

8-S4-5 and 8-CS4-5 Meter-Mix Systems

332436B

EN

For metering, mixing, and dispensing of silicone material.
For professional use only.

Not approved for use in explosive atmospheres or hazardous locations.

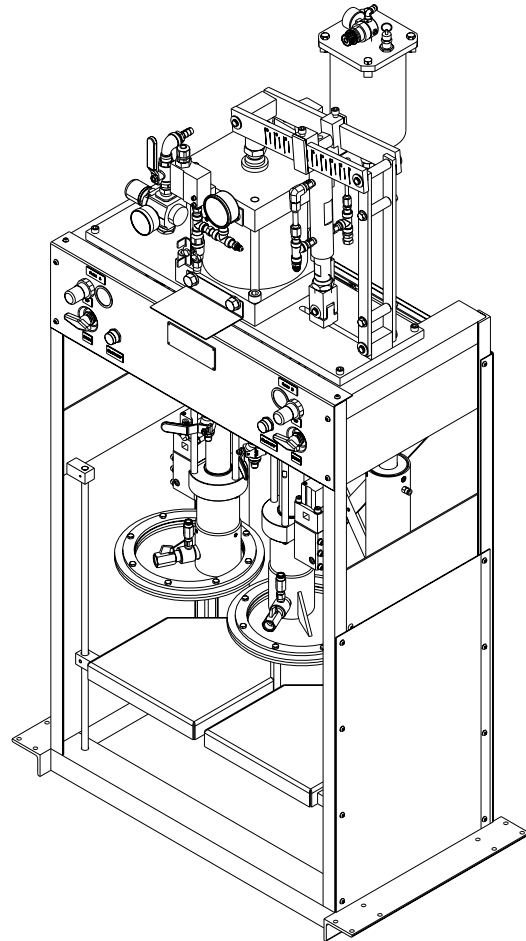


Important Safety Instructions

Read all warnings and instructions in this manual. Save these instructions.

See page 3 for model information, including maximum working pressure and approvals.

If the visuals in the printed copy are unclear, refer to the electronic version available on www.graco.com.



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Models

Part No.	Maximum Working Pressures psi (MPa, bar)	Description
8-S4-5M	3000 (21, 207)	Pneumatic Controlled, 1:1 Fixed Ratio, 5-Gallon Meter Mix Machine. Machine uses B443M Base Pumps with check assemblies for enhanced control. Machine has 3 in. (8 cm) ram air cylinders, 8 in. (20 cm) air motor.
8-CS4-5M		Pneumatic Controlled, 1:1 Fixed Ratio, 5-Gallon Meter Mix Machine. Machine uses B443M Base Pumps with check assemblies for enhanced control. Machine has 3 in. (8 cm) ram air cylinders, 8 in. (20 cm) air motor. Machine has Variable Ratio Drive for Slave Color Pump and 3-Quart Pressure Tank.

Warnings

The following warnings are for the setup, use, grounding, maintenance, and repair of this equipment. The exclamation point symbol alerts you to a general warning and the hazard symbols refer to procedure-specific risks. When these symbols appear in the body of this manual or on warning labels, refer back to these Warnings. Product-specific hazard symbols and warnings not covered in this section may appear throughout the body of this manual where applicable.

 WARNING	
	<p>TOXIC FLUID OR FUMES HAZARD</p> <p>Toxic fluids or fumes can cause serious injury or death if splashed in the eyes or on skin, inhaled, or swallowed.</p> <ul style="list-style-type: none"> • Read MSDSs to know the specific hazards of the fluids you are using. • Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines. • Always wear chemically impermeable gloves when spraying, dispensing, or cleaning equipment.
	<p>PERSONAL PROTECTIVE EQUIPMENT</p> <p>Wear appropriate protective equipment when in the work area to help prevent serious injury, including eye injury, hearing loss, inhalation of toxic fumes, and burns. This protective equipment includes but is not limited to:</p> <ul style="list-style-type: none"> • Protective eyewear, and hearing protection. • Respirators, protective clothing, and gloves as recommended by the fluid and solvent manufacturer
	<p>SKIN INJECTION HAZARD</p> <p>High-pressure fluid from dispensing device, hose leaks, or ruptured components will pierce skin. This may look like just a cut, but it is a serious injury that can result in amputation. Get immediate surgical treatment.</p> <ul style="list-style-type: none"> • Engage trigger lock when not dispensing. • Do not point dispensing device at anyone or at any part of the body. • Do not put your hand over the fluid outlet. • Do not stop or deflect leaks with your hand, body, glove, or rag. • Follow the Pressure Relief Procedure when you stop dispensing and before cleaning, checking, or servicing equipment. • Tighten all fluid connections before operating the equipment. • Check hoses and couplings daily. Replace worn or damaged parts immediately


WARNING

FIRE AND EXPLOSION HAZARD

Flammable fumes, such as solvent and paint fumes, in **work area** can ignite or explode. To help prevent fire and explosion:

- Use equipment only in well ventilated area.
- Eliminate all ignition sources; such as pilot lights, cigarettes, portable electric lamps, and plastic drop cloths (potential static arc).
- Keep work area free of debris, including solvent, rags and gasoline.
- Do not plug or unplug power cords, or turn power or light switches on or off when flammable fumes are present.
- Ground all equipment in the work area. See **Grounding** instructions.
- Use only grounded hoses.
- Hold gun firmly to side of grounded pail when triggering into pail. Do not use pail liners unless they are antistatic or conductive.
- **Stop operation immediately** if static sparking occurs or you feel a shock. Do not use equipment until you identify and correct the problem.
- Keep a working fire extinguisher in the work area.


EQUIPMENT MISUSE HAZARD

Misuse can cause death or serious injury.

- Do not operate the unit when fatigued or under the influence of drugs or alcohol.
- Do not exceed the maximum working pressure or temperature rating of the lowest rated system component. See **Technical Data** in all equipment manuals.
- Use fluids and solvents that are compatible with equipment wetted parts. See Technical Data in all equipment manuals. Read fluid and solvent manufacturer's warnings. For complete information about your material, request MSDS from distributor or retailer.
- Turn off all equipment and follow the **Pressure Relief Procedure** when equipment is not in use.
- Check equipment daily. Repair or replace worn or damaged parts immediately with genuine manufacturer's replacement parts only.
- Do not alter or modify equipment. Alterations or modifications may void agency approvals and create safety hazards.
- Make sure all equipment is rated and approved for the environment in which you are using it.
- Use equipment only for its intended purpose. Call your distributor for information.
- Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces.
- Do not kink or over bend hoses or use hoses to pull equipment.
- Keep children and animals away from work area.
- Comply with all applicable safety regulations.

 **WARNING**



MOVING PARTS HAZARD

Moving parts can pinch, cut or amputate fingers and other body parts.

- Keep clear of moving parts.
- Do not operate equipment with protective guards or covers removed.
- Pressurized equipment can start without warning. Before checking, moving, or servicing equipment, follow the **Pressure Relief Procedure** and disconnect all power sources.



SPLATTER HAZARD

Hot or toxic fluid can cause serious injury if splashed in the eyes or on skin. During blow off of platen, splatter may occur.

- Use minimum air pressure when removing platen from drum.

Component Identification

- | | | | |
|---|------------------------------|---|---------------------------------------|
| A | Main Air Inlet | H | Ram Air Regulator and Gauge |
| B | Pump Air Regulator and Gauge | J | Colorant Bleed Valve |
| C | Drum Blow-off Valve | K | Colorant Pump |
| D | Pump Bleed Valve | L | Colorant Rail |
| E | Pail Shelf | M | Colorant Tank |
| F | Platen Bleed Valve | N | Colorant Tank Air Regulator and Gauge |
| G | Ram Control Valve | P | Material Ball Valve |

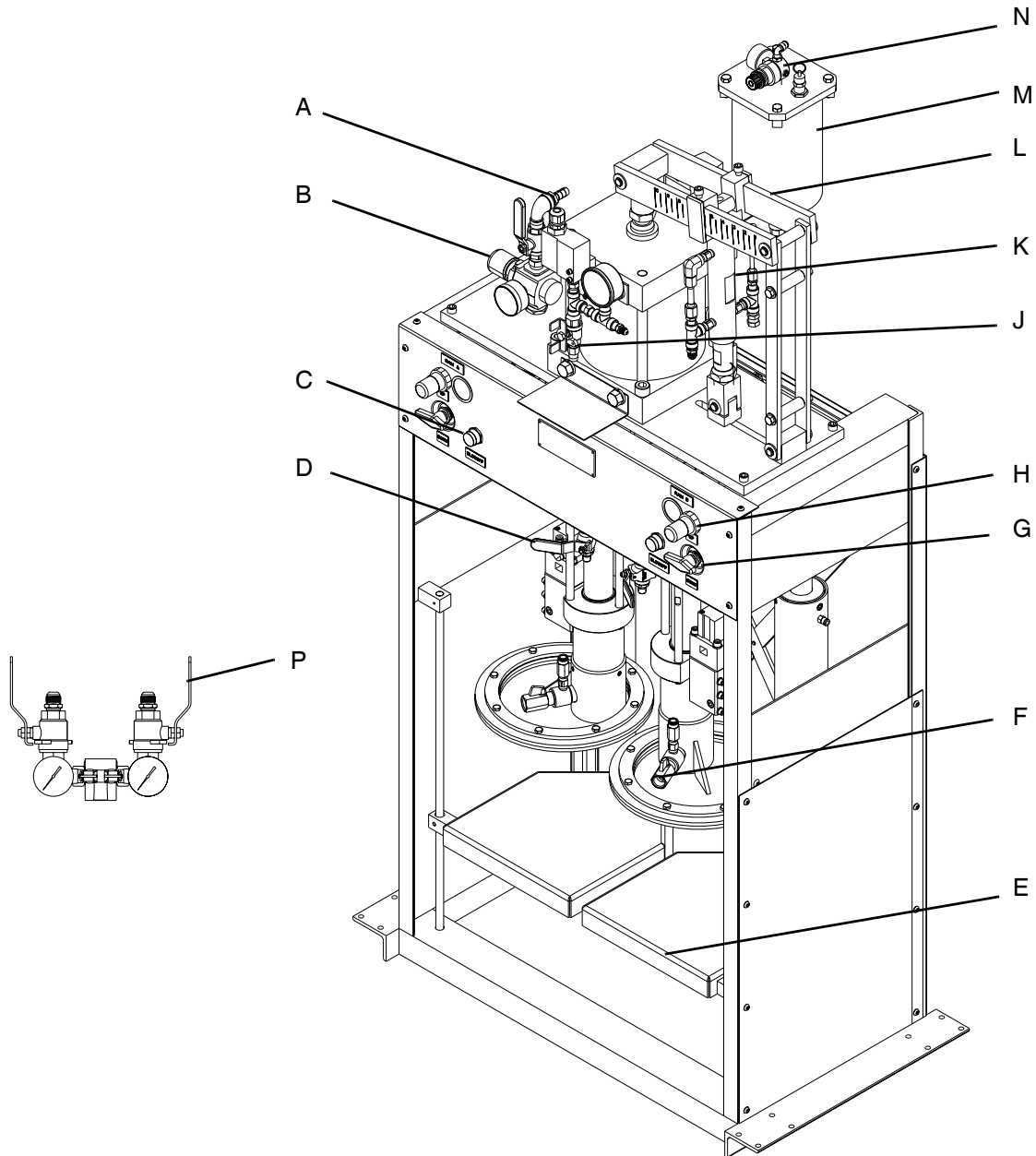


FIG. 1: 8-CS4-5M





General Information

Pressure Settings

Ram Air

For low durometer material (<50), the pressure setting is 40 psi (280 kPa, 2.8 bar).

For high durometer material (50-70), the pressure setting is 80 psi (550 kPa, 5.5 bar).

						
Excessive ram air pressure applied to a 5-Gallon Platen or Colorant Platen (if installed) may rupture the material pail and may result in serious injury.						

Pump Air

Adjust the pump air pressure as required to get the desired flow or to refill the screw as needed.

NOTICE
To avoid machine damage, do not exceed 120 psi (0.8 MPa, 8.3 bar) pump air pressure.

Colorant Feed Tank Regulator (Optional)

The colorant feed tank regulator provides a constant downward pressure on the pigment, colorant or oil that is in the Colorant Feed Tank. The pressure setting is dependant on the thickness of the material. Use enough air pressure to provide a constant flow of material to the Color Injector. A starting pressure would be 50 psi (345 kPa, 3.4 bar) for 2000 centipoise colorant.

Colorant High Pressure Switch (8-CS4-5M)

The main air solenoid is controlled by a high pressure switch. If the colorant pressure exceeds 2500 psi (17 MPa, 172 bar), it will remove air to the machine. This can occur from improper settings or a plugged check valve or nozzle. Refer to **Pressure Relief Procedure**, page 17, to relieve pressure.

Fluid Pressure Gauges

All A and B material pressure gauges should read the same as each other during normal operation of the machine.

Main Air Regulator

Adjust the main air regulator until the desired output pressure or the correct refill rate for the screw is achieved. Use 80% of the cure cycle time as a target rate and pressure to fill the barrel. A 40 psi (280 kPa, 2.8 bar) setting may result in an outlet pressure of 1000 psi (7 MPa, 69 bar) as seen in the gauges above the material manifold. For thicker material, set the main air regulator between 50 and 60 psi (345-410 kPa, 3.4-4.1 bar) and determine if the pressure sufficient for the application.

Ram Air Regulator

The ram air regulator controls the amount of air being supplied to the pail shelf. The pail shelf provides a constant upward force on the pail to maintain a flow of material to the metering pump.

NOTICE

To avoid machine damage, the ram control valve should always be in the "UP" position during normal operations. See **Purge and Prime the Pump**, page 13.

NOTICE

The pail shelf is locked in place for shipping by a locking screw. To avoid injury, ensure the locking screw is unscrewed before setting the ram air regulator pressure.

The Pressure settings for the ram air regulator is dependant upon the thickness of the material. For low viscosity material (<50,000 centipoise), set the pressure regulator to approximate 40 psi (280 kPa, 2.8 bar). For high (50,000-70,000 centipoise) viscosity material set the regulator to approximate 80 psi (550 kPa, 5.5 bar).

Low Level Valves

The adjustable low level valves are designed to stop the metering pump when the material in either pail runs low. The valves are to prevent the machine from pumping air into the material lines. When the pail shelves are lowered, the pump can resume operating.

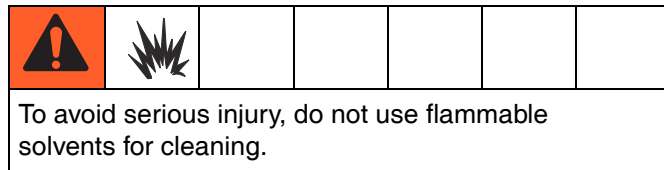
NOTE: Close the air motor ball valve before lowering the pail shelves.

Platen - Colorant Tank (Optional)

The platen is recommended for materials that are not pourable or self leveling. There is a small plastic platen shipped with each colorant tank. If the colorant is in paste form, the platen is placed on top of the colorant and should be removed **BEFORE** filling the tank. If the colorant that is being used flows easily the platen should not be used because it will sink and block the tank outlet.

Solvents

These are rarely used with modern 1:1 silicones. For cleaning, methylene chloride or white spirits solvent are used. Methylene chloride is recommended because it is non-flammable.

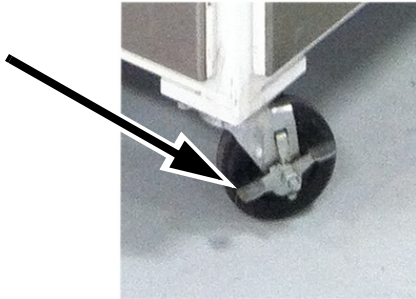


Installation



1. Locate and Secure the Machine

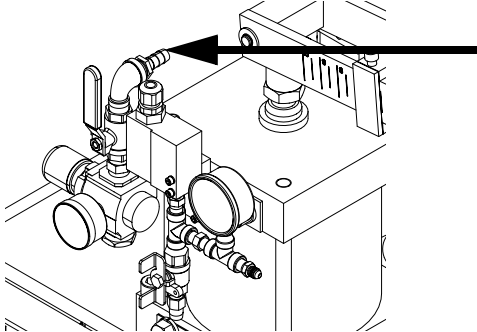
- a. Move the machine to a desired location.
- b. Lock the casters, if installed, using the built in brake.



- c. Adjust the feet, if installed, as necessary to level the unit.

2. Connect the Air Source

- a. Connect air to the air assembly.



3. Ground the System.



The equipment must be grounded to reduce the risk of static sparking. Static sparking can cause fumes to ignite or explode. Grounding provides an escape wire for the electric current.

- a. *8-CS4-5M*: Connect a ground strap from the machine frame to a true earth ground.
- b. *Dispense Valve*: follow your local code.
- c. *Fluid Supply Containers*: follow your local code.
- d. *Dispensing target/container*: follow your local code.
- e. *To maintain grounding continuity when flushing or relieving pressure*, hold a grounded *metal* pail firmly to a metal part of the dispense valve, then initiate dispense.

4. Fill the Colorant Tank and Prime the Color Pump (Optional)

- a. Reduce the air pressure supplied to the colorant tank by turning the regulator on top of the tank in a counter-clockwise direction. Continue to turn the regulator until the tank pressure gauge indicates 0 psi.
- b. Lift the pressure relief ring at the top of the tank before removing four screws or unscrewing the clamps that hold the Tank Cover in place.

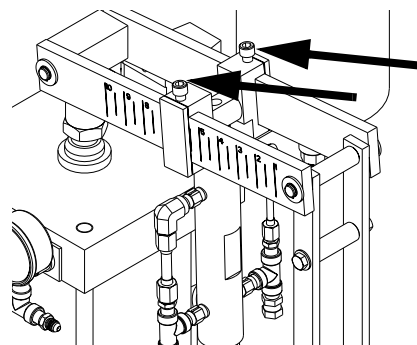


- c. Lift the cover off and lubricate or glue (using RTV) the o-ring located in the groove on the bottom of the cover.
- d. Lift the colorant platen out of the tank if it is installed. In some applications it might not be used. (See **Platen - Colorant Tank (Optional)**, page 9).
- e. Stir the pigment to the manufacturer requirements.
- f. Pour or scoop the colorant into the colorant tank, filling it to the desired level. When filling the tank, leave room for the platen if being used.
- g. Place the platen, if needed, on top of the colorant with the head of the screw facing up.
- h. Place the colorant tank cover back on the tank. Be sure to seat the o-ring into the groove before tightening the screws or clamps.

- i. Adjust the colorant tank regulator to the desired pressure. For 2000 centipoise colorant, 50 psi (345 kPa, 3.4 bar) should be sufficient.

To avoid machine damage and serious injury, do not allow the colorant tank pressure to exceed 110 psi (0.8 MPa, 8 bar).						

- j. Loosen the screws at the top of the colorant pump and one on the bottom of the colorant pump to slide it as close to the air motor as possible. Be sure to keep it parallel with the air motor shaft.



- k. Tighten the screws.

5. Load Material Pails

- a. If a pail is not installed, proceed to the next step. If a pail is installed, refer to **Pail Change-Over**, page 20.
- b. Lower the pail shelf to its minimum height by turning the ram control valve to the DOWN position.
- c. Wipe the bottom of the platen with a clean rag to remove any foreign objects that might contaminate the mixture.
- d. Remove the covers of both pails, paying close attention not to drop dirt or other foreign objects into the new silicone. If the material did not settle, flatten the material out to ensure proper purging will occur.

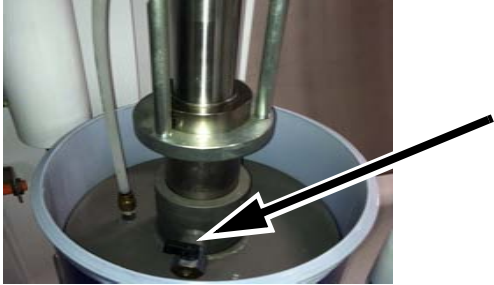
- e. Load the new pail into the machine, paying special attention to put the “A” material on the “A” side.

NOTICE

To avoid cavitation and component interference, install the pail on the pail shelf so that the handle of the pail will not interfere with the ram during normal machine operation.

NOTE: Apply lubricant to the platen seal to aid the installation. Use material if a lubricant is not available.

- f. Open the bleed ball valve on the platen hub to allow air to escape.



- g. Set the ram air regulator to 5 psi (35 kPa, 0.3 bar).
- h. Turn the ram control valve to the UP position to raise the pail shelf to the platen.
- i. Slowly increase the ram air regulator to the operating pressure.

NOTE: If your pails have liners, use special care not to push them down into the pail with the platen.

NOTICE

To avoid cavitation and machine damage, the ram control valve should be left in the UP position while pumping.

NOTE: Once the platen enters the pail, air should exhaust out of the bleed ball valve.

- j. Allow enough material to escape to ensure all of the air is forced out from under the platen.

- k. Close the bleed ball valve when it appears that all of the air bubbles have disappeared from the stream of silicone.
- l. Repeat the steps above to load the material pail for the other side.
- m. If the machine is equipped with the color option, refer to **Fill the Colorant Tank and Prime the Color Pump (Optional)**, page 11, before performing the purging process.

Setup

1. Purge and Prime the Pump

- a. Turn the main air regulator until the Main Air gauge reads 5 psi (35 kPa, 0.3 bar) to prevent cavitation of the pump material. Be sure the ram control valves are in the UP position and the ram air regulators are set to 50 psi (345 kPa, 3.4 bar) or more.
- b. Place waste containers under the bleed valves for both the A and B pumps.
- c. Place a waste container under the colorant bleed valve.
- d. Open the A, B and colorant bleed valves.
- e. Open the main air valve to begin pumping. The Air Cylinder will begin to move in either direction. If not, slowly increase the air pressure on the main air regulator. Material will begin to flow from the colorant and pump bleed valves.

NOTICE

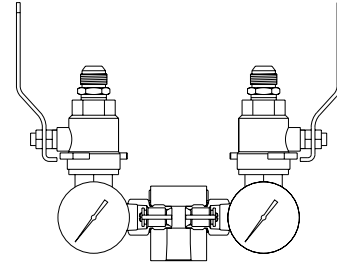
To avoid machine damage, do not exceed 20 psi (140 kPa, 1.4 bar) of the main air regulator.

- f. Continue purging until it appears that all of the air has been purged from the pumps. When the stream of material is free of bubbles, close the Bleed Valves.

2. Prime the Material Line Connections

This can be completed with the lines attached to the manifold or into individual waste containers.

Priming through the Manifold



- a. Slide the rotation screw assembly with the static mixer assembly from the press.
- b. Open both material ball valves on the dispense manifold.
- c. Dispense material until there are no longer signs of air in the material.
- d. Close both material ball valves.

Priming Individually

- a. Verify the main air valve is closed and that there is no pressure on the material lines.
- b. Perform **Pressure Relief Procedure**, page 17.
- c. Disconnect the A and B material lines from the manifold. If the system is equipped with color injection, disconnect the color line.
- d. Set the main air valve regulator to 5 psi (35 kPa, 0.3 bar).
- e. Open the main air to the pump and dispense each line into its own waste container. Increase the pressure as required.
- f. Prime until all lines no longer show signs of air in the material.

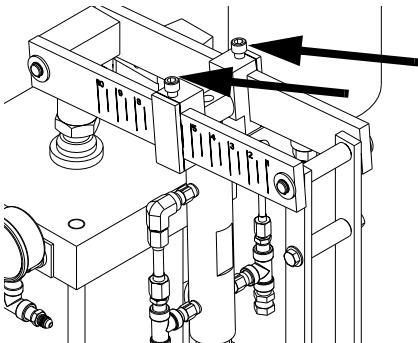
- g. Attach all lines to their proper locations. Pay close attention not to swap the lines with their original locations on the manifold.

3. Adjust the Colorant

If the optional colorant equipment has been installed, this section details how to adjust the total percentage contribution.



The percent contribution is adjusted by moving the colorant pump closer or further from the air motor. The mounting rail for the pump has a ruler marked on it to aid in setting the percentage. A ratio check is recommended to confirm the percentage contribution.

- a. Dispense material until the colorant rail is parallel with the top of the machine.
- b. Close the main air ball valve.
- c. Open the colorant pump bleed valve.
- d. Loosen the screws at the top of the colorant pump and one on the bottom of the colorant pump.



- e. Slide the colorant pump to the desired location, keeping it vertical (parallel to the air motor). For adjustment reference, refer to **Appendix A - Colorant Adjustment Chart**, page 28.
- f. Tighten the three bolts again and close the bleed valve.

Startup

						
<p>Moving parts can pinch or amputate fingers. When the pump is operating and when raising or lowering the pail shelf, keep fingers and hands away from the pump intake, platen, pail shelf, and lip of the pail.</p>						

Once the **Setup** procedures have been accomplished, the machine is ready to run. Make certain that all material lines are connected, fittings are tight to prevent leaking.

To start the machine:

1. Make sure the ram controls are in the “up” position.
2. Open the main air to the pump.
3. Open both A and B material valves to begin dispensing.

NOTE: To increase outlet pressure turn the main air regulator in the clockwise direction.

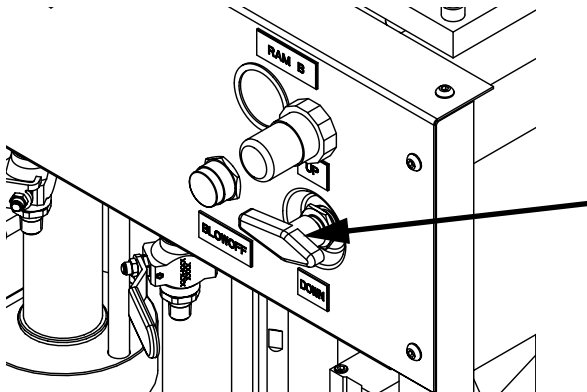
Shutdown



Short Term

Perform the procedure if the machine will be left idle less than the pot life of the material.

1. Rotate the ram control valve to the “LOCK” position as shown.



NOTE: If the ram control valve is set to either the “UP” or “DOWN” position, the pail shelf will fall downward.

2. Close the main air ball valve.
3. Perform **Pressure Relief Procedure**, page 17.

NOTICE

Machine damage may occur from the mixed material if left idle more than the pot life of the material. Refer to **Long Term Shutdown** if machine will be left idle more than the pot life of the material.

Long Term

Perform the procedure if the machine will be left idle more than the pot life of the material.

1. Perform **Short Term** procedure.
2. Remove all assemblies that contain mixed material and clean those components.

Pressure Relief Procedure



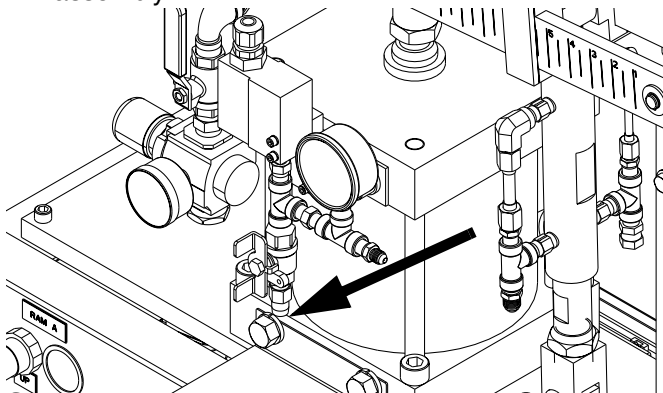
This equipment stays pressurized until pressure is manually relieved. To help prevent serious injury from pressurized fluid, such as skin injection, splashing fluid and moving parts, follow the Pressure Relief Procedure when you stop spraying and before cleaning, checking, or servicing the equipment.

There are two ways to relieve pressure of the system.

Material Ball Valves

Perform the procedure if the dispense head can flow material freely.

1. Close the main air ball valve.
2. Slide the injection equipment from the press.
3. Open both A and B material ball valves until the material no longer flows and the pressure gauges read "0".
4. Close both A and B material ball valves.
5. Adjust the colorant tank regulator to "0".
6. Verify the colorant tank regulator gauge shows "0".
7. Remove the colorant check valve from the bleed assembly.



8. Open the colorant bleed valve until material no longer flows.
9. Close the colorant bleed valve and install the check valve.

Bleed Ball Valves

Perform the procedure if the dispense head is plugged or there is no air to actuate the dispense head solenoid.

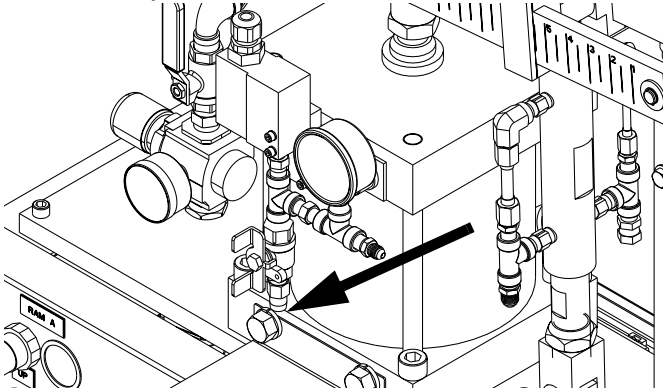
1. Close the main air ball valve.
2. Place a waste container below each bleed valve.
3. Open both "A" and "B" material ball valves.



In the following step, any pressure in the lines will be instantly relieved if no obstructions are within the lines. This may lead to material spraying out of the valve and splashing in the bucket. Use appropriate protective wear to prevent contact with materials.

4. Close both "A" and "B" material ball valves after material stops flowing.
5. Open the "A" bleed ball valve. Residual pressure will be relieved in the fluid lines between the pump and the check valve.
6. Verify the pressure gauge reads 0 psi.
7. Close the "A" bleed ball valve.
8. Repeat for the "B" pump bleed valve.
9. Adjust the colorant tank regulator to "0".

10. Remove the colorant check valve from the bleed assembly.



11. Open the colorant bleed valve until material no longer flows.
12. Close the colorant bleed valve and install the check valve.

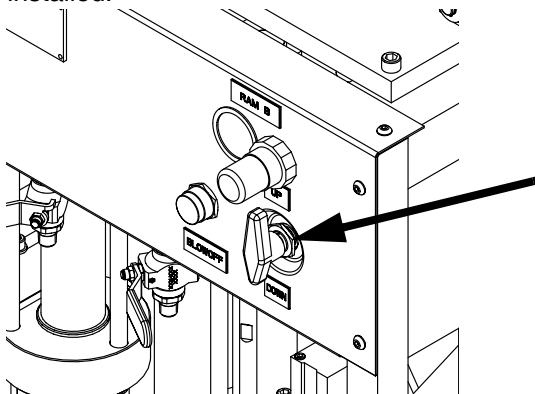
Operation

Pail Change-Over

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Excessive ram air pressure in the material pail could cause the pail to rupture, causing serious injury. Ensure that the pressure settings are set to the recommended air pressure. Refer to **Pressure Settings**, page 8.

1. Close the main air ball valve.
2. If the machine is equipped with the color option, refer to **Fill the Colorant Tank and Prime the Color Pump (Optional)**, page 11.
3. Turn the ram control valve to the DOWN position and let the air escape from the ram air cylinders if a pail is installed.



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Activating the blow-off button prior to reaching 30 psi (210 kPa, 2.1 bar) of ram air pressure may result in serious injury. Activate the blow-off button only when the pressure reaches 30 psi (210 kPa, 2.1 bar) or below.

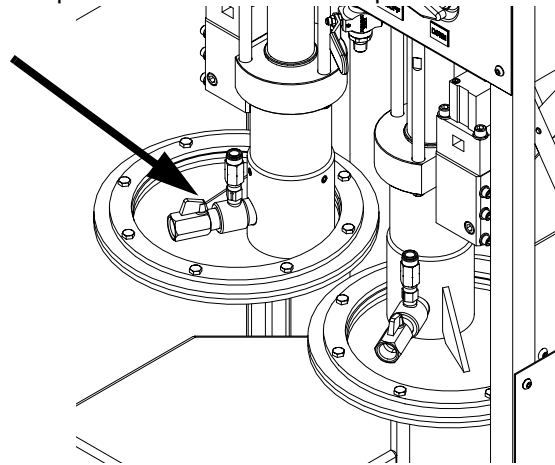
4. Press the blow-off button to push the pail and shelf off the platen.

5. Lower the pail shelf to its minimum height.
6. Clean the bottom of the platen with a flat, non-metal scraper.
7. Load the new pail into the machine, paying special attention to put the "A" material on the "A" side.

NOTICE
Failure to separate chemical components will result in the curing of material in the pumps and hoses.

NOTICE
To avoid cavitation and component interference, install the pail on the pail shelf so that the handle of the pail will not interfere with the ram during normal machine operation.

8. Apply a small amount of lubricant to the platen seal to aid the installation. Use a small amount of material if a lubricant is not available.
9. Open the bleed valve on the platen hub.



10. Set the ram air regulator to 5 psi (35 kPa, 0.3 bar).
11. Turn the ram control valve to the UP position to raise the pail shelf to the platen.
12. Slowly increase the ram air regulator to the operating pressure.

NOTE: If the pails have liners, use special care not to push them down into the pail with the platen.

NOTICE

To avoid cavitation and machine damage, the ram control valve should be left in the UP position while pumping.

NOTE: Once the platen enters the pail, air and material will exhaust out the ball valve on the platen hub. Allow the silicone to flow until it is free of bubbles then close the ball valve.

13. Repeat the **Pail Change-Over** procedure to load the material pail for the other side.

Testing Procedures



Pump Testing

If the machine is suspected of pumping inaccurately, follow these procedures to check each pump.

If the machine is equipped with a third stream for color, check that it is within 50 psi (345 kPa, 3.4 bar) of the other material pressures. The difference in pressure arises because of the check valves in the material stream as it enters the manifold.

A good indication that there may be a problem with the pumps is if the pressures fluctuate or fail to recover at the same rate.

1. Verify the system has material and that the hoses have material in them.
2. Close both material ball valves at the manifold.
3. If the machine has the optional colorant pump installed, open the bleed valve at the front of the air motor. This will prevent the over pressure switch from turning off the air.
4. Open the main air ball valve to turn on the air motor.
5. Once the pressure in the system has built up and the motor has stopped, look at the material pressure gauges. They should have pressures within 50 psi (345 kPa, 3.4 bar) of each other.
6. Test the seals in the A pump by opening the bleed valve on the B Pump. The A pump should only have a small amount of movement, if any, while it builds up a bit more pressure. After it reaches a steady state with the pressure, the pump should remain stationary.
7. Test the A pump in the opposite direction by letting some material out of the pump bleed valve until the pump direction changes over. Observe the pump for movement again after the pressure stabilizes.
8. Repeat steps 6 and 7 for pump B.

If the machine keeps cycling at any point during the test for either the A or B side, refer to the troubleshooting section to determine the possible causes.

Ratio Testing

The ratio test will be used to verify that the machine is pumping a 1:1 ratio of A and B material. If colorant is being added, it can also verify the percentage that is being added.

1. If the optional colorant equipment has been installed, follow these procedures. Otherwise, skip to step 3.
2. Install a check valve on the outlet of the colorant bleed valve. Adjust the valve so that no material comes out when the pump is stationary. This is required because the colorant tank is pressurized.
3. Close both material ball valves on the dispense manifold.
4. Using the same operating pressures that are normally used for your production, open the main air ball valve.
5. Open the colorant bleed valve and let any residual pressure bleed out into a waste container.
6. Label three cups "A", "B", and "C". Weigh each of these three cups and record their weight.
7. Place cup "C" under the colorant bleed ball valve.
8. Collect the ratio sample from the A and B material bleed valves by opening them simultaneously.
9. Allow the pump to make at least two complete cycles, then close the bleed valves simultaneously.
10. Weigh all cups again and subtract their original weight to get the amount of material dispensed.

$$\text{Material Weight} = \text{New Weight} - \text{Original Weight}$$

11. Perform the following calculations to determine the A:B ratio and the percentage of colorant being added.

$$\% \text{ Color} = \frac{\text{Color Weight}}{\text{Total Weight}} = \frac{C_{\text{weight}}}{A_{\text{weight}} + B_{\text{weight}} + C_{\text{weight}}}$$

$$\text{Ratio A:B} = \frac{A_{\text{weight}}}{B_{\text{weight}}} : 1$$

12. If the material ratio has deviated by more than +/- 1%, refer to **Pump Testing**, page 22.
13. If the percentage of color being added is greater than 0.1%, refer to **Adjust the Colorant**, page 14.

Troubleshooting



Before performing any troubleshooting procedure:

1. Perform **Pressure Relief Procedure** on page 17.
2. Close the main air valve.
3. Remove air supply.

4. Allow the press equipment to cool.

Try the recommended solutions in the order given for each problem to avoid unnecessary repairs. Also, determine that all circuit breakers, switches, and controls are properly set and wiring is correct.

Common Problems

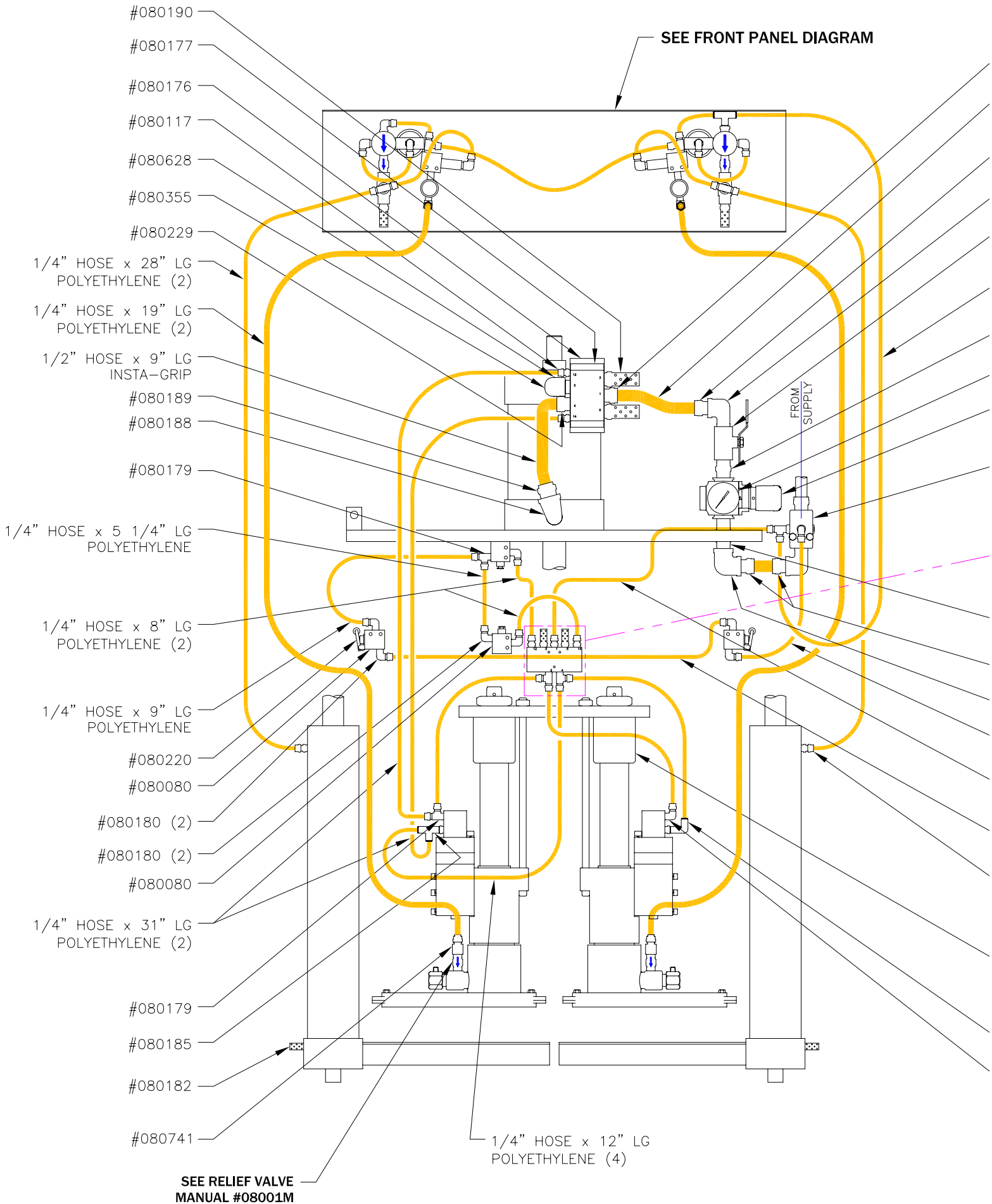
Problem	Cause	Solution
Up-Stroke If the pump continues to move in the up direction after all of the outlets have been closed, check the following areas.	Air in the Material	Air is the most common cause of up and down-stroke errors. Therefore, the Pump Testing procedure, page 22, should be performed a couple of times to ensure the pump is void of air. An indication of air in the pump can be seen when the pump changes directions from the up-stroke to the down-stroke. If air is present, the pump will jump or move more rapidly in the down direction and then begins to move slowly when it hits the material. To remove any air from the pump, refer to Purge and Prime the Pump , page 13, and then repeat the test again.
	Piston Ball Check	The ball seat at the end of the pump piston may have foreign material lodged in the seat preventing the ball from seating properly. Over time, the pressure of abrasive silicones can damage the piston seat or piston ball requiring it to either be replaced or repaired. Careful inspection of the piston seat should be taken every time the pump is disassembled.
	Piston Seal	The Piston Seal prevents material leaking around the Piston during the up-stroke cycle. Piston Seal failure can be caused by extended use or from a rough Pump Cylinder wall.
	Pump Cylinder	A worn or galled cylinder wall will allow material to flow by the Piston Seal causing the pump to creep in the up direction. Prolonged use in this state will cause permanent damage and introduce foreign object into the chemical.
	Upper Rod Seal	The Upper Rod Seal prevents material leaking around the displacement rod. Upper Rod Seal failure can be caused by extended use or from a rough displacement rod wall.

Problem	Cause	Solution
Down-Stroke If the pump continues to move in the down direction after all of the outlets have been closed, check the following areas.	Shovel Rod Seal	The seal separates the cylinder from the shovel plate housing. If it fails, material will be forced into the shovel plate housing during the down-stroke.
	Check Plunger (B443 Pump)	The check plunger is controlled by a pneumatic valve instead of material pressure. Shaft wear, plunger failure, or seat/seal damage could allow material to back flow into the pail or out the weep holes on the intake block.
Up-Stroke and Down-Stroke If the pump fails to dispense any material in either direction check the following areas.	Check Plunger	The device opens on the up-stroke and closes on the down-stroke. It is controlled by pneumatic plunger pressure pushing down on a ball against a seat. If either of these devices fail the pump will not work properly. The symptoms of an Intake Assembly problem can range from partially cured parts (due to cross contamination of the system) to no material on either stroke of the pump.
	Shovel Assembly	The shovel and shovel plate work together to pull material from the pail into the pump. The shovel plate rises on the down-stroke so material can flow through the holes in the Shovel. On the up-stroke the shovel plate closes forming a seal with the Shovel that forces material into the pump housing. If either of these components are working improperly, the pump would fail to load and dispense material.

Parts

PNEUMATIC CIRCUIT DIAGRAM AND PARTS LIST

8-S4-5M / 8-CS4-5M



#080229

1/2" HOSE x 8" LG
INSTA-GRIP

#080229

#080138

#080192

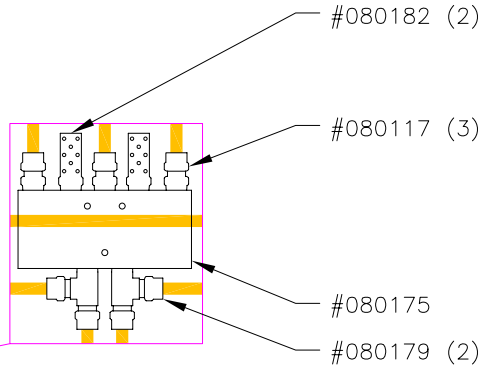
1/4" HOSE x 22" LG
POLYETHYLENE

#080098

#080110

#080083
#080823

**SEE MODEL #SA950-1A
MANUAL #SA95001M**



#080195

#080229

#080186

1/4" HOSE x 12" LG
POLYETHYLENE

1/4" HOSE x 18" LG
POLYETHYLENE

1/4" HOSE x 5 1/4" LG
POLYETHYLENE

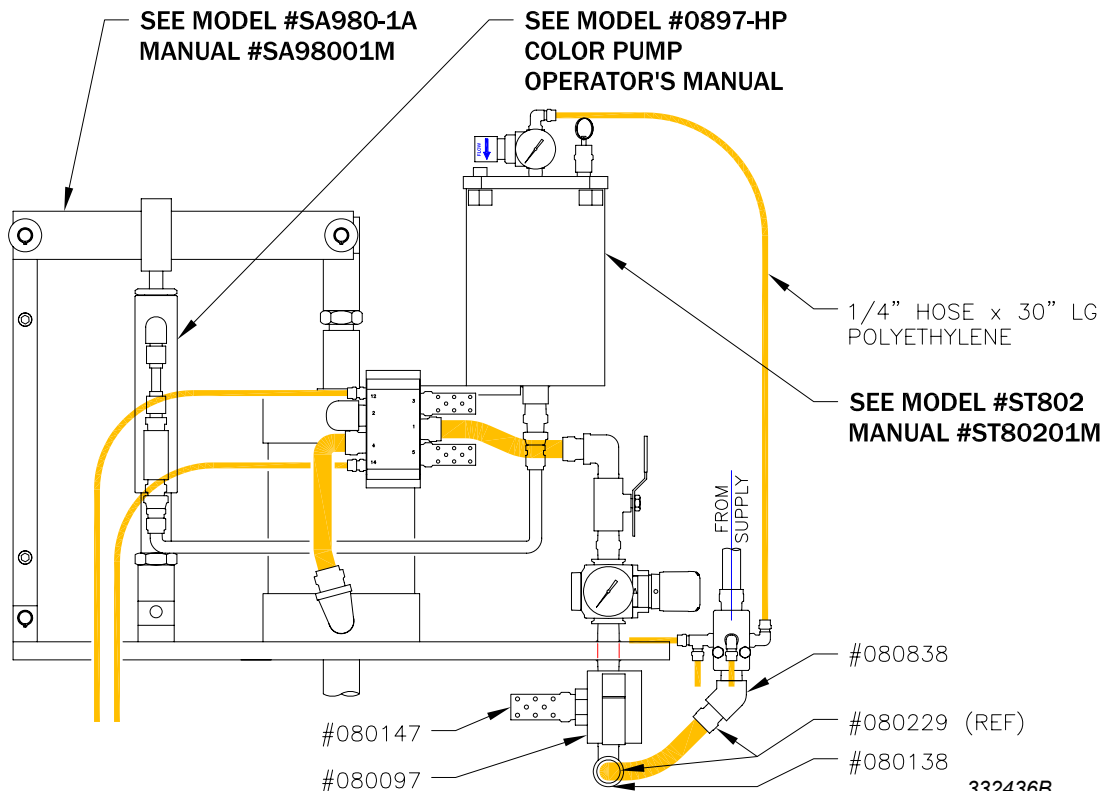
#080117

**SEE MODEL #B443
MATERIAL PUMP
OPERATOR'S MANUAL**

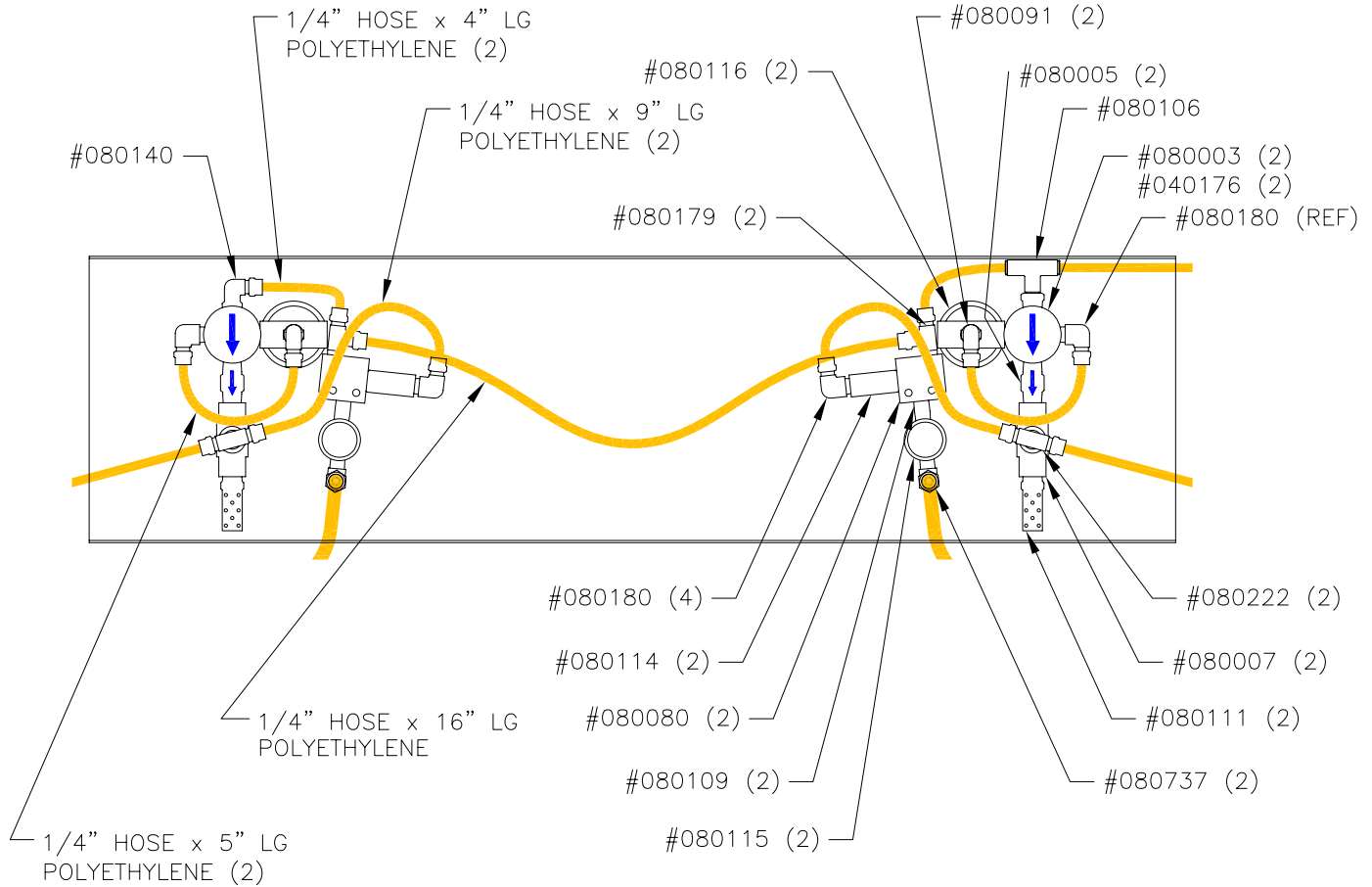
#080093

#080180

COLOR COMPONENTS (CS4-5 & CS4-5M)



FRONT PANEL DIAGRAM



PARTS LIST (FRONT PANEL)

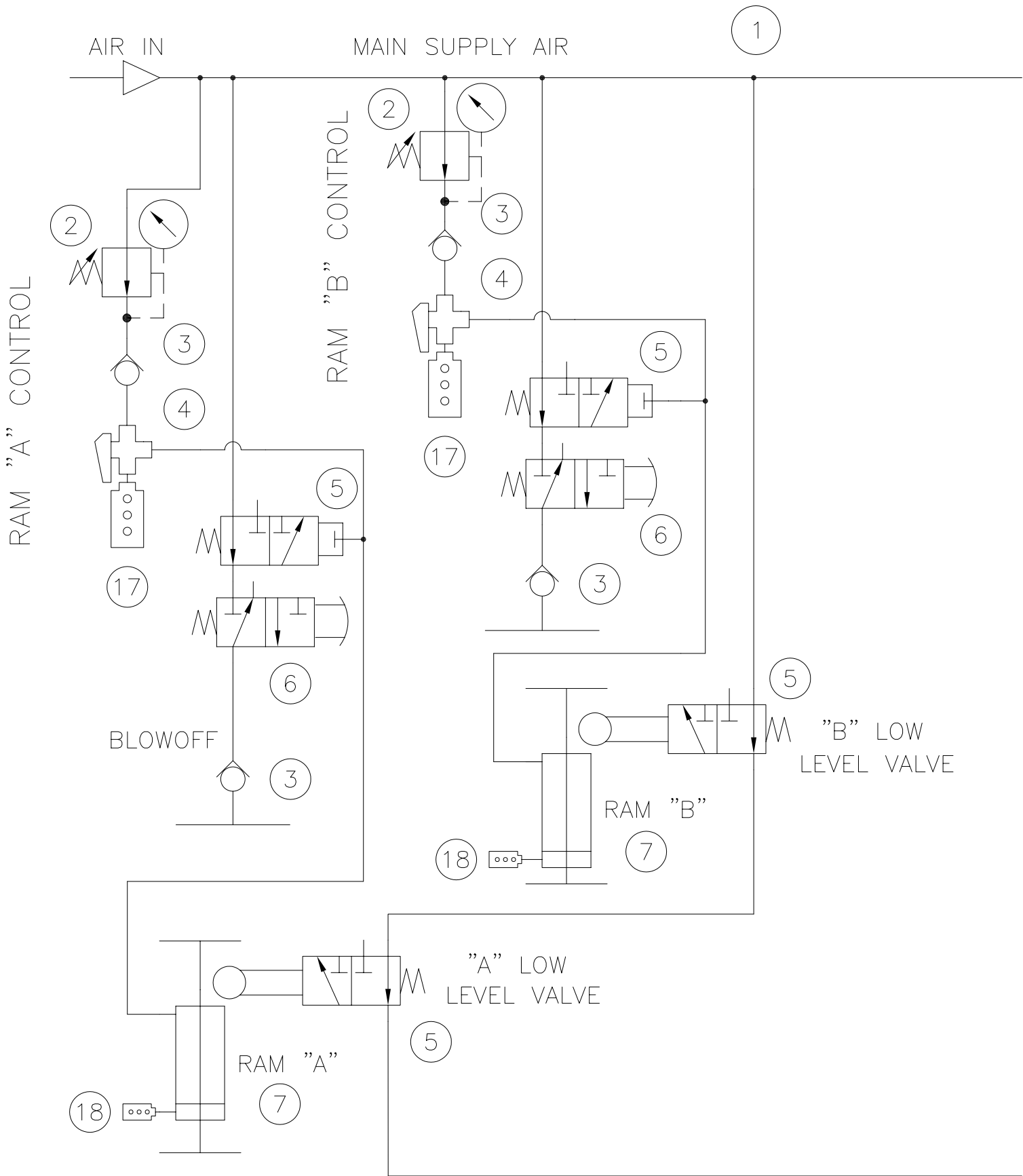
#/NAME	PART NO	DESCRIPTION (QTY)
..	040176	RETAINING NUT (2)
2	080003	PRESSURE REGULATOR, 0-100psi (2)
3	080005	1/4" NPTM x 1/4" NPTM CHECK VALVE, 15# CRACK PRESS (2)
4	080007	SWITCHING VALVE, 3-WAY, 1/4" NPTF PORTS (2)
5	080080	AIR VALVE (2)
..	080091	1/8" NPTF x 1/4" OD HOSE FERRULE ELBOW (2)
..	080106	1/4" NPTM x 1/4" OD HOSE FERRULE BRANCH TEE
..	080109	1/8" NPTM x 1/8" NPTM CLOSE NIPPLE (2)
17	080111	1/4" NPTM MUFFLER (2)
5	080114	AIR PILOT ACTUATOR (2)
..	080115	AIR VALVE, PUSHBUTTON (2)
2	080116	PRESSURE GAUGE, 0-160psi (2)
..	080140	1/4" NPTM x 1/4" OD HOSE FERRULE ELBOW
..	080179	1/8" NPTM x 1/4" OD HOSE FERRULE RUN TEE (2)
..	080180	1/8" NPTM x 1/4" OD HOSE FERRULE ELBOW (4)
..	080222	1/4" NPTM x 1/4" OD HOSE FERRULE BRANCH TEE (2)
..	080737	1/8" NPTM x 3/8" OD HOSE FERRULE ELBOW (2)

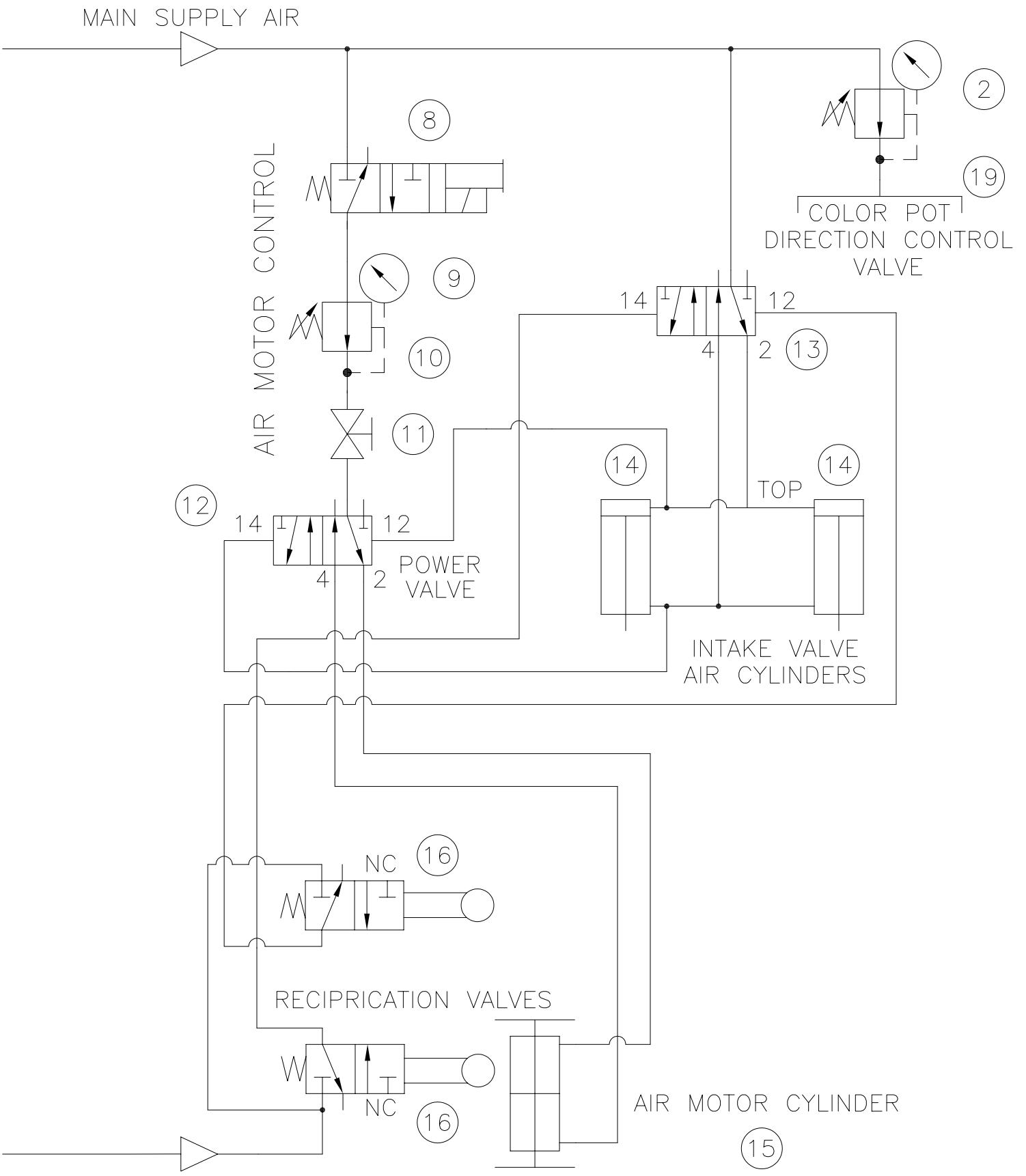
PARTS LIST (S4-5 & S4-5M)

<u>#/NAME</u>	<u>PART NO</u>	<u>DESCRIPTION (QTY)</u>
15	.....030006	AIR MOTOR, 6" BORE x 4 1/2" STROKE (SEE MECHANICAL COMPONENTS)
15	.....030007	AIR MOTOR, 8" BORE x 4 1/2" STROKE (OPTIONAL ~ SEE SHT #SK52901M)
5/16	.....080080	VALVE, AIR (4)
..	.....080083	1/4" NPTM PLUG
..	.....080093	1/8" NPTM x 1/4" OD HOSE PUSH-ON SWIVEL ELBOW
..	.....080098	1/2" NPTM x 1/2" NPTM NIPPLE
10	.....080110	GAUGE, 0-160psi
..	.....080117	1/8" NPTM x 1/4" OD HOSE FERRULE CONNECTOR (7)
..	.....080138	1/2" NPTM x 1/2" NPTF ELBOW
13	.....080175	VALVE, PILOT
12	.....080176	SUB BASE
12	.....080177	VALVE, SOLENOID, AIR PILOT
..	.....080179	1/8" NPTM x 1/4" OD HOSE FERRULE RUN TEE (4)
..	.....080180	1/8" NPTM x 1/4" OD HOSE FERRULE ELBOW (8)
18	.....080182	1/8" NPTM MUFFLER (4)
..	.....080185	1/8" NPTM x 1/4" OD HOSE PUSH-ON SWIVEL RUN TEE
..	.....080186	1/2" NPTF x 1/2" NPTF ELBOW (USED ON S4-5 MODELS ONLY)
..	.....080188	3/4" NPTM x 3/4" NPTF ELBOW
..	.....080189	3/4" NPTM x 1/2" ID HOSE BARB FTG
..	.....080190	1/2" NPTM MUFFLER (2)
11	.....080192	EXHAUST VALVE, 1/2" NPTF
6	.....080195	1/2" NPTM x 2" LG NIPPLE
6	.....080220	CAM ACTUATOR (2)
..	.....080229	1/2" NPTM x 1/2" ID HOSE BARB FTG (5)
..	.....080355	1/2" NPTM x 1/2" NPTF ELBOW
..	.....080628	3/4" NPTM x 1/2" NPTF REDUCER
..	.....080741	1/4" NPTF x 3/8" OD HOSE FERRULE CONNECTOR (2)
9	.....080823	PRESSURE REGULATOR, 5-150psi
14	.....B443 IND	MATERIAL PUMP (2) (SEE PUMP OPERATOR'S MANUAL FOR #030008)
7	.....FAR-PL5	PAIL LIFT CYLINDER (2) (SEE MECHANICAL COMPONENTS)
1	.....SA950-1A	AIR MANIFOLD ASS'Y

COLOR PARTS LIST (CS4-5 & CS4-5M)

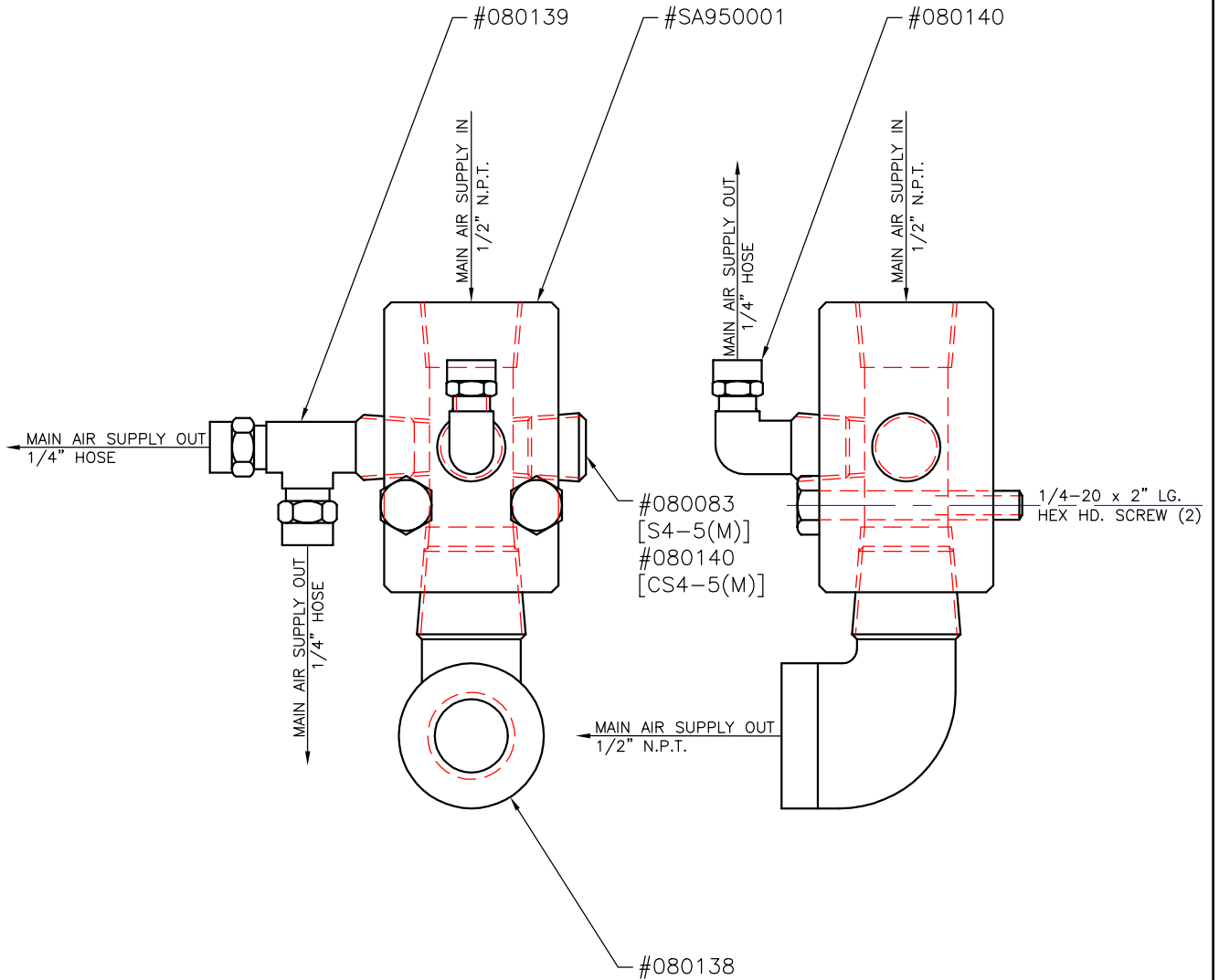
<u>#/NAME</u>	<u>PART NO</u>	<u>DESCRIPTION (QTY)</u>
8	.....080097	VALVE, SOLENOID
..	.....080138	1/2" NPTM x 1/2" NPTF ELBOW
..	.....080147	3/4" NPTM MUFFLER
..	.....080838	1/2" NPTF x 1/2" NPTF 45dg ELBOW
..	.....SA980-1A	V.R. DRIVE ASS'Y
..	.....0897-HP IND	COLOR PUMP
19	.....ST802	3-QUART COLOR TANK
19	.....ST830	3-GALLON COLOR TANK (OPTIONAL ~ SEE SHT# ST83001M)





SUPPLY AIR TO RECIPRICATION CIRCUIT

(=) SEE PG. #4 & #5 FOR PART #/NAME



PARTS LIST

PART NO.	DESCRIPTION
080083	PIPE PLUG
080138	ELBOW
080139	RUN TEE
080140	ELBOW (2 OPTIONAL, REPLACES 080083)
SA950001	AIR INLET MANIFOLD

THIS ASSEMBLY USED ON MACHINE:
(1:1) S4-5(M) & CS4-5(M)

FLUID Automation, Inc

WIXOM, MI.

RELEASED: 2-2-98
REVISED: 1-14-99

DESCRIPTION:

ACCESSORY MODEL #SA950-1A (ASS'Y #SA950)
AIR INLET MANIFOLD

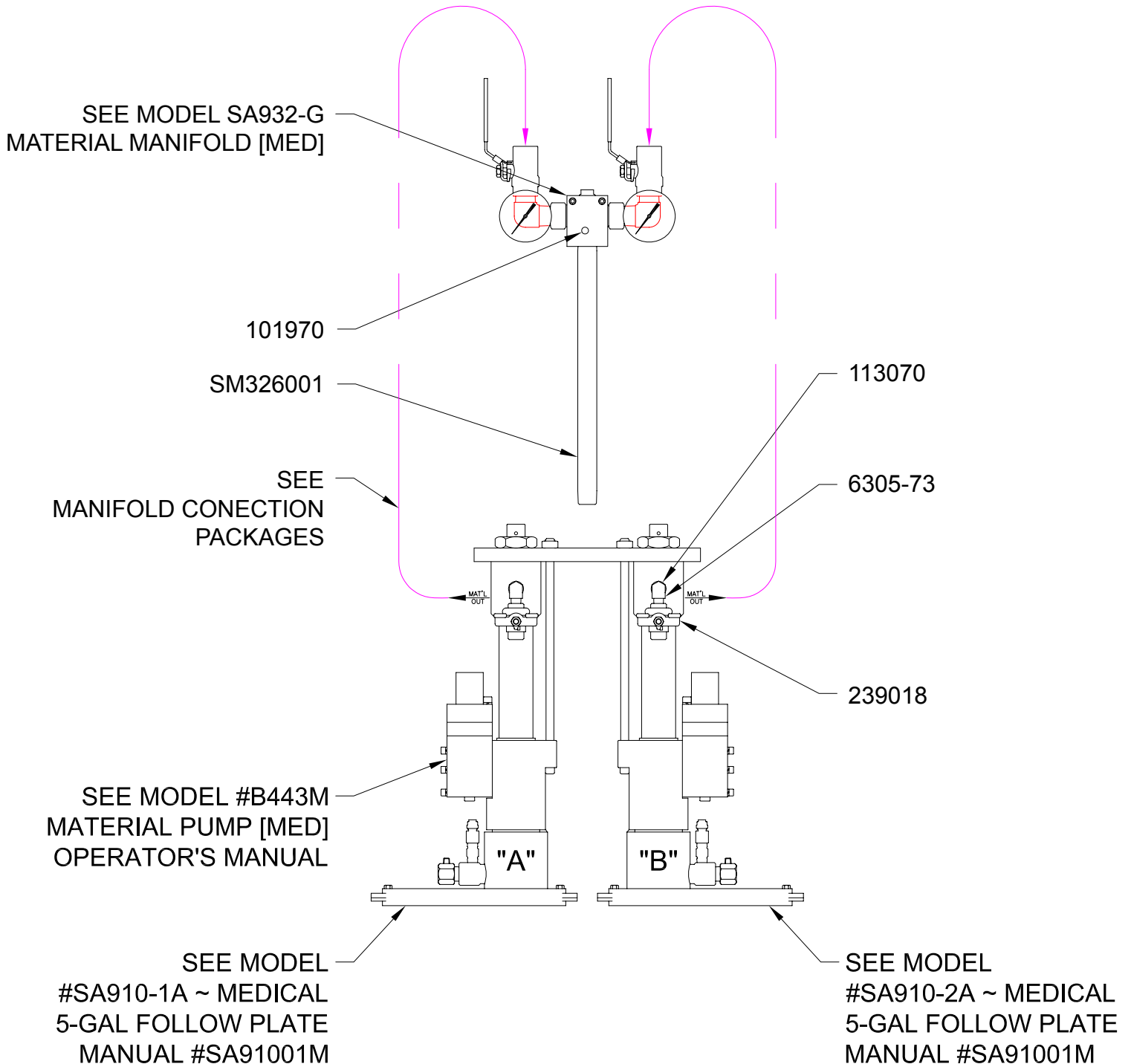
MATERIAL FLOW CIRCUIT AND PARTS LIST

8-S4-5M / 8-CS4-5M

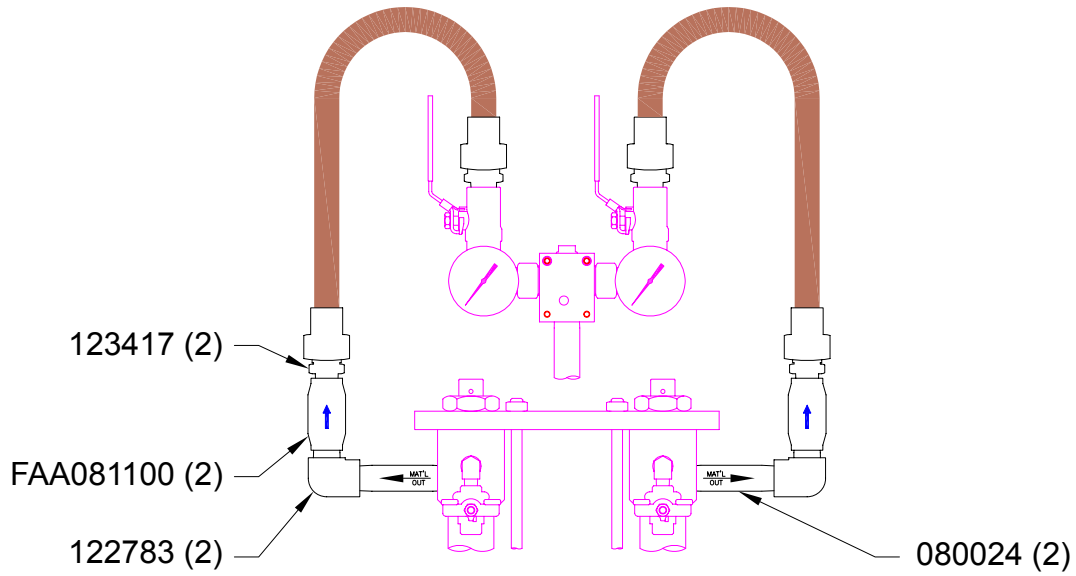
PARTS LIST (S4-5M)

PART NO DESCRIPTION (QTY)

101970	PLUG,PIPE,HDLS
113070	FITTING,NIPPLE,REDUCER, 3/8-14 (2)
239018	VALVE,BALL,SST (2)
6305-73	FITTING,ELBOW,90,1/4NPT,FF,316SS (2)
SM326001	MIXER,12-ELEMENT



MANIFOLD CONNECTION (PACKAGES)



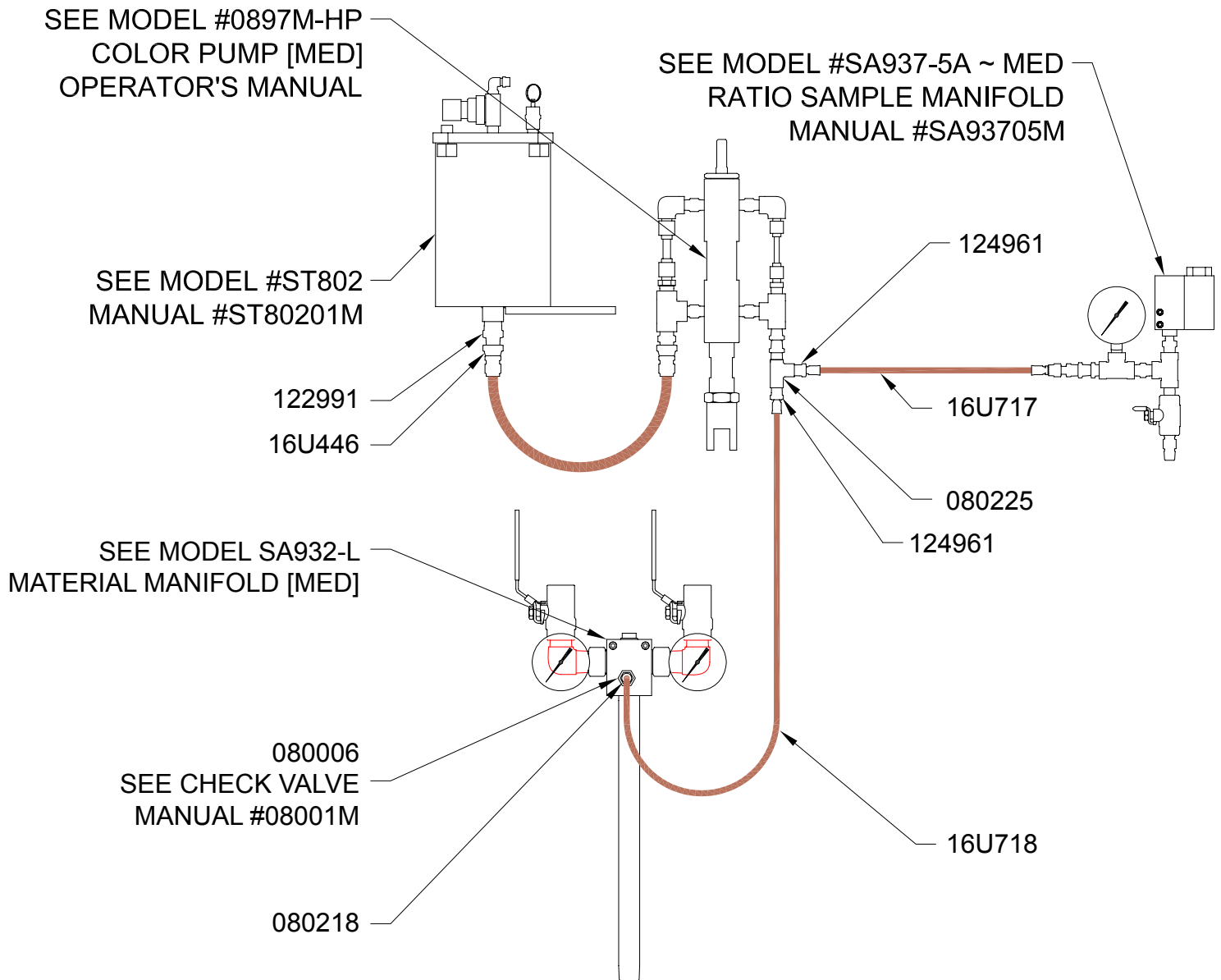
PART NO DESCRIPTION (QTY)

080024	FITTING,NIPPLE,3/4NPTM,4",304 SS	(2)
122783	CABLE,COPPER,BRAIDED,FLAT	(2)
123417	FITTING,ADPTR,3/4 NPTM X 3/4 JIC	(2)
FAA081100	VALVE,CHECK 3/4NPT,FXF,7KPSI,SS	(2)

PARTS LIST (CS4-5M ~ COLOR PARTS)

PART NO DESCRIPTION (QTY)

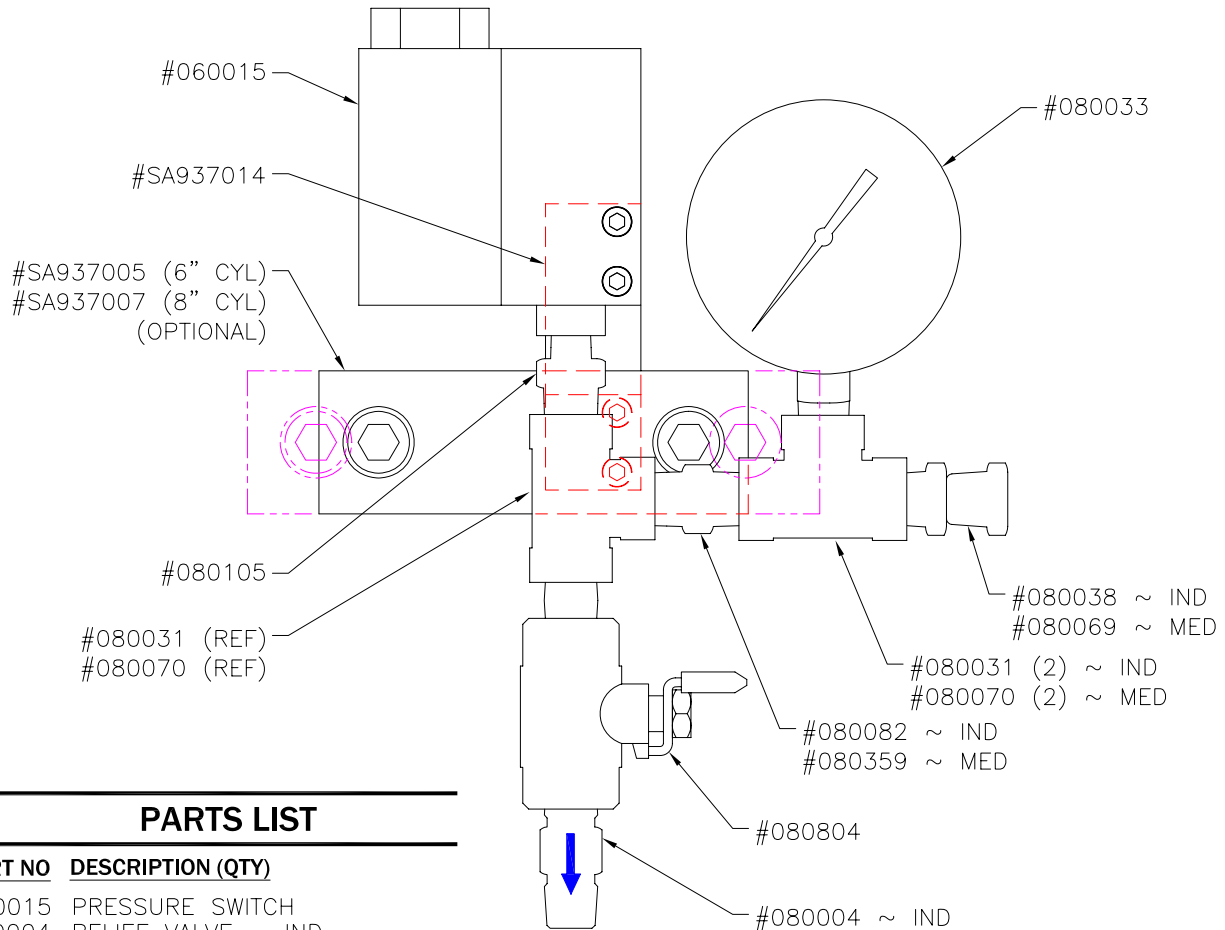
080006	VALVE,CHECK,1/4NPTX1/4NPT,SST
080218	FITTING,1/4" JIC [7/16-20 UNF]
080225	FITTING,TEE,RUN,1/4NPT,FFM
122991	ADAPTER,JIC06X1/4,MM,SS,6K,316
124961	FITTING,ADP,04JICX1/4NPT,MM,SS,6K
16U717	HOSE,ASSY,1/4X19.5,SS,BRD,WHT
16U718	HOSE,ASSY,1/4X120,SS,BRD,WHT
16U446	HOSE,ASSY,3/8X19.5,SS BRD,WHT



1/2-13 x 1" LG
S.H.C.S. (2)

#10-24 x 7/8" LG
S.H.C.S. (2)

#10-24 x 1 3/4" LG
S.H.C.S. (2)



PARTS LIST

PART NO	DESCRIPTION (QTY)
060015	PRESSURE SWITCH
080004	RELIEF VALVE ~ IND
080031	FEMALE PIPE TEE (2) ~ IND
080033	GAUGE 3000 psi
080038	FEMALE SWIVEL PIPE ADAPTER ~ IND
080069	FLARE MALE CONNECTOR ~ MED
080070	FEMALE PIPE TEE (2) ~ MED
080082	PIPE NIPPLE ~ IND
080105	PIPE NIPPLE
080294	RELIEF VALVE ~ MED
080359	PIPE NIPPLE ~ MED
080804	BALL VALVE w/NIPPLE
SA937005	PRESSURE SWITCH MOUNT
SA937007	PRESSURE SWITCH MOUNT (OPTIONAL) (REPLACES DET. SA937005)
SA937014	ADAPTER

**SEE RELIEF VALVE
ASS'Y #08002M**

THIS ASSEMBLY USED ON MACHINE:
(1:1) CS4-5(M)
(10:1) 201 & 202 (W/3rd PART)

MODEL NUMBERS FOR THIS ASSEMBLY:
#SA937-5A ~ INDUSTRIAL (6" MOTOR),
#SA937-5A-2 ~ INDUSTRIAL (8" MOTOR),
#SA937-5A ~ MEDICAL (6" MOTOR) &
#SA937-5A-2 ~ MEDICAL (8" MOTOR)

FLUID Automation, Inc

WIXOM, MI.

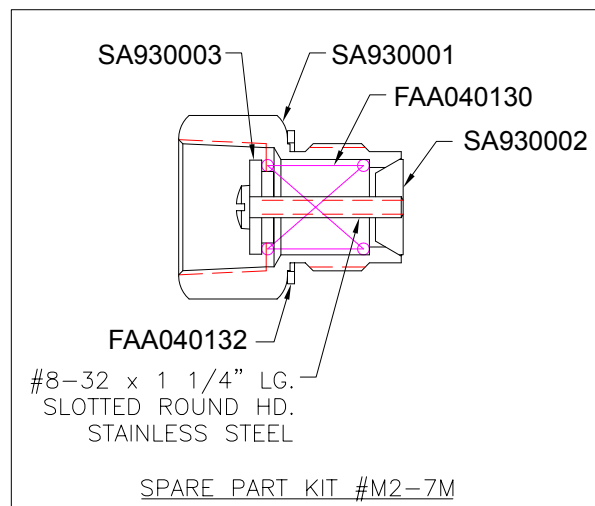
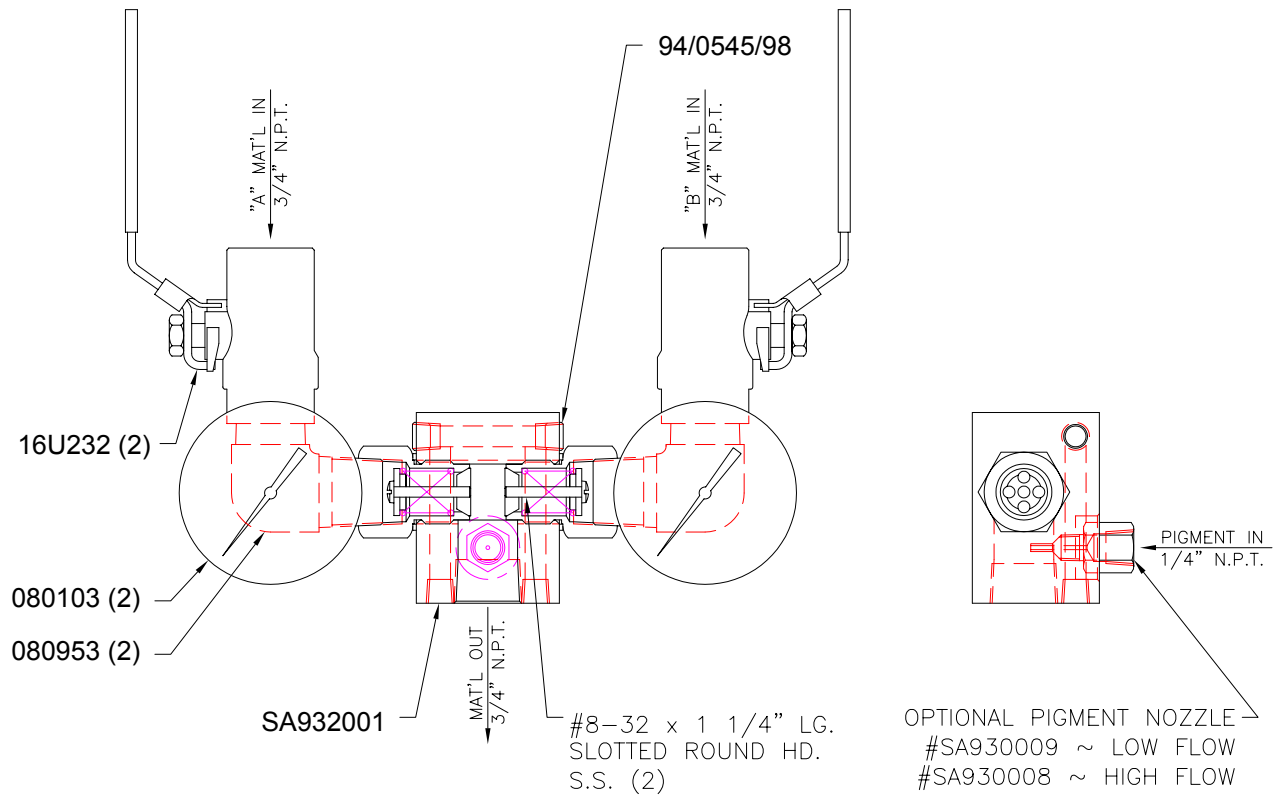
RELEASED: 1-23-98

REVISED: 10-7-03

DESCRIPTION:

ACCESSORY MODEL # (SEE NOTE) (ASS'Y #SA937)

COLOR SAMPLE / HI-PRESSURE SWITCH



PARTS LIST

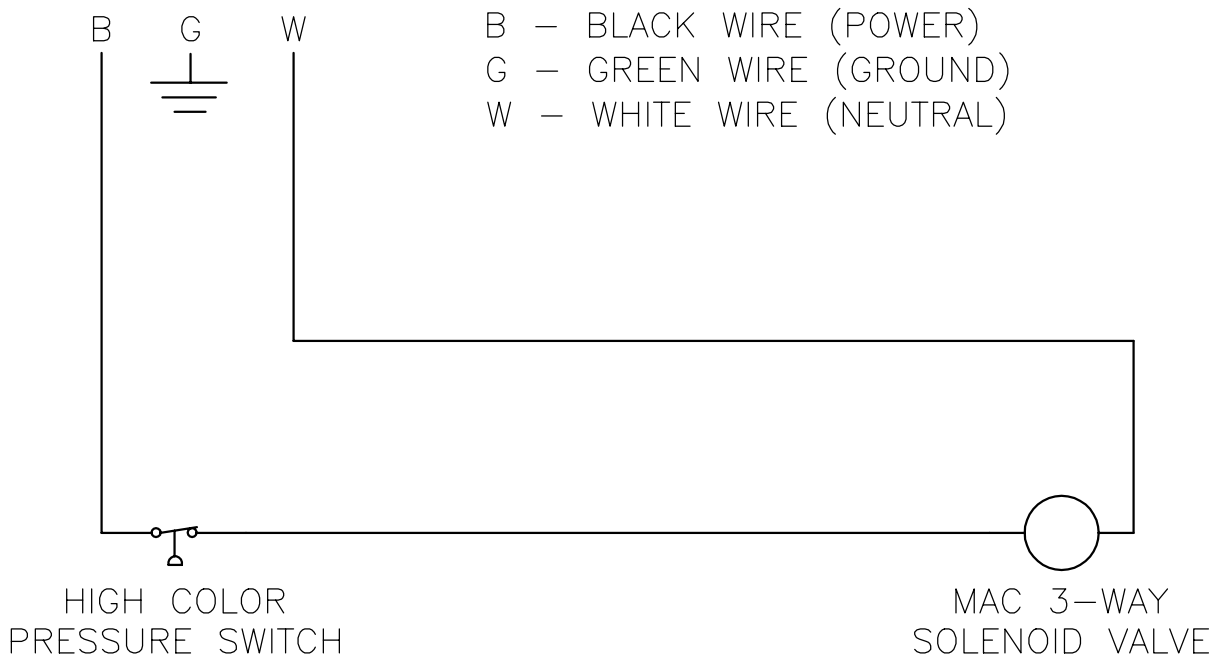
PART NO.	DESCRIPTION (QTY)
080103	GAUGE,5000,PSI,LIQUID,2.5"
080953	FITTING,ELBOW,MALE,3/4"NPT,SST
16U232	VALVE,BALL, 3/4,SS,6000PSI
94/0545/98	PLUG,SKT HD,1/8NPT,18-8SS
FAA040130	SPRING
FAA040132	GASKET,COPPER,1.2ODX1.02ID
SA930001	BODY,CHECK VALVE,SST,3/4 NPT
SA930002	PLATE,CHECK VALVE,SST
SA930003	RETAINER,SPRING,CHECK VALVE,SST
SA930008	NOZZLE,PIGMENT,HIGH FLOW
SA930009	NOZZLE,PIGMENT,LOW FLOW
SA932001	BODY,MANIFOLD,SA932



RELEASED: 1-25-02
 REVISED: 12-1-05

DESCRIPTION: ACCESSORY MODEL #SA932-G, SA932-G-L & SA932-G-H (ASS'Y #SA932) ~ MEDICAL
 1:1 RATIO WATER COOLED SILICONE MANIFOLD (OPTIONAL COLOR)

ELECTRICAL DIAGRAM FOR CS4 AND CH4 MACHINES



NOTE: 120VAC MODELS HAVE A STANDARD PLUG, 220VAC MODELS HAVE JUST A CORD WITH NO PLUG.



WIXOM, MI.

DATE: 1-19-99

DES: LLD

CHK'D: FAI

PAGE: ~

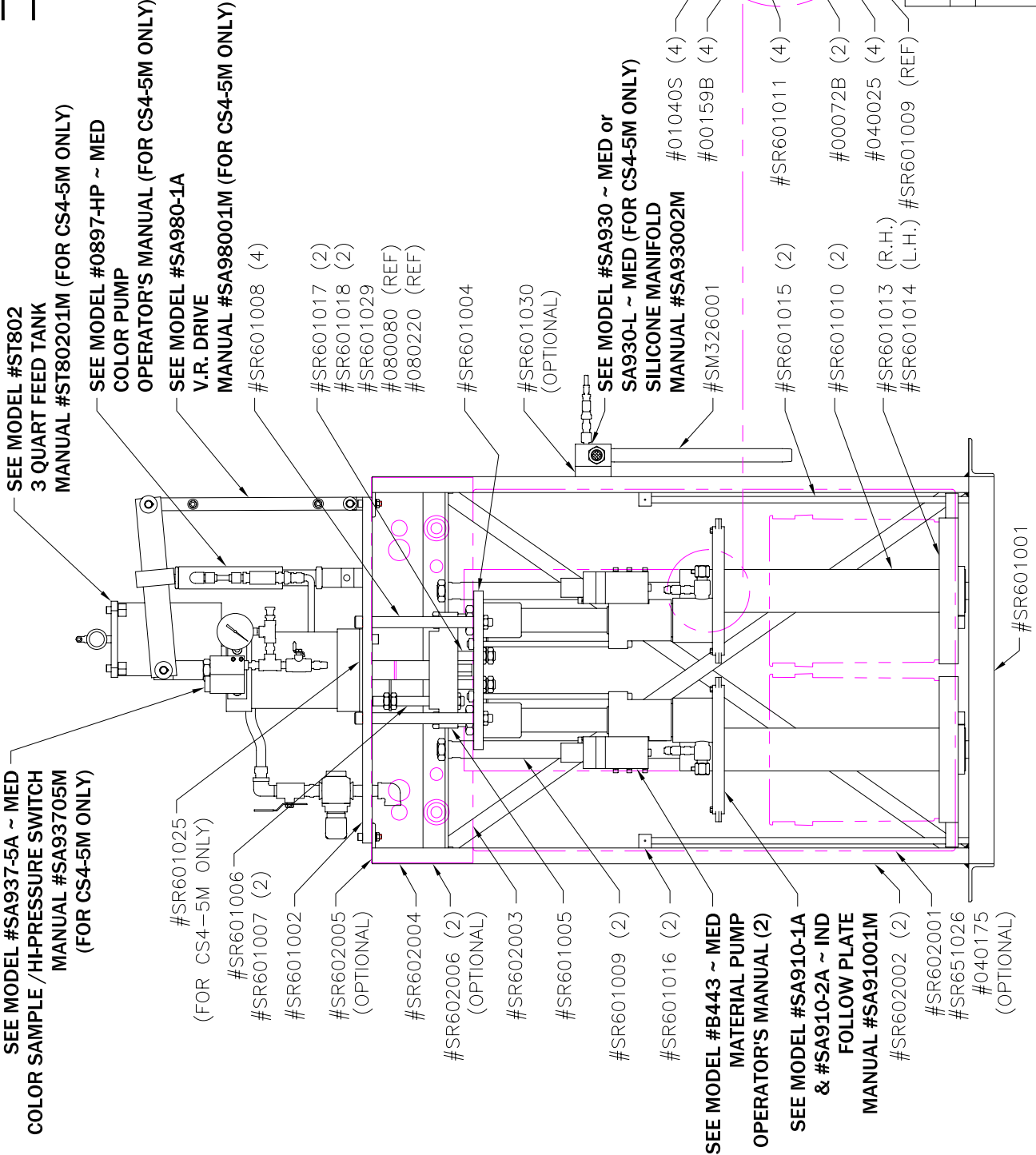
DESCRIPTION:

F.A.I. STANDARD

PARTS LIST

PART NO DESCRIPTION (QTY)

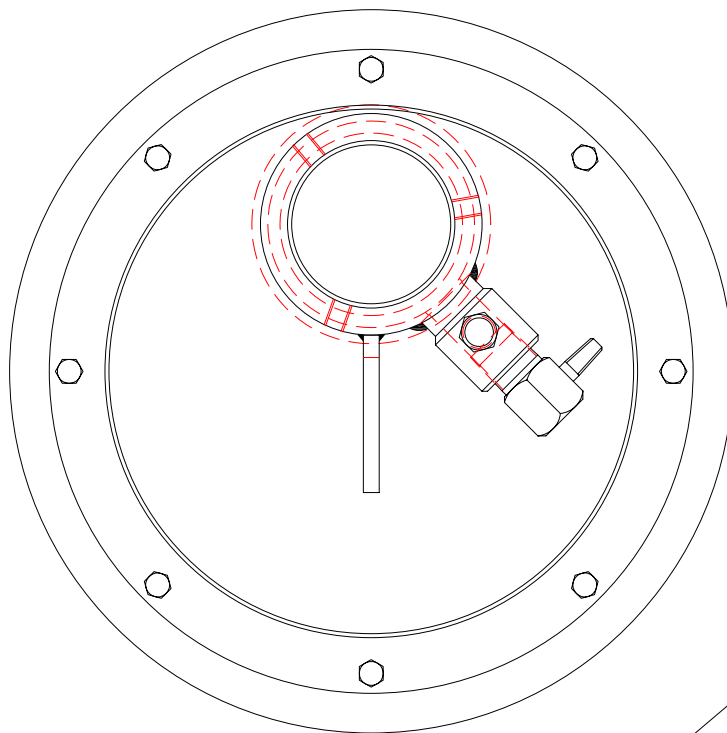
00072B	"O" RING, 3/32" C/S, 1.188" ID ~ BUNA (2)
00147B	"O" RING, 1/8" C/S, 1.375" ID ~ BUNA (8)
00159B	"O" RING, 1/8" C/S, 2.750" ID ~ BUNA (4)
01012B	"U" CUP SEAL, 3.000 OD x 2.250 ID x .375 C/S ~ BUNA 80 DURO (4)
01040S	WIPER RING, 1.684 OD x 1.375 ID x .104 BASE THK ~ URETHANE, 90 DURO (4)
020009	WEAR RING ~ (2)
040025	SNAP RING, EXTERNAL, 1.375" ID ~ STEEL (4)
040175	VISE-ACTION LATCH, T-HANDLE 180dg TURN, 1.15/16" MAX REACH (2) (OPTIONAL)
SM326001	SPIRAL MIXER, 12-ELEMENT FRAME
SR601001	MOTOR MOUNT PLATE
SR601002	PUMP MOUNTING PLATE
SR601004	DRIVE BAR
SR601005	LIMIT VALVE MOUNT
SR601006	MOTOR LIMIT VALVE MOUNT (2)
SR601007	DOWN ROD (4)
SR601008	SHAFT (2)
SR601009	RAM CYLINDER (2)
SR601010	RAM END HOUSING (4)
SR601011	PISTON (2)
SR601012	R.H. PAIL SHELF
SR601013	L.H. PAIL SHELF
SR601014	ROD (2)
SR601015	PAIL SHELF GUIDE (2)
SR601016	LOW LEVEL SHUT-OFF MOUNT (2)
SR601017	LOW LEVEL ROD (2)
SR601018	TRAY (CS4-5M ONLY)
SR601025	BRACKET
SR601029	MANIFOLD (OPTIONAL)
SR601030	DOOR (OPTIONAL)
SR602001	SIDE PLATE (2) (OPTIONAL)
SR602002	FRONT PANEL
SR602003	BACK PANEL
SR602004	TOP DUST COVER (OPTIONAL)
SR602005	SIDE PANEL (OPTIONAL REPLACES SR602002)
SR602006	DOOR LATCH MOUNT (OPTIONAL)
SR651026	



WIXOM, MI.

DATE: 6-10-08 DES: J.M. CHK'D: F.A.

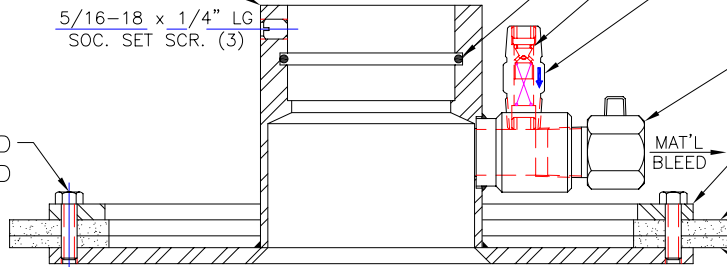
DESCRIPTION:
MODEL #S4-5M & #CS4-5M
MECHANICAL COMPONENT



#SA910001 ~ L.H.
#SA910002 ~ R.H.

5/16-18 x 1/4" LG
SOC. SET SCR. (3)

#040969 (8) ~ MED
#040970 (8) ~ IND



#00158B
#00009V
(FOR SEAL KIT)
#080005 ~ IND
#080006 ~ MED
**SEE CHECK VALVE
ASS'Y #08001M**

#SA905007
#SA908002
#SA908003
#SA908005

PARTS LIST

PART NO	DESCRIPTION (QTY)
00158B	"O" RING, 1/8" C/S, 2.625" ID ~ BUNA
040969	HEX HD SCREW, 1/4-20 x 7/8" LG ~ SS (8)
040970	HEX HD SCREW, 1/4-20 x 7/8" LG ~ STEEL (8)
080005	1/4" NPTM x 1/4" NPTM CHECK VALVE, 15# CRACK PRESSURE, ~ BRASS
080006	1/4" NPTM x 1/4" NPTM CHECK VALVE, 15# CRACK PRESSURE ~ SS
SA905007	BALL VALVE, 1/2" NPTM
SA908002	RETAINER
SA908003	SEAL ~ BLK
SA908005	SEAL ~ WHT
SA910001	FOLLOW PLATE HUB ~ L.H.
SA910002	FOLLOW PLATE HUB ~ R.H.

SEAL KIT (MODEL #SA908K)

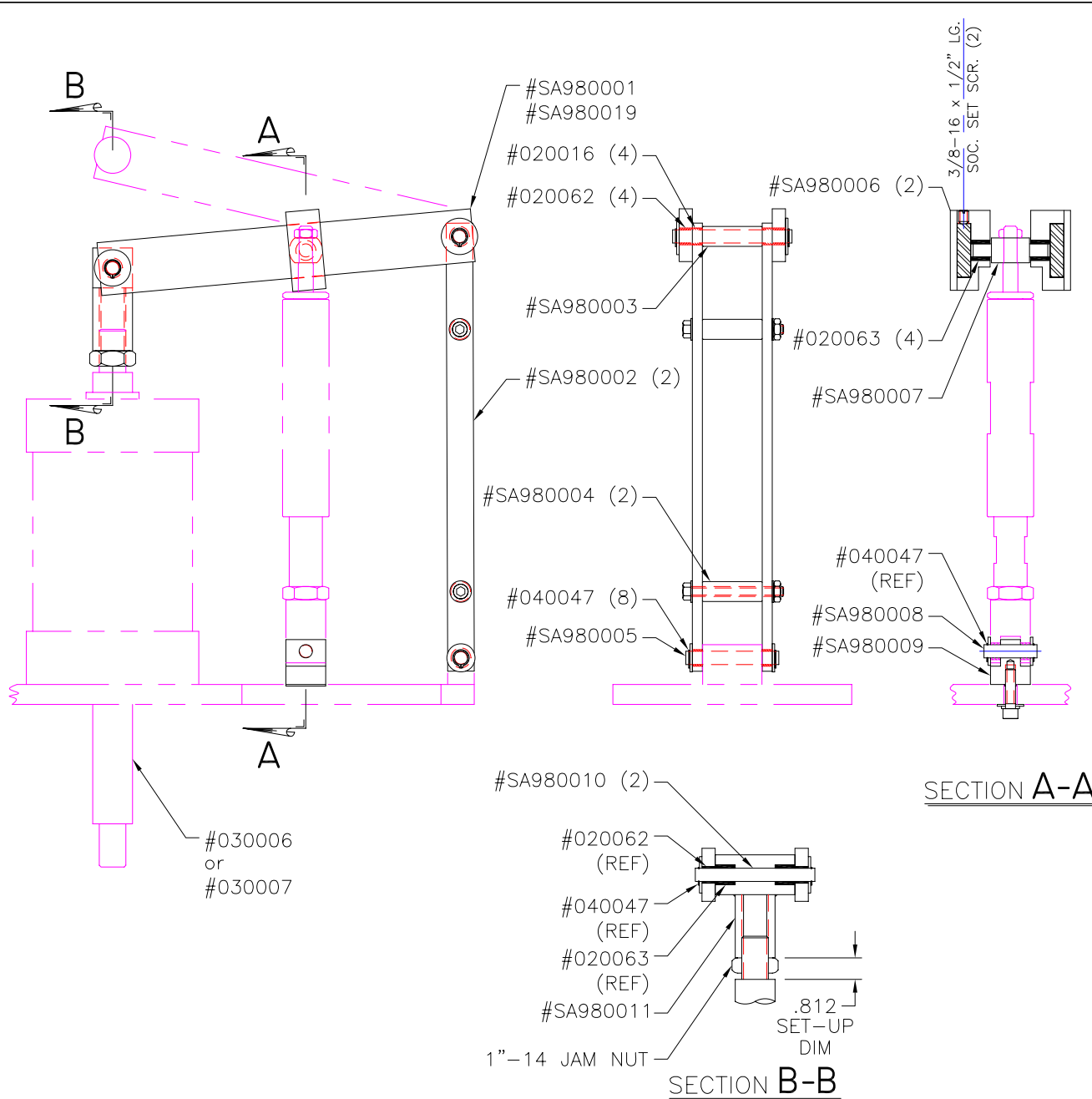
PART NO	DESCRIPTION (QTY)	THIS ASSEMBLY USED ON MACHINE:
00009V	"O" RING, 1/16" C/S, .218" ID	(1:1) S4-5(M) & CS4-5(M)
00158B	"O" RING, 1/8" C/S, 2.625" ID ~ BUNA	
SA908003	SEAL ~ BLK	
SA908005	SEAL ~ WHT	



WIXOM, MI.

RELEASED: 1-3-98
REVISED: 6-6-08

DESCRIPTION: ACCESSORY MODEL #SA910-1A & #SA910-2A (ASS'Y #SA910) ~ INDUSTRIAL & MEDICAL
5-GALLON FOLLOW PLATE ~ OFFSET CENTER HUB



PARTS LIST

PART NO	DESCRIPTION (QTY)
020016	BRONZE BUSHING (4)
020062	BRONZE BUSHING (4)
020063	BRONZE BUSHING (4)
040047	SNAP RING (8)
SA980001	V.R. DRIVE BAR
SA980002	PIVOT BAR (2)
SA980003	UPRIGHT TOP SPACER
SA980004	UPRIGHT SPACER (2)
SA980005	V.R. DRIVE PIN
SA980006	V.R. SLIDE (2)
SA980007	UPPER PIVOT
SA980008	V.R. DRIVE PIN
SA980009	SLIDING PIVOT BLOCK
SA980010	V.R. DRIVE PIN (2)
SA980011	CYLINDER ADAPTER
SA980019	V.R. DRIVE BAR

THIS ASSEMBLY USED ON MACHINE:
 (1:1) CS4-5(M)
 (10:1) 103, 103-4

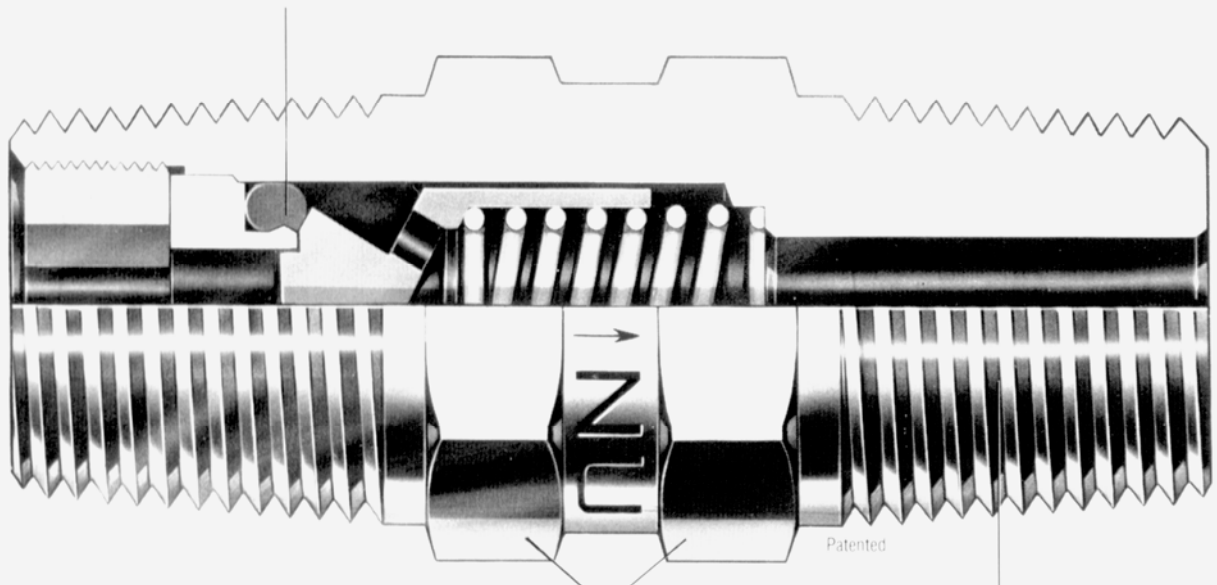


WIXOM, MI.

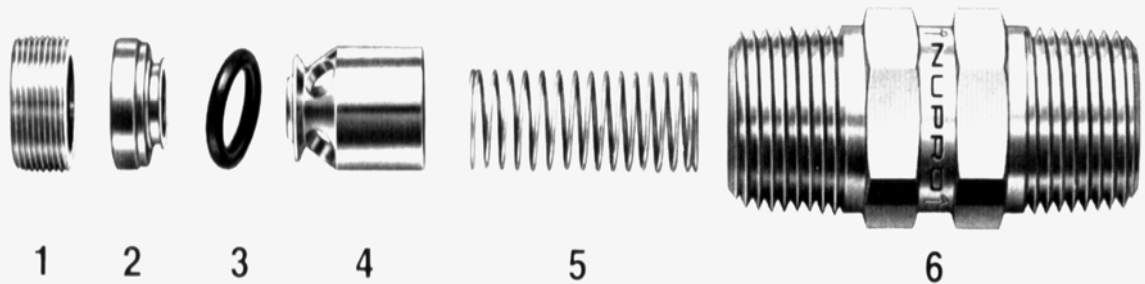
RELEASED: 1-23-98
 REVISED: 4-11-00

DESCRIPTION: ACCESSORY MODEL #SA980-1A (ASS'Y #SA980)
 V.R. DRIVE ASS'Y

FULLY CONTAINED O-RING SEAL



MATERIALS OF CONSTRUCTION



	F.A.I. PART NUMBERS			
	Ass'y #080006	Ass'y #080292	Ass'y #080005	Ass'y #080291
	316SS ~ 1/4" N.P.T.	316SS ~ 1/2" N.P.T.	Brass ~ 1/4" N.P.T.	Brass ~ 1/2" N.P.T.
1. Insert Lock Screw	080272	080273	080278	080279
2. Insert	080268	080269	080274	080275
3. O-Ring	00009V	00059V	00009B	00059B
4. Poppet	080270	080271	080276	080277
5. Spring	040182	040186	040182	040186
6. Body	080299	080300	080297	080298

FLUID Automation, Inc.

WIXOM, MI

RELEASED: 5-5-97

REVISED:

DESCRIPTION:

CHECK VALVE ASSEMBLY
15# ~ NON-ADJUSTABLE

MANUAL#: 08001M



CA & CPA Series Check Valve Cracking Pressure Adjustment

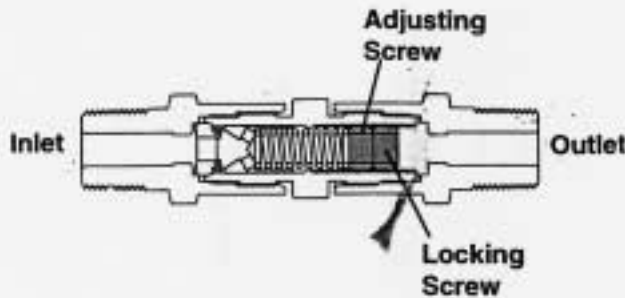
Tools Needed

CA & 4CPA
5/32 in. hex key

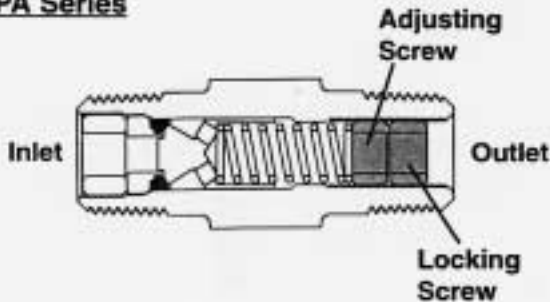


8CPA
5/16 in. hex key

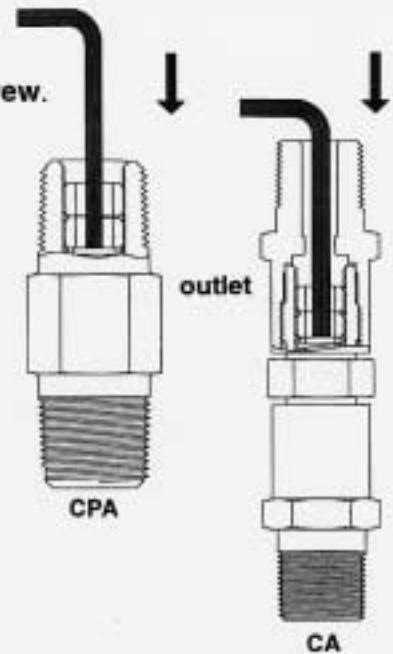
CA Series



CPA Series

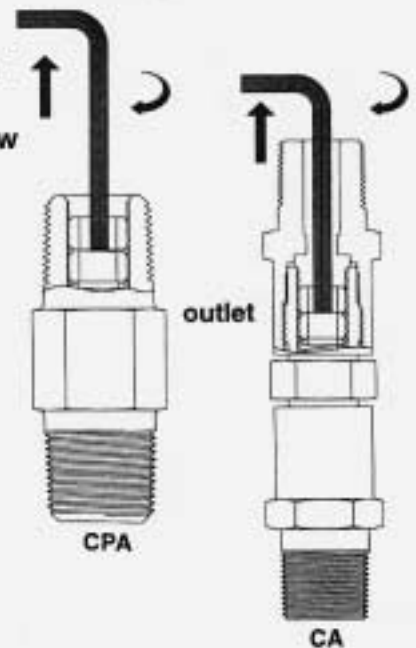


2. Slide wrench down into adjusting screw.



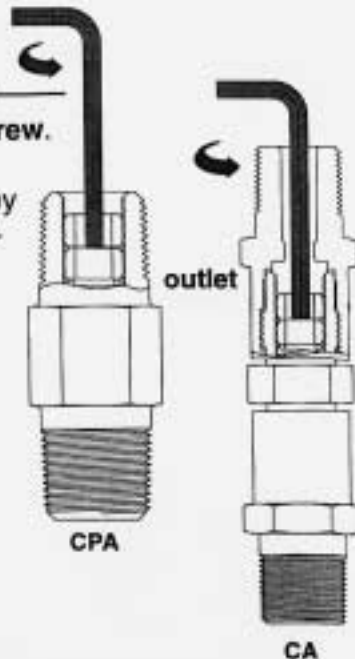
3. Turn both screws to reach desired cracking pressure. (Turn clockwise to increase cracking pressure, counter clockwise to decrease cracking pressure)

4. Slide wrench back up into locking screw and turn clockwise to lock.



1. Insert wrench into locking screw.

Loosen screw by turning counter-clockwise.

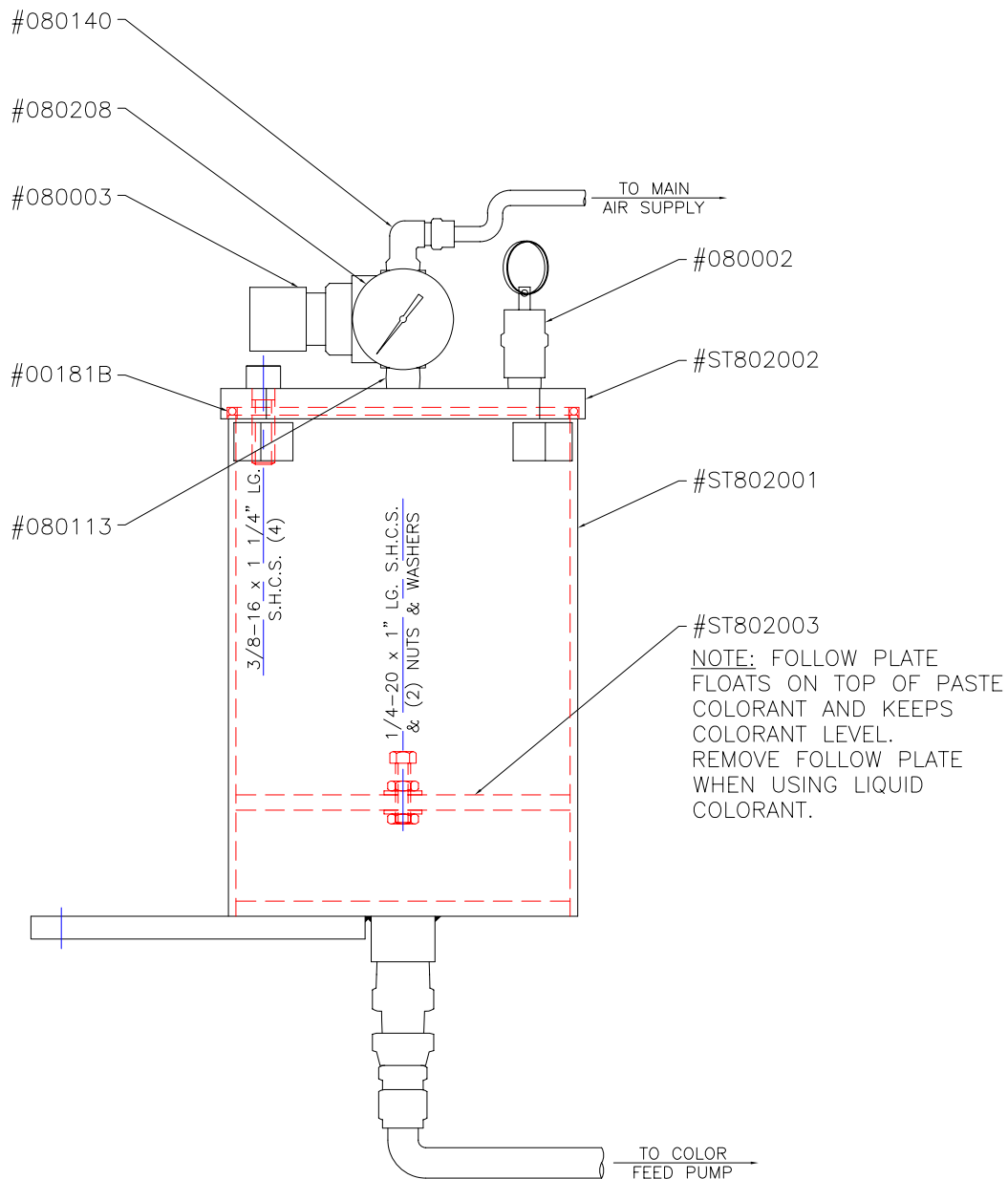


5. Verify cracking pressure and adjust screws if required.



NUPRO Company
4800 E. 345th Street
Willoughby, Ohio 44094, U.S.A.





PARTS LIST

PART NO.	DESCRIPTION
00181B	"O" RING
080002	RELIEF VALVE
080003	PRESSURE REGULATOR
080113	CLOSE NIPPLE
080140	MALE ELBOW
080208	GAUGE, 160psi
ST802001	TANK
ST802002	LID
ST802003	FOLLOW PLATE

THIS ASSEMBLY USED ON MACHINE:

(10:1) 101, 102, 103, 201 & 201G
 (1:1) CS4-5(M), CH4-55-55(M), CH4-55-5(M),
 CE4-5(M), CE4-55-55(M) & CE4-55-5(M)

FLUID Automation, Inc

WIXOM, MI.

RELEASED: 1-23-98
 REVISED: 10-9-01

DESCRIPTION:

TANK MODEL #ST802 (ASS'Y #ST802)
 (3) QUART FEED

OPERATOR'S MANUAL #B443/#B443A/#B443M

INCLUDING: OPERATION, INSTALLATION & MAINTENANCE

RELEASED: 1-3-01

REVISED: 4-2-12

4.50" STROKE ~ MAX

2.7855 IN³ (45.65cc) MAX

CARBON STEEL & S.S. CONSTRUCTION

RECIPROCATING, DOUBLE-ACTING

SHOVEL LOADING, METERING PUMP

AIR OPERATED INTAKE VALVE

IMPORTANT: READ THIS MANUAL CAREFULLY BEFORE INSTALLING, OPERATION OR SERVICING THIS EQUIPMENT.

OPERATING PRECAUTIONS

- HEED ALL WARNINGS.
- WARNING: HIGH PRESSURE DEVICE. Improper usage of this equipment could result in serious injury. The possibility of injection into the flesh is a potential hazard. Never allow any part of the human body to come in front of or in direct contact with the material outlet. An injection injury can be serious. If injection should occur, contact a qualified physician immediately for treatment.
- COMPONENT RUPTURE. This pump is capable of producing high material pressure. Use appropriate outlet hose and valves.
- Be sure material hoses and other components are able to withstand fluid pressures developed by this pump.
- Do not operate pump continuously at speeds in excess of 20 cycles per minute, to avoid losing material prime.
- Disconnect air line from pump air motor when system sits idle for long periods of time.
- Materials and solvents being pumped by this pump must be compatible with the parts of this pump that come in contact with material and solvent.
- SERVICING. Before servicing or cleaning pump, or removing fluid hose or gun from a unit that has been used, be sure to disconnect air lines and carefully bleed the pressure off the system.

INSTALLATION

- The pump is held together by (3) tie rods from the intake housing (on the pump) to the pump mount plate (with 1/2-13 nuts). Care must be taken to radially align the housing to the plate and to tighten the (3) tie rods evenly, to avoid pump binding or scoring. The pump mount plate is held in position by (4) down rods connecting the pump to the machine.
- Connect the pump (by the displacement rod) to the air motor by connecting a 3/4-10 threaded rod (to the displacement rod) with a 1"-14 coupling on the opposite end which then connects the rod to the drive motor.
- The B443 (#SP443) pump is to be mounted in a 2 5/8" I.D. hub on a 55-gallon or 5-gallon follower plate at the intake by (2) 5/16-18 set screws.

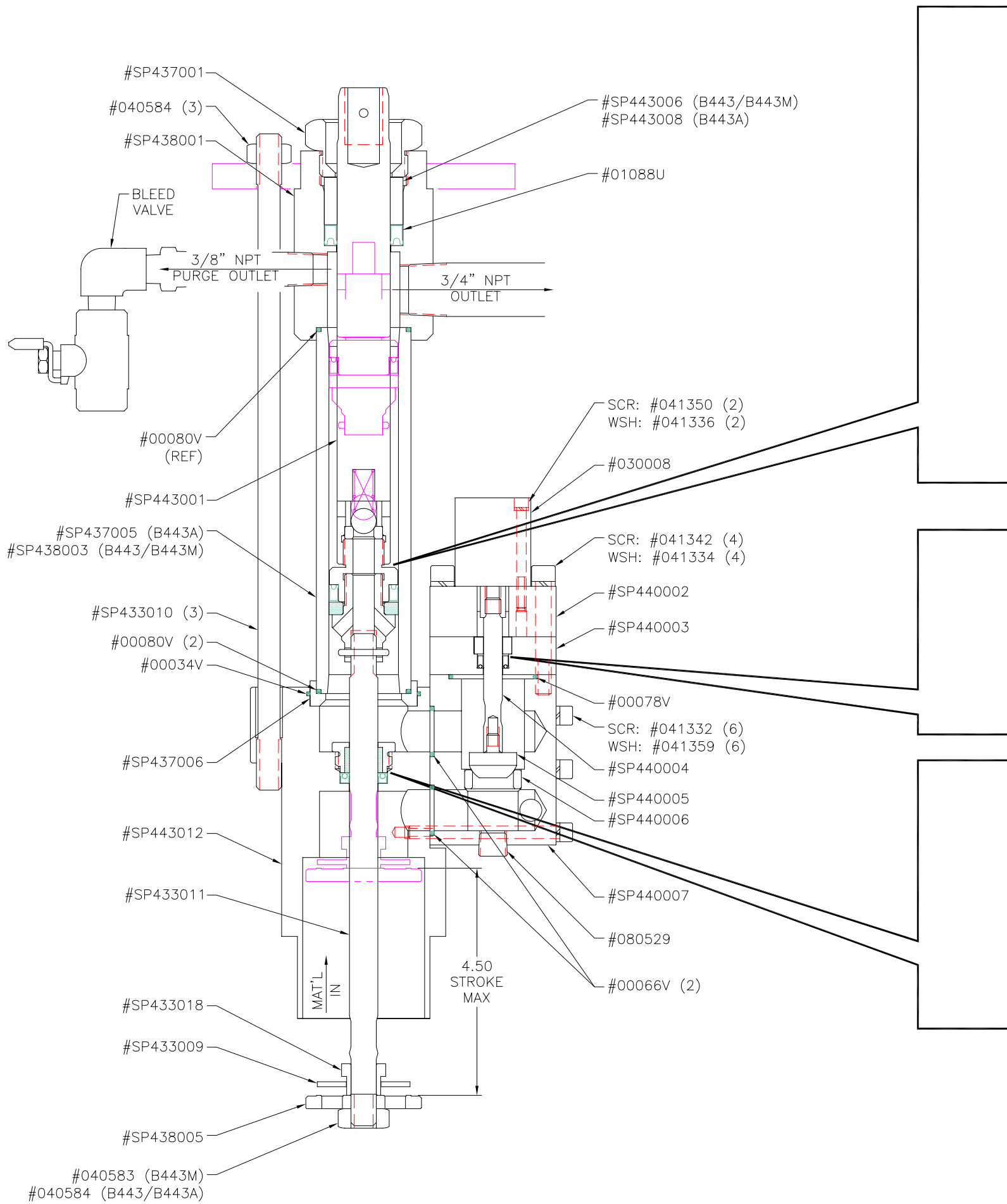
MAINTENANCE

- Cycle pump periodically to keep seals pliable.
- Keep displacement rod clean of all foreign materials.
- Material will keep pump lubricated.
- Cycle pump to bottom of stroke when not using pump.
- If pump is to be inoperative for more than a few hours at a time, disconnect air supply and relieve all pressure from the system.

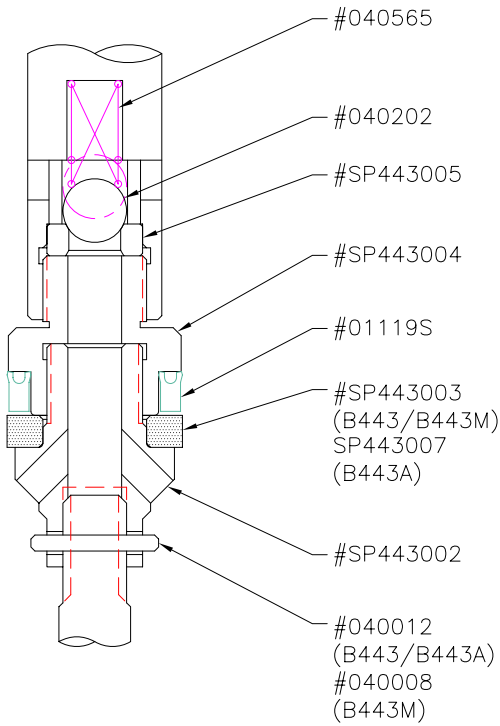
PUMP DISASSEMBLY

- Basic mechanical (S.A.E.) tools:
 - 5/16", 1/2, 3/4" & 15/16" open-end wrenches
 - 5/32", 3/16" & 1/4" Allen wrenches
 - 1 1/4" socket & wrench
 - Adjustable wrench
- Before removing pump from machine allow pump to cycle to the down position (bottom of stroke).
- Once pump is removed disconnect (3) tie rods which hold pump together.
- Place pump in vice on flats of displacement rod hold shovel rod (at the flats with 1/2" open-end wrench) and disconnect hex nut (with 3/4" open-end wrench) from bottom of shovel rod.
- Slide off stop nut, shovel plate and shovel from shovel rod.
- Remove (6) bolts (with 3/16" Allen wrench) holding the ball check housing onto the intake housing, also allowing removal of seals between housings.
- Remove (4) bolts (with 1/4" Allen wrench) from cylinder plate, also allowing removal of seal between ball check housing and seal plate.
- Hold shaft (at the flats with 5/16" open-end wrench) and separate plunger by turning counterclockwise.
- Slide off seal plate, seal and seal retainer from shaft.
- Hold air cylinder (in vise) and separate shaft by turning (with 5/16" open-end wrench) counterclockwise.
- Remove (2) bolts (with 5/32" Allen wrench) holding air cylinder onto cylinder plate.
- Remove intake housing by separating it from cylinder (use caution, coming into contact with threads of shovel rod, thus ensuring no damage to seals).
- Unscrew (with 1 1/4" socket wrench) packing nut from intake housing allowing replacement of bushing.
- Separate adapter from intake housing, allowing removal of seal.
- Separate cylinder from packing housing.
- Hold piston (at the flats with 3/4" open-end wrench) and separate piston spacer by turning (with 7" pipe wrench) counterclockwise, thus allowing removal of bearing and seal.
- Hold displacement rod (with 15/16" open-end wrench) and separate piston spacer by turning (with 7" pipe wrench) counter clockwise, thus allowing removal of seat, ball and spring.
- Slide displacement rod from packing housing in opposite direction of packing nut (ensuring no damage to seals).
- Unscrew packing nut (with adjustable wrench) from packing housing.
- Remove bushing and seal.
- Place all parts in a solvent tank for cleaning, except seals which will be damaged by the solvent.

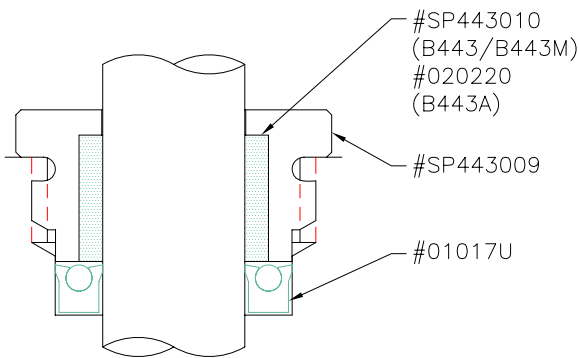
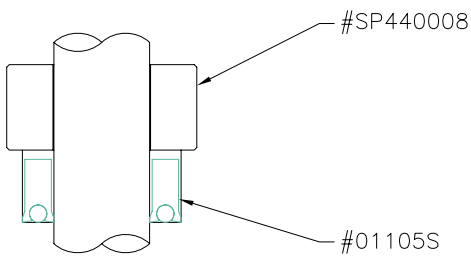
NOTE: SEE MACHINE MANUAL FOR PUMP PURGING AND PRIMING PROCEDURES



B443/B443A/B443M (#SP443) PUMP PARTS LIST



PART NO	DESCRIPTION [LEGACY #] (QTY)
00034V	"O" RING, 1/16" C/S, 2.125" ID ~ [B44]
00066V	"O" RING, 3/32" C/S, .812" ID ~ [B454] (2)
00078V	"O" RING, 3/32" C/S, 1.562" ID ~ [B455]
00080V	"O" RING, 3/32" C/S, 1.688" ID ~ [B415] (2)
01017U	POLYSEAL, .937 OD x .562 ID x .188 C/S ~ FLUOROTREL, COLOR = LIGHT BLUE [B452]
01088U	POLYSEAL, TYPE "B", 1.562 OD x 1.062 ID x .375 C/S, NO EXPANDER ~ FLUOROTREL, COLOR = LIGHT BLUE
01105S	POLYSEAL, TYPE "B", .625 OD x .375 ID x .125 C/S ~ HYTREL, COLOR = ORANGE
01119S	POLYSEAL, TYPE "B", 1.375 OD x 1.000 ID x .312 C/S, NO EXPANDER ~ FLUOROTREL, COLOR = LIGHT BLUE
030008	CYLINDER, 1 1/8" BORE, 1/2" STROKE [B457]
040565	BALL, 1/2" DIA, GRADE 25, R/C A92 ~ TUNGSTEN CARBIDE
040565	COMPRESSION SPRING, .42" OD, 28.0#/in ~ ZINC PLATED
041332	S.H.C.S., 1/4-20 x 3" LG ~ GRADE 5 STEEL (6)
041334	SPLIT LOCK WASHER, 5/16" SCREW ~ STEEL, ZINC PLATE (4)
041336	SPLIT LOCK WASHER, #10 SCREW ~ STEEL, ZINC PLATE (2)
041342	S.H.C.S., 5/16-18 x 2 1/4" LG ~ GRADE 5 STEEL (4)
041350	S.H.C.S., #10-24 x 2" LG ~ GRADE 5 STEEL (2)
041359	SPLIT LOCK WASHER, 1/4" SCREW ~ STEEL, ZINC PLATE (6)
080529	1/4" NPTM PIPE PLUG, HEX SOCKET ~ 302 STAINLESS STL
SP433009	SHOVEL PLATE [B235]
SP433010	TIE ROD [B240] (3)
SP433011	SHOVEL ROD [B226]
SP433018	STOP NUT [B234]
SP437001	PACKING NUT [B401]
SP437006	ADAPTER [B416]
SP438001	PACKING HOUSING [B402SS]
SP438005	SHOVEL [B418SS]
SP440002	CYLINDER PLATE [B447]
SP440003	SEAL PLATE [B444]
SP440004	SHAFT [B446]
SP440005	PLUNGER [B464]
SP440006	SEAT [B462]
SP440007	BALL CHECK HOUSING [B463SS]
SP440008	SEAL RETAINER [B445]
SP443001	DISPLACEMENT ROD
SP443002	PISTON
SP443004	PISTON SPACER
SP443005	SEAT
SP443009	PACKING NUT
SP443012	INTAKE HOUSING



B443: COMPONENT VARIANT

040012 SPRING PIN ~ STEEL	SP443003 BEARING
040584 JAM NUT ~ STEEL (4)	SP443006 BUSHING
SP438003 CYLINDER [B414SS]	SP443010 BUSHING

B443A: COMPONENT VARIANT

020220 BUSHING ~ BRONZE	SP437005 CYLINDER [B414]
040012 SPRING PIN ~ STEEL	SP443007 BEARING
040584 JAM NUT ~ STEEL (4)	SP443008 BUSHING

B443M: COMPONENT VARIANT

040008 SPRING PIN ~ 420 SS	SP443003 BEARING
040583 JAM NUT ~ 18-8 SS	SP443006 BUSHING
040584 JAM NUT ~ STEEL (3)	SP443010 BUSHING
SP438003 CYLINDER [B414SS]	

SEAL KITS

B443K (INDUSTRIAL/MEDICAL):

PART NO DESCRIPTION [LEGACY #] (QTY)

00034V "O" RING [B44]	01105S POLYSEAL
00066V "O" RING [B454] (2)	01119S POLYSEAL
00078V "O" RING [B455]	SP443003 BEARING
00080V "O" RING [B415] (2)	SP443006 BUSHING
01017U POLYSEAL [B452]	SP443010 BUSHING
01088U POLYSEAL	

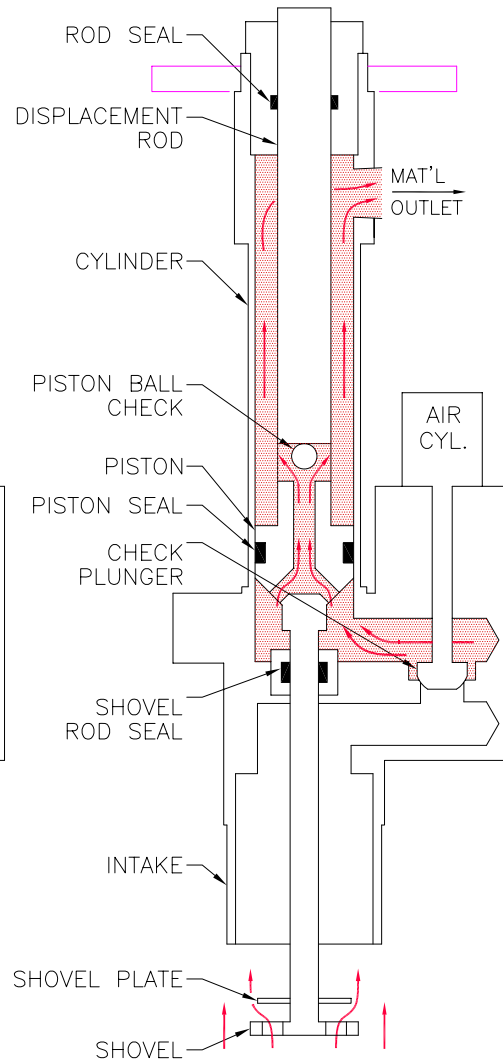
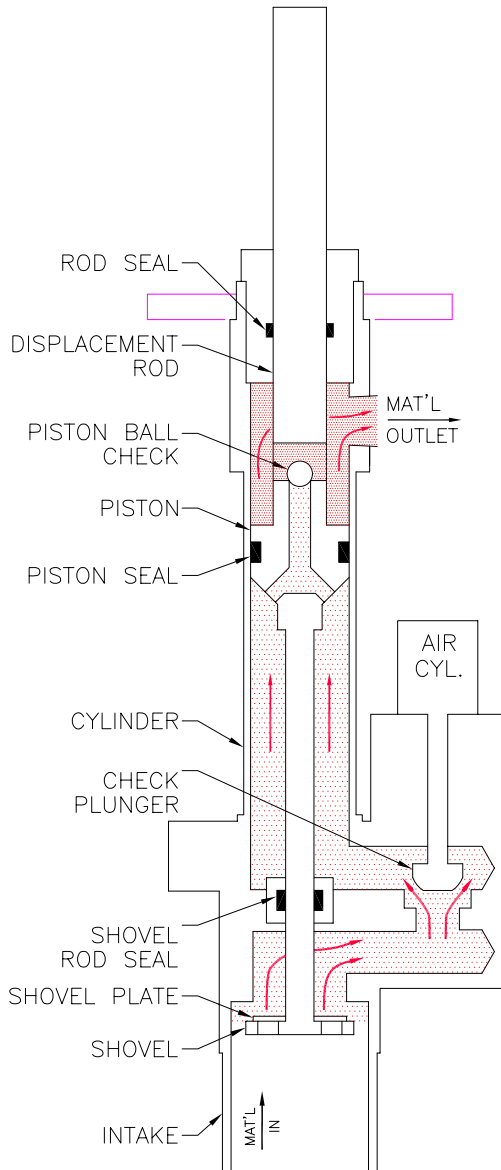
B443KA (ABRASIVE MAT'L):

PART NO DESCRIPTION [LEGACY #] (QTY)

00034V "O" RING [B44]	01105S POLYSEAL
00066V "O" RING [B454] (2)	01119S POLYSEAL
00078V "O" RING [B455]	020220 BUSHING
00080V "O" RING [B415] (2)	SP443007 BEARING
01017U POLYSEAL [B452]	SP443008 BUSHING
01088U POLYSEAL	

THEORY OF OPERATION

TROUBLE SHOOTING



UPSTROKE

- DISPLACEMENT ROD MOVES UPWARD IN THE CYLINDER.
- PISTON BALL CHECK IS SEATED AND MATERIAL ABOVE PISTON IS DISPENSED THROUGH MATERIAL OUTLET.
- AS THE PISTON MOVES UP, AIR CYLINDER LIFTS CHECK PLUNGER FROM SEAT AND CYLINDER IS FILLED WITH MORE MATERIAL.
- AS THE SHOVEL MOVES UP, THE SHOVEL PLATE BLOCKS MATERIAL PASSAGE IN THE SHOVEL AND AIDS IN THE REFILL OF THE CYLINDER.

DOWN STROKE

- AS PISTON STARTS DOWN, AIR CYLINDER CLOSSES THE CHECK PLUNGER.
- MATERIAL IN CYLINDER FORCES PISTON BALL CHECK FROM SEAT AND FLOWS THROUGH PISTON TO UPPER PORTION OF CYLINDER.
- AS THE DISPLACEMENT ROD MOVES DOWN, HALF OF THE MATERIAL IS FORCED THROUGH THE MATERIAL OUTLET AND THE OTHER HALF REMAINS IN THE CYLINDER ABOVE THE PISTON.
- AS THE SHOVEL MOVES DOWN, THE SHOVEL PLATE LIFTS ALLOWING THE SHOVEL TO PASS THROUGH THE MATERIAL WITHOUT CAVITATING THE PUMP.

PROBLEM: NO MATERIAL, PUMP STALLED
 CAUSE: OBSTRUCTED MATERIAL PATH
 SOLUTION: REMOVE OBSTRUCTION, USUALLY CURED MATERIAL

PROBLEM: NO MATERIAL, PUMP CYCLING CONTINUALLY
 CAUSE: LOST PRIME
 SOLUTION #1: RAM CONTROL VALVE NOT IN DOWN POSITION OR DOWN PRESSURE TOO LOW. CORRECT THE SETTINGS, AND REPRIME THE PUMP.
 SOLUTION #2: REDUCE PUMP SPEED IF OPERATING TOO FAST TO MAINTAIN PRIME. AND/OR INCREASE RAM DOWN PRESSURE.
 SOLUTION #3: REMOVE OBSTRUCTION FROM PUMP INTAKE, SUCH AS PLASTIC DRUM LINER.

PROBLEM: NO MATERIAL ON DOWN STROKE
 CAUSE #1: NO CHECK PLUNGER MOVEMENT
 SOLUTION: CHECK SIGNAL TO VALVE, VALVE OPERATION, AND CORRECT FAULTY COMPONENT.
 CAUSE #2: CHECK PLUNGER IS NOT SEATING
 SOLUTION: REMOVE THE CHECK PLUNGER, CLEAN AND INSPECT FOR FOREIGN MATERIAL OR DAMAGE, IF DAMAGED REPLACE.
 CAUSE #3: SHOVEL ROD SEAL LEAKING
 SOLUTION: REPLACE SEAL & BEARING

PROBLEM: NO MATERIAL ON UP STROKE
 CAUSE #1: PISTON BALL CHECK NOT SEATING
 SOLUTION: REPLACE SPRING, BALL OR SEAT IF DAMAGED OR REMOVE FOREIGN MATERIAL FROM BETWEEN BALL AND SEAT
 CAUSE #2: PISTON SEAL LEAKING
 SOLUTION: REPLACE SEAL. INSPECT CYLINDER BORE AND PISTON BEARING FOR DAMAGE

OPERATOR'S MANUAL #.0897-HP ~ MED

INCLUDING: OPERATION, INSTALLATION & MAINTENANCE

RELEASED: 3-1-96

REVISED: 4-21-09

3.75" STROKE ~ MAX
.3315 IN³ (5.43cc) MAX

STAINLESS STEEL CONSTRUCTION

4-CHECK COLOR METERING PUMP
MEDICAL VERSION
3000 psi MAX PRESSURE

**IMPORTANT: READ THIS MANUAL CAREFULLY BEFORE INSTALLING,
OPERATION OR SERVICING THIS EQUIPMENT.**

OPERATING PRECAUTIONS

- HEED ALL WARNINGS.
- WARNING: HIGH PRESSURE DEVICE. Improper usage of this equipment could result in serious injury. The possibility of injection into the flesh is a potential hazard. Never allow any part of the human body to come in front of or in direct contact with the material outlet. An injection injury can be serious. If injection should occur, contact a qualified physician immediately for treatment.
- COMPONENT RUPTURE. This pump is capable of producing high material pressure. Use appropriate outlet hose and valves.
- Be sure material hoses and other components are able to withstand fluid pressures developed by this pump.
- Do not operate pump continuously at speeds in excess of 20 cycles per minute, to avoid losing material prime.
- Disconnect air line from pump air motor when system sits idle for long periods of time.
- Materials and solvents being pumped by this pump must be compatible with the parts of this pump that come in contact with material and solvent.
- SERVICING. Before servicing or cleaning pump, or removing fluid hose or gun from a unit that has been used, be sure to disconnect air lines and carefully bleed the pressure off the system.

INSTALLATION

- Raise the air motor to top of stroke.
- Insert 1/2-20 threaded end of drive rod into upper pivot of variable ratio drive assembly.
- Fasten with 1/2-20 threaded nut.
- Attach variable ratio drive pivot block to mounting pivot at lower end of pump.
- Lower air motor until pivot block reaches the mounting plate.
- Attach 3/8-16 x 1 1/4" long S.H.C.S. through slot in mounting plate to the pivot block.
- Attach inlet and outlet hoses.

MAINTENANCE

- Cycle pump periodically to keep seals pliable.
- Keep displacement rod clean of all foreign materials.
- Material will keep pump lubricated.
- Cycle pump to bottom of stroke when not using pump.
- If pump is to be inoperative for more than a few hours at a time, disconnect air supply and relieve all pressure from the system.

PUMP DISASSEMBLY

- Basic mechanical (S.A.E.) tools:

9/16" open-end wrench
11/16" open-end wrench
3/4" open-end wrench
1 1/16" open-end wrench
1 1/2" open-end wrench
8" pipe wrench

Before removing pump from machine allow pump to cycle to the down position (bottom of stroke.)

- Hold mounting tube (at the flats) in vise.
- Unscrew nut (at the flats with 1 1/2" open-end wrench) from cylinder, thus allowing you to remove drive rod and nylon bushing.
- Slide drive rod, along with nylon piston and lower rod, from cylinder in the direction identifiable top from bottom by the chamfered I.D. of the bore.
- Hold lower rod and drive rod (at the flats with 9/16" open-end wrench) and separate rods from each other.
- Slide piston from lower rod, thus allowing removal of "o" rings.
- Remove mounting tube from vise.
- Hold cylinder (at the flats) in vise, and unscrew mounting tube (hold at the flats with 1 1/16" open-end wrench), thus allowing you to remove bushing.
- Hold mounting tube (at the flats with 1 1/16" open-end wrench) and unscrew pivot (with 1 1/2" open-end wrench) and then the lock nut.

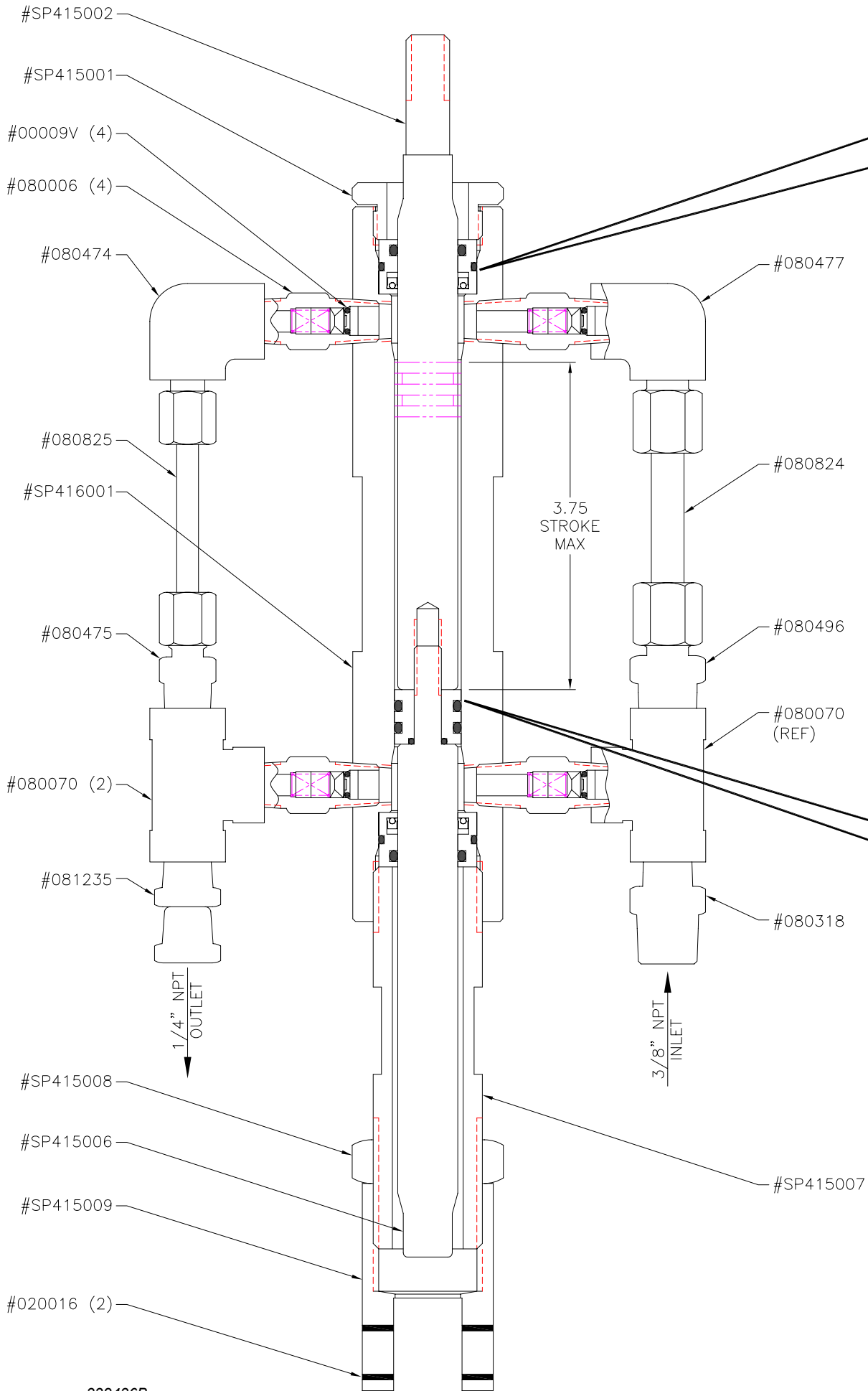
(The following is for the outlet side of cylinder.)

- Disconnect top nut (with 9/16" open-end wrench) from elbow and 3/4 turn (with 3/4" open-end wrench) elbow.
- Then disconnect lower nut (with 9/16" open-end wrench) from fitting, allowing tube assembly removal.
- Disconnect elbow (with 3/4" open-end wrench) from check valve.
- Remove pipe tee (with 3/4" open-end wrench) from check valve.
- Now remove both top & bottom check valves (with 9/16" open-end wrench) from cylinder.

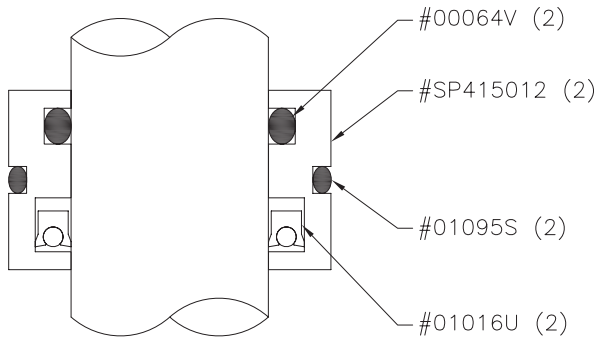
(The following is for the inlet side of the cylinder.)

- Disconnect top nut (with 11/16" open-end wrench) from elbow and 3/4 turn (with 3/4" open-end wrench) elbow.
- Then disconnect lower nut (with 11/16" open-end wrench) from fitting, allowing tube assembly removal.
- Disconnect elbow (with 3/4" open-end wrench) from check valve.
- Remove pipe tee (with 8" pipe wrench) from check valve.
- Now remove both top & bottom check valves (with 9/16" open-end wrench) from cylinder.
- Place all parts in a solvent tank for cleaning, except seals which will be damaged by the solvent.

NOTE: SEE MACHINE MANUAL FOR PUMP PURGING AND PRIMING PROCEDURES



.0897-HP ~ MEDICAL (#SP416) PUMP PARTS LIST



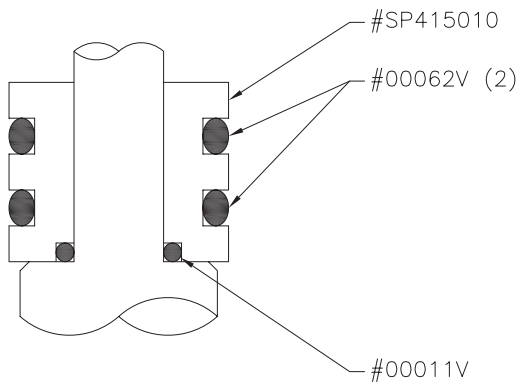
**HIGH PRESSURE
ASSEMBLY**

PART NO	DESCRIPTION [LEGACY #] (QTY)
00011V	"O" RING, 1/16" C/S, .312" ID ~ [0897-13]
00062V	"O" RING, 3/32" C/S, .562" ID ~ [0897-12] (2)
00064V	"O" RING, 3/32" C/S, .688" ID ~ [0897-10] (2)
01016U	POLYPAK SEAL, .937 OD x .687 ID x .125 C/S ~ ULTRA YELLOW (2)
01095S	"O" RING, 2.00 x 25.00 MM FPM 75 ~ (2)
020016	BRONZE BUSHING, 1/2" ID x 5/8" OD x 3/8" LG (2)
080006	1/4" NPTM x 1/4" NPTM CHECK VALVE, 15# CRACK PRESSURE ~ SS [0897-14SS] 4)
080070	1/4" NPTF x 1/4" NPTF x 1/4" NPTF TEE ~ SS [0897-18SS] (2)
080318	3/8" NPTM x 1/4" NPTM HEX NIPPLE ~ SS
080474	1/4" JIC (7/16-20 UNF) 37dg FLARE TUBE x 1/4" NPTF ELBOW w/ TUBE NUT & SLEEVE ~ SS [0897-20SS]
080475	1/4" JIC (7/16-20 UNF) 37dg FLARE TUBE x 1/4" NPTM HEX NIPPLE w/ TUBE NUT & SLEEVE ~ SS [0897-22SS]
080477	3/8" JIC (9/16-18 UNF) 37dg FLARE TUBE x 1/4" NPTF ELBOW w/ TUBE NUT & SLEEVE ~ SS [0897-15SS]
080496	3/8" JIC (9/16-18 UNF) 37dg FLARE TUBE x 1/4" NPTM HEX NIPPLE w/ TUBE NUT & SLEEVE ~ SS [0897-17SS]
080824	ASS'Y ~ 3/8" NUT & FERRULE w/ 3/8" DIA x .035 W x 2 1/4" LG TUBE (FLARED BOTH ENDS) ~ SS [0897-16SS]
080825	ASS'Y ~ 1/4" NUT & FERRULE w/ 1/4" DIA x .035 W x 2 1/4" LG TUBE (FLARED BOTH ENDS) ~ SS [0897-21SS]
081235	1/4" NPTM x 1/4" NPTF SWIVEL HEX NIPPLE ~ SS
SP415001	NUT [0897-1]
SP415002	DRIVE ROD [0897-2]
SP415006	LOWER ROD [0897-6]
SP415007	MOUNTING TUBE [0897-7]
SP415008	LOCK NUT [0897-8]
SP415009	PIVOT [0897-9]
SP415010	NYLON PISTON [0897-5N]
SP415012	NYLON BUSHING [0897-4N] (2)
SP416001	CYLINDER [0897-3SS]

SEAL KITS

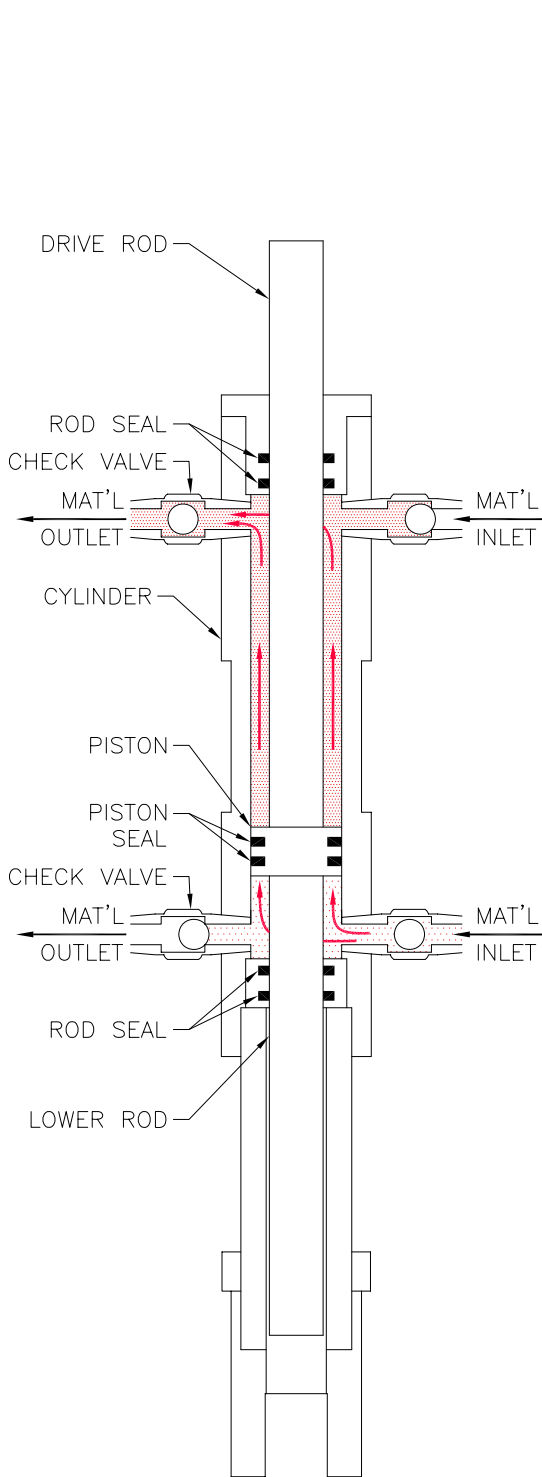
0897HPK (HIGH PRESSURE):

PART NO	DESCRIPTION [LEGACY #] (QTY)
00009V	"O" RING, 1/16" C/S, .218" ID ~ (4)
00011V	"O" RING, 1/16" C/S, .312" ID ~ [0897-13]
00062V	"O" RING, 3/32" C/S, .562" ID ~ [0897-12] (2)
00064V	"O" RING, 3/32" C/S, .688" ID ~ [0897-10] (2)
01016U	POLYPAK SEAL, .937 OD x .687 ID x .125 C/S ~ ULTRA YELLOW (2)
01095S	"O" RING, 2.00 x 25.00 MM FPM 75 ~ (2)



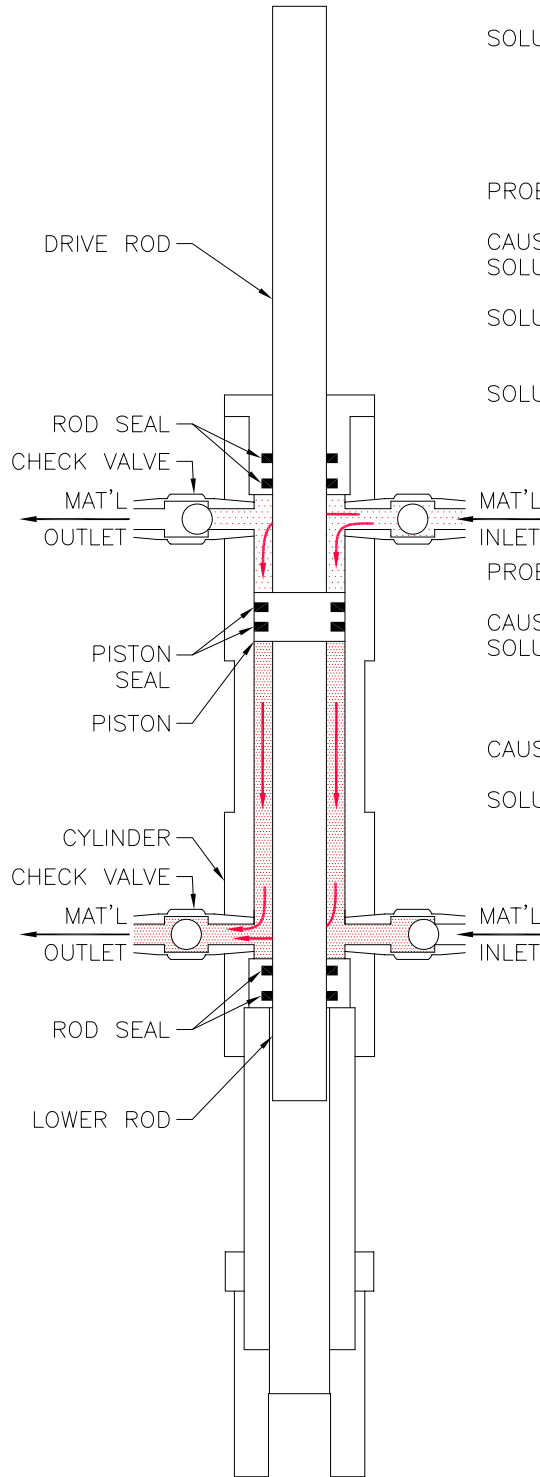
THEORY OF OPERATION

TROUBLE SHOOTING



UPSTROKE

– AS THE PISTON MOVES UP, MATERIAL ABOVE PISTON IS DISPENSED THROUGH UPPER MATERIAL OUTLET CHECK VALVE. ALLOWING MATERIAL TO FILL THROUGH LOWER MATERIAL INLET CHECK VALVE.



DOWN STROKE

– AS PISTON STARTS DOWN, MATERIAL BELOW PISTON IS DISPENSED THROUGH LOWER MATERIAL OUTLET CHECK VALVE. ALLOWING MATERIAL TO FILL THROUGH UPPER MATERIAL INLET CHECK VALVE.

PROBLEM: NO MATERIAL, PUMP STALLED
 CAUSE: OBSTRUCTED MATERIAL PATH
 SOLUTION: REMOVE OBSTRUCTION, USUALLY CURED MATERIAL

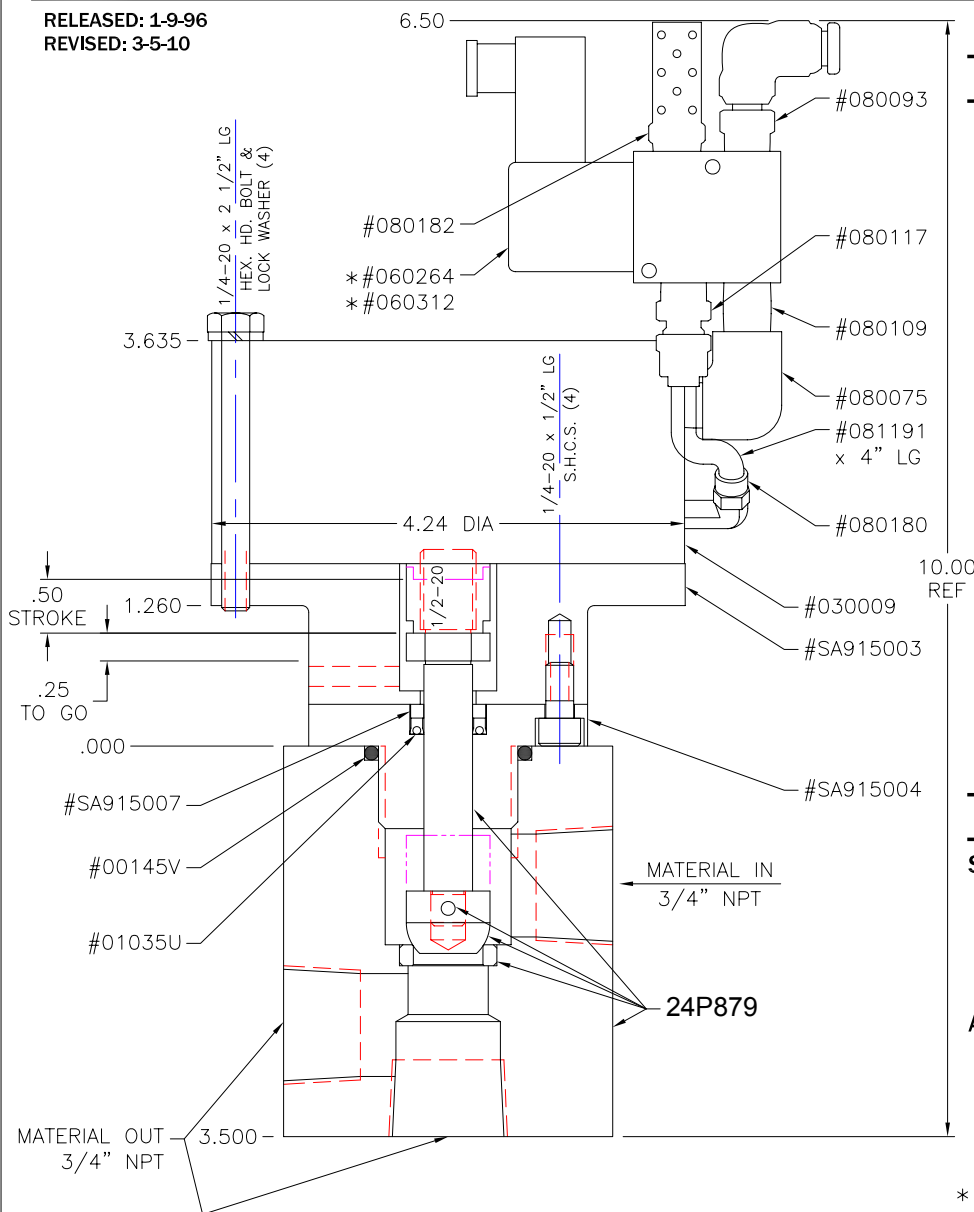
PROBLEM: NO MATERIAL, PUMP CYCLING CONTINUALLY
 CAUSE: LOST PRIME
 SOLUTION #1: COLOR FEED PUMP IS NOT FEEDING MATERIAL TO PUMP.
 SOLUTION #2: REDUCE PUMP SPEED IF OPERATING TOO FAST TO MAINTAIN PRIME.
 SOLUTION #3: REMOVE OBSTRUCTION FROM PUMP INTAKE, SUCH AS PLASTIC DRUM LINER.

PROBLEM: NO MATERIAL ON UPSTROKE OR DOWN STROKE
 CAUSE #1: PISTON SEAL LEAKING
 SOLUTION: REPLACE SEAL. INSPECT CYLINDER BORE AND PISTON BEARING FOR DAMAGE.
 CAUSE #2: CHECK VALVE IS NOT SEATING
 SOLUTION: REMOVE AND CLEAN CHECK VALVE, CLEAN AND INSPECT FOR FOREIGN MATERIAL OR DAMAGE, IF DAMAGED REPLACE.

SA916 INTERFACE VALVE

**AIR OPERATED
3/4" N.P.T. INLET & OUTLET**

RELEASED: 1-9-96
REVISED: 3-5-10



VALVE PARTS LIST

PART NO	DESCRIPTION (QTY)
00145V	"O" RING, 1/8" C/S, 1.250" ID
01035U	POLYPAK SEAL, .687 OD x .437 ID x .125 C/S ~ ULTRA YELLOW
030009	CYLINDER, 3" BORE, 3/4" STROKE, SINGLE ROD DOUBLE ACTING, 1/2-20 FEMALE THREADS ROD END
*.060264	SOLENOID, 24 VDC (5.4w)
*.060312	SOLENOID, 120/60 110/50 VAC
080075	1/8" NPTM x 1/8" NPTF ELBOW ~ STEEL
080093	1/8" NPTM x 1/4" OD HOSE PUSH-ON SWIVEL ELBOW ~ BRASS
080109	1/8" NPTM x 1/8" NPTM CLOSE NIPPLE ~ BLACK PIPE, PLATED
080117	1/8" NPTM x 1/4" OD HOSE FERRULE STRAIGHT FTG ~ BRASS
080180	1/8" NPTM x 1/4" OD HOSE FERRULE ELBOW ~ BRASS
080182	1/8" NPTM MUFFLER ~ BRASS
081191	POLYETHYLENE HOSE, 1/4" OD ~ BULK PER FOOT
#24P879	KIT, HOUSING, SEAT, SA916
SA915003	CYLINDER MOUNT
SA915004	BUSHING
SA915007	WASHER

SEAL KITS

SA916K: MAT'L SEAL KIT

PART NO INCLUDES

00145V	"O" RING, 1/8" C/S, 1.250" ID
01035U	POLYPAK SEAL, .687 OD x .437 ID x .125 C/S ~ ULTRA YELLOW
040072	SPRING PIN, 1/8" DIA x 3/4" LG

AIR CYLINDER SEAL KIT

PART NO DESCRIPTION (QTY)

030010	REBUILD KIT (INCLUDES ALL SEALS NEEDED TO REBUILD #030009 AIR CYLINDER)
--------	-------------------------------------------------------------------------

*OPTIONAL COILS, MUST CHOOSE ONE

DISASSEMBLY

1. With SA916 in vise, unscrew cylinder, cylinder mount and bushing from valve body. Remove and inspect o-ring.

NOTE: If mat'l has leaked into cylinder mount see note below

2. Remove spring pin and (4) 1/4"-20 x 1/2" S.H.C.S.

3. Slide bushing from cylinder mount to expose seal. Inspect shaft for wear or galling.

ASSEMBLY

1. Insert new seal in bushing and replace bushing / seal onto shaft being careful to not damage seal with shaft end. Replace screws.

2. With plunger on shaft, replace spring pin.

3. Install new o-ring on bushing OD and screw bushing loosely into body.

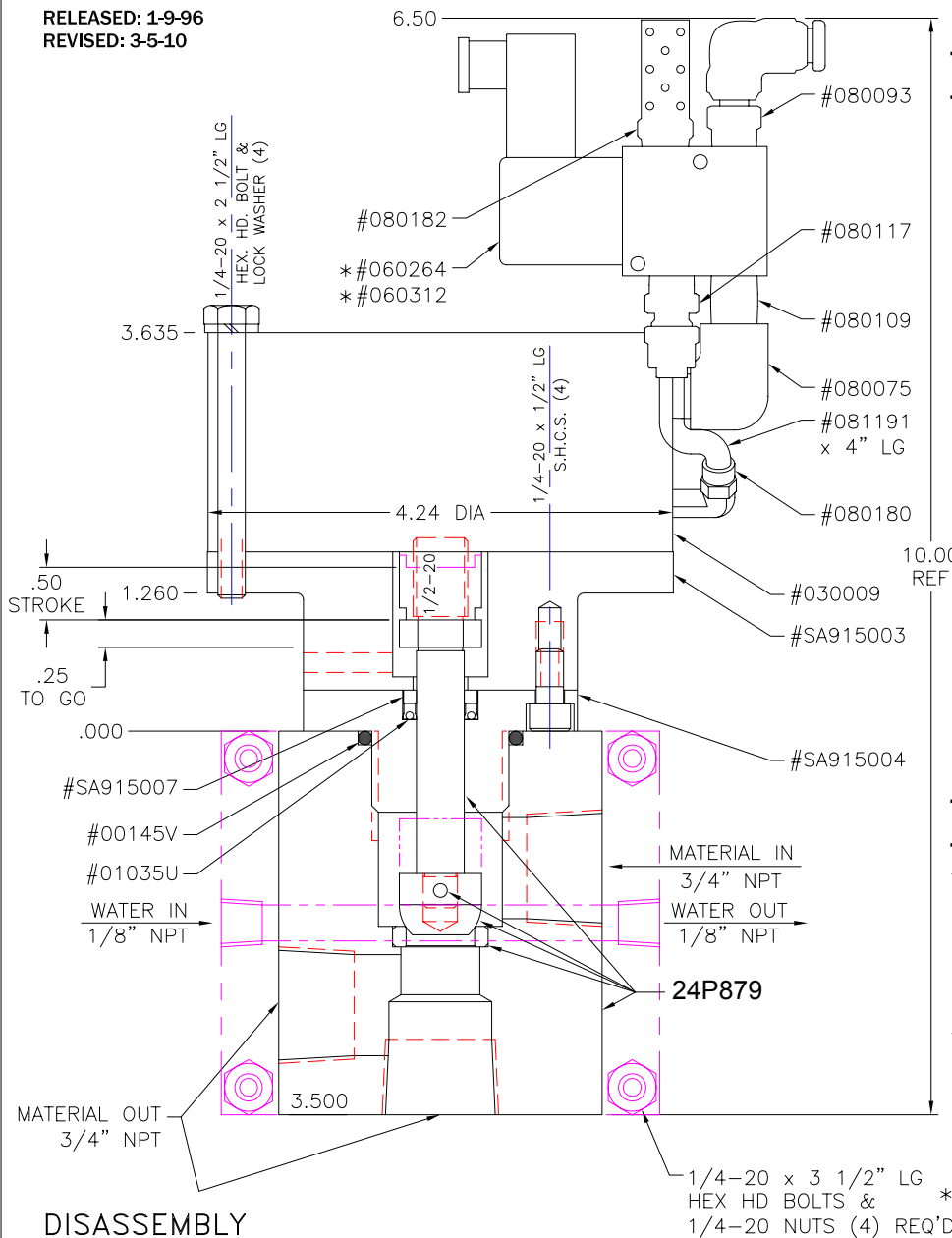
4. Before tightening bushing to body, apply air pressure to the extend port of the air cylinder. This will assist alignment of the plunger to the seat.

NOTE: If the cylinder is removed from the cylinder mount, **DO NOT** tighten the bolts (1/4-20 x 2 1/2" Hex Hd.) holding the cylinder to the mount until after the bushing has been tightened to the mount. Also, leave air pressure on during tightening.

SA916-WJ INTERFACE VALVE W/ WATER JACKET

AIR OPERATED 3/4" NPT INLET & OUTLET

RELEASED: 1-9-96
REVISED: 3-5-10



VALVE PARTS LIST

PART NO	DESCRIPTION (QTY)
00145V	"O" RING, 1/8" C/S, 1.250" ID
01035U	POLYPAK SEAL, .687 OD x .437 ID x .125 C/S ~ ULTRA YELLOW
030009	CYLINDER, 3" BORE, 3/4" STROKE, SINGLE ROD DOUBLE ACTING, 1/2-20 FEMALE THREADS ROD END
*.060264	SOLENOID, 24 VDC (5.4w)
*.060312	SOLENOID, 120/60 110/50 VAC
080075	1/8" NPTM x 1/8" NPTF ELBOW ~ STEEL
080093	1/8" NPTM x 1/4" OD HOSE PUSH-ON SWIVEL ELBOW ~ BRASS
080109	1/8" NPTM x 1/8" NPTM CLOSE NIPPLE ~ BLACK PIPE, PLATED
080117	1/8" NPTM x 1/4" OD HOSE FERRULE STRAIGHT FTG ~ BRASS
080180	1/8" NPTM x 1/4" OD HOSE FERRULE ELBOW ~ BRASS
080182	1/8" NPTM MUFFLER ~ BRASS
081191	POLYETHYLENE HOSE, 1/4" OD ~ BULK PER FOOT
24P879	KIT, HOUSING, SEAT, SA916
SA915003	CYLINDER MOUNT
SA915004	BUSHING
SA915007	WASHER
SA916002	COOLING PLATE (2)

SEAL KITS

SA916K: MAT'L SEAL KIT

PART NO	INCLUDES
00145V	"O" RING, 1/8" C/S, 1.250" ID
01035U	POLYPAK SEAL, .687 OD x .437 ID x .125 C/S ~ ULTRA YELLOW
040072	SPRING PIN, 1/8" DIA x 3/4" LG

AIR CYLINDER SEAL KIT

PART NO	DESCRIPTION (QTY)
030010	REBUILD KIT (INCLUDES ALL SEALS NEEDED TO REBUILD #030009 AIR CYLINDER)

DISASSEMBLY

1. With SA916 in vise, unscrew cylinder, cylinder mount and bushing from valve body. Remove and inspect o-ring.

NOTE: If material has leaked into cylinder mount see note below

2. Remove spring pin and (4) 1/4"-20 x 1/2" S.H.C.S.

3. Slide bushing from cylinder mount to expose seal. Inspect shaft & bushing for wear or galling.

ASSEMBLY

1. Insert new seal in bushing and replace bushing / seal onto shaft being careful to not damage seal with shaft end. Replace screws.

2. With plunger on shaft, replace spring pin.

3. Install new o-ring on bushing OD and screw bushing loosely into body.

4. Before tightening bushing to body, apply air pressure to the extend port of the air cylinder. This will assist alignment of the plunger to the seat.

NOTE: If the cylinder is removed from the cylinder mount, **DO NOT** tighten the bolts (1/4-20 x 2 1/2" Hex Hd.) holding the cylinder to the mount until after the bushing has been tightened to the mount. Also, leave air pressure on during tightening.

#SR601002 (ALTER)
 DRILL OUT EXISTING HOLE
 & 5/8-11 TAP THRU
 @ ASS'Y

5/8-18 x 1" LG
 HEX HD SCREW (2)

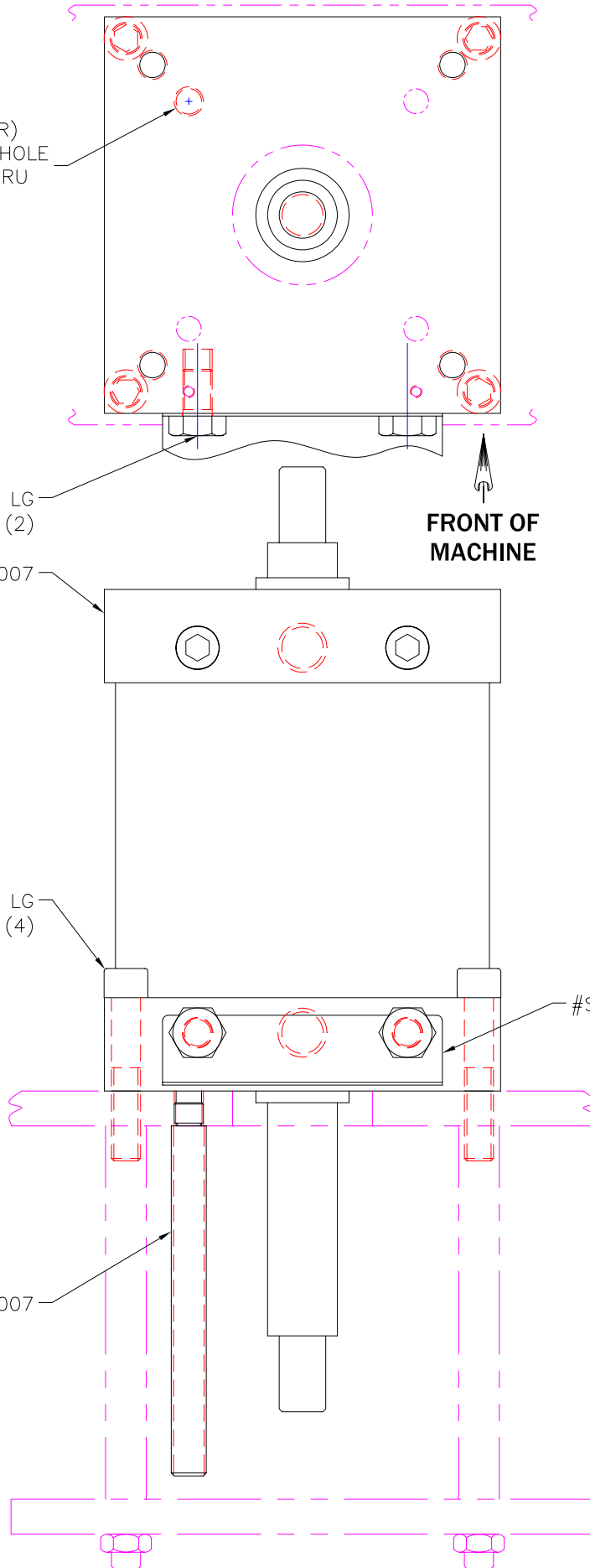
#030007

FRONT OF
 MACHINE

5/8-11 x 3 1/2" LG
 S.H.C.S. (4)

#SR601027

#SR604007

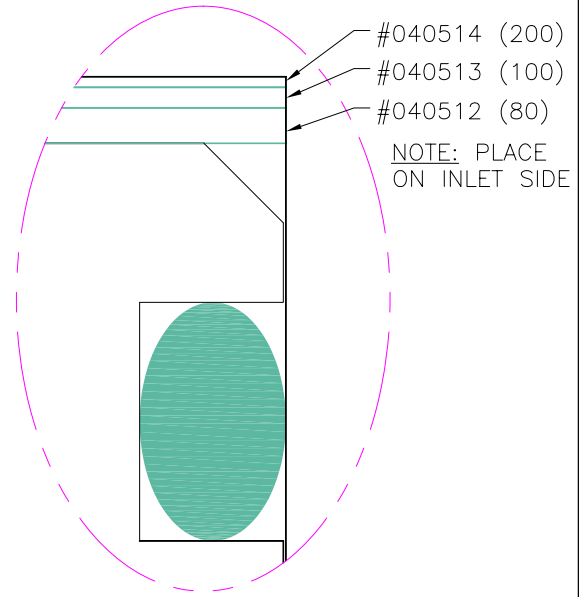
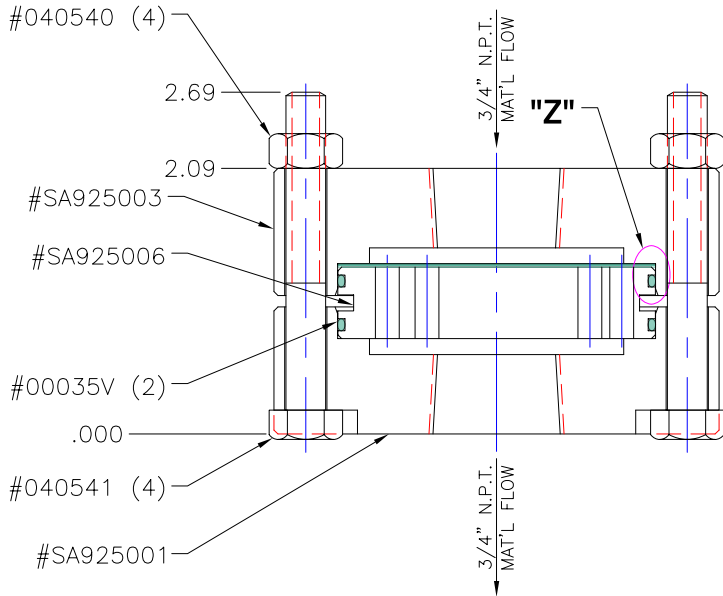


WIXOM, MI.

RELEASED: 1-28-02
REVISED: 5-12-09

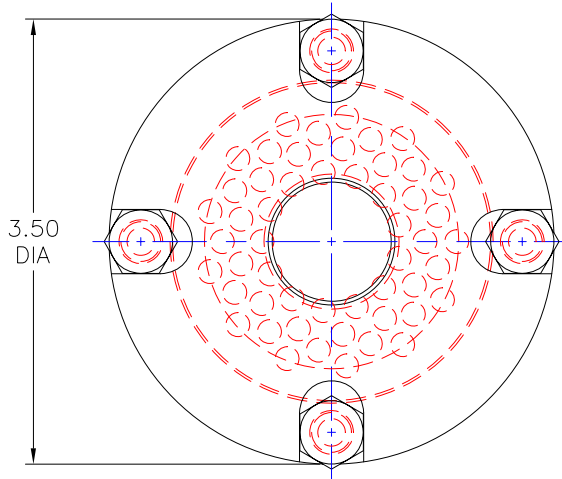
DESCRIPTION:

MODEL #SK529 (ASS'Y #SK529)
 8" AIR CYLINDER UPGRADE FOR S-series MACHINE



VIEW IN CIRCLE Z

SCALE ~ 20x



PARTS LIST

PART NO	DESCRIPTION (QTY)
00035V	"O" RING, 1/16" C/S, 2.250" ID ~ (2)
040512	WOVEN WIRE SCREEN, 2 1/2" DIA, 80 MESH, .0055 WIRE, 178 MICRON ~ 304 SS
040513	WOVEN WIRE SCREEN, 2 1/2" DIA, 100 MESH, .0045 WIRE, 140 MICRON ~ 304 SS
040514	WOVEN WIRE SCREEN, 2 1/2" DIA, 200 MESH, .0021 WIRE, 74 MICRON ~ 304 SS
040540	HEX NUT, 5/16-18 ~ GRADE 8 ULTRA-COATED CADMIUM STEEL (4)
040541	HEX HD SCREW, 5/16-18 x 2 1/2" LG ~ GRADE 8 ULTRA-COATED CADMIUM STEEL (4)
SA925001	HOUSING - OUTLET, 3/4" NPT
SA925003	HOUSING - INLET, 3/4" NPT
SA925006	SCREEN SUPPORT

SEAL KIT ~ #SA925K

PART NO	DESCRIPTION (QTY)
00035V	"O" RING, 1/16" C/S, 2.250" ID ~ (2)
040512	WOVEN WIRE SCREEN, 2 1/2" DIA, 80 MESH, .0055 WIRE, 178 MICRON ~ 304 SS
040513	WOVEN WIRE SCREEN, 2 1/2" DIA, 100 MESH, .0045 WIRE, 140 MICRON ~ 304 SS
040514	WOVEN WIRE SCREEN, 2 1/2" DIA, 200 MESH, .0021 WIRE, 74 MICRON ~ 304 SS



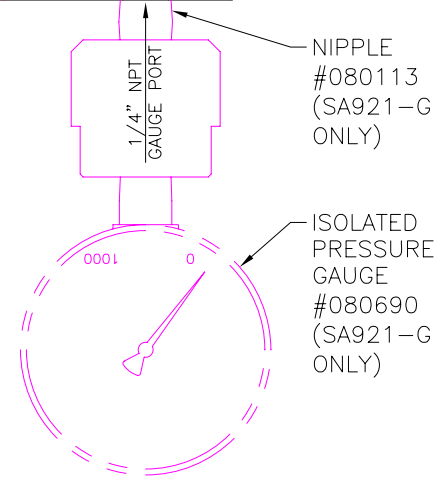
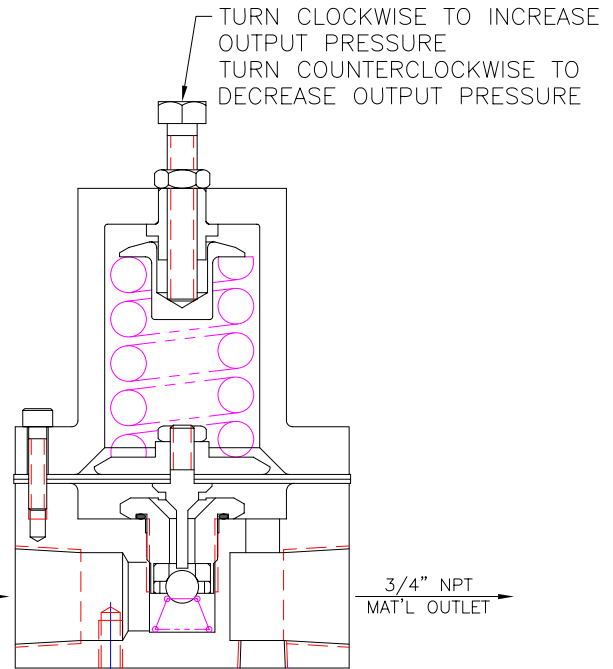
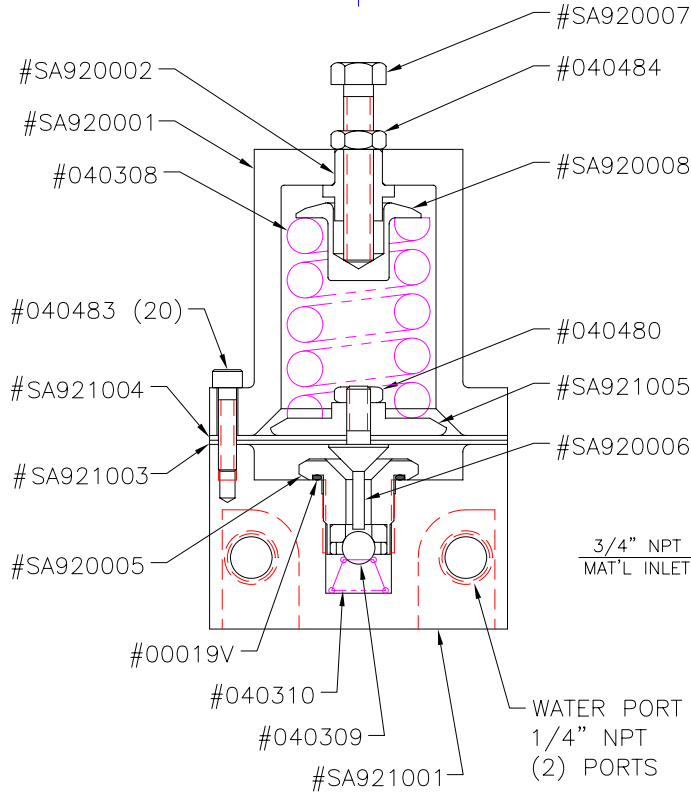
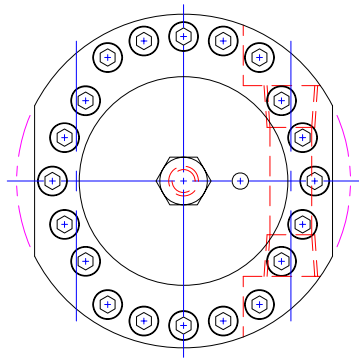
WIXOM, MI.

RELEASED: 5-9-01

REVISED: 1-25-11

DESCRIPTION:

ACCESSORY MODEL #SA925-1A (ASS'Y #SA925)
SCREEN PACK ~ IN-LINE MATERIAL FILTER, 3/4" NPT INLET/OUTLET



(SA921) PARTS LIST

PART NO	DESCRIPTION (QTY)
00019V	"O" RING, 1/16" C/S, .812" ID
SA921004	POLYPROPYLENE SEMI-CLEAR DIAPHRAGM
SA921003	WHITE PTFE DIAPHRAGM
040308	COMPRESSION SPRING, .375 WIRE
040309	11/32" BALL ~ CARBIDE
040310	SPRING
040480	LOCKNUT, CENTERLOCK, 1/4-28" THDS ~ STEEL
040483	S.H.C.S., #10-32 x 7/8" LG ~ SS (20)
040484	HEX JAM NUT, 5/16-24 THDS ~ STEEL
SA920001	SPRING CHAMBER
SA920002	PLUG
SA920005	VALVE
SA920006	SCREW
SA920007	SCREW
SA920008	CAP
SA921001	BASE
SA921005	PLATE

SPARE PART KIT ~ #SA920K

PART NO	INCLUDES
00019V	"O" RING, 1/16" C/S, .812" ID
040301	POLYPROPYLENE SEMI-CLEAR DIAPHRAGM
040302	WHITE DIAPHRAGM

(SA921-G) ADDITIONAL PARTS LIST

PART NO	DESCRIPTION (QTY)
080113	1/4" NPTM x 1/4" NPTM CLOSE NIPPLE ~ SS
080690	ISOLATED PRESSURE GAUGE, 0-1000 psi, 1/4" NPTF BOTTOM MOUNT, 2 1/2" DIA GLYCERIN FILLED ~ SS

NOTE:
 - MAX INLET 3000psi
 - OUTPUT PRESSURE ADJUSTABLE FROM 0-600psi

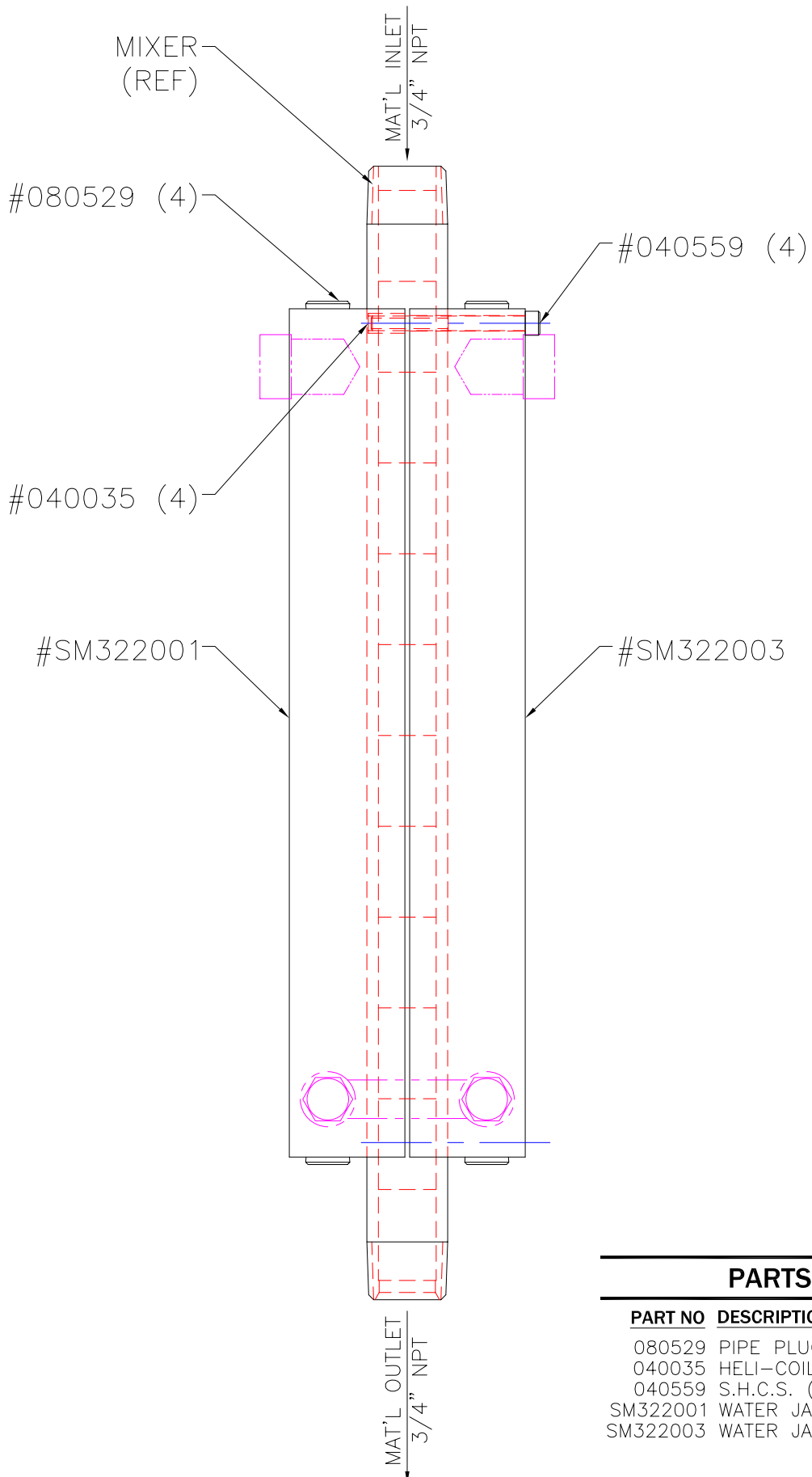


WIXOM, MI.

RELEASED: 1-24-02
 REVISED: 2-7-08

DESCRIPTION: ACCESSORY MODEL #SA921 & SA921-G (ASS'Y #SA921)
 MATERIAL REGULATOR

MANUAL#: SA92101M



PARTS LIST

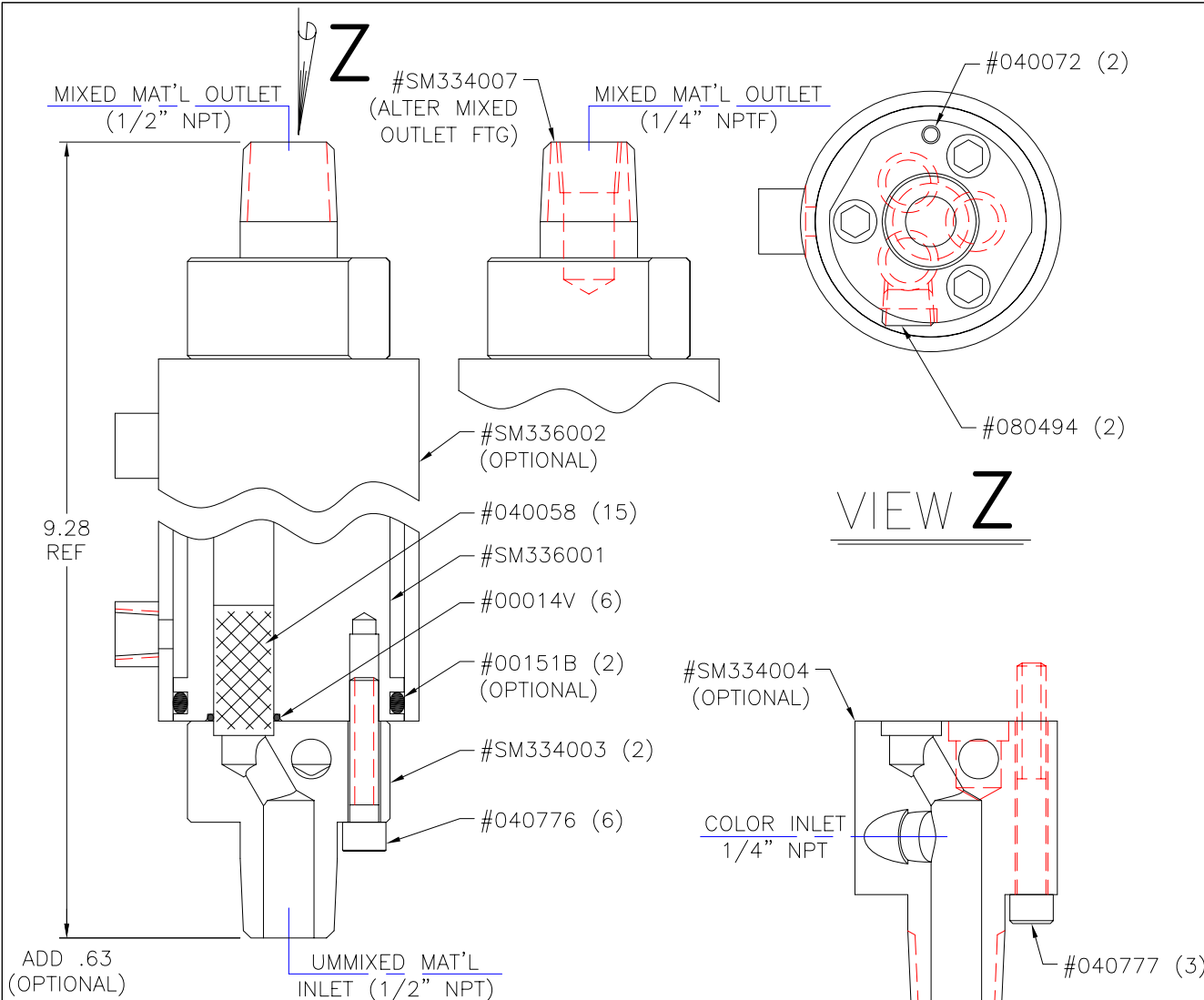
PART NO	DESCRIPTION (QTY)
080529	PIPE PLUG (4)
040035	HELI-COIL (4)
040559	S.H.C.S. (S.S.) (4)
SM322001	WATER JACKET
SM322003	WATER JACKET



WIXOM, MI.

RELEASED: 1-5-01
 REVISED: 7-12-07

DESCRIPTION: MIXER MODEL #SM322 (ASS'Y #SM322)
 #SM326001 (TAH #100-612) MIXER WATER JACKET



PARTS LIST

PART NO	DESCRIPTION (QTY)	SM336-15-M	SM336-15-WJ-M	SM336-15A-M	SM336-15A-WJ-M	SM336-15C-M	SM336-15C-WJ-M	SM336-15D-M	SM336-15D-WJ-M	SM336-15L-M	SM336-15L-WJ-M	SM336-15N-M	SM336-15N-WJ-M	SM336-15R-M	SM336-15R-WJ-M	SM336-15S-M	SM336-15S-WJ-M
00014V	"O" RING, 1/16" C/S, .500" ID ~ (6)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
00151B	"O" RING, 1/8" C/S, 1.750" ID ~ BUNA (2~OPTIONAL)		X		X		X		X		X		X		X		X
040058	1/2" DIA x 1" MIXER CARTRIDGE, 2-ELEMENT (15)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
040072	ROLLPIN, 1/8" DIA x 3/4" LG (2)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
040776	S.H.C.S., 1/4-20 x 1 1/4" LG, CLASS 3A UNC, R/C B70, 70000psi TENSILE STRENGTH ~ 18-8 SS (6)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
◆ 040777	S.H.C.S., 1/4-20 x 2" LG, CLASS 3A UNC, R/C B70, 70000psi TENSILE STRENGTH ~ 18-8 SS (3)					X	X	X									
080494	1/8" NPTM PIPE PLUG ~ SS (2)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
SM334003	IN-OUT FTG, STD (2)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
◆ SM334004	IN-OUT FTG, 1/4" NPT PORT (OPTIONAL)					X	X	X									
* ◆ SM334005	IN-OUT FTG, 1/8" NPT PORT (OPTIONAL)									X	X	X	X				
◆ SM334007	IN-OUT FTG ~ MIXED (OPTIONAL)			X	X			X	X			X	X				X
* ◆ SM334008	IN-OUT FTG, 1/8" & 1/4" NPT PORTS (OPTIONAL)													X	X	X	X
SM336001	MIXER BODY W/COOLING	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
SM336002	WATER JACKET, 15-CARTRIDGE (OPTIONAL)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

SEAL KIT ~ #SK3341

PART NO	DESCRIPTION (QTY)	◆ = REPLACES QTY~1 #SM334003 & QTY~3 #040776	* = NOT SHOWN
00014V	"O" RING, 1/16" C/S, .500" ID ~ (6)		
00151B	"O" RING, 1/8" C/S, 1.750" ID ~ BUNA (2)		



WIXOM, MI.

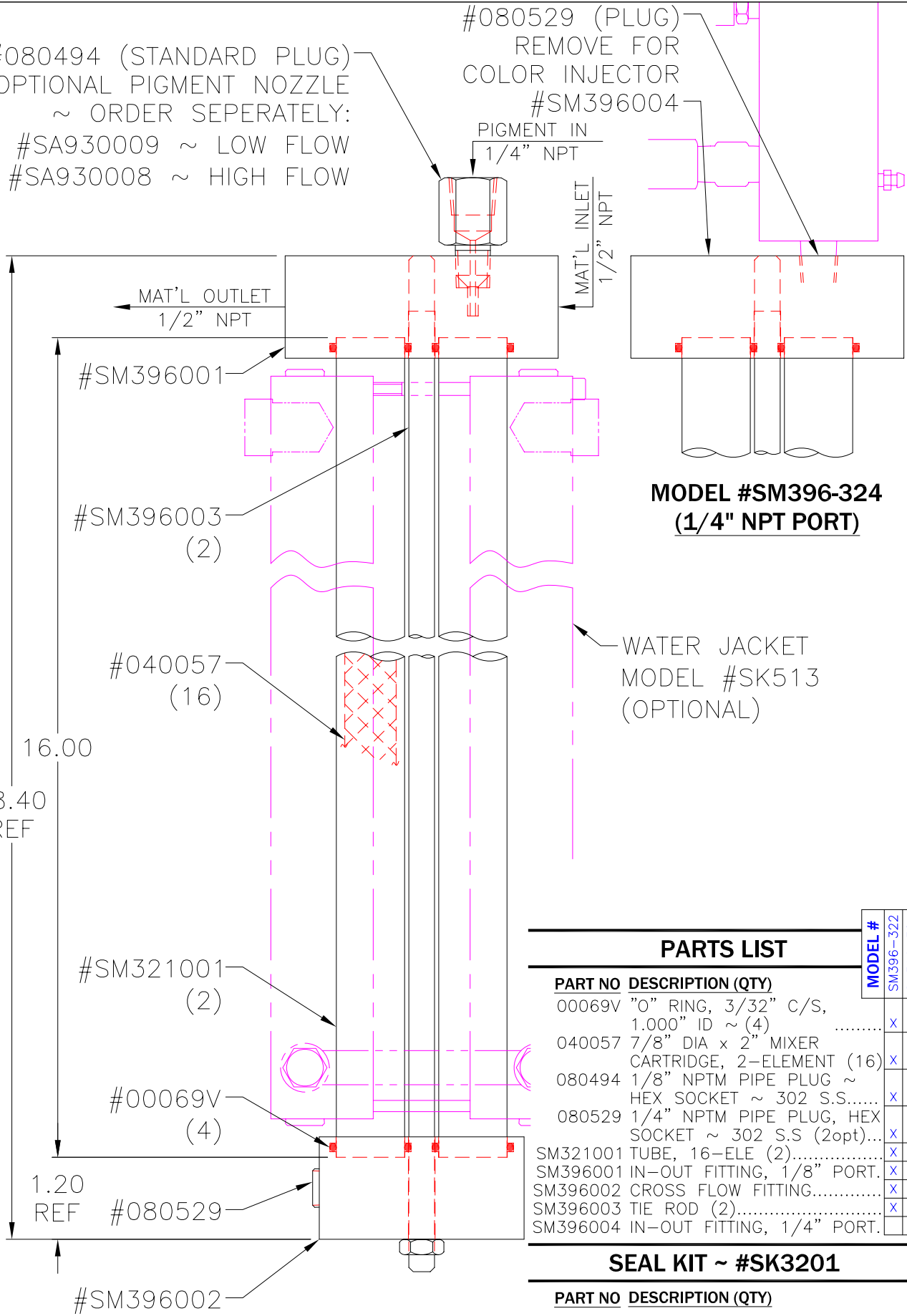
RELEASED: 1-29-97
 REVISED: 3-23-12

DESCRIPTION: MIXER MODEL # SEE NOTE (ASS'Y #SM336) ~ MEDICAL
 3 PASS ~ 1/2" DIA, 15 CARTRIDGES [30-ELEMENTS]

MANUAL#: SM33601M

#080494 (STANDARD PLUG)
 OPTIONAL PIGMENT NOZZLE
 ~ ORDER SEPERATELY:
 #SA930009 ~ LOW FLOW
 #SA930008 ~ HIGH FLOW

#080529 (PLUG)
 REMOVE FOR
 COLOR INJECTOR
 #SM396004



MODEL #SM396-324
(1/4" NPT PORT)

WATER JACKET
 MODEL #SK513
 (OPTIONAL)

16.00
 18.40
 REF

1.20
 REF

PARTS LIST

PART NO	DESCRIPTION (QTY)	MODEL #
00069V	"O" RING, 3/32" C/S, 1.000" ID ~ (4)	SM396-322 X X
040057	7/8" DIA x 2" MIXER CARTRIDGE, 2-ELEMENT (16)	SM396-324 X X
080494	1/8" NPTM PIPE PLUG ~ HEX SOCKET ~ 302 S.S.....	X
080529	1/4" NPTM PIPE PLUG, HEX SOCKET ~ 302 S.S (2opt)...	X X
SM321001	TUBE, 16-ELE (2).....	X X
SM396001	IN-OUT FITTING, 1/8" PORT.	X
SM396002	CROSS FLOW FITTING.....	X X
SM396003	TIE ROD (2).....	X X
SM396004	IN-OUT FITTING, 1/4" PORT.	X

SEAL KIT ~ #SK3201

PART NO	DESCRIPTION (QTY)
00069V	"O" RING, 3/32" C/S, 1.000" ID ~ (4)

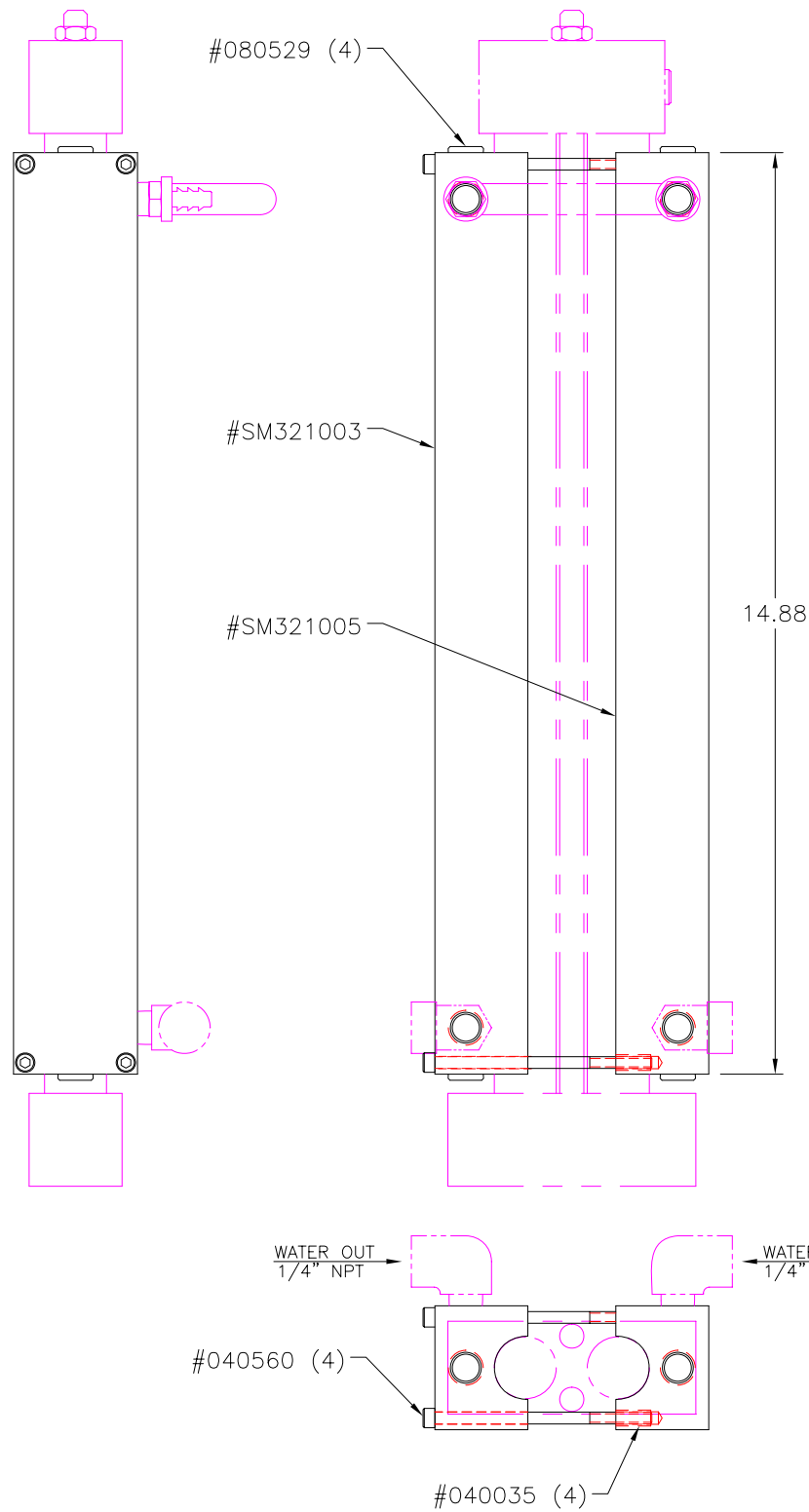


WIXOM, MI.

RELEASED: 8-29-11
 REVISED: ~

DESCRIPTION: MIXER MODEL #SEE NOTE (ASS'Y #SM396) ~ MEDICAL
 2 PASS ~ 1" DIA 16 CARTRIDGES 32 ELEMENTS

MANUAL#: SM39601M



PARTS LIST

PART NO	DESCRIPTION (QTY)
040035	HELI-COIL THREAD INSERT, #10-32 UNF THDS, CADMIUM FINISH, 3/8" FREE RUNNING, .236/.256 OD, 9 1/2" NUMBER OF COILS NOMINAL LENGTH ~ 304 STAINLESS STL (4)
040560	S.H.C.S., #10-32 x 3 1/2" LG, CLASS 3A UNC, ROCKWELL B70, 70000psi TENSILE STRENGTH ~ 18-8 STAINLESS STL (4)
080529	1/4" NPTM PIPE PLUG, HEX SOCKET, 150psi MAX PRESSURE ~ 302 STAINLESS STL (4)
SM321003	WATER JACKET ~ LEFT
SM321005	WATER JACKET ~ RIGHT

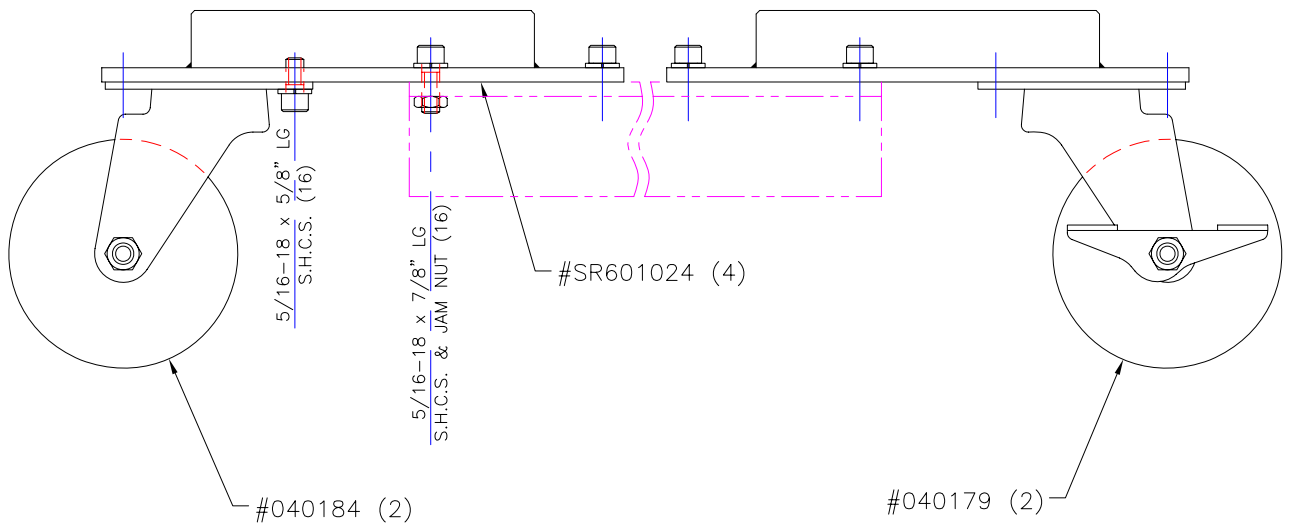
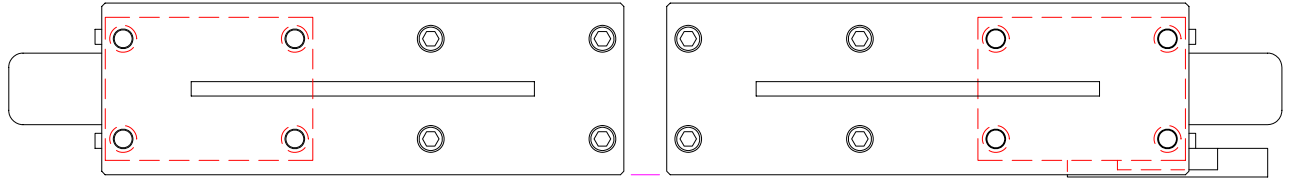
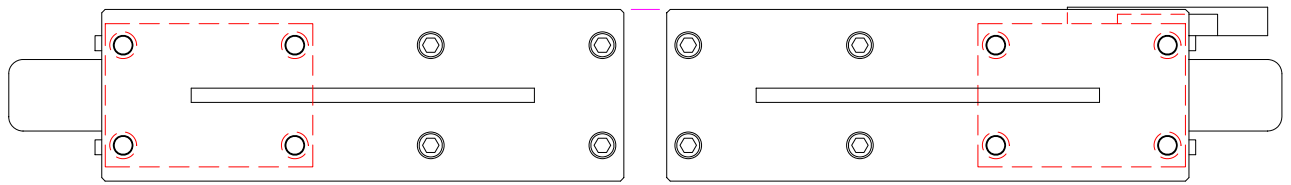


WIXOM, MI.

RELEASED: 5-8-01
 REVISED: 4-23-12

DESCRIPTION:

KIT MODEL #SK513 (ASS'Y #SK513)
 WATER JACKET ~ 2 PASS 1" DIA 16 CARTRIDGE [32 ELEMENT] MIXER



WIXOM, MI.

RELEASED: 10-25-99
 REVISED:

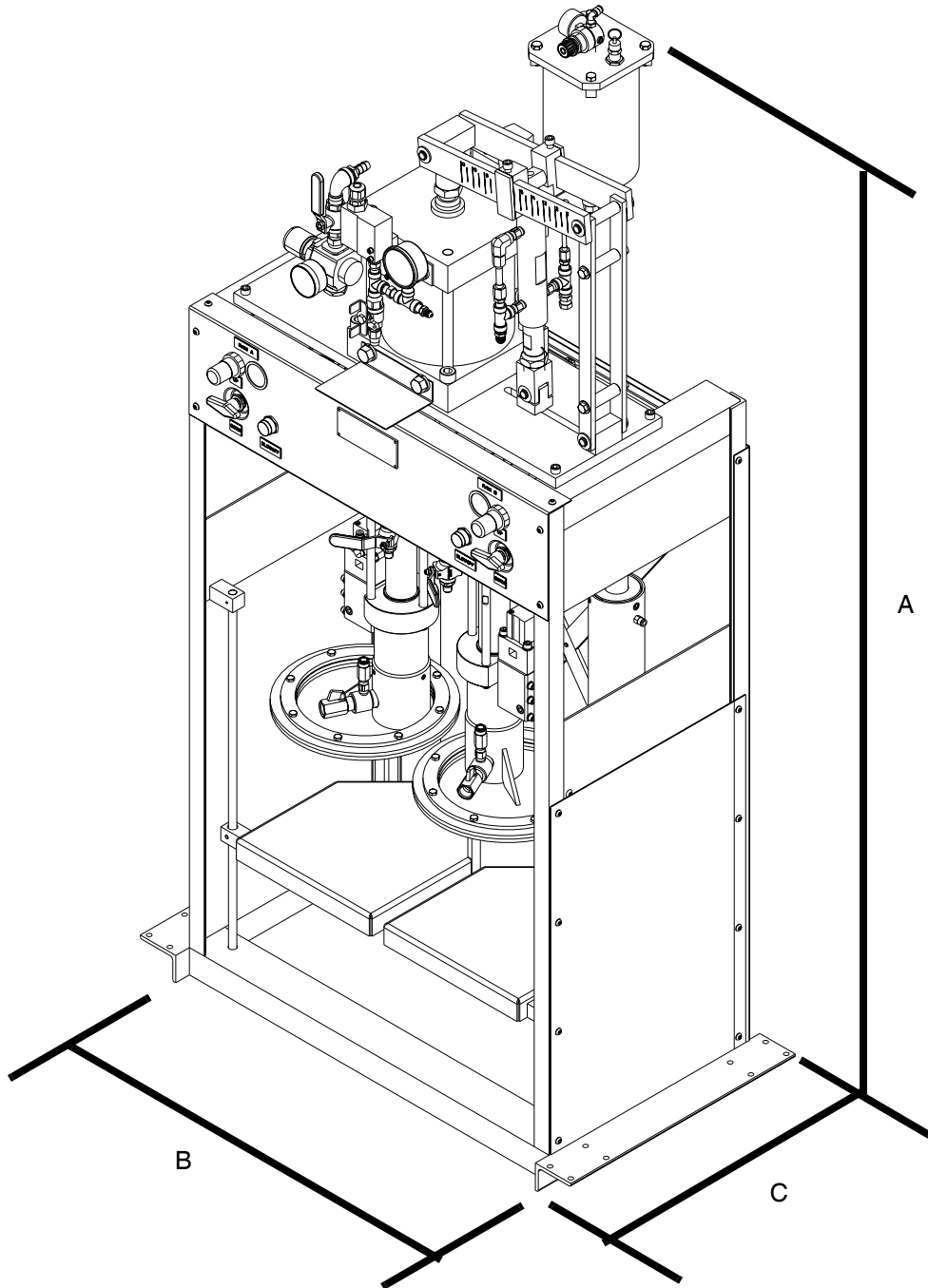
DESCRIPTION:

KIT MODEL #SK505 (ASS'Y #SK505)
 WHEEL MOUNT (S4-5 & CS4-5)

Appendix A - Colorant Adjustment Chart

Color Percent	Colorant Pump Model and Pump Position				
	0897M-HP	146M-HP	230M-HP	414M-HP	623M-HP
2%	3.05	1.59			
3%	4.89	2.70	1.49		
4%	6.73	3.81	2.20		
5%	8.56	4.92	2.91		
6%	10.40	6.02	3.61	1.73	
7%		7.13	4.32	2.12	
8%		8.24	5.02	2.51	1.46
9%		9.35	5.73	2.91	1.72
10%		10.46	6.44	3.30	1.98
11%			7.14	3.69	2.24
12%			7.85	4.08	2.51
13%			8.56	4.48	2.77
14%			9.26	4.87	3.03
15%			9.97	5.26	3.29
16%				5.65	3.55
17%				6.04	3.81
18%				6.44	4.07
19%				6.83	4.33
20%				7.22	4.59
21%				7.61	4.85
22%				8.01	5.11
23%				8.40	5.38
24%				8.79	5.64
25%				9.18	5.90
26%				9.58	6.16
27%				9.97	6.42
28%					6.68
29%					6.94
30%					7.20
31%					7.46
32%					7.72
33%					7.98
34%					8.25
35%					8.51
36%					8.77
37%					9.03
38%					9.29
39%					9.55
40%					9.81

Dimensions



Dimensions	8-CS4-5MM
A - Height	72 in. (183 cm)
B - Width	37 in. (94 cm)
C - Depth	21 in. (53 cm)

Technical Data

8-CS4-5M and 8-S4-5M Meter-Mix Dispense Systems		
	U.S.	Metric
Maximum Fluid Working Pressure	3000 psi	207 bar, 21 MPa
Ratio Range	1:1	
Flow Rate Range*	Up to 3 lb/min	Up to 1.4 kg/min
Viscosity Range	50,000 to 2,500,000 centipoise	
Pigment Ratio Range	0.2% to 6%	
Power Requirements	100-120 VAC, 1PH, 50/60 Hz	
AMPS	2.5	
Operating Temperature	Ambient to 120°F	Ambient to 48°C
Air Requirements	10 ft ³ /min @ 100 psi	0.3 m ³ /min @ 7 bar (0.7 MPa)
Colorant Tank		
Maximum Air Pressure	100 psi	7 bar, 0.7 MPa
Ram		
Maximum Air Pressure	100 psi	7 bar, 0.7 MPa
Materials of Construction		
Wetted materials on all models	303, 304, 316 Stainless Steel, Hard Chrome Carbon Steel, Carbide	
Weight		
All models	830 lb	376 kg
Notes		
* Flow rates and viscosities are general estimates. Flow rates drop as viscosity increases. Fluids are expected to shear under pressure. New applications or fluids should always be tested to determine proper line sizes and equipment selections. See your Graco authorized distributor for other capabilities.		

Graco Standard Warranty

Graco warrants all equipment referenced in this document which is manufactured by Graco and bearing its name to be free from defects in material and workmanship on the date of sale to the original purchaser for use. With the exception of any special, extended, or limited warranty published by Graco, Graco will, for a period of twelve months from the date of sale, repair or replace any part of the equipment determined by Graco to be defective. This warranty applies only when the equipment is installed, operated and maintained in accordance with Graco's written recommendations.

This warranty does not cover, and Graco shall not be liable for general wear and tear, or any malfunction, damage or wear caused by faulty installation, misapplication, abrasion, corrosion, inadequate or improper maintenance, negligence, accident, tampering, or substitution of non-Graco component parts. Nor shall Graco be liable for malfunction, damage or wear caused by the incompatibility of Graco equipment with structures, accessories, equipment or materials not supplied by Graco, or the improper design, manufacture, installation, operation or maintenance of structures, accessories, equipment or materials not supplied by Graco.

This warranty is conditioned upon the prepaid return of the equipment claimed to be defective to an authorized Graco distributor for verification of the claimed defect. If the claimed defect is verified, Graco will repair or replace free of charge any defective parts. The equipment will be returned to the original purchaser transportation prepaid. If inspection of the equipment does not disclose any defect in material or workmanship, repairs will be made at a reasonable charge, which charges may include the costs of parts, labor, and transportation.

THIS WARRANTY IS EXCLUSIVE, AND IS IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.

Graco's sole obligation and buyer's sole remedy for any breach of warranty shall be as set forth above. The buyer agrees that no other remedy (including, but not limited to, incidental or consequential damages for lost profits, lost sales, injury to person or property, or any other incidental or consequential loss) shall be available. Any action for breach of warranty must be brought within two (2) years of the date of sale.

GRACO MAKES NO WARRANTY, AND DISCLAIMS ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, IN CONNECTION WITH ACCESSORIES, EQUIPMENT, MATERIALS OR COMPONENTS SOLD BUT NOT MANUFACTURED BY GRACO. These items sold, but not manufactured by Graco (such as electric motors, switches, hose, etc.), are subject to the warranty, if any, of their manufacturer. Graco will provide purchaser with reasonable assistance in making any claim for breach of these warranties.

In no event will Graco be liable for indirect, incidental, special or consequential damages resulting from Graco supplying equipment hereunder, or the furnishing, performance, or use of any products or other goods sold hereto, whether due to a breach of contract, breach of warranty, the negligence of Graco, or otherwise.

FOR GRACO CANADA CUSTOMERS

The Parties acknowledge that they have required that the present document, as well as all documents, notices and legal proceedings entered into, given or instituted pursuant hereto or relating directly or indirectly hereto, be drawn up in English. Les parties reconnaissent avoir convenu que la rédaction du présente document sera en Anglais, ainsi que tous documents, avis et procédures judiciaires exécutés, donnés ou intentés, à la suite de ou en rapport, directement ou indirectement, avec les procédures concernées.

Graco Information

Sealant and Adhesive Dispensing Equipment

For the latest information about Graco products, visit www.graco.com.

For patent information, see www.graco.com/patents.

TO PLACE AN ORDER, contact your Graco distributor, go to www.graco.com and select "Where to Buy" in the top blue bar, or call to find the nearest distributor.

If calling from the US: 800-746-1334

If calling from outside the US: 0-1-330-966-3000

All written and visual data contained in this document reflects the latest product information available at the time of publication. Graco reserves the right to make changes at any time without notice.

Original instructions. This manual contains English. MM 332436

Graco Headquarters: Minneapolis

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