THE "BOSS" Proportioner

Turbo Liner Spray System Operators Manual

Models: **SFE 5-12k**
SFE 6-12k

Spray Foam Equipment & Manufacturing
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Serial #_____

CONTENTS

WARNINGS

Fire, Electric Shock and Explosion Hazard

High Voltage components can cause electric shock. Combustible materials and fumes in confined work areas can ignite and explode. To help prevent explosion, fire and electric shock:

- Shut off all power before opening or servicing any part of proportioner.
- Ensure that all electrical wiring and service is done by qualified personnel and complies with local codes.
- Use equipment in well ventilated areas.
- Eliminate all ignition sources.
- Keep work areas free of solvents, rags, gasoline and other debris.

Skin Injection Hazard

High pressure fluid from spray gun, ruptured components, or leaks will pierce skin. This may look minor but is a serious condition. **Get immediate emergency treatment!**

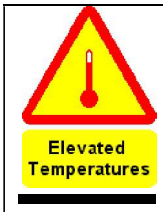
- Do not point spray gun at anyone or any part of body.
- Do not place hand or fingers over gun tip.
- Use lowest possible pressure when troubleshooting or flushing equipment.
- Check hoses, connections and fittings daily. Tighten or replace loose or worn or damaged parts immediately.
- Relieve all pressure from proportioner and all components when you stop spraying and before cleaning or servicing equipment.

Personal Protective Equipment

You must wear proper protective equipment when operating, servicing or when in the operating area of equipment. This will protect you from serious injury including but not limited to: eye injury, inhalation of toxic fumes, and loss of hearing.

This equipment includes but is not limited to:

- Protective eyewear
- Respirator, gloves, and clothing recommended by fluid and solvent manufacturer
- Hearing protection



Burn Hazard

This equipment is used with heated fluid which is hot and will cause some surfaces on equipment to become very hot. To avoid burns:

- Do not touch fluid or equipment.
- Allow fluid and equipment to completely cool before touching or servicing.
- Wear gloves and protective clothing.

Toxic Fumes and Fluid Hazard

- Read Material Safety Data Sheet (MSDS) to know specific hazards of fluid you are using.
- Handle and store hazardous fluids according to applicable guidelines.

Misuse of Equipment Hazard

Misuse can cause serious injury or death!

- For professional use only.
- Do not exceed the maximum temperature rating or working pressure of equipment.
- Check equipment daily replacing worn or damaged parts immediately.
- Read manuals, warnings, and labels before operating equipment.
- Use only compatible fluids/solvents.
- Keep hoses away from traffic areas, sharp edges and hot surfaces.
- Comply with all safety warnings and labels.
- Service of equipment should be done by qualified personnel only.

TYPICAL INSTALLATION

Key for Figure 1

1 **Proportioner**
2 **Spray hose**
3 **Supply lines**
4 **Recirculating/pressure relief lines**
5 **Barrel pumps**

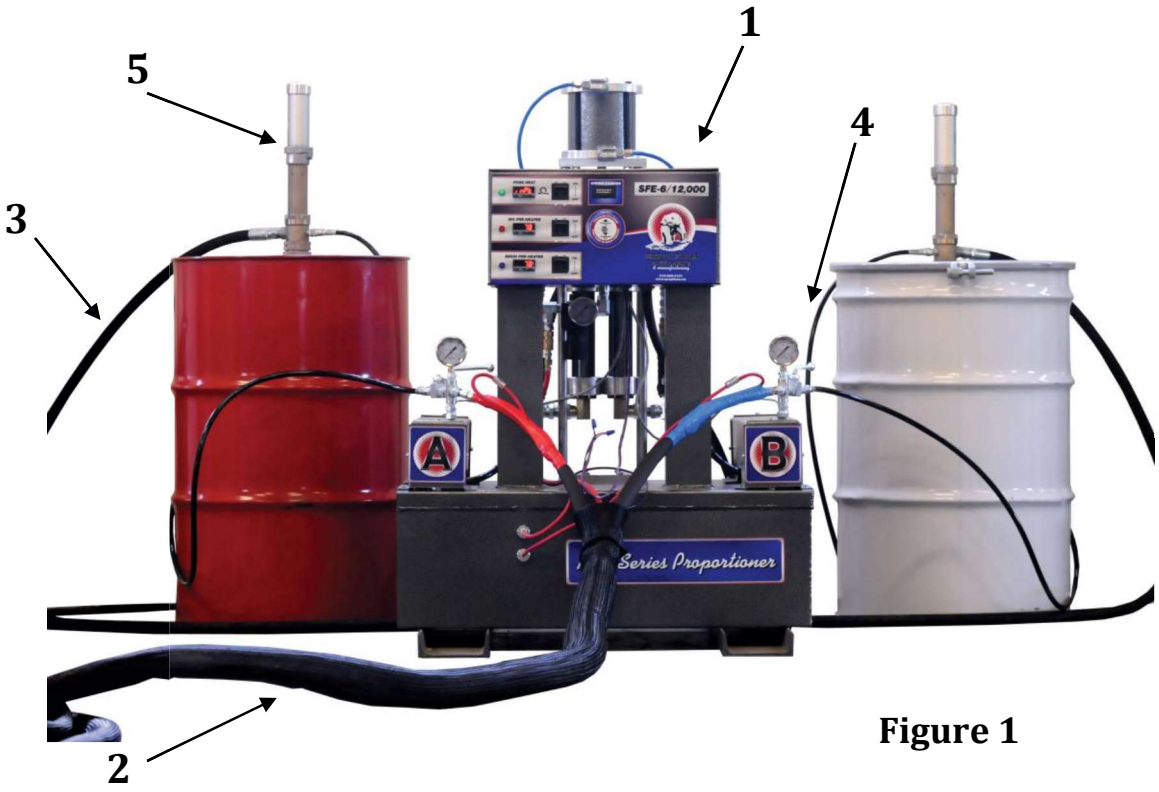


Figure 1

COMPONENTS OF
"THE BOSS" PROPORTIONER

Key for Figure 2

1 A side pre-heater
2 B side pre-heater
3 Recirculating/pressure relief valve
4 Air pressure regulator (controls fluid operating psi)
5 Fluid operating pressure gauge
6 Temperature controller
7 Pump switch
8 Breakers
9 A side outlet
10 B side outlet
11 Voltage leads for hose heat
12 Temperature Sensing Unit (TSU)
13 Air connection for spray gun
14 Air motor
15 Stroke counter
16 Fluid pump

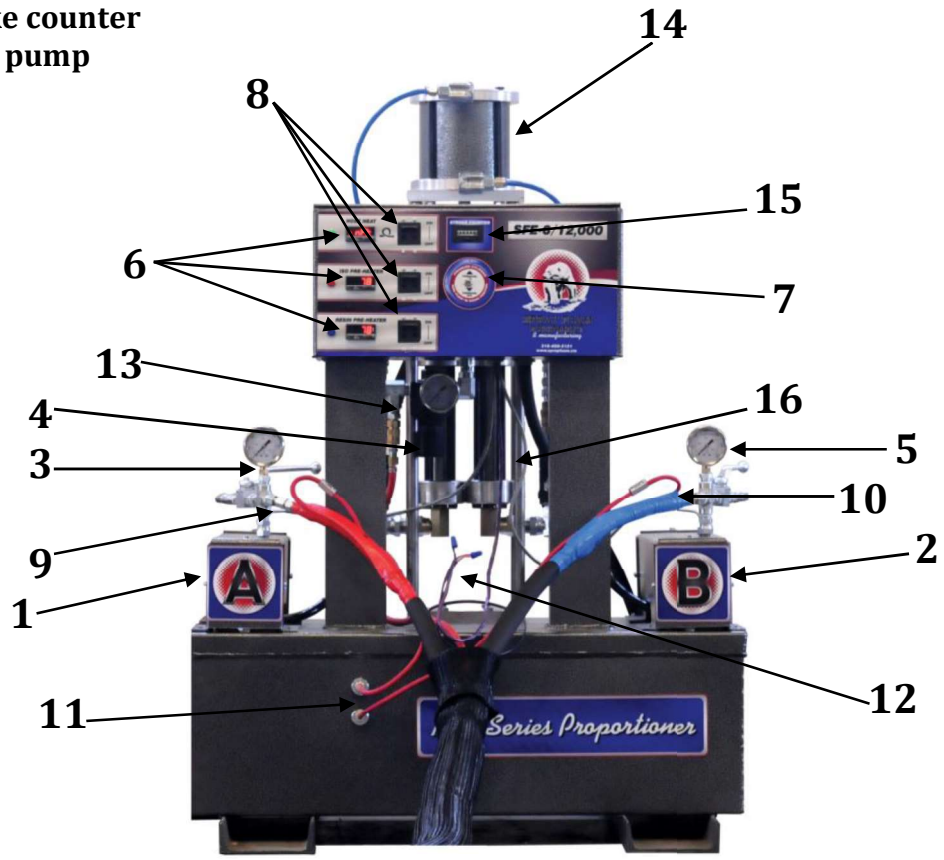


Figure 2

MOISTURE SENSITIVITY OF ISOCYANATES

Isocyanates are catalysts used in two component spray foams and polyurea coatings. This product is commonly referred to as ISO or A side. When ISO is exposed to moisture, it begins to react by forming small crystals that become suspended in the fluid. After prolonged exposure, a film is created on the surface of the fluid and the ISO begins to thicken into a gel. This adversely affects the performance of the ISO as well as puts added stress on the wetted parts of the plural component system.

To prevent exposing ISO to moisture:

- Always use a sealed container with transfer pump securely fastened.
- Keep vent in container closed or use a desiccant dryer if needed.
- Keep the solvent cup of the fluid pump filled with SFE pump lube, part no. SFE-410. This removes any excess fluid on pump shaft to prevent material from hardening when exposed to moisture.
- Always park pumps in down position to eliminate any chance of moisture contact with ISO residue that may be on pump shaft.
- Never use reclaimed ISO as it is not possible to determine if it has been exposed to moisture.
- Never store ISO in an open container.
- Use only spray hoses that are moisture resistant and designed for use with plural component systems.

CIRCULATING FLUID THROUGH THE SYSTEM

If there are ISO and RESIN components within the system, it is **absolutely vital** that the material is recirculated every two weeks if the machine is not in use! **Failure to properly circulate material may cause permanent damage to hose, supply lines, recirculating lines, and machine!**

Follow these steps to properly recirculate material through system:

1) **Turn on all breakers for hose heat and pre-heaters on machine.**

2) **Turn compressor on to supply air to transfer pumps. Do NOT turn on switch to pressure up air motor! Use only transfer pumps to circulate material through system.**

3) **Remove gun from manifold.**

4) **Circulate fluid through entire system and out of manifold ports back into supply drums. Allow to circulate for five minutes per side.**

5) **Close all ports on manifold.**

6) **Replace spray gun on manifold.**

7) **Open pressure relief valves on preheaters to allow fluid to flow through recirculating line back to supply drums. Allow to circulate two minutes per side.**

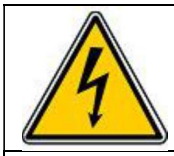
8) **Close pressure relief valves.**

9) **Turn compressor off to discontinue air supply to transfer pumps.**

10) **Turn off all breakers for hose heat and pre-heaters on machine.**

SETUP

1) Mount machine in a dry, level area away from moisture.

	**Electric Shock Warning!**
	Installation of this equipment requires accessing parts which could result in electric shock or serious injury. A qualified electrician should make all electrical connections. Install according to all national, state and local codes.

Electrical requirements for proportioner:

- Input Voltage: 1 phase, 240V AC, 50/60hz
- Amperage Requirements: 67Amp max load

**See Technical Data sheet for more details.

2) Connect a 6 AWG (2 wire + ground) electrical cord to main breaker, which is located in upper housing of machine.

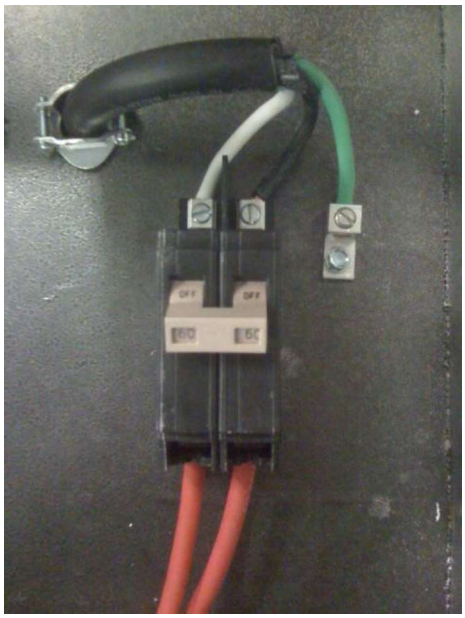


Figure 3

3) Connect transfer pumps.

a. Install barrel pumps in component A (Isocyanates) and B (Resin) supply drums.

b. Install air mixer in component B drum. Only mix if resin contains water as the blowing agent.

c. Connect ¾ in. supply hoses between barrel pumps and fluid inlet on proportioner.

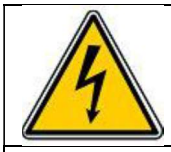
Figure 4

	**Warning!**
	Use high pressure hose rated to withstand the maximum working pressure of this equipment.

4) Connect recirculating/pressure relief lines.

a. We recommend using a high pressure return line to connect the pressure relief valves to the barrel pumps.

b. An optional connection would be a relief line from the pressure relief valve to a grounded and sealed waste container.

	**Risk of electric shock!**
	Make sure all electricity is disconnected. A qualified electrician should make all electrical connections.

5) Connect heated spray hose.

Figure 5

a. Connect the hose assembly to the fittings coming out of each pre-heater that face forward and inward on each side of the front of the machine (red to A side on left pre-heater and blue to B side on right pre-heater).

b. Connect the electrical connectors on the two red #6 gauge wires coming out of the front of the proportioner base to the two #6 gauge wires on the hose assembly.

c. Connect the heat sensor wire from proportioner to heat sensor wire on hose (secure with wire connectors, tape and insulate connections).

Figure 6

d. Pull back the scuff jacket on the spray hose approximately 6 feet on the gun end. A purple sensor wire will protrude from the insulation on the hose. Cut the end of the purple sensor wire that runs the length of the hose and connect it to the short wire coming out of hose insulation.

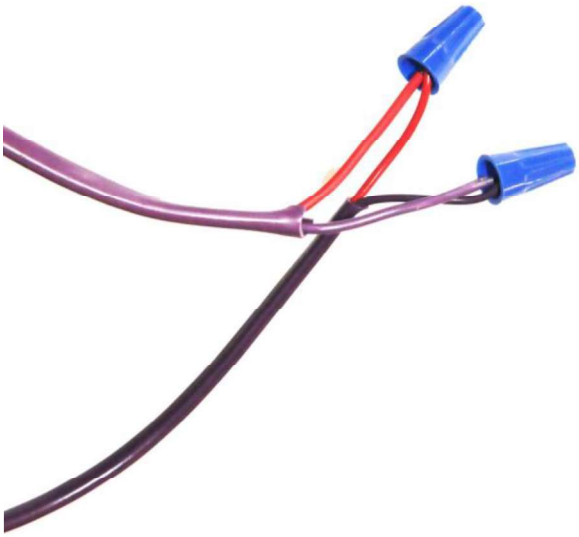


Figure 7

e. Twist, secure with wire connectors, and insulate as before. Pull the scuff jacket back to the end of hose and tape.

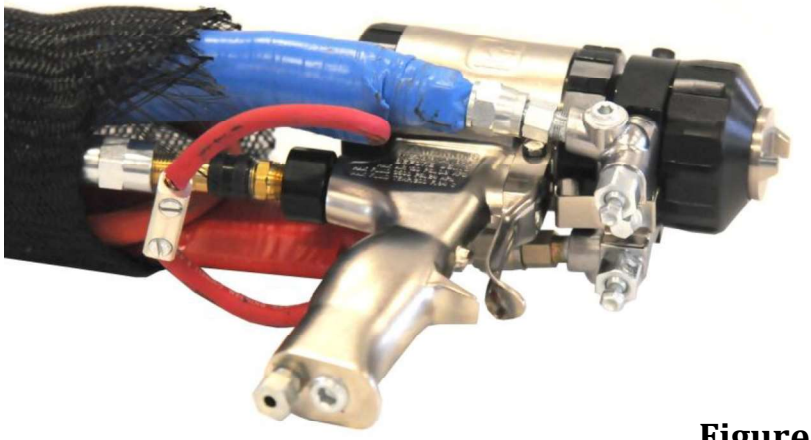


Figure 8

f. There are two red #6 gauge wires protruding from gun end of spray hose. These two wires should be connected using an electrical connector sized for #6 gauge wire. Tape this connection neatly to hose.

6) Connect gun to spray hose.

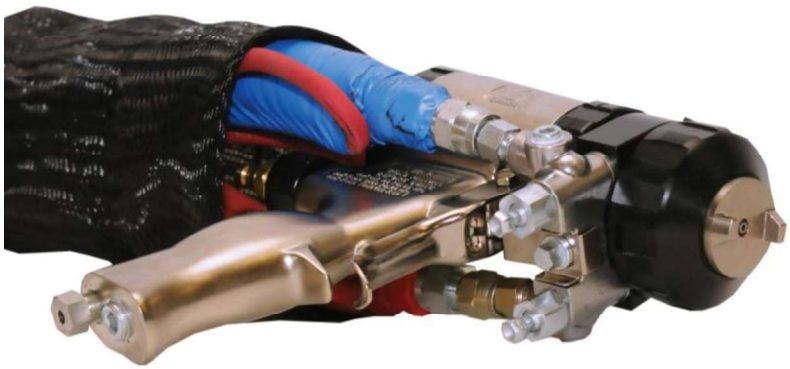


Figure 9

a. Close gun fluid manifold valves.

b. Connect red to A side and blue to B side.

c. Pressure check hose. Check for leaks. If there are not leaks, wrap hose and electrical connections to prevent from damage.

	**Risk of Electric Shock!**
	Disconnect all power before servicing.

7) Determine appropriate transformer lead.

a. Remove the access panel from the left side of unit on the bottom which reads SFE. Use the chart below to determine the lead that is appropriate for desired hose length. This lead should be connected to the end of the fuse facing you. If it is not connected, connect it now. (Leave this panel off for now.)

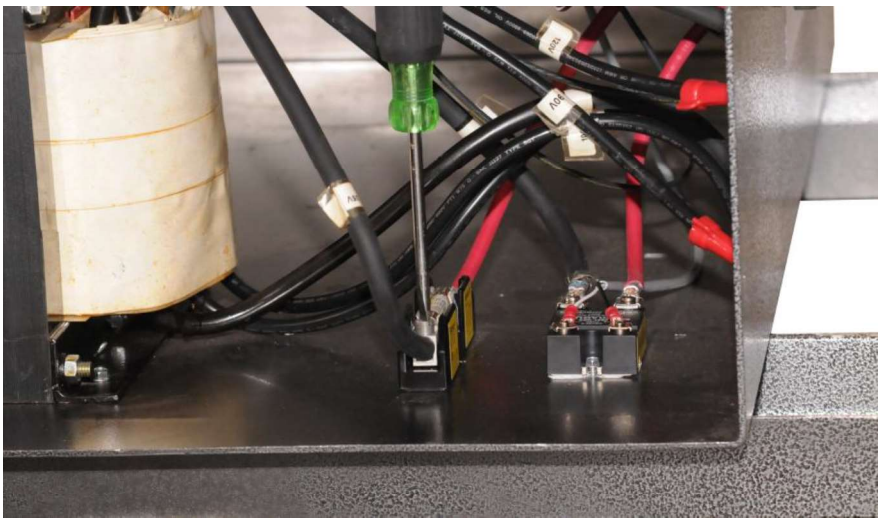


Figure 10

Voltage guidelines for recommended hose temperature:

Hose Length	Lead Voltage
50’	20v
100’	35v
150’	50v
200’	64v
250’	76v
300’	90v

To test amperage to make sure the correct voltage is going to the hose, place a clamp amp meter on one of the red wires coming out of the front of machine. The AC amps should read between 38 and 55. If the amperage is higher than 55, connect the next lowest voltage lead wire from the transformer to the fuse block in bottom of machine. If it is below 38, connect the next highest voltage lead. (See Figure 10 above for voltage connection guidelines.)

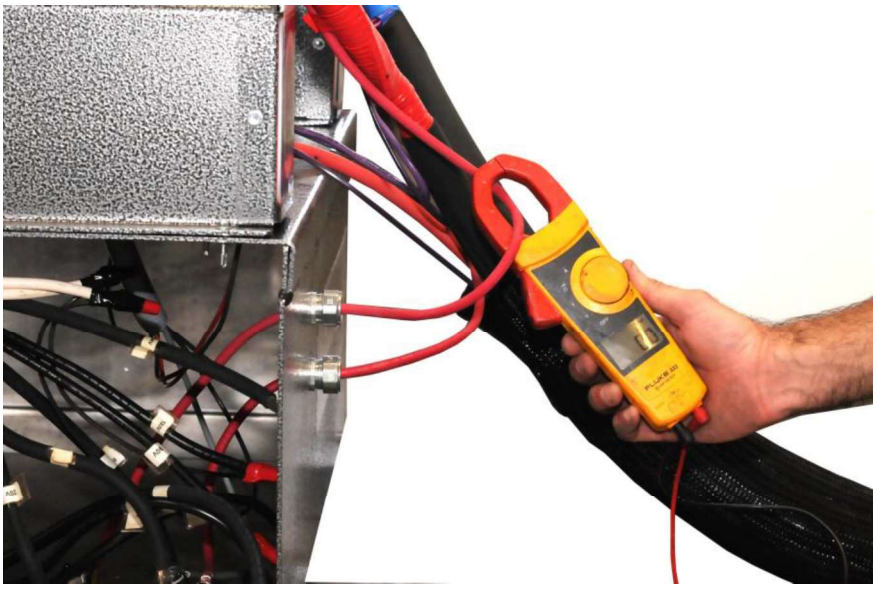


Figure 11

STARTUP

Personal Protective Equipment

You must wear proper protective equipment when operating, servicing or when in the operating area of equipment. This will protect you from serious injury including but not limited to: eye injury, inhalation of toxic fumes, and loss of hearing.

This equipment includes but is not limited to:

- Protective eyewear
- Respirator, gloves, and clothing recommended by fluid and solvent manufacturer
- Hearing protection

1) Make sure all hoses, cables and connections are properly connected.

2) Check pump lube levels in solvent cups and resupply if necessary.

3) Connect air supply to barrel pumps.

a. Turn on air mixer to B component material. If using a foam that contains water as the blowing agent, it is recommended to stir the B component for 20-30 minutes before spraying.

b. Turn both input valves on proportioner to the on position (handle in line with the hose).

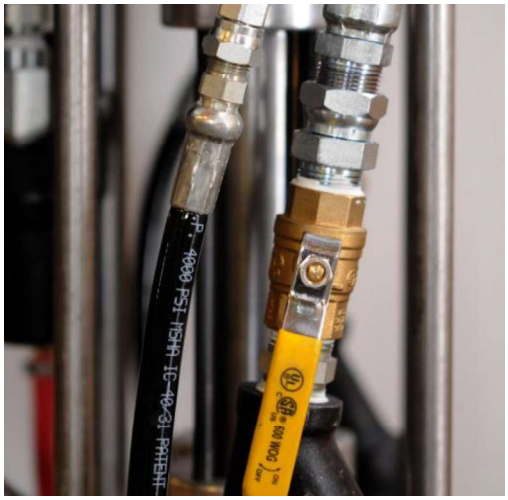
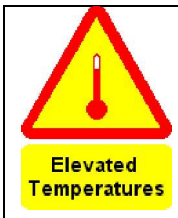


Figure 12

c. Hold gun fluid manifold over two waste containers. Open fluid valves A and B until clean, air-free fluid comes from valves.

d. Close valves.

Figure 13

	**Burn Hazard** This equipment is used with heated fluids which is hot and will cause some surfaces on equipment to become very hot. To avoid burns: • Do not touch fluid or equipment. • Allow fluid and equipment to completely cool before touching or servicing. • Wear gloves and protective clothing.

3) Set Temperatures

Figure 14

a. Turn all breakers to the on position. The numbers that appear on the controllers are the actual temperatures.

b. Hold down the left button on the top controller (hose heat controller) and press the up arrow button to the far right. This will increase the target temperature. Set this at 125°. The bottom two (A and B side pre-heater) controllers should be set the same way at approximately 130°. The same indicator lights *and* the LED indicator lights to left of controller indicate pre-heaters are heating. It may take 20 or 30 minutes for all to heat up to working temperature.

4) Set Pressure

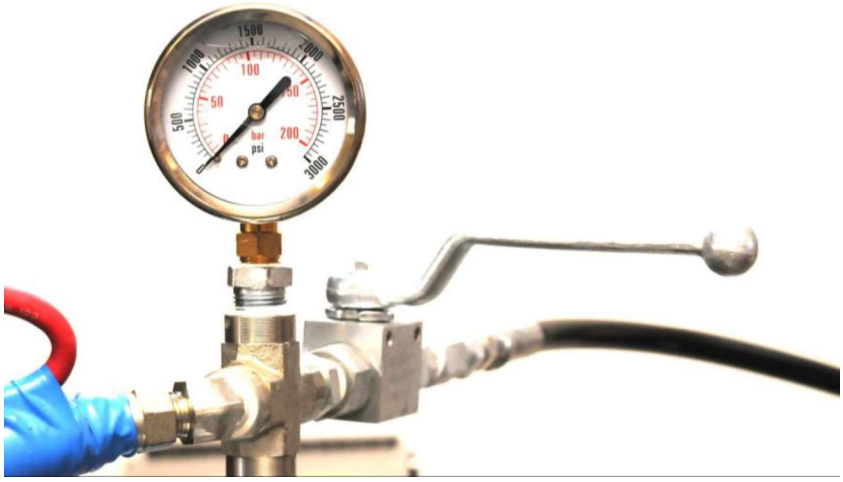


Figure 15

a. Turn the toggle switch on (up position).

b. The gauges on the pre-heaters display the working pressure. Adjust air regulator until each pre-heater pressure gauge is registering approximately 800 psi (you can increase pressure on the regulator assembly to increase/decrease this pressure).

c. The pressure may need to be bled off of either the A or B side so that the pressure on each gauge is the same.

   Do not allow the pressures of the A and B side to have a variance of more than 200 psi or you could get a material "crossover" at the gun.

SPRAYING MATERIAL

Skin Injection Hazard

High pressure fluid from spray gun, ruptured components, or leaks will pierce skin. This may look minor but is a serious condition. **Get immediate emergency treatment!**

- Do not point spray gun at anyone or any part of body
- Do not place hand or fingers over gun tip
- Use lowest possible pressure when troubleshooting or flushing equipment
- Check hoses, connections and fittings daily. Tighten or replace loose or worn or damaged parts immediately
- Relieve all pressure from proportioner and all components when you stop spraying and before cleaning or servicing equipment

Figure 16

1) Engage gun safety lock.

2) Attach gun fluid manifold and attach air line. Open the air valve at gun.

4) Open gun fluid manifold valves A and B (turn counterclockwise).

5) Disengage gun safety lock.

6) **Adjust fluid pressure if needed on gauges at pre-heaters.**

7) **Test spray for several seconds. Adjust temperature and pressure for desired results.**

8) **You are now ready to spray.**

SHUTDOWN

1) **Properly clean gun**.
   It is very important to keep a clean gun. Refer to spray gun literature for proper cleaning of gun after use.

2) **Turn off hose heat.**

3) **Turn off A and B pre-heater breakers.**

4) **Turn pressure toggle switch to off position.**

5) **Bleed pressure from the system with the recirculating/pressure relief valves very slowly.**
   The pump needs to be "parked" in the down position**.** You may need to switch the toggle off/on one time to cycle the pumps downward.

6) **Turn off main power.**

MAINTENANCE

- Check pump lube level in solvent cups daily.
- Inspect daily the machine, supply lines, spray hose, and spray gun to ensure everything is in proper working order and that there are no leaks.
- Remove plug on wye inlet and clean as needed.
- Clean check valves on gun regularly.
- Clean mixing chamber ports and check for side seal wear regularly.
- Thoroughly grease gun after use to prevent accidental material crossover.
- Keep ISO from exposure to moisture by ensuring transfer pump remains secure.
- Inspect hose daily and make any necessary repairs to ensure proper performance.
- Drain moisture from air compressor daily as to prevent any damage to system components.
- Recirculate material throughout entire system every two weeks if machine is not in use.
- Flush entire system with compatible solvent to store machine for extended period.

TECHNICAL DATA

Line Voltage Requirement	SFE-5-6k (195-264 Vac, 50/60 Hz) SFE-5-12k (195-264 Vac, 50/60 Hz) SFE-6-6k (195-264 Vac, 50/60 Hz) SFE-6-12k (195-264 Vac, 50/60 Hz)
Amperage Requirement	SFE 6k series (42 Amps max load) SFE 12k series (67 Amps max load)
Heater Wattage	SFE 6k series (6000 watts) SFE 12k series (12000 watts)
Maximum Fluid Working Pressure	SFE-5 series (2000 psi) SFE-6 series (3000 psi)
Maximum Fluid Temperature	195° F
Maximum Output	SFE- 5 series (32 lb./min) SFE- 6 series (32 lb./min)
Output Each Cycle (A and B pumps)	SFE-5 series (0.0500 gal/cycle) SFE-6 series (0.0500 gal/cycle)
Fluid Inlets	¾ npt with ¾ npsm union
Fluid Outlets	Component A (ISO) #8 (1/2”) JIC with #5(5/16) JIC adapter Component B (RES) #10 (5/8”) JIC with #6(3/8) JIC adapter
Fluid Circulation	¼” with thermoplastic tubing (3000 psi)
Parts Contacting Fluid	Stainless Steel, Zinc Plated, Carbon Steel, Aluminum, Chrome, Brass, PTFE, Viton O-rings
Weight	SFE 6k series (276 lbs) SFE 12k series (301 lbs)
Dimensions	D: 32in x W:36in x H:51in

Spray Foam Equipment Standard Warranty

Spray Foam Equipment warrants all equipment referenced in this document which is manufactured by Spray Foam Equipment 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 Spray Foam Equipment, Spray Foam Equipment will, for a period of twelve months from the date of sale, repair or replace any part of the equipment determined by Spray Foam Equipment to be defective. This warranty applies only when the equipment is installed, operated and maintained in accordance with Spray Foam Equipment's written recommendations.

This warranty does not cover, and Spray Foam Equipment 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-Spray Foam Equipment component parts. Nor shall Spray Foam Equipment be liable for malfunction, damage or wear caused by the incompatibility of Spray Foam Equipment with structures, accessories, equipment or materials not supplied by Spray Foam Equipment, or the improper design, manufacture, installation, operation or maintenance of structures, accessories, equipment or materials not supplied by Spray Foam Equipment.

This warranty is conditioned upon the prepaid return of the equipment claimed to be defective to Spray Foam Equipment for verification of the claimed defect. If the claimed defect is verified, Spray Foam Equipment will repair or replace free of charge any defective parts. The equipment will be returned to the original purchaser transportation prepaid. If the 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.

Spray Foam Equipment'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.

SPRAY FOAM EQUIPMENT 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 SPRAY FOAM EQUIPMENT. These items sold, but not manufactured by Spray Foam Equipment (such as electric motors, switches, hose, etc.), are subject to the warranty, if any, of their manufacturer. Spray Foam Equipment will provide purchaser with reasonable assistance in making any claim for breach of these warranties.

In no event will Spray Foam Equipment be liable for indirect, incidental, special or consequential damages resulting from Spray Foam Equipment 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 Spray Foam Equipment, or otherwise.

Spray Foam Equipment Information

TO PLACE AN ORDER, visit our website or call our Spray Foam Equipment Headquarters:

www.sprayfoam.cm
(318) 644-5140

SPRAY FOAM EQUIPMENT 1705 BEULAH CHURCH RD., CALHOUN, LA 71225

TURBO LINER
SPRAY IN BEDLINERS
1 W. Cameron Kellogg, ID 83837 Toll Free: 1(877) 678-8726

Boss SFE-6K Proportioner:
Proper retract/park procedure and pump top seal adjustment.

The retracting or parking procedure on essentially all proportioners, regardless of brand, is the most important daily maintenance procedure of your spray machine. We have seen many A-side pump failures over the years, the majority of them were top seal failures due to improper retracting and/or lubing of the A-side pump.

The Boss 6-6K proportioner has the potential to park in the up position if the retract procedure is not done correctly.
From the manual in the "SHUTDOWN" procedure on page 22;
4) Turn pressure toggle to off position.
5) Bleed pressure from system with recirculating/pressure relief valves very slowly.
The pump needs to be "parked" in the down position. You may need to switch the toggle off/on one time to cycle the pump downward.

Retract/Pressure Toggle Switch


Pumps Shown In Parked Position

In step 5), pressure may also be bled off by spraying the gun or through the side blocks (if they are not attached to the gun) by opening the ball valve.

At the end of the day make sure the pumps are in the bottom retracted position. Then put a small amount of DOP (also known as pump lube or TSL, throat seal liquid) in the lube cup on top of the A-side pump to ensure that no iso material will harden on the pump shaft causing a seal failure. The B-side pump should also be lubed initially but isn't critical like the A-side and won't harden on you.

The lube cup will need to be cleaned out on a regular basis and replaced with fresh pump lube. (The lube thickens with the iso material)
Use extreme caution when cleaning the top of your pump and make sure you don't ding the pump shaft. This is a common mistake and pump shafts are expensive.

Some of the Gusmer and Graco machines have an auto lube pump that is used but this too needs to be maintained. Parking the pump is just as important as well as changing out the pump lube on a regular basis. The lube bottle fluid needs to be changed before the pump lube gets too thick to pump through the lube system and locks up your lube pump.

The Boss pumps use an adjustable Chevron top seal. The lube cup with the holes in it is also the packing nut for the top seal.

Top seal packing nut adjustment: the packing nut should be snug but not too tight as it is possible to tighten the nut to the point of locking the pump up. Loosen the packing nut then screw it back in until the nut contacts the seal, tighten the nut approximately 1/8 turn, until snug. Monitor your pumps to make sure there is no excess material weeping out of the top of the pump, tighten the packing nut in very small increments as needed to help stop any excess material that is coming past the top seal.

Initial Seal Contact Position

Position After 1/8" Adjustment

Remember! Parking or retracting your pumps and fresh pump lube at end of day shutdown is the most important daily maintenance procedure of your machine. It is also the most common failure we see here.

Please give us a call if you have any questions.
Turbo Liner Tech Dept.

TURBO LINER
SPRAY IN BEDLINERS

1 W. Cameron Kellogg, ID 83837 Toll Free: 1(877) 678-8726

Boss Proportioner, A side pump lube cup

All proportioners require the pumps to be retracted to the bottom position at the end of the day. The A side pump also needs to be lubed at end of day. This will seal up the top of the pump and prevent any hardening of A side material that may lock up your pump.

The Boss pump uses an adjustable top seal. The packing nut is the lube cup on this pump. It has holes in it for the top packing adjustment.

The lube cup is also very hard to clean and keep fresh lube in, which is part of your daily maintenance.

Here is a simple, inexpensive fix for the lube cup that will make your maintenance life a little easier. The fix is to fit a small piece of hose over the top of the pump to act as a lube cup that is easy to clean and maintain.

Use the common 1.5” clear vinyl hose that most hardware stores carry. Cut a piece about 1” long. The hose is a tight fit over the top of the pump and will need to be warmed up for installation. A propane torch will do the trick, use caution.

1) Bleed all line pressure off the machine and turn the power off.

2) Remove the double nuts off the top of the A-side pump shaft.
3) Using the appropriate wood block and pry bar, carefully force the pump cross-bar up and off the A pump shaft.
4) Warm up your hose piece till it is soft and pliable. Install over the top of the pump and push down over the holes to seal them up. The top of the hose should be about .25” above the top of the pump
5) Push the cross-bar down onto the pump shaft and re-install the top nuts, use thread lock on the nuts.
6) Fill the cup with fresh pump lube.
7) Monitor the lube cup daily, clean out and refill the cup as needed.

SPRAY FOAM EQUIPMENT & manufacturing

318-644-5140

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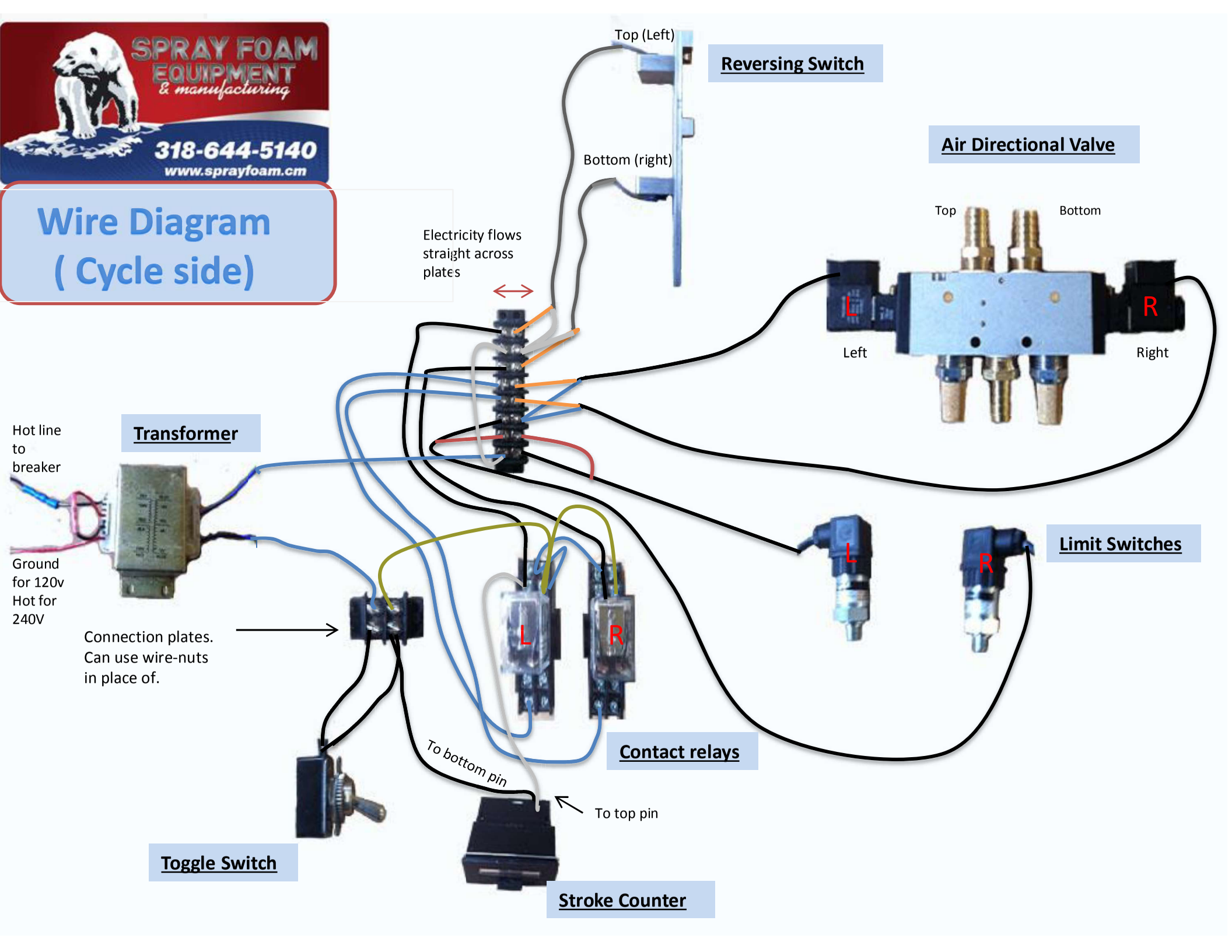
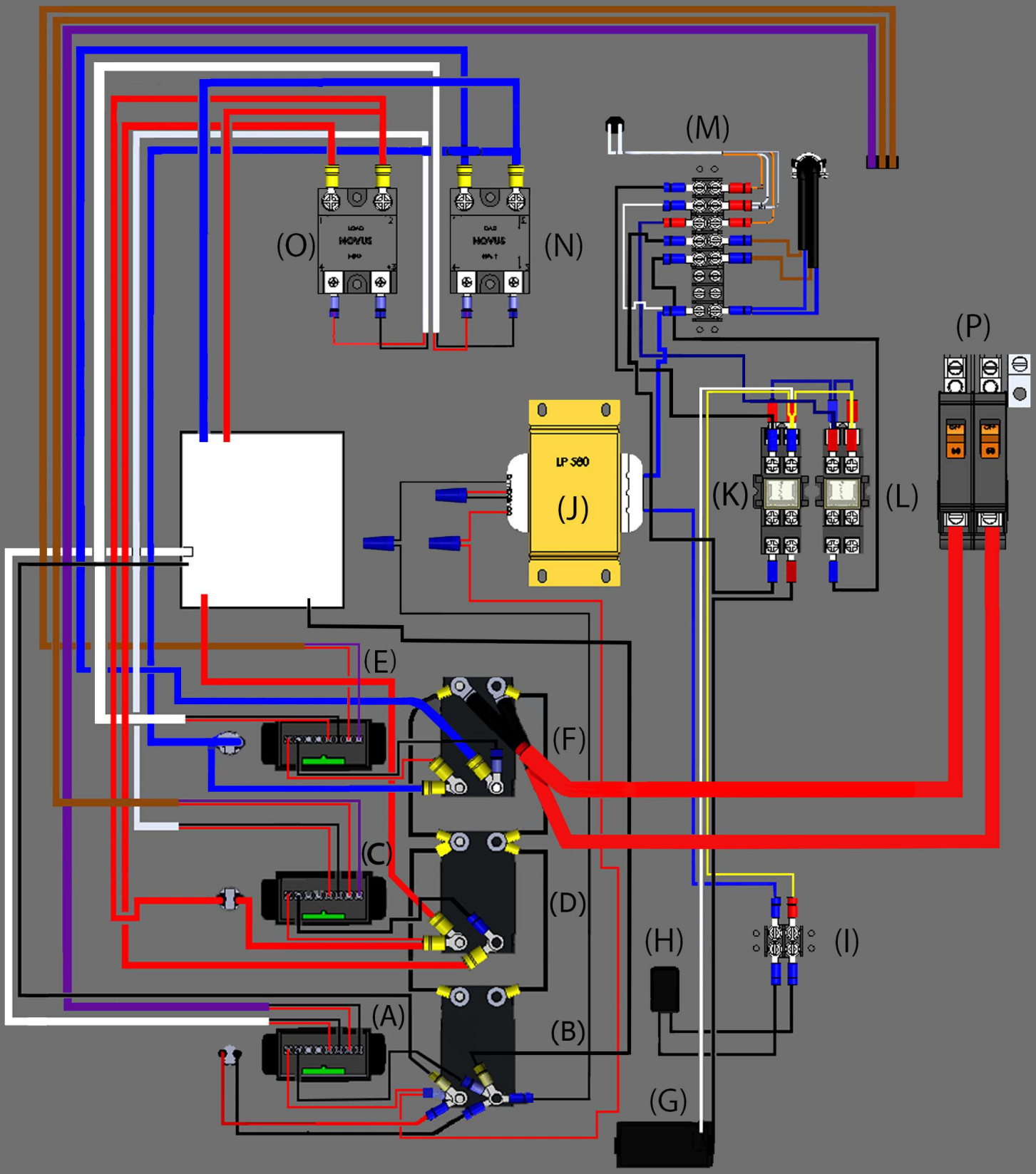
Wire Diagram (Cycle side)

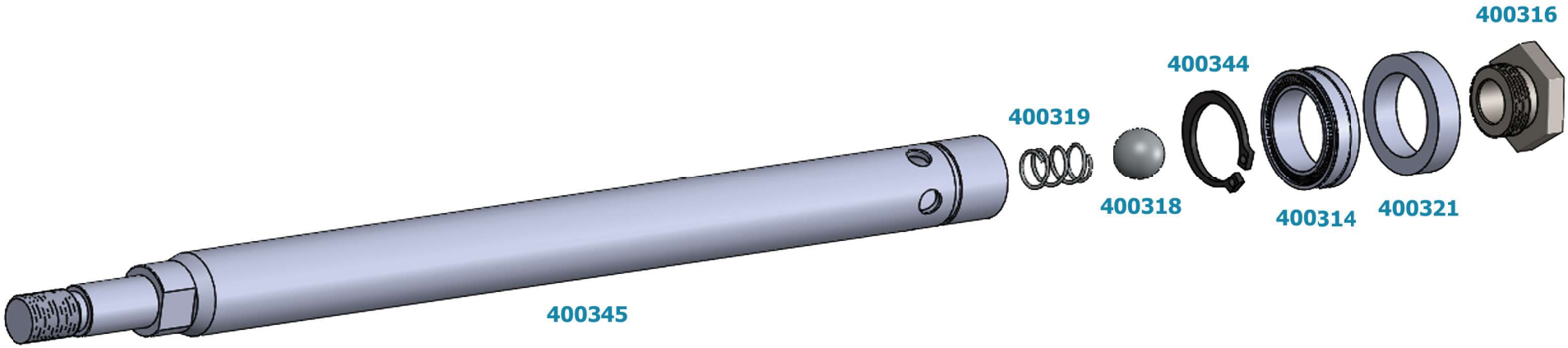




SCALE:

A = HOSE HEAT CONTROLLER
B = HOSE HEAT BREAKER
C = ISO CONTROLLER
D = ISO PRE-HEATER BREAKER
E = RESIN CONTROLLER
F = RESIN PRE-HEAT BREAKER
G = STROKE COUNTER
H = TOGGLE SWITCH
I =SMALL TERMINAL STRIP
J = 240V X24V STEP DOWN MINI TRANSFORMER
K = ICE CUBE RELAY- LEFT
L = ICE CUBE RELAY-RIGHT
M = LARGE TERMINAL STRIP
N = RESIN NOVIS RELAY
O = ISO NOVIS RELAY
P = MAIN BREAKER

BOSS Machine
Fluid Pump Shaft Assembly



400314 - High Pressure Seal
400316 - Transfer Housing Seat
400318 - Small Check Valve Ball for Transfer Housing
400319 - Small Spring for Transfer Housing
400321 - Backup Ring for High Pressure Seal
400344 - Small Retaining Clip for Fluid Pump Shaft
400345 - Shaft for 1.25” Fluid Pump (Chevron Style)

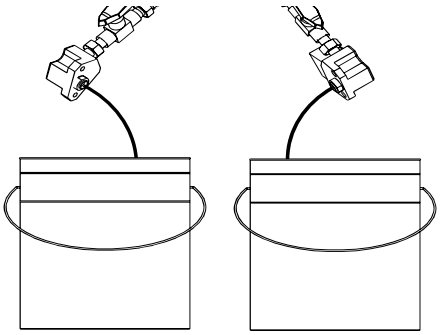
Proportioning Pump Overhaul Procedure

Glas-Craft and Boss Pumps

1. Dump pressure off system

WARNING
Be sure air and power are off to system.

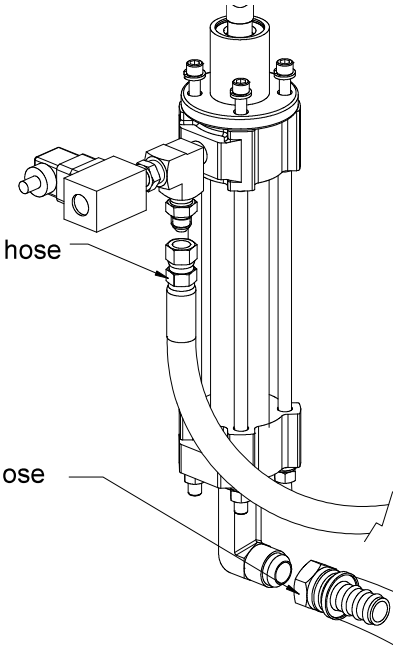
This is achieved by removing side blocks from the gun, opening ball valves and purging materials into clean containers.



2. Flush system side to be rebuilt with suitable solvent.

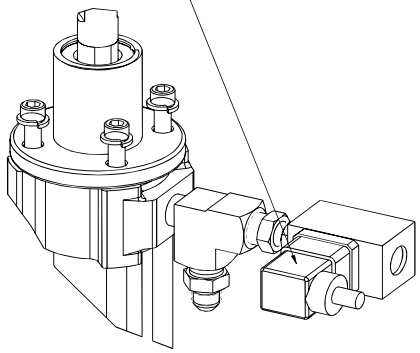
NOTE
Step three is optional, but it makes the process easier.

3. Disconnect inlet and outlet fittings from the pump.

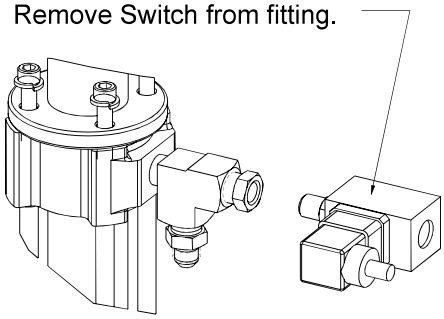


4. Disconnect the din connector from over pressure switch.

a. remove plug

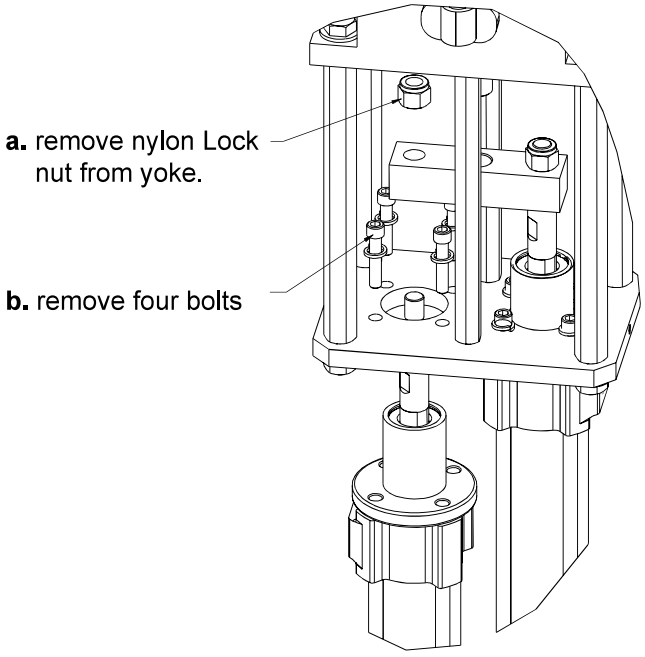


b. Remove Switch from fitting.



CAUTION
Do not immerse Over Pressure Valve in solvents externally. (Flushing will not affect).

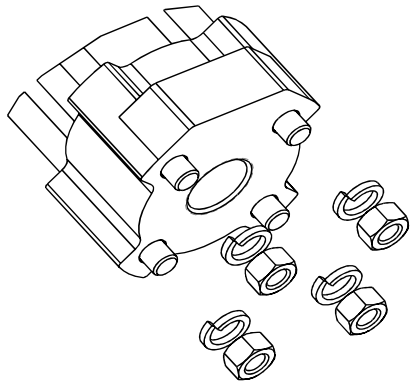
5. Remove pump from base.



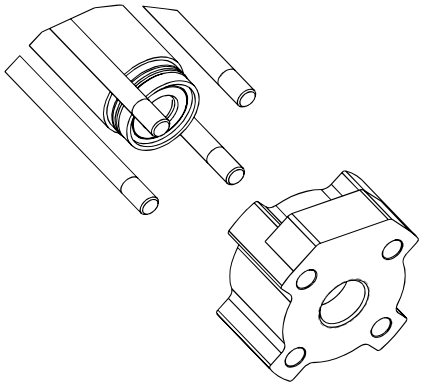
Proportioning Pump Overhaul Procedure

Breaking Down Pump

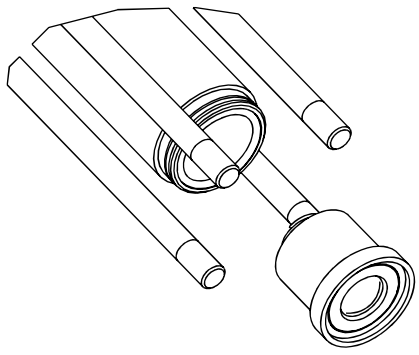
1. Remove four nuts at the base of pump break loose, in a criss-cross pattern.



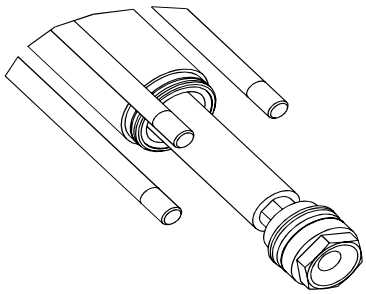
2. Remove Base from Tie Rods.



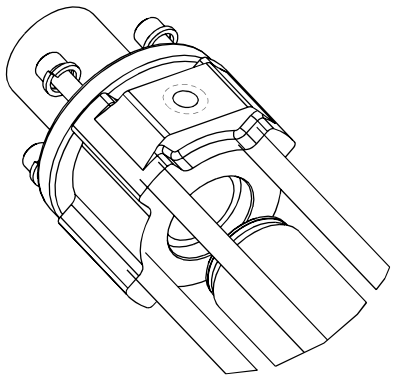
3. Remove Valve Housing from the cylinder.



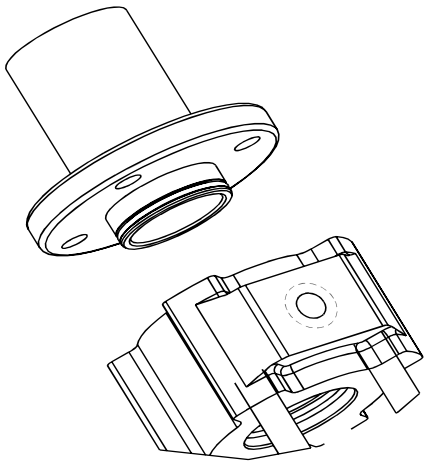
4. Using a rubber mallet, tap shaft out through the bottom of the cylinder, P/N 18219-00.



5. Remove cylinder, from Pump Head.



6. Remove Cup Adapter from Pump Head.

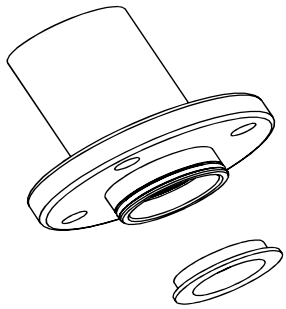


Proportioning Pump Overhaul Procedure

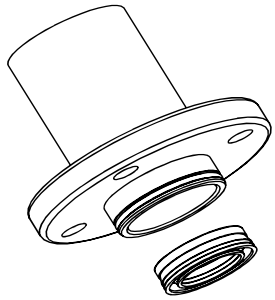
Disassemble Sub-Assemblies

1. Cup Adapter.

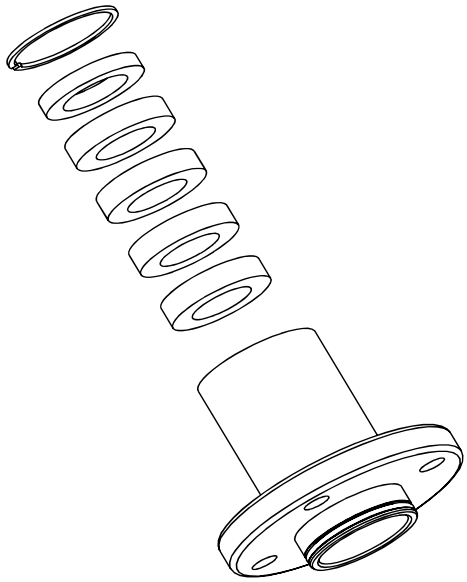
a. Remove Support Washer.



b. Remove Seal.

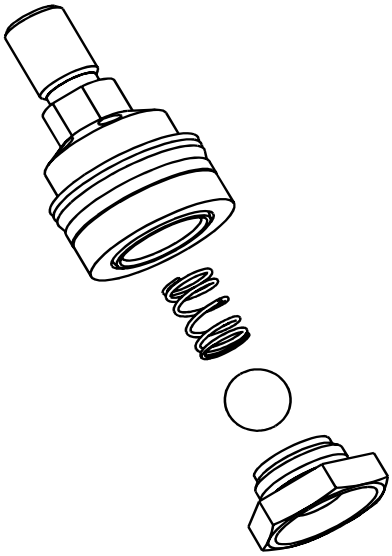


c. Remove Snap Ring, Nylon Washer & Felt Wipers.

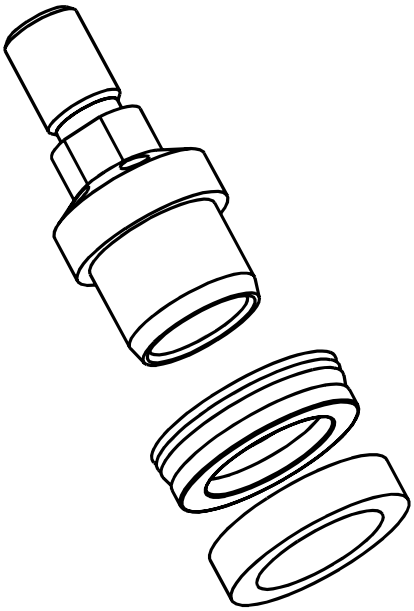


2. Shaft Assembly:

a. Remove Transfer Seat from Transfer Housing. Watch for Check Ball and Spring. The Ball is loaded with spring tension.



b. Remove Piston Guide and Pump Seal.



Proportioning Pump Overhaul Procedure

Cleaning

1. Thoroughly wash all parts in suitable solvent.

2. If parts have any build-up of hardened material, it is acceptable to polish parts with fine sand paper, (1200 grit) or steel wool(000).

3. It is recommended that the cylinder be honed with a fine grit bead honer.

Inspection

1. The Pump Cylinder inner wall should be smooth. No pitting or scarring should be seen. If slight scars show in the wall, they must not be able to be felt with a finger nail.

2. The Pump Shaft must not have any scoring, pitting, or build up of any debris on the shaft.

3. Set the Check Ball in the Seat and hold up to a light. Observe for light between seat surface and the ball.

NOTE
If a large sliver of light shows, check for debris or scaring on Seat or Ball.

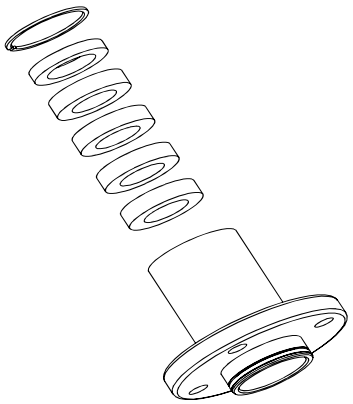
4. Repeat the above step for both upper and lower check ball assemblies.

NOTE
The Lower seat is reversible, you can use either side.

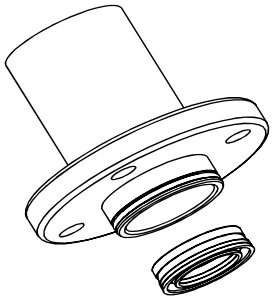
Re-Assemble

1. Soak Felts in a light weight non detergent oil or DOP then install into Cup Housing.

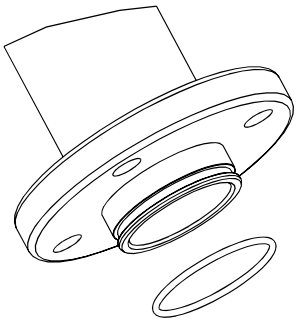
2. Install Nylon Washer, push down and install Snap Ring in groove.



3. On bottom side of Cup Housing install the Seal so that the lip faces out

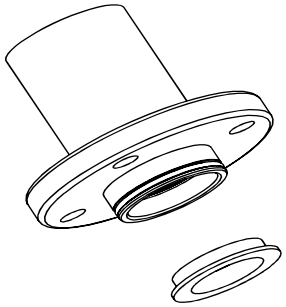


4. Lubricate and install O-Ring on bottom groove of the Cup Housing.

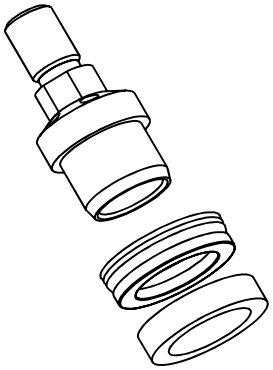


Proportioning Pump Overhaul Procedure

5. Install Support Washer with lip facing toward seal.

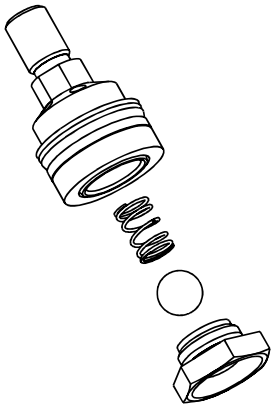


6. Place Seal and Piston Guide on Transfer Housing. The lips of the Seal will face away from Piston Guide.

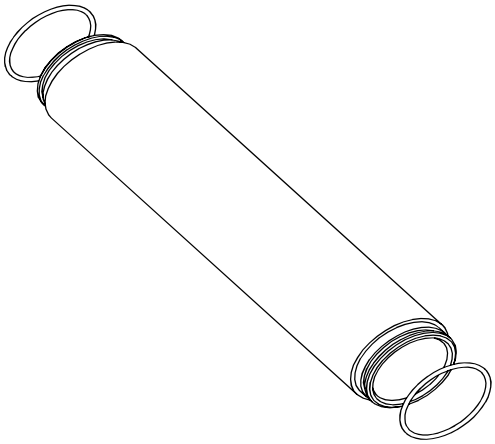


7. Set Check Ball Spring in Transfer Housing and set Check Ball on Spring.

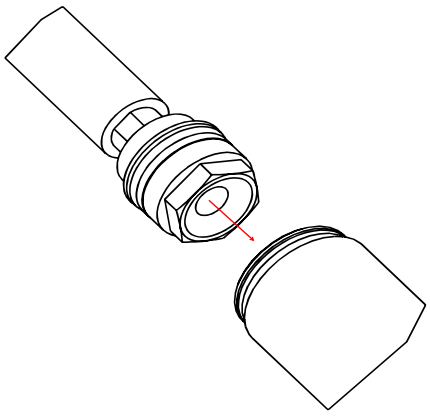
8. Apply blue lock-tite to the threads of Seat and install on Transfer Housing. Tighten these two parts!



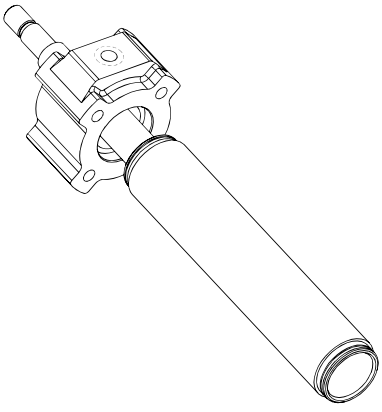
9. Lubricate and install two O- Rings on Cylinder.



10. Using a light weight non-detergent oil, coat the seal on the shaft assembly and the walls of the cylinder, then install the shaft assembly into the cylinder, leave approximately 4” of the shaft exposed on the top side.

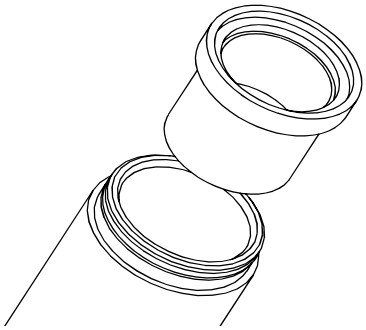


11. Install cylinder/shaft assembly into pump Head, careful not to cut O-Ring for Pump Cylinder.

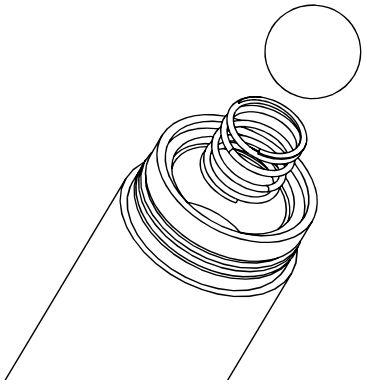


Proportioning Pump Overhaul Procedure

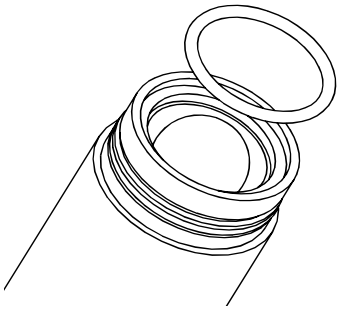
12. With the Pump Assembly upside down, (easy if clamped in a vise) install Foot Valve Housing into Cylinder.



13. Set Check Spring in place and set Check Ball on Spring.



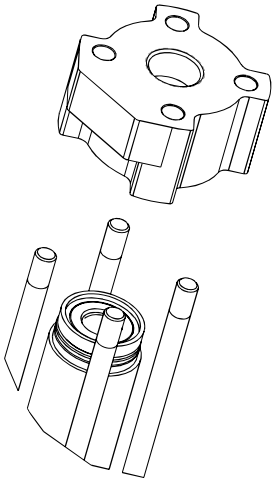
14. Lubricate and install O-Ring in groove of Foot Valve Housing.



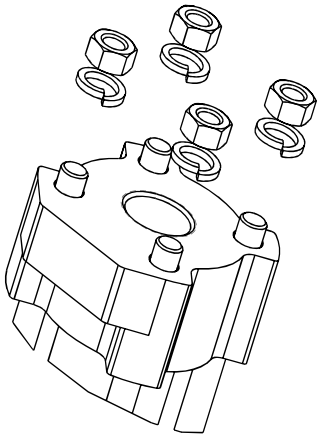
15. Lubricate the outer edge of Seat and set top of ball, square and center flats of Seat and Foot Valve Housing.

Apend note to 15: O-ring In diagram 14 must be installed on outside of the check ball seat before the check ball seat is installed.

16. Gently set Pump Base through Tie Rods and push down square and firm until it sets down over cylinder O-Ring.



17. Continue holding Pump Base down and install Lock Washers and hand thread Nuts. Tighten the Nuts in a criss-cross pattern until tight. The pump is now complete and ready for service.



TURBO LINER
SPRAY IN BEDLINERS

1 W. Cameron Kellogg, ID 83837 Toll Free: 1(877) 678-8726

Basic Proportioner Troubleshooting

All proportioners or high pressure plural component spray systems are basically the same in the process of pumping, heating, monitoring and mixing the material at the gun. Whether it be coatings or foam you are shooting, or which machine or gun you have, the basics covered here should apply to your equipment and help look at the ABCs of basics of troubleshooting for your spray system. Troubleshooting is always done from the top-down verifying test results as you go, in a spray system that is from the supply system to the gun. Have your specific supply pump, machine and gun manuals at hand for reference.

1) **Power and air supply**; verify that the source electrical power and air pressure/volumes for your system are correct and verified by meter or gauge. Check electrical circuit breakers, compressor, air regulator, etc…

2) **Material**; material needs to be clean, fresh and preconditioned to 70°, drums need to be off the concrete floor on a pallet or the like to prevent cold transfer. For coatings the B-side will need to be pre mixed. Your mixer motor is an air tool. Make sure your mixer is being lubed regularly and working properly.

3) **Material supply system**; this consists of supply pumps, hoses, valves, filters, pressure and temp gauges that feed your machine. Your machine needs a clean, filtered, 70°, unrestricted flow of both A & B material.

The supply pressure will vary with the type of pumps you have and what air pressure you are feeding them. With the common 125 psi shop air supply a 1/1 pump should put out approx. 125 psi of fluid flow and a 2/1 pump will put out approx. 250psi.

The supply pump gauges can be erratic as the pumps cycle and the A & B gauges will act differently due to the different viscosities of the A & B materials; this is normal.

As you monitor these gauges make sure that the gauges read at least 50 PSI at the low end of the cycle. If you are bouncing off zero then you are starving your machine for material.

We recommend that all spray systems be retrofitted with supply monitoring gauges if they don't have them; this is an invaluable troubleshooting tool. The supply monitoring gauges are to be installed after the filter so a plugged filter screen would be detected.

4) **Heat zones**; there are 3 heat zones. The A & B Primary heaters heat the material to the specific temp set on the controllers and the hose heat maintains the temp of the material from the machine to the gun.

   The primary heaters are very fast and will be up to temp in a minute or so. They can be left off until you are almost ready to spray to prevent over pressure due to heat. The hose heat will take 30-60 minutes depending on your system. Verify that all is working properly.

5) **Material flow**; after the machine is up to temp, using only the supply pump pressure (do not pressure the machine up), bleed material from each gun side block into a clean container or back into their respective A & B drums. Monitor

the A & B supply gauges as they cycle to get a dynamic or working pressure range. As long as they are 50 psi or above in the low end of the cycle as discussed above in #3 you should have adequate supply pressure and material flow through your machine.

6) **Ramp up test**; a ramp up test will tell you what your proportioning pumps are producing via the main high pressure gauges.

   With the machine on, heated up and supply pressure feeding the machine; bleed all pressure off the system, then turn on and pressure up the system. Read the A & B gauges, they should ramp up evenly to the normal operating pressure. Bleed off the pressure and repeat the test 4-5 times to get a good reading. The pressure differential between A & B should be 300 or less. A large differential, 1000 psi for instance, would indicate a pump failure of some kind, (or starvation, make sure you have verified material supply and flow in earlier steps).

7) **Heated hose**; the heated hose and whip assemblies are somewhat fragile and take the most abuse of any part of your spray system. How you take care of it will determine the service life of the hose assembly.

   Keep your hose covered with plastic sleeving or similar and clean the overspray off the hose regularly to avoid build up.

   The gun end of the hose will start to come un-done after some use. Take the time to re-do, re-insulate, re-tape or whatever it takes to keep your hose in good shape and in service.

Do not heat a coiled hose, it will create excess heat that could cause a hose failure or an error code on the new RTD hose used on the newer Graco Reactor 2 series machines.

Be aware of the electrical connections on your hose. On the common low voltage hose there are two heavy #6 wires from your machine that feed the heating elements in your hose and heated whip hose in a circuit. There will also be a thermocouple and wire that senses the heat and sends a reading to the hose controller. Electrical and thermocouple connections are common failure points to keep an eye on.

8) **Spray gun**; 80% of the tech calls we get relate to the gun and its maintenance or lack thereof.

Know your gun, read the manual, train your people and have spare parts on hand. A whole separate chapter can be written on the gun but we'll keep it simple for now.

In conclusion;
This covers most of the main points of your system that must be in place in order for your spray system to operate correctly. When you have a problem and start troubleshooting make sure to review all manuals, troubleshooting guides, material data sheets and tech docs that pertain to your system first. All of these documents are available on the dealers section of our web site, www.turboliner.com

Most problems turn out to be something minor that has been overlooked. Take a hard look at your system and make sure everything is correct before you proceed to avoid failures. Please don't hesitate to call if you need assistance.

Turboliner Tech Dept.
877-678-8726

Probler P2 - Installation: Equipment Assembly

How The Gun Works

The trigger actuates a small valve in the gun handle that controls the flow of air into the piston assembly. When the trigger is pulled, air flows through the valve to the front of the piston. Air pressure forces the piston towards the rear of the gun, simultaneously closing off the purge air and moving the mixing chamber to a position where the mixing chamber orifices are aligned with the orifices in both the side block seal and check valve assemblies.

The proper alignment of the orifices is determined by the setting of the adjustment nut, located on the piston lock assembly. This adjustment nut determines the length of travel of the air piston and has been preset at the factory and should not require adjustment. (SEE MAINTENANCE SECTION)

The two fluids (isocyanate and polyol) then flow through the material shut-off valves, seal, and check valve assemblies and into the mixing chamber. The two fluids impinge against one another and exit the mixing chamber in a swirling, conical spray pattern.

When the trigger is released, the mixing chamber returns to its original position and purge air flows into the mixing chamber housing. The front tip o-ring, keeps air purge inside the gun head, forcing all of the air through the orifices in the mixing chamber, for a complete, total and constant purge.

This purge air continues to flow through the mixing chamber until the air switch is pulled up to shut-off all air to the gun; or until the trigger is pulled again.

Piston Lock

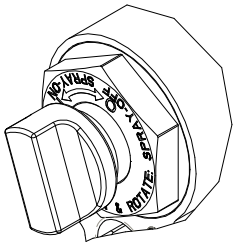
Engage piston lock whenever you stop spraying, to avoid accidental triggering.

Always use piston lock in conjunction with fluid ball valves to avoid accidental triggering.

WARNING

Read warnings in Gun Manual.

To engage Piston lock: push knob in and turn clockwise. If engaged, gun will not actuate.



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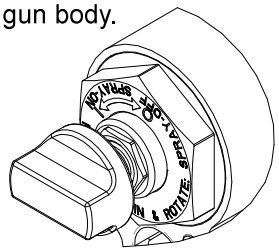
To disengage piston lock: push knob in and turn counterclockwise until it pops out. There will be a gap between knob and gun body.



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See page 19 for piston lock adjustment or installation.

Loss of Air Pressure

In event of loss of air pressure, gun will continue to spray. To shut off gun, do one of the following:

- Push in piston lock, see **Engage piston lock**.
- Close ball valves A and B.

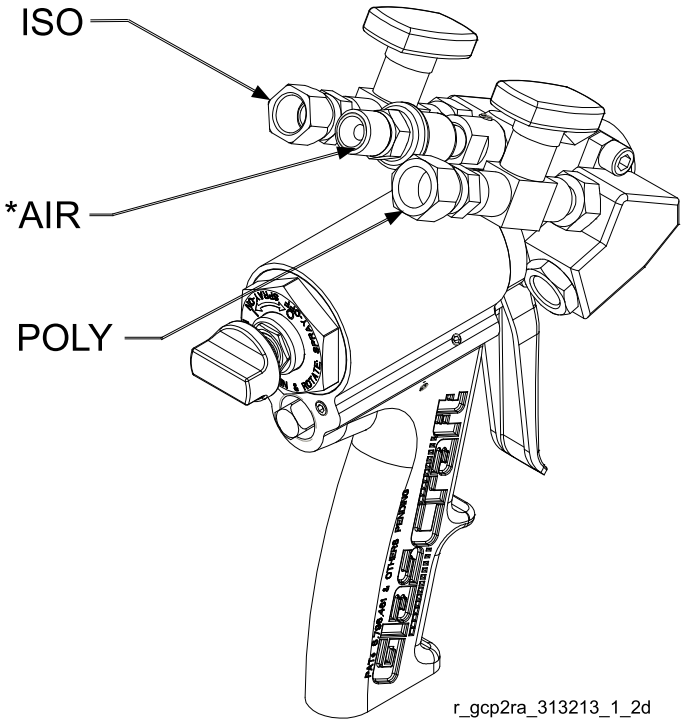
Probler P2 - Installation: Equipment Assembly

GlasCraft Equipment

Air Hose is ¼ in. NPS

JIC and SAE Fittings ***DO NOT*** require the use of PTFE tape.

Once the fittings are attached and tight, refer to system manuals for start-up instructions.



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*Fitting GC2394 is an unattached part that may need to be connected to the air hose first, depending on air hose fitting, then connected to the gun.

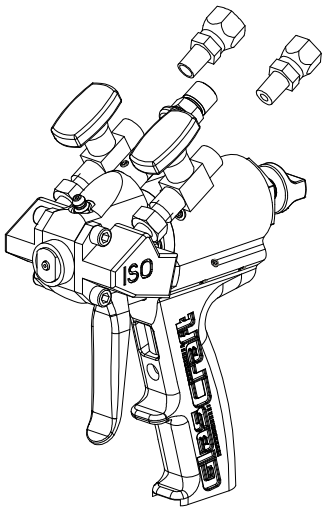
Installing P2 on Other Equipment

⚠ WARNING

Do not place any part of the body in the path of the material spray. Do not point the gun at or near other personnel. Do not look into the mixing chamber orifice at any time. Because of the hazardous materials used in this equipment, it is recommended that the operator use an air mask, goggles, protective clothing, and other safety equipment as prescribed by current regulations, recommendations of the chemical suppliers, and the laws in the area where the equipment is being used.

If original equipment does not require the use of an unheated whip hose or isolation hose, the P2 can be directly installed on to the material hose.

1. Remove the fittings from the original gun.
2. Remove swivel fittings from ball valves. Ball valves are 1/8 in. NPT female. Remove swivel fitting from air slide valve. The air slide valve is a ¼ in. NPSM.



r_gcp2ra_ _1_3d

3. Install the original fittings into ball valves.

It is recommended to use a non-permanent thread lock on the 1/8 in. NPT threads to assist as a sealant and keep the fittings from twisting with gun movement.

4. Install the gun on the original hoses.

⚠ WARNING

Relieve ALL system fluid and air pressure according to manufacturer's instructions.

Probler P2 - Operation: Start-Up Instructions

Refer to specific system user manuals for complete system installation.

Pre operation Checklist

Check that all fittings are tight and air regulators are turned to ***"zero pressure"***.

⚠ WARNING

Do not place any part of the body in the path of the material spray.
Do not point the gun at or near other personnel.
Do not look into the mixing chamber orifice at anytime.
Because of the hazardous materials used in this equipment, it is recommended that the operator use an air mask, goggles, protective clothing, and other safety equipment as prescribed by current regulations, recommendations of the chemical suppliers, and the laws in the area where the equipment is being used.

Operating Requirements

- 8-10 CFM at 90-110 psi (0.62-0.76 MPa, 6.2-7.6 bar)
- MAXIMUM Static Fluid Pressure - 3500 psi (24.1 MPa, 241 bar)

⚠ WARNING

The GlasCraft Probler P2 Gun is designed and manufactured to operate at a maximum static fluid pressure not to exceed 3500 psi (24.1 MPa, 241 bar). When attached to a GlasCraft proportioning system, this pressure will not be exceeded. However, if the GlasCraft Probler P2 Gun is installed on any other manufacturer's self-designed equipment, great care must be taken to ensure that the maximum static fluid pressure not be exceeded.

If the gun is being used for short periods of spraying, GlasCraft recommends that the purge air be left ON.

⚠ WARNING

If purge air is to be turned OFF, BOTH MATERIAL SHUT-OFF VALVES, MUST BE TURNED TO THEIR "OFF" POSITION AND PISTON-LOCK ENGAGED BEFORE TURNING "OFF" THE PURGE AIR !
Failure to follow this procedure will possibly result in the gun head becoming encased with mixed product.

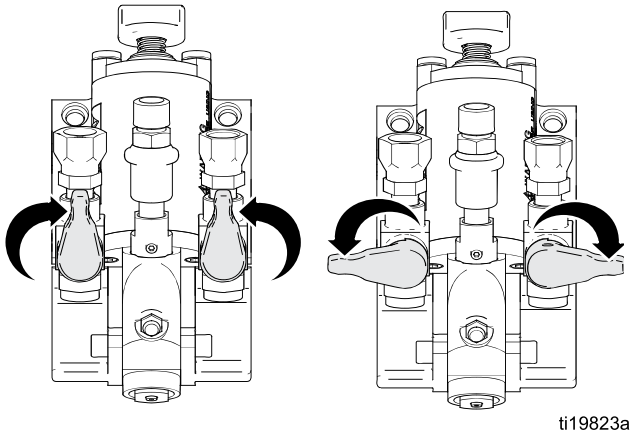
For proper purging following use, the air switch must be left OPEN for at least 15 SECONDS after the trigger has been released.

The flow of material into the mixing chamber is controlled by the ON or OFF position of the two material shut-off valves.

Both material shut-off valves must be FULLY OPEN and piston lock DISENGAGED during dispensing and must be FULLY CLOSED and piston lock ENGAGED during service or extended shut-down periods.

⚠ WARNING

BOTH MATERIAL SHUT-OFF VALVES, MUST BE TURNED TO THEIR "OFF" POSITION AND ALL FLUID PRESSURE RELIEVED BEFORE REMOVING SIDE BLOCK SCREWS!!
Failure to follow this procedure will possibly result in the gun head becoming encased with mixed product.



ON ***OFF***

Refer to system manuals for start-up and shut-down procedures.

Probler P2 - Operation: Start-Up Instructions

Spray Technique

Always operate safely and follow all safety procedures outlined.

To achieve the optimum spray pattern for each application, the appropriate mixing chambers are available in seven spray sizes.

The standard mixing chamber supplied with your gun will be adequate for all but the smallest and largest applications.

Foam rise and cure times will vary according to the material and substrate temperature. Higher material or substrate temperature will increase rise and cure times; lower material or substrate temperatures will decrease rise and cure times. Consult your chemical manufacturer's data specification sheets for their recommended spray temperatures. Under most circumstances, both components will be used at identical temperatures.

Higher pressures and temperatures may be used to increase material break-up, improve mixing and speed rise times. With hose lengths over 50 ft., or when material viscosities are high, higher material pump pressures may be necessary.

The gun air switch assembly MUST BE OPENED (down position) prior to spraying to provide air for trigger operation and purge air when the trigger is released.

When spraying, the gun trigger may be depressed continuously, or triggered at the end of each stroke. A smooth, even layer is best achieved by moving the gun back and forth in a slow, even motion, overlapping the previous pass about 50 to 75 percent. DO NOT SPRAY OVER RISING FOAM! The ideal gun-to-surface distance is about 18 to 24 inches. Be sure to point the gun directly at the surface to be sprayed. Spraying at an angle to the surface will cause the foam to be rough and will generate overspray.

Probler P2 General Information: Maintenance

⚠ WARNING

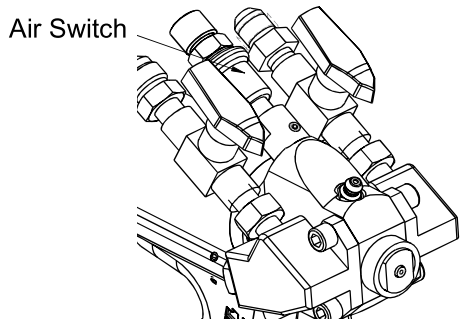
Before attempting to perform any maintenance on this gun, relieve All Fluid and Air Pressures!

- To relieve fluid and air pressures:
- Turn OFF all air supplies at system except gun trigger air.
- Trigger the gun until all fluid pressures have been relieved.
- Turn OFF the gun trigger air at the system.
- Turn proportioner off.
- Trigger the gun until all trigger air pressure has been relieved.

Perform Gun maintenance as follows:

1. Check for leaking seals (34):

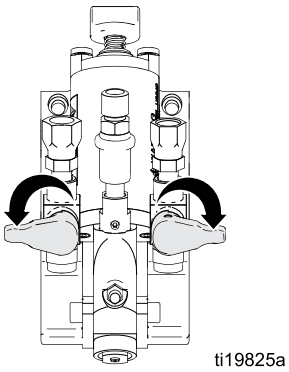
- Engage piston lock.
- Turn OFF the gun incoming air by closing gun air switch.



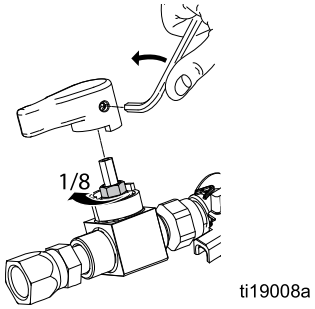
- Wait approximately 10 - 20 seconds, then turn ON the incoming air by opening gun air switch.
- Repeat two or three times.
- If any material has been purged from the gun, the seals (34) are leaking, or o-ring (35).
- Correct leaks by replacing the seals or o-rings and re-checking.

2. Check the material valves, p/n 25649 and 256460 for any leaks:

- Turn OFF both material valves.



- Disengage piston lock.
- Trigger the gun several times.
- Wait approximately 10-20 seconds.
- Trigger the gun several times.
- If additional material is purged, the material valves are leaking.
- Correct the leaks by loosening the set screw and removing red or blue handle. Turn the valve packing nut clockwise in 1/8-turn increments until leak is corrected. Re-check.



3. Check side blocks

- Turn OFF the air switch on the gun.

⚠ WARNING

Before removing the side blocks make certain that both material valves are in the OFF positions and trigger several times to depressurize fluid in gun!

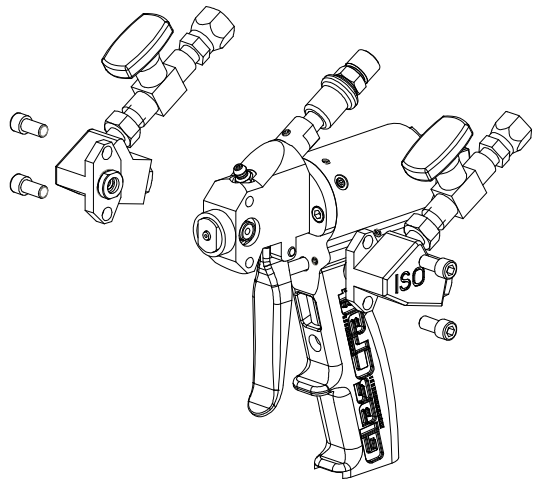
If the material valves are on when the side blocks are removed the gun will quickly become encased in urethane!

⚠ WARNING

Point gun side blocks down, away from all personnel. Existing fluid pressures could cause material to exit the side blocks with considerable force.

Probler P2 General Information: Maintenance

- Take the side blocks off by removing screws.



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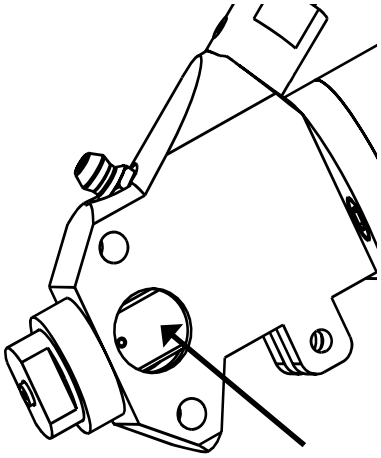
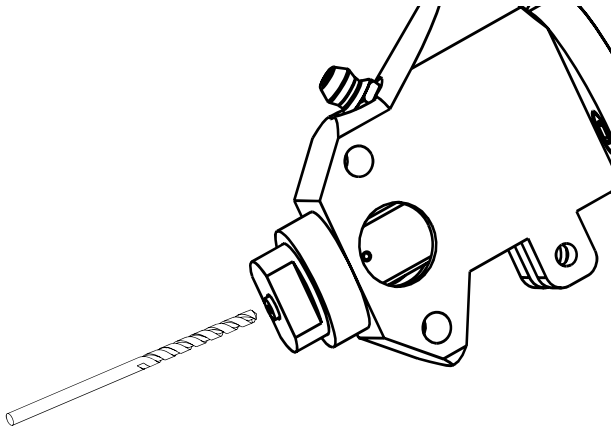
- Examine the sides of the mixing chamber for scratches and/or material build-up. Carefully, without scratching the seal surfaces (sides), remove any accumulated material. Solvent can be used to wash accumulated material off of chamber, side blocks, etc. Keep the gun chamber tilted toward the ground so that solvent does not run back into gun. Certain solvents will attack o-rings on chamber shaft causing swelling and deterioration of o-rings.

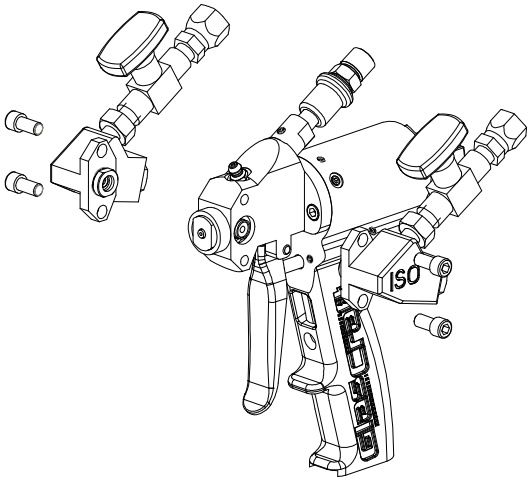


- Place generous amounts of high quality, white lithium grease (Part No. 117773) in each side of the gun front housing and on the side block seals.

- Use correct size drill bit to clean out the mixing chamber exit passage. Use correct size drill bit to clean the inlet side holes of the mixing chamber taking care not to scratch the mixing chamber's polished surfaces (refer to the drill chart).



- Re-assemble the side blocks and tighten the screws. Grease should appear at the tip of the mixing chamber.



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DO NOT open the air switch on the gun because this will purge grease from the gun. The grease should be allowed to remain in the gun overnight.

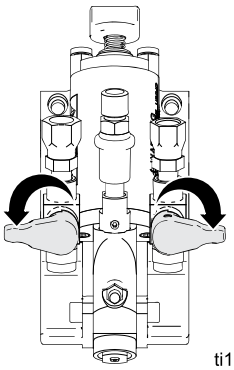
Probler P2 General Information: Maintenance

Daily Shut-Down

For experienced users

Once you have used the gun with a product and system, and you have become comfortable with techniques on how all the variables are affecting your operations and maintenance requirements, Daily, Weekly, and Monthly maintenance requirements can be addressed specific to your operation.

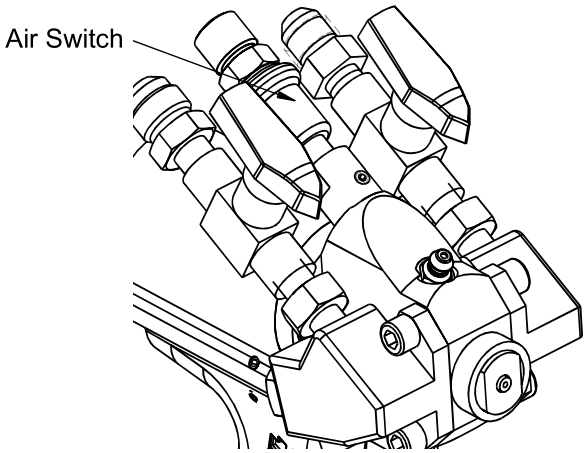
1. Turn the ball valves off, activate and deactivate the gun 5 - 6 times to purge residual pressure.



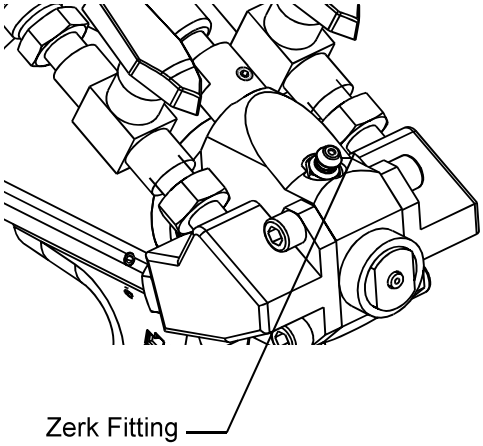
2. Engage piston lock.

3. Drill out the chamber insert snout with correct size drill bit for insert (see drill chart).

4. Pull slide valve halfway back to limit the air purge.

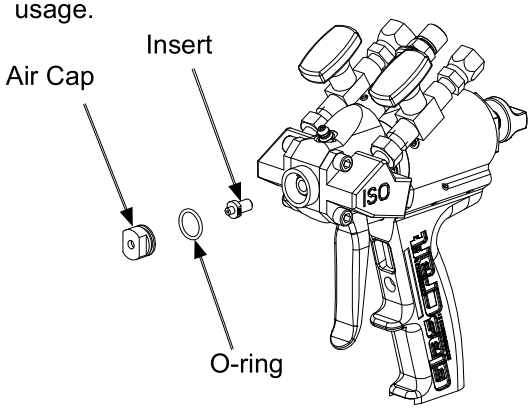


5. Use grease gun (Part No. 117792) to inject white lithium grease (Part No. 117773) into zerk fitting until a light mist of grease is purged through the snout. Shut off the air purge.



6. Remove the air cap and set to side. If solvent soaking is required, remove the o-ring before soaking.

7. Remove the snout insert and soak in solvent until next usage.



Daily Start-Up

8. Clean the snout insert. Be sure both, the face and bottom flat are clean. Drill the snout bore out with the correct size bit for snout (see drill chart).

9. Clean the inner bore of the chamber. Drill out the chamber snout inlet bore as required.

10. Install the snout insert.

11. Install the air cap on to the chamber. Tighten finger tight until the cap bottoms out. Snug down with a ½ in. wrench. This does not require high torque. Over tightening can result in chamber damage.

Probler P2 General Information: Maintenance

Refer to specific system user manuals for complete system installation.

Parts Replacement Procedure

⚠ WARNING

Before attempting to perform any maintenance on this gun OR before removing the side blocks, make certain that both gun material valves are in the OFF positions and trigger several times to depressurize fluid in gun!

If the material valves are on when side blocks are removed, the gun will quickly become encased in urethane!

1. Read each procedure entirely before beginning and refer to the illustrations as needed.
2. Flush and clean all chambers and passages as they become accessible.
3. Clean all parts before assembly.
4. Replace all o-rings and seals with new parts from the appropriate kit.
5. Inspect all parts for wear or damage and replace as required with new *genuine GlasCraft replacement parts from your authorized GlasCraft distributor.*
6. Inspect all threads for wear or damage and replace as required.
7. Tighten all threaded parts securely, but not excessively, upon assembly.
8. Lightly lubricate all o-rings and threads with grease (Part No. 118665).
9. Check all springs for resilience. They should return quickly to their original (new) length.

Routine Care

⚠ WARNING

Before attempting to perform any maintenance on this gun OR before removing side blocks, make certain that both gun material valves are in the fully OFF positions and trigger several times to depressurize fluid in gun!

If the material valves are on when side blocks are removed, the gun will quickly become encased in urethane!

It is recommended that the following service be performed on a daily basis.

1. Clean the gun using a brush and an appropriate clean solvent.
2. Inspect the side block seals making certain they are clean and free of scratches, nicks or foreign material. Clean and replace as required.
3. Remove, clean or replace the filter screen.
4. Maintain a reasonable stock level of “wear” items such as seals and o-rings. (see Service & Repair Parts Kits listed in Parts & Illustrations section.)
5. Grease gun daily to prevent 2 component curing and keep fluid passages clean. Purge air carries grease mist through air chamber and impingement ports then out the mix chamber nozzle, coating all surfaces. Use Part No. 117773 grease.

Probler P2 General Information: Maintenance

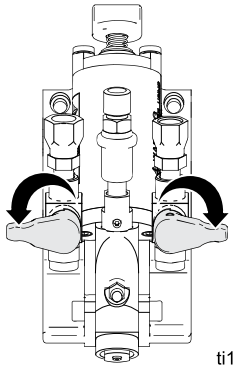
Piston Lock Adjustment and Installation Procedure

The P2 gun piston throw is factory set and as a rule, should not require adjustment. The piston throw refers to how far back the air piston will travel when the gun is triggered. Proper throw adjustment will align the mixing chamber side ports with the side block seal thru port.

Determine if the piston throw is correct:

1. Follow the **pressure relief procedure** on page 15 and disconnect material hoses from the gun.

2. Turn the material ball valves to the OFF position.



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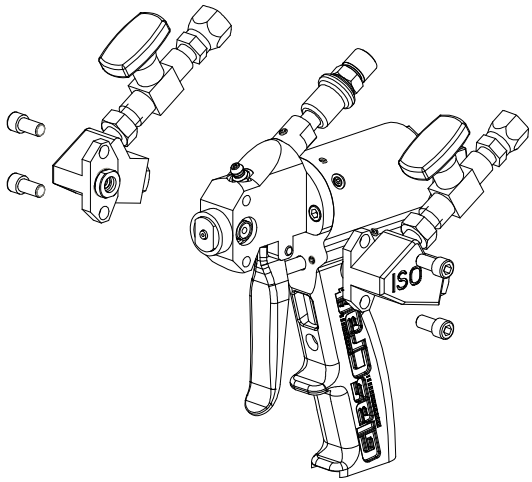
3. Verify that the piston lock cap has been tightened and fully threaded into the gun.

4. Remove the side blocks.



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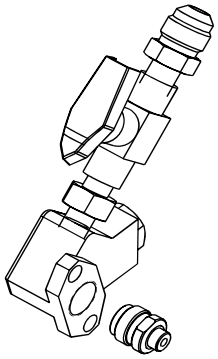
5. Remove one of the side block seal housings, from side block. Leave the seal (34) in housing and rinse with suitable solvent.



6. Place the side seal housing in the gun head so the face of the seal sets against the mix chamber.

⚠ WARNING

If the material valves are on when side blocks are removed, the gun will quickly become encased in urethane!

7. Turn the gun trigger air supply on , then trigger the gun.

The purge air will not shut off with the side block removed.

8. If the impingement port is not fully visible through the side seal housing turn the trigger-air off and trigger the gun to relieve pressure. Use a 9/16 in. open-end wrench to adjust the adjustment nut in the appropriate direction. Repeat steps 7 and 8 until it is adjusted properly.

9. If the impingement port on the mix chamber is fully visible through the side seal housing (either on center or slightly forward), the piston lock adjustment nut is properly aligned.

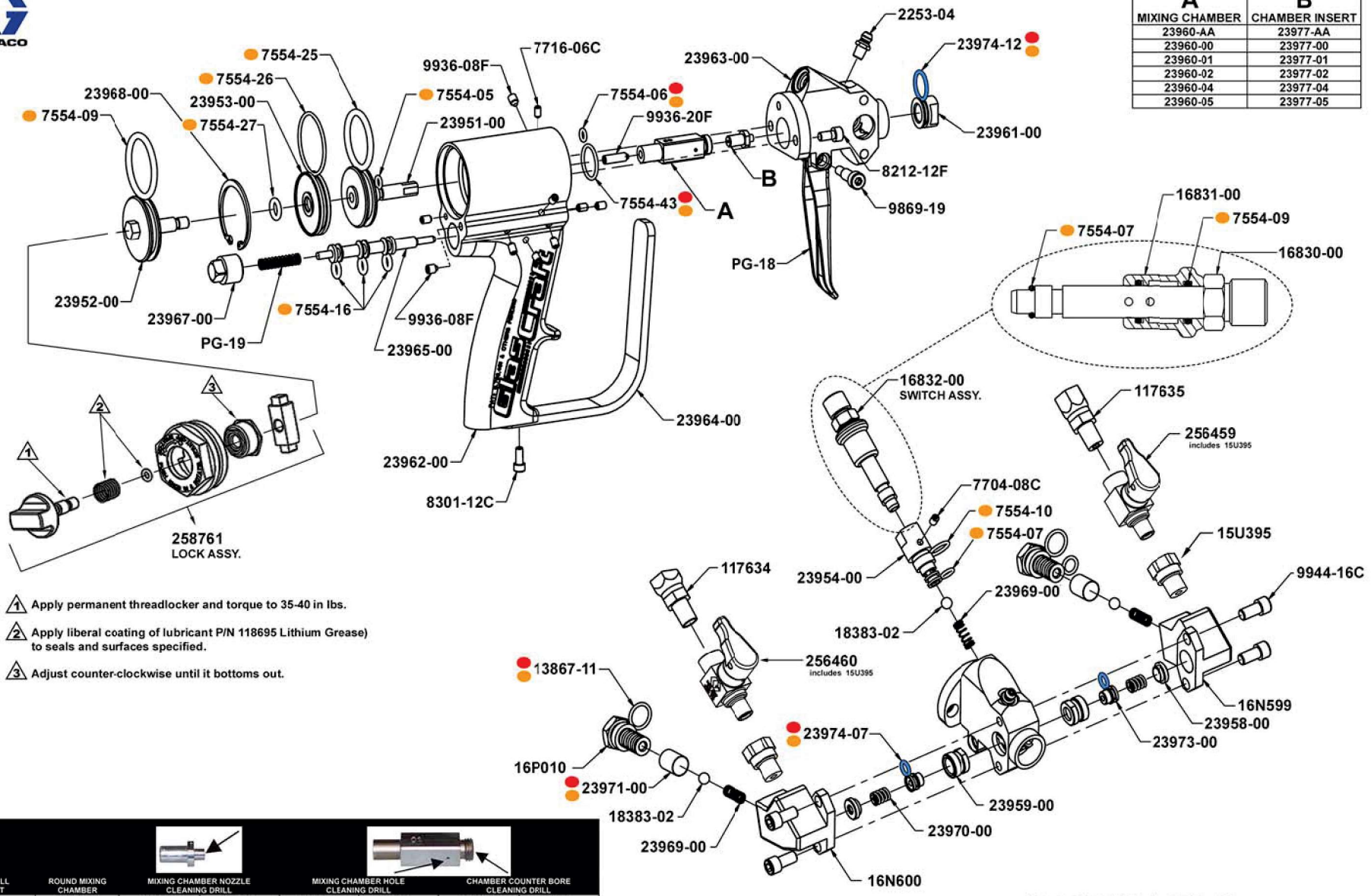
Non-permanent thread locker can be applied to the adjustment nut if necessary.

10. Reassemble the gun.

Before each use: Verify that the piston lock assembly is installed and working properly.

- Engage piston lock.
- Pressurize the system to working pressure.
- Open material ball valves.
- Point the gun in a safe direction and trigger gun. No material should flow from gun tip.
- DO NOT USE IF IT IS NOT WORKING PROPERLY.

P2 Gun After Oct 2012



A MIXING CHAMBER	B CHAMBER INSERT
23960-AA	23977-AA
23960-00	23977-00
23960-01	23977-01
23960-02	23977-02
23960-04	23977-04
23960-05	23977-05

1. Apply permanent threadlocker and torque to 35-40 in lbs.
2. Apply liberal coating of lubricant P/N 118695 Lithium Grease) to seals and surfaces specified.
3. Adjust counter-clockwise until it bottoms out.

DRILL KIT	ROUND MIXING CHAMBER	MIXING CHAMBER NOZZLE CLEANING DRILL		MIXING CHAMBER HOLE CLEANING DRILL		CHAMBER COUNTER BORE CLEANING DRILL	
	23960-AA	14963-28	0.033	14963-29	0.022	14963-27	0.043
30059-00	23960-00	14963-30	0.049	14963-24	0.035	14963-13	0.0595
30059-01	23960-01	14963-11	0.057	14963-16	0.042	14963-14	0.067
30059-02	23960-02	14963-12	0.071	14963-17	0.052	14963-46	0.081
30059-03	23960-03	14963-15	0.086	14963-13	0.059	14963-19	0.094
30059-04	23960-04	14963-19	0.094	14963-14	0.07	14963-51	.1094
30059-05	23960-05	14963-20	0.116	14963-15	0.086	14963-52	.1338

DRILL PIN VISE 17672-00

SERVICE KITS

No Longer Avaliable ~~30017-00 GUN HEAD KIT~~

23975-00 STANDARD SERVICE KIT

mcc-0012 Rev. 10/12

P/N 30148-01

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BASIC GUN ISSUES: CAUSES AND CURES

Side Wipe Seal Issues:

One of the main problems I see is side wipe seals getting glued into the side wipe nuts, either A side, B side or both. The side wipe seals **must** be free floating and have spring pressure to seal them against the mixing chamber and hold back 2000 plus psi of fluid pressure.

With no spring pressure, fluid (both A&B in this case) could leak into the gun head when you are on the trigger and purge/spit material out onto your project through the purge air as soon as you let off the trigger. If you coat over the A or B product that just spit out onto your project through the purge air, it will off-gas due to the materials exothermic heat reaction thus causing bubbles.

The picture below shows two side blocks next to a new side wipe retaining nut and side seal (this is what the side seal should look like) Notice the side wipe is fully extended through the retaining nut as it should be.

Side seal spring pressure is a must. The A side seal will glue itself together over time and needs to be cleaned. If it is not sealing against the mixing chamber then it will fill the head of your gun with material if the ball valve is on and the purge air is off. Rule of thumb; always turn your purge/gun air on before you turn your ball valves on so any material leakage will blow out the tip instead of filling your gun.

When you install the side blocks look for the gap between the block and gun head.

This is the extended side seal telling you there is spring pressure on it. The other test is to push on your side seal before install to verify that the seal is free and has spring pressure on it.

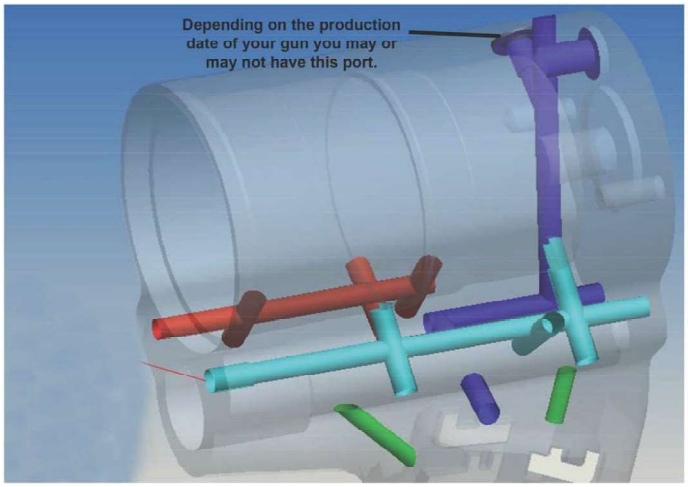
Abuse Issues:

Another thing we see is our share of abused spray guns. In some cases they look like they were beat on with a hammer. Such as the air cap shown in the next picture. This kind of damage can distort the air cap, leading to leakage past the o-ring seal. The P2 gun is over $3000; it is designed for high pressure and is o-ring sealed with an anodized aluminum body. If it is leaking somewhere, over tightening will not generally help. **And… if you have to hammer on it, you are doing it wrong!**

Check Balls and Springs (Screen Housings and Air Slide Assembly):

The check balls and springs for the air slide valve and the screen housings are there for a reason. They should be replaced with new parts if there is an issue or a crossover. The springs and check balls are there to stop back flow of material in the event of a failure. In the side blocks the check balls stop material flow at the side block in the event of a cross over; in the air slide it prevents material from entering line air line and traveling up the air hose and back to the machine.

Gun Body Air Passages:



Clean all air passages with correct sized drill bits. As you can see by the drawing there are air passages throughout the entire gun body. Each air passage has a specific function. If an air passage is even partially blocked is can create issues with the proper functioning of your gun. It can cause the gun function to seem sluggish or even cease to function at all.

Mixing Chamber Issues and Dressing:

This is a good example of a mixing chamber that was in rough shape and took some work to get a good surface back. I use 320 grit then 1000 grit on a piece of glass (glass provides a good flat surface) with light oil.
There was large circular pitting that is typical of a mixing chamber that was left in RS-98 or NMP for an extended period of time. The mixing chamber is one of the only ferrous metal parts on the gun and will rust and pit if left to soak in either of the solvents as they are oxidizers. I always clean the mixing chamber by hand as opposed to soaking it in polysolvent.

The top mixing chamber in the photo above shows a trashed chamber that sat in the juice/solvent too long, it is shown next to the one I'm surfacing, which at the time of the photo was almost done with its surfacing and was salvageable. Below is the finished product ready for use.

Shut Down:

The proper procedure for greasing the gun on shut down; switch to retract/park and bleed/spray the pressure down to 500 psi to park your pumps in the bottom position. With the ball valves off, trigger the gun rapidly several times to purge/clear the tip. Turn the air down about half way with the gun slide valve.

Grease the tip until grease starts to purge from the tip; shut the air off and the gun is shut down. The grease is there to seal up the gun and prevent any A-side material from hardening, not necessarily for lubrication. Use only white lithium grease as it is less reactive to the A material, petroleum grease will lock up with the A-side and become hard as a rock.

On start up in the morning remove the side blocks, the air cap and the nose of the gun. Wipe the excess grease off the mixing chamber and out of the gun nose, some grease is fine just get the majority of it. Use a new razor blade and clean the sides of the mixing chamber and clean the side holes and nozzle with the proper bits Inspect for scratches or damage and resurface as needed..
Install the gun nose and air cap. Before installing the side blocks, clean the gun screens if needed and check for side wipe seal spring pressure.

Air Piston and Its Adjustment:

To adjust the piston stop adjustment, push the air cap on the nose of the gun to the back position. The side hole in the chamber should be in line with the center of the side block screw holes. I use a side wipe nut and seal to line it up accurately and adjust the stop screw as needed.

I lock-tight the screw and once this adjustment is set I fill the hole with silicone. I check this adjustment on every gun that comes across my bench but it rarely changes once it's set and lock-tighted in.

The newer version of the P2 has a safety lock on the back and adjusts a little different using a 9/16 wrench but the principle is the same.

Correct adjustment, the side hole is in line with screw holes with the tip pushed all the way back to the stop.

Side Wipe Retaining Nut:

One of my most used cleaning tools is a simple scotch bright hone made from stiff coat hanger type wire with scotch bright pad wrapped to the desired size. Chuck it into your hand drill to clean/ polish various parts of the gun, pumps or whatever.

The other frequently used tool on my bench is a simple plumber's propane torch. Use caution, and common sense of course but a little heat applied to parts that are glued together with A-side and they will come right apart for reuse instead of replacement due to damage.

Block to Valve Adapter Fitting Cleaning:

Figure 1 shows the fitting in question between the block and valve.
We have come across this several time, the opening in the adapter fitting ends up with a buildup of material inside its orifice. If the side block is suspected to have an issue internally make sure you remove the fitting when cleaning the side block as you can end up with the same buildup shown in the photo on the next page figure 2. This fitting as you can see is nearly completely blocked off.

Figure 1

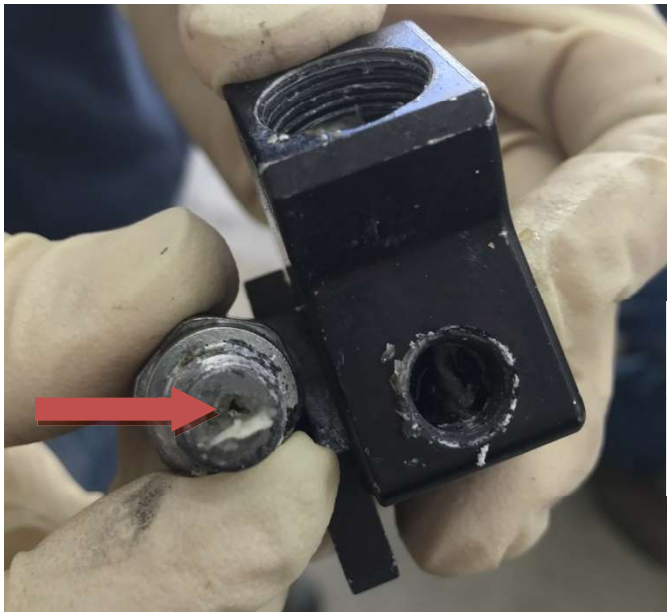


Figure 2

There is a learning curve in all trades. This is the tool of the trade, it sprays glue essentially. The tech needs to know and understand the operation and maintenance of the gun and keep A-side material as your friend not your enemy or it will give you problems. **Pam Cooking spray should be used on the exterior of the gun. The Pam will act as a release agent between the gun and any material it comes in contact with, making cleanup a lot easier.**
Remember: A clean tool is a happy tool and the spray gun is a tool of this trade.

IPM IP-02 PUMP INSTALLATION AND SERVICE

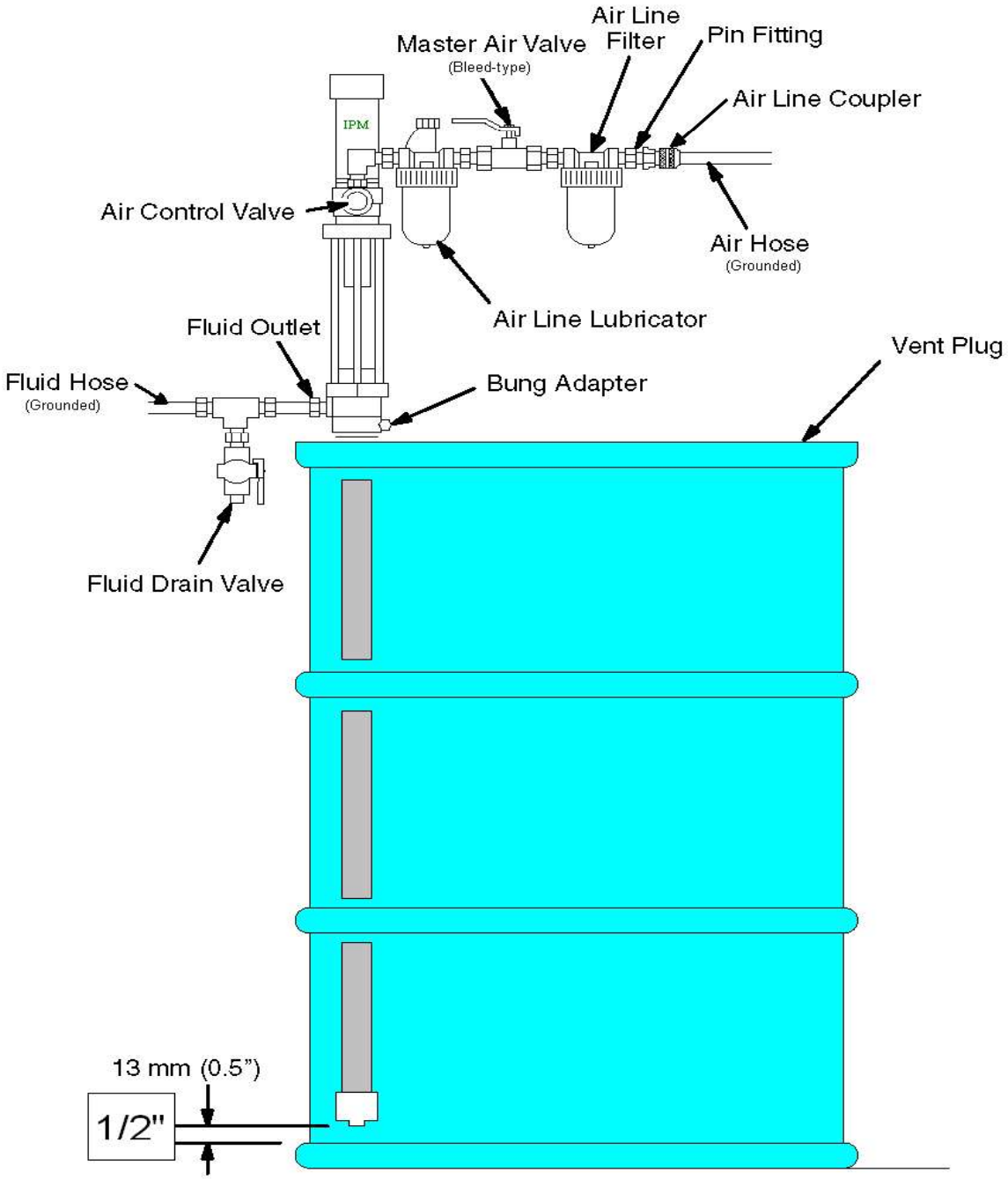


Figure B

Figure B depicts only a typical installation providing a guide for your reference but many other installation methods can be used based on your specific application. Some parts shown are not included but are sold separately. Feel free to call your **Local Distributor** for assistance.

2.1 Installation procedures

Install the necessary accessories in sequence using **Figure B** (page 8) as a guide. An air control valve (IPM part #601805) for controlling air flow is required. To minimize the risk of serious injury such as splashing/spraying chemicals on the skin, in the eyes or injury from moving parts, install the following accessories in your system.

1. **Bleed-off master air valve**
   This valve will relieve the air trapped in the system after pump operation is ceased. Air that is trapped between this valve and the pump can cause the pump to reciprocate un-intentionally or un-expectantly and may cause injury to the operator.

2. **Fluid Drain Valve**
   The fluid drain valve is installed to relieve fluid pressure in the pump, hose or at the dispensing valve when pump operation is ceased. The relief of pressure by the dispensing valve, which at times is inadequate if there is a clog or other restriction in the hose or dispensing valve can be achieved by using this fluid drain valve. Always use a metal valve for grounding purposes.

Lubrication

Connect an air lubricator to help achieve maximum pump longevity. The in-line lubricator provides proper lubrication to the air motor during operation. Next, install a bleed-off master air valve on the system. This valve is required on your system to relieve trapped air as explained above.

Air filters help to remove dirt and foreign particles from the supply air. Water moisture will also be trapped within this filter. Be sure to release the trapped water daily as a good maintenance practice. Connect a grounded air supply hose for main air supply.

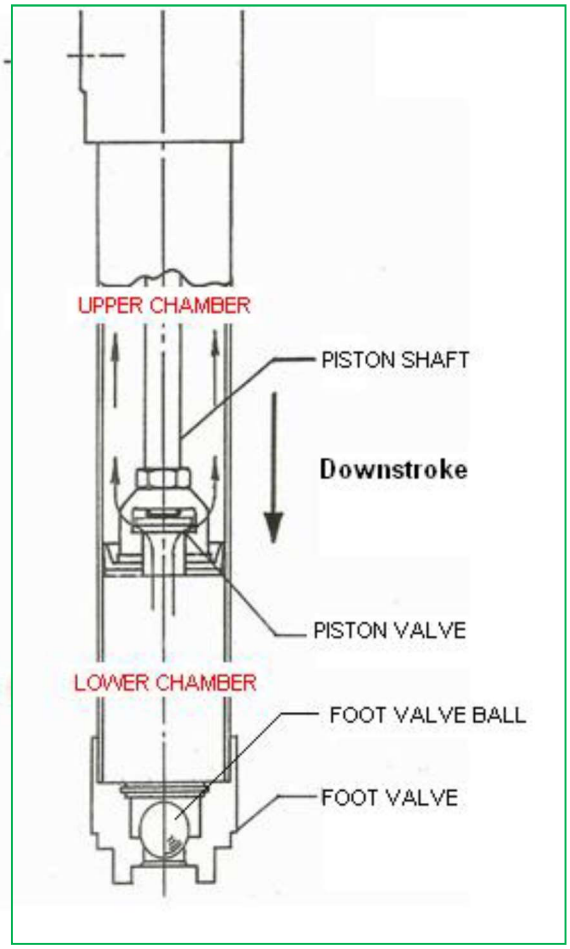
For the fluid section, connect one fluid drain valve directly after the outlet of the pump. Be sure to connect it pointing downwards for safety. Connect a grounded fluid hose to the fluid outlet 3/4” NPT (female).

Ensure that installation is fully completed before proceeding with start up operations.

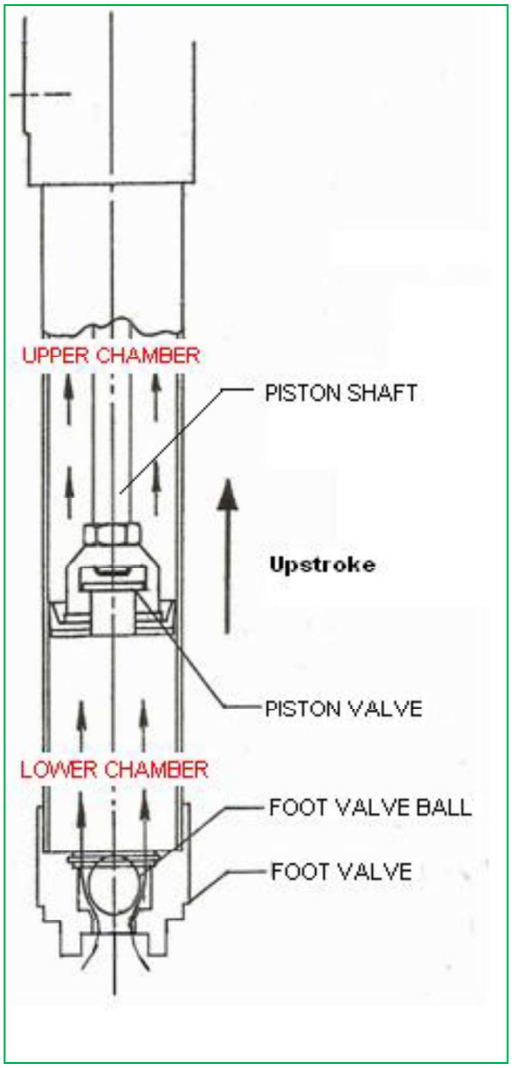
Ensure grounding of the pump and accessories is completed before beginning pump operation. Observe all OSHA and other safety regulations.

3.0 OPERATIONS

3.1 Internal pump schematics

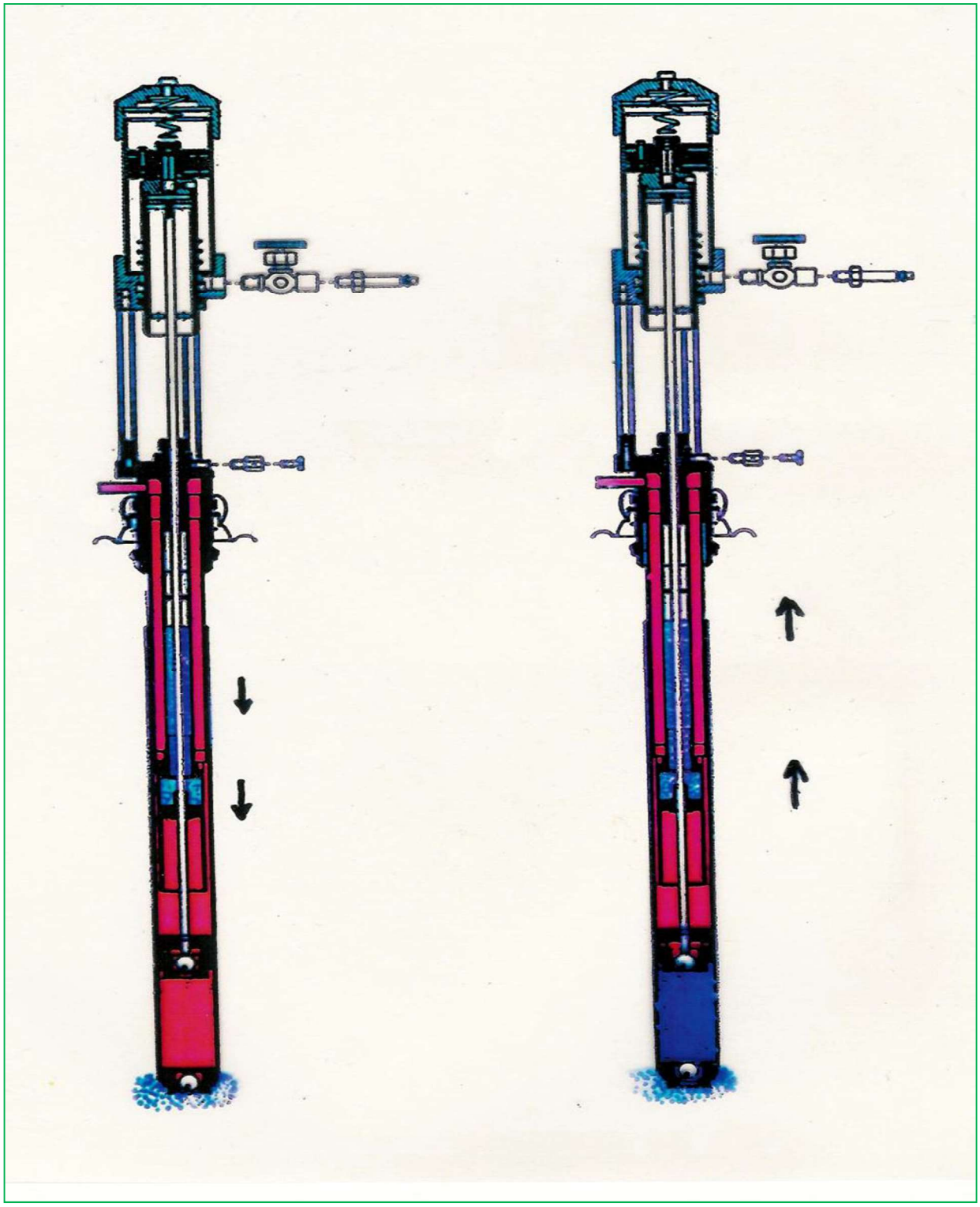


Downstroke: When the PISTON SHAFT is in the downstroke motion, the fluid that is present in the lower chamber of the cylinder moves the FOOT VALVE BALL into the closed position. The entrapped fluid then lifts the PISTON VALVE up as it flows into the upper chamber and to the fluid outlet in **Figure B** (page 9).



Upstroke: During the upstroke motion, the PISTON VALVE is closed and fluid present in the upper chamber is transferred to the outlet port. At the same time, the FOOT VALVE BALL is opened by incoming pressure and fluid is then drawn into the lower chamber.

Every IPM transfer pump is a 2 stage pump system. They are designed to pump fluid on both the up stroke and down stroke during operation for optimum efficiency and output.



3.2 Start up and adjustment of transfer pump

1. Ensure that the air control valve is closed then open the bleed-type master air valve. Connect the quick disconnect coupler to the male fitting.

2. For safety, open the dispensing valve slowly, then drain fluid into a grounded metal container. Ensure metal-to-metal contact is maintained between the container and the valve at all times.

3. Adjust the air control valve slowly for just enough pressure to start running the pump. This is to prime all air within the system. After all the air has been expelled from the lines, close the dispensing valve. During the priming of the pump, the pump operates when the dispensing valve is opened and stops when the valve is closed.

4. Turn the air regulator slowly until sufficient flow from the dispensing valve is achieved. Remember to always run the pump at the lowest possible speed necessary to achieve what is desired. Never exceed the maximum working pressure of any component in the system.

5. The pump should not be left to run dry of the fluid being worked upon. When running empty, the operating speed will rise rapidly, increasing the chance of damage to the pump and/or components. During operation should the pump be found to run too fast, stop it immediately and ensure the fluid supply is not too low or the drum is empty. If air has gone into the system, repeat the priming procedure. Ensure that all air has been expelled from the lines before beginning operation again. Flush the pump or leave it filled with a compatible solvent when not in use.

6. Always follow the Pressure Relief Procedure should the pump be put away for any period of time or during system shut off at the end of the day.

3.3 Shut down procedure

1. Relieve the air pressure with the air regulator.

2. Open the air needle valve.

3. Bleed off residual pressure in the system with the bleed-off master air valve.

4. Open the drain valve to relieve fluid pressure in the system. Use a container to collect the fluid drained off. **Be especially careful as the fluid may still be under pressure**. Hold the metal fluid drain valve against the side of the grounded container while relieving the pressure.

Note: For long periods of shut-down, flush the pump thoroughly with an appropriate cleaning fluid to prevent solidified chemical build-up.

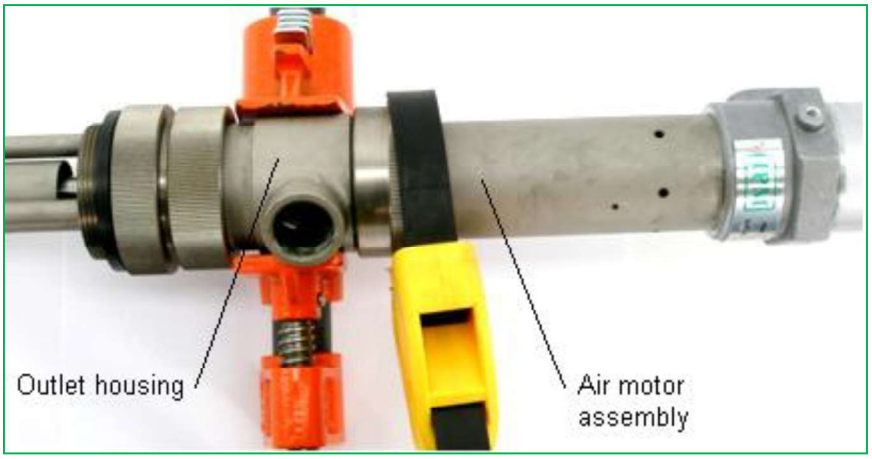
4.0 MAINTENANCE & REPAIR

4.1 Air section disassembly

1. Follow the *Procedure for Pressure Relief* (page 5). It is very important to relieve all air and fluid line pressure as well as pump pressure before proceeding to the next step or injury can occur.

2. Remove inlet and outlet hoses. Place the pump in a vise or other holding device. If you know that you just need to work on the air motor, the pump can simply be left in the drum it is operating in.

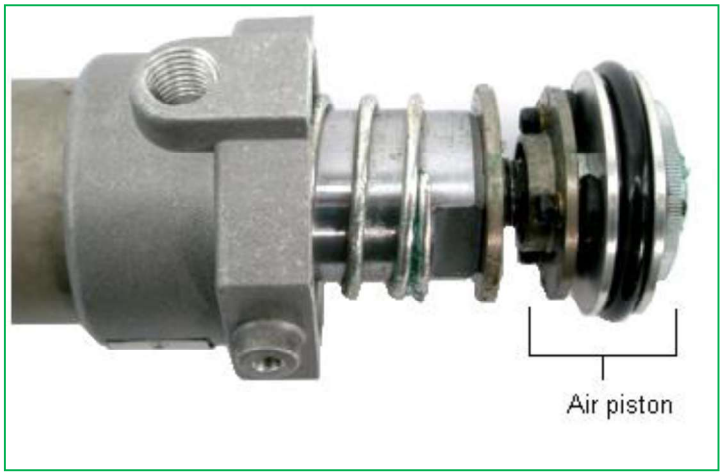
3. Clamp on the housing with the outlet hole against one of the jaws of the vice. When clamping the housing- either the air motor assembly or the lower tube and/or foot valve can be removed.



Use a strap wrench to remove the air motor assembly.

The pump assembly can be removed from the air motor by disengaging the Piston Rod.

Remove the air cylinder either by hand or by using a strap wrench.

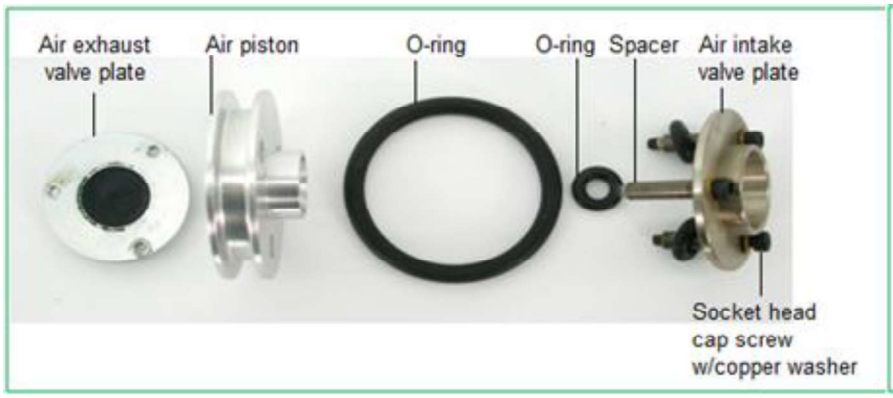


Air motor assembly and piston rod with the air cylinder removed.

Place a pair of channel-lock pliers on the knurled area of the exhaust valve plate and a crescent wrench on the flats to remove the air piston assembly. Examine the spring in the air motor cap to ensure that it is not damaged or loose. Examine the gasket in the air motor cap and replace as needed. This gasket seals the cylinder cap to the air cylinder. Also inspect the lower return spring to ensure it is secured correctly into the air motor base assembly.

4.2 Air motor assembly

Assemble the air motor assembly in reverse order from above procedure. Ensure all parts shown in illustration below are included and in operable shape. The air exhaust valve plate and socket head screws require the use of Loctite-222 on the threads to ensure they do not vibrate loose. It is also important to check the rubber stop in the air exhaust valve plate to ensure it is secure. Tighten the screws to 10-14 inch pounds.



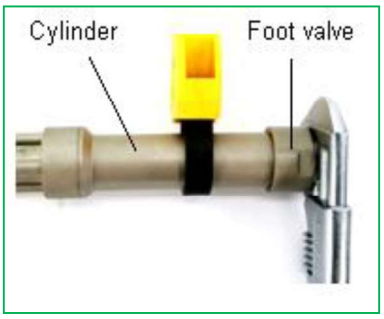
1. Assemble the air piston assembly (use Loctite-222), with washer onto piston rod. Hand-tighten only.

2. Place O-ring inside the machined groove in the air motor base. Place gasket in the top of the air motor base with spring centered inside the gasket, resting on the air motor base. Slide the piston rod and air valve assembly in to the air motor base.

3. Insert the conical spring into the machined groove in the air cylinder cap followed by the square cut gasket. Clamp the air motor base into a vice, using a strap wrench to re-assemble the air cylinder and air cylinder cap to the air motor base. Hand-tighten only the air cylinder cap so as not to damage the gasket.

4. Place the connecting ring around the connecting rod housing and hand-tighten.

4.3 Fluid section disassembly



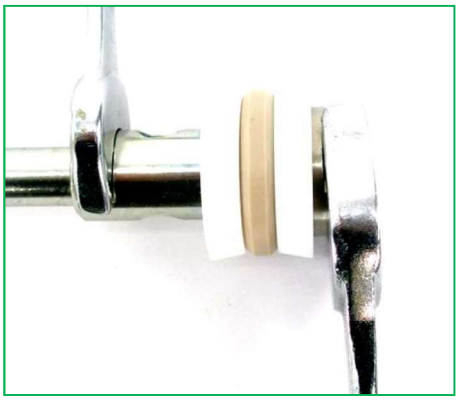
1. Remove the foot valve while holding the cylinder with a strap wrench.

2. With the upper air motor assembly already removed, you should be able to simply push from the upper ball end the complete assembly out the bottom of the lower section.

3. Use two wrenches and dismantle the upper pump section. Note the orientation of the Teflon cups. One faces up, followed by a wear ring in the center and the second cup faces down followed by a lower support washer. Use Loctite-222 when re-installing.

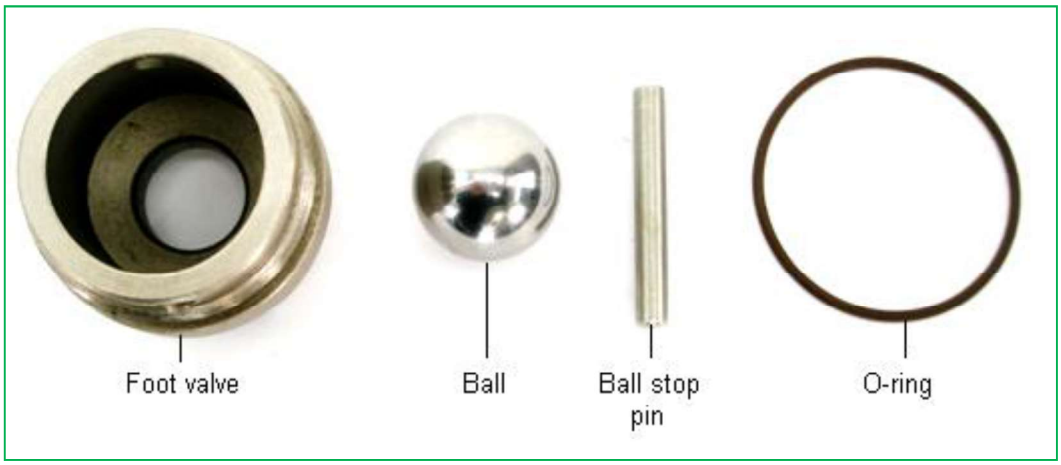
Breakdown of upper portion of the lower connecting rod assembly.

Breakdown of internal foot valve.



Internal foot valve disassembled. Clean, inspect or replace if necessary these components before re-assembly. Use Loctite-222 when re-installing.

After the lower piston rod is inspected and proper parts replaced/cleaned as needed, inspect the lower body assembly and make sure that they are also clean and free from any scratches. Grease and push this assembly back up from the bottom into the pump's cylinder just far enough to re-attach the foot valve.



Lower foot valve parts. On the **stubby** version of the IP02 pump there are ¾" female pipe threads under the foot valve- on the **drum length** there are not. Should you need to extend into your container farther it is recommended to install a cylinder extension tube to keep the foot valve at the lowest possible point.

Be sure to inspect, clean and replace any of the above items if needed. You will need to re-assemble the foot valve assembly in reverse from the way that you removed it.

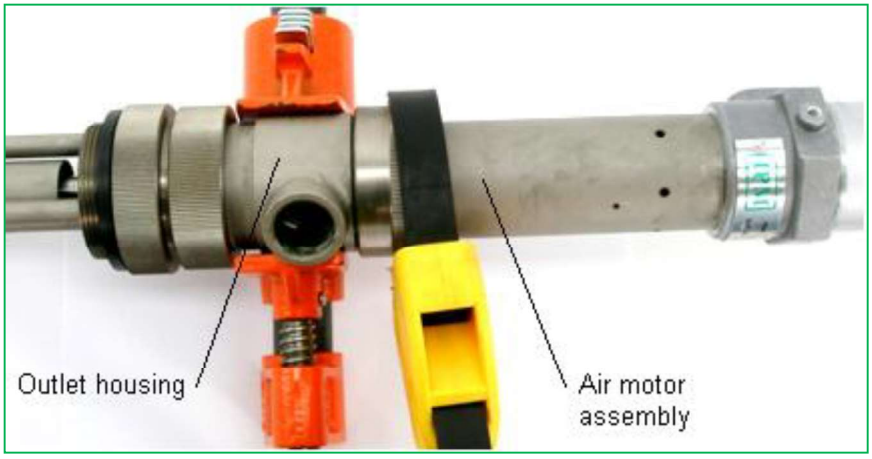
4.4 Securing the fluid section to the air section

The piston rod is actually inside the air motor assembly- which has been removed in the above illustration so you can see more detail.

Notice how the upper connecting rod is being inserted at an angle. This is to ensure that the ball on the end correctly engages the keyway slot in the photo on the left.

You will need to “hook” the ball in to the slot by moving the rod at an angle, then press it towards the center of the notch.

Note: the lower section will need to have the piston rod extended and the air motor will need to be in the down position in order for you to have enough length to hook these two components together.

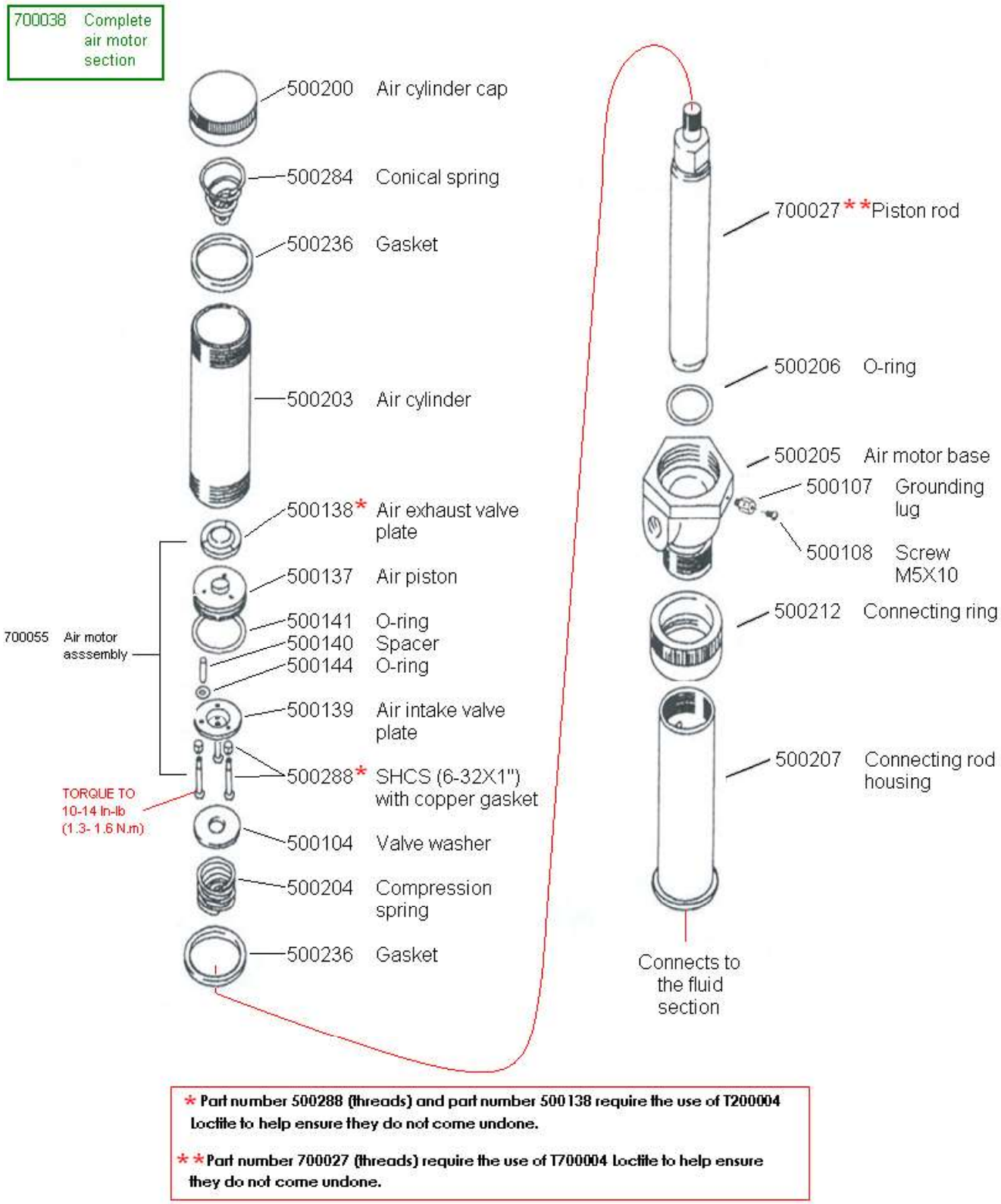


Connect the air motor section to the outlet housing as shown above.

You should now be ready to re-install the pump into your container. Attach the fluid hose first and tighten before attaching the air line and turning the air supply back on.

6.0 PARTS IDENTIFICATION

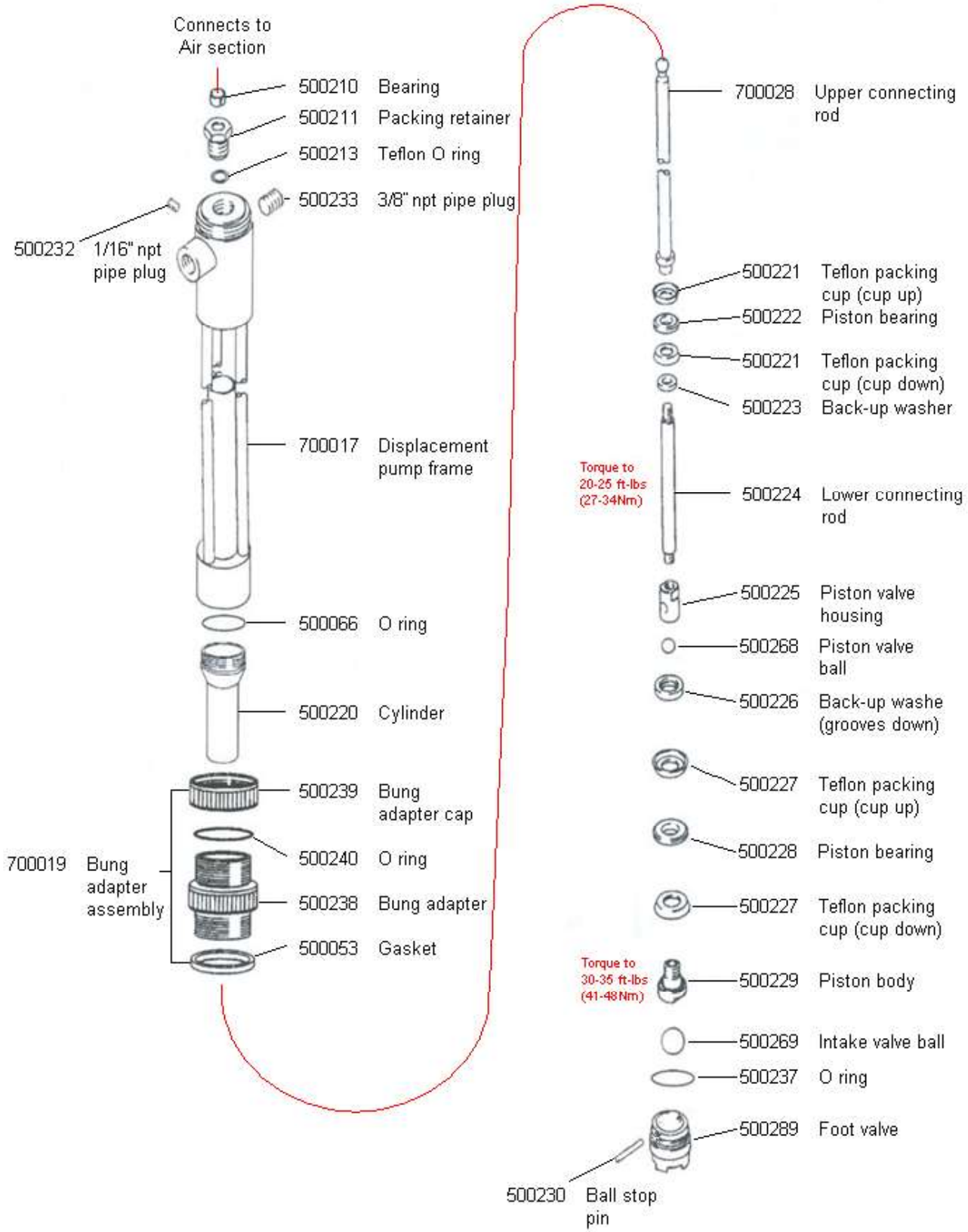
6.1 Parts drawing for air motor section
Pump # 810201



* Part number 500288 (threads) and part number 500138 require the use of T200004 Loctite to help ensure they do not come undone.

** Part number 700027 (threads) require the use of T700004 Loctite to help ensure they do not come undone.

6.2 Parts drawing for fluid section
Pump # 810201

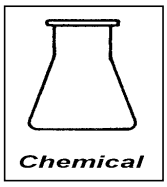
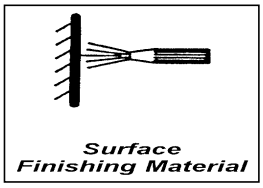
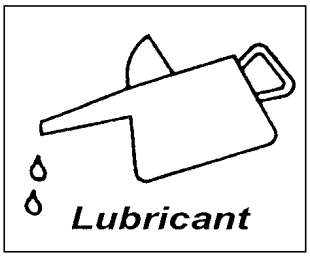


8.0 TROUBLESHOOTING

Problem	Causes	Recommended Solutions
Pump does not operate.	Air supply or pressure is inadequate. Air lines restricted. Dispensing valve is not open or clogged. Clogged fluid lines, valves, hoses or damaged air motor. Low or exhausted fluid supply.	Increase air pressure. Check for any restrictions in air line. Open and/or clear valve. Follow pressure relief procedure to clear obstruction. Service air motor. Replace parts as necessary. Refill fluid. Prime system and/or flush it.
Non-stop air exhaust.	Worn or damaged air motor gasket, packing, seals, etc	Service air motor. Replace parts as necessary.
Erratic pump operation.	Intake valve or packing worn off. Intake valve is not completely closed.	Refill fluid. Prime system or flush it. Clear obstruction and service pump. Replace parts as necessary.
Low output on upstroke.	Held open or worn intake valve.	Clear obstruction and service pump. Replace parts as necessary.
Low output on down stroke.	Held open or worn intake valve.	Clear obstruction and service pump. Replace parts as necessary.
Low output on both strokes.	Restriction in air lines or air pressure low. Closed or clogged valves. Fluid supply is insufficient or exhausted. Obstructions in fluid lines, hoses, valves, etc.	Increase air pressure or supply. Open valve or clear valve. Refill fluid. Prime system or flush it. Follow pressure relief procedure to clear obstruction.

9.0 TECHNICAL SPECIFICATIONS

Recommended application chart

Industry	Application	Viscosity Range(CPS)
	Alcohol	0-100
	Dye	0-1000
	Methyl Chloride	0-200
	Solvents	0-500
	Paint(Latex)	100-1000
	Paint(Oil base)	100-800
	Sealer(Wood)	100-800
	Stain(Oil base)	100-1000
	Anti-Freeze	30-100
	Die Lubricant	30-50
	Gear Oil	200-1000
	Lubricant	100-1500
	Mold Release Agent	30-100
	Oil	100-500

Air pressure requirements: For optimum pump performance, 80 PSI should be supplied to the IP02 series transfer pumps.

Pump viscosity guide

All calculations in Centipoise (cps)

IP01 series pumps: 1 – 2,000 cps
IP02 series pumps: 1 – 4,000 cps
OP series pumps: 1 – 4,000 cps
IP05 series pumps: 1 – 10,000 cps
IP10 series pumps: 1 – 20,000 cps

Calculations are based on the following general guidelines

- Inbound air pressure: 100 psi
- Pressure at dispense point: 0 psi
- Hose/pipe length w/smooth inner surface = L: 25 feet
- Hose size = D: ¾”
- Flow rate = Q: 2 gpm
- Viscosity = V: cps
- Pressure loss in hose/pipe (psi), P: $P = 0.0273QVL/D_4$

The above viscosity values are only general guidelines. Other factors should always be taken into consideration such as; dispensing valves, fittings, hose unions, elevation, outside ambient temperature, etc.

810201, 810202, 810203, 810204

Air Operated Fluid Pump

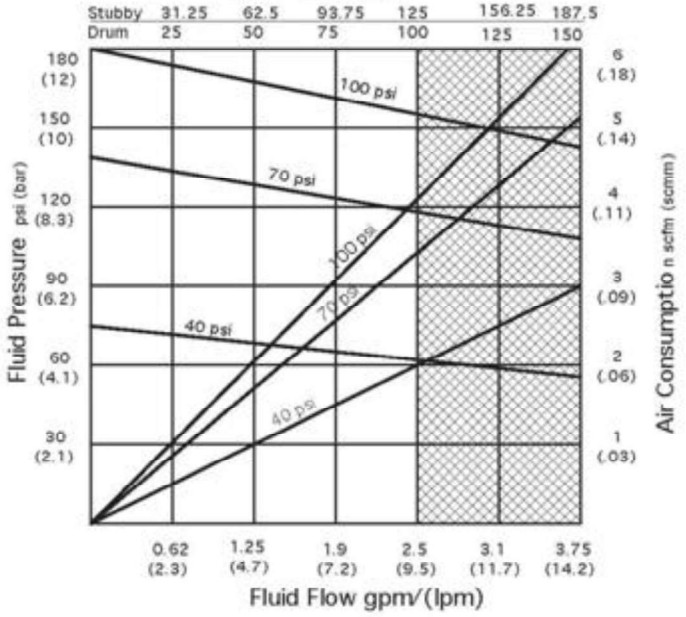
Divorced Design

Technical Specifications

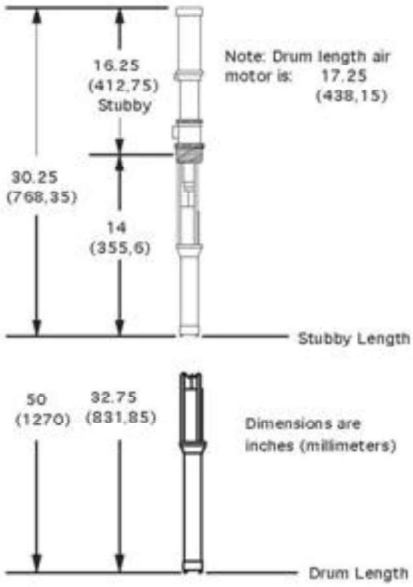
Fluid Ratio..... 2:1
Max. Output Flow (intermittent)(Stubby).....2.5 gpm (9.5 lpm)
Max. Output Flow (intermittent)(drum).....3.75 gpm (11.7 lpm)
Max. Output Flow (continuous)(stubby).....2.0 gpm (7.6 lpm)
Max. Output Flow (continuous)(drum).....2.5 gpm (9.5 lpm)
Maximum Output Pressure.....360 psi (24.8 bar)
Maximum Air Input Pressure.....180 psi (12.4 bar)
Air Inlet Port.....1/4 npt(f)
Fluid Outlet Port.....3/4 npt(f)
Fluid Inlet Port (stubby).....3/4 npt (f)
Rod & Piston Packings.....Teflon®
Other Seals.....Viton®
Rod & Cylinder.....Carbon Steel or Stainless Steel
Other Wetted Parts.....Carbon Steel or Stainless Steel
Weight stubby/drum.....11.5 lbs. (5.2 Kg.)/17 lbs. (7.7 Kg.)
Package Dimensions & Weight:
IP-02....4"x4"x54" (102mm x 102mm x 137cm) 19 lbs. (8.6 Kg.)
IP-02S..4"x4"x35" (102mm x 102mm x 889mm) 16 lbs. (7.26 Kg.)

Performance

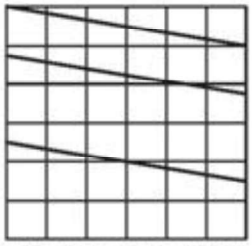
Cycles per Minute



Dimensions

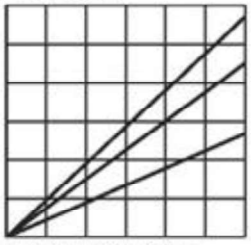


How to Read Performance



Pressure/Flow

1. Locate required flow along bottom edge of chart.
2. Follow vertically to bold line for input air pressure.
3. Follow horizontally to left edge of chart to read maximum available fluid pressure.



Air Consumption

1. Locate fluid flow along bottom edge of chart.
2. Follow vertically to bold line for input air pressure.
3. Follow horizontally to right edge of chart to read air consumption.

100 Series 2:1
Air Operated Fluid Pump

IPM's IP-02 series of pumps are specifically designed for use with difficult to handle materials. The immersed lower pump, tie tubes, and sealing bung bushing allow quick drum change without exposing the system to contamination and moisture.

- Carbon Steel or stainless steel construction for economy and durability
- Teflon® packings and Viton® seals for material compatibility.
- Available in tote, drum and stubby lengths.

Piston style air motor allows a compact pump design; best suited for use as a drum transfer pump.

Rotatable air motor coupling allows air inlet and fluid outlet to be orientated to any position.

Recirculation fitting allows material to be returned to the drum. Can also be used to pressurize the drum.

Separable bung bushing allows fast slip-in/slip-out drum change. Bushing is not part of the pump, so no need to disconnect hoses to rotate pump. Sealed design provides an excellent moisture barrier.

Full length wet cup prevents material from hardening on rod stroke area while changing drums. Extends seal life.

Immersed lower pump assembly maintains wetted rod and seal area, preventing material from hardening. Extends rod and seal life.

Typical Fluids Handled
*Polyureas
*Polyols
*Enamels
*Isocyanates
*Acid catylized finishes

Typical Applications
*Aerospace
*Wood furniture
*Automotive
*Transportation
*Petro-chemical

International Pump Manufacturing
Phone: 253-863-2222 Fax: 253-863-2223

3107 142nd Ave East Suite #106
Sumner, WA. 98390

Web: www.ipmpumps

Email: sales@ipmpumps.com

IPM IP-02 Transfer Pump Troubleshooting and Maintenance

Commonly occurring issues:

Pump does not operate:

- Air supply or pressure is inadequate or the air lines are restricted; increase air pressure and check for any restrictions in the air line
- Dispensing valve is not open or it is clogged; open and/or clear valve
- Clogged fluid lines, valves, hoses, etc; follow the pressure relief procedure to clear obstruction
- Damaged air motor; service and clean the air motor (The supply pump air motor is not so different than that of an air tool. With properly lubricated you can expect better performance and life out of the air motor)
- Depleted or exhausted fluid supply; refill fluid and prime the system or flush it

Non-stop air exhaust:

- Worn or damaged air motor, gasket, packing, seal, etc; service the air motor

Erratic pump operation:

- Intake valve or packing's are worn; refill the fluid and prime the system
- Intake valve is not completely closed; clear the obstruction and service the pump

Low output on the upstroke:

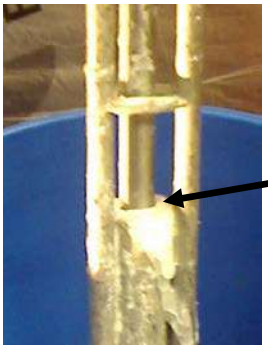
- Clogged or worn piston valve; clear the obstruction and service

Low output on the down stroke:

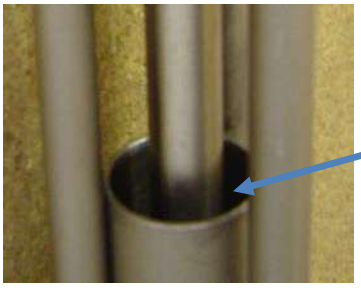
- Clogged or worn intake valve; clear the obstruction and service
- Restriction in air lines or pressure is too low; increase the air pressure or supply
- Closed or clogged valves; open or clear the valve
- Fluid supply is insufficient or exhausted; refill fluid and prime the system
- Obstructions in fluid lines, hoses, valves, etc; follow the relief procedure to clear the obstruction

Loss or Momentary Loss of Pressure:

- Material buildup in lower section of pump frame; (see photos below)



Check for buildup in this area of the lower section of the pump frame. A buildup of material here can make the pump sluggish and even stop working.



This is the area where the pump shaft goes into the lower section of the pump. The buildup can be on the shaft as well as inside of the tube section of the frame.

Turbo Liner

1 W. Cameron Kellogg, ID 83837 Toll Free: 1(877) 678-8726

Supply Monitoring;

We recommend that all spray machines be fitted or retro-fitted with supply material monitoring gauges. Most all of the higher end machines, such as the Graco Reactor 2 series, come with them now.

Supply monitoring is a very valuable trouble shooting tool. Placed between your supply filter and the machine it will tell you with a glance "do I have supply pressure" yes or no; no more guess work. If you have no supply pressure when troubleshooting it could be a pump failure or plugged supply filter.

When troubleshooting your system, always start at the head of the stream, the supply pump, and work your way down to the gun; verifying the results as you go.

I deal with tech calls daily and troubleshoot machine problems. My first question on a tech call is "do you have supply pressure?", if I get the "I don't know" answer then we could spend the rest of the day shooting in the dark and overlooking a simple supply problem that the gauges would have shown you.

The gauges will fluctuate as the supply pumps cycle and depending on specifics the cycle could be from 50-300. The A and B gauges will fluctuate at different rate due to the difference in viscosity of the A and B materials, this is normal.

As long as you have a minimum of 50 psi reading on the gauge at the low end of the cycle then you should have adequate supply to your

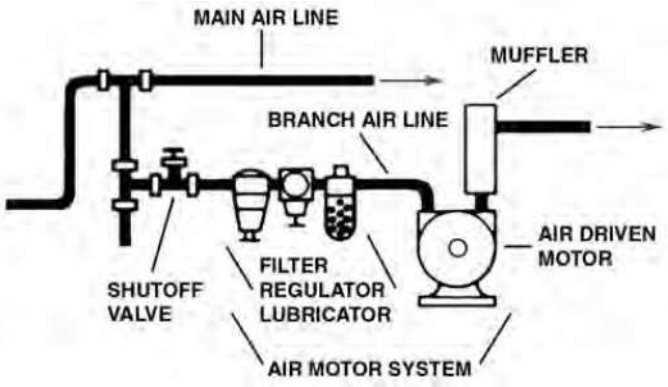
machine and will avoid a starvation scenario the will cause an off-ratio problem.

The attached picture shows a nicely plumbed retro-fit job. Machines will differ but with a little ingenuity and common hardware fittings you should be able to plumb in a clean and functional supply monitoring set up that will do the trick for minimal cost.

John Powers, Turboliner Tech. Dept.

2.0 INSTALLATION

2.1 Typical air motor set-up



This set-up represents only one of many possible configurations. Other set-ups are possible depending on your specific application.

3.0 OPERATIONS

3.1 Drum mixer operating tips

An 8" blade on the bottom of the mixer shaft is standard on each drum mixer to get maximum pull of heavy materials from the bottom of the barrel. Additionally, two 6” upper blades assist in pulling fluid from the sides of the drum for optimum mixing capability.

If you do not have a center bung in your drum, IPM has designed an off-set bung adaptor riser (IPM part #610067) that angles the mixer shaft away from the sides of the drum to allow proper chemical mixing. As a temporary measure, you can also take an 18" – 20” piece of 2" diameter threaded pipe and screw into your bung. Carefully bend/point the top of the pipe away from the center of the drum, tilting the bung for better mixer clearance.

The amount of air you will need to mix your fluids will depend on certain factors such as viscosity, mixing speed, specific chemical, temperature, etc. Typically, 10 - 20 CFM air pressure is sufficient for mixing operations. A 3/8” ball valve can be used effectively as a metering or speed control measure.

Proper blade rotation is important for the swing out style blade assemblies to function correctly. Looking from the bottom of the drum mixer, the shaft/blade rotation should be clockwise for proper swing-out of the blades.

Certain chemicals are the type that set up or seize the folding blades if allowed to solidify on the blade assemblies. **ENSURE YOU PERFORM THIS OPERATION IN AN AREA THAT IS WELL VENTILATED AND HAS NO FIRE HAZARDS.** If this should happen, an effective way to remove the hardened chemicals is to heat the blades with a welding or propane torch to burn the residue off. Since the blades are stainless steel, the heat will not adversely affect them. It is not necessary to heat the blades to a point they become red hot. Once the cleaned blade assemblies have cooled, clean the remaining debris from the assembly and lubricate with WD-40 or an equivalent lubricant, then test to ensure they swing freely for proper operation.

A few drops of oil in the air **inlet** port helps to lubricate the air motor. With proper maintenance, the air motor on this drum mixer will work efficiently for many years. If moisture is present in your air supply, muffler freezing can occur during longer mixing operations. If this happens, simply take the muffler apart and wash in warm water. Ensure the muffler is completely dry before re-installing it back on the air motor. Do not drop the air motor as the hex top cap is plastic.

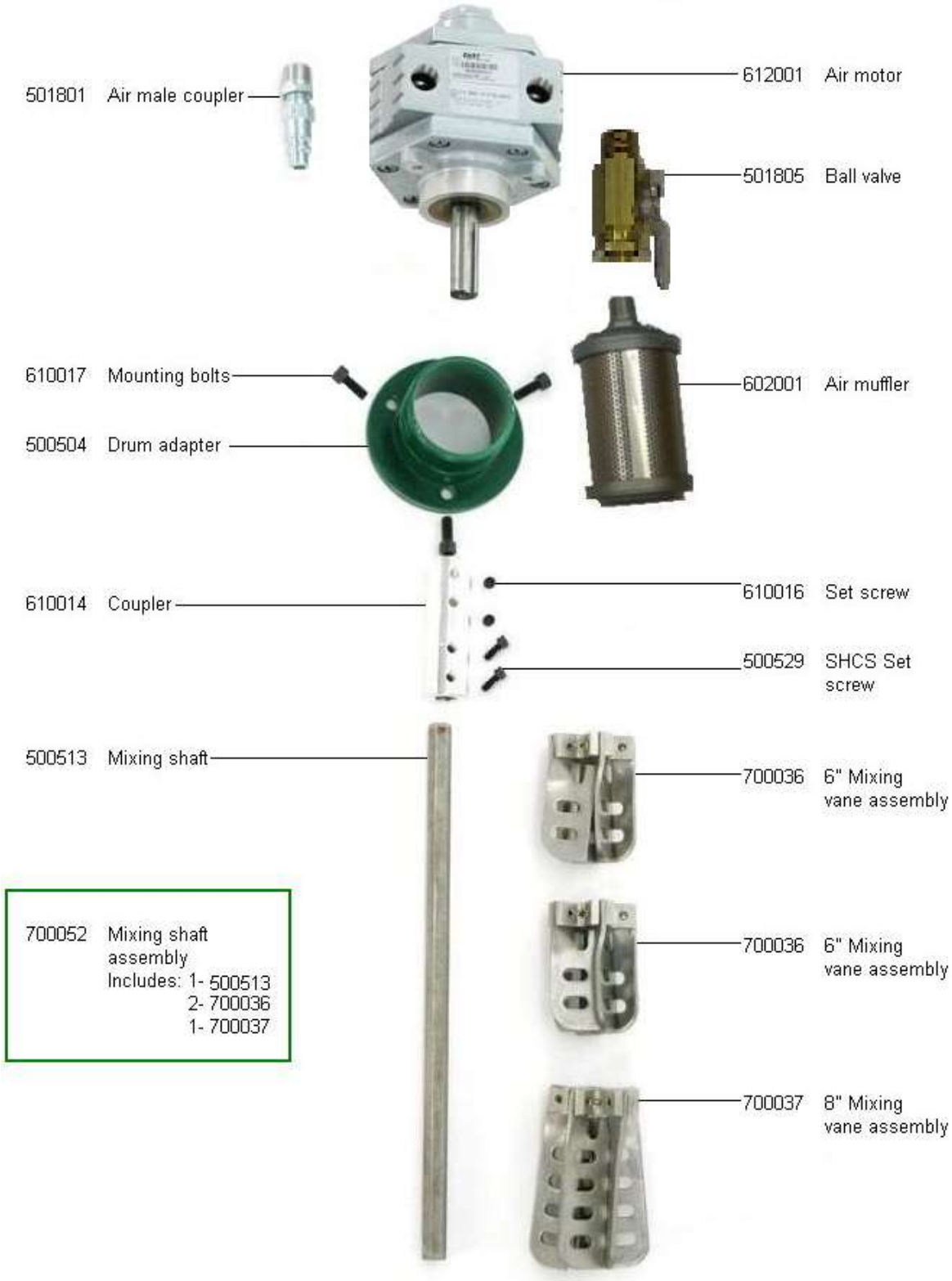
The DM-101 drum mixer is a very effective tool in 55 gallon barrel mixing operations. Complete fluid mixing can be achieved in short periods of time, usually within 30 minutes. The unique folding action design of the blade allows the mixing shaft to pass through the 2” bung in most drums and with two 6” and one 8” blade, optimum mixing is achieved throughout the drum.

3.2 Fluid mixing tips

- Do not pull too deep a vortex as this will entrap air into the fluid.
- Do not pull too shallow a vortex as this will cause unbalanced mixing of fluids.
- Tilting the barrel slightly will help reduce air entrapment.
- For proper mixing, the actual blades should be 1/3 the diameter of the drum. Example; a 24” drum requires an 8” mixing blade.
- Mix fluids for 30 to 45 minutes High Speed. This will help suspend/mix the pigments throughly into the "B-Side" component. Then reduce to a medium to low speed mix.
- The slower speed entrap less air into fluids during spraying processes.
- Never mix ISO fluid with drum mixer as this will entrap air into the chemical.
- “B Side” component in fast set coatings such as Turbo Liner's Polyurea Products require they be mixed with a paddle drum mixer Continuously.
- Always lubricate drum mixer motor for maximum life expectancy.
- Collapsible blades make IPM drum mixer compatible with any barrel.
- Use IPM’s new 13” mixing blade assembly for tote application.
- Use off-set bung adaptor riser to prevent mixing blades from contacting interior drum wall on drums with an off-center bung hole.

4.0 PARTS IDENTIFICATION

Parts illustration for air driven drum mixer (Drum length)
Part # 604001



5.0 TECHNICAL SPECIFICATIONS

5.1 Performance graph

604001
610072

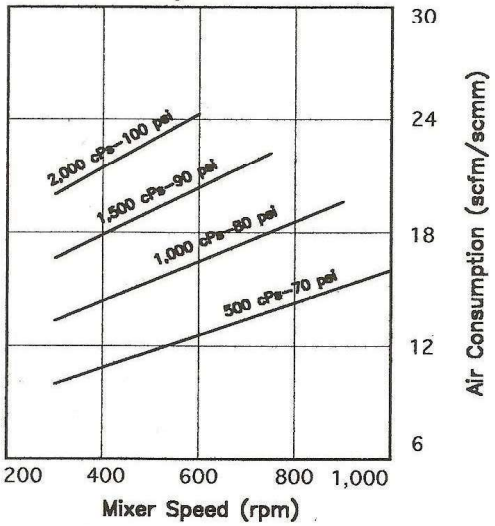
Air Operated Drum Mixer

International Pump Manufacturing
IPM
3107 142nd, Ave. E. # 106
Sumner, WA 98390
Tel: 253-863-2222
Fax: 253-863-2223
www.ipmpumps.com

Technical Specifications

Minimum Operating Speed.....300 rpm
Maximum Continuous Operating Speed.....1,000 rpm
Maximum Intermittent Operating Speed.....1,200 rpm
Minimum Recommended Viscosity.....None
Maximum Recommended Viscosity.....2,000 cPs
Blade Circle (collapsed).....2" dia.
Air Inlet Port.....1/4 npt(f)
Air Outlet Port (muffled).....1/4 npt(f)
Wetted Parts.....Stainless Steel
Weight.....11 lbs. (5 Kg.)

Air Consumption



Choose mixer speed across bottom of chart and follow up to material viscosity. Approximate required air flow is shown at right. Required air pressure is shown beside viscosity, but will vary with material.

Higher viscosities require higher pressures

Every fluid has individual properties and characteristics. However, in general, higher viscosity fluids require more air pressure to turn the blades. A minimum air operating pressure of 40 psi is recommended for all fluids up to 500 cPs. For fluids between 500 cPs and 2,000 cPs, increase air pressure from 40 psi to 100 psi. To minimize air consumption, use the lowest air pressure possible to achieve the required mixing speed, and make small speed corrections with the throttling valve.

Mixer Operating Tips

Maintaining Particle Suspension

Initially, higher mixer speed is required to *get* particles in suspension. This typically can be done in 1/2 hour or less. Once the particles are in suspension, the mixer speed can be reduced to only that required to *maintain* suspension. To minimize air consumption, always use the lowest air pressure required to do the job, then use the throttling valve to maintain the speed.

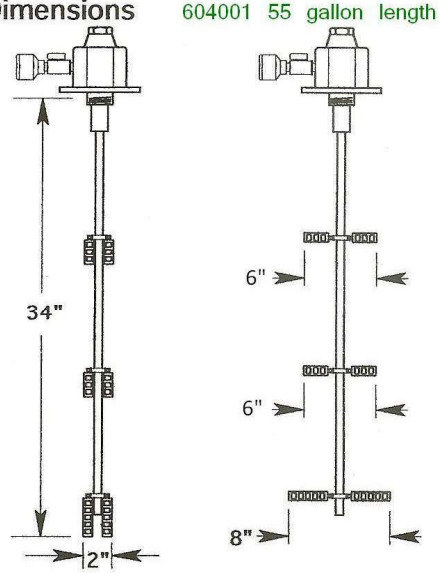
"Meter out" for controllability

IPM drum mixers are shipped with the throttling valve assembled in the "meter out" flow direction. This is the flow direction recommended to maintain effective speed control, especially at low rpm conditions.

Muffler Maintenance

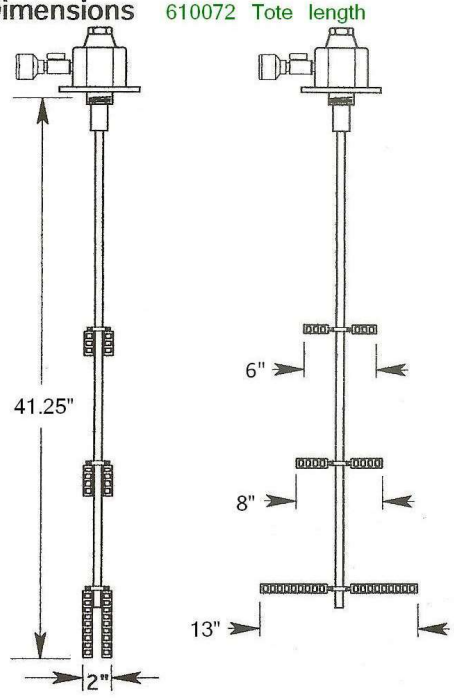
Periodic cleaning of the air motor muffler ensures the lowest possible air consumption, and makes for consistent speed control. Depending on usage and the condition of shop air, clean the muffler with solvent, and blow out trapped solids.

Dimensions 604001 55 gallon length



Ar rest, blades will fit through a 2" bung opening.
While spinning, blades extend to the diameters shown.

Dimensions 610072 Tote length



For Technical Support for the Boss Spray System or to Order Material and Parts, Contact Turbo Liner Inc. 877-678-8726 We are Open Monday through Friday 8am-5pm Pacific Time.

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