MAULDIN

BY CALDER BROTHERS

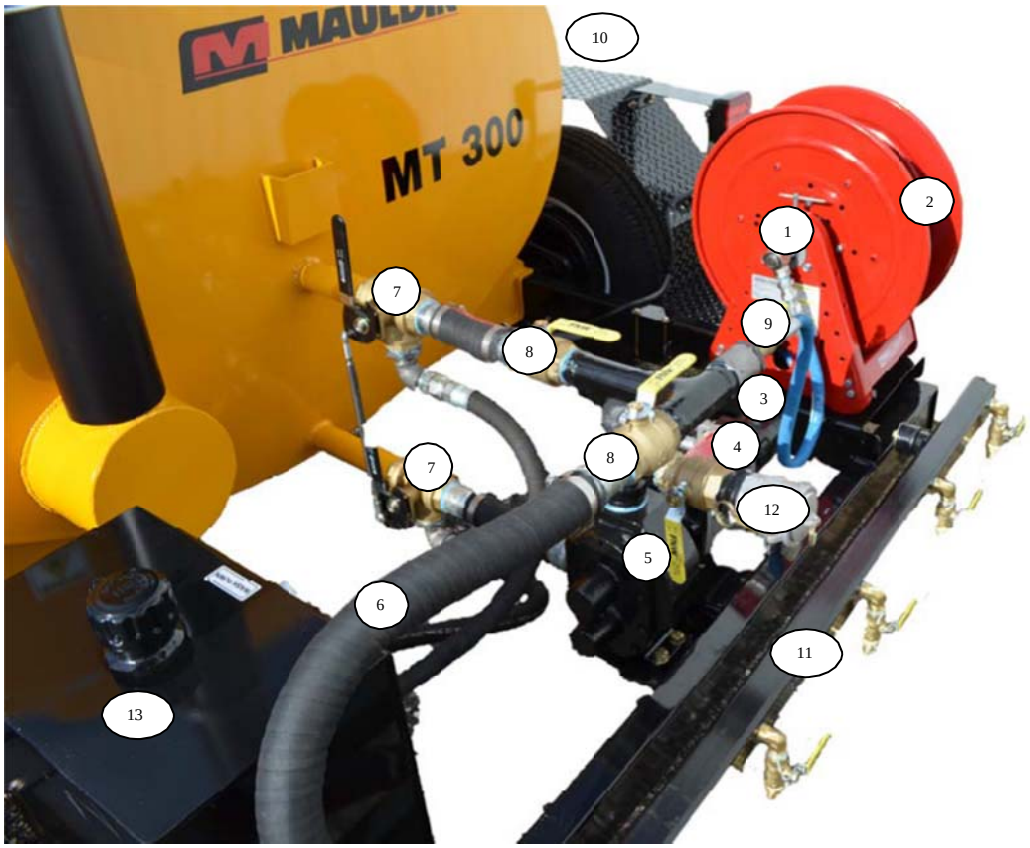
PARTS & OPERATION MANUAL

MODEL MT-300 / MT600

MT300 803-M-T3-GP-Y—2803 to Current

MT600 816-M-T6-GK-Y-*02816 to Current

SOLD & SERVICED BY



1. Hose Reel.....050-0723
2. Asphalt Hose (Reel) 050-0723-1
3. Motor, Hydraulic 013-124404
4. Hydraulic motor mount 123-130042
   - Coupler, Motor to Pump 011-0252-13
5. Asphalt Pump 011-0252
6. Asphalt Hose 123564
7. Valve 3-way, 1.5” NPT (2x) 017-130312
   - 3 Way valve actuator rod.....121-212056
8. Valve 2-way 1.5” NPT.....019-0120
9. Valve, Ball Small (2x) 122463
10. Handspray Wand Assy 123250
    - Nozzle 123484
    - Vavle, Handle 123058
11. Spray Bar Assy.....122-212522
    - Nozzle (X6).....123-123484
    - Valve, Ball (x6) 017-0043
12. Load attachment 123-130113
    - Cap.....123-130112
13. Tank, Cleanout 122-212080
    - Tank cap.....050-0522

1. Engine, Kohler Gasoline 010-0541
   - Diesel Kohler 010-0535
2. Pump, Drive Hydraulic 013-0055
   - Coupling, Pump 015-0119
   - Chain, Coupling 015-0044
   - Coupling, Engine 015-0033
3. Propane Tank (not shown) 050-0049
   - Regulator 050-0049
   - Strap, Tank 010-0649
4. Hydraulic Filter/head assembly 021-0001
   - Filter 021-0169
5. Valve electric, Spray 017-0233
6. Tank, Hydraulic 122-212070
   - Cap, Tank 060-0069
7. Valve, Selector 017-0210
8. Battery (not shown) 020-0045
   - Cable (Negative) 020-0248
   - Cable (Positive) 020-0247
9. Diesel Burner Control Box
   - Rocker switch 020-0236B
   - Thermostat 123715

IMPORTANT SAFETY INFORMATION

Most accidents involving construction maintenance are caused by failure to observe basic safety rules or precautions. An accident can often be avoided by recognizing potentially hazardous situations before an accident occurs.

Read and understand all safety precautions and warnings, before operating or performing lubrication and maintenance on this machine.

WARNING: IMPROPER OPERATION, LUBRICATION OR MAINTENANCE OF THIS MACHINE CAN BE DANGEROUS AND COULD RESULT IN INJURY OR DEATH.

WARNING: DO NOT OPERATE THIS MACHINE UNTIL YOU READ AND UNDERSTAND THE INSTRUCTIONS IN THE OPERATION SECTION OF THIS MANUAL.

WARNING: DO NOT PERFORM ANY LUBRICATION AND MAINTENANCE ON THIS MACHINE UNTIL YOU READ AND UNDERSTAND THE INSTRUCTIONS IN THE MAINTENANCE SECTION OF THIS MANUAL.

SERVICE WARNING

General Machine Safety

a. Have first aid kit ready and available.
b. Proper clothing should be worn at all times. Long sleeved shirts and pants are recommended. Always use safety glasses and proper gloves when performing functions on the machine.
c. A clean work station is a safe work station. This also aids in proper visual inspection of the machine daily, and ensures proper daily maintenance.
d. Operator shall bear the responsibility that when maintenance is complete proper safety guards, and decals have been returned to the machine.
e. Operating personnel must perform service checks regularly to be sure systems are in good operating condition. If abnormal conditions are detected, inform maintenance personnel immediately
f. Operator shall obey all laws.

Hot Material Safety

a. Operator shall always wear protective gear for face, hands, feet, eyes, and body while working with hot bituminous products
b. Operator shall always have proper knowledge and carry in truck proper MSDS of material on board.

c. When hot asphalt touches the skin, flush area completely according to MSDS. Remember if you are not using emulsions, cool water may not be the best solution. Get medical attention.

Fire and Burst Explosion Safety

a. Operator shall keep machine clear of sparks, open flames and incandescent material. Some bitumen fumes are flammable and can explode.
b. Operator shall never load machine when water is present in the bottom of the tank. Hot material can cause the water to steam and burst the tank.
c. Operator shall never mix material in the tank of the distributor. Not all asphalt products mix and problems will occur. Always contact material handler before changing tank products to ensure compatibility or arrange for offload of material first.
d. DO NOT SMOKE

Burner Safety

a. Operator shall never operate the burner assemblies while truck is in motion or being loaded.
b. Operator shall be present during entire heating cycle.
c. Operator shall be sure burner tubes are covered by a minimum of 8" of material before burner operation. Uncovered tubes can cause explosion in tank.
d. Operator is responsible for safe heating temperatures of the material and not exceeding the “flash point”.
e. Operator shall begin tank circulation of material as soon as possible for safe heating of product.

Refueling Safety

a. Operator is responsible to keep the hose, or nozzle in contact with the tank fill tube to prevent spark.
b. Do not overfill.
c. DO NOT SMOKE

OPERATION INSTRUCTIONS

MT300/ MT600

****WARNING****

To avoid possibly injury or death do NOT load tank with hot material when condensation or water is present in tank. Hot material and water will have a violent reaction producing steam and pressure resulting product damage and potential injury or death may occur.

Never exceed the recommended temperature for the specific material being used. If the required temperature is not known, please contact the material manufacturer.

Heating instruction

MT300/ MT600

Propane

- Open propane tank and set regulator to @5 PSI.
- Open valve at propane burner(s) on rear of tank while using a striker to light gas.
- After the burner is going return the front of the tank and turn the regulator up to 8-12 PSI.
- ***Burners shall not be left un-attended! You are responsible to turn them off when desired temperature is achieved. (This is usually 120 –140 degrees F.)***

Diesel

- Flip the burner blower controls to the on position.
- Turn the Thermostat dial to the desired spray temperature.
- Flip the burner fuel switches to the on position and the burners will light.
- After burners start to warm, the material must be circulated.
- When set temperature is reached the burners will turn off, and the material is ready to spray

Burner Safety

- Operator shall never operate the burner assemblies while truck is in motion or being loaded.
- Operator shall be present during entire heating cycle.
- Operator shall be sure burner tubes are covered by a minimum of 8" of material before burner operation. Uncovered tubes can cause explosion in tank.
- Operator is responsible for safe heating temperatures of the material and not exceeding the “flash point”.
- Operator shall begin tank circulation of material as soon as possible for safe heating of product.

Hand Spray Instruction

MT300/ MT600

- Partially open the recirculating tank valve to feather to minimize hydraulic system going over relief. You may use the tank valve to regulate spray wand spray pattern.
- At the front of the unit move the pump direction lever into the “Forward.”
- At the back of machine open hand spray wand valve and use your hand spray wand.
- When finished spraying close the recirculating tank valve and switch the pump direction to “Reverse” this will return the unused material from the spray wand and lines to the material tank.
    - Close and open the hand spray “wand valve” a few times to ensure as much material is removed as possible.
- After the material has been returned and you can hear “sucking” noises from the wand move the pump direction lever to “Neutral” and close Spray wand valves.

Spray bar Instructions

MT300/ MT600

On units equipped with spray bar

- At the front of the machine (with the engine @ idle) pull the pump direction lever to “Forward” position.
- At the rear of the machine open the spray bar valve.
- To spray – Position the trailer to the area you wish to spray, turn your headlight switch to on and the spray bar will began to spray. (you should try to maintain a vehicle speed of 2-3 MPH while spraying.) to end the spray shut headlights off.
    - If you desire to test or manually turn the spray bar on, there is a switch located on the front of the trailer mounted to the engine.
    - Please note that any vehicle equipped with daytime running lights you need to check that taillights are not on until the headlight switch is on***. (Standard daytime running lights equipped on most new vehicles turns only the headlights only. The taillight <u>on</u> wire controls the spray bar.)***

Clean Out Instruction

MT300/ MT600

- At the front of the machine pull the pump valve lever to “Reverse” (speed up engine to high idle)
- At rear of machine close your hand spray “tank valve”, then open your hand spray “wand valve” until you hear air sucking through the end. Close and open the hand spray “wand valve” a few times to ensure as much material is removed as possible.
- Close the hand spray valve.
- With the selector valve still in reverse, (high idle) at the front of the machine turn the spray switch to “On.” This will do the same as sucking air in your hand spray wand only it will suck air in the spray bar. Do this a few times also to ensure as much material is removed as possible.
- At the front of the machine pull the pump direction lever to “Neutral.” (RETURN ENGINE TO IDLE)
- If desired, you can introduce clean out material into the lines for storage. To do this at the rear of the machine at the inlet of the asphalt pump turn that lever to “Clean Out.”
- At the front of the machine pull the pump direction lever to “Forward.” You will now be introducing clean out solvent to the bar switch on the spray switch until the clean out solvent gets to the nozzles, then shut the switch off.
- Next open hand spray valve and open wand until clean out solvent spays through nozzle, close wand, return hand spray valve to closed position.
- Leave the “Clean Out” lever in the clean out direction, to assure tack does not gravity feed into the pump.
- Turn the pump direction valve to “Neutral” and your machine is ready for overnight or long term storage.

Note: be sure to stop the engine whenever the machine is not in use. This will increase the life of the hydraulic components.

For any further questions please contact your Dealer or Mauldin representative

ADDENDUM "A"

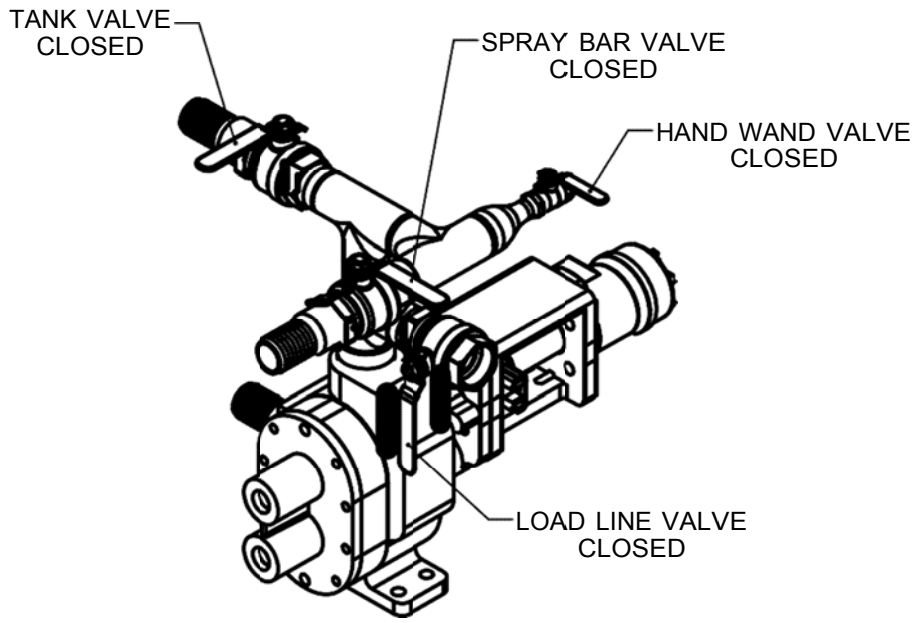
Guideline Temperatures for common liquid Asphalts

Type & Grade	Spraying Temperature		Type & Grade	Spraying Temperature	
Asphalt Cements	Deg. C	Deg. F	**Cutback Asphalts**	Deg. C	Deg. F
AC-2.5	130	270	MC-30	30	80
AC-5	140	280	MC-70	50	120
AC-10	140	280	MC-250	75	165
AC-20	145	295	MC-800	95	200
AC-40	150	300	MC-3000	110	230
AR-1000	135	275	RC-70	50	120
AR-2000	140	285	RC-250	75	195
AR-4000	145	290	RC-800	95	200
AR-8000	145	290	RC-3000	110	230
			SC-70	50	120
PEN 40-50	150	300	SC-250	75	160
PEN 60-70	145	295	SC-800	95	200
PEN 85-100	140	280	SC-3000	110	230
PEN 120-150	130	270			
PEN 200-300	130	270			

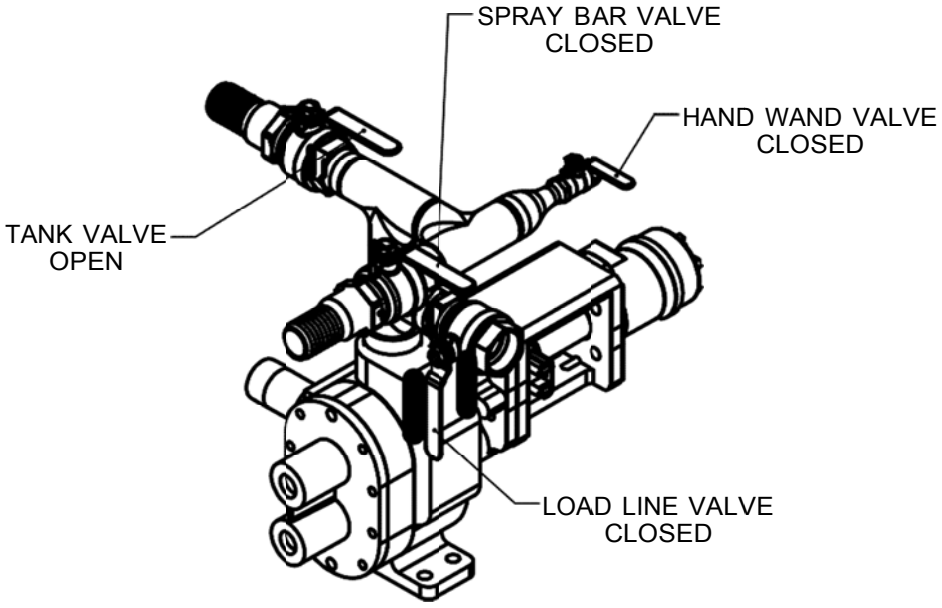
Emulsified Asphalts		
RS-1	20-60	70-140
RS-2	50-85	125-185
HFRS-2	50-85	125-185
MS-1	20-70	70-160
MS-2	20-70	70-160
MS-2h	20-70	70-160
HFMS-1	20-70	70-160
HFMS-2	20-70	70-160
HFMS-2h	20-70	70-160
HFMS-2s	20-70	70-160
SS-1	20-70	70-160
SS-1h	20-70	70-160
CRS-1	50-85	125-185
CRS-2	50-85	125-185
CMS-2	20-70	70-160
CMS-2h	20-70	70-160
CSS-1	20-70	70-160
CSS-1h	20-70	70-160

These recommendations are provided by "The Asphalt Institute" and advise the minimum spray temperatures for safety.

TACK TANK PUMP STATION VALVE OPERATION

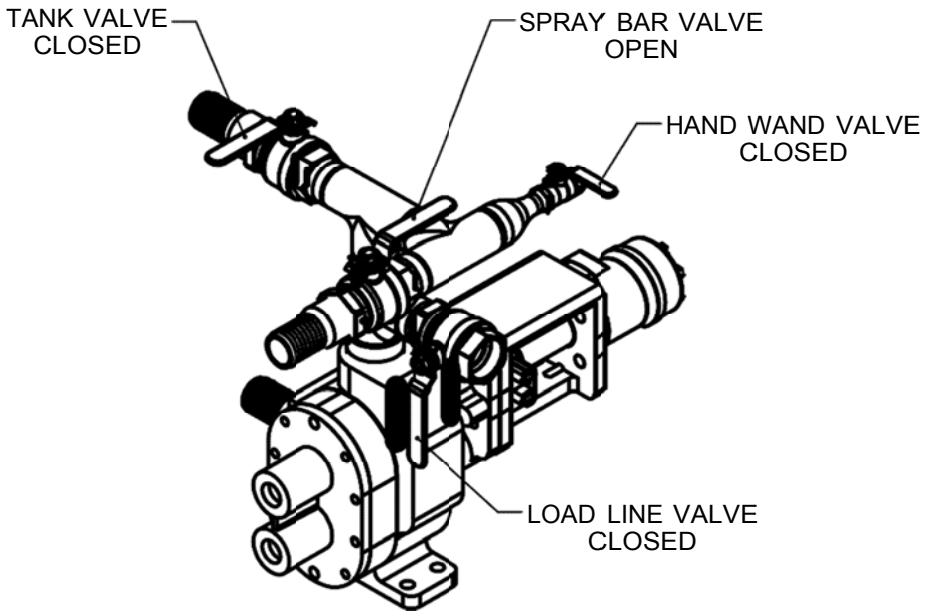


VALVE ORIENTATION FOR OFF DUTY OR TRAVEL MODE

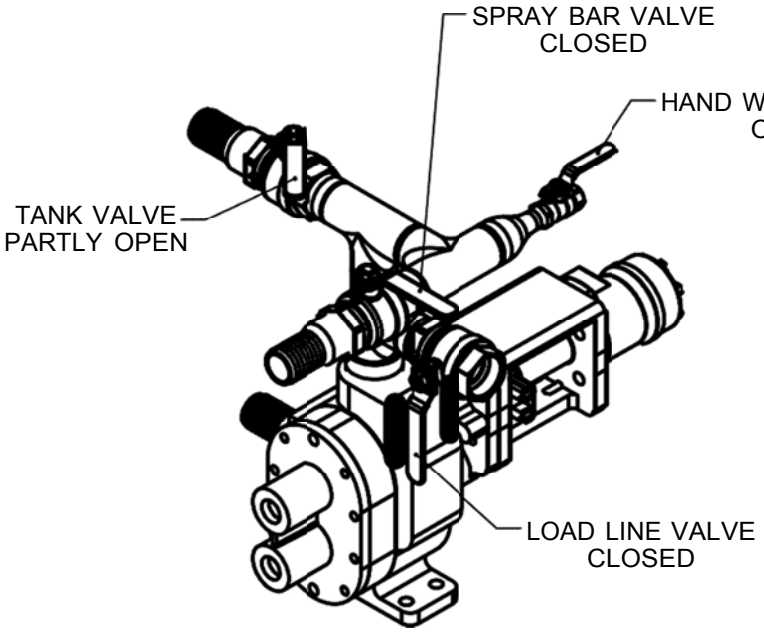


VALVE ORIENTATION FOR RECIRCULATION - HEATING OPERATION

TACK TANK PUMP STATION VALVE OPERATION



VALVE ORIENTATION FOR SPRAY BAR OPERATION

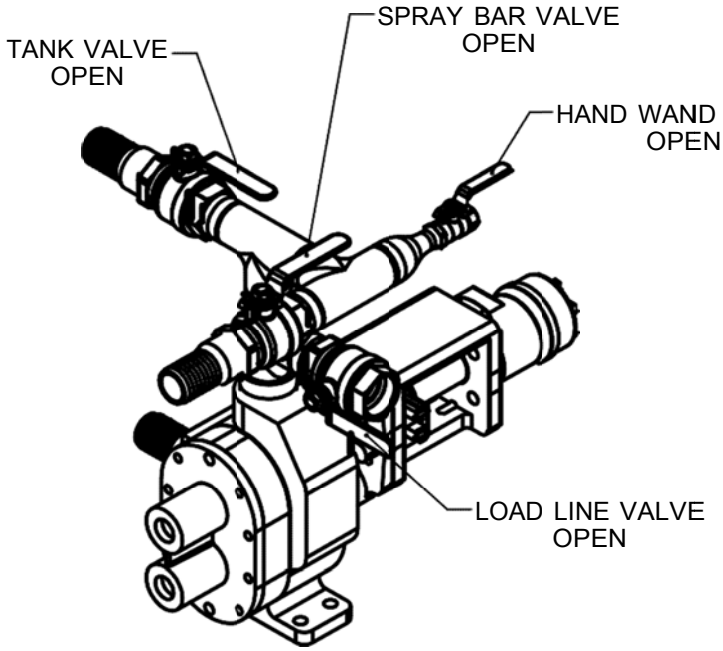


NOTES:

1. TO MINIMIZE HYDUALIC SYSTEM GOING OVER RELIEF, THE TANK VALVE MAY BE OPEN PART WAY. USE THE SPRAY WAND FAN SPRAY TO DETERMINE OPTIMUM SPRAY PATTERN.

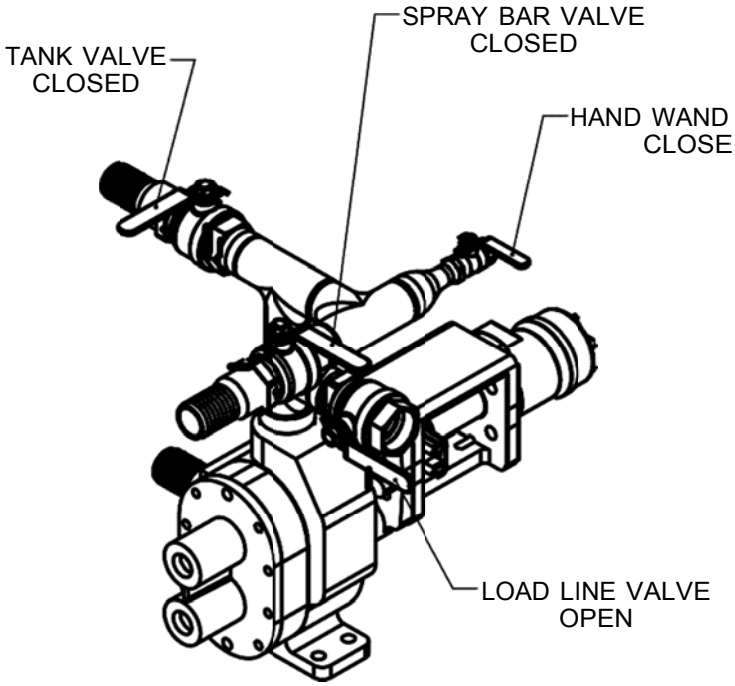
VALVE ORIENTATION FOR HAND WAND SPRAYING

TACK TANK PUMP STATION VALVE OPERATION



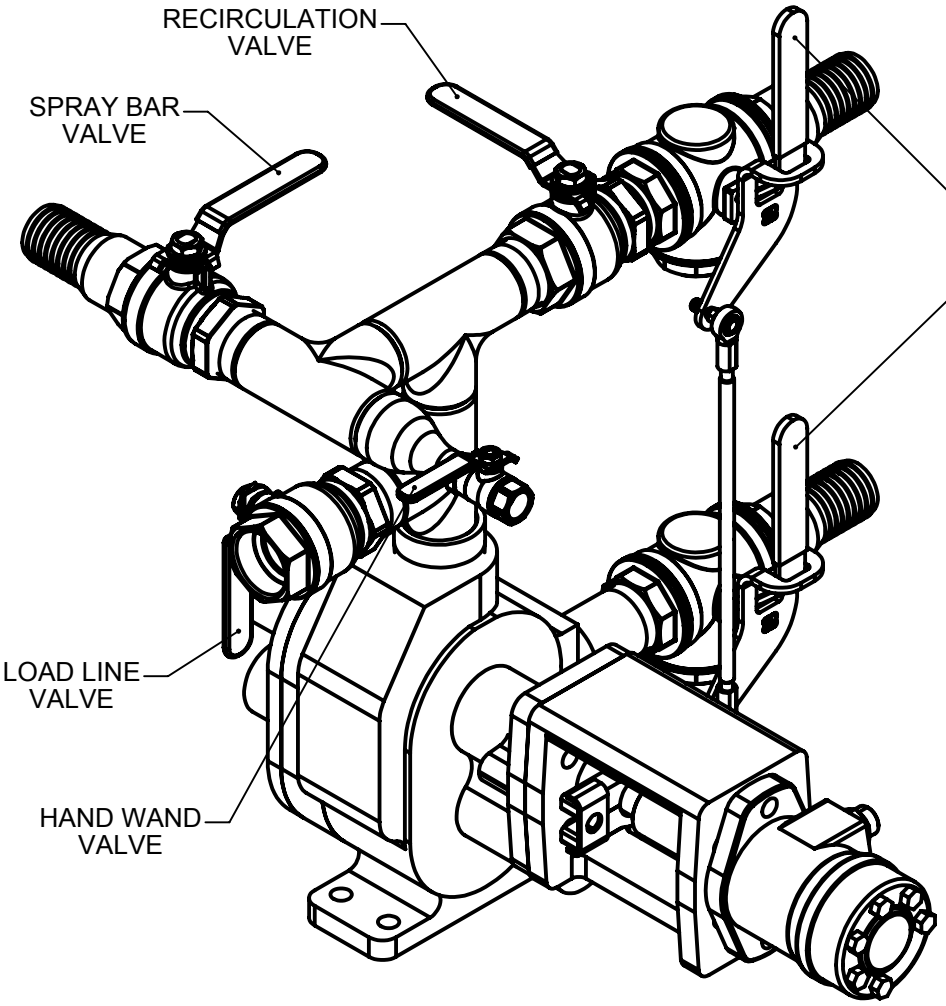
NOTES:
1. SHUT OFF ALL SPRAY NOZZLE VALVES.
2. BE SURE THAT THE LOAD LINE HOSE PLUG IS SECURE.
3. SPRAY HOSE WAND INTO FILL NECK OF THE CLEAN-OUT TANK.
4. CYCLE NOZZLE VALVES ONE AT A TIME TO PURGE MATERIAL OUT INTO A SUITABLE CONTAINER.

VALVE ORIENTATION FOR CLEAN-OUT OPERATION



NOTES:
1. BEFORE CHANGING ANY OF THE VALVE POSITIONS FROM CLOSED POSITION, BE SURE TO TURN OFF ASPHALT PUMP.
2. REMOVE THE PLUG FROM THE LOAD LINE AND MOUNT THE TRANSFER HOSE.
3. MOUNT THE OTHER END OF THE HOSE TO THE INTENDED TRANSFER TANK.
4. OPEN THE LOAD LINE VALVE AND RUN THE PUMP; FORWARD TO TRANSFER OUT OF THE TANK, OR REVERSE TO TRANSFER INTO THE TANK.

VALVE ORIENTATION FOR LOAD LINE OPERATION (IF FURNISHED WITH THIS OPTION)



3-WAY PAIR VALVES:
HANDLES IN HORIZONTAL POSITION
CONNECTS PUMP TO ASPHALT TANK.
HANDLES IN VERTICAL POSTION
CONNECTS PUMP TO SOLVENT TANK.

NOTE:
REFER TO OPERATIONS MANUAL FOR DETAILED INSTRUCTIONS IN OPERATING MACHINERY FOR THE DIFFERENT FUNCTIONS.

VALVE	PARKED TRAVEL	RECIRC. HEATING	SPRAY BAR OPERATION	HAND WAND OPERATION	REVERSE SUCTION	CLEAN OUT	LOAD LINE TRANSFER
RECIRCULATION	CLOSED	OPEN	CLOSED	HALF OPEN	OPEN	OPEN	CLOSED
SPRAY BAR	CLOSED	CLOSED	OPEN	CLOSED	OPEN	OPEN	CLOSED
HAND WAND	CLOSED	CLOSED	CLOSED	OPEN	OPEN	OPEN	CLOSED
LOAD LINE	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	OPEN

MAULDIN
PAVING PRODUCTS

CALDER BROTHERS CORPORATION

(LIMITED) PRODUCT WARRANTY

Calder Brothers Corporation warrants that the Paver, Roller, Tank or Grader under this program will be free from defects in material and workmanship for a period of(12) twelve months from the date of installation. Written notice of any claimed defect must be given to Calder Brothers Corporation within the warranty period and within (30) thirty days after such defect is discovered. Liability under this warranty is limited to replacing or repairing at Calder Brothers Corporation election, any part or parts deemed defective after examination by Calder Brothers Corporation or an Authorized Service Representative via prepaid transportation for which is found to be defective, will be repaired or replaced and returned to the customer via prepaid surface transportation within the United States. Should any part be found not defective, inspection and handling may be charged to the customer by Mauldin or an Authorized Service Representative.

EXCLUSIONS:
This warranty does not apply to routine wearable parts of the Mauldin machine such as seals, points, plugs, hoses or similar items. This warranty does not extend to any machine or part replaced or repaired under this warranty. This warranty does not cover any repair or replacement labor or any part of parts found defective after examination by Mauldin or an Authorized Service Representative. This warranty does not apply to defects caused by casualty or unreasonable use, including faulty repairs by others and failure to provide reasonable and necessary maintenance.

THIS WARRANTY SET FORTH HEREIN IS IN LIEU OF AND EXCLUDES ANY AND ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, ARISING BY OPERATION OF LAW OR OTHERWISE, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND CUSTOMER WAIVES ANY OBLIGATION OF LIABILTY OF MAULDIN ARISING IN TORT OR STRICT LIABILITY IN TORT, OR FOR LOSS OR USE, REVENUE OR PROFIT WITH RESPECT TO MAULDIN MACHINE AND/OR PARTS FOR ANY LIABILTY OF CUSTOMER TO ANY THIRD PARTY, OR FOR OTHER DIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES.

I have read and fully understand the warranty policy above.

_____ _____

Customer Witness

CALDER BROTHERS CORPORATION

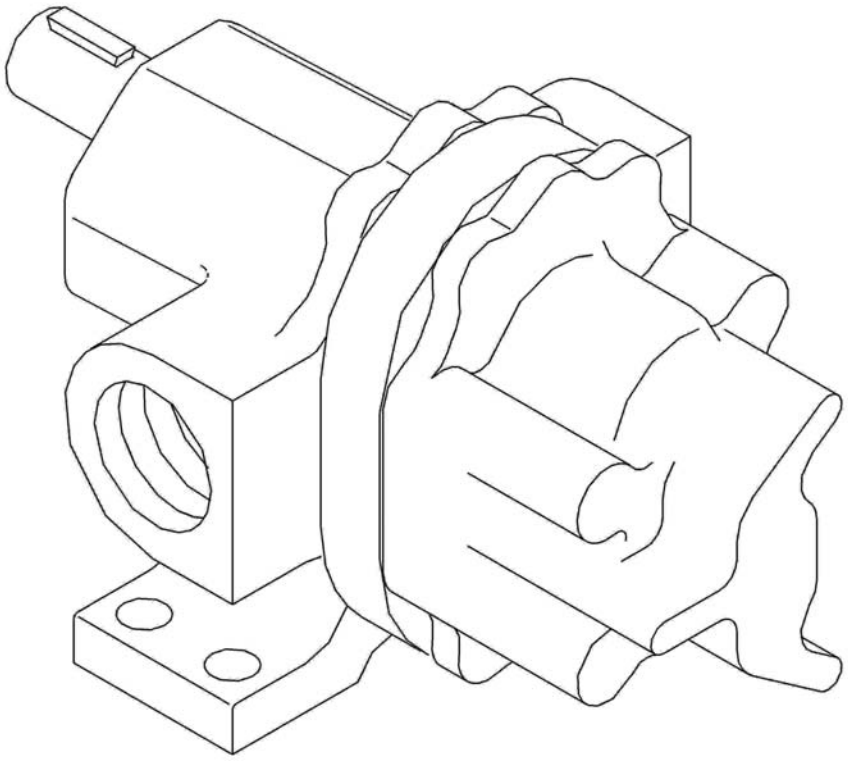
Calder Brothers Corporation
250 E Warehouse Ct.
Taylors SC, 29687

4amauldin.com 864-244-4800 Fax 864-244-5007

AM, AP & AL SERIES PUMPS
OWNERS MANUAL

G12-207

2/2/04



SAFETY INSTRUCTIONS

This is an industrial component. Only a qualified systems integrator should be allowed to design it into a system. The integrator must determine proper plumbing, mounting, driveline and guard components.

Improper installation or use could lead to a serious, even fatal, accident. The system integrator must communicate all safe operation procedures to the end user(s).

Before operation, fully understand and follow the instructions shown in this manual and any instructions communicated by the system integrator. No one should be allowed to operate or maintain this pump who has not been fully trained to work safely according to the configuration of the pump system and in accordance with all applicable government and industry regulations.

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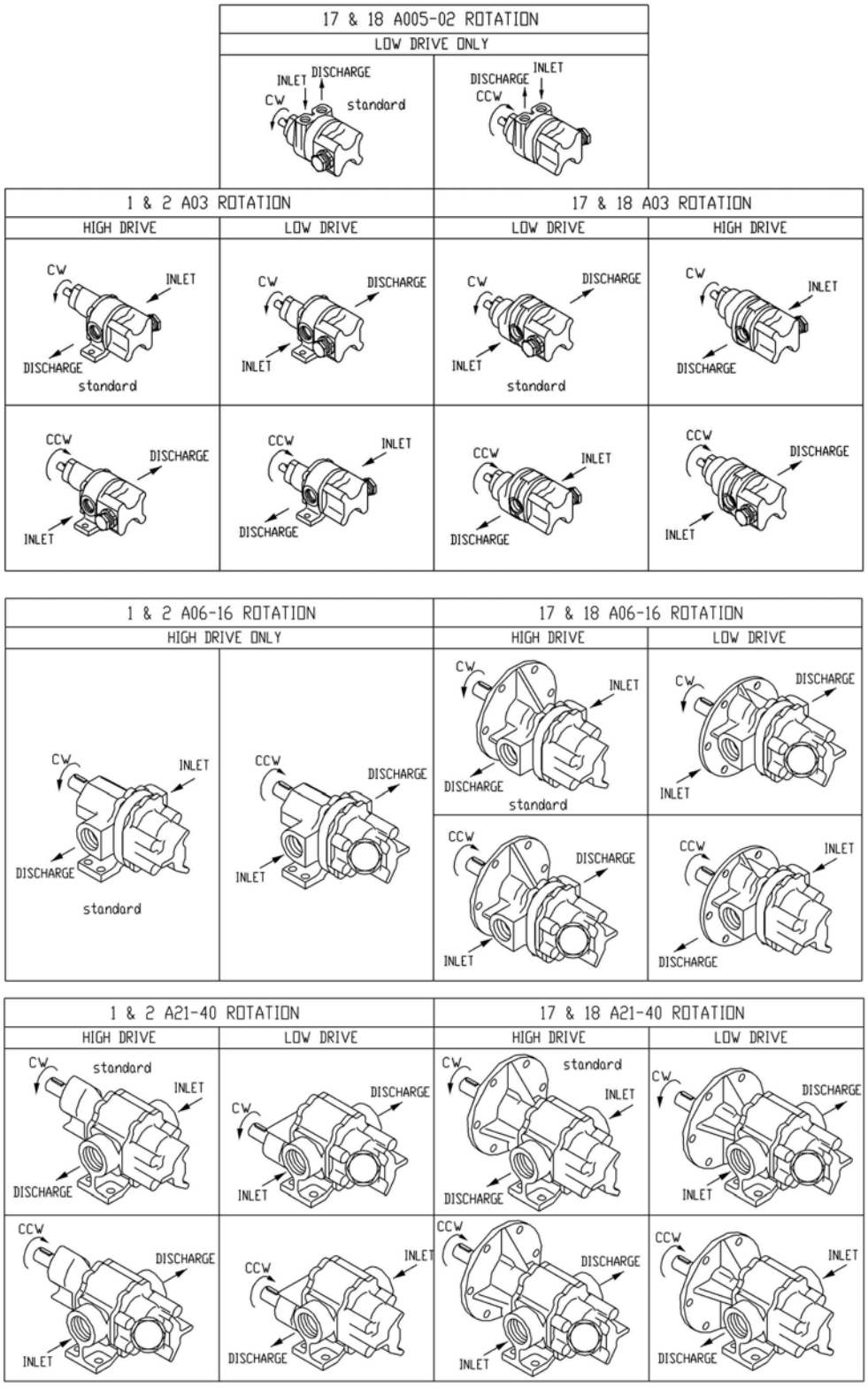
Email: sales@roperpumps.com
www.roperpumps.com

INSTALLATION

Check Ports Versus Rotation:

Make sure the inlet and outlet ports have been correctly plumbed corresponding to the direction of rotation. See figure below for various configurations.



Good Practice

NOTE: These are general guidelines and do not cover all possible situations.
It is the responsibility of the system integrator to apply this product properly.

Plumbing

1. The inlet pipe should be as short and straight as possible to minimize suction pressure losses. Excessive restrictions at the inlet can cause cavitation resulting in poor performance, noise, vibration, or pump damage.
2. Slope the inlet plumbing appropriately to avoid air pockets.
3. Plumbing weight, misalignment with the ports or thermal expansion can exert excessive force on the pump. Plumbing must be properly supported and aligned with expansion joints, if required, to minimize these forces.
4. To prevent over pressure situations, install a relief valve as close to the pump outlet as possible. Install the relief valve before any shut-off valves.

Over-pressure may burst pump or system components. Always include a relief valve in installation. Do not over pressurize pump or block discharge line while running.

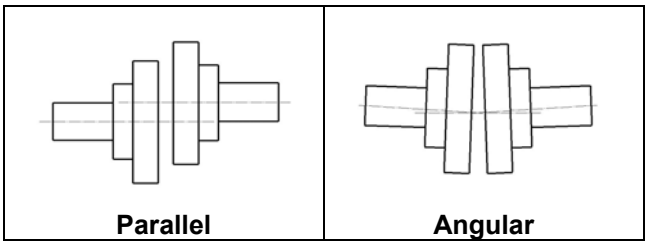
Separate Pump and Drive Assemblies

Driveline Guards

1. Assure adequate guards have been installed to prevent personnel contacting moving components.
2. Follow all OSHA, Federal, state and local codes.

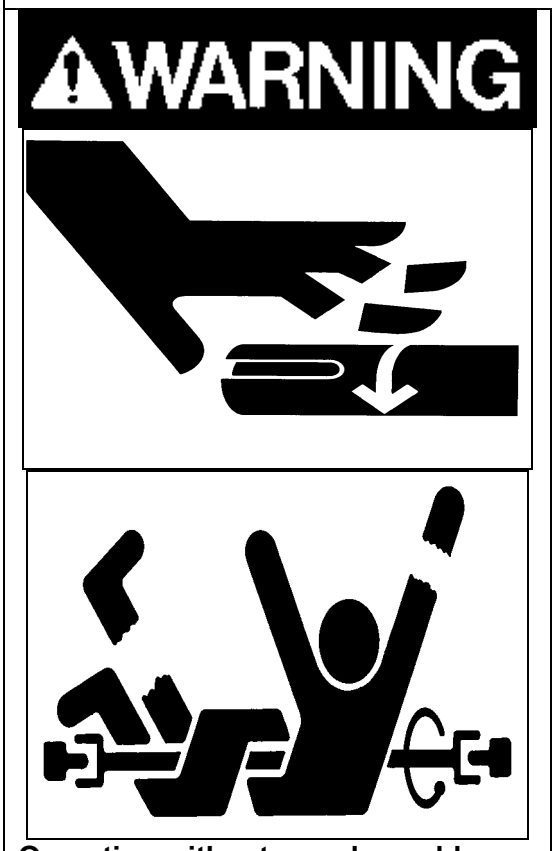
Check Alignment of Pump to Driveline

Excessive misalignment can overload the pump input shaft and cause premature failure. The figures below show parallel and angular misalignments.



Mounting Base

1. Mount the unit on a rigid, heavy base to provide support and absorb shock. Bases should be designed for high rigidity, not just strength.
2. The pump feet were not designed for mounting to concrete and do not have enough contact area to prevent concrete from failing. When mounting to cement or concrete, use a steel base plate (supplied by others) to distribute the mounting stress over an area large enough to prevent the cement from failing. The base plate should be at least as thick as the pump feet. Grout it in place.



Operating without guards could result in serious injury or death. Machinery in operation can grab, crush, cut, mangle and dismember. Do not operate without adequate guards in place.

Roper Pumps' Close Coupled Drives

Units where the drive mounts directly to the pump

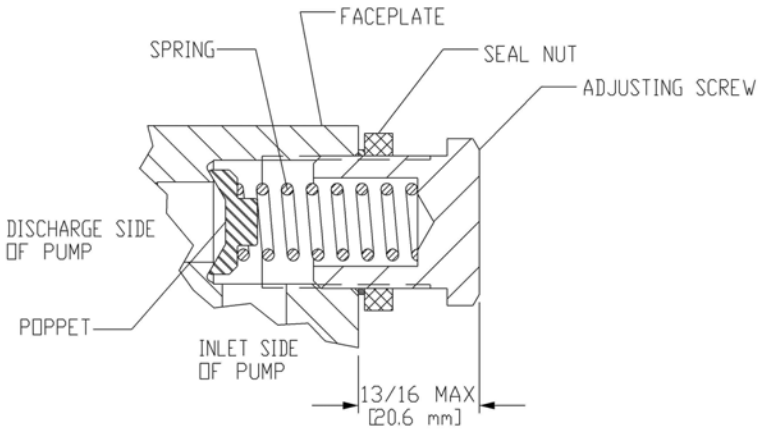
- Exposed drivelines require guards.
- Alignment between pump and drive line is maintained by the assembly.
- Because the assembly absorbs reaction forces of the driveline, the mounting base does not need to be as robust. The level of rigidity and strength is determined by the piping stresses from the system.

PUMP RATINGS

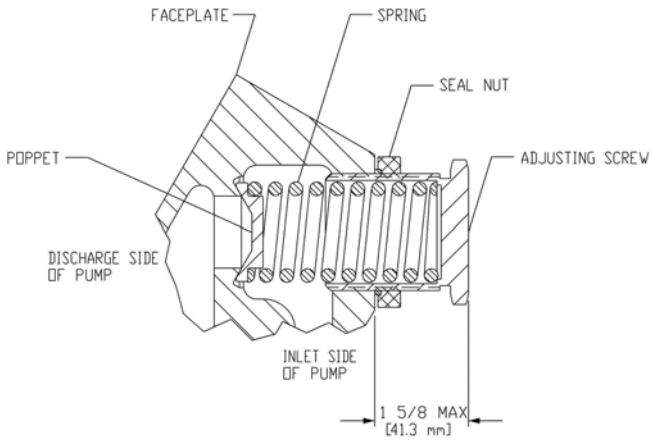
Maximum Ratings				
Pump Size	Flow Rate GPM	Pressure PSI	Temperature ^{0}F	Input Speed RPM
005	1.8	300	212	3600
01	3.6	300	212	3600
02	7.6	300	212	3600
03	11.6	300	212	3600
06	11.2	150	212	1800
08	16.3	150	212	1800
12	23.5	150	212	1800
16	30.8	150	212	1800
21	40.2	150	212	1800
27	49.8	150	212	1800
32	59.1	150	212	1800
40	75.6	150	212	1800

RELIEF VALVE

SIZES 005 thru 03



SIZES 06 thru 40



The relief valve must be positioned as shown in instructions for direction of rotation – otherwise the valve is inoperable, discharge pressure will not be working against the relief valve.

If the built-in relief valve is used, it is mandatory that the relief valve be set BY THE USER, since maximum relief valve pressure depends upon the viscosity and specific gravity of the liquid, the flow rate (pump RPM), and also the initial relief valve setting.

NOTE: The fact that the pump has the correct rotation and discharges liquid thru the desired port does NOT insure that the relief valve is installed in the correct position, or that it has the correct setting for the application.

TO ADJUST RELIEF VALVE

Warning: Take precautions necessary to prevent personal injury or physical damage that could be caused by any loss of the product being pumped while adjusting relief valve.
DO NOT adjust relief valve without all guards in place.

Relief valve must be adjusted under conditions identical to the operating conditions (Viscosity, RPM, etc.)

1. Connect a pressure gauge near the pump in the discharge line between the pump and the point where the discharge line will be closed. (Some pumps have tapped and plugged holes in the case near the outlet which may be used for this connection.)

2. Loosen the sealing nut on the adjusting screw.

3. Back the adjusting screw out to the point where the end of the adjusting screw will be as shown on the Relief Valve drawing.

4. Start pump and close discharge line slowly. Do not exceed pressure rating of pump or other equipment between pump and discharge line valve. If this pressure is reached while closing the discharge valve, do not close any further. (This might occur with very high viscosity liquids.) It would then be necessary to install a separate relief valve in the system for protection. Do not run pump with closed discharge line for more than two minutes at a time.

5. With discharge valve closed, turn adjusting screw clockwise in ½ turn increments until the pressure gauge shows the desired pressure setting.

6. Tighten sealing nut.

7. Open discharge line, and turn pump off.

Relief valve is now set.

To replace spring and/or poppet, shut pump off, decrease the pressure on the spring and remove the plug cap by unscrewing it from the faceplate. After inspecting parts and replacing those required, reassemble the parts in reverse order to which they were removed, making sure the spring is centered on poppet and guide. Replace gasket and screw the plug cap into position and adjust pressure to desired setting. Tighten sealing nut.

A built-in relief valve should not be used on applications where the discharge must be closed for more than a few minutes. Prolonged operation with the relief valve fully by-passing will cause heating of the liquid circulating thru the valve, thus resulting in possible damage.

MECHANICAL SEAL (AM) PUMPS

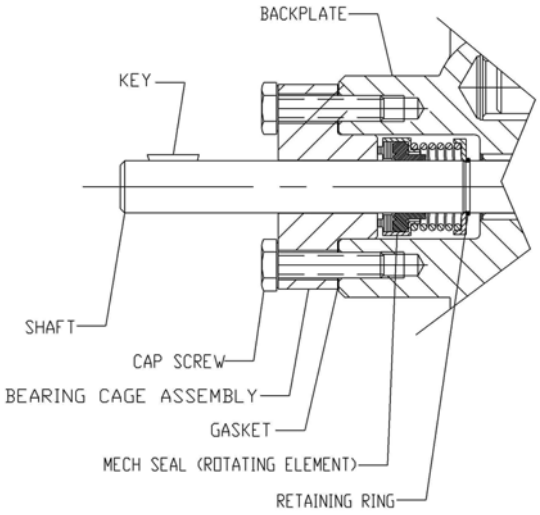
Mechanical seals do not require adjustment. Leakage developed at the seal may be due to one of the following conditions: worn, marred, or cracked rotating or stationary seal face, or bellows that have become hard, soft, cracked, expanded or extruded.

When replacing or servicing a mechanical seal, take particular care not to mar or scratch the sealing surfaces or injure the bellows. If the seal has been used, do not put it back into service unless both sealing surfaces are perfectly flat and smooth or else replaced.

To replace the mechanical seal, remove the key, cap screws, and bearing cage assembly (AM005 thru AM03) or seal retainer (AM06 thru AM40). Remove burrs and sharp edges from the end of shaft and keyway and clean the shaft. Next, the seal rotating parts may be removed from the shaft.

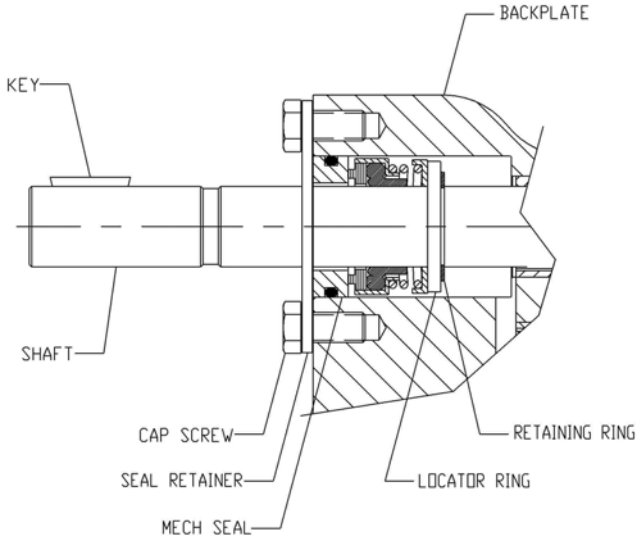
AM005-AM03

To reassemble the mechanical seal on pump sizes AM005 thru AM03, lubricate with light machine oil the section of the shaft over which the seal is to be mounted. Slide the rotating element onto the shaft. Be sure it is properly positioned against the retaining ring. After checking the bearing cage and replacing, if required, coat the sealing surfaces with light machine oil. Install bearing cage and gasket and secure with cap screws.



AM06-AM40

To reassemble the mechanical seal on pump sizes AM06 thru AM40, lubricate with light machine oil the section of the shaft over which the seal is to be mounted. Slide the locator ring over the shaft and back against the retaining ring. Slide the rotating element onto the shaft. Be sure it is properly positioned against the locator ring. After checking the stationary seal face and o-ring and replacing, if required, coat the sealing surface with light machine oil. Install stationary seal face and retainer plate and secure with cap screws.



CHANGING FROM PACKED BOX TO MECHANICAL SEAL

When it is desirable to change from packed box to mechanical seal, remove the key, cap screws, packing plate, packing gland, packing rings and washer (AM06-AM40 only). The exposed surface of the shaft should be free from burrs and sharp edges. Clean the shaft and apply a film of light machine oil. Install the retaining ring. Refer above to install the seal.

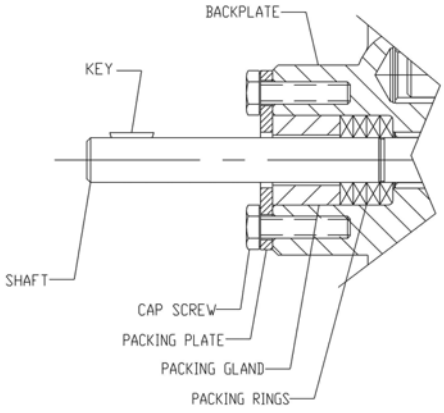
LIP SEAL (AL) PUMPS

AL pumps with lip seals must be run in the clockwise direction of rotation only. Maximum discharge pressure is 100 PSIG (6.9 BAR) and maximum inlet pressure is 5 PSIG (3 BAR). For a pump equipped with a lip seal, follow these instructions. Leaking lip seals should be replaced. Note the direction of the lip on the old seal. Carefully pry the defective seal from the bore, making certain that the bore is not scored or damaged. Clean the shaft and bore. Inspect the shaft for wear. If worn or scored, replace. The exposed surface of the shaft should be free from burrs and sharp edges. Lightly oil shaft and bore into which the lip seal is to be fitted. Be careful not to damage the sealing lip and be certain that the lip on the new seal is turned the same direction as the old seal. Slide the seal onto the shaft and press into the bore.

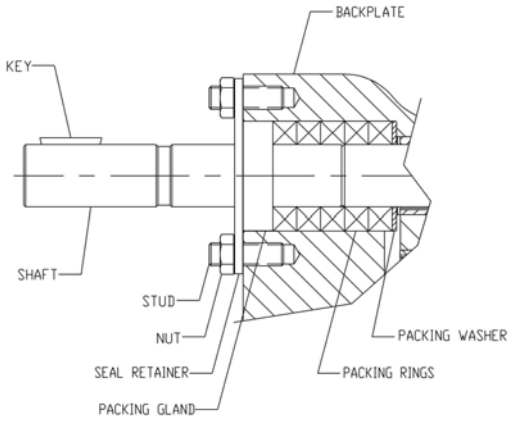
PACKED BOX (AP) PUMPS

Operate the pump under normal conditions and, after a short run-in period, examine the packing for leakage. If leakage is excessive, stop the pump and follow the procedure described below. A slight leakage is a necessary and normal condition for packing and allows for expansion and proper seating.

SIZES 005 THRU 03



SIZES 06 THRU 40



To replace packing, remove the key, cap screws or nuts, packing plate, packing gland, and packing rings. (Packing hooks are commercially available to assist in removing the packing rings.)

Clean the shaft and adjacent parts. Examine the shaft. If it is excessively worn or scored, replace shaft and gear assembly. It is generally not recommended to reuse old packing rings. When installing packing, use formed packing rings. DO NOT use a one-piece spiral wrap of packing. Before installing packing, carefully clean the stuffing box and shaft.

Packing rings should be installed one ring at a time, with the joints of adjacent rings staggered approximately 180°. Each ring should be seated firmly before the next ring is installed.

The packing gland cap screws or nuts should first be evenly tightened with a wrench to seat the packing firmly in the stuffing box and against the shaft. DO NOT over-tighten the packing. The gland cap screws or nuts should then be backed off until finger-tight. After the pump is started, visually examine the stuffing box for excessive leakage. If the packing leakage exceeds ten drops per minute, stop the pump and adjust the gland nuts. The gland cap screws or nuts should be adjusted evenly in 1/6 to 1/3 turn (1 to 2 flats on the nut) increments. Start the pump and allow it to operate for several minutes. Again, visually examine the stuffing box for excessive leakage. Repeat the above procedure until the stuffing box leakage is between five to ten drops per minute.

DO NOT over-tighten the packing. Slight leakage is a necessary requirement for proper packing operation. Leakage of five to ten drops per minute when the pump is operating is desirable, as it will preserve the packing and avoid scoring of the shaft. Over-tight packing may score shafts, increase torque requirements of the pump, damage couplings and drives, and generate excessive heat.

The packing gland should be adjusted whenever leakage exceeds ten drops per minute. The condition of the packing should be checked at regular intervals, the frequency depending on the type of service. Experience will dictate how frequently the inspections should be made.

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