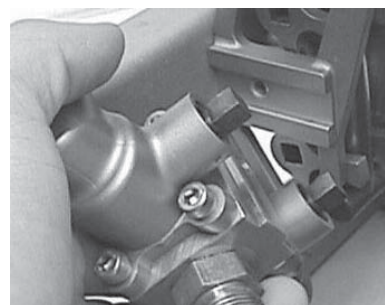
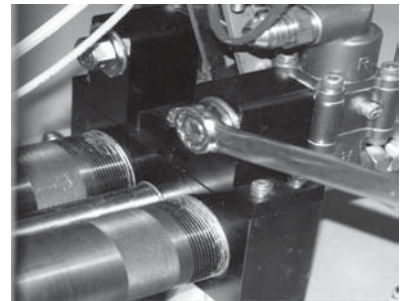
5. Place a 7/8" wrench on the pipe extension flats to unscrew and free the extension from the Coco module.

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



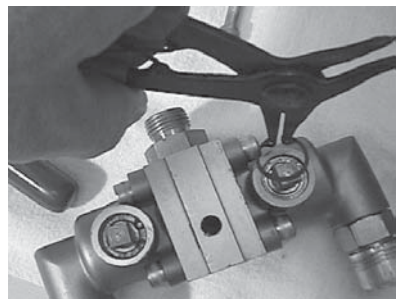
7. Remove the bolt (S-334) securing the spacer block to the frame module (M-571).

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



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

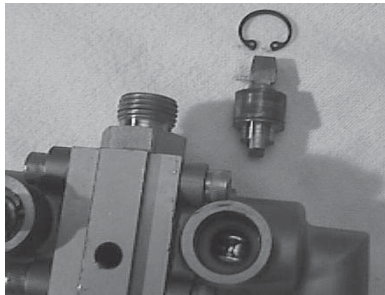
10. Use an 8-15 mm snap ring tool to remove the ring retaining the coupler shaft (M-581).





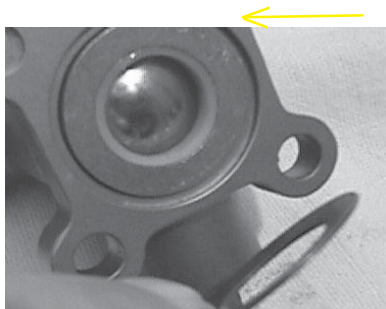
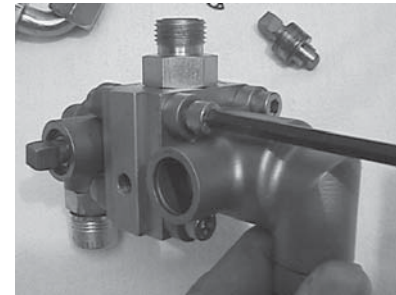
# SERVICING THE SYSTEM

## Disassembly of the Coco Module



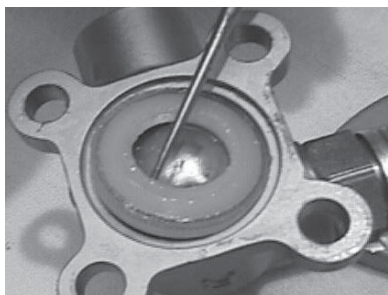
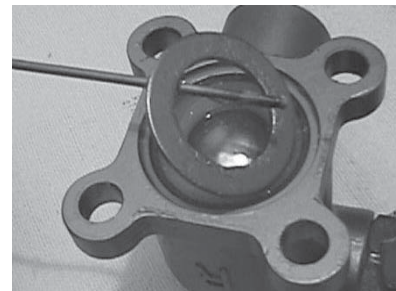
12. Grasp the coupler shaft (M-581) and gently work it and its bushing (M-802) from the cavity.

13. Remove the four screws securing the valve to the spacer block. If they do not separate easily, tap them apart. Use a plastic mallet.



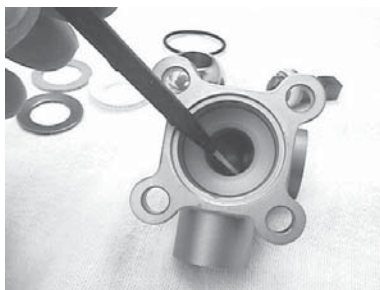
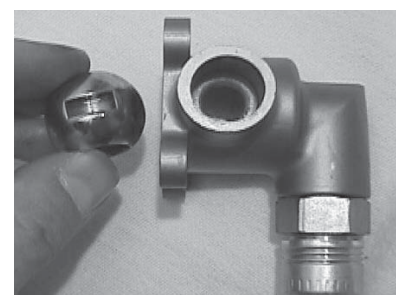
14. Remove the O-Ring (S-509) and the seal spring (S-330) (concave washer).

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



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

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



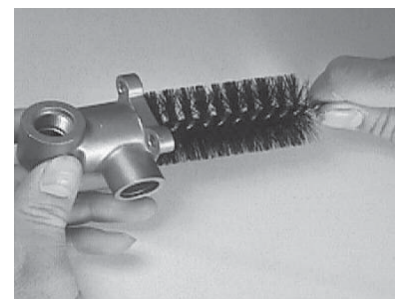
18. Using the seal pick, gently urge the bottom seal from its seat. Take care not to scratch the housing.

19. 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.

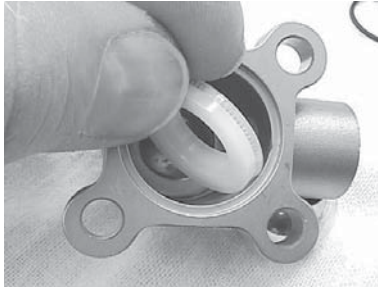
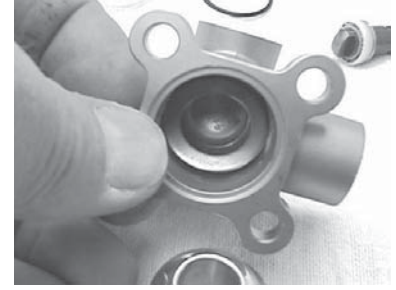


## Assembly of the Coco Module



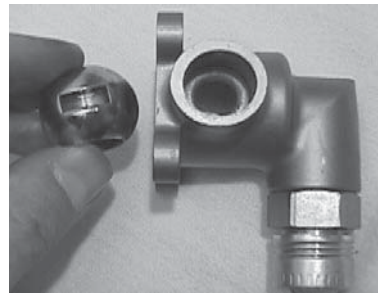
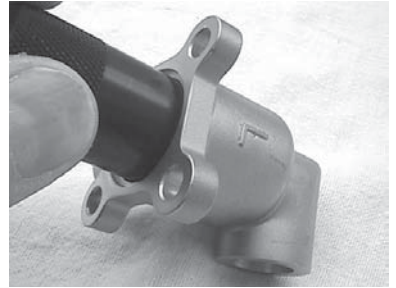
1. Fit the seal spring (S-330) into the pocket with its concave side toward the ball.

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



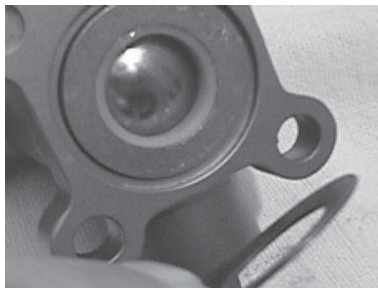
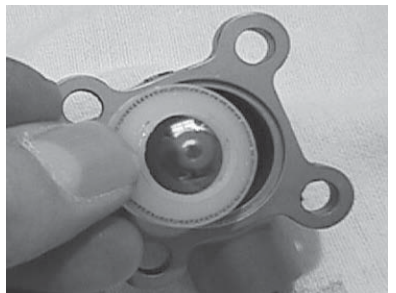
3. Insert the seal perpendicular to the bore until it is within the pocket. Then, twist it flat so that the spring side of the seal is facing down.

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.



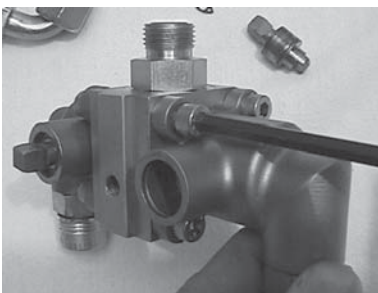
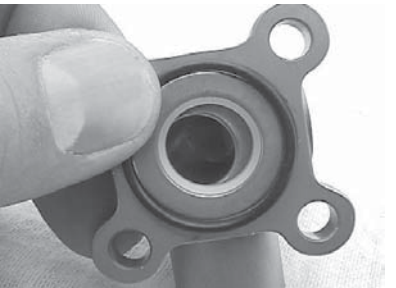
5. Slide the ball into the pocket with its detent (slot) open to the coupler pocket. Use the tongue of the coupler (M-581) to align the ball detent.

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



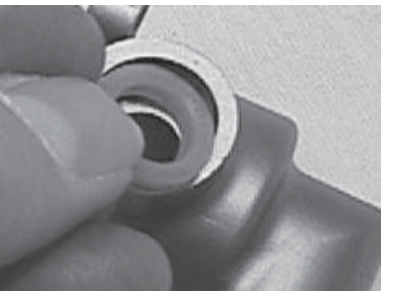
7. Install the flat washer over the seal, and apply silicone lube to hold it in place. Install the spring, concave side to the ball!!

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.

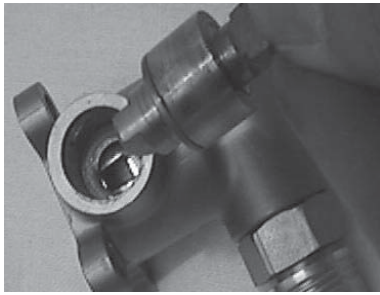


9. Attach the valve bodies to the center block. Take care not to distort the o ring seal. Snug, but do not tighten, the bolts.

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.

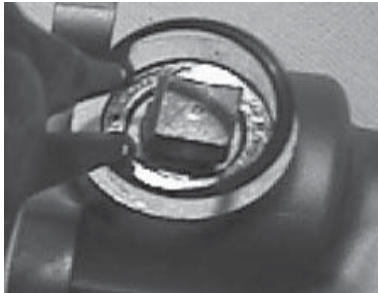
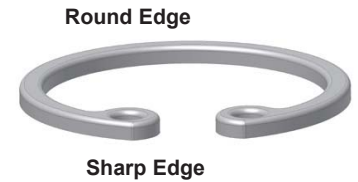


## Assembly of the Coco Module



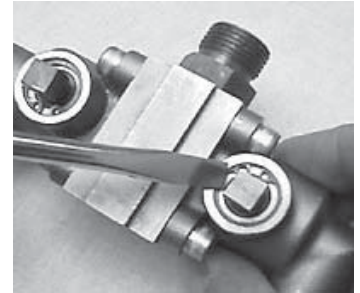
11. Carefully insert the coupler shaft (M-581), bronze bushing (M-802) and washer (P-469) into the housing.

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

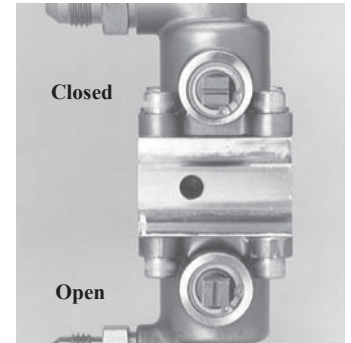


13. Install the retaining ring with the round edge inward, toward the ball. This orientation is important.

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



15. 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.



16. 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 by using the forks of the fixture to tweak the stems until both forks seat. Then turn work the fixture spline into the groove of the center block. When aligned, bolt the fixture to the center block and tighten the 8 bolts.

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



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

## The Metering Cylinders

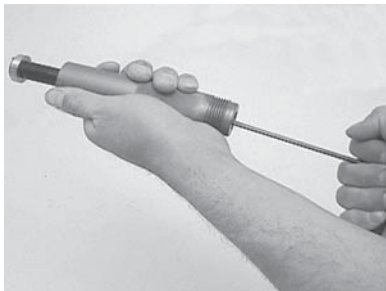
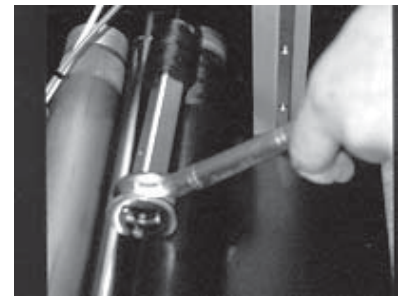
The frequency of service will depend upon the abrasive content of the material being dispensed and, to some degree, the abrasive atmosphere common to many construction sites. The need for metering assembly service is recognized by leakage between the metering piston and its cylinder, sluggish extension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



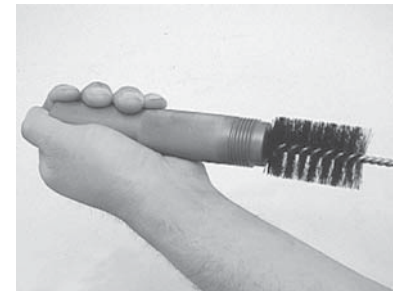
1. Grasp the metering piston and press it into its cylinder, purging the component back through the inlet fittings.

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



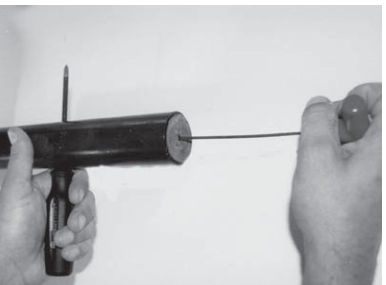
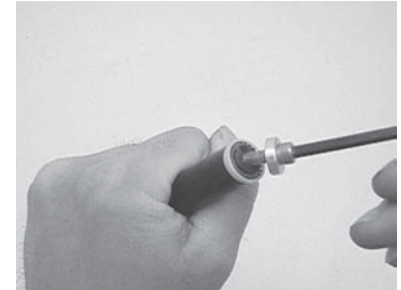
3. Press the piston from the cylinder bore. If it is seized, call Lily or visit a machine shop for assistance. Do not damage the bore!

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



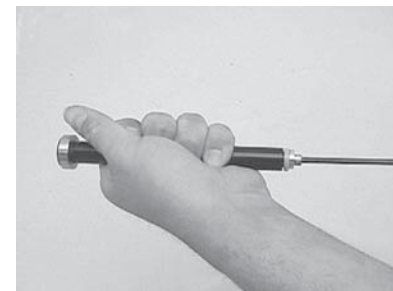
5. If the piston is scratched or marred, polish its surface with an abrasive cloth until no burr remains to damage the metering cylinder.

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

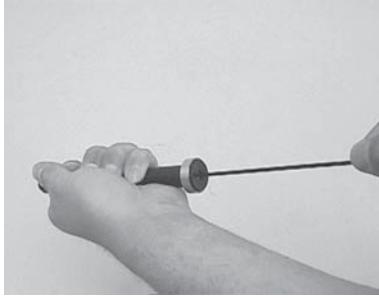


7. When removing or tightening pad or seal retaining screws, secure the piston from rotation by inserting a rod or screwdriver through the hole in the piston body. This will enable you to apply significant torque without using a clamping device.

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

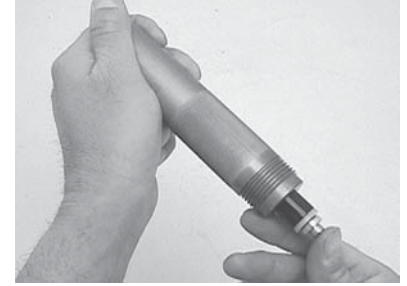


## The Metering Cylinders cont.



9. 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.

10. 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 11.**

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.

## **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.

## **Incorrect ratio**

Ratio assurance check to confirm valve performance.

## **Sluggish flow**

Disconnect the outlet fittings and observe the resin flow from the Coco ports. If the flow is unrestricted, there may be a partial obstruction in the mixer, hose, outlet valve, or other exterior plumbing. If no obstruction is found, the SSO or TSO valve may not be fully opening. Service the valve.

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

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.

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.

## **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.

## **Coco cylinder rod binding as it engages flippers.**

Valve bodies not properly aligned. See Page 16 for alignment instructions.

## **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.

## **Pneumatic switches respond but no fluid flow.**

Open control cabinet door and check pressure at miniature gauge fixed to the top of the regulator. If pressure is indicated, shift the slide valve to deenergize the system and then disconnect the hoses or manifold at the outlet fittings. Place a container beneath the fittings and restore the air supply. If material flows, there is an obstruction in the outlet plumbing. If material does not flow, service the Coco module.

**Caution:** if pressure is indicated at the gauge, both fluid lines are probably under pressure!!

## **Unable to prime hose or hoses at start up.**

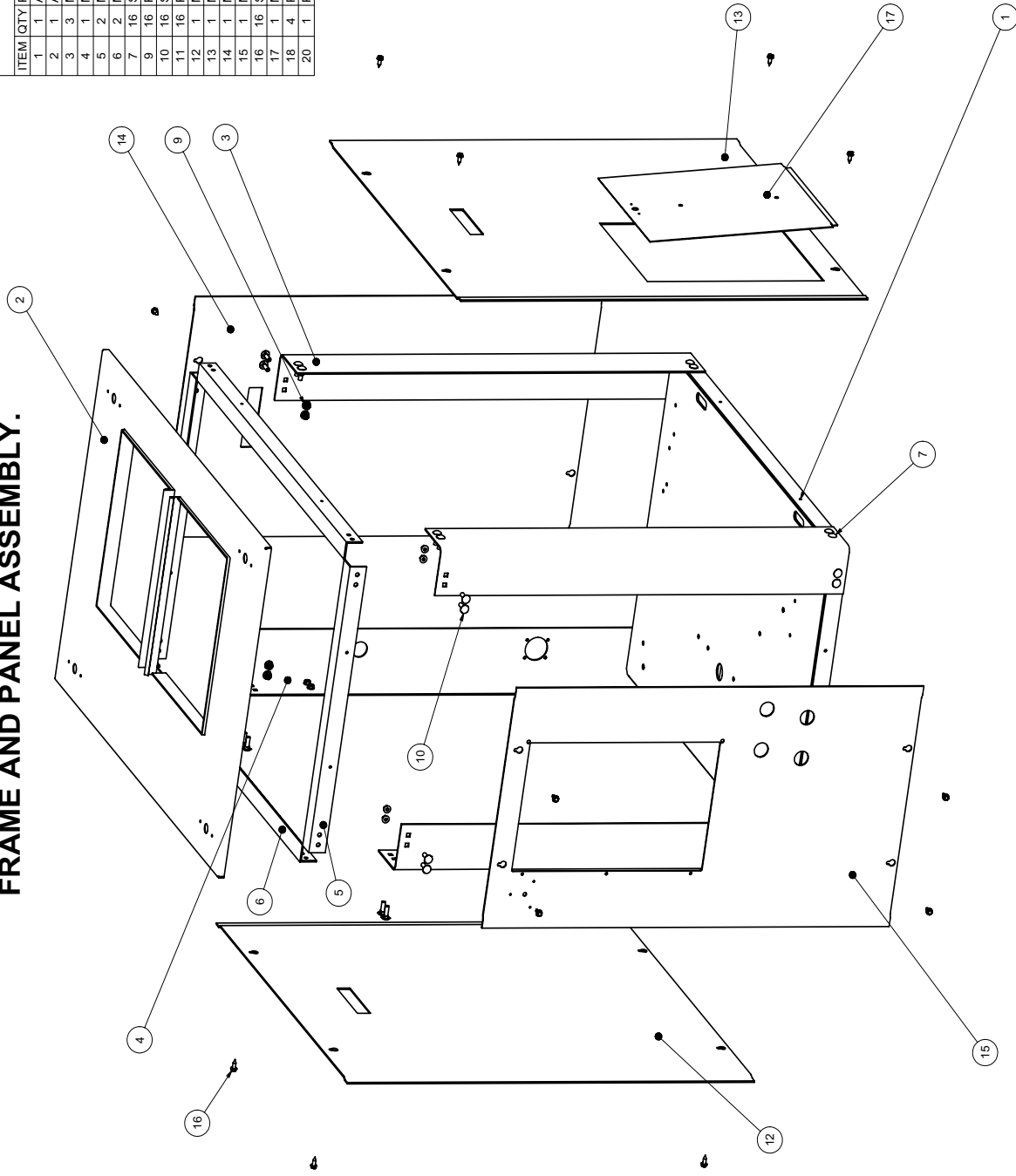
Remove shot sizing spacers and repeat the procedure.

**If you cannot correct the problem, call Lily Service from a cellular phone on site. If possible, phone with the unit, an air supply, tools, and resin information at hand.**



# FRAME AND PANEL ASSEMBLY.

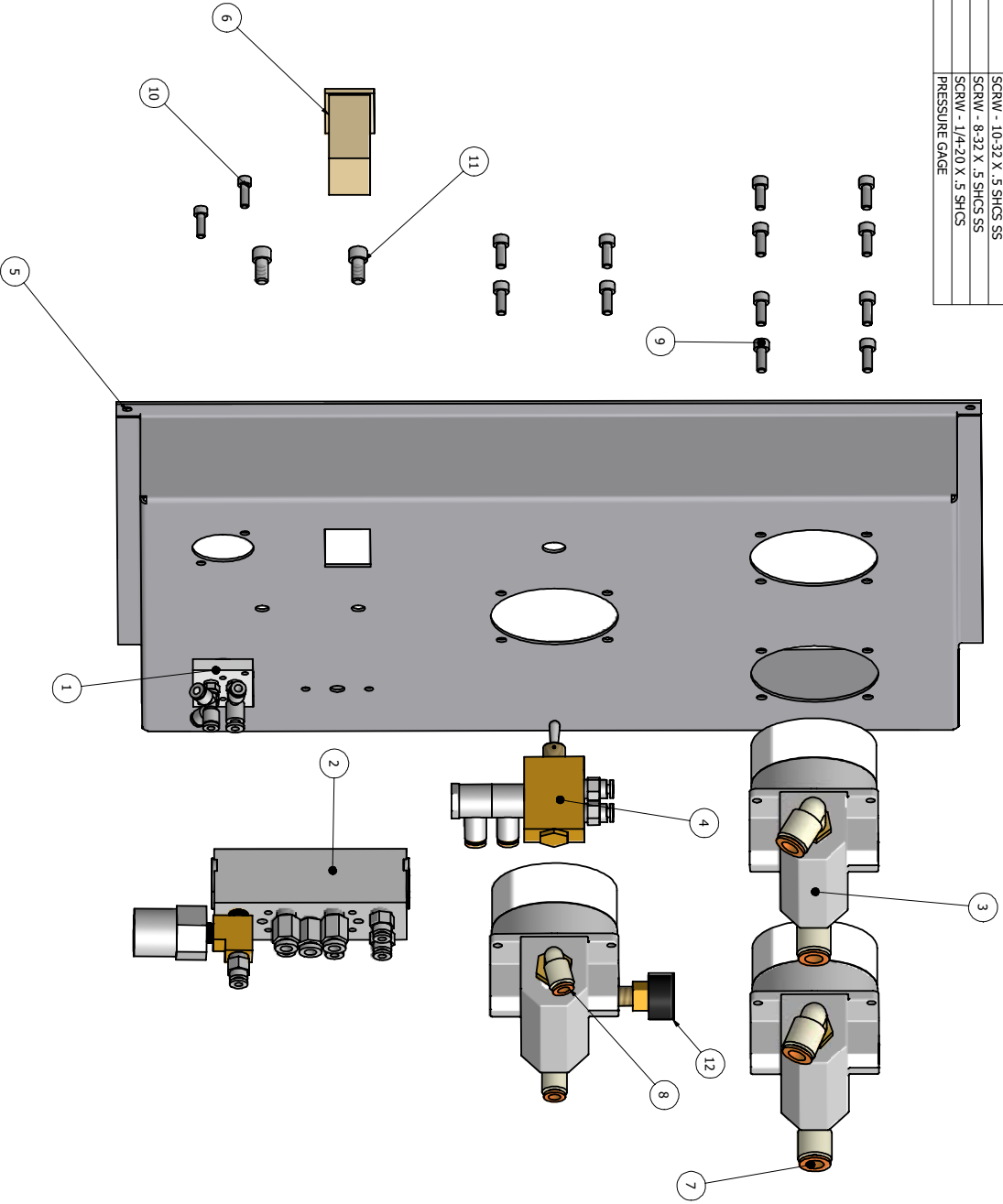
ITEM	QTY	PART NUMBER	FRAME AND PANEL ASSY DESCRIPTION
1	1	A-1338	FRAME BASE ASSY
2	1	A-1337	MAIN LID ASSY
3	3	M-1300	CORNER SUPPORT CD75/135
4	1	M-1301	CROSS SUPPORT CD75/135 SHORT
5	2	M-1302	CROSS SUPPORT CD75/135 LONG
6	2	M-1303	5/16-18 X 2 CARRIAGE BOLT 18-8 S.S.
7	16	S-258	5/16-18 HEX NUT 18-8 S.S.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

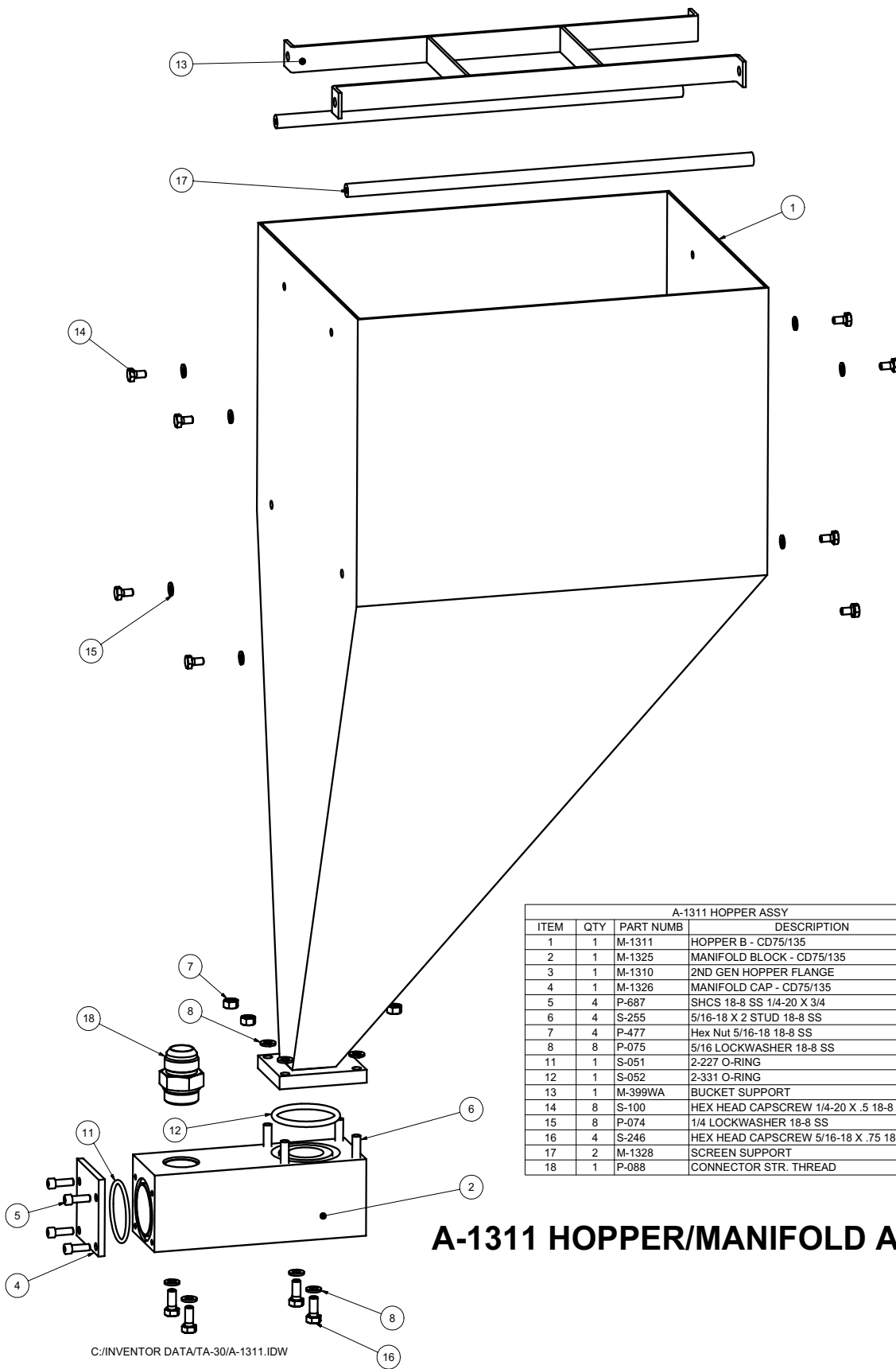




ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	UMBILICAL ASSY	UMBILICAL CONNECTION ASSY
2	1	TWIN VALVE ASSY	CONTROL VALVE ASSY
3	3	P-089	AIR REGULATOR
4	1	P-707 ON OFF ASSY	MACHINE ON/OFF SWITCH
5	1	M-1314	DASH BOX
6	1	P-299	COUNTER - ELECTRIC
7	4	S-930	CF SFT - 3/8 X 3/8 NPT ELBOW
8	2	S-755	CF SFT - 1/4 X 3/8 NPT ELBOW M
9	12	S-666	SCRW - 10-32 X .5 SHCS SS
10	2	P-344	SCRW - 8-32 X .5 SHCS SS
11	2	S-99	SCRW - 1/4-20 X .5 SHCS
12	1	P-810	PRESSURE GAGE

# DASHBOARD ASSY

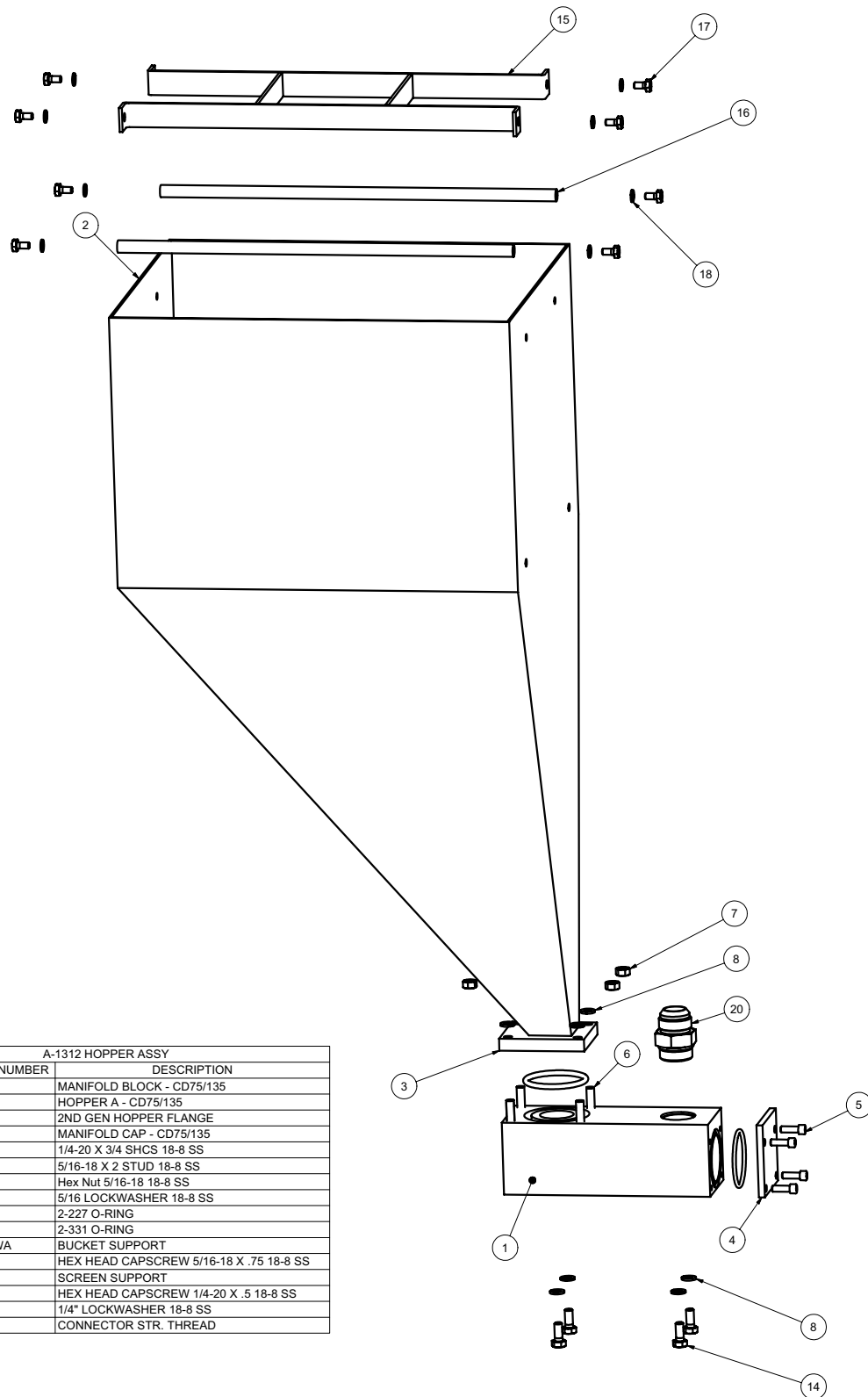




A-1311 HOPPER ASSY			
ITEM	QTY	PART NUMB	DESCRIPTION
1	1	M-1311	HOPPER B - CD75/135
2	1	M-1325	MANIFOLD BLOCK - CD75/135
3	1	M-1310	2ND GEN HOPPER FLANGE
4	1	M-1326	MANIFOLD CAP - CD75/135
5	4	P-687	SHCS 18-8 SS 1/4-20 X 3/4
6	4	S-255	5/16-18 X 2 STUD 18-8 SS
7	4	P-477	Hex Nut 5/16-18 18-8 SS
8	8	P-075	5/16 LOCKWASHER 18-8 SS
11	1	S-051	2-227 O-RING
12	1	S-052	2-331 O-RING
13	1	M-399WA	BUCKET SUPPORT
14	8	S-100	HEX HEAD CAPSCREW 1/4-20 X .5 18-8 SS
15	8	P-074	1/4 LOCKWASHER 18-8 SS
16	4	S-246	HEX HEAD CAPSCREW 5/16-18 X .75 18-8 SS
17	2	M-1328	SCREEN SUPPORT
18	1	P-088	CONNECTOR STR. THREAD

## A-1311 HOPPER/MANIFOLD ASSY

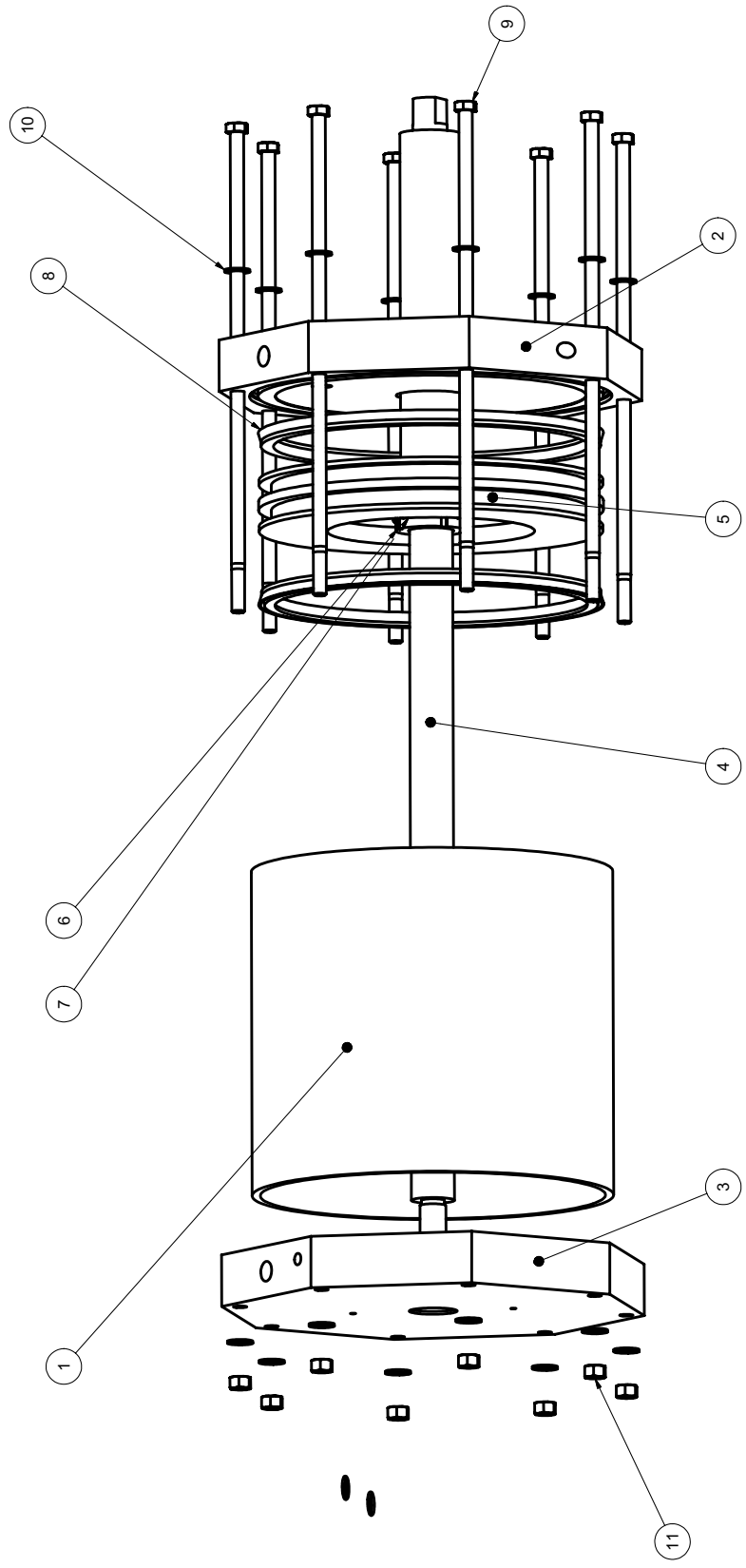
C:/INVENTOR DATA/TA-30/A-1311.IDW



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

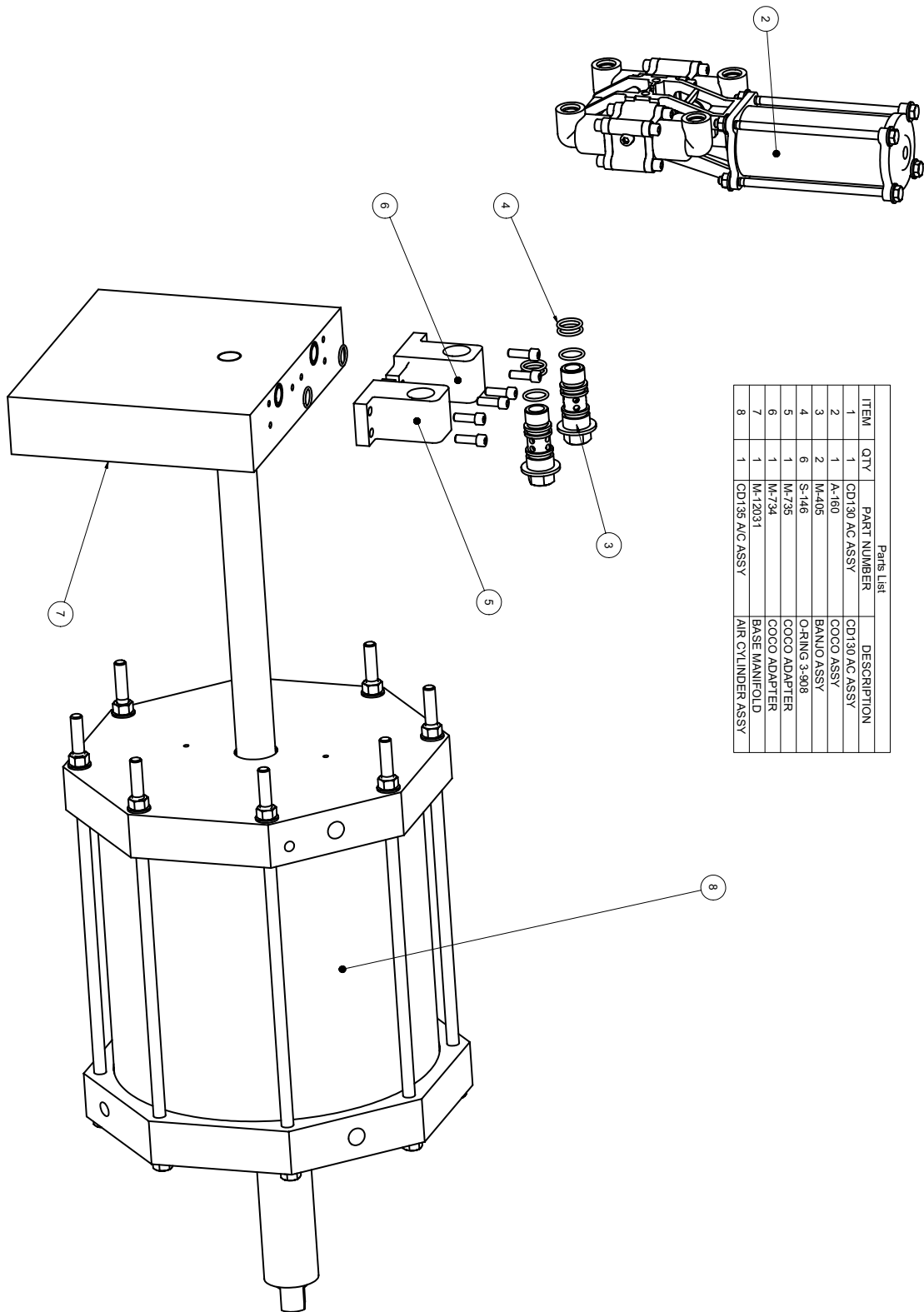
## A-1312 HOPPER MANIFOLD ASSY

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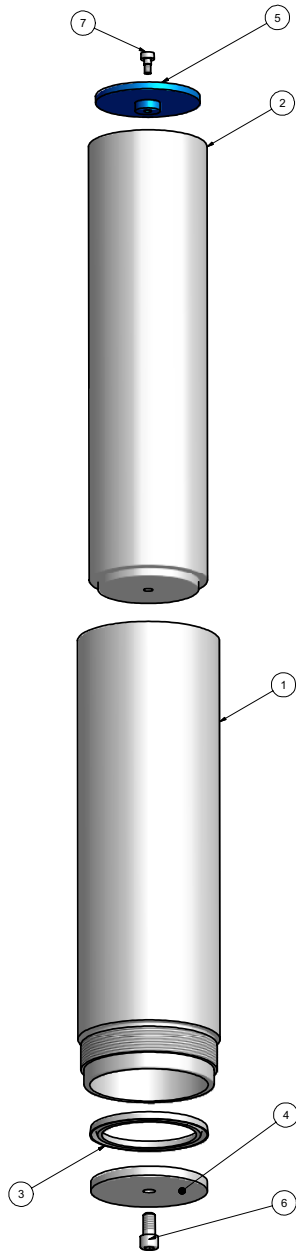
## CD135 A/C ASSY

CD135 A/C ASSEMBLY			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	M-12001	AC - SLEEVE - 10"
2	1	M-12002	AC - CAP - REAR
3	1	M-12003	AC - CAP - FRONT
4	1	M-12004	AC - ROD
5	1	M-12006	AC - PISTON - 10"
6	1	P-436	LOCKNUT - 10" AC
7	1	P-437	LOCKWASHER - 10" AC
8	2	P-689	SEAL - 10" PISTON
9	8	S-635	HEX HEAD CAPSCREW 3/8-16 X 14
10	16	P-119	3/8 FLATWASHER
11	8	P-570	3/8" HEX NUT 18-8 SS
12	2	S-420	SEAL O-RING



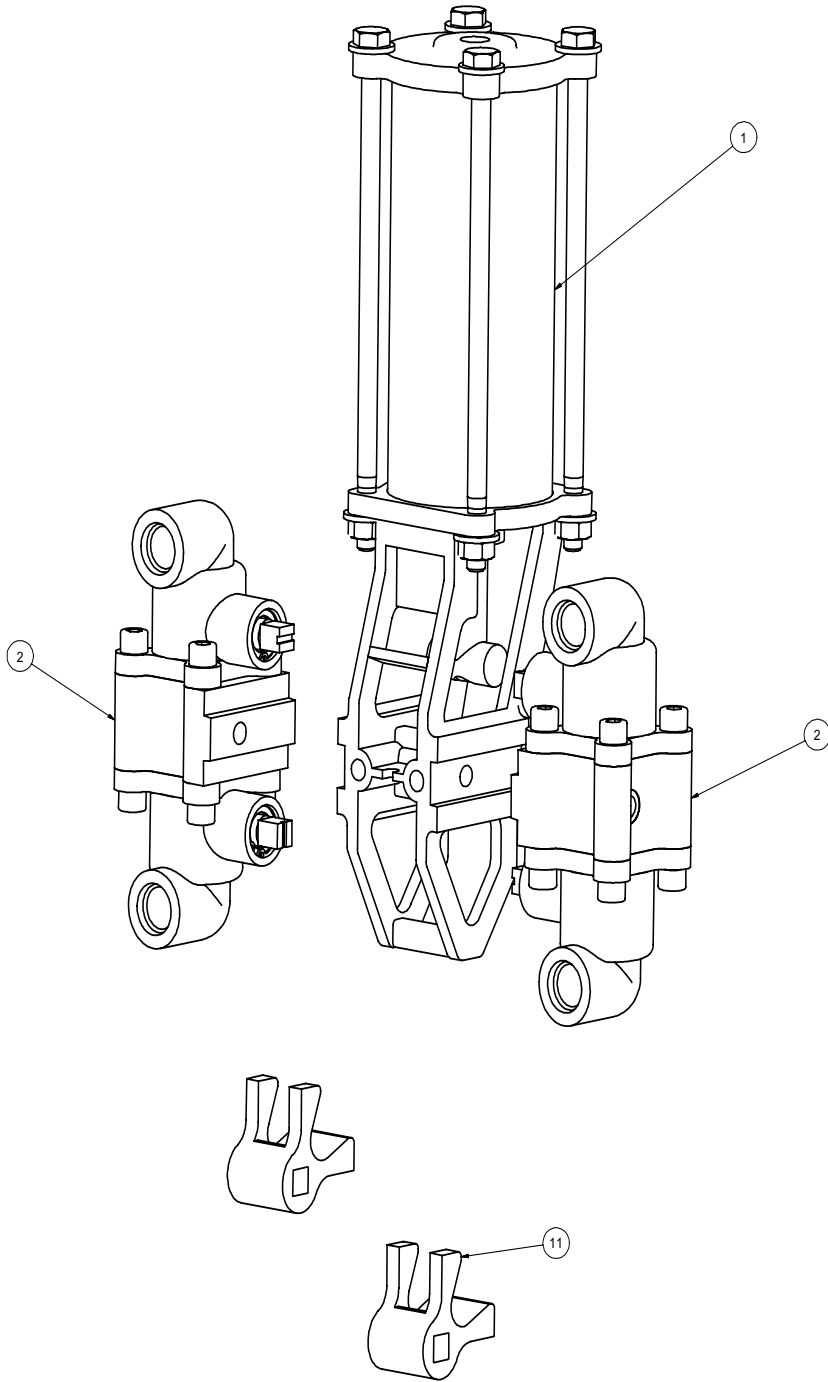
Parts List

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	CD130 AC ASSY	CD130 AC ASSY
2	1	A-160	COCO ASSY
3	2	M-405	BAND ASSY
4	6	S-146	O-RING 3-908
5	1	M-735	COCO ADAPTER
6	1	M-734	COCO ADAPTER
7	1	M-12031	BASE MANIFOLD
8	1	CD135 AC ASSY	AIR CYLINDER ASSY



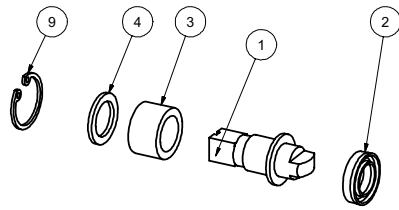
Parts List			
ITE	QTY	PART NUMBE	DESCRIPTION
1	1	M-12008	1:1 METERING CYLINDER
2	1	M-12010	1:1 METERING PISTON
3	1	S-220	PISTON SEAL
4	1	M-12012	PISTON CAP
5	1	P-864	PISTON PAD
6	1	S-99	1/4-20 X .5 SHCS SS
7	1	P-539	6/32 SH SHOULDER SCREW

A-140 1:1 METERING ASSY



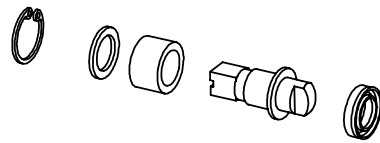
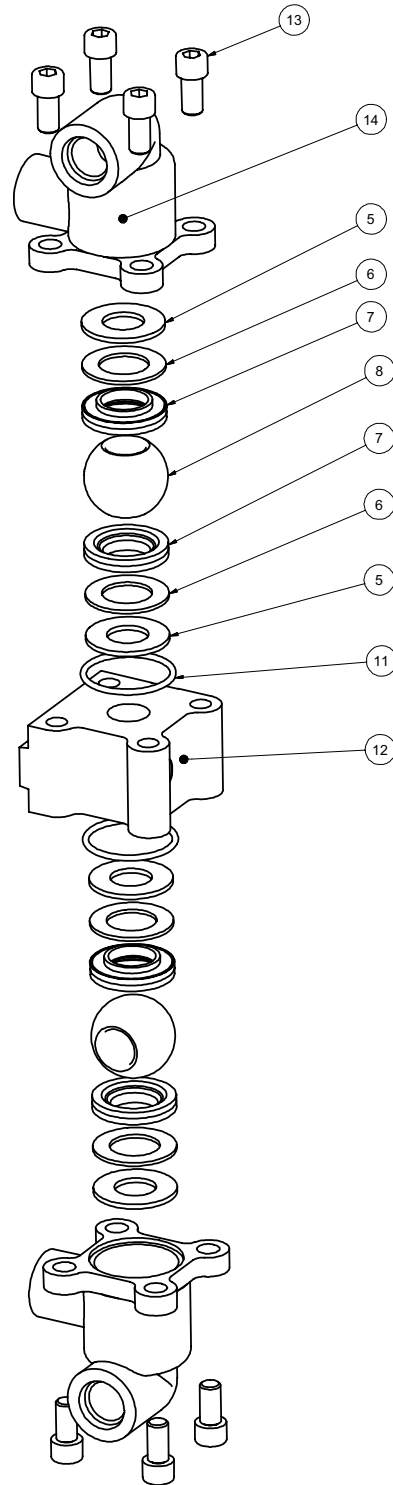
## A-160 COCO ASSY

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

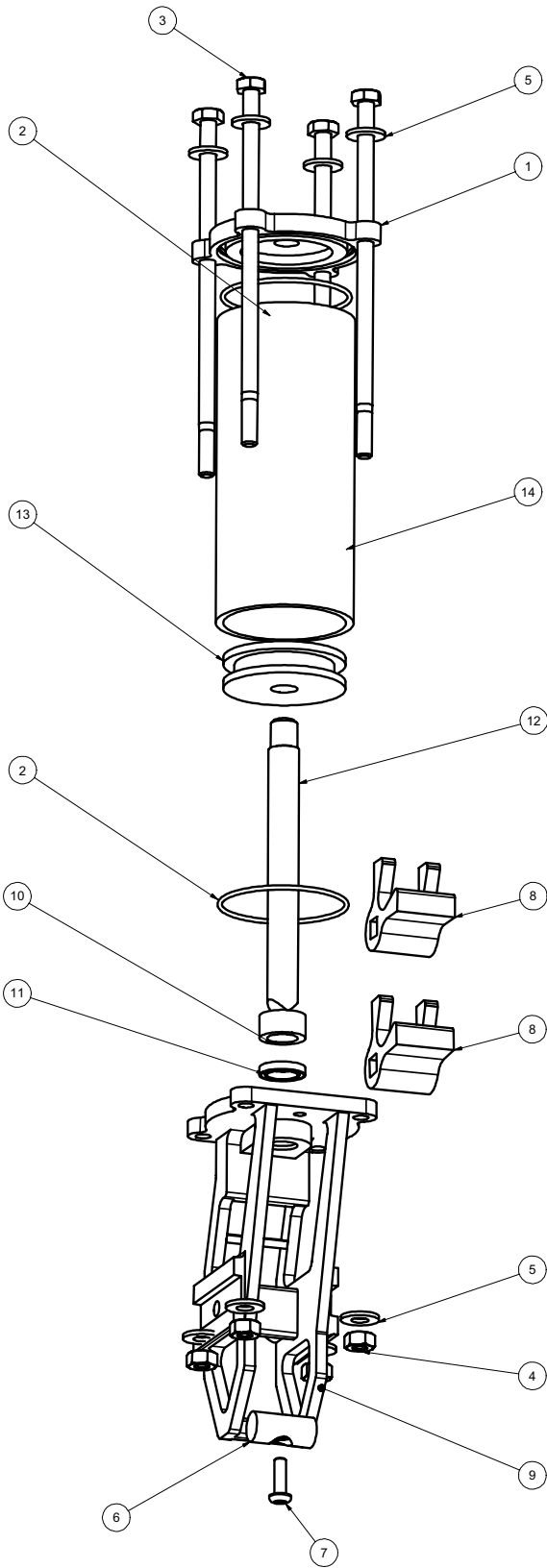


### A-160-3

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



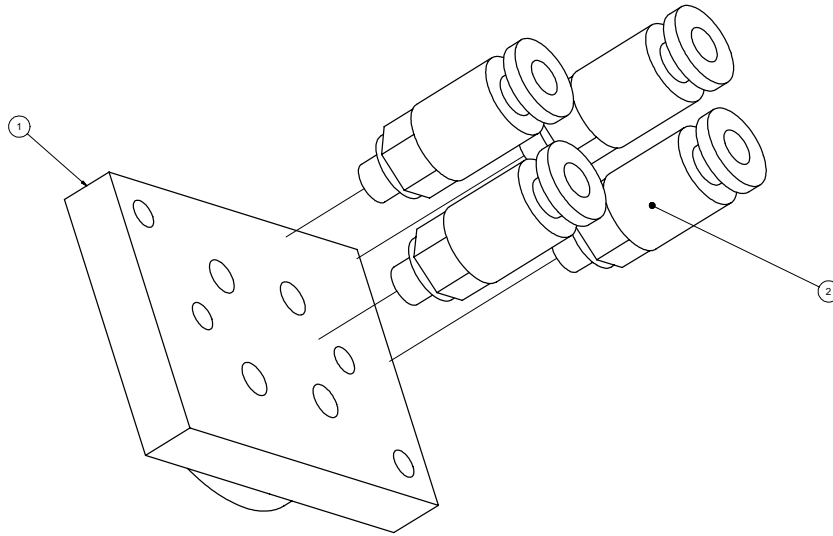




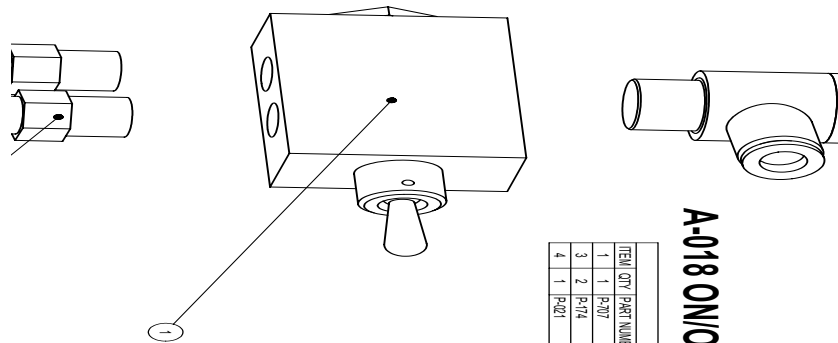
### A-013 ASSY

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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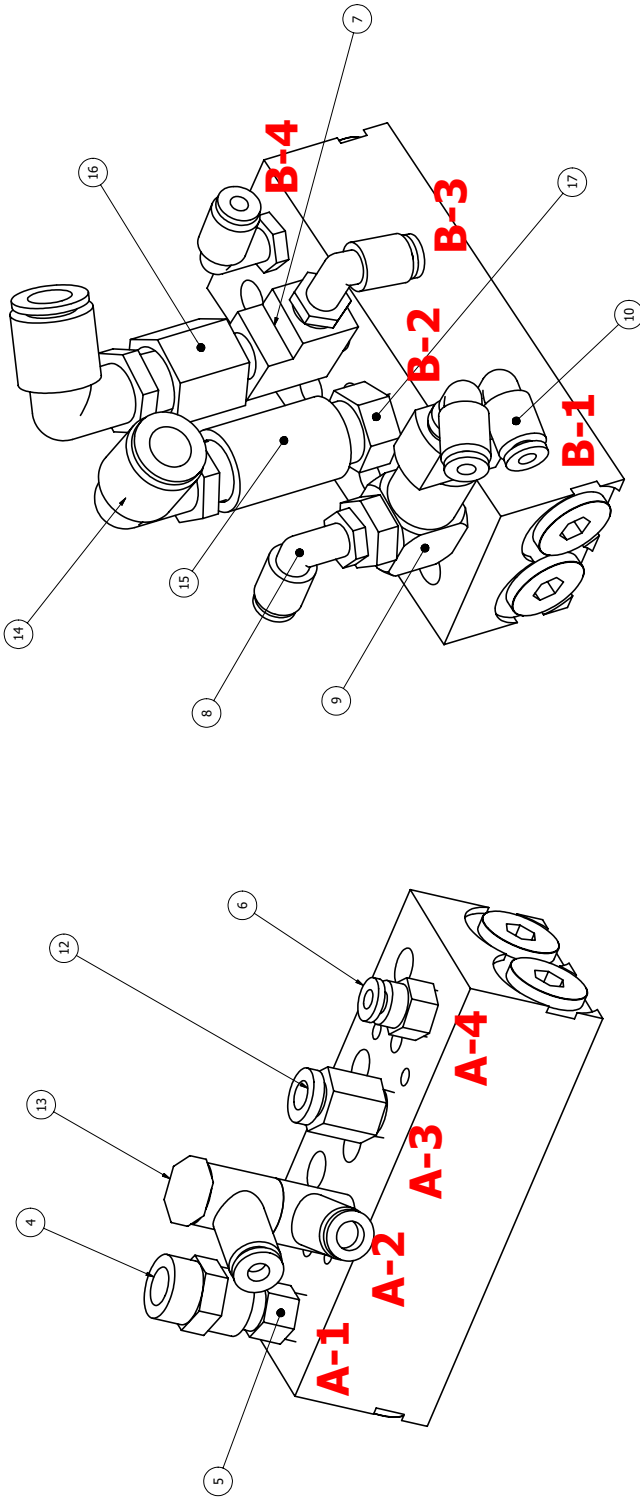
UMBILICAL CONNECTION ASSY			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	M-850	SOCKET - UMBILICAL CONTROL
2	4	P-186	5/32 X 10-32 UNION



A-018 ON/OFF ASSY			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	P-307	ON/OFF SWITCH
3	2	P-174	1/8 NPT X 5/32 UNION
4	1	P-021	

**A-018 ON/OFF SWITCH ASSY**

# TWIN VALVE ASSY CD135

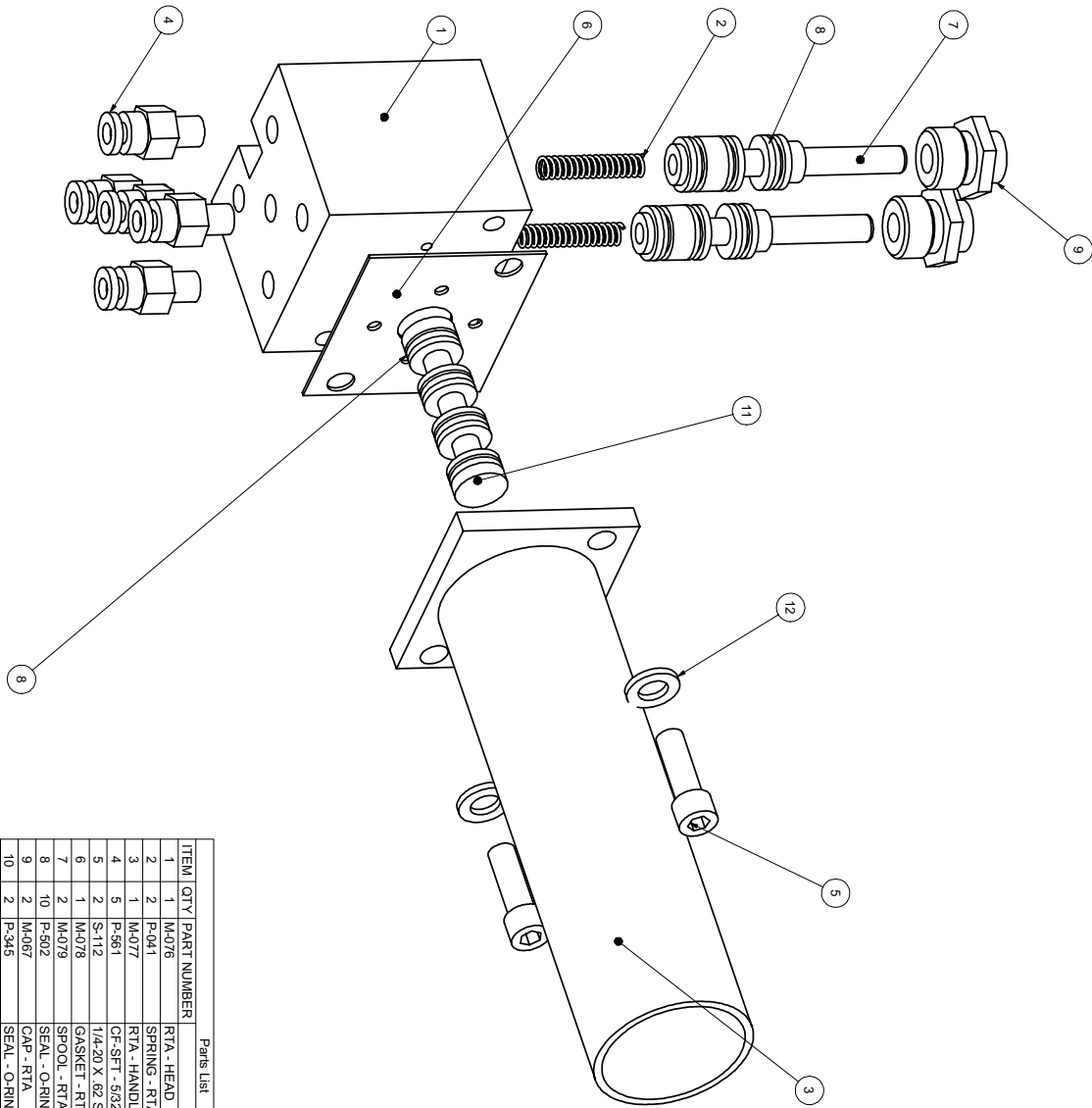


Parts List

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
12	1	S-499	CF SFT - 1/4 X 1/8 NPT UNION MALE
13	1	P-066	

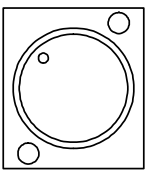
Parts List

ITEM	QTY	PART NUMBER	DESCRIPTION
7	1	S-021	PIPE TEE 1/8 NPT BRASS
8	3	P-176	CF SFT 5/32 X 1/8 NPT SWVL ELBOW
9	1	P-182	AL - STROKE SENSOR 1/8 NPT
10	2	P-209	CF SFT 5/32 ROTATING ELBOW
14	2	S-940	CF SFT 3/8 X 1/4 NPT SWVL ELBOW
15	1	P-201	PIPE COUPLING
16	1	S-143	REDUCER 1/4 F X 1/8 M NPT
17	1	S-445	NIPPLE 1/4NPT X 1/8NPT



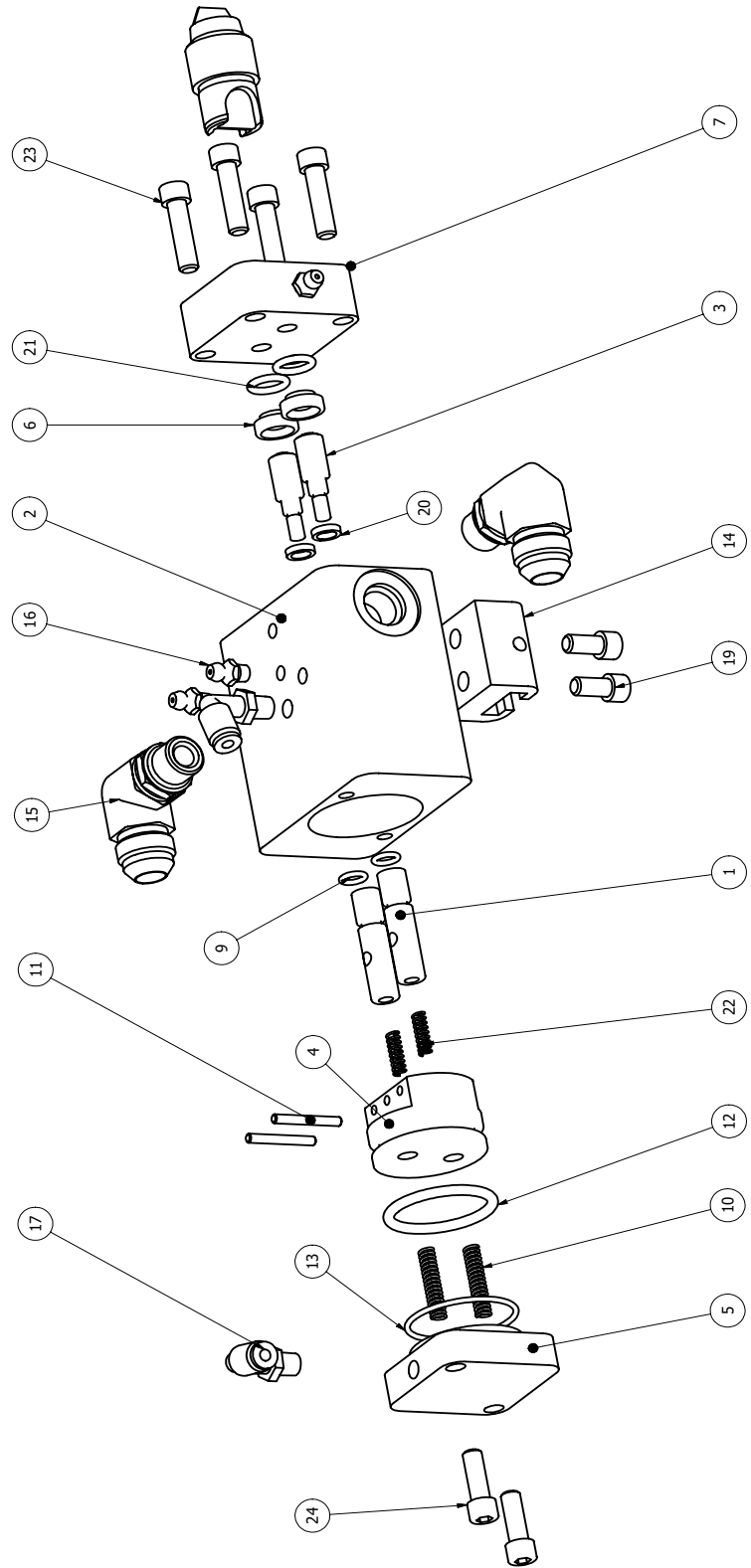
Parts List

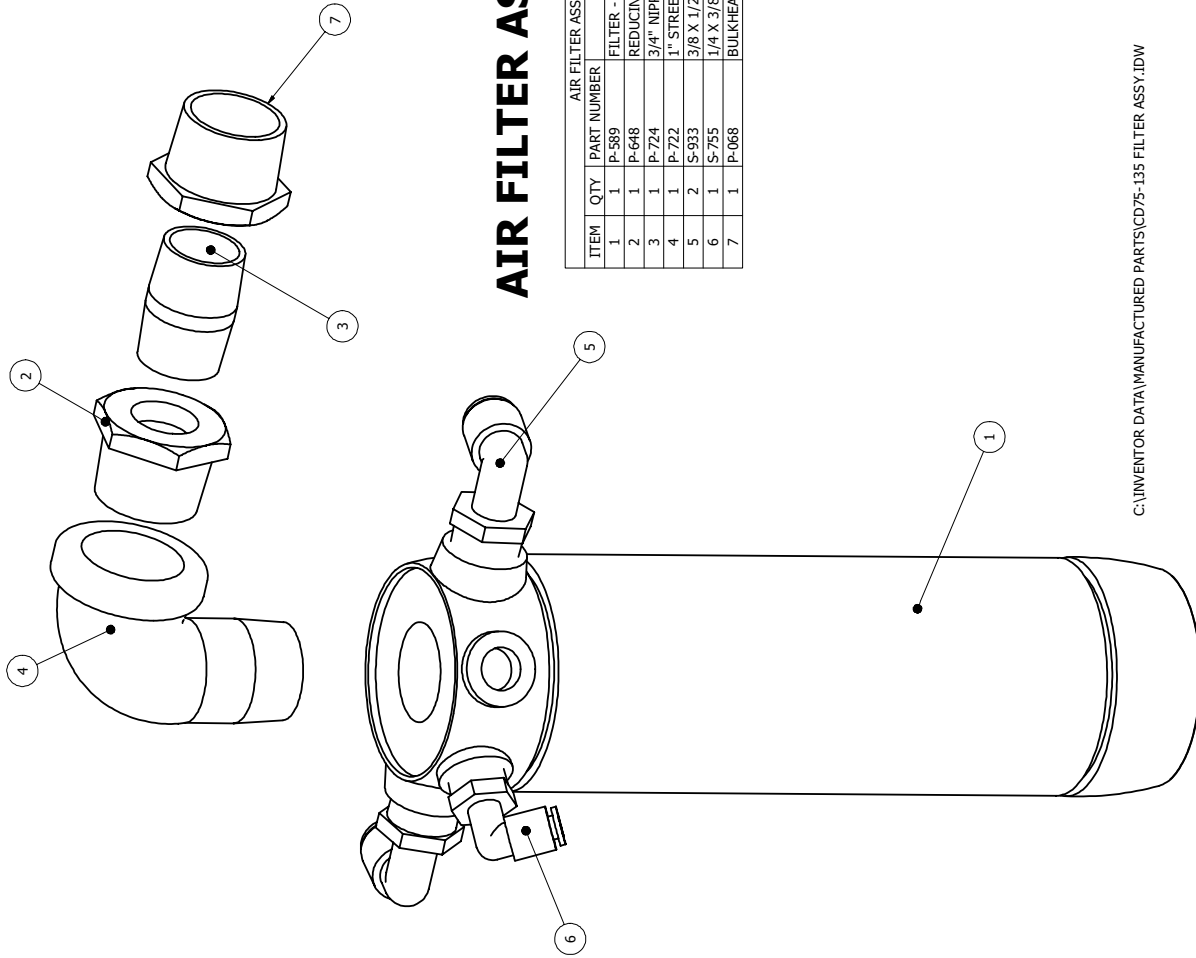
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	M-076	RTA - HEAD
2	2	P-041	SPRING - RTA BLOCK
3	1	M-077	RTA - HANDLE
4	5	P-561	CF-SFT - 5/32 X 1/16" NPT UNION
5	2	S-112	1/4-20 X .62 SHCS S.S.
6	1	M-078	GASKET - RTA HANDLE
7	2	M-079	SPOOL - RTA BLOCK
8	10	P-302	SEAL - O-RING
9	2	M-067	CAP - RTA
10	2	P-345	SEAL - O-RING
11	1	M-080	SPOOL - RTA HANDLE
12	2	S-415	WASHER



**NOTE: ITEM NO'S. 14 & 15 ARE AVAILABLE OPTIONS DEPENDING ON APPLICATION REQUIREMENTS.**

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 ZerK
17	2	P-565	CF SFT - 5/32 X 1/16" NPT ELBOW
19	2	S-99	SCRW - 1/4-20 X .5 SHCS
20	2	S-419	SEAL - U-CUP TSO PLUNGERS
21	2	S-425	SEAL O-RING 2-110
22	2	P-484	SPRING - TSO VALVE
23	4	S-037	1/4 - 20 X 1 SHCS 18-8 SS
24	2	P-687	1/4 - 20 X .75 SHCS 18-8 SS





## AIR FILTER ASSY CD75/135

AIR FILTER ASSY CD75-135			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	P-589	FILTER - P.U.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-933	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

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