



OPERATION & PARTS MANUAL

Bentonite & Lubrication Pump 2325B/D

Pump S/N: 2325B/D (FA61088F)

Publication No. 050166A

Rev. No. 220930 R221227

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Introduction

This manual contains important safety, operation, maintenance, and parts information for your Akkerman 2325B Series Bentonite & Lubrication Pump. You must read and understand this manual, the engine operation manual and any additional equipment manuals before you operate and maintain this equipment. Keep this manual with your 2325B/D Bentonite & Lubrication Pump at all times. Additional copies of this manual may be purchased from the Akkerman Aftermarket Support Department, or downloaded from the Akkerman web site at www.akkerman.com.

The contractor is responsible for the overall safety program on the job site. Use this manual as a part of the safety program.

The use of second rate parts could affect the efficient performance of the 2325B Series Bentonite & Lubrication Pump. ALWAYS use genuine Akkerman parts.

Understand safety signal words, DANGER, WARNING, CAUTION, SAFETY INSTRUCTIONS, and NOTICE. When you see these words in this manual or on safety decals mounted on your equipment, follow the safety message to avoid personal injury and/or property damage.

▲ DANGER Indicates an extremely hazardous situation which, if not avoided, WILL result in death or serious injury.

▲ WARNING Indicates a potentially hazardous situation which, if not avoided, COULD result in death or serious injury.

▲ CAUTION Indicates a potentially hazardous situation, which, if not avoided, MAY result in minor or moderate injury. It may also be used to alert against unsafe practices.

SAFETY INSTRUCTIONS Usually consists of individual messages stating procedures or actions that must be followed for the safe operation of a product.

NOTICE Identifies potential property damage and important installation, operator, or maintenance information.



Akkerman 2325B/D Bentonite & Lubrication Pump

The 2325B/D Series Bentonite & Lubrication Pumps are designed for the GBM lubrication system though it can be used in other lubrication applications. In the GBM jetting application, the pump system aides the GBM cutting process by lubricating the cutter bits and spoils during excavation. In the GBM lubrication application, the pump system assists with lubricating the pilot tubes, casing and augers and product pipe by reducing friction and easing the jacking process. The unit is capable of displacing a viscosity (Marsh Funnel) as high as 100 seconds.

If you find any errors with this manual or have any suggestions for improvement, please let us know. Email your comments via the Akkerman web site (Contact Us web page), or mail your suggestions to: Akkerman Inc, ATTN: Technical Publications, 58256 266th Street, Brownsdale, MN 55918.

Akkerman Inc. reserves the right to improve its product without notice or obligation.

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Safety

BE ALERT FOR SAFETY INFORMATION

When you see this safety alert symbol on your equipment or in this manual, be alert to the possibility of personal injury or property damage.

Read all safety information.

Keep safety decals clean and in good condition.
Replace missing or damaged safety decals.



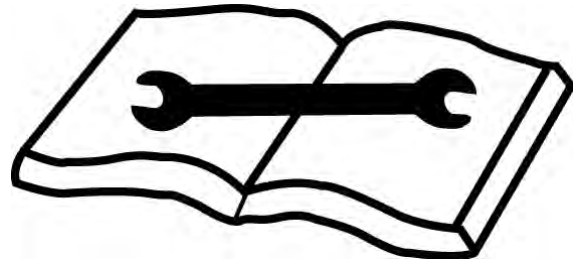
**ATTENTION!
BECOME ALERT!
YOUR SAFETY IS INVOLVED!**

READ OPERATOR'S MANUAL

⚠ WARNING Unsafe operation or maintenance can cause severe injury or death.

Read and understand the Operator's Manual before operating or servicing this equipment.

Any unauthorized modifications will void the warranty.



WEAR PROTECTIVE CLOTHING

Wear OSHA approved protective clothing, such as hard hat, gloves, safety goggles, earmuffs or ear plugs, face shield, and steel-toed boots, when operating and servicing this equipment.

Wear reasonably close fitting clothing and remove jewelry before working on or near this equipment. This will help prevent the danger of catching them in moving parts or controls.



HYDRAULIC OIL/FLUIDS UNDER PRESSURE

⚠ WARNING Escaping oil or other fluids under pressure can penetrate your skin causing serious injury.

Release all pressure before performing maintenance or repairs. Never weld near pressurized fluid lines.

DO NOT use your hands to check for leaks. When searching for leaks, use a piece of wood or cardboard.

Contact medical help immediately if any oil or fluid is injected into your skin. A serious infection or reaction can emerge without proper medical treatment.



BEWARE OF SUSPENDED LOADS

⚠ WARNING Suspended loads may fall and cause severe personal injury or death.

If a hydraulic hose, chain, or cable from the boom of a crane or excavator breaks, the boom and/or load can fall instantly.

Do not enter area under or around a load.



AVOID CONTACT WITH MIXER SHAFT & PROPELLER

⚠ WARNING Contacting shaft or propeller may cause serious injury.

Keep ALL parts of body and foreign objects from coming in contact with mixer shaft or propeller during operation.



LOCKOUT/TAGOUT POWER BEFORE SERVICING

⚠ DANGER Failure to lockout tagout power before servicing will cause severe personal injury or death.

LOCKOUT/TAGOUT power before attempting to make repairs or adjustments to this equipment, unless otherwise indicated. Proper lockout tagout will prevent accidents and save lives. Performing the lockout tagout will also prevent the equipment from moving or operating unexpectedly.



MAINTAIN BATTERY SAFELY

⚠ WARNING Batteries produce explosive gases.

Wear eye protection and protective clothing during battery service.

Keep sparks, flames, and cigarettes away from batteries.

Contact with battery acid can cause severe burns. Flush immediately and thoroughly with clean water. Get medical attention immediately.

Charge a battery only in a well-ventilated area.

Never charge a frozen battery.



REFUELING

⚠ WARNING Fires and explosions can cause serious injury or death.

Handle fuel with care. It is highly flammable.

DO NOT refuel while smoking or when near open flame or sparks.

Always stop engine before refueling.

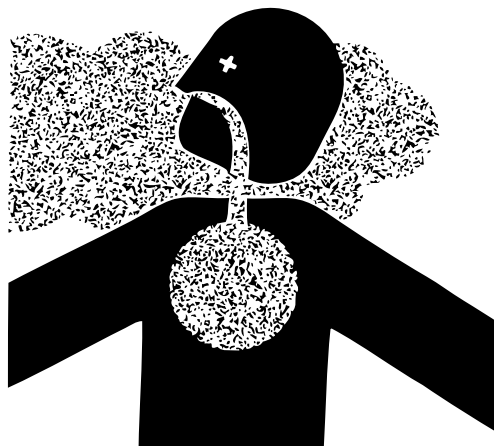


EXPOSURE TO DANGEROUS CHEMICALS

⚠ WARNING Exposure to chemicals may cause serious injury or death.

BEFORE mixing chemicals or other agents in the jetting and/or lubrication tanks, be sure the area is well ventilated and other personnel removed from the area.

Use proper personal protective equipment per the chemical manufacturer's instructions.



USING A PRESSURE WASHER WAND

⚠ WARNING Using the jetting pump with a pressure washer wand can generate enough fluid pressure and velocity to penetrate skin resulting in serious personal injury.

Contact medical help immediately if fluid is injected into your skin. A serious infection or reaction can emerge without proper medical treatment.

NEVER point the wand towards a person or animal.

Be sure to release pressure after use and before performing maintenance to prevent accidental fluid injection.

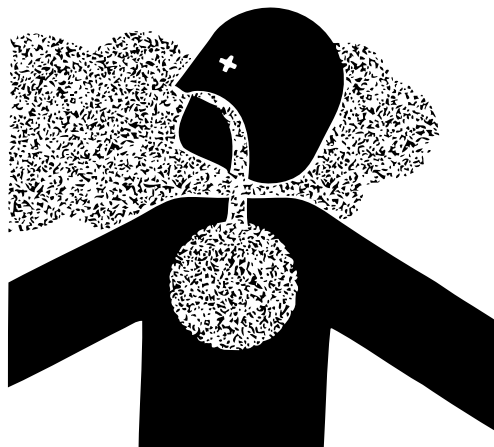
Wear safety glasses and gloves, and depending on the wand use, a particle mask may be necessary.



BEWARE OF EXHAUST FUMES

⚠ WARNING Exposure to engine exhaust fumes can cause severe injury or death. Always work in a properly ventilated area.

If it is necessary to run an engine in an enclosed area, use the proper equipment to safely remove the exhaust fumes from the working area.



AVOID PINCH POINTS

⚠ WARNING Moving parts or the mishandling of parts can cause severe personal injury.

Keep hands away from moving parts.

Watch your fingers, hands, and legs while equipment is in operation.

Handle parts carefully to avoid crushing and pinch point hazards.



FIRE PREVENTION

⚠ CAUTION Fires can cause injury or property damage.

Keep equipment clean. Remove all debris from equipment.

Have a fire extinguisher available at all times. Keep the fire extinguisher fully charged.



PRESSURIZED COOLING SYSTEM

⚠ WARNING Cooling system under pressure. Explosive release of HOT engine coolant can cause severe burns. SLOWLY remove the radiator cap ONLY if the engine is cool.



BE CAUTIOUS OF OIL COOLER FINS

⚠ WARNING Oil cooler fins are SHARP and may cause injury if touched.

Oil cooling system may be HOT and cause severe burns if contacted.

Always use gloves when near the oil cooler. Perform service on oil cooler only when cool.



UNAUTHORIZED WELDING

⚠ WARNING Unauthorized welding can cause structural failure resulting in possible injury or death.

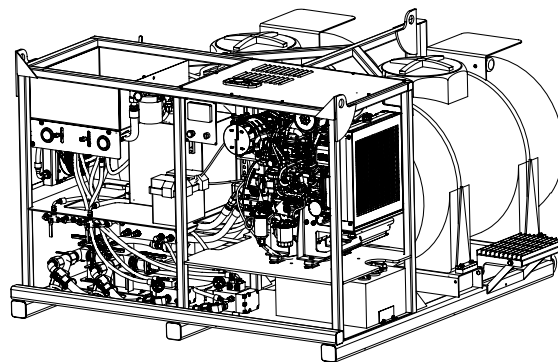
Do not weld on any structural member.
Unauthorized welding or repair will void the warranty.



REGULARLY CLEAN AND INSPECT EQUIPMENT

Remove any grease, oil, or debris buildup to avoid potential injury or equipment damage.

Inspect equipment for damage. If damaged, repair or replace immediately.



PRACTICE SAFE MAINTENANCE

⚠ WARNING Unexpected movement may cause serious personal injury.

Shutdown engine before performing any maintenance, adjustments, or removing obstructions.

Only trained and qualified personnel should perform any maintenance or repairs.

Keep the area around the equipment clean and dry when performing maintenance.

Do not service the machine while it is in operation.

Replace worn or damaged parts. Remove grease, oil, or debris buildup.



SLIPPERY WHEN WET

⚠ WARNING Slips and falls can cause serious personal injury.

Ensure firm footing in wet or slippery conditions.

Replace skid-resistant material if it is damaged or missing to prevent slips and falls.

Remove any buildup of grease, oil, or debris.



KEEP JOB SITE CLEAN AND ORGANIZED

⚠ WARNING Tripping can cause serious personal injury.

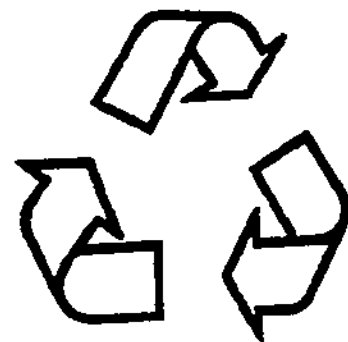
Be sure to keep job site clean and organized.



RECYCLE WASTE

Follow local, state, federal, and international regulations when recycling or disposing of waste. Waste includes fluids/oil, fuel, filters, coolant, and batteries.

Use leakproof containers when draining fluids/oil. Do not pour waste on the ground, down a drain, or into any water source.

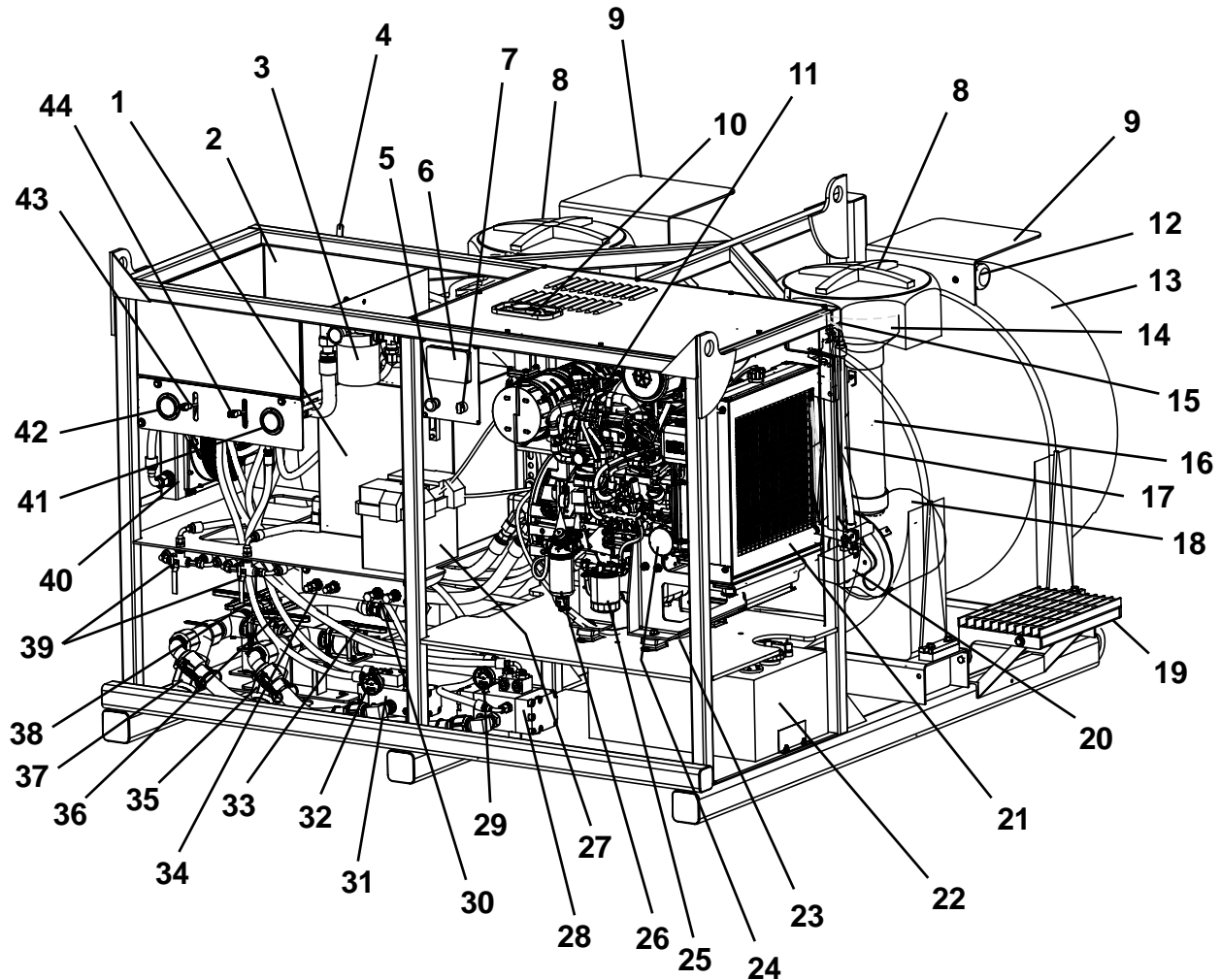


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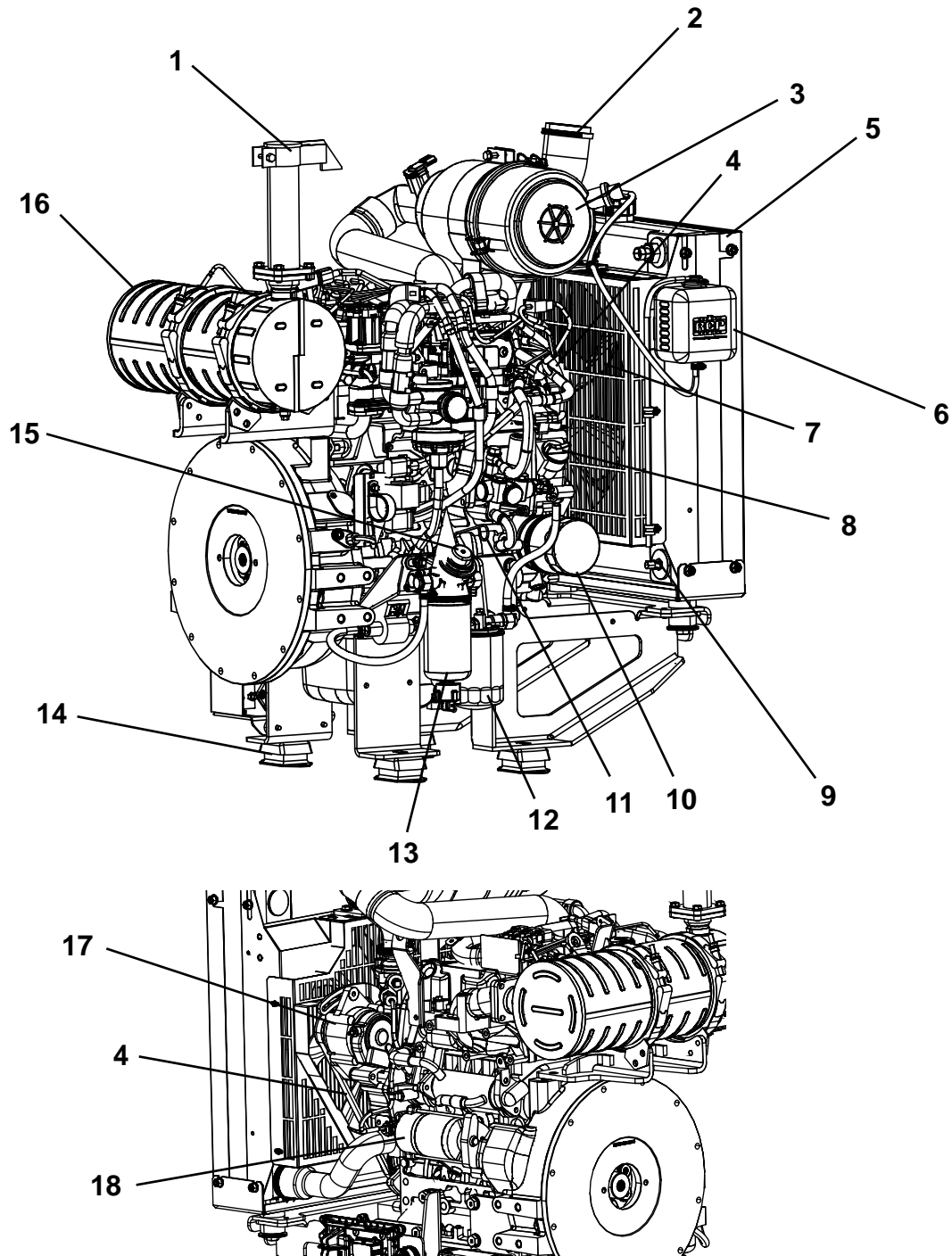
Terminology

BENTONITE & LUBRICATION PUMP - 2325B/D



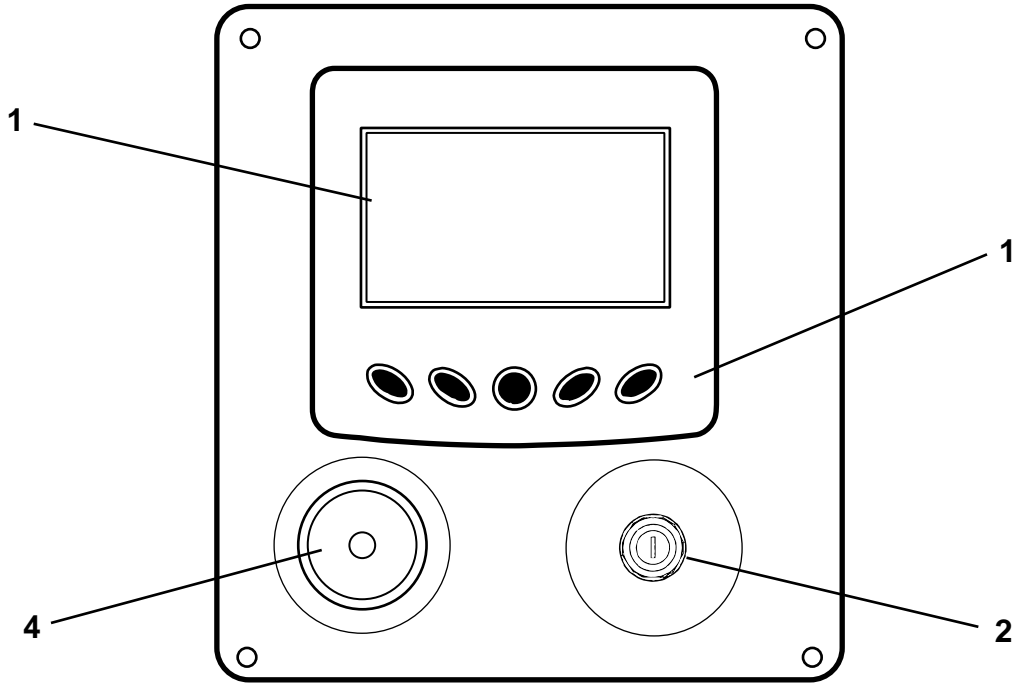
- | | | |
|---------------------------------|---------------------------------|-------------------------------------|
| 1. Hydraulic Tank (25 gal.) | 17. Mixer/Agitator Mount | 32. Piston Pump Fluid |
| 2. Storage Basket | 18. Agitator Chamber | Pressure Gauge 6 Gal. |
| 3. Hydraulic Return Filter | 19. Step | 33. Tank Shutoff Valve - Right Tank |
| 4. Mixer Control - Left Tank | 20. Mixer Motor With Propeller | 34. Hose Connection 6 Gal |
| 5. Emergency Stop | 21. Radiator | PSI/Return |
| 6. Engine Monitoring Display | 22. Diesel Fuel Tank (18 gal.) | 35. Strainer & Element - Right Tank |
| 7. Engine Ignition Switch | 23. Engine Drain Hose | 36. Bypass Shutoff Valve |
| 8. Tank Lid | 24. Engine Oil Filter | 37. Strainer & Element - Left Tank |
| 9. Shelf | 25. Primary Fuel Filter | 38. Tank Shutoff Valve - Left Tank |
| 10. Exhaust | 26. Fuel Water Separator Filter | 39. Fluid Return Valves |
| 11. Diesel Engine | 27. Battery | 40. Oil Cooler |
| 12. Manual Storage Tube | 28. Piston Pump 10 GPM | 41. Pump 10 GPM Hydraulic |
| 13. Lubrication Tank (325 gal.) | 29. Piston Pump Fluid | Pressure Gauge |
| 14. Removable Reducer Coupling | Pressure Gauge 10 Gal. | 42. Pump 6 GPM Hydraulic |
| 15. Mixer Control - Right Tank | 30. Hose Connection 10 Gal | Pressure Gauge |
| 16. Mix Tube | PSI/Return | 43. Pump/Mixer Selector 6 Gal. |
| | 31. Piston Pump 6 GPM | 44. Pump/Mixer Selector 10 Gal. |

ENGINE - 2325B/D KUBOTA ENGINE



- | | |
|--------------------------|-------------------------------------|
| 1. Exhaust | 10. Oil Filter |
| 2. Air Intake | 11. Engine Oil Dipstick |
| 3. Air Cleaner | 12. Primary Fuel Filter |
| 4. Fan Belt | 13. Fuel Water Separator Filter |
| 5. Radiator | 14. Motor Mount |
| 6. Coolant Overflow Tank | 15. Diesel Fuel Primer |
| 7. Engine Cooling Fan | 16. Diesel Particulate Filter (DPF) |
| 8. Engine Oil Fill Plug | 17. Alternator |
| 9. Coolant Drain | 18. Starter |

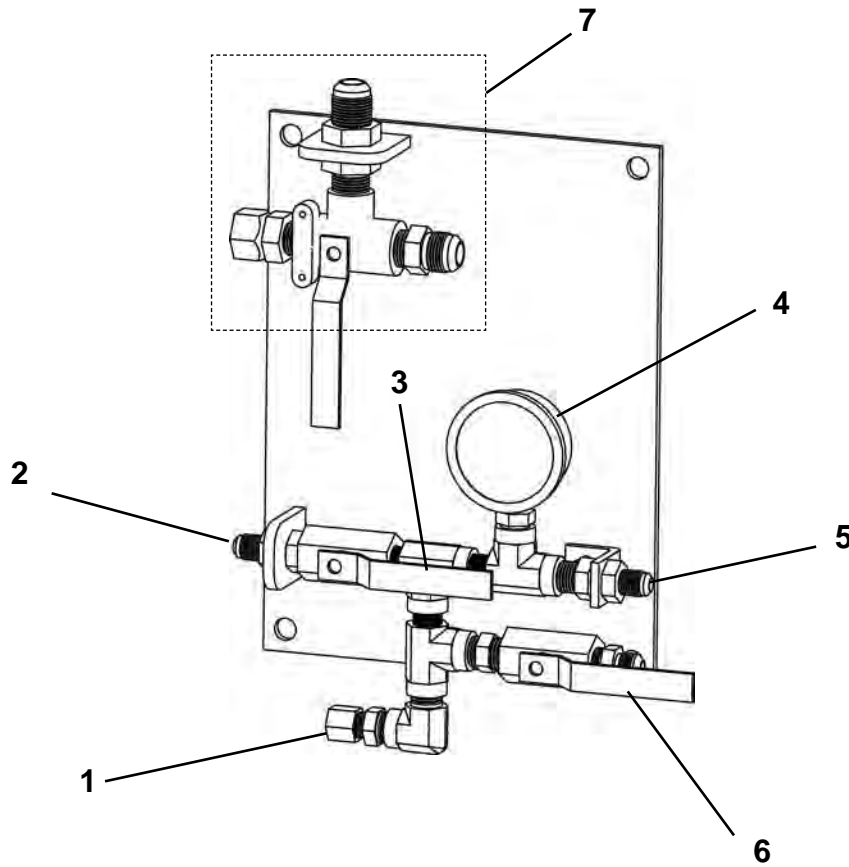
ENGINE MONITORING DISPLAY & CONTROLS



- 1. Engine Monitoring Display
- 2. Soft Key Selection Enter Buttons

- 3. Key Ignition Switch
- 4. Emergency Stop

PUMP SHAFT CONTROL



- 1. Washer Wand or Auxiliary Jetting Pressure OUT
- 2. Tooling Pressure OUT
- 3. Pressure Shutoff Valve

- 4. Pressure Gauge 2500 psi Max.
- 5. Pressure IN
- 6. Return Shutoff Valve
- 7. Circuit Control

Controls & Instruments

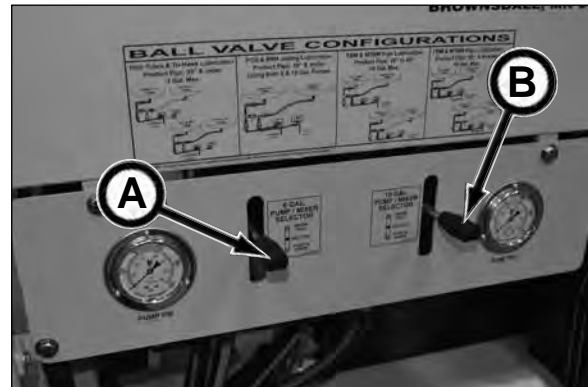
PUMP/MIXER SELECTORS

The Pump/Mixer Selectors (A - 6 Gal., B - 10 Gal.) are used to regulate the fluid for motor startup, tank recirculation, solution mixing and tooling lubrication by controlling the fluid pump and the in-tank agitator (mixer) functions as follows:

| | |
|---------------|-------------------|
| Mixer Only* | - Up Position |
| Neutral | - Middle Position |
| Pump & Mixer* | - Down Position |

Before starting pump motor, there must be enough water/solution in each tank to cover inlet and the pump/mixer selector **MUST** be in the neutral position.

* The Mixer Control must be at the ON position.

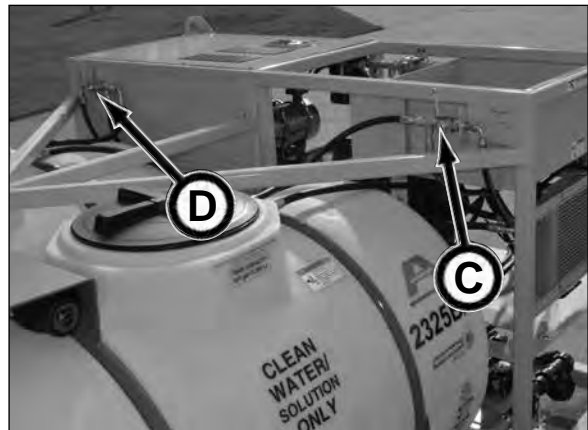


MIXER CONTROLS

The mixer controls (C - Left Tank, D - Right Tank) regulate the hydraulic oil to the mixer motor.

With the mixer control in the ON position, the hydraulic oil will flow to the mixer motor and then return to tank. If the Pump/Mixer selector is at the Mixer only position, the Mixer control must be at the ON position, otherwise the mixer will not operate.

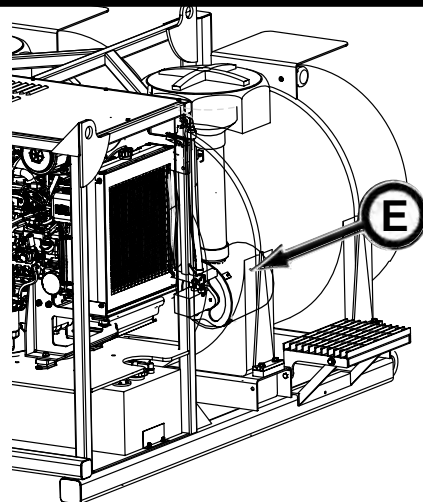
With the mixer control in the OFF position, the hydraulic oil will flow back to tank thus bypassing the mixer. If the Pump/Mixer selector is at the Pump & Mixer position, only the pump will operate, no mixing.



IN-TANK AGITATOR (MIXER)

The in-tank agitator system (E) aggressively mixes liquid based polymers and bentonite up to a viscosity (Marsh Funnel) of 100 seconds to prevent fluid settlement during mixer only or pump & mixer control functions. The agitator is controlled with the Pump/Mixer Selector. The Mixer control must be in the Mixer On position.

Before starting pump, be sure the Pump/Mixer Selector is in the neutral position.



SHUTOFF VALVES

TANK SHUTOFF VALVES

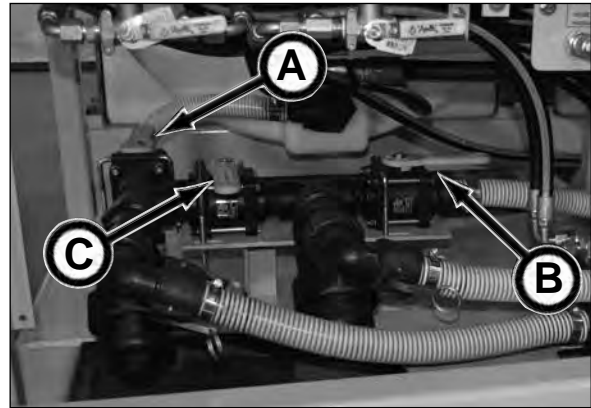
The tank shutoff valves (A - left tank, B - right tank) are used to open and close the tank supply outlets.

NOTICE

The tank shutoff valves **MUST** be open before starting the pump. Failure to do so could cause damage to pump and cause the hydraulic oil to heat up.

BYPASS VALVE

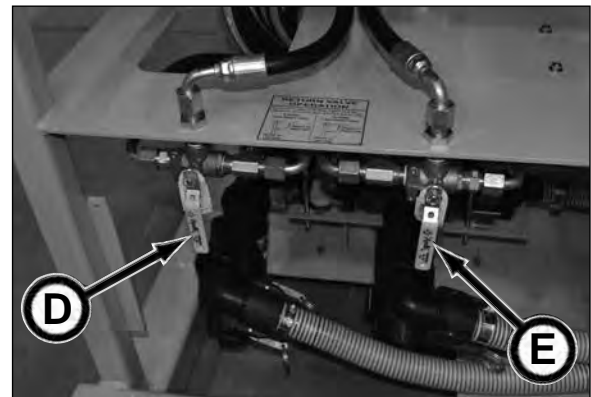
The bypass shut off valve (C) is used to divert fluid from one or both tanks to one pump or both pumps.



FLUID RETURN VALVES

The 6 (D) and 10 (E) gallon fluid return valves allow the operator to control the return fluid to a specific (right or left) tank.

Refer to decal for valve operation.



PRESSURE GAUGES

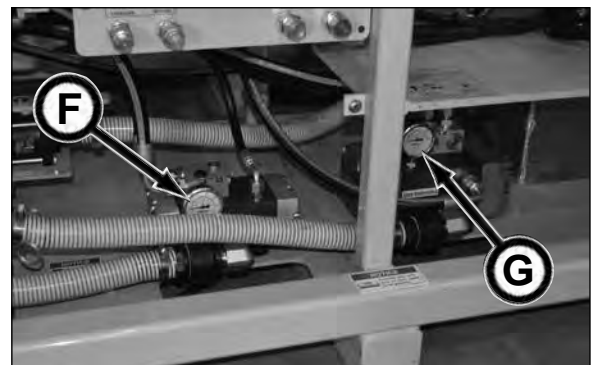
Piston Pump Fluid Pressure Gauges

The piston pump pressure gauges display the fluid pressure of the piston pump.

6 Gal. Pump Pressure Gauge (F)

10 Gal. Pump Pressure Gauge (G)

Maximum pressure is 2,500 psi (17,237 kPa)



Piston Pump Hydraulic Pressure Gauges

The piston pump pressure gauges display the hydraulic oil pressure of the piston pump.

6 Gal. Pump Pressure Gauge (H)

10 Gal. Pump Pressure Gauge (I)

Maximum pressure is 2,500 psi (17,237 kPa)



HYDRAULIC TANK

The hydraulic tank provides hydraulic oil for the fluid pumps and mixer motors. The tank includes a temperature and sight gauge (A).

Fill oil until fluid reaches high mark on sight gauge.

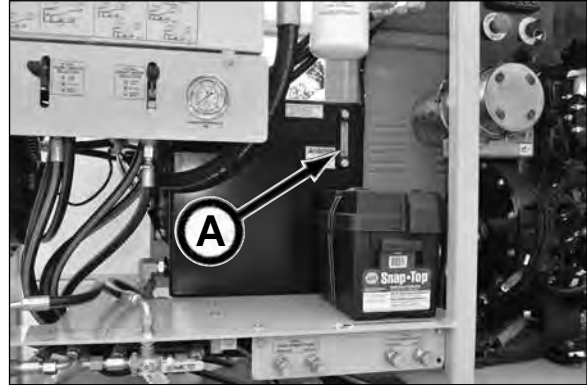
Recommended hydraulic oil:

| Ambient Temp. | Hydraulic Oil |
|-------------------|---------------|
| below 70°F (21°C) | ISO 46 |
| above 70°F (21°C) | ISO 68 |

NOTICE

Do not mix oil manufacturers or grades.

Hydraulic oil tank capacity is 25 gal. (94.6 L).



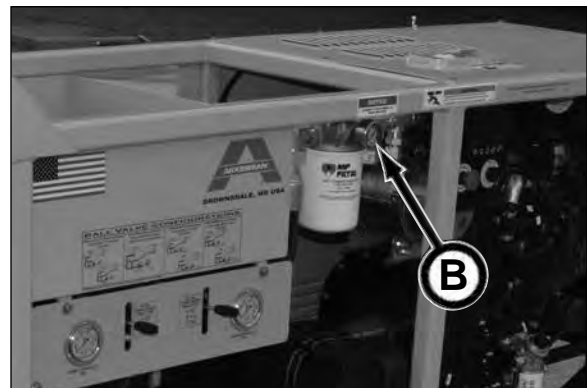
HYDRAULIC RETURN FILTER INDICATOR

To prevent over or under servicing of the hydraulic return filter, a filter indicator (B) has been installed on the return filter housing.

The green OK zone indicates that the filter is functioning properly.

The yellow zone indicates that the filter will soon require replacement.

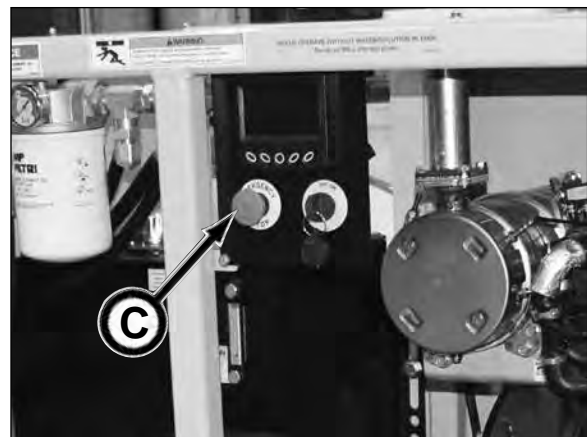
When the needle on the gauge is in the red CHANGE zone, replace filter as soon as possible to prevent component damage (for more information, refer to Check Hydraulic Return Filter in section 9, Periodic Maintenance).



EMERGENCY STOP BUTTON

Push Emergency Stop button (C) IN to stop all electrical and hydraulic functions.

This button must be pulled out to restart engine.



KEY IGNITION SWITCH

NOTICE

For additional engine information, refer to your engine operation manual.

The key ignition switch controls the engine electrical system.

OFF

The key can be inserted and removed in this position. BEFORE shutting down the engine, allow engine to idle, without load for 5 minutes. This will allow engine components to slightly cool before the engine is shut down.

ON

When the key switch is turned to the ON position, power is applied to the engine and engine monitoring display. After the engine preheat process is complete, the engine monitoring screen will appear. Press the soft key button beneath START (A) on the display. The engine will start. If the engine does not start in 15 seconds, turn the key switch to OFF, otherwise the starter motor will overheat.



ENGINE SPEED CONTROL

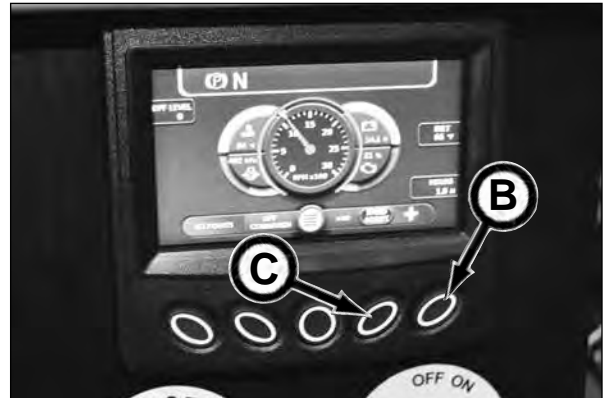
NOTICE

For additional engine information, refer to your engine operation manual.

Use the speed adjust buttons to increase or decrease the engine speed.

Increase Speed (+): Press softkey button (B) to the desired speed.

Decrease Speed (-): Press softkey button (C) to the desired speed.



HOURMETER

NOTICE

For additional engine information, refer to your engine operation manual.

The hourmeter (D) is displayed on the engine monitoring display indicating the total number of hours the engine has run.

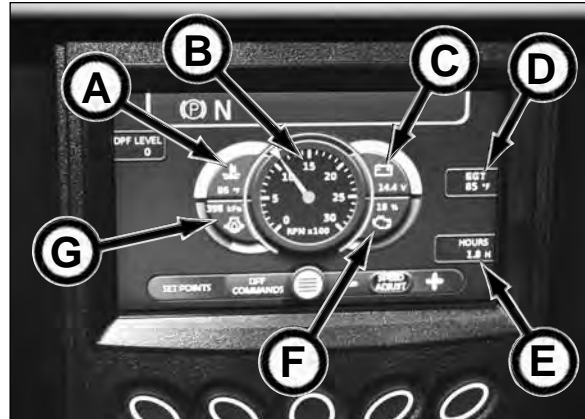


ENGINE MONITORING DISPLAY

NOTICE For additional engine information, refer to your engine operation manual.

The engine monitoring display appears once the preheat process has completed. Once the engine is started the gauges and indicators will be active.

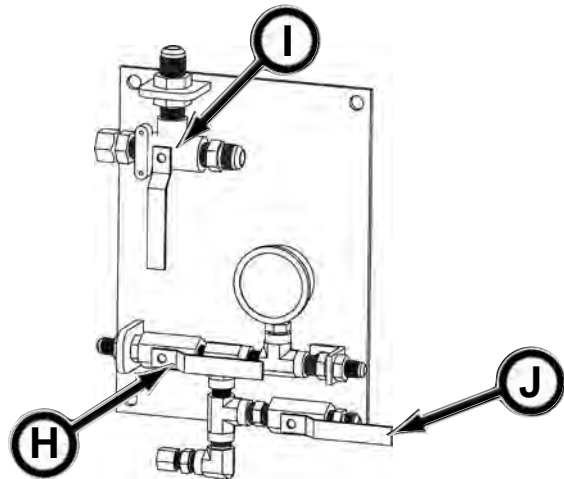
- Coolant Temperature (A)
- Engine RPM (B)
- Battery Voltage (C)
- Exhaust Gas Temperature (D)
- Hourmeter (E)
- Engine Load % (F)
- Oil Pressure (G)



FLUID VOLUME CONTROL

Use the pressure (H) and return (I) shutoff valves on the pump shaft control to adjust the fluid volume.

Using the auxiliary shutoff valve (J) on the pump shaft control, allows the 2325B series to pump additional/different fluid to the pipeline.



PUMP SHAFT CONTROL

The shaft control (A) allows the operator to control the jetting/lubrication from the launch or reception shafts. The control is connected directly to the 2325B series pump pressure and return ports.

Use a combination of the circuit ball valves (B and C) to control water/solution to component, washer wand or auxiliary, or to tank (Bypass Mode).

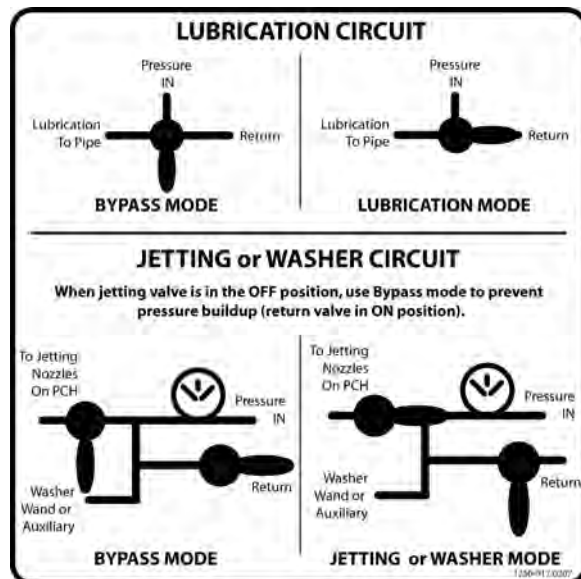
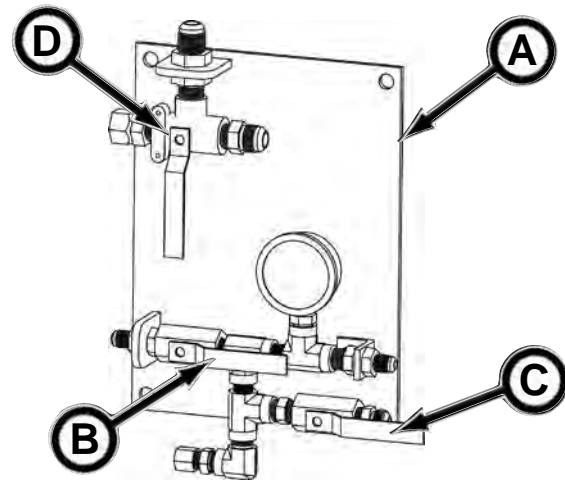
The control provides lubrication to:

- steering head for lubrication to outside of pilot tubes
- pilot tube adapter for lubrication to spoils for reaming head or open cutter head
- jetting on Powered Reaming Head
- washer wand or auxiliary

NOTICE

The washer wand or auxiliary is available in either the Jetting/Washer Mode or Bypass Mode.

Use the auxiliary shutoff valve (D) on the pump shaft control, to pump additional/different fluid to the pipeline.



Pre-Start Inspection

⚠ WARNING

Do not operate this equipment until you read, study, and understand this manual, the engine operation manual, and any other equipment manuals that may be used. A daily inspection of the equipment must be performed to prevent severe personal injury or death and equipment damage.

The contractor is fully responsible for the safety of all personnel on the job site. Check with the contractor that all site preparation requirements are in place. Be sure to comply with all MSHA and OSHA regulations, such as: an active safety program is in practice, a confined space permit (if needed) is issued, personal protective equipment is being worn; flammable, combustible, and hazardous materials are properly stored; and a lockout/tagout procedure is in place.

Use the following checklist ✓ as a guide for your daily pre-start inspection.

| | |
|--|---|
| | 1. Follow the MSHA (Mining Safety & Health Administration) and OSHA (Occupational Safety & Health Administration) regulations. |
| | 2. Contractor is responsible for all personnel to wear proper protective equipment on the job site. Replace equipment if defective. |
| | 3. Combustible, toxic and oxygen deficiency detectors MUST be in place, tested, and in proper working condition. |
| | 4. A qualified electrician must check that all electrical connections are properly secured and grounded prior to operation. |
| | 5. Water/solution must be in tanks prior to start up. |
| | 6. Be sure Pump/Mixer Selectors are in neutral position and Mixer Controls are in OFF position. |
| | 7. Be sure pump shaft control shutoff valves are in Bypass position. |
| | 8. The tank shutoff valve(s) MUST be open prior to starting the pump(s). |
| | 9. All pump connections must be secure to prevent cavitation. |
| | 10. Clean strainer(s) before operating pump(s). |
| | 11. USE ONLY CLEAN WATER SOURCE. |
| | 12. Check controls and switches for proper operation. Repair or replace if damaged or worn. |
| | 13. Remove combustible or flammable materials from equipment. Store materials properly. |
| | 14. Check engine diesel fuel level. Add as needed. |
| | 15. Check engine oil level. Add as needed. |
| | 16. Check hydraulic oil level. Add as needed. |
| | 17. Check belt tension. Tighten as needed. |
| | 18. Check controls and switches for proper operation. Repair or replace if damaged or worn. |
| | 19. Inspect equipment for damage. Repair or replace as needed. |
| | 20. Thoroughly clean equipment of mud and dirt. |
| | 21. Be sure all shrouds, covers and guards are in place and securely fastened before operation. |
| | 22. Check for loose or missing hardware. Replace damaged or missing hardware. |
| | 23. Check for worn, loose, or damaged wire connections. Repair or replace wiring connections. |
| | 24. Tighten loose clamps or fittings. |
| | 25. Check for fluid leaks. Repair leak or replace components. |
| | 26. If operating in freezing weather, be sure to constantly circulate water/solution to prevent freezing. |
| | 27. Keep job site clean and organized. |

NOTES

Operation

OPERATING GUIDELINES

⚠ WARNING

Do not operate this equipment until you read, study, and understand this manual, your engine manual and any additional equipment manuals before you operate this equipment. Failure to do so, could result in severe personal injury or death.

1. Before operating, read and understand the Safety, Pre-Start Inspection, and Operation sections.
2. Do not operate this equipment while under the influence of alcohol, drugs, or medication.
3. Follow all Federal, State, and Local safety regulations and procedures.
4. Be sure OSHA prescribed safety protective equipment is being worn by all personnel.
5. Be sure the area is safe for operation. Keep work site clean and orderly.
6. Have a fully charged fire extinguisher on the job site at all times.
7. Before operating, inspect equipment and conduct repairs as needed.
8. Test air monitoring and ventilation detectors for proper operation. Never enter a tunnel or shaft without combustible gas detectors and oxygen deficient detectors.
9. Never walk or work under any part of the excavator or crane and suspended loads.
10. Do not make any modifications to any Akkerman products. Doing so could cause structural failure and will void the warranty.
11. Check shields and guards. They must be in place and undamaged prior to operation.
12. The tank shutoff valves **MUST** be open and the tanks filled with water/solution prior to starting the engine. Failure to do so will cause damage to pump after prolonged use without water/solution.
13. Check all fluid levels (fuel, hydraulic, engine oil) before operating. Add as necessary.
14. Remove combustible or flammable materials from equipment.
15. Test all controls and switches to make sure they operate properly.
16. Place all controls in neutral before start up.
17. Stop engine before making repairs, adjustments, or removing obstructions from mixing tanks.
18. Eye, ear and respiratory protection **MUST** be worn by operator while filling tanks with chemicals such as wetting agents, polymer, etc.
19. Never dry run or operate pump(s) with tank shutoff valve(s) closed.
20. In cold weather operation, constantly circulate water/solution to prevent freezing.
21. At daily shutdown or if pump will not be operated for a prolonged period of time in freezing weather, flush and drain pump and ALL fluid lines to prevent clogging or freezing.
22. Keep ALL parts of the body and foreign objects from coming in contact with mixer shaft or propeller during pump operation.
23. If using a pressure washer wand, **NEVER** point the wand towards a person or animal. Also, be sure to release pressure after use and before performing maintenance to prevent accidental fluid injection.
24. If repairs are necessary to equipment, before making repairs, be sure to lockout tagout power source to prevent accidental starting of equipment.
25. If this manual is lost, contact your Akkerman Aftermarket Support Representative for a new manual or download this manual from the Akkerman web site at www.akkerman.com.

LUBRICATION GUIDELINES

The lubrication type or mixture is based on soil conditions, consistency, clay, sand, cobble, etc. Your polymer supplier can help you with the proper lubrication mixture based on your Geotech report for the project.

Displaceable Ground:

- Control the flow so there is no lubrication flowing out of the pilot tubes in the launch shaft.
- As a guideline, typical usage of lubricant in pilot tube annular space is approximately 1 gal per foot. For example, on a 300 ft drive, approximately 300 gallons will be required.

Soft Rock With Tri-Hawk® Drill Bit

- Control the flow so there is lubrication flowing (flush cuttings) out of the pilot tubes in the launch shaft.
- As a guideline, use up to 4 gpm of lubricant to flush cuttings to launch shaft and for cooling of tool.



Before shutting down the lubrication pump, loosening pilot tube joints or adding additional pilot tubes, vent the fluid into a catch pan to relieve pressure and prevent the fluid from entering the inner tube of the pilot tube.

If using a lubricant other than clean water during pilot tube installation, the lubricant in the pilot tubes **MUST** be flushed with clean water before removing pilot tubes from the reception shaft. Remove the steering head, and use clean water to flush the pilot tubes until the water is clear and free of sediment. Failure to do so will result in the clogging of the fluid and/or sight path of the pilot tubes.

Use of polymers and bentonite with fluid mixtures up to 100 seconds (Marshall Funnel) viscosity can be used in the 2325B series Bentonite & Lubrication Pump.

As a guideline, typical usage of lubricant in overcut annular space is approximately:

| <i>Casing/PRH/PCH Size</i> | <i>Lubricant Per Ft</i> | <i>Lubricant Per 300 Ft Drive</i> |
|----------------------------|-------------------------|-----------------------------------|
| 11" Casing | 1.5 gal. | 450 gal. |
| 14"/16" Casing/PRH 14/16 | 2.0 gal. | 600 gal. |
| 20" Casing/PRH 20/PCH 20 | 2.5 gal. | 750 gal. |
| PCH 22.5 | 3.0 gal. | 900 gal. |
| PCH 28.5 | 4.0 gal. | 1,200 gal. |
| PCH 36 | 4.5 gal. | 1,350 gal. |
| PCH 44 | 5.5 gal. | 1,650 gal. |

SETTING UP BENTONITE & LUBRICATION PUMP

1. Position the 2325B series Bentonite & Lubrication Pump on firm, level ground near desired area of use.

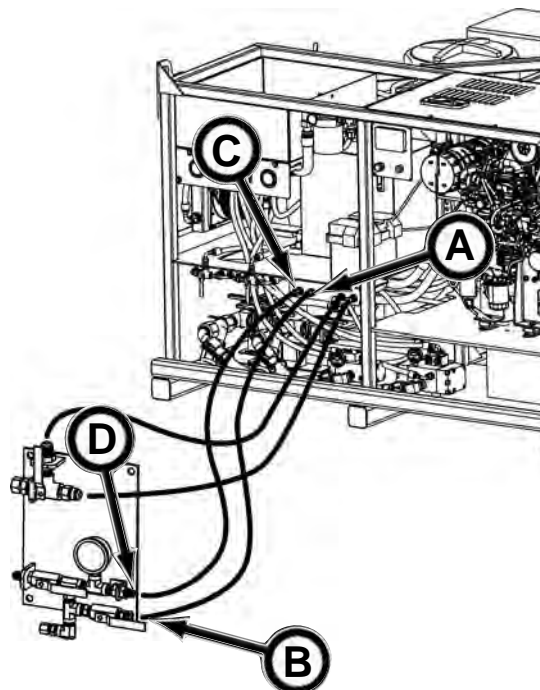
⚠ WARNING Do not position the pump near the edge of shaft where the ground may be unstable and cause a slide or cave-in. Doing so could cause severe injury or death.



2. Connect the 3/8 in. and 5/8 in. (if required) lubrication hoses to the pump and shaft control as follows:

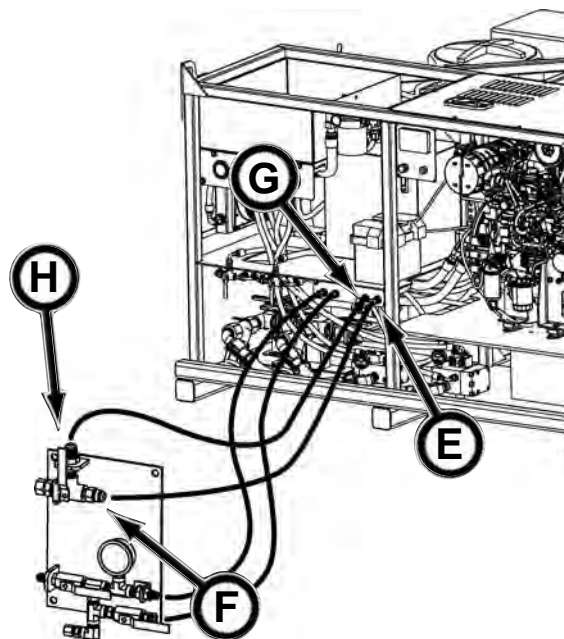
6 GPM LUBRICATION CIRCUIT (3/8 in. Hoses)

- a. Connect the 3/8 in. hose to pump return connection (A) and return connection (B) on shaft control.
- b. Connect the 3/8 in. hose to pump pressure connection (C) and Pressure IN connection (D) on shaft control.



10 GPM LUBRICATION CIRCUIT (5/8 in. Hoses)

- c. Connect the 5/8 in. hose to pump return connection (E) and return connection (F) on shaft control.
- d. Connect the 5/8 in. hose to pump pressure connection (G) and Pressure IN connection (H) on shaft control.



3. Once the jetting and lubrication hoses are properly connected, proceed to Jetting Circuit Hookup and/or Lubrication Circuit Hookup in the next few pages.

LUBRICATION 6 GPM CIRCUIT HOOKUP

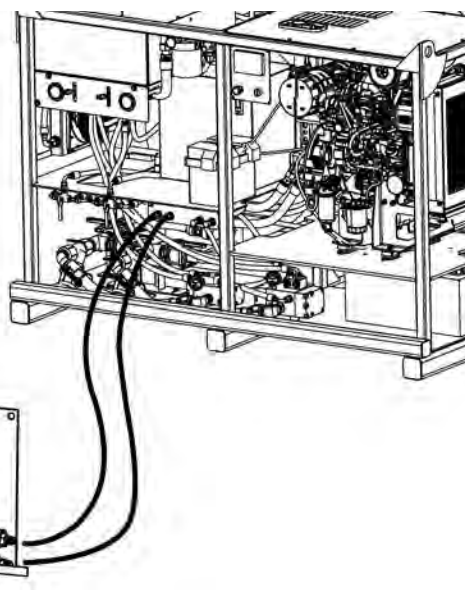
NOTICE

For information on how to arrange ball valves on pump and shaft control, refer to Pump Ball Valve Configurations and Using Shaft Control For Lubrication, later in this section.

The lubrication circuit provides lubrication/bentonite to:

- steering head for lubrication to outside of pilot tubes
- pilot tube adapter and reaming head for lubricating the outside of the casings
- lubrication ports on Powered Reaming Head
- lubrication ports on Powered Cutter Head
- washer wand or auxiliary

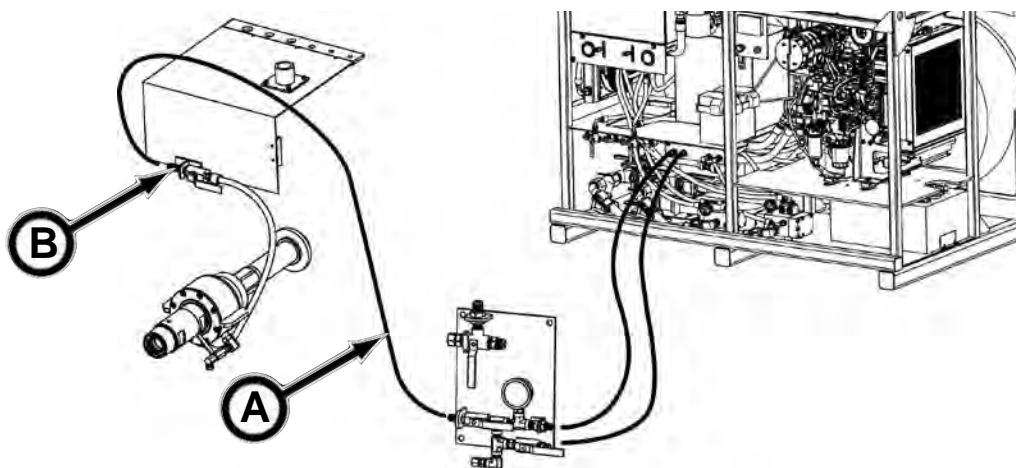
Hookup hoses based on the jetting/lubrication requirement as follows:



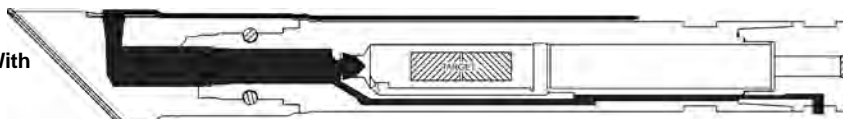
1. Lubricating Outside Of Pilot Tubes

Connect the lubrication hose (A) from the shaft control to the lube control valve (B) on the GBM. The lube control on the GBM is connected to the drive swivel which allows the lubricant to flow through the dual walled pilot tube annular space and out the steering head/Tri-Hawk® drill bit port.

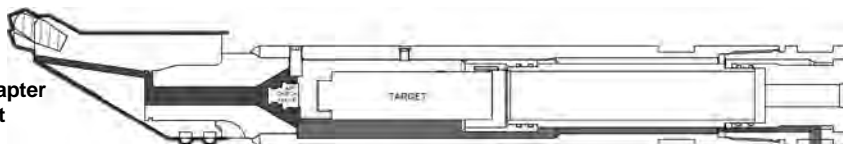
- (Displaceable Ground) control the lubrication flow so there is no lubrication flowing out of the pilot tubes in the launch shaft.
- (Soft Rock With Tri-Hawk® drill bit) control the lubrication flow so there is lubrication flowing (flush cuttings) out of the pilot tubes in the launch shaft.
- before loosening pilot tube joints, vent the fluid into a catch pan to relieve pressure and prevent the fluid from entering the inner tube of the pilot tube.
- Use of polymers and bentonite with fluid mixtures up to 100 seconds (Marshall Funnel) viscosity can be used in the 2325B series Bentonite & Lubrication Pump.



Steering Head Adapter With Steering Head Bit Fluid Path



Pilot Tube To TriHawk Adapter With Tri-Hawk Drill Bit Fluid Path



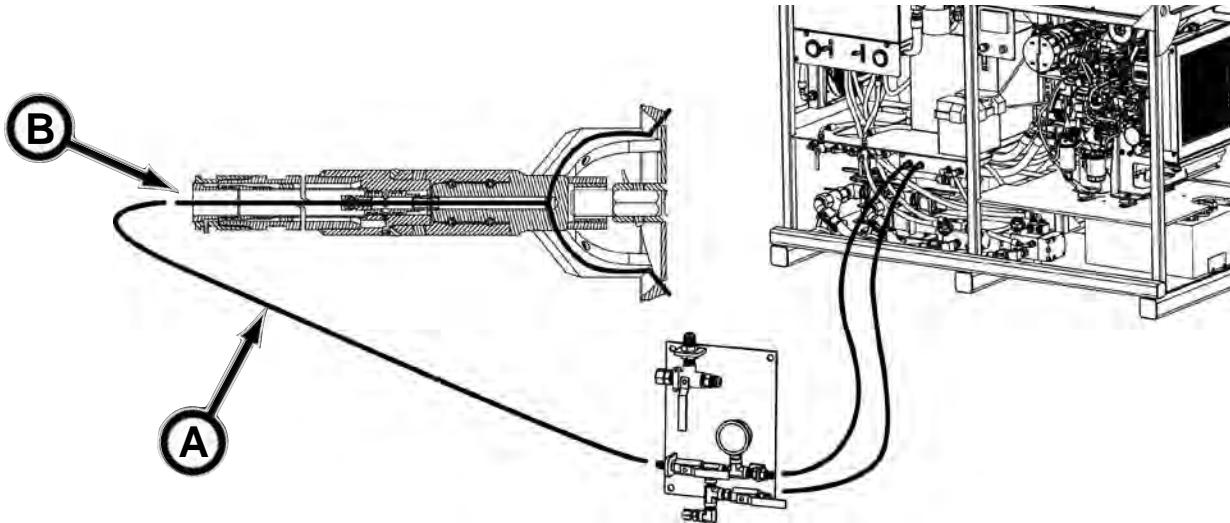
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Lubrication 6 GPM Circuit Hookup (continued)

2. Lubricating Outside Of Casing Using Reaming Head Lubrication Ports

Connect the lubrication hose (A) from the shaft control to the supply hose (B) connected to the fluid connector in the reaming head.

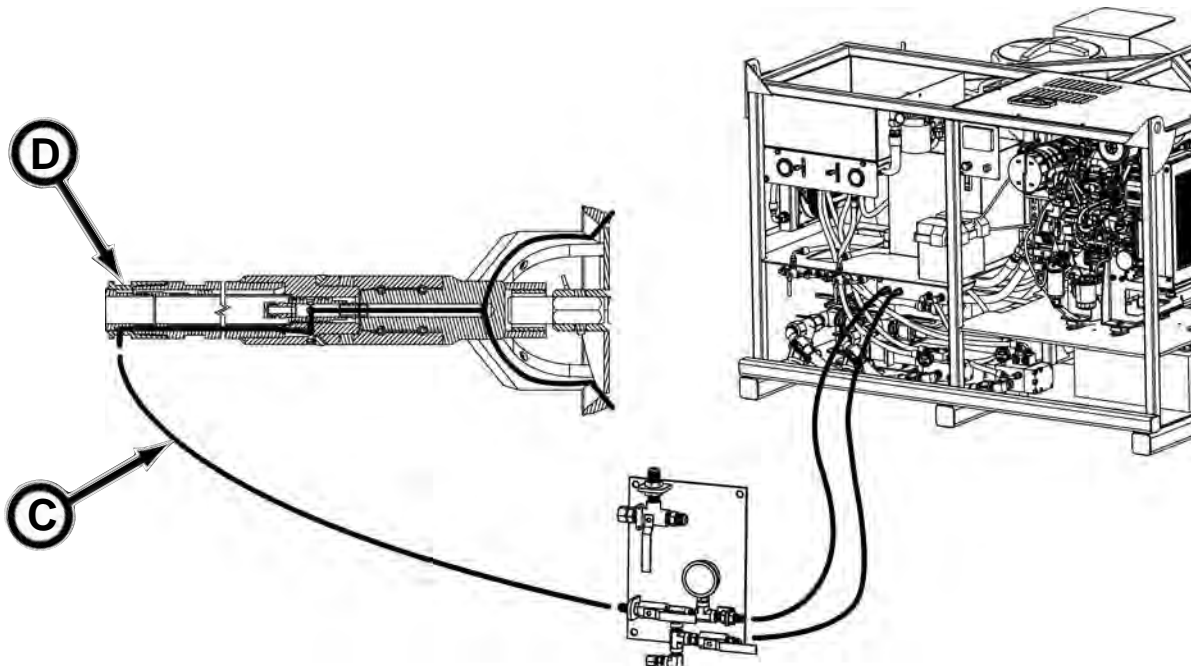
- the lubricant will flow through the supply hose into the reaming head fluid connector and out the lubrication ports of the reaming head arms to lubricate the outside of casings.



3. Lubricating Outside Of Casing With Reaming Head Assembly

Connect the lubrication hose (C) from the shaft control to the fluid connector (D) in reception shaft.

- the lubricant flows through the dual walled pilot tubes, pilot tube adapter, and out the lubrication ports on the reaming head arms to lubricate the outside of casings.

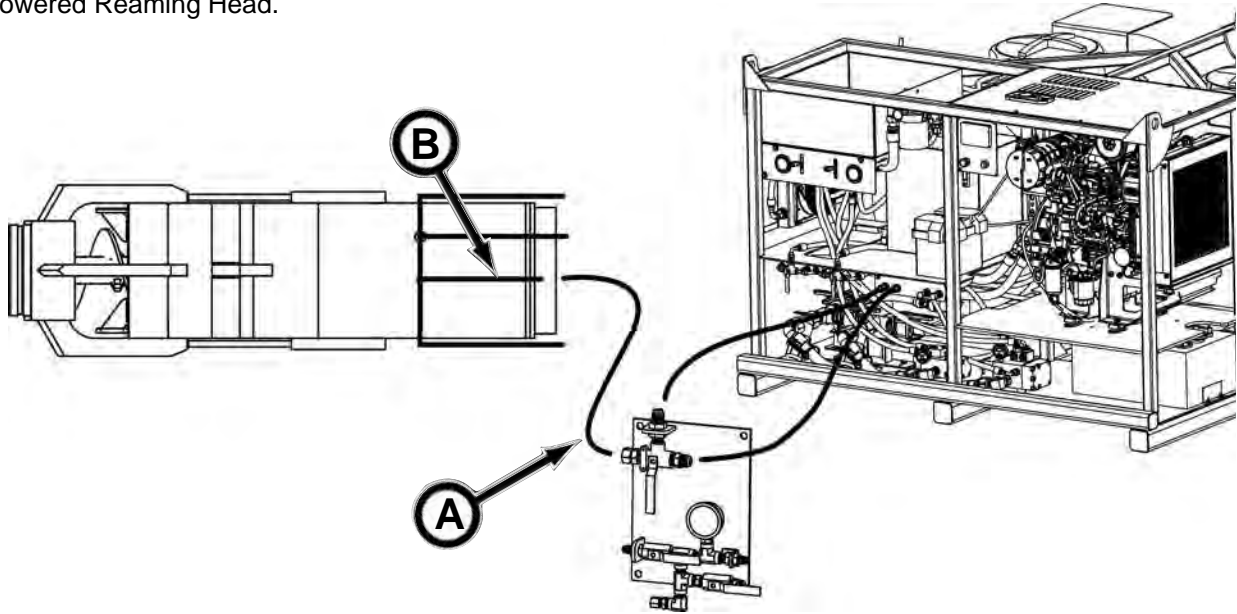


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Lubrication 6 GPM Circuit Hookup (continued)

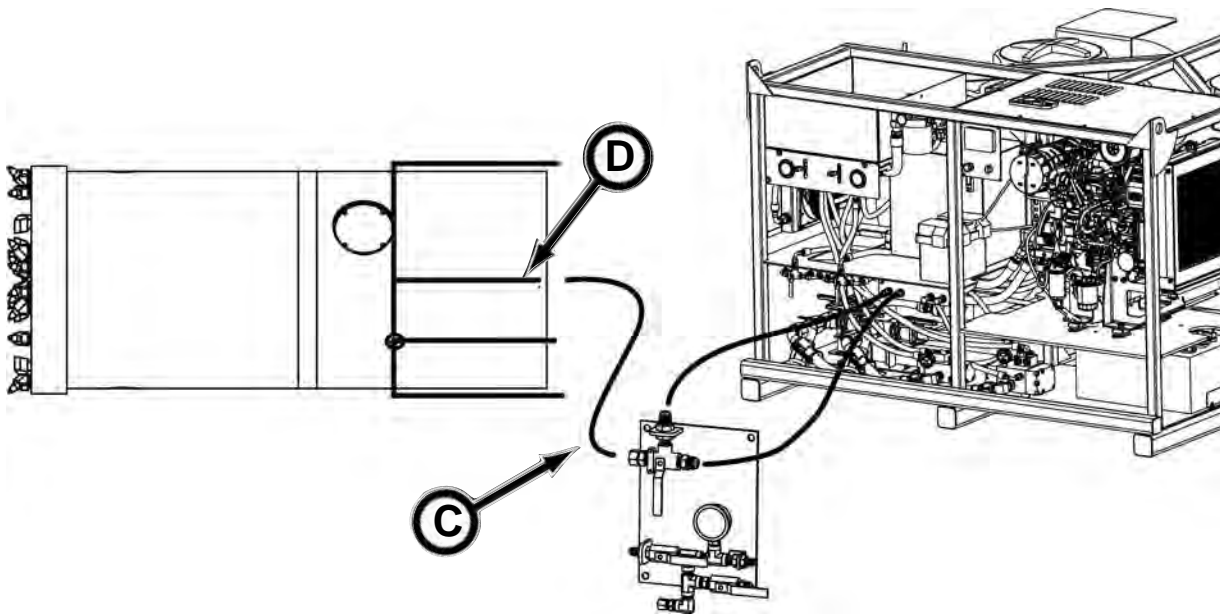
4. Lubricating Outside Of Product Pipe Using Powered Reaming Head Lubrication Ports

Connect the lubrication hose (A) from the shaft control to the lubrication hose (B) in the rear of the Powered Reaming Head.



5. Lubricating Outside Of Product Pipe Using Powered Cutter Head Lubrication Ports

Connect the lubrication hose (C) from the shaft control to the lubrication hose (D) in the rear of the Powered Cutter Head.



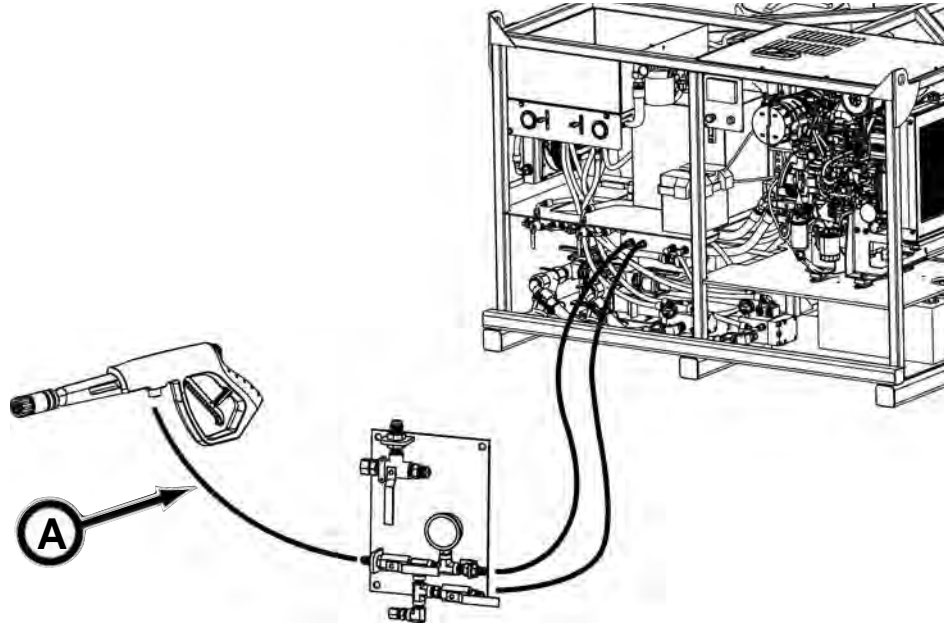
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Lubrication 6 GPM Circuit Hookup (continued)

6. Using Pressure Washer Wand or Auxiliary

Connect the jetting hose (A) from the shaft control to the washer wand or other auxiliary device.

- refer to the wand or auxiliary device operation manual for the proper safe operation.



WARNING Using the lubrication pump with a pressure washer wand can generate enough fluid pressure and velocity to penetrate skin resulting in serious personal injury.



Contact medical help immediately if fluid is injected into your skin. A serious infection or reaction can emerge without proper medical treatment.

NEVER point the wand towards a person or animal.

Be sure to release pressure after use and before performing maintenance to prevent accidental fluid injection.

Wear safety glasses and gloves, and depending on the wand use, a particle mask may be necessary.

LUBRICATION 10 GPM CIRCUIT HOOKUP

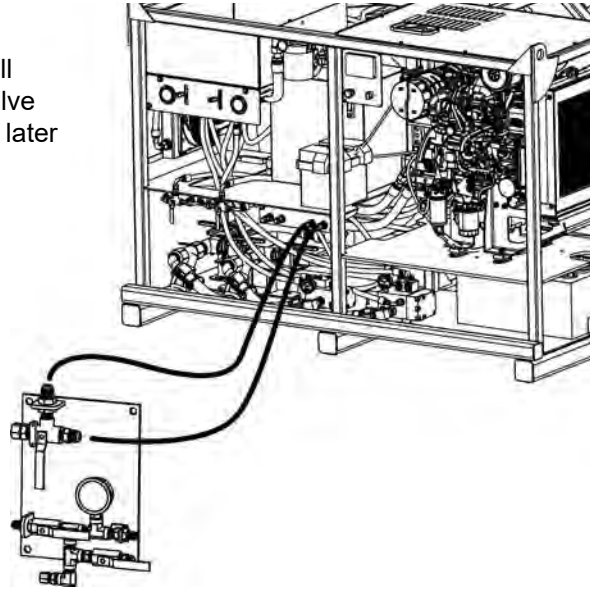
NOTICE

For information on how to arrange ball valves on pump and shaft control, refer to Pump Ball Valve Configurations and Using Shaft Control For Lubrication, later in this section.

The lubrication circuit provides lubrication/bentonite to:

- pilot tube adapter for lubrication to spoils for reaming head or open cutter head
- jetting on Powered Reaming Head
- jetting on Powered Cutter Head
- lubricate TBM/MTBM product pipe
- washer wand or auxiliary

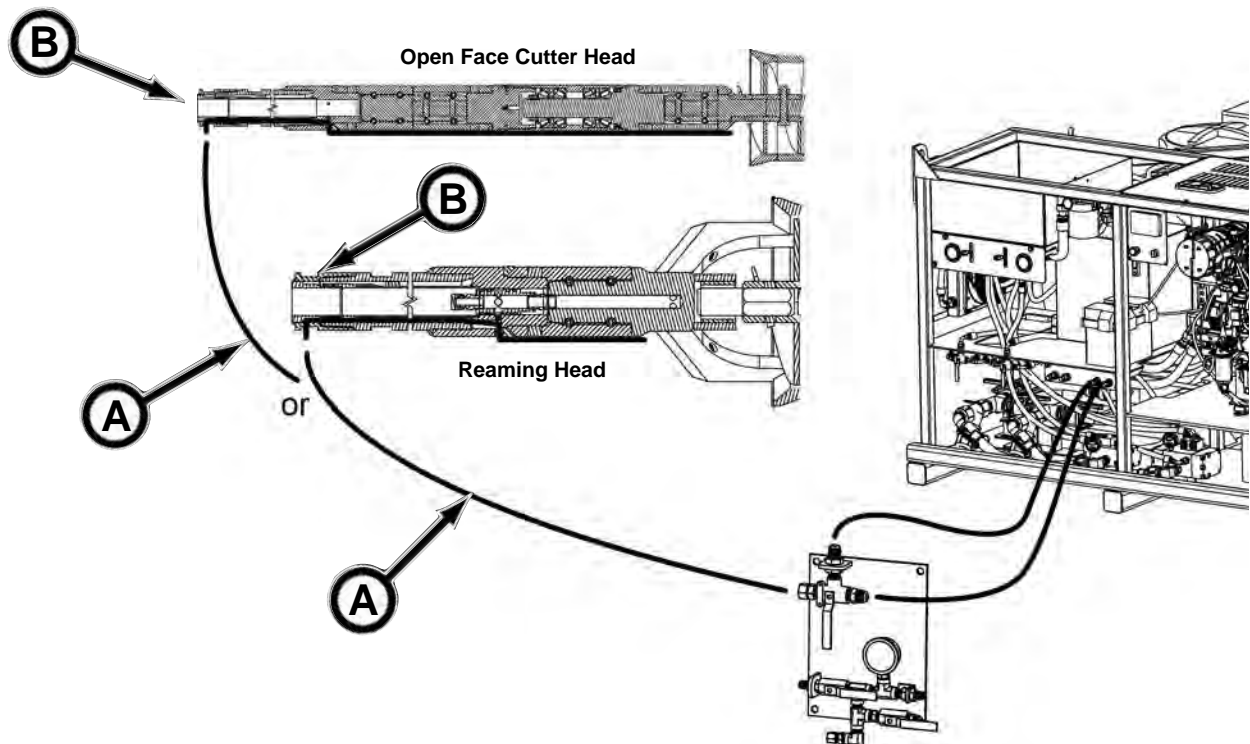
Hookup hoses based on the lubrication requirement as follows:



1. Lubricating Spoils For Reaming Head or Open Cutter Head

Connect the lubrication hose (A) from the shaft control to the fluid connector (B) in reception shaft.

- the lubricant flows through the dual walled pilot tubes and out the lubrication port on the pilot tube adapter to lubricate the spoils for the reaming head or open face cutter head.

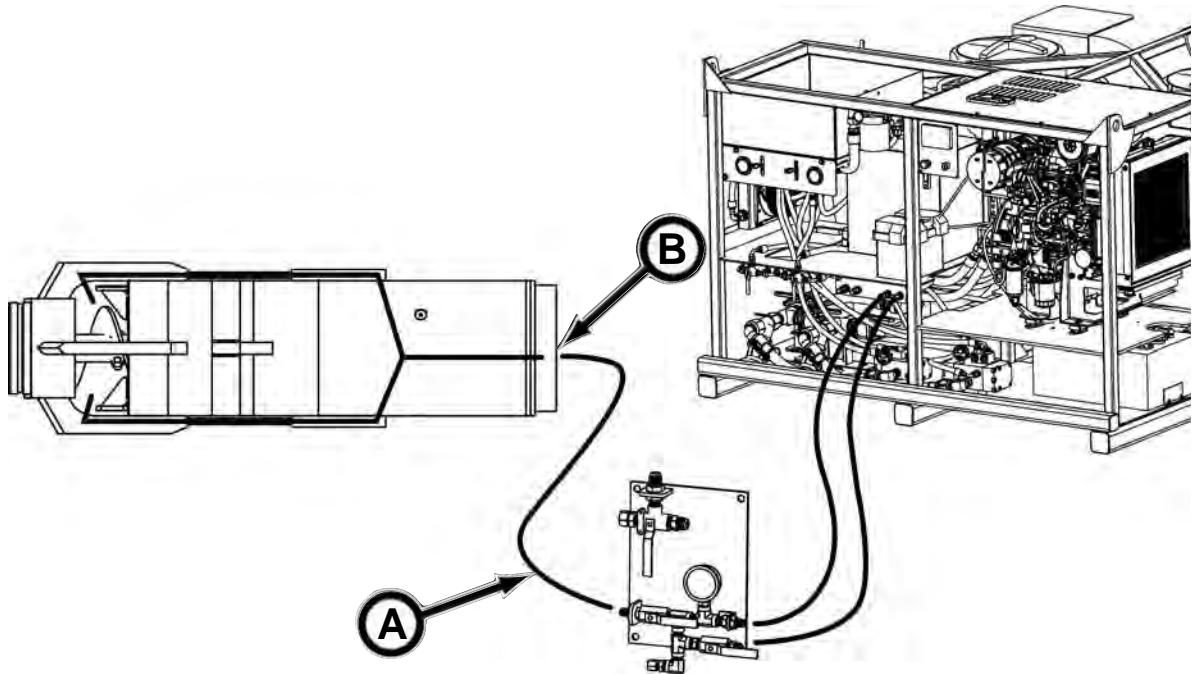


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Lubrication 10 GPM Circuit Hookup (continued)

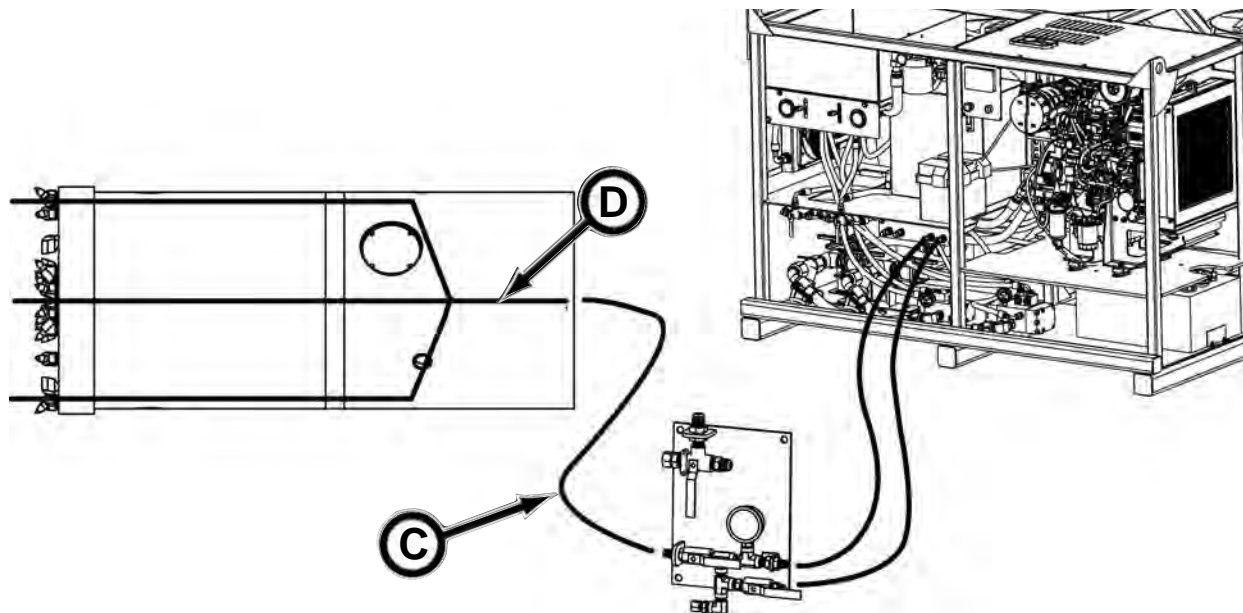
2. Powered Reaming Head Jetting Nozzles

Connect the lubrication hose (A) from the shaft control to the lubrication hose (B) in the rear of the Powered Reaming Head in the launch shaft.



3. Powered Cutter Head Jetting Nozzles

Connect the jetting hose (C) from the shaft control to the jetting hose (D) in the rear of the Powered Cutter Head.

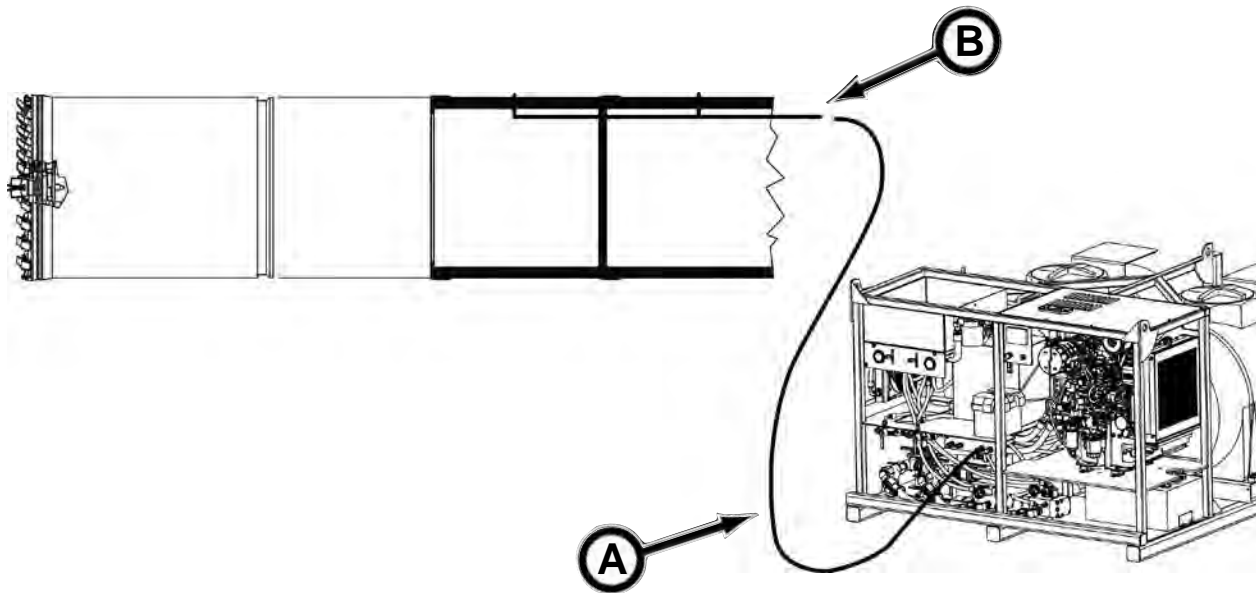


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Lubrication 10 GPM Circuit Hookup (continued)

4. TBM & MTBM Product Pipe (30" to 60" OD) Lubrication

Connect the lubrication hose (A) from the pump pressure port to the TBM/MTBM bentonite port system (B).



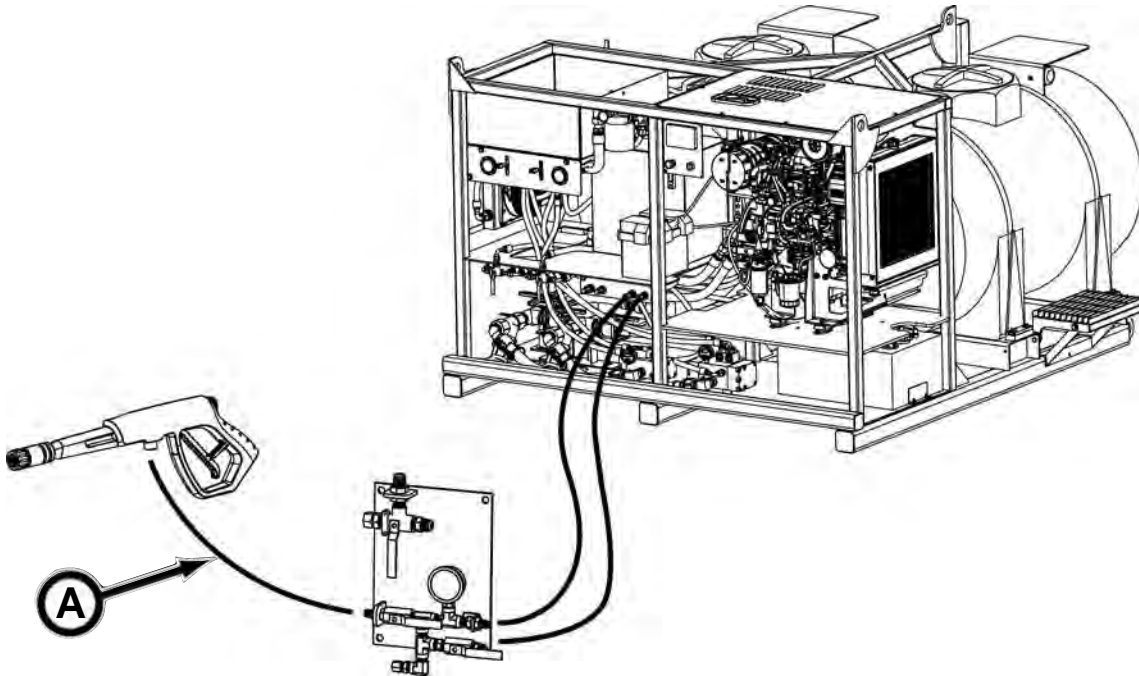
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Lubrication 10 GPM Circuit Hookup (continued)

5. Using Pressure Washer Wand or Auxiliary

Connect the jetting hose (A) from the shaft control to the washer wand or other auxiliary device.

- refer to the wand or auxiliary device operation manual for the proper safe operation.



⚠ WARNING Using the lubrication pump with a pressure washer wand can generate enough fluid pressure and velocity to penetrate skin resulting in serious personal injury.



Contact medical help immediately if fluid is injected into your skin. A serious infection or reaction can emerge without proper medical treatment.

NEVER point the wand towards a person or animal.

Be sure to release pressure after use and before performing maintenance to prevent accidental fluid injection.

Wear safety glasses and gloves, and depending on the wand use, a particle mask may be necessary.

LUBRICATION 16 GPM CIRCUIT HOOKUP

NOTICE For information on how to arrange ball valves on pump, refer to Pump Ball Valve Configurations later in this section.

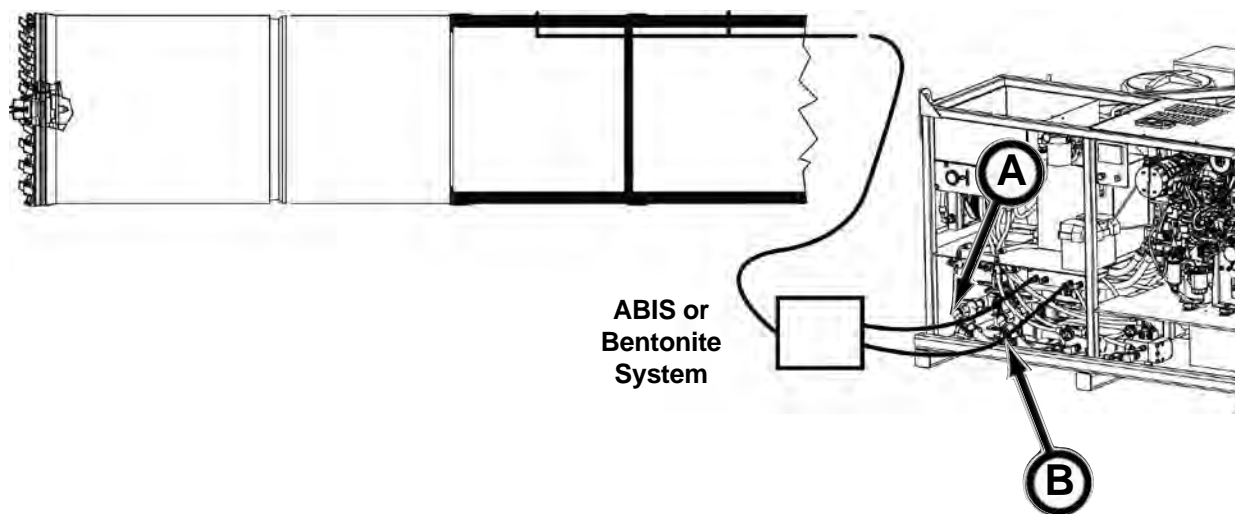
NOTICE When using 2325B series pump at 16 gal with a TBM or MTBM, A49342A Kit, TBM Applications is required. Contact your Akkerman Aftermarket Support representative for more information.

The lubrication circuit provides lubrication/bentonite to:

- TBM & MTBM pipe lubrication for product pipe 60" OD and greater.
- lubricate with 6 GPM and 10 GPM supply independently or combined for 16 GPM to meet lubrication requirements.

Hookup hoses based on the lubrication requirement as follows:

Connect the lubrication hose (A) from the 2325B series pump 6 GPM pressure port to the TBM/MTBM ABIS or bentonite system. Connect the lubrication hose (B) from the 2325B series pump 10 GPM pressure port to the TBM/MTBM ABIS or bentonite system.



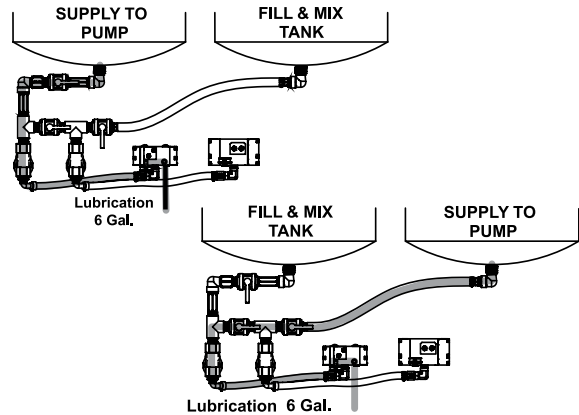
PUMP BALL VALVE CONFIGURATIONS

The tank supply ball valves and the bypass ball valve can be arranged to allow the 2325B/E Bentonite & Lubrication Pump to be used for assorted tunneling applications with various fluid pressure outputs.

I. Pilot Tubes & Tri-Hawk Lubrication - 6 Gal. Maximum

Product Pipe: 30" OD & Under

- open supply to pump tank ball valve
- close fill & mix tank ball valve

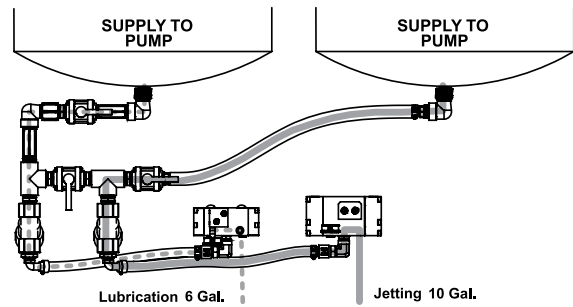


II. PCH & PRH Jetting/Lubrication

- Using Both 6 Gal. Max. & 10 Gal. Max. Pumps

Product Pipe: 30" OD & Under

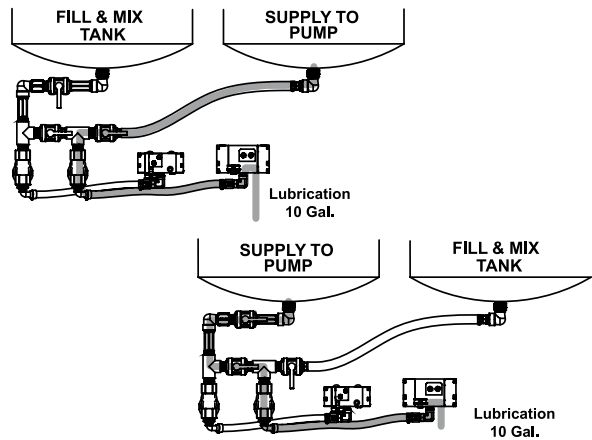
- open supply to pump tank ball valves
- close bypass ball valve



III. TBM & MTBM Pipe Lubrication - 10 Gal. Max.

Product Pipe: 30" to 60" OD

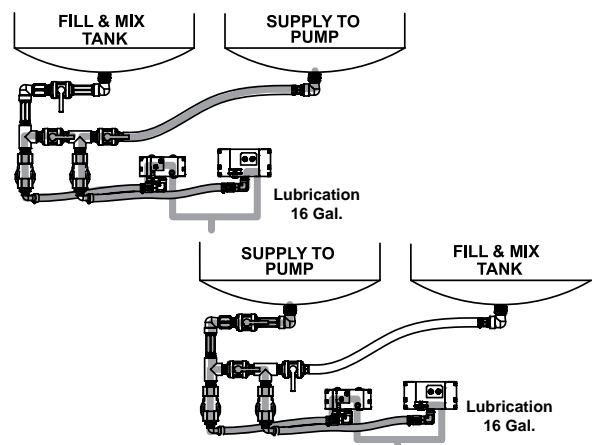
- open supply to pump tank ball valve
- close fill & mix tank ball valve



IV. TBM & MTBM Pipe Lubrication - 16 Gal. Max.

Product Pipe: 60" OD & Greater

- open supply to pump tank ball valve
- open bypass ball valve



NOTICE

When using 2325B series pump at 16 gal with a TBM or MTBM, A49342A Kit, TBM Applications is required.

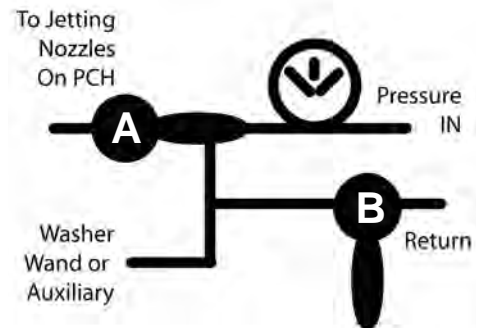
USING SHAFT CONTROL FOR LUBRICATION

1. Set up Lubrication Pump (refer to Setting Up Lubrication Pump in this section).
2. Hookup lubrication circuit to tooling (refer to Lubrication Circuit Hookup in this section).
3. Perform start up procedure (refer to Start Up Procedure in this section).
4. Use the ball valve(s) on the shaft control to control the jetting and lubrication circuits as follows:

Jetting/Lubrication Circuit

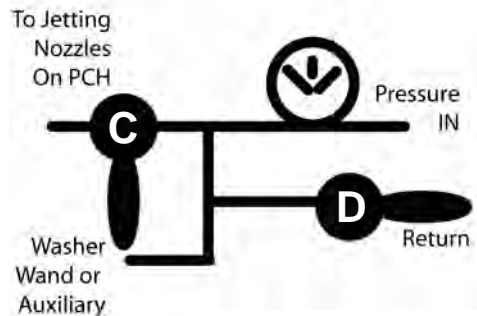
Move ball valves (A and B) as shown to lubricate:

- steering head for lubrication to outside of pilot tubes
- pilot tube adapter and reaming head for lubricating the outside of casings
- jetting nozzles on PRH
- jetting nozzles on PCH
- washer wand or auxiliary



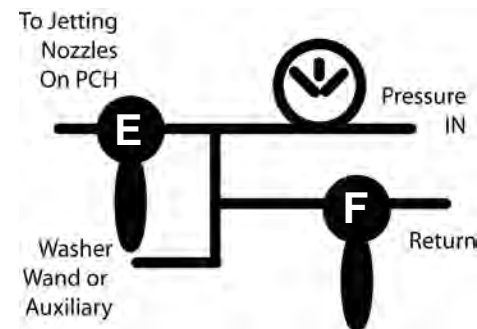
Move ball valve (C & D) as shown to:

- Return solution to tank or bypass



Move ball valve (E & F) as shown to:

- use washer wand or other auxiliary device



Lubrication Circuit

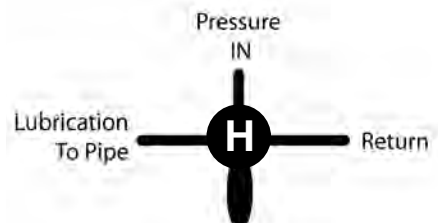
Move ball valve (G) as shown to lubricate:

- pilot tube adapter for lubrication to spoils for reaming head or open cutter head
- outside of casings with reaming head
- outside of product pipe using the PCH
- outside of product pipe using the PRH



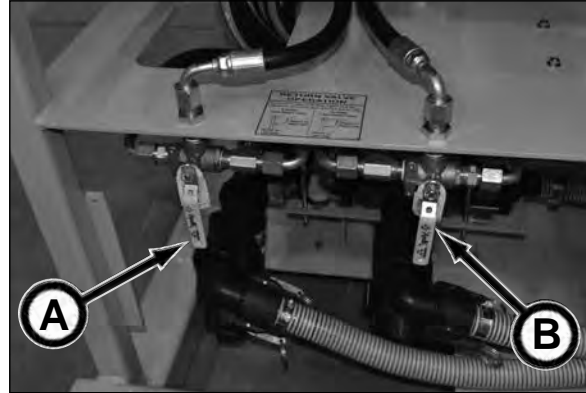
Move ball valve (H) as shown to:

- Return solution to tank or bypass



FLUID RETURN VALVE OPERATION

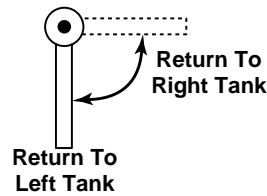
The 6 (A) and 10 (B) gallon fluid return valves can be arranged to control the return fluid to a specific tank.



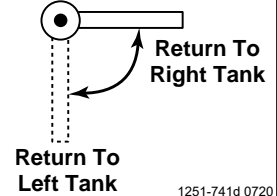
RETURN VALVE OPERATION

The 6 and 10 gallon fluid return valves allow the operator to control the return fluid to a specific tank.

6 Gallon Fluid Return Valve



10 Gallon Fluid Return Valve



1251-741d 0720

STARTING THE ENGINE - 2325B/D

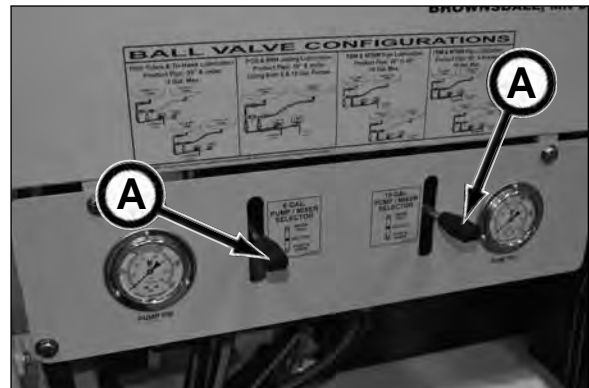
NOTICE

For proper new engine break-in, refer to your engine operation manual. And for any additional engine information including cold weather starting, refer to your engine operation manual.

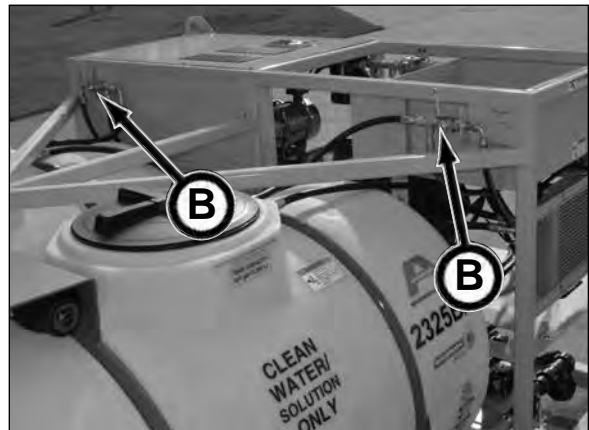
1. Visually check the following items. If any leaks are found, shut down the engine and perform repairs as needed.
 - Check for engine oil, fuel and engine coolant leaks.
 - Check for damaged or missing parts and fasteners.
 - Check the electrical harnesses for cracks, abrasions, and damaged or corroded connectors.
 - Check hoses for cracks, abrasions, and damaged loose or corroded clamps.
 - Check and clean radiator fins as necessary.
 - Check the fuel filter/water separator for presence of water and contaminants. If you find water or contaminants, drain the fuel filter/water separator and then prime the fuel system.



2. Place pump/ Mixer Selectors (A) in Neutral position.



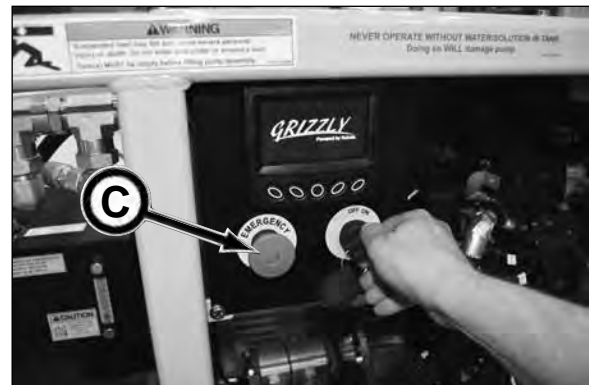
3. Be sure Mixer controls (B) are in OFF position.



NOTICE

If the engine has been stored for an extended period of time (more than 3 months), refer to the engine operation manual on Starting Engine After Long Term Storage.

4. Pull the Emergency Stop button (C) out and turn the key switch to the ON position.



(Continued on next page)

A pre-heat message may appear. Then the message will disappear.



The message "Engine Power may be temporarily reduced due to turbo protection strategy" may appear. To clear message, press soft key (A).



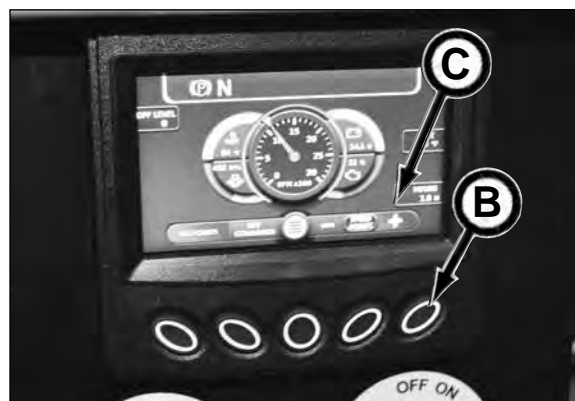
5. To start engine, press the soft key button beneath START (A) on the display.

The engine will start. If the engine does not start in 15 seconds, turn the key switch to OFF, otherwise the starter motor will overhead. Then wait 30 seconds before beginning the start sequence again.



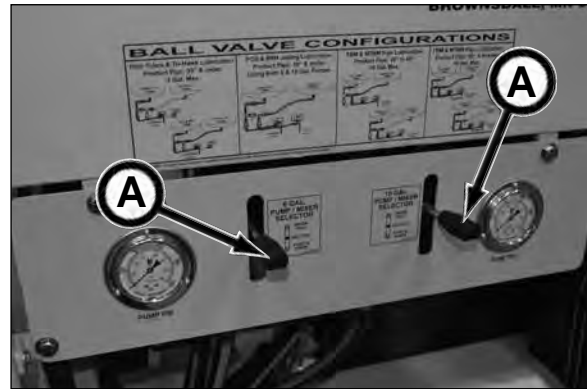
6. Once the engine starts, the display gauges and indicators should be active.
7. Warm up engine for at least one minute before increasing engine speed, then run at medium speed without load for a few minutes by pressing soft key button (B) beneath Speed Adjust + (C) on the display to desired speed.

8. Check for leaks.

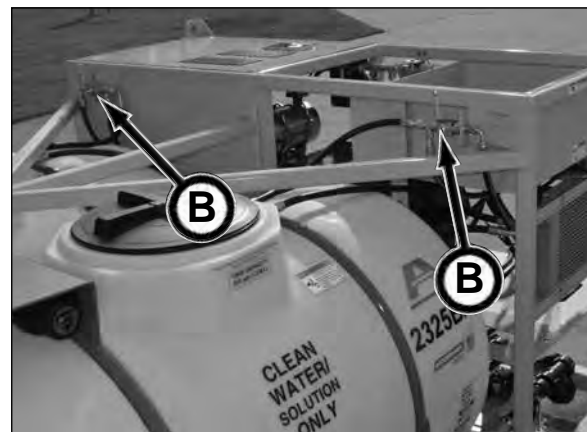


SHUTTING DOWN THE ENGINE - 2325B/D

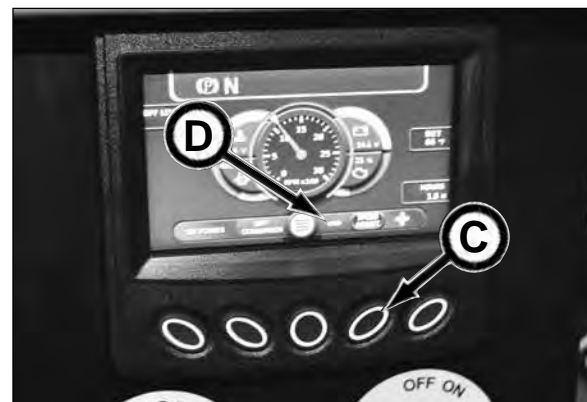
1. Place pump/ Mixer Selectors (A) in Neutral position.



2. Be sure Mixer controls (B) are in OFF position.



3. Run the engine at low idle for at least five minutes before shutting down by pressing soft key button (C) beneath Speed Adjust - (D) on the display to low idle.



4. Turn the key switch to the OFF position and remove key from switch to prevent accidental starting.
5. If the engine will not be used for an extended period of time, refer to the engine operation manual on Long Term Storage.



START UP PROCEDURE - 2325B/D

Use the following procedure to properly start up the bentonite and lubrication pump.

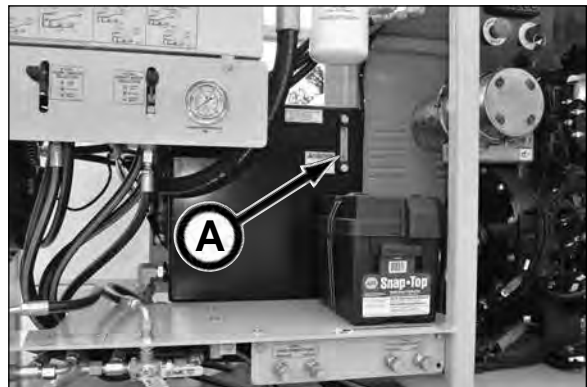
1. Check the engine oil. Add oil if necessary. Refer to engine manual for oil recommendations. Do not overfill.



2. Check diesel fuel level. Add fuel if necessary.



3. Check hydraulic oil tank level (A). Add hydraulic oil if necessary.



4. Clean BOTH tank strainers.



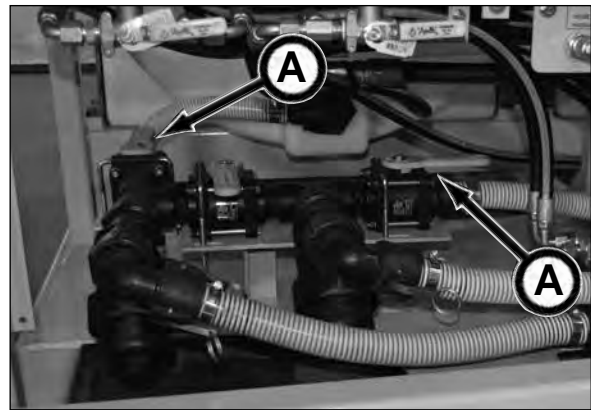
(Continued on next page)

5. Add CLEAN water in tanks before starting the engine. Replace tank lids securely to prevent foreign objects from entering tanks.

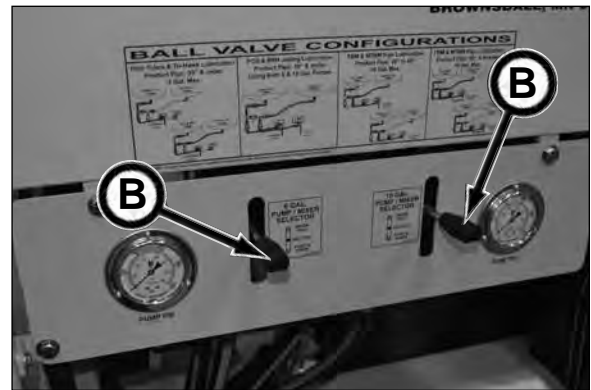
NOTICE NEVER dry run pumps. Doing so will cause damage to pump after prolonged use without water.



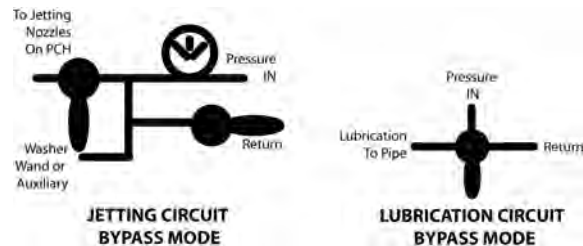
6. Open both tank ball valves (A).



7. Place both Pump/Mixer selectors (B) in center (neutral) position.



8. On shaft control, arrange circuit valves in bypass mode to prevent pressure buildup.



(Continued on next page)

9. Start engine and allow to warm up for at least one minute before increasing engine speed.

NOTICE

The engine has a break-in period of 50 hours. Refer to the engine operation manual for more information.



10. Check for leaks.

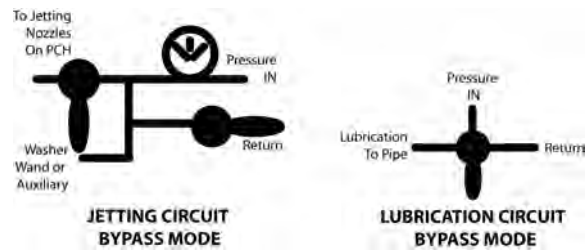


DAILY SHUTDOWN - 2325B/D

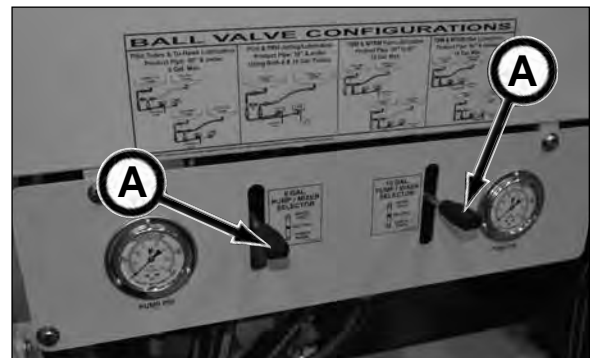
1. Reduce engine speed to low idle.



2. On shaft control, arrange jetting and lubrication circuit valves in bypass mode.



3. Place both Pump/Mixer selectors (A) in neutral (center) position.



4. Shutdown engine. Refer to Shutting Down The Engine in this section.



5. Close tank shut off valves on BOTH jetting and lubrication tanks.
6. If the potential of freezing weather exists, refer to Cold Weather Protection in this section.



MIXING TANKS

⚠ WARNING Exposure to chemicals may cause serious injury or death. **BEFORE** mixing chemicals or other agents in the water tank, be sure the area is well ventilated and other personnel removed from the area. Use proper personal protective equipment (PPE) per the chemical manufacturer's instructions.

The 2325B series Bentonite and Lubrication Pump is capable of mixing liquid based polymers and bentonite up to **100 seconds (Marsh Funnel) viscosity**.

1. Fill water tank with clean water as needed per instructions on lubricant packaging.

NOTICE Before mixing polymers and bentonite, the water should be stabilized to the following pH and hardness levels:

| | |
|----------------|--|
| pH | 8.5 - 9.5 |
| Water Hardness | do not exceed 200 ppm (depending on lubricant) |

Note:

1. Pure water is neutral with a pH level of 7.
2. Soda ash helps lower water hardness as well as raise the pH simultaneously.

2. Open tank shut off valve.

NOTICE Be sure fluid is visible in clear tube (A-(6 Gal.) Left Tank, B-(10 Gal.) Right Tank) from tank outlet to fluid pump before starting motor. If not, an air lock is present and must be released by opening stainer assembly cap until fluid flows into clear tube. Otherwise, fluid from tank will not be pumped, causing pump damage when it operates without liquid for a prolonged period of time.

3. Place Pump/Mixer Selectors (C) in the Neutral position.

4. Start engine..

5. Move desired Pump/Mixer Selector to the Mixer position. Be sure tank Mixer Control (D-(6 Gal.) Left Tank, E-(10 Gal.) Right Tank) is turned to the On position, otherwise the mixer will not operate.

6. Remove cover on tank to gain access to hopper (F).

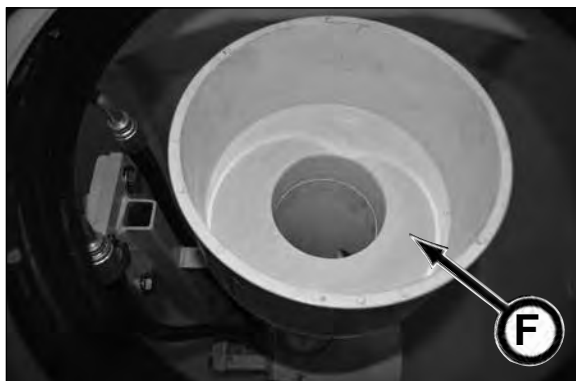
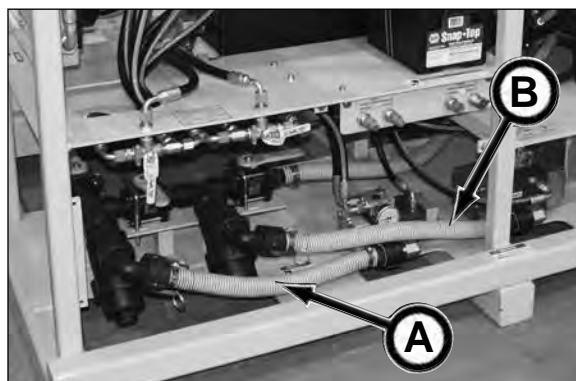
7. Gradually pour lubricant into hopper in tank, following instructions on packaging (for example, depending on material, add material through the hopper at a rate not to exceed 3 - 5 minutes per 50 pounds).

8. Replace tank cover to prevent foreign objects from entering the tank.

9. Allow time for proper mixing of solution, typically 15 - 20 minutes. Follow instructions on packaging.

10. The tank solution is now available for use.

11. If needed, repeat steps 1 through 9 for other tank.



CLEANING TANKS

⚠ WARNING Exposure to chemicals may cause serious injury or death.

BEFORE mixing chemicals or other agents in the water tank, be sure the area is well ventilated and other personnel removed from the area.

Use proper personal protective equipment (PPE) per the chemical manufacturer's instructions.



⚠ WARNING Do not allow anyone to enter tank. Tank fumes or becoming accidentally trapped may cause severe injury or death.

1. Fill tank with clean water.



2. Remove strainer.



3. Open tank shut off valve to flush tank with clean water.

NOTICE To help drain tank, CAREFULLY tip pump towards outlet of drain.

(Continued on next page)



NOTICE

If needed, the hopper can be removed from mix tube assembly for ease of cleaning tank. Be sure to replace hopper on mix tube assembly after cleaning.



4. Continue using clean water to flush the tank and water system components until the water is clear and free of sediment. Failure to do so will result in clogging of the fluid in the tank, hoses and/or components.
5. Once tank is clean and water emptied, close tank shut off valve.
6. Put enough water in tank to cover outlet to prevent accidental dry running of pump.

NOTICE

NEVER operate pump without shut off valve open and tank filled with water.

IMPORTANT: If operating in freezing weather, the tank must be drained or a RV anti-freeze solution must be added to the tank to prevent component damage. Refer to Cold Weather Protection in this section.

7. Replace tank cover.



8. Replace strainer.
9. Repeat steps 1 through 8 for other tank.



COLD WEATHER OPERATION

Freezing temperatures during the tunneling process, creates the necessity to prepare the site and equipment for the cold weather. Failure to do so will cause damage to components and supporting equipment. Refer to Cold Weather Protection in this section for more information.

There are various methods of keeping equipment from freezing:

- When working with water, it needs to be constantly circulated to prevent freezing. Otherwise the equipment must be drained and/or treated with a RV anti-freeze solution to prevent freezing.
- If the 2325B series Bentonite and Lubrication Pump will be shut off for a considerable length of time and the temperature is at or below freezing, the fluid must be drained or treated with RV anti-freeze.
- Water tanks must be drained or treated with RV anti-freeze.
- Drain hoses to prevent freezing and keep low areas properly drained to prevent freezing damage.
- For all equipment, use proper lubricant based on ambient temperature to prevent damage.
- Use compressed air to purge a system of water. Be sure the discharge valve is open before doing so.
- Install heaters for hydraulic systems.



If systems were shut down for freezing weather, be sure to start systems slowly and let them run for at least five minutes to allow for warm up and in the case of a pump, to displace any surface ice that may have accumulated in the fluid before going back to full operation mode.

Remember it is also critical to keep the work site safe and employees comfortable during the freezing weather. Good training, supervision, proper clothing and limiting personal exposure to the weather is essential for keeping personnel and equipment safe on the job site.

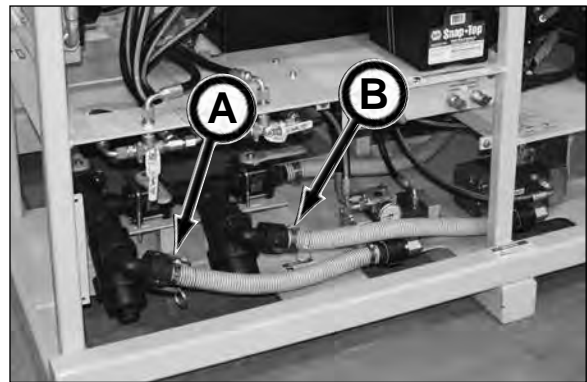
COLD WEATHER PROTECTION - DRAINING SYSTEM

NOTICE

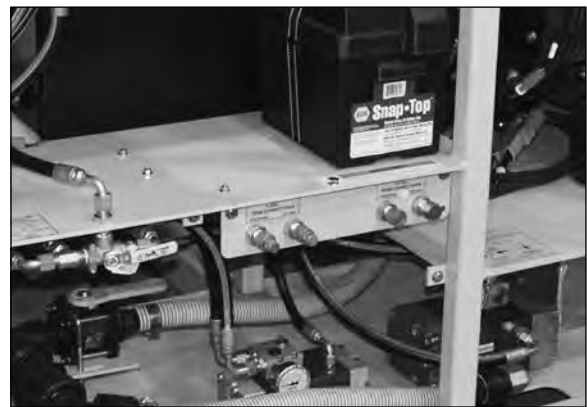
To prevent damage to pump components in freezing weather, flush and drain pumps and ALL fluid lines from both tanks. Failure to do so will cause damage to pump components. If using a RV Anti-Freeze solution for cold weather protection, refer to Cold Weather Protection - Using RV Anti-Freeze Solution in this section.



1. Release cam lock hose assembly (A-(6 Gal.) Left Tank, B-(10 Gal.) Right Tank) from the strainer assembly.



2. Remove pressure and return hoses or hose caps from pressure and return connections.



3. Remove strainer.

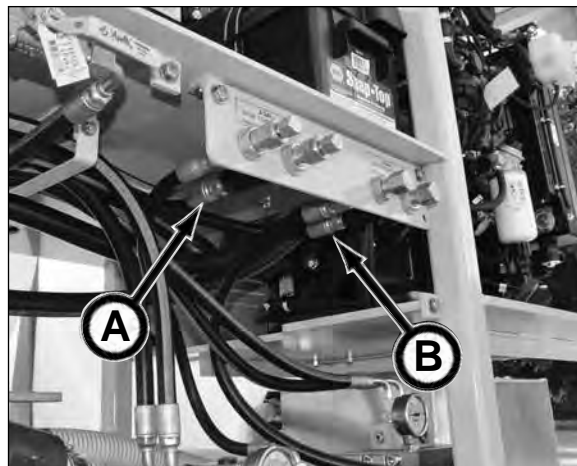


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4. Remove tank return hoses.

Left Tank Return Hose (A)

Right Tank Return Hose (B)



5. Open tank shut off valves.

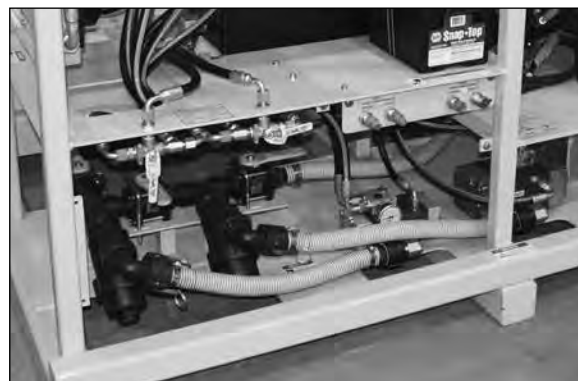


6. Once all fluid is drained:

- reinstall pump cam lock hose assemblies to pumps
- reinstall pressure and return hoses or caps on connections
- reinstall strainers and caps
- replace tank return hoses

NOTICE NEVER dry run pump. Doing so will damage pump.

7. Repeat steps 1 through 6 for other tank.



COLD WEATHER PROTECTION - USING RV ANTI-FREEZE SOLUTION

NOTICE

Akkerman Inc. **HIGHLY** recommends draining the system for cold weather protection. If the customer decides to use RV anti-freeze solution for cold weather protection, the customer is responsible for any damages occurred.

NOTICE

To prevent component damage in freezing weather, the pump system **MUST** be drained or treated with a RV Anti-Freeze solution.

1. If tank is empty add approximately 4 - 5 gallons (15 - 19 L) of clean water. Proceed to step 3.
2. If tank is full, drain tank by releasing cam lock hose assembly (A-(6 Gal.) Left Tank, B-(10 Gal.) Right Tank) until 4 - 5 gallons (15 - 19 L) of water/solution is left in tank. Then reinstall cam lock hose assembly to pump. Proceed to step 3.
3. Add 4 - 5 gallons (15 - 19 L) of RV anti-freeze into tank. Be sure there is a 50/50 mixture of liquid to RV anti-freeze in the tank.

NOTICE

Be sure to follow the proper solution instructions on the RV anti-freeze container.

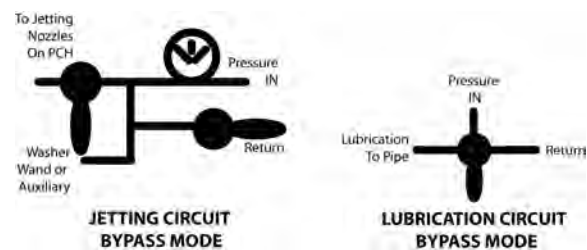
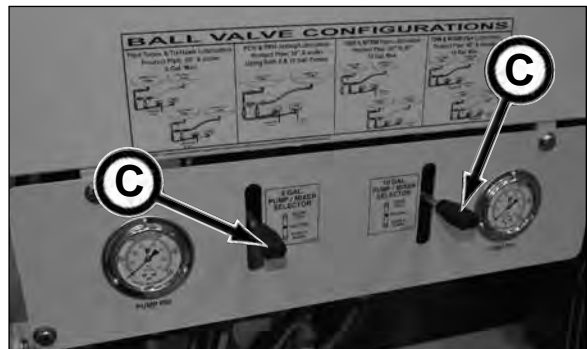
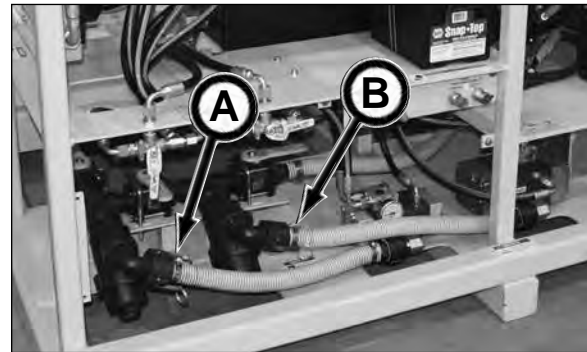
4. Place Pump/Mixer Selector (C) to the Neutral position.

5. On shaft control, arrange valves in bypass mode as shown.

NOTICE

NEVER dry run pump. Doing so will damage pump.

6. Start engine and move Pump/Mixer Selector to the Pump/Mixer position. Cycle pump for at least two minutes to ensure the liquid/RV anti-freeze mixture is pumped through complete system.
7. Place Pump/Mixer Selector in Neutral position.
8. Repeat steps 1 through 7 for other tank.
9. Shut down engine and refer to engine operation manual for cold weather protection.



NOTES

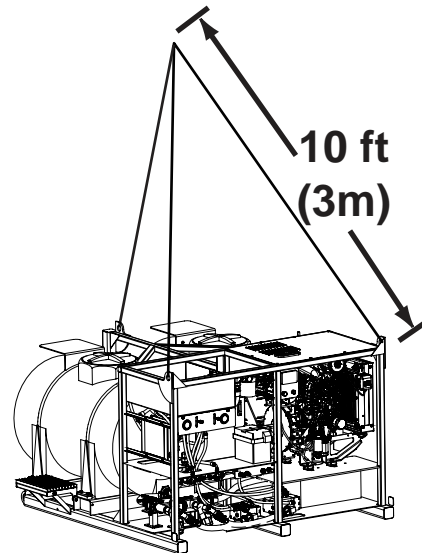
Transporting

TRANSPORTING GUIDELINES

1. Know the local, state, and federal transportation regulations.
2. Obtain required permits for transporting.
3. Remove any obstacles from the trailer floor.
4. Clean debris from equipment.
5. Load and unload on level ground.
6. Securely fasten the 2325B series Bentonite & Lubrication Pump to trailer floor.
7. BEFORE lifting equipment with a hoist or other lifting device, the equipment lifting eyes and sling must be inspected for damage before lifting.
8. Observe the lifting instructions on the equipment.

LIFTING INSTRUCTIONS

- Frame weight:
 - with full tank: 9,500 lbs (4,309 kg)
 - with empty tank: 4,000 lbs (1,814 kg)
- Lifting with a crane requires a three or four part sling with legs a minimum of 10 ft (3 m) long.
- Frame **MUST** lift freely. If it is stuck to the ground, it **MUST** be broken loose prior to lifting.
- Frame lifting eyes **MUST** be inspected prior to each lift. Any damage **MUST** be repaired prior to lifting.



Transporting

NOTES

Fuels & Lubricants

NOTICE

Use of inferior fuel or lubricants will affect the efficient performance of your 2325B series Bentonite & Lubrication Pump. Always use high quality fuel and lubricants as specified in this section. Refer to the Periodic Maintenance section for proper lubrication quantity, maintenance intervals, and procedures.

FUEL SPECIFICATIONS

NOTICE

For more information on maintaining your fuel and additional fuel specifications, refer to your engine manual.

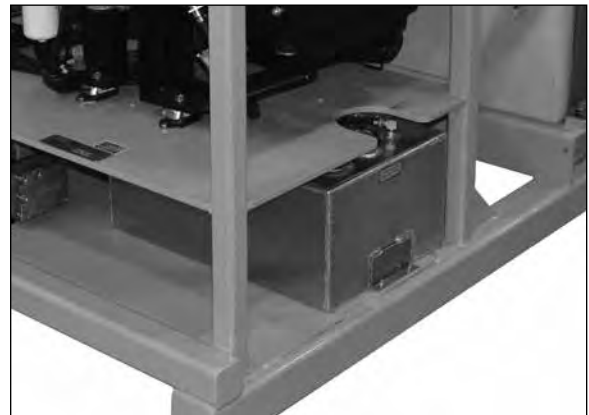
Diesel fuel specification:

The use of ultra low sulfur fuel is mandatory. Use No.2-D S15 diesel fuel as an alternative to No.2-D, and use No.1-D S15 diesel fuel as an alternative to No.1-D for ambient temperatures below 14°F (-10°C).

The fuel must meet the following properties:

- Diesel fuels specified to EN 590 or ASTM D975 are recommended.
- Fuel cetane number of 45 minimum. A cetane number greater than 50 is preferred, especially for ambient temperatures below -4°F (-20°C) or elevations above 5,000 ft (1,500 m).
- DO NOT USE fuels that have sulfur content greater than 0.0015% (15 ppm).
- Bio-Diesel fuels (refer to engine manual).
- NEVER mix kerosene, used engine oil, or residual fuels with the diesel fuel.
- Keep the fuel tank and fuel-handling equipment clean at all times.
- Poor quality fuel can reduce engine performance and/or cause engine damage.
- Fuel additives are not recommended. Some fuel additives may cause poor engine performance.

Fuel tank capacity is 18 gal. (68 L).



ENGINE OIL (KUBOTA ENGINE)

NOTICE For more information on the engine oil specifications, refer to your engine operator's manual.

The engine is filled with SAE 15W40 oil.

Change the oil and filters after the first 50 hours of operation and every 400 hours thereafter with SAE 15W-40 engine oil or other oil viscosity based on the expected air temperature range during the period between oil changes as shown in graph.

Other high quality detergent oils, including synthetic, of API (American Petroleum Institute) are acceptable. Refer to the engine operator's manual for more information.

The engine oil capacity is approximately 1.85 qt (7.0 L). Always check the oil with the pump on level ground. Oil level should be within the marks on the dipstick. Do not overfill!

If using oil of different brands from the previous fill, be sure to drain all the previous oil before adding the new engine oil.

Use of the following oil not only reduces engine performance in low temperatures until it warms up sufficiently, but may also lead to excessive engine wear or engine seizure:

- Oil with viscosity higher than 10W-30
- Oil not recommended by Kubota

With DPF (Diesel Particulate Filter) equipped engines, part of the fuel may get mixed with engine oil during the regenerating process. This may dilute the oil and increase its quantity. If the oil rises above the oil level gauge upper limit, it means the oil has been diluted too much. In this case, immediately change the oil.



| | |
|---------------------------------|----------------------------|
| Above 25°C (77°F) | 10W-30 or 10W-40 or 15W-40 |
| -10°C to 25°C (14°F to 77°F) | 10W-30 or 10W-40 or 15W-40 |
| Below -10°C (14°F) | 10W-30 or 10W-40 |

ENGINE COOLANT

⚠ WARNING Cooling system under pressure. Explosive release of HOT engine coolant can cause severe burns. SLOWLY remove the radiator cap ONLY if the engine is cool.

The engine radiator coolant is filled with a 50% mixture of long-life ethylene glycol engine coolant and soft, distilled, deionized, or demineralized clean water. NEVER use water only.

Refer to your engine manual for information regarding Long Life Coolant (LLC) or Extended Life Coolant (ELC).



NOTICE Refer to your engine manual for bleeding cooling system, if necessary.

The coolant capacity for the engine and radiator is approximately 1.53 gal. (5.8 L). Do not overfill.



HYDRAULIC TANK OIL

The hydraulic tank (A) is factory filled with ISO-VG-68, a premium AW (All-Weather) hydraulic oil.

Use ISO-VG-68 or equivalent when adding or changing lubricant.

Recommended: hydraulic oil:

| <i>Ambient Temp.</i> | <i>Hydraulic Oil</i> |
|----------------------|----------------------|
| below 70°F (21°C) | ISO 46 |
| above 70°F (21°C) | ISO 68 |



NOTICE Do not mix oil manufacturers or grades.

Hydraulic oil tank capacity is 25 gal. (94.6 L).

STORING LUBRICANTS

Your equipment can operate at maximum performance only if clean lubricants are used. Use clean containers to handle all lubricants.

Lubricants should be stored in an area protected from dust, moisture, and other contaminants.

All lubricants must be stored at least 100 ft (30.5 m) from the portal, entrance to the tunnel, launch shaft or reception shaft.



Periodic Maintenance

⚠ WARNING

Review the Safety section in this manual before performing maintenance. Failure to do so, could cause severe injury or death.

The requirements for maintenance are shown on the maintenance charts in this section. Intervals of maintenance are based on normal operating conditions. If operating under more difficult conditions, use a shorter time interval between maintenance.

LOCKOUT TAGOUT POWER BEFORE SERVICING

⚠ WARNING

Severe personal injury or death can result from unexpected machine movement.

LOCKOUT TAGOUT power before attempting to make repairs or adjustments to this equipment, unless otherwise indicated. Proper lockout tagout will prevent accidents and save lives. Performing the lockout tagout will also prevent the equipment from moving or operating unexpectedly.



HYDRAULIC OIL/FLUIDS UNDER PRESSURE

⚠ WARNING

Escaping oil or other fluids under pressure can penetrate your skin causing serious injury.

Release all pressure before performing maintenance or repairs. Never weld near pressurized fluid lines.

DO NOT use your hands to check for leaks. When searching for leaks, use a piece of wood or cardboard.

Contact medical help immediately if any oil or fluid is injected into your skin. A serious infection or reaction can emerge without proper medical treatment.



AVOID PINCH POINTS

⚠ WARNING

Moving parts or the mishandling of parts can cause severe personal injury.

Keep hands away from moving parts.

Watch your fingers, hands, and legs while equipment is in operation.

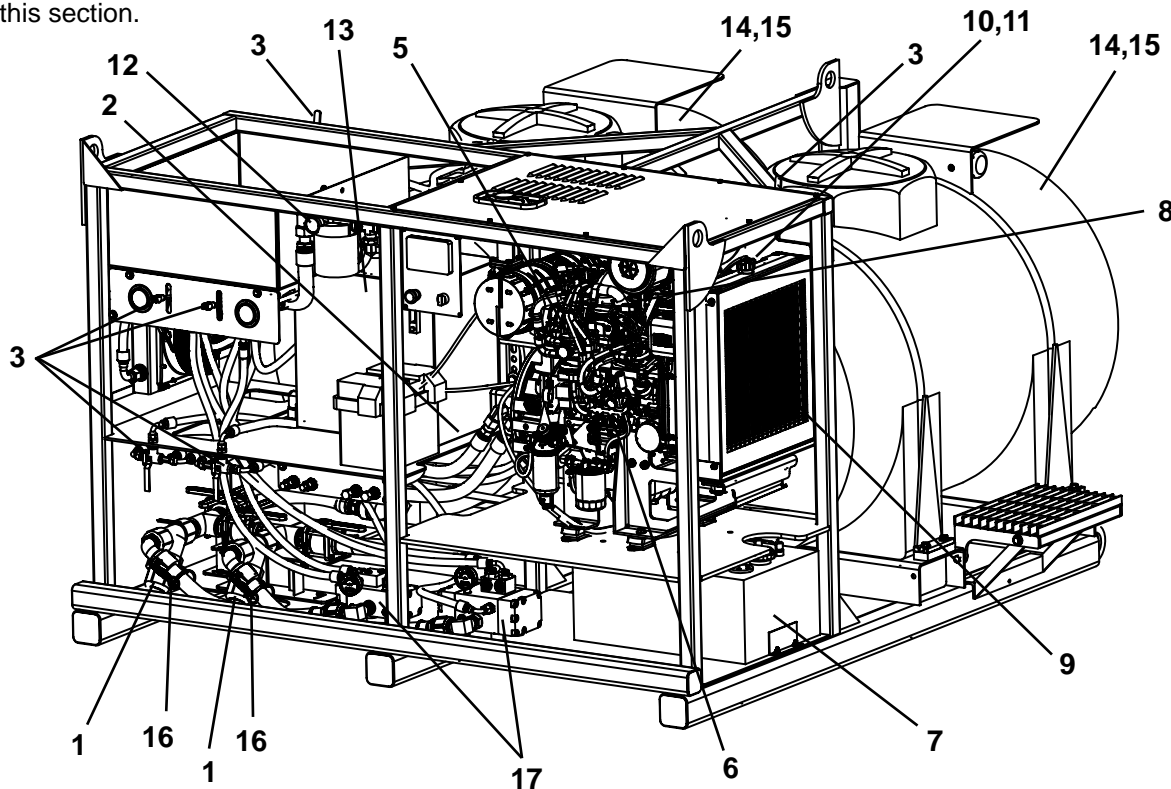
Handle parts carefully to avoid crushing and pinch point hazards.



MAINTENANCE CHARTS

IMPORTANT: The maintenance charts shown in this section includes a general selection of the engine maintenance. Refer to your engine operation manual for complete engine maintenance information.

NOTICE Use the item number in the chart to refer to the detailed maintenance procedures later in this section.



*DAILY OR EVERY 10 HOURS OF OPERATION

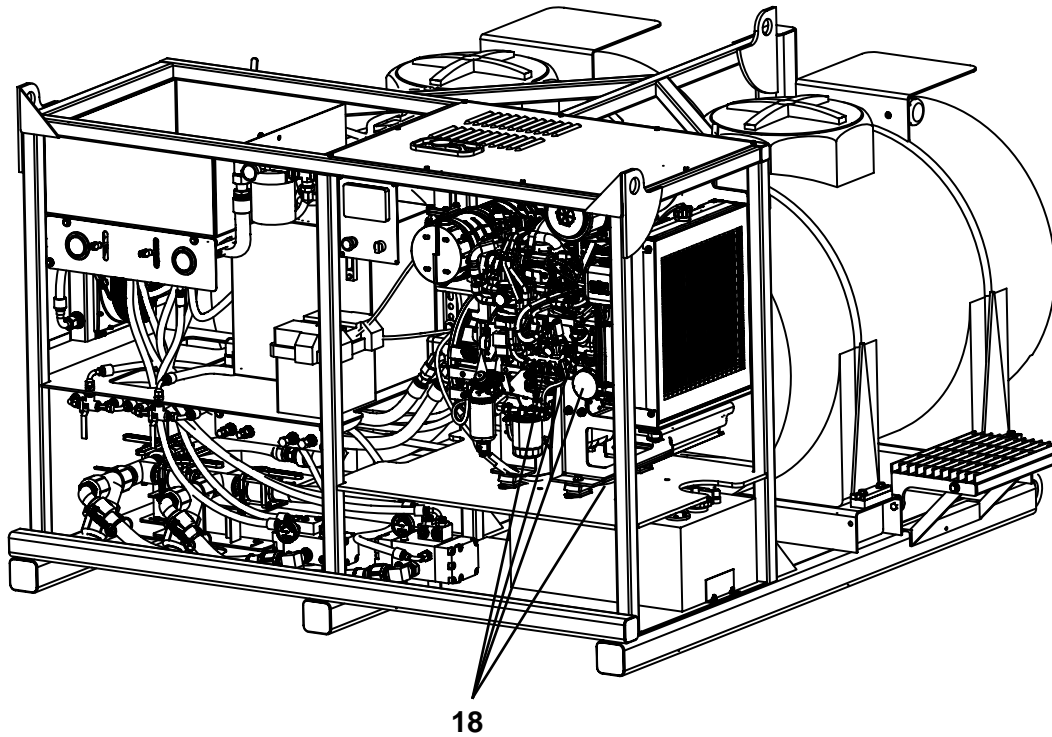
| ITEM | COMPONENT | SERVICE | REQUIREMENT | MATERIAL |
|------|---------------------------|---------------------------|---|--------------------|
| 1. | Tank Strainers | Clean | If damaged, replace with new. | |
| 2. | Covers & Guards | Inspect | Replace if damaged. | |
| 3. | Valves & Levers | Inspect | Inspect for proper operation. | |
| ^4. | Wiring & Cables | Inspect | If damaged, replace with new. | |
| 5. | Engine | Inspect | Visually inspect for damage. | |
| 6. | Engine Crankcase | Check Oil Level | Add oil as needed. | See Section 8 |
| 7. | Fuel Tank | Check Diesel Fuel Level | Add fuel as needed. | See Section 8 |
| 8. | Air Cleaner Dust Unloader | Clean Out | | |
| 9. | Radiator | Check Coolant Level | Add coolant as needed. | See Section 8 |
| 10. | Fan | Inspect Fan & Guard | If damaged, replace with new. | |
| 11. | Cooling Fan Belt | Inspect | Refer to engine manual. | |
| 12. | Hydraulic Return Filter | Check Indicator | Replace filter as needed per indicator. | Return Filter |
| 13. | Hydraulic Tank | Check Fluid Level | Add hydraulic fluid as needed. | See Section 8 |
| 14. | Water/Solution Tank | Inspect | Repair or replace if damaged. | |
| 15. | Water/Solution Tank | Flush | Flush in freezing weather or is idle for more than a day. | |
| 16. | Hoses & Tube | Check | Replace if damaged. | |
| 17. | Pump | Inspect For Fluid Leakage | Maximum 10 drops per minute. | >10, Replace Seals |
| ^18. | Decals | Inspect | If damaged, replace with new. | |

* Refer to your engine operation manual for additional maintenance information.

** During engine break-in period, change the oil and filter for the first time at 50 hours of operation.

^ Not Shown

NOTICE Use the item number in the chart to refer to the detailed maintenance procedures later in this section.



***FIRST 50 HOURS OF OPERATION & EVERY 400 HOURS THEREAFTER**

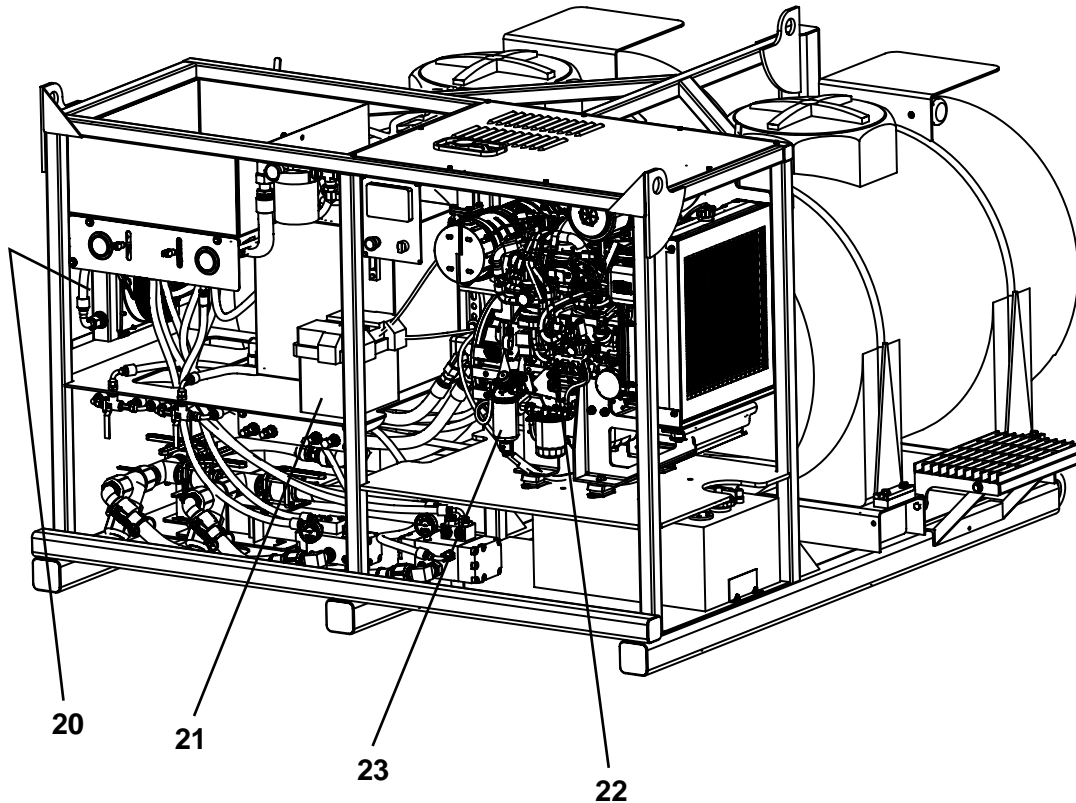
| ITEM | COMPONENT | SERVICE | REQUIREMENT | MATERIAL |
|-------|------------------|-----------------------|--------------------------------|---------------|
| **19. | Engine Crankcase | Drain & Fill & Filter | Replace with new oil & filter. | See Section 8 |

*** Refer to your engine operation manual for additional maintenance information.**

**** During engine break-in period, change the oil and filter for the first time at 50 hours of operation.**

NOTICE

Use the item number in the chart to refer to the detailed maintenance procedures later in this section.



***WEEKLY OR EVERY 50 HOURS OF OPERATION**

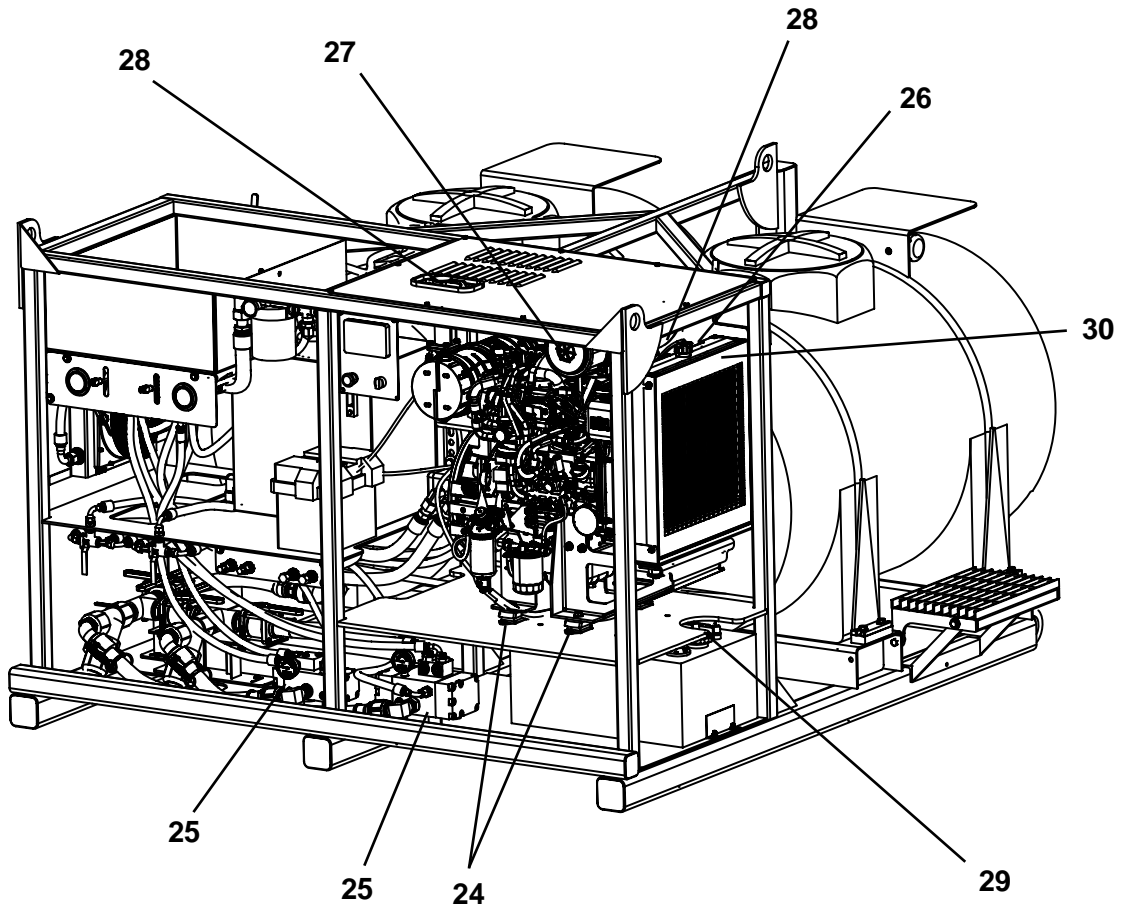
| ITEM | COMPONENT | SERVICE | REQUIREMENT | MATERIAL |
|------|----------------------|---------------|---------------------------------------|---------------|
| 20. | Oil Cooler Fins | Check & Clean | If damaged, repair or replace. | Battery/Cable |
| 21. | Battery | Check | Check for damage or frayed cables. | |
| 22. | Fuel Hoses & Clamps | Inspect | If worn or damaged, replace with new. | |
| 23. | Fuel Water Separator | Drain Water | | |

*** Refer to your engine operation manual for additional maintenance information.**

Note: During engine break-in period, change the oil and filter for the first time at 50 hours of operation.

NOTICE

Use the item number in the chart to refer to the detailed maintenance procedures later in this section.



***MONTHLY OR EVERY 250 HOURS OF OPERATION**

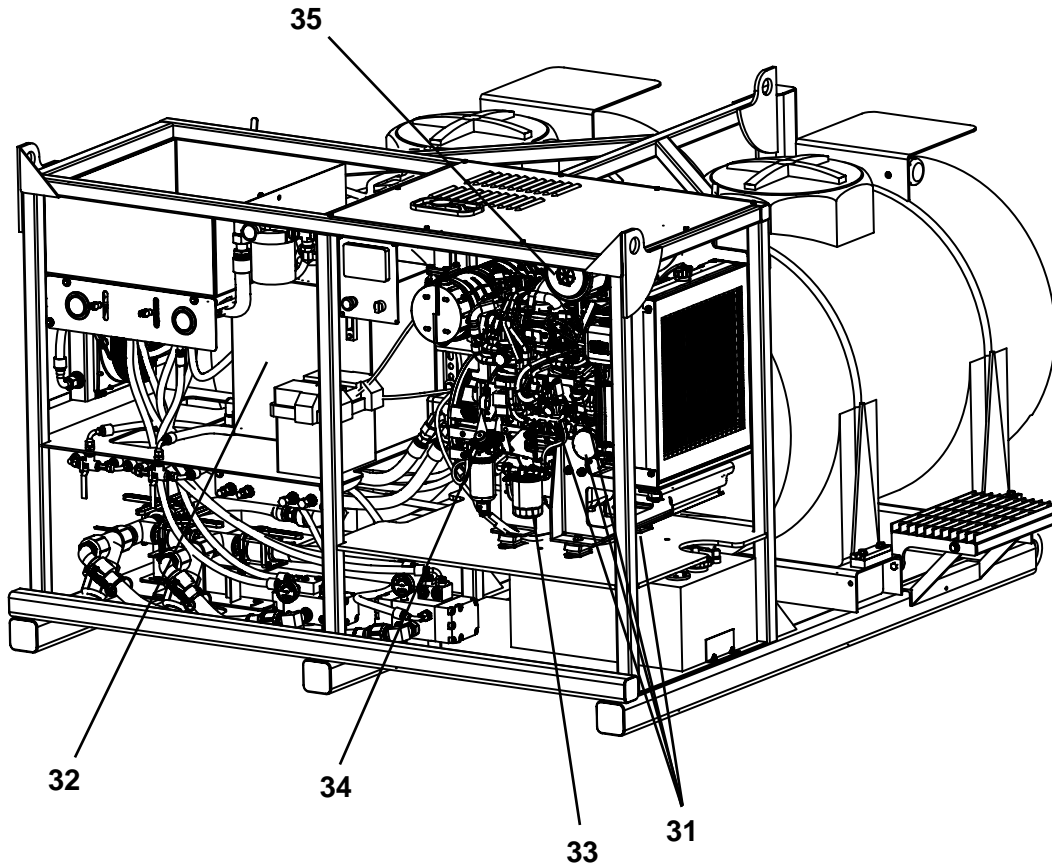
| ITEM | COMPONENT | SERVICE | REQUIREMENT | MATERIAL |
|------|----------------------|------------------------|-------------------------------|------------|
| 24. | Engine Mtg Bolts | Inspect | If damaged, replace with new. | Element(s) |
| 25. | Pump Mounting Bolts | Inspect | If damaged, replace with new. | |
| 26. | Engine Fan Belt | Check & Adjust Tension | Refer to engine manual. | |
| 27. | Air Cleaner | Check | If dirty, replace with new. | |
| 28. | Air Intake & Exhaust | Inspect | | |
| 29. | Fuel Tank Cap | Inspect | | |
| 30. | Radiator | Check Hoses & Clamps | | |

* Refer to your engine operation manual for additional maintenance information.

** During engine break-in period, change the oil and filter for the first time at 50 hours of operation.

NOTICE

Use the item number in the chart to refer to the detailed maintenance procedures later in this section.



***EVERY 400 HOURS OF OPERATION**

| ITEM | COMPONENT | SERVICE | REQUIREMENT | MATERIAL |
|-------|------------------|-----------------------|--------------------------------|---------------|
| **31. | Engine Crankcase | Drain & Fill & Filter | Replace with new oil & filter. | See Section 8 |

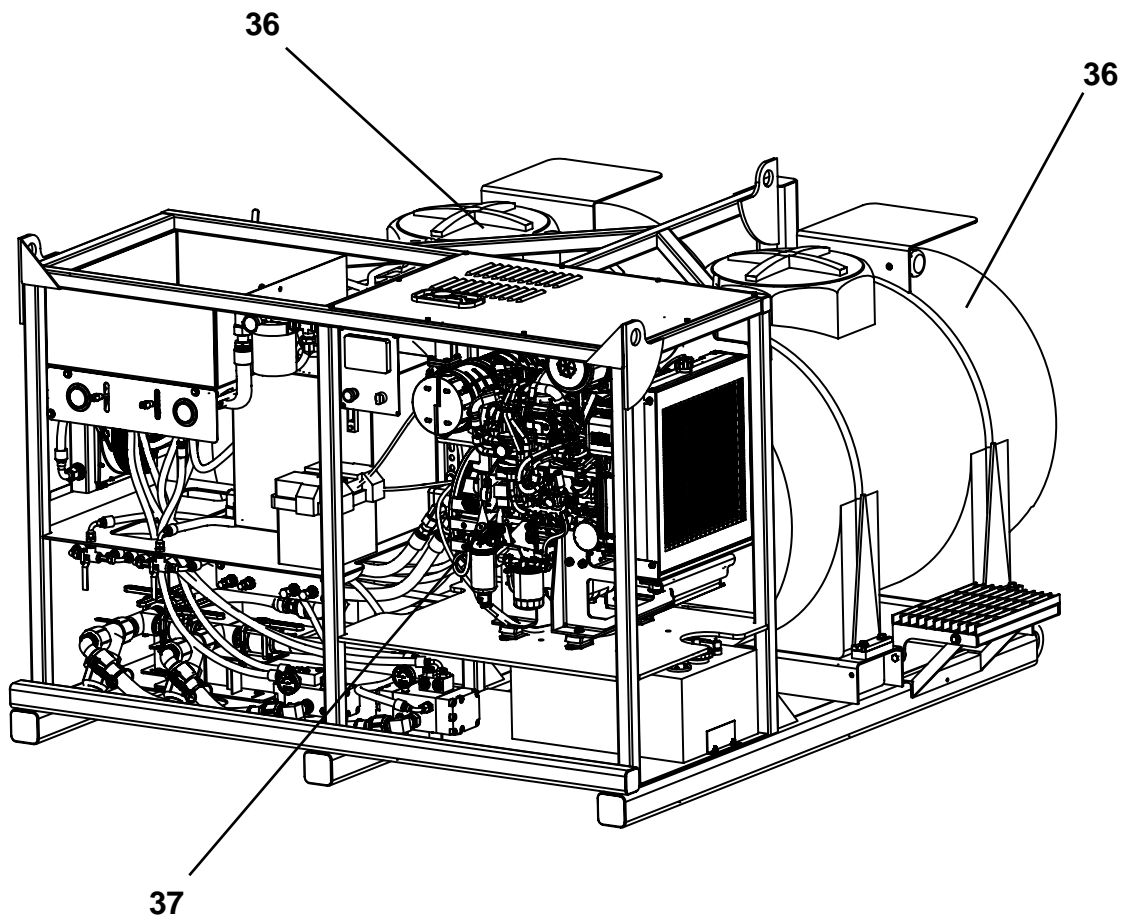
***EVERY 500 HOURS OF OPERATION**

| ITEM | COMPONENT | SERVICE | REQUIREMENT | MATERIAL | |
|------|----------------|-----------------|------------------|---------------|-------------|
| 32. | Hydraulic Tank | Drain & Fill | 25 gal. (94.6 L) | See Section 8 | |
| 33. | Fuel Filter | Replace | | | Fuel Filter |
| 34. | Fuel System | Prime | | | |
| 35. | Air Cleaner | Replace Element | | | Element |

* Refer to your engine operation manual for additional maintenance information.

NOTICE

Use the item number in the chart to refer to the detailed maintenance instructions later in this section.



AFTER EACH DRIVE

| ITEM | COMPONENT | SERVICE | REQUIREMENT | MATERIAL |
|------|---------------------|---------|-------------------------------------|----------|
| 36. | Water/Solution Tank | Flush | Flush tank and prepare for storage. | |

AS REQUIRED

| ITEM | COMPONENT | SERVICE | REQUIREMENT | MATERIAL |
|------|-----------|-------------|-------------------------|----------|
| 37. | Engine | Maintenance | Refer to engine manual. | |

* Refer to your engine operation manual for additional maintenance information.

DAILY OR EVERY 10 HOURS OF OPERATION

NOTICE

Refer to your engine operation manual for additional maintenance information.

1. CLEAN TANK STRAINERS

Clean tank strainers with water or other non-abrasive cleaner.

If damaged, replace with new.



2. INSPECT COVERS & GUARDS

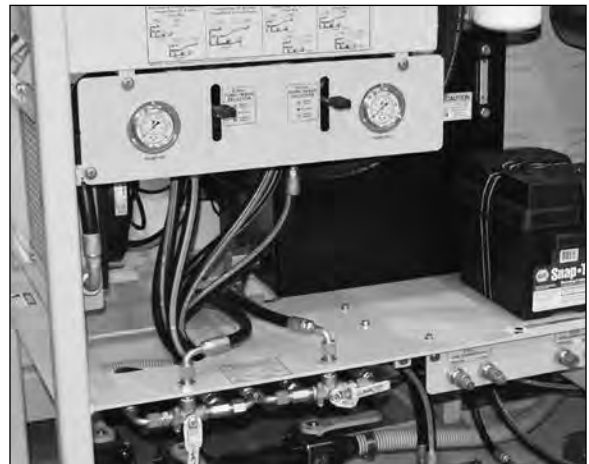
Inspect all guards and covers to be sure they are properly mounted in place, and undamaged. Repair or replace as needed. NEVER operate without covers or guards in place.



3. INSPECT VALVES AND LEVERS

Inspect valves and levers for proper operation.

Repair or replace as needed.



4. INSPECT WIRING & CABLES

Inspect wiring and cable for cracking, fraying or other damage. Replace as needed.



5. INSPECT ENGINE

Perform an overall visual inspection of the engine:

- check for engine oil leaks
- check for fuel leaks
- check for damaged or missing parts
- check the electrical harnesses for cracks, abrasions, and damaged or corroded connectors.
- check hoses for cracks, abrasions, and damaged, loose or corroded clamps.

If leaks appear or any parts are damaged, repair or replace before operating the engine.



6. CHECK ENGINE CRANKCASE OIL LEVEL

Check engine oil level on dipstick. Oil level should be to the full mark on the dipstick.

If necessary, add engine oil. See Engine Oil in the Fuels & Lubricants section for the proper oil specification.

NOTICE After the first 50 hours of operation, replace engine oil and engine oil filter.



7. CHECK FUEL TANK LEVEL

⚠ WARNING Diesel fuel is extremely flammable and explosive. Handle with care. DO NOT refuel while smoking or when near open flame or sparks.

1. Shut off engine before refueling.
2. Clean area around the fuel cap.
3. Remove the fuel cap from the fuel tank.
4. Refuel tank until fuel tank is full. NEVER overfill the fuel tank. Wipe up spills.
5. Replace fuel cap.

NOTICE The fuel system will require priming if any of the following items occur. Refer to Every 500 Hours Of Operation, 34. Priming The Fuel System in this section or your engine operation manual.

- Fuel tank is empty
- Fuel system maintenance such as changing the fuel filter and draining the fuel filter/water separator, or replacing a fuel system component.



8. CLEAN OUT DUST UNLOADER VALVE

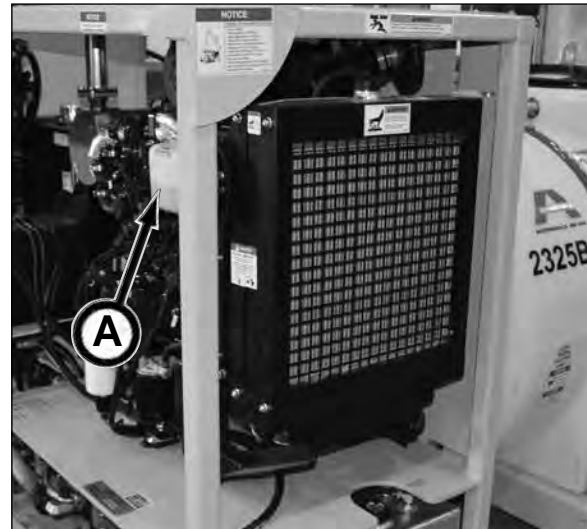
Squeeze air cleaner dust unloader valve on air cleaner assembly to release any trapped dirt particles. If the sealing top of the valve is damaged, life of the air filter elements will be greatly reduced.



9. CHECK COOLANT LEVEL

⚠ WARNING Cooling system under pressure. Explosive release of HOT engine coolant can cause severe burns. SLOWLY remove the radiator cap ONLY if the engine is cool.

1. Visually check the cooling system for leaks. Tighten all clamps securely.
2. Check to be sure the coolant level in the engine coolant reservoir (A) is between the low and high marks. Add coolant mixture if needed. Refer to Engine Coolant in the Fuels & Lubricants section of this manual.
3. Inspect all cooling system hoses. If the hoses are found to be in a hard, weak, or cracked condition, replace the hose(s).
4. Check the radiator for bent fins. Carefully straighten fins.
5. Check the inlet and outlet tubes for cracks, kinks, dents, or fractured seams. Repairs must be made by a qualified radiator technician.



10. INSPECT FAN & FAN GUARD

⚠ WARNING NEVER operate engine without fan guard in place. Serious personal injury could result if contact is made with rotating fan.

With engine shut off and key removed from engine ignition switch to prevent accidental starting, check radiator and oil cooler fans for cracks, and bent or loose blades. Check fans to make sure they are properly mounted. Replace damaged fan and/or fan guard.



11. INSPECT COOLING FAN BELT

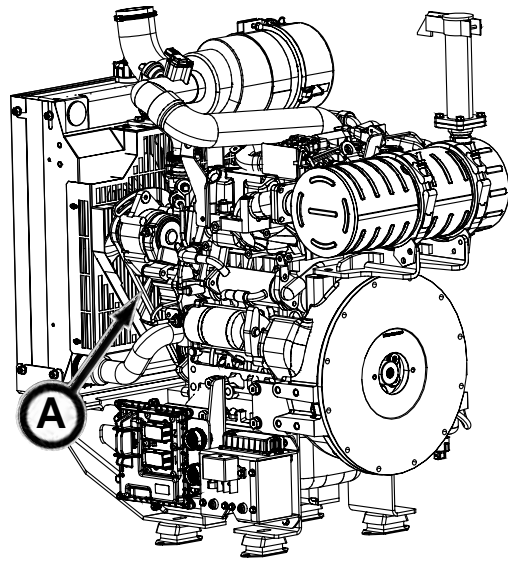
NOTICE Refer to your engine operation manual for more information.

With the engine shut down and the key removed from the engine ignition switch, visually inspect engine fan belt (A) for cracking, fraying or missing material. Replace belt as needed.

Check engine cooling belt for cracking, fraying or wear. Replace belt as needed.

Check the belt deflection per instructions in the your engine manual for proper belt re-tensioning.

Be sure to replace all guarding after replacing or re-tensioning belt.



12. CHECK HYDRAULIC RETURN FILTER INDICATOR

To prevent over or under servicing of the hydraulic return filter, a filter indicator (B) has been installed on the return filter housing.

The green OK zone indicates that the filter is functioning properly.

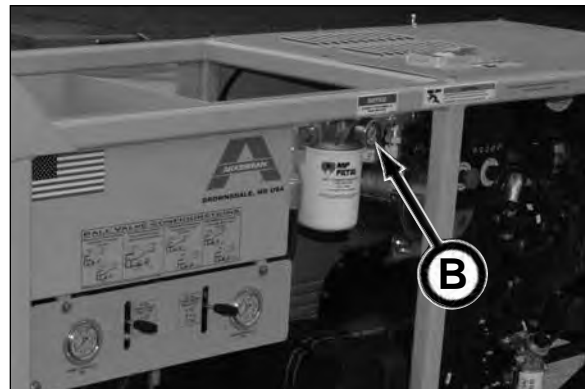
The yellow zone indicates that the filter will soon require replacement.

When the needle on the gauge is in the red CHANGE zone, replace filter as soon as possible using the following procedure:

1. Clean and dry area around return filter.
2. Remove filter. Dispose of oil and filter properly.

NOTICE Remove filter gasket if stuck in filter housing.

3. Fill new filter with clean hydraulic oil (refer to Section 8, Lubricants for oil specification).
4. Lubricate new filter gasket with a light coating of clean hydraulic oil.
5. Install new filter. Hand tighten only.
6. Start motor until the hydraulic system is warm. Then check for leaks.
7. Shut down motor.
8. Check hydraulic tank oil level on gauge (C). Add hydraulic oil, if necessary.



13. CHECK HYDRAULIC TANK OIL LEVEL

Check hydraulic tank oil level gauge (A). Add hydraulic oil, if necessary.

The hydraulic tank is filled with ISO-VG-46 20W Premium Hydraulic Oil. Refer to Hydraulic Tank in the Fuels & Lubricants section for more information.

Hydraulic oil tank capacity is 25 gal. (94.6 L).



14. INSPECT WATER/SOLUTION TANKS

Inspect water/solution tanks for damage. Repair or replace as needed.



15. FLUSH WATER/SOLUTION TANKS

The water/solution tanks must be flushed with clean water if:

- the solution will be sitting idle more than an overnight period. Check the directions on the polymer or bentonite bag/container for additional instructions.
- the solution will be sitting idle overnight in freezing weather. The tanks will also require draining or adding a RV anti-freeze solution. (refer to Cold Weather Protection in section 6, Operation.



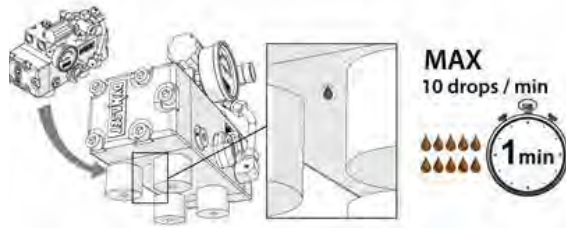
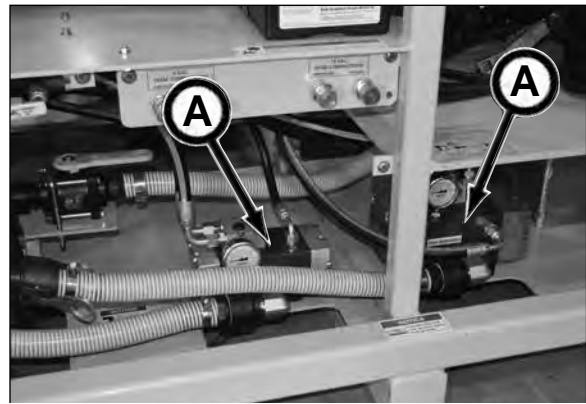
16. INSPECT OUTLET TUBE & PRESSURE & RETURN HOSES

Inspect outlet tube, pressure and return hoses and all hydraulic hoses for cracks, wear or damage. Replace as needed.



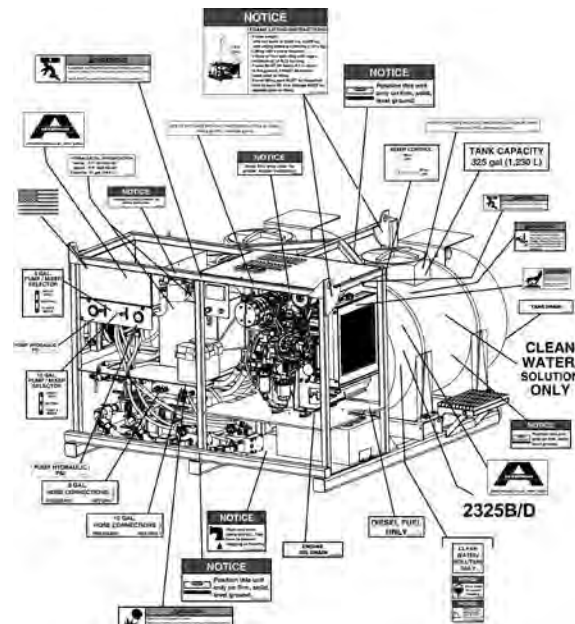
17. INSPECT PUMP LEAKAGE

Inspect both pumps for leakage. The maximum fluid leakage is 10 drops per minute. If a pump leakage exceeds 10 drops per minute, the pump seals must be replaced. Contact your Akkerman Aftermarket Support Representative for more information.



18. INSPECT DECALS

Visually inspect all decals so they are clean and readable. Replace decals if they are damaged, missing, or hard to read.



FIRST 50 HOURS OF OPERATION & EVERY 400 HOURS THEREAFTER

NOTICE

Refer to your engine operation manual for additional maintenance information.

19. CHANGE ENGINE OIL & FILTER

1. Start the engine and run to operating temperature.
2. Stop the engine.



3. Clean area around the fill cap. Remove cap. This will allow oil to drain more easily.



4. Clean area around engine oil drain hose plug.
5. Position a properly sized container to collect waste oil.
6. Remove drain plug and drain oil into container. Dispose of oil properly.
7. Replace drain plug.



(Continued on next page)

8. Clean area around oil filter (A).
9. Remove oil filter and clean filter mounting pad. Dispose of filter properly.



10. Lubricate gasket on new filter with clean oil.
11. Install new filter and hand tighten according to values printed on the filter. Do not overtighten the filter element.



12. Fill engine with engine oil specified in the Fuels & Lubricants section. The following fluid capacity is an approximate value. Be sure to check levels after filling. **DO NOT OVERFILL.**

Oil Capacity (approx.):
Kubota 1.85 gal. (7.0 L)

13. Install fill cap. Clean up spills.
14. Start engine and run until warm for 5 minutes and check for leaks.
15. After the engine is warm, shut it off and let it sit for 10 minutes.
16. Recheck the engine oil level on dipstick and fill as needed. Do not overfill!

Deutz: Oil level should be to the full mark on the dipstick.



WEEKLY OR EVERY 50 HOURS OF OPERATION

NOTICE

Refer to your engine operation manual for additional maintenance information.

20. INSPECT & CLEAN OIL COOLER FINS

⚠ WARNING

Oil cooler fins are SHARP and may cause injury if touched. Oil cooling system may be HOT and cause severe burns if contacted. Always use gloves when near the oil cooler. Perform service on oil cooler only when cool.



1. Inspect the oil cooler fins for dirt and bent or damaged fins.



⚠ CAUTION

When using compressed air, always wear eye protection to prevent injury to eyes.

2. Use compressed air (maximum 28 psi) to blow off dirt, dust and debris from oil cooler fins. If there is a large amount of debris on the fins, use a mild soap to thoroughly clean fins and then rinse with water.
3. Carefully straighten any bent fins.
4. Inspect oil cooler tubes for cracks, kinks, dents and fractured seams. Repair or replace oil cooler as necessary.



21. CHECK BATTERY

⚠ WARNING Batteries produce explosive gases.

Wear eye protection and protective clothing during battery service.

Keep sparks, flames, and cigarettes away from batteries.

Contact with battery acid can cause severe burns. Flush immediately and thoroughly with clean water. Get medical attention immediately.

Charge a battery only in a well-ventilated area.

Never charge a frozen battery.



Visually check the battery for damage. If damaged replace with new.

Check battery cables for damage or fraying. If damaged, replace with new.

Be sure cables are secured properly to the battery posts and engine mounts.

Inspect battery mount and strap for damage. If damaged, replace with new.



24. INSPECT FUEL HOSES & CLAMPS

NOTICE Refer to your engine operation manual for additional maintenance information.

Inspect fuel hoses/lines and clamps for wear or damage.

If there are signs of wear or damage, replace with new.



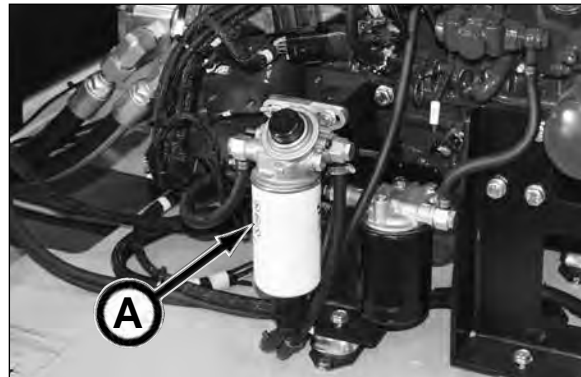
23. CHECK FUEL/WATER SEPARATOR

NOTICE

Refer to your engine operation manual for additional maintenance information.

Check the fuel/water separator (A) for water and/or sediment.

1. Shut off engine.



2. Carefully disconnect sender.



3. Loosen drain valve.

4. Drain into catch pan until only fuel is visible, no bubbles.

5. Tighten drain valve.



6. Carefully replace sender.

7. The fuel system requires bleeding.

Check your engine operation manual for the proper method to prime your engine's fuel system.



8. Pump the the diesel fuel primer until a strong resistance is felt and pressure has built up.

9. Start engine and run in idle for approximately five minutes.

10. Check for leaks.



MONTHLY OR EVERY 250 HOURS OF OPERATION

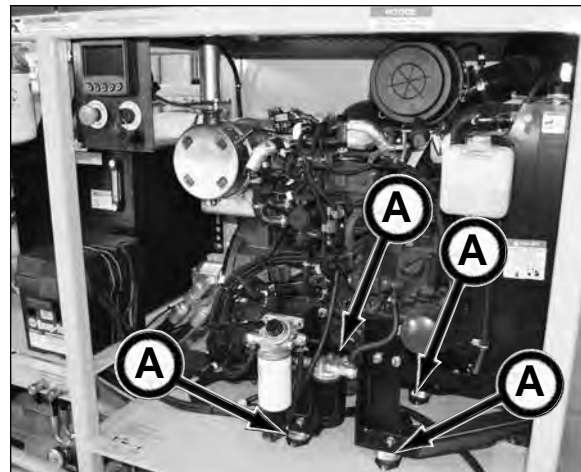
NOTICE

Refer to your engine operation manual for additional maintenance information.

24. INSPECT ENGINE MOUNTS

Visually inspect engine mounts (A) (four locations) for loose hardware or damaged parts.

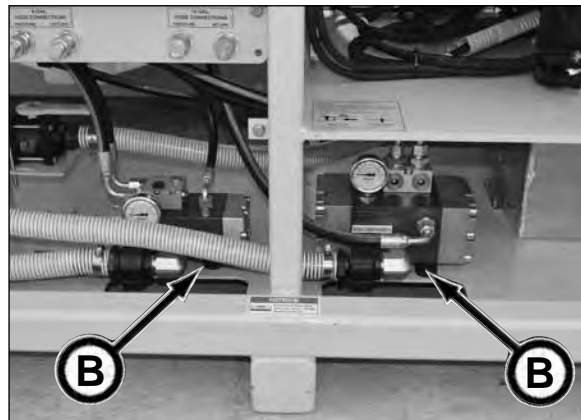
Tighten all loose hardware and replace defective parts.



25. INSPECT PUMP MOUNTING BOLTS

Visually inspect pump mounting bolts (B) for loose hardware or damaged parts.

Tighten all loose hardware and replace defective parts.



26. CHECK ENGINE COOLING FAN BELT

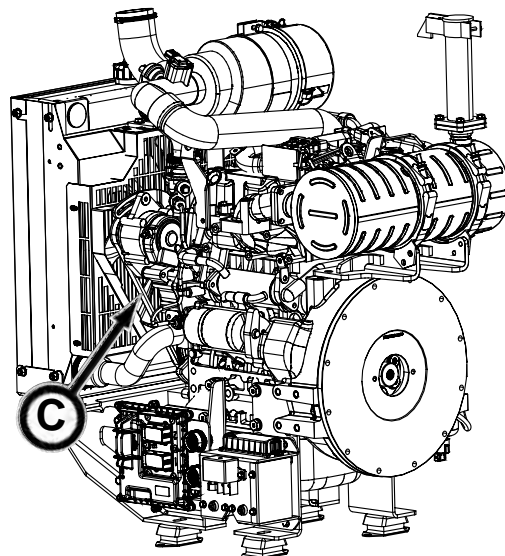
NOTICE

Refer to your engine operation manual for more information.

Check engine cooling belt (C) for cracking, fraying or wear. Replace belt as needed.

Check the belt deflection per instructions in the your engine manual for proper belt re-tensioning.

Be sure to replace all guarding after replacing or re-tensioning belt.

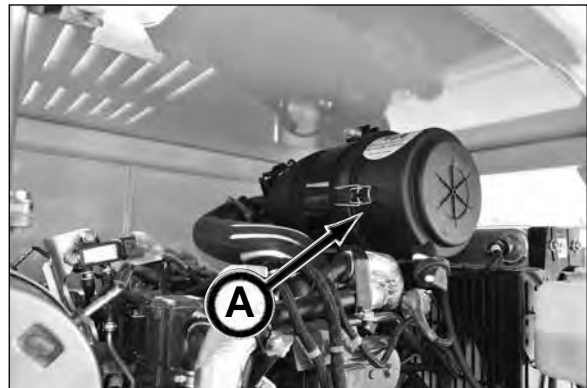


27. CLEAN AIR CLEANER

NOTICE Refer to your engine operation manual for more information.

Periodically check air cleaner for dirt and dust buildup. The engine performance efficiency is drastically affected with a clogged filter element.

1. Clean area around the air cleaner assembly (A).



2. Squeeze air cleaner dust unloader valve on air cleaner assembly to release any trapped dirt particles.



3. Unlatch and remove cover.

4. Wipe the inside of the air cleaner with a clean, damp cloth. Dirt left in the filter housing will shorten the life of the filter element.

5. Visually inspect primary filter.

If it appears to be dirty, the primary and secondary filters must be replaced. Refer to 35. Replacing Air Cleaner Element in this section.



6. Reinstall the air cleaner cover.

7. Secure the cover to the housing with the three latches.



28. INSPECT AIR INTAKE & EXHAUST CONNECTIONS

NOTICE Refer to your engine operation manual for more information.

Inspect all air intake and exhaust connections. Tighten clamps as needed and replace defective parts.



29. INSPECT & CLEAN FUEL TANK CAP

Inspect cap and gauge for damage. If cap or gauge are damaged, replace with new.

Remove cap and clean any debris or dirt from cap body.



30. INSPECT RADIATOR HOSES & CLAMPS

Inspect radiator hoses and clamps.

If worn or damaged, replace with new.

Replace radiator hoses if they are swollen, hardened or cracked.



EVERY 400 HOURS OF OPERATION

NOTICE

Refer to your engine operation manual for additional maintenance information.

31. CHANGE ENGINE OIL & FILTER

1. Start the engine and run to operating temperature.
2. Stop the engine.



3. Clean area around the fill cap. Remove cap. This will allow oil to drain more easily.



4. Clean area around engine oil drain hose plug.
5. Position a properly sized container to collect waste oil.
6. Remove drain plug and drain oil into container. Dispose of oil properly.
7. Replace drain plug.



(Continued on next page)

8. Clean area around oil filter (A).
9. Remove oil filter and clean filter mounting pad.
Dispose of filter properly.



10. Lubricate gasket on new filter with clean oil.
11. Install new filter and hand tighten according to values printed on the filter. Do not overtighten the filter element.



12. Fill engine with engine oil specified in the Fuels & Lubricants section. The following fluid capacity is an approximate value. Be sure to check levels after filling. **DO NOT OVERFILL.**

Oil Capacity (approx.):
Kubota 1.85 gal. (7.0 L)

13. Install fill cap. Clean up spills.
14. Start engine and run until warm for 5 minutes and check for leaks.
15. After the engine is warm, shut if off and let it sit for 10 minutes.
16. Recheck the engine oil level on dipstick and fill as needed. Do not overfill!

Deutz: Oil level should be to the full mark on the dipstick.



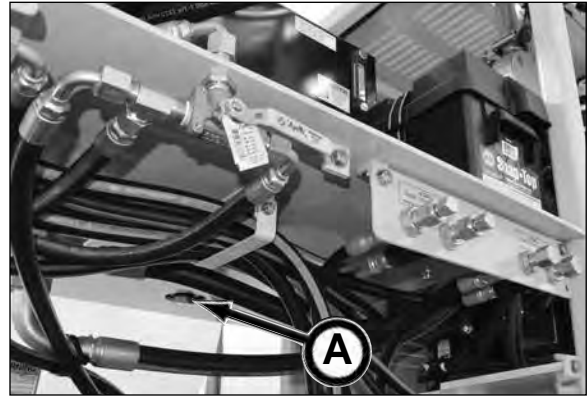
EVERY 500 HOURS OF OPERATION

NOTICE

Refer to your engine operation manual for additional maintenance information.

32. DRAIN & FILL HYDRAULIC TANK

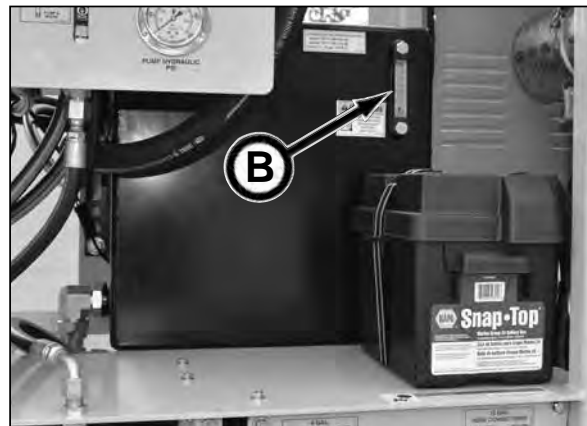
1. Remove drain plug (A) and drain oil into a catch pan. **DO NOT** allow oil to contact the hydraulic pump or main drive belts.
2. Replace drain plug.



3. Remove fill cap.
4. Fill tank with approximately 25 gal. (94.6 L) of SO-VG-68, a premium AW (All-Weather) hydraulic oil or refer to Hydraulic Tank Oil in the Lubricants section for more information.
5. Replace fill cap.



6. Check oil level with oil level gauge (B).

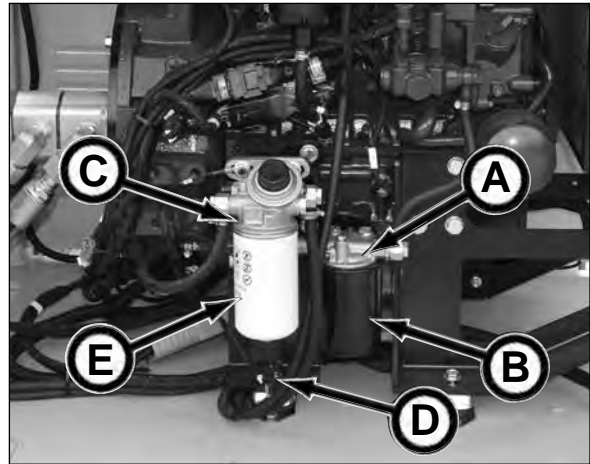


33. REPLACE FUEL FILTER & FUEL WATER SEPARATOR

NOTICE

Refer to your engine operation manual for more information.

1. Stop the engine and allow to cool.
2. Clean area around the fuel filter assembly (A).
3. Remove the fuel filter (B) with a filter wrench.
Catch any escaping fuel.
4. Clean the fuel filter assembly mounting surface.
5. Apply a small amount of diesel fuel to the gasket of the new fuel filter.
6. Install the new fuel filter. Hand tighten the filter. Otherwise, follow the installation instructions on the fuel filter. Do not add fuel into the filter prior to installation to filter assembly.
7. Clean area around the fuel water separator assembly (C).
8. Disconnect the sender (D).
9. Remove the fuel water separator filter (E) with a filter wrench. Catch any escaping fuel.
10. Clean the water separator assembly filter mounting surface.
11. Apply a small amount of diesel fuel to the gasket of the new fuel filter.
12. Install the new fuel filter. Hand tighten fuel water separator filter. Otherwise, follow the installation instructions on the filter. Do not add fuel into the filter prior to installation to filter assembly.
13. Prime the fuel system. Refer to 34. Priming Fuel System in this section.
14. Check for fuel leaks.



34. PRIMING FUEL SYSTEM

Whenever the fuel system has been opened up for service such as changing the fuel filter, replacing a fuel system component, or running out of fuel and adding fuel to an empty tank, the fuel system must be primed.

Check your engine operation manual for the proper method to prime your engine's fuel system.



1. Pump the fuel primer until a strong resistance is felt and pressure has built up.

NOTICE NEVER use the starter motor to crank the engine and prime the fuel system. Doing so will result in starter damage.

2. Start the engine and run in idle for approximately five minutes
3. Check for leaks.



35. REPLACE AIR CLEANER FILTER ELEMENT

NOTICE Refer to your engine operation manual for more information.

Replace air cleaner elements at 500 hours or 12 months, whichever occurs first.

1. Clean area around the air cleaner assembly.



2. Unlatch and remove cover.



3. Gently remove primary element. Bumping the element against air cleaner housing may contaminate the clean side of the filter housing with dirt and dust.

4. Properly dispose of primary element.

5. Thoroughly clean out the inside of filter housing with a clean, damp cloth. Dirt left in the filter housing will shorten the life of the filter elements.



6. Gently remove the secondary (safety) element. Immediately install a new secondary element to prevent any dirt or dust from entering the air intake system.



(Continued on next page)

7. Carefully install a new secondary element.



8. Carefully install a new primary filter element into the filter housing.



9. Reinstall the air cleaner/housing cover properly.
The dust unloader valve must face down towards the 6 o'clock position.



10. Secure the cover to the housing with the latches.

NOTICE

Do not use latches on cover to force filter into air cleaner. Using cover to force filter into housing will damaged cleaner housing.



AFTER EACH DRIVE

36. FLUSH & CLEAN WATER/SOLUTION TANKS

After each drive, the 2325B series Bentonite & Lubrication Pump tanks must be flushed and cleaned, and then either drained completely or add RV anti-freeze to the water system so the pump will be ready for the next drive.

1. Flush and clean water system by using clean water to flush the tank and water system components until the water is clear and free of sediment. Failure to do so will result in clogging of the fluid in the tank, hoses and/or components. Refer to Cleaning Tanks in section 6, Operation for more information.
2. Once tank and water system is clean, completely drain system or add RV anti-freeze to the water system. Refer to Cold Weather Protection in section 6, Operation for more information.
3. Repeat steps 1 and 2 for other tank water system.



AS REQUIRED

37. ENGINE MAINTENANCE

Refer to your engine operation manual for complete maintenance information for your engine.



NOTES

Storage

PREPARING FOR STORAGE

NOTICE

Refer to your engine operation manual for additional maintenance information.

1. Repair worn or damaged parts.
2. Wash all equipment and tanks thoroughly.
3. Drain tanks. Flush and drain pump and all fluid lines including to prevent clogging or freezing during storage. Be sure to also remove and clean tank strainer.
4. Lubricate all grease points.
5. Drain engine oil, replace filter and refill engine with oil specified in Fuels & Lubrication section.
6. Drain water and sediment from fuel system. Dispose of water and sediment properly. Then prime fuel system.
7. Add proper fuel stabilizer for a full tank. Fill fuel tank completely.
8. Store diesel fuel in plastic, aluminum, or steel containers specially coated for diesel fuel storage.
9. Loosen all belts.
10. Clean air cleaner.
11. Restart engine and operate machine long enough to warm the oil. Check for leaks after machine warms up.
12. Remove battery (negative cable first) and store it in a cool, dry place. Remove corrosion from cables and battery case. Use baking soda to neutralize acid. Place battery on wood (not concrete) and connect a small trickle charger to it to maintain charge; or charge battery every 30 days it is in storage, if necessary.
13. Repaint equipment where necessary.
14. Drain hydraulic oil, flush oil reservoir, change hydraulic filter, and refill hydraulic tank. Check for leaks.
15. Wipe up lube spills. Dispose of rags and trash properly.
16. If possible, store equipment under cover and out of the weather in a ventilated area.
17. If the engine to be stored for a long period of time, refer to your engine operation manual.
18. Clean and drain lubrication and high pressure jetting hoses. Store indoors to minimize UV damage.

REMOVING FROM STORAGE

NOTICE

Refer to your engine operation manual for additional maintenance information.

1. Clean equipment thoroughly.
2. Check to make sure all decals are clean and readable.
3. Check condition of wires and cables. Repair or replace as necessary.
4. Charge battery and install it.
5. Check coolant level. If coolant is low, check for leaks and add coolant as required.
6. Adjust engine, main drive, and hydraulic pump drive belt tension.
7. Check for leaks. Repair or replace as necessary.
8. Check oil level in hydraulic tank. Add oil if necessary (refer to section 8, Lubricants for oil specifications). Also, check condition of the oil; be sure there is no water in the oil.
9. Check hydraulic return filter indicator. Replace filter as needed per indicator.
10. Check tank strainers. Clean as needed. If damaged, replace with new.
11. Check condition of all hoses and connections. Tighten, repair or replace with new as needed.
12. Before operating, cycle hydraulic functions several times to purge air from hydraulic system.
13. Refer to your engine operation manual on how to restore engine to service.
14. If diesel fuel is stored for more than a month prior to use, or there is a slow turnover in fuel tank or supply tank, add a fuel conditioner or equivalent to stabilize the fuel and prevent water condensation. Refer to your engine operation manual for more information.
15. Fill tanks with clean water.
16. Review this Operator's Manual and your engine operation manual.

Troubleshooting

NOTICE

For additional engine troubleshooting information, refer to your engine/motor operation manual.

| Problem | Cause | Solution |
|---|---|--|
| Engine does not start or is difficult to start. | Emergency Stop button is activated. | Pull out Emergency Stop button. |
| | Fuel is thick. | Check the fuel tank, drain water from fuel water separator. Replace fuel filters. |
| | No fuel in fuel tank. | Fill fuel tank. |
| | Battery is discharged. | Charge battery. |
| | Air cleaner is dirty. | Replace air cleaner filter. |
| | Jetting & lube control not in bypass. | Move control to bypass mode. |
| | If engine still does not start, contact your Akkerman Aftermarket Support Representative. | |
| Pump cannot reach maximum pressure. | Pump shaft control in bypass mode. | Reset to lubrication/jetting/washer mode. |
| | Relief valve is not set properly. | Adjust relief to 2500 psi max. |
| | If max. pressure still cannot be reached, contact your Akkerman Aftermarket Support Representative. | |
| Lubrication pump is pulsating. | Air in water supply. | Add more water/solution in tank and check pump inlet connections. |
| | Dirty tank strainer. | Clean tank strainer. |
| | Outlet cam lock is not engaged. | Be sure cam lock is fully engaged. |
| | Hydraulic oil level is low. | Fill hydraulic oil tank as needed. |
| | If pump continues to pulsate, contact your Akkerman Aftermarket Support Representative. | |
| No water discharge out of pump. | No water in tank. | Fill tank. |
| | Suction hose not connected to pump. | Connect suction hose. |
| | Selector is in neutral or mixer position. | Move selector to Pump position. |
| | Ball valve on tank closed. | Open tank ball valve. |
| | Strainer plugged. | Clean strainer. |
| | Inlet hose damaged. | Replace hose. |
| | Air lock between tank and strainer. | Release air lock by loosening strainer until fluid flows. |
| | If no water still does not discharge out of pump, contact your Akkerman Aftermarket Support Representative. | |

(Continued on next page)

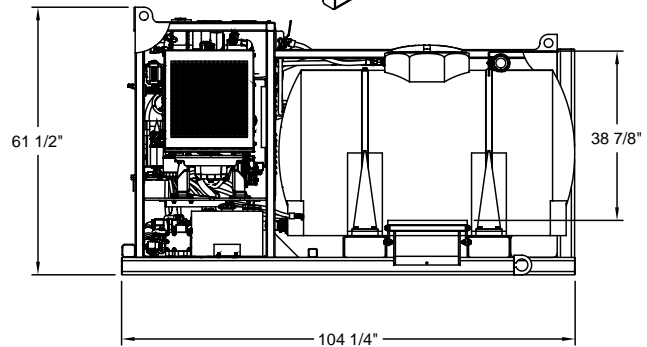
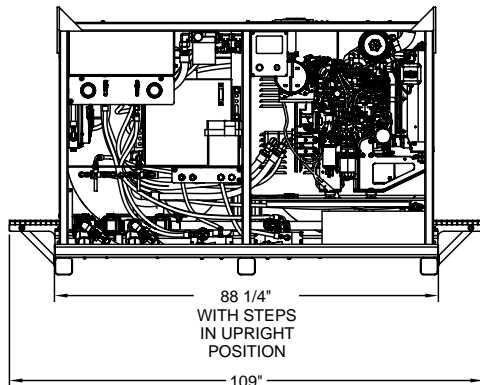
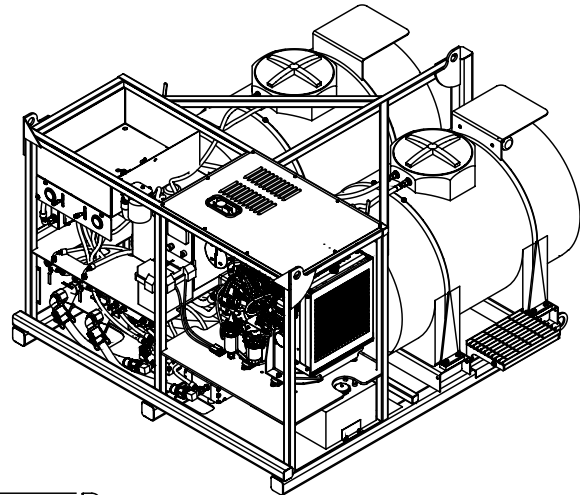
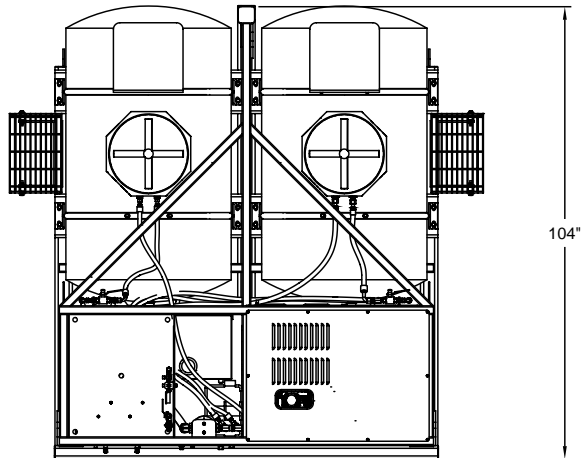
Troubleshooting

| Problem | Cause | Solution |
|-----------------------------|--|------------------------------------|
| Hydraulics are running hot. | Dirty oil cooler. | Clean oil cooler. |
| | Low relief valve setting. | Adjust valve to 2500 psi max. |
| | Pump(s) worn. | Replace pump(s). |
| | If the hydraulics continue to run hot, contact your Akkerman Aftermarket Support Representative. | |
| Mixer not functioning. | Selector valve is in neutral position. | Move selector to Mixing position. |
| | Mixer control is in Off position. | Move control to Mixer On position. |
| | Hydraulic oil level is low. | Fill hydraulic oil tank as needed. |
| | If mixer is still not functioning contact your Akkerman Aftermarket Support Representative. | |

Specifications

BENTONITE & LUBRICATION PUMP

NOTICE Refer to your engine operation manual for additional maintenance information.



Dimensions:

- Height 61.5 in. (1,562 mm)
- Width
 - with steps in 88.25 in. (2,242 mm)
 - with steps out 109 in. (2,769 mm)
- Length 104 in. (2,642 mm)
- Weight* (empty tanks)..... 4,000 lbs. (1,814 kg)
- (full tanks) 9,500 lbs. (4,309 kg)
- * approximate

Power Unit:

- Diesel Engine @ 2,700 rpm ... 37.5 HP (28 kW)
- 3 Cylinder diesel engine, water cooled, Tier 4

Drive System Direct Drive

Mixer (Agitator) Hydraulic-Driven, In-tank

Fluid Pumps

- Pump 1 Flow (Max.) 6 gpm (22.7 L/min)
- Pump 2 Flow (Max.) 10 gpm (37.9 L/min)
- Pressure Rating (Max.) 2,500 psi (17,237 kPa)
- Capability solution up to 100 seconds (MF)
- MF - Marsh Funnel

Fluid Capacities

- Water Tank Two, 325 gal (1,230 L)
- Hydraulic Reservoir 25 gal. (94.6 L)
- Fuel Tank 18 gal (68 L)
- Engine Oil *
 - Kubota 1.85 gal. (7 L)
- Engine Coolant *
 - Kubota 1.53 gal. (5.8 L)

* Do not overfill.

TORQUE CHART

Use these torque values as a guideline when tightening hardware unless otherwise specified in this manual.

| Lubricated Coarse UNC Threads Grade 8 Fasteners | | | Lubricated Fine UNF Threads Grade 8 Fasteners | | |
|--|--------------------------|--------|--|--------------------------|--------|
| Bolt Size | Torque ft. lbs. (N·m) | | Bolt Size | Torque ft. lbs. (N·m) | |
| 1/4 - 20 | 10 | (14) | 1/4 - 28 | 11 | (15) |
| 5/16 - 18 | 20 | (27) | 5/16 - 24 | 22 | (30) |
| 3/8 - 16 | 35 | (47) | 3/8 - 24 | 39 | (53) |
| 7/16 - 14 | 56 | (76) | 7/16 - 20 | 62 | (84) |
| 1/2 - 13 | 85 | (115) | 1/2 - 20 | 96 | (130) |
| 9/16 - 12 | 123 | (167) | 9/16 - 18 | 137 | (186) |
| 5/8 - 11 | 170 | (231) | 5/8 - 18 | 192 | (260) |
| 3/4 - 10 | 301 | (408) | 3/4 - 16 | 336 | (456) |
| 7/8 - 9 | 450 | (610) | 7/8 - 14 | 500 | (678) |
| 1 - 8 | 680 | (922) | 1 - 12 | 740 | (1003) |
| 1-1/8 - 7 | 960 | (1302) | 1-1/8 - 12 | 1030 | (1397) |
| 1-1/4 - 7 | 1360 | (1844) | 1-1/4 - 12 | 1500 | (2034) |
| 1-1/2 - 6 | 2360 | (3200) | 1-1/2 - 12 | 2660 | (3607) |

Identification Numbers

Model and serial numbers are required when ordering parts or requesting service information. Record your model and serial numbers below.

2325B/D BENTONITE & LUBRICATION PUMP

Model Number 2325B/D

Serial Number _____



NOTES

Safety Data Sheets

The Federal Occupational, Safety, and Health Administration (OSHA) Standard 29 CFR 1910.1200, require that specific safety data sheets (SDS) be available to employees before operating this equipment. This may include information on substances contained in this equipment such as hydraulic fluid and gear lubricant.

Akkerman Inc. will provide, at no cost, SDS which apply to its product line. Simply contact your Akkerman Aftermarket Support representative for a copy.

To ensure a prompt response to your SDS request, include your return address (including zip or postal code) and the equipment's model numbers and serial numbers with your request.

NOTES

Warranty

Akkerman warrants that all equipment manufactured by it be free from defects due to workmanship or material when normally used and serviced for a period of 90 days from the date of shipment by Akkerman. Normal wear and tear to the equipment, including, but not limited to, wear on the cutter face tooling, hydraulic filters, augers, casings, slurry line and seals is not covered by this warranty. Akkerman does not warrant that the equipment meets the requirements of any particular safety code or rule governing equipment classification. If the Customer has questions about local safety codes, rules or ordinances, authorities local to the project should be consulted.

In order to be considered as a potential warranty claim, the component in question must be returned to Akkerman (freight prepaid) for factory inspection and analysis, and determination of warranty applicability. No warranty is provided for electronics or electrical components of any kind. The validity of all warranty claims are subject to the discretion and determination of the Akkerman Aftermarket Support Department. All such determinations are final.

Warranty

NOTES

Parts

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INTRODUCTION

This parts manual contains assembly illustrations of the Akkerman 2325B Series Bentonite & Lubrication Pumps. The illustrations in this manual are intended to show typical construction of various parts. In some instances, the details of parts illustrated may not exactly represent their actual appearance, but will help to identify parts performing the same functions.

LOCATING PARTS

This parts manual is organized to help you locate parts information quickly. An Alphabetical Index, Section 17, is provided to determine the page number of the assembly a part is used. If the part number is known, the Numerical Index, Section 18, can also be utilized to find the page number of the assembly.

USE GENUINE AKKERMAN PARTS

The use of second-rate parts could affect the efficient performance of the Bentonite & Lubrication Pump. ALWAYS use genuine Akkerman parts.

PARTS ORDERING

To order fast, accurate, and reliable parts service, call (800) 533-0386, (507) 567-2261, or fax (507) 567-2720, and provide the following information.

1. Model Number
2. Serial Number
3. Part Number, Description, and Quantity
4. Shipping Preference

MEASUREMENTS

The unit of measure in this manual is in inches unless indicated otherwise.

HARDWARE SPECIFICATION

All Akkerman products are assembled with SAE Grade 8 bolts, nuts, and washers. ALWAYS use matched fastener hardware when replacing or repairing the unit.

If you find any errors with this manual or have any suggestions for improvement, please let us know.

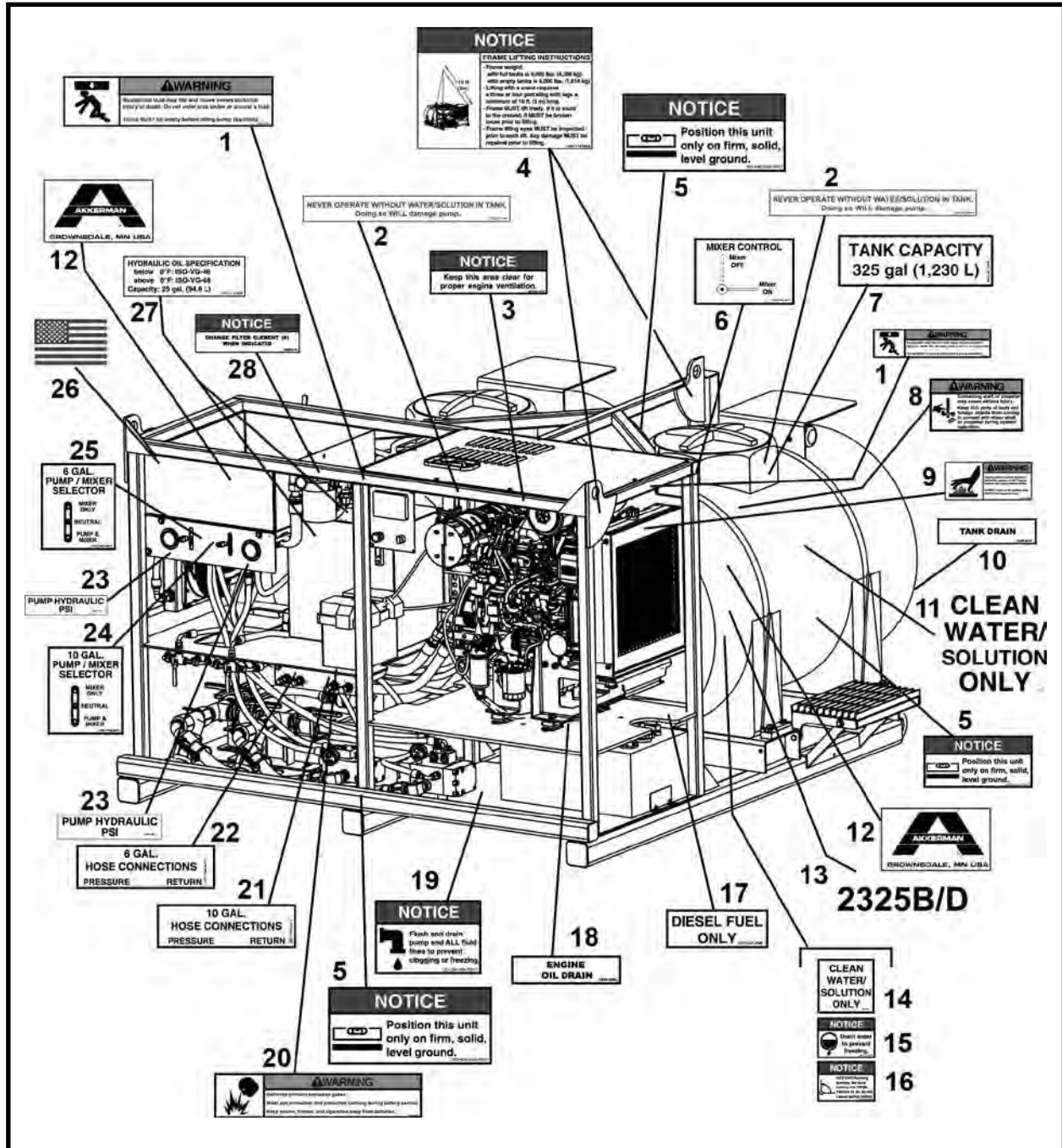
Mail your suggestions to:

Akkerman Inc, ATTN: Technical Publications, 58256 266th Street, Brownsdale, MN 55918.

Akkerman Inc. reserves the right to improve its product without notice or obligation.

NOTES

BENTONITE & LUBRICATION PUMP DECALS - RIGHT VIEW, 1255-109
2325B/D (SN: FA61088F)



| ITEM | QTY | PART NO. | DESCRIPTION |
|------|-----|-----------|---|
| 1 | 1 | 1251-018 | DECAL, Warning Suspended Loads |
| 2 | 2 | 1251-677 | DECAL, Never Operate Without Water/Solution |
| 3 | 2 | 1251-664 | DECAL, Notice, Keep Area Clear |
| 4 | 2 | 1252-139 | DECAL, Notice Lifting Instructions |
| 5 | 3 | 1250-638 | DECAL, Notice Position Level Ground |
| 6 | 1 | 1251-748A | DECAL, Mixer Control |
| 7 | 1 | 1251-221 | DECAL, Tank Capacity 325 gal. |
| 8 | 1 | 1250-311 | DECAL, Warning Keep Away From Propeller |
| 9 | 1 | 1250-697 | DECAL, Warning Radiator |
| 10 | 1 | 1251-813 | DECAL, Tank Drain |

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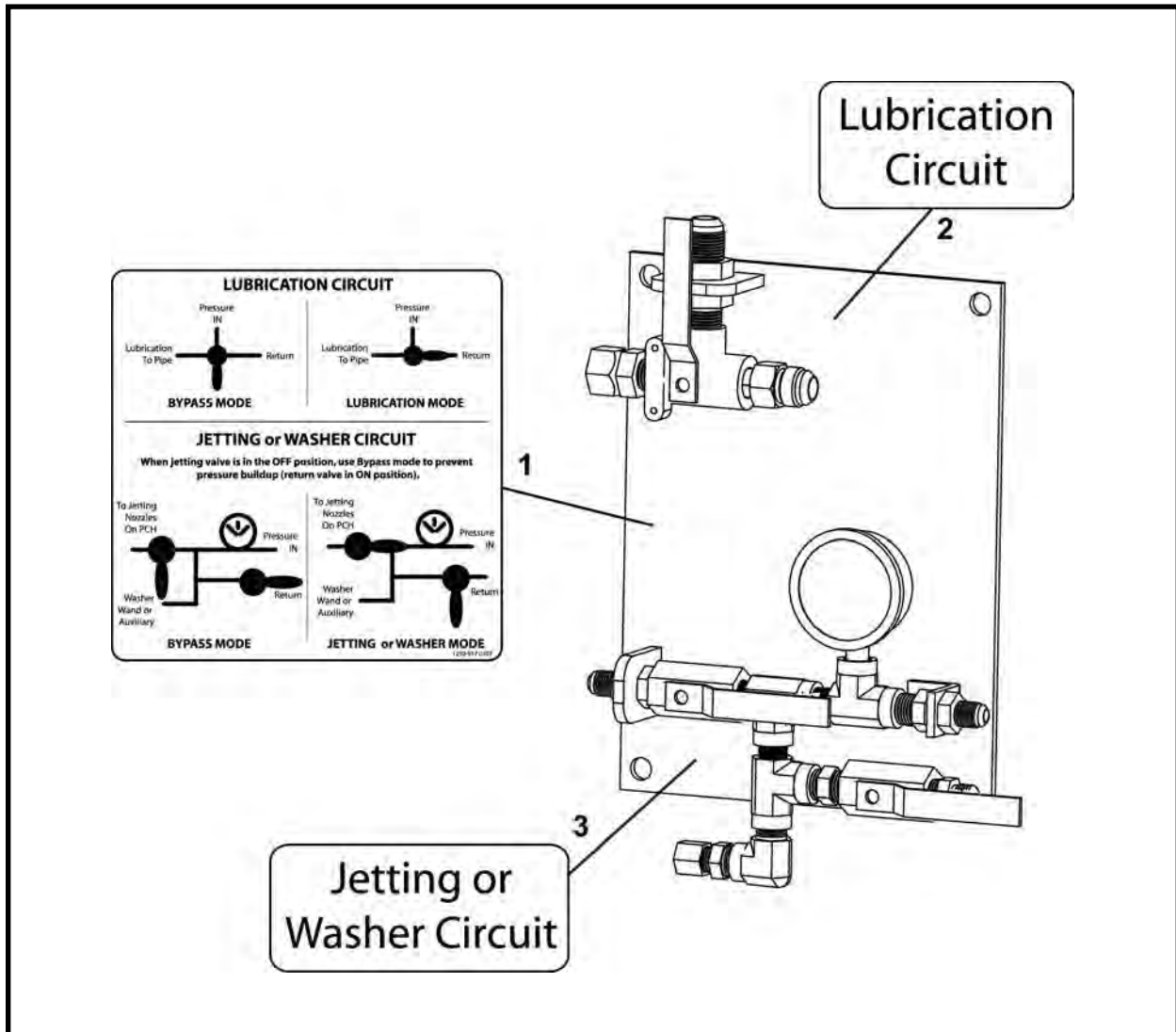
**BENTONITE & LUBRICATION PUMP DECALS - RIGHT VIEW, 1255-109
2325B/D (SN: FA61088F)**

| ITEM | QTY | PART NO. | DESCRIPTION |
|------|-----|-----------|-------------------------------------|
| 11 | 1 | 1251-678 | DECAL, Clean Water/Solution Only |
| 12 | 1 | 1251-246 | DECAL, Akkerman, Large |
| 13 | 1 | 1251-768 | DECAL, Model 2325B/D |
| 14 | 1 | 1251-679 | DECAL, Clean Solution Only Small |
| 15 | 1 | A3000-1 | DECAL, Notice Drain Water |
| 16 | 1 | 1251-023 | DECAL, Notice Open Valves |
| 17 | 1 | 1251-021 | DECAL, Diesel Fuel Only |
| 18 | 1 | 1250-498C | DECAL, Engine Oil Drain |
| 19 | 1 | 1251-228 | DECAL, Notice Flush and Drain |
| 20 | 1 | 1251-016 | DECAL, Warning Battery Explosive |
| 21 | 1 | 1251-742B | DECAL, Hose Connections 10 Gal. |
| 22 | 1 | 1251-742A | DECAL, Hose Connections 6 Gal. |
| 23 | 2 | 1252-140 | DECAL, Pump Hydraulic PSI |
| 24 | 1 | 1251-743B | DECAL, Pump/Mixer Selector 10 Gal. |
| 25 | 1 | 1251-743A | DECAL, Pump/Mixer Selector 6 Gal. |
| 26 | 1 | 1250-558 | DECAL, USA Flag Small |
| 27 | 2 | 1251-218 | DECAL, Hydraulic Oil Specification |
| 28 | 1 | 40000-16 | DECAL, Notice Change Filter Element |

**BENTONITE & LUBRICATION PUMP DECALS - LEFT VIEW, 1255-109
2325B/D (SN: FA61088F)**

| ITEM | QTY | PART NO. | DESCRIPTION |
|------|-----|-----------|---|
| 8 | 2 | 1251-681 | DECAL, Fluid Pressure Max 2500 PSI |
| 9 | 1 | 1251-741D | DECAL, Return Valve Position |
| 10 | 1 | 1251-228 | DECAL, Notice Flush and Drain |
| 11 | 1 | 1252-139 | DECAL, Notice Lifting Instructions |
| 12 | 1 | 1251-749 | DECAL, Warning Oil Cooler Fins Sharp |
| 13 | 1 | 1250-638 | DECAL, Notice Position Level Ground |
| 14 | 1 | 1251-023 | DECAL, Notice Open Valves |
| 15 | 1 | A3000-1 | DECAL, Notice Drain Water |
| 16 | 1 | 1251-679 | DECAL, Clean Water/Solution Only - small |
| 17 | 1 | 1251-768 | DECAL, Model 2325B/D |
| 18 | 1 | 1251-813 | DECAL, Tank Drain |
| 19 | 2 | 1251-246 | DECAL, Akkerman, Large |
| 20 | 1 | 1251-678 | DECAL, Clean Water/Solution Only |
| 21 | 1 | 1250-311 | DECAL, Warning Keep Away From Propeller |
| 22 | 1 | 1251-221 | DECAL, Tank Capacity 325 gal. |
| 23 | 1 | 1250-558 | DECAL, USA Flag Small |
| 24 | 1 | 1251-677 | DECAL, Never Operate Without Water/Solution |
| 25 | 1 | 1251-748A | DECAL, Mixer Control |
| 26 | 2 | 1251-018 | DECAL, Warning Suspended Loads |

JETTING & LUBRICATION PUMP SHAFT CONTROL DECALS

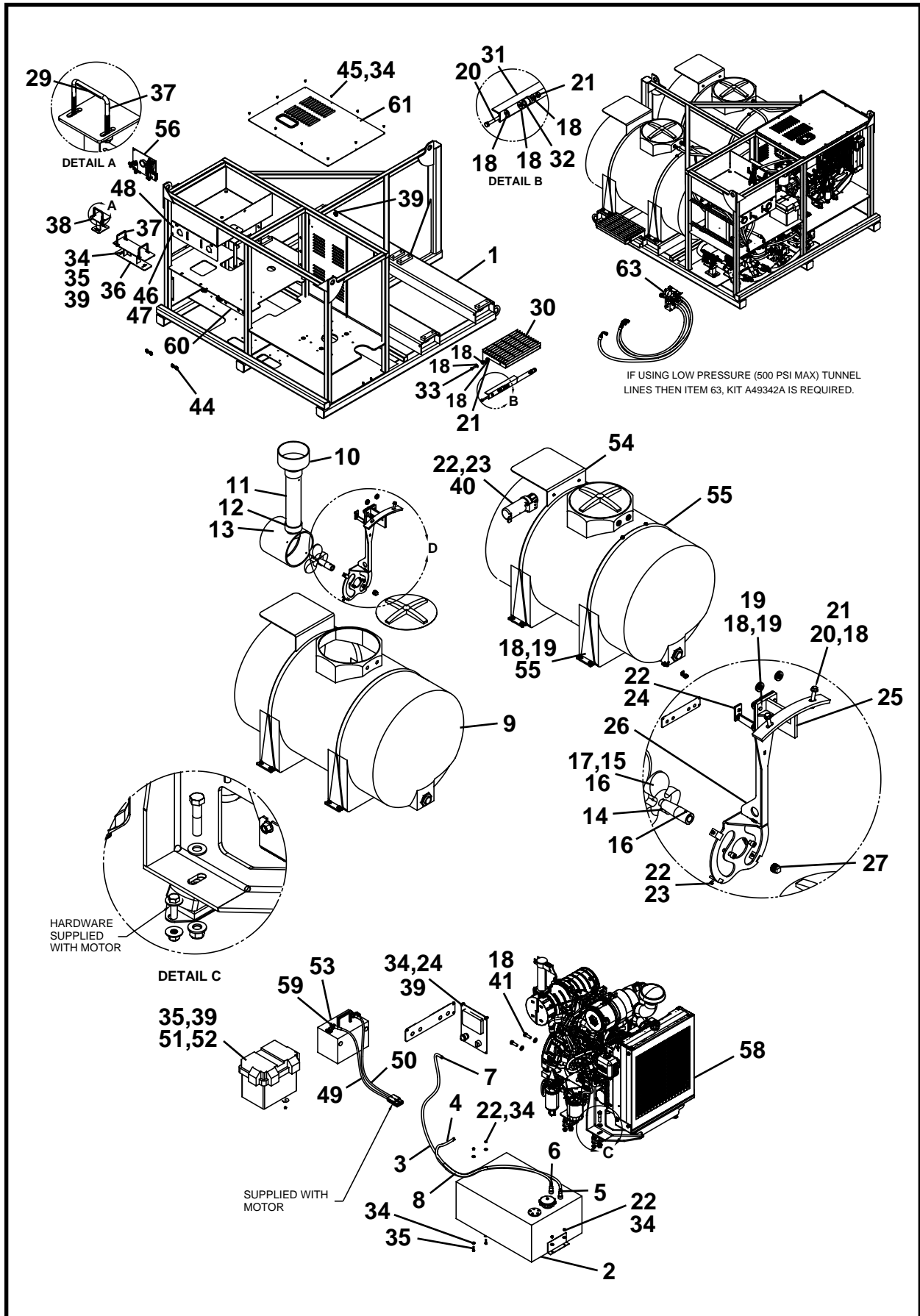


| ITEM | QTY | PART NO. | DESCRIPTION |
|------|-----|-----------|---|
| 1 | 1 | 1250-917A | DECAL, Lubrication-Jetting-Washer Control |
| 2 | 1 | 1250-917B | DECAL, Lubrication Circuit |
| 3 | 1 | 1250-917C | DECAL, Jetting Or Washer Circuit |

NOTES

BENTONITE & LUBRICATION PUMP FINAL ASSEMBLY, FA61088F

2325B/D (SN FA61088F)

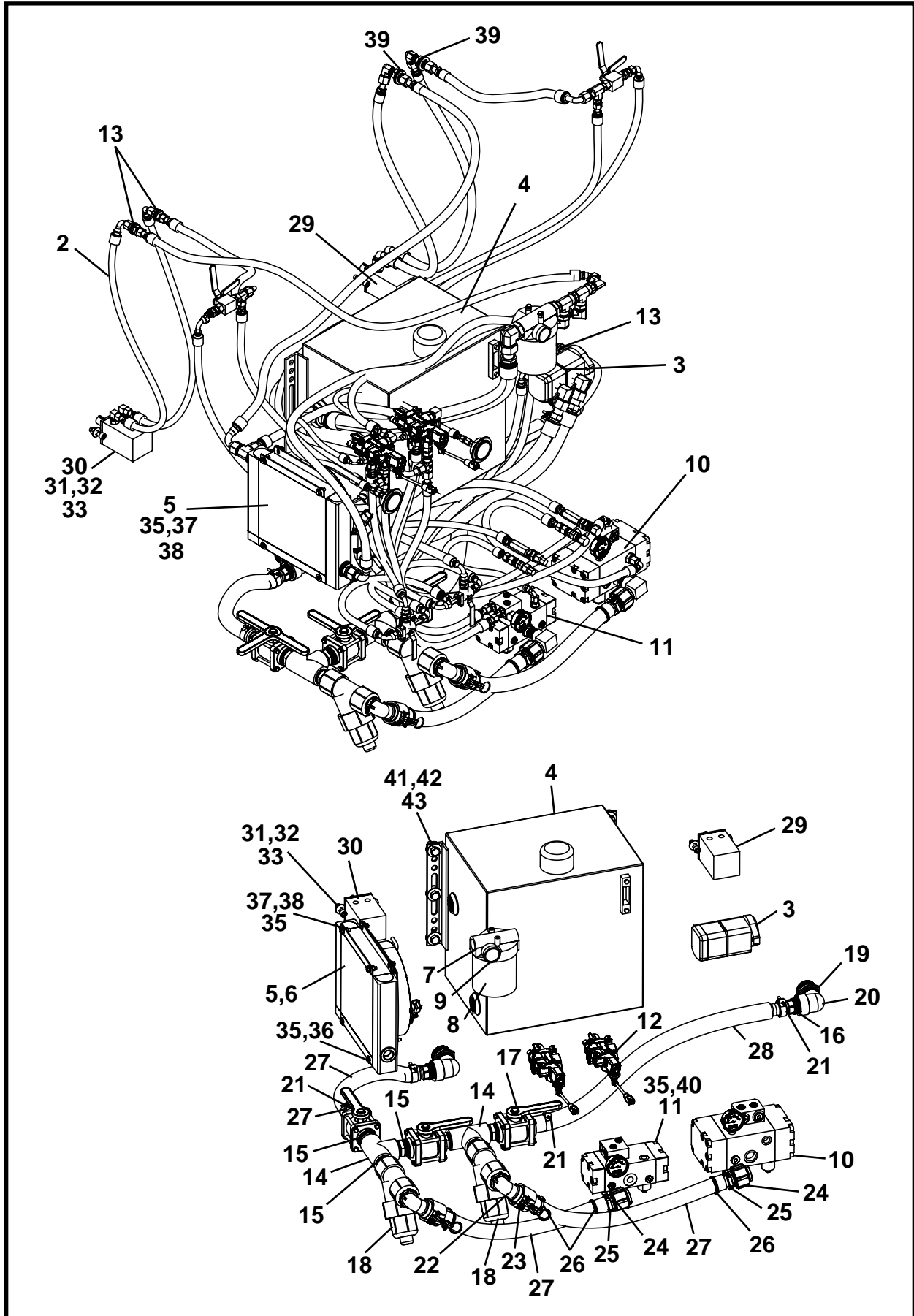


**BENTONITE & LUBRICATION PUMP FINAL ASSEMBLY, FA61088F
2325B/D (SN FA61088F)**

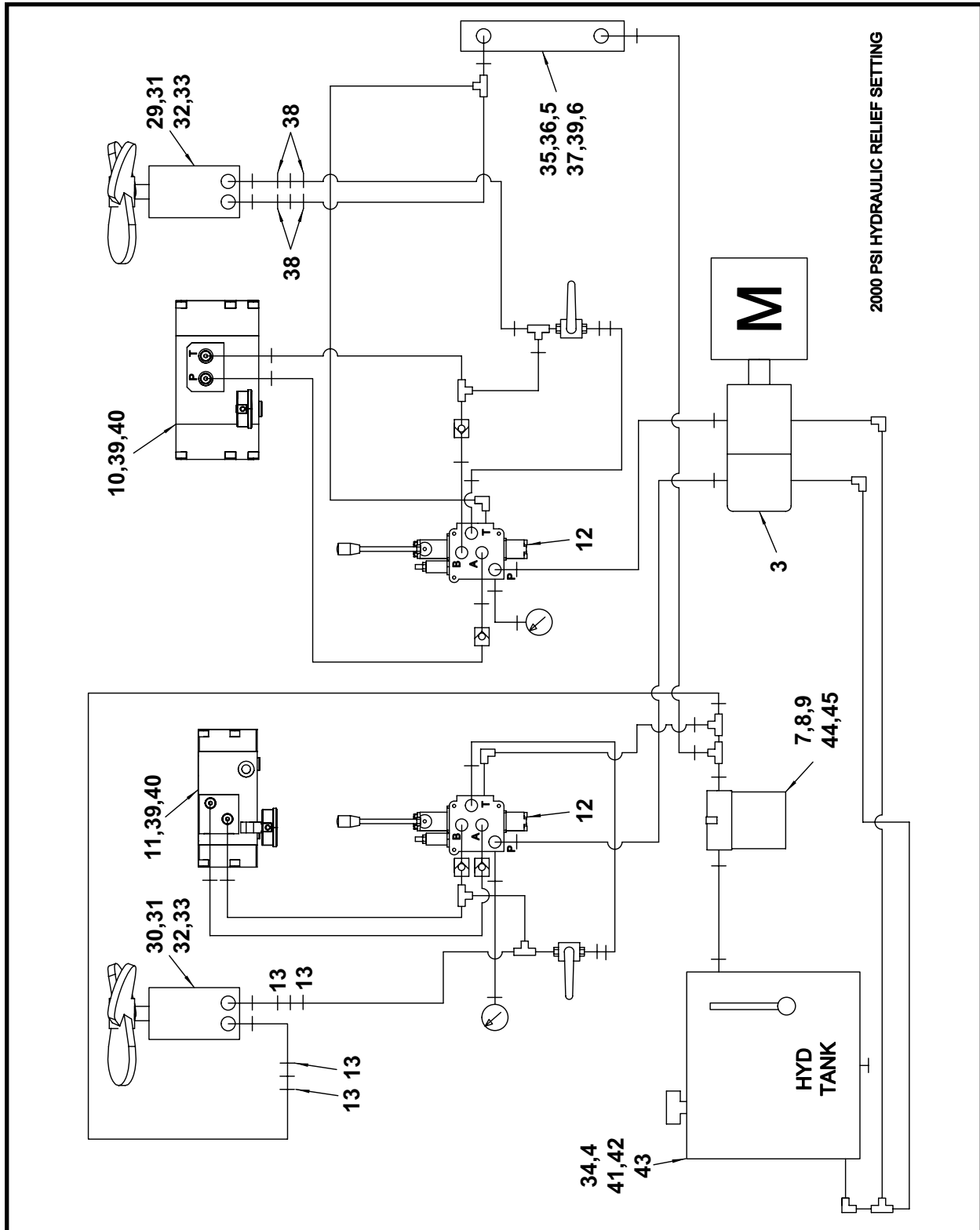
| ITEM | QTY | PART NO. | DESCRIPTION |
|------|--------|---------------|---|
| 0 | 1 | FA61088F | 2325B/D BENTONITE & LUBRICATION PUMP ASSEMBLY |
| 1 | 1 | A61141A | FRAME |
| 2 | 1 | P0125-140 | TANK, Fuel |
| 3 | 10 LI | P0201-240 | LINE, Fuel 1/4 |
| 4 | 39 LI | P0201-281 | HOSE, Fuel 5/16 |
| 5 | 1 | P0300-893 | HOSE BARB, 5/16 x 1/4 NPT Male |
| 6 | 1 | P0300-742 | HOSE BARB, 1/4 x 1/4 NPT Male |
| 7 | 5 | P0201-241 | CLAMP, Closed End |
| 8 | 12 LI | P0313-102 | LOOM, Nylon 1/2 |
| 9 | 2 | A48401P | TANK, 325 Gal |
| 10 | 2 | P0258-066 | COUPLING, Reducing 8 x 4 |
| 11 | 2 | A48477P | TUBE, PVC Bentonite Mix |
| 12 | 2 | P0258-067 | COUPLING, Reducing 4 x 3 |
| 13 | 2 | A48478P | TUBE, PVC Agitator Mix |
| 14 | 2 | A48479P | ROD, Agitator Shaft Extension |
| 15 | 2 | A48411P | PROPELLER, 10 in. |
| 16 | 8 | P0032-002 | SCREW, Socket Set 5/16 x 3/8 |
| 17 | 3.5 LI | P0047-003 | KEY, Square 1/4 |
| 18 | 60 | P0040-008 | WASHER, Hardened Flat 1/2 |
| 19 | 24 | P0001-08-005 | SCREW, Hex Cap 1/2 UNC x 1.25 |
| 20 | 8 | P0001-08-012 | BOLT, Hex 1/2 UNC x 3 |
| 21 | 12 | P0013-08A-000 | NUT, Nyloc 1/2 |
| 22 | 16 | P0013-04-000 | NUT, Nyloc 1/4 |
| 23 | 10 | P0020-14-205 | SCREW, Truss Head Machine 1 |
| 24 | 7 | P0001-04-003 | BOLT, Hex 1/4 UNC x .75 |
| 25 | 2 | A48424A | MOUNT, Agitator |
| 26 | 2 | A08330A | FRAME, Agitator |
| 27 | 2 | P0258-075 | PLUG, Threaded 1 NPT |
| 28* | 1 | A61187A | HYDRAULIC & WATER ASSEMBLY |
| 29 | 3 LI | P0201-312 | LINE, Fuel 3/8 |
| 30 | 2 | A45054A | STEP |
| 31 | 2 | A45057A | BRACE, Step |
| 32 | 4 | A45170P | BUSHING |
| 33 | 4 | P0001-08-007 | BOLT, Hex 1/2 UNC x 1.75 |
| 34 | 38 | P0040-004 | WASHER, Hardened Flat 1/4 |
| 35 | 10 | P0001-04-004 | BOLT, Hex 1/4 UNC x 1 |
| 36 | 1 | A08205A | SUPPORT, Ball Valve |
| 37 | 3 | P0202-201 | U-BOLT, 3/8 |
| 38 | 1 | A61172A | SUPPORT, Ball Valve |
| 39 | 17 | P0003-04-000 | NUT, Hex Regular 1/4 UNC |
| 40 | 1 | P0095-128 | CANISTER, Manual |
| 41 | 2 | P0001-08-009 | BOLT, Hex 1/2 UNC x 2.25 |
| 42 | 4 | P0001-04-009 | BOLT, Hex 1/4 UNC x 2.5 |
| 43 | 1 | P0055-130 | CLAMP 1 |
| 44 | 4 | P0043-011 | WASHER, Nord Lock 7/8 |
| 45 | 10 | P0001-04-002 | BOLT, Hex 1/4 UNC x .5 |
| 46 | 6 | P0040-006 | WASHER, Hardened Flat 3/8 |
| 47 | 6 | P0001-06-002 | BOLT, Hex 3/8 UNC x .5 |
| 48 | 1 | A61186P | PLATE, Valve Cover |
| 49 | 1 | A61838A-048 | CABLE, Battery - Negative |
| 50 | 1 | A61839A-048 | CABLE, Battery - Positive |
| 51 | 1 | P0064-127 | CASE, Battery |
| 52 | 8 | P0042-013 | WASHER, Hardened Fender 1/4 x 9/32 x 1.5 |
| 53 | 1 | P0064-019 | BATTERY |
| 54 | 2 | A48824A | STRAP, Tank With Shelf |
| 55 | 2 | A48823A | STRAP, Tank |
| 56 | 1 | A43749A | CONTROL, PCH Jetting & Lube Pit |
| 57 | 7.2 QT | P0126-041 | OIL, Diesel 15W40 |
| 58 | 1 | P0125-168 | ENGINE, Diesel Kubota |
| 59 | 2 | P0055-288 | TERMINAL, Battery Cable - Top |
| 60 | 1 | A61724P | PLATE, Hose Connection |
| 61 | 1 | A61209A | PANEL, Engine Cover |
| 62* | 1 | 1255-109 | KIT, Decal 2325B/D FA61088F |
| 63* | 0 | A49342A | KIT, 2325B TBM Applications |

* Refer to this section for parts information. LI - Linear Inch QT - Quart

HYDRAULICS & WATER ASSEMBLY, A61187A
2325B/D (SN FA61088F)



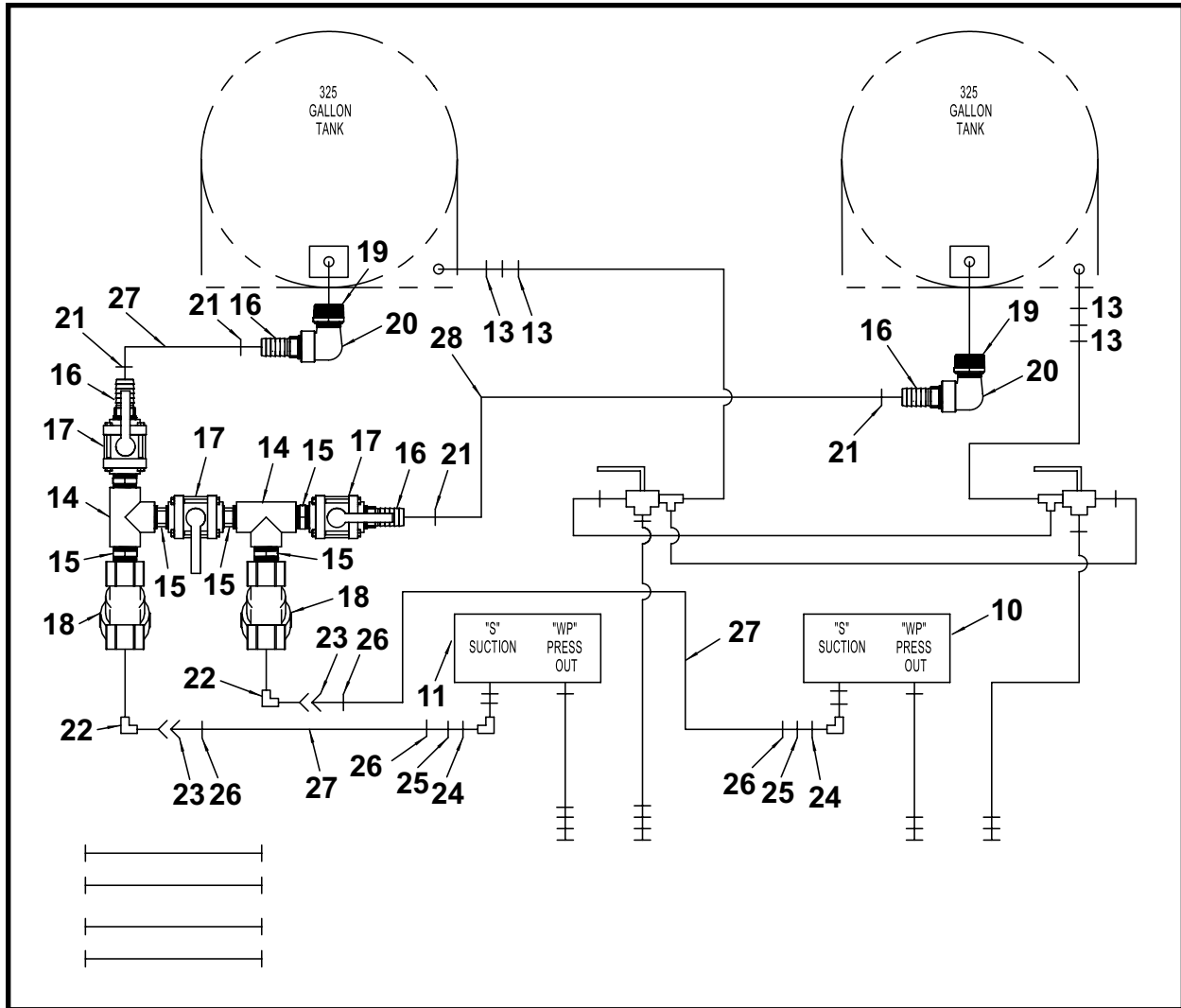
HYDRAULICS & WATER ASSEMBLY, A61187A
2325B/D (SN FA61088F)



| ITEM | QTY | PART NO. | DESCRIPTION |
|------|-----|-----------|-----------------------------|
| 0 | 1 | A61187A | HYDRAULICS & WATER ASSEMBLY |
| 1* | 1 | A61199A | FITTINGS ASSEMBLY |
| 2* | 1 | A61198A | HYDRAULIC HOSE ASSEMBLY |
| 3 | 1 | P0303-401 | PUMP, Gear |

(Continued on next page)

HYDRAULICS & WATER ASSEMBLY, A61187A
2325B/D (SN FA61088F)



| ITEM | QTY | PART NO. | DESCRIPTION |
|------|-----|------------|---|
| 4 | 1 | P0125-139 | 25 GALLON TANK ORB (Includes items 4a & 4b) |
| 4a | 1 | P0125-139A | CAP, Breather |
| 4b | 1 | P0125-139B | GAUGE, Sight |
| 5 | 1 | P0093-036 | OIL COOLER |
| 6 | 1 | P0093-036A | SWITCH, Temp With Relay 30 AMP |
| 7 | 1 | P0309-144B | FILTER HEAD ASSEMBLY |
| 8 | 1 | P0309-145A | ELEMENT, Filter 10 Micron |
| 9 | 1 | P0301-105 | GAUGE, Filter Indicator |
| 10 | 1 | P0303-396 | PUMP, Piston Fluid |
| 11 | 1 | P0303-399 | PUMP, Piston Bentonite, 6 GPM |
| 12 | 2 | P0302-803 | VALVE |
| 13 | 8 | P0040-012 | WASHER, Hardened Flat 3/4 |
| 14 | 2 | P0258-043 | TEE |
| 15 | 6 | P0258-005 | NIPPLE, 1-1/2 |
| 16 | 4 | P0258-044 | BARB, Hose |
| 17 | 3 | P0258-006 | VALVE, 1-1/2 |
| 18 | 2 | P0258-012 | STRAINER, 1-1/2 Line 12 Mesh |
| 19 | 2 | P0258-004 | REDUCER, 2 x 1-1/2 |
| 20 | 2 | P0258-018 | ELBOW, 1-1/2 NPT |
| 21 | 4 | P0201-127 | T-CLAMP 1-3/4 To 1-15/16 |

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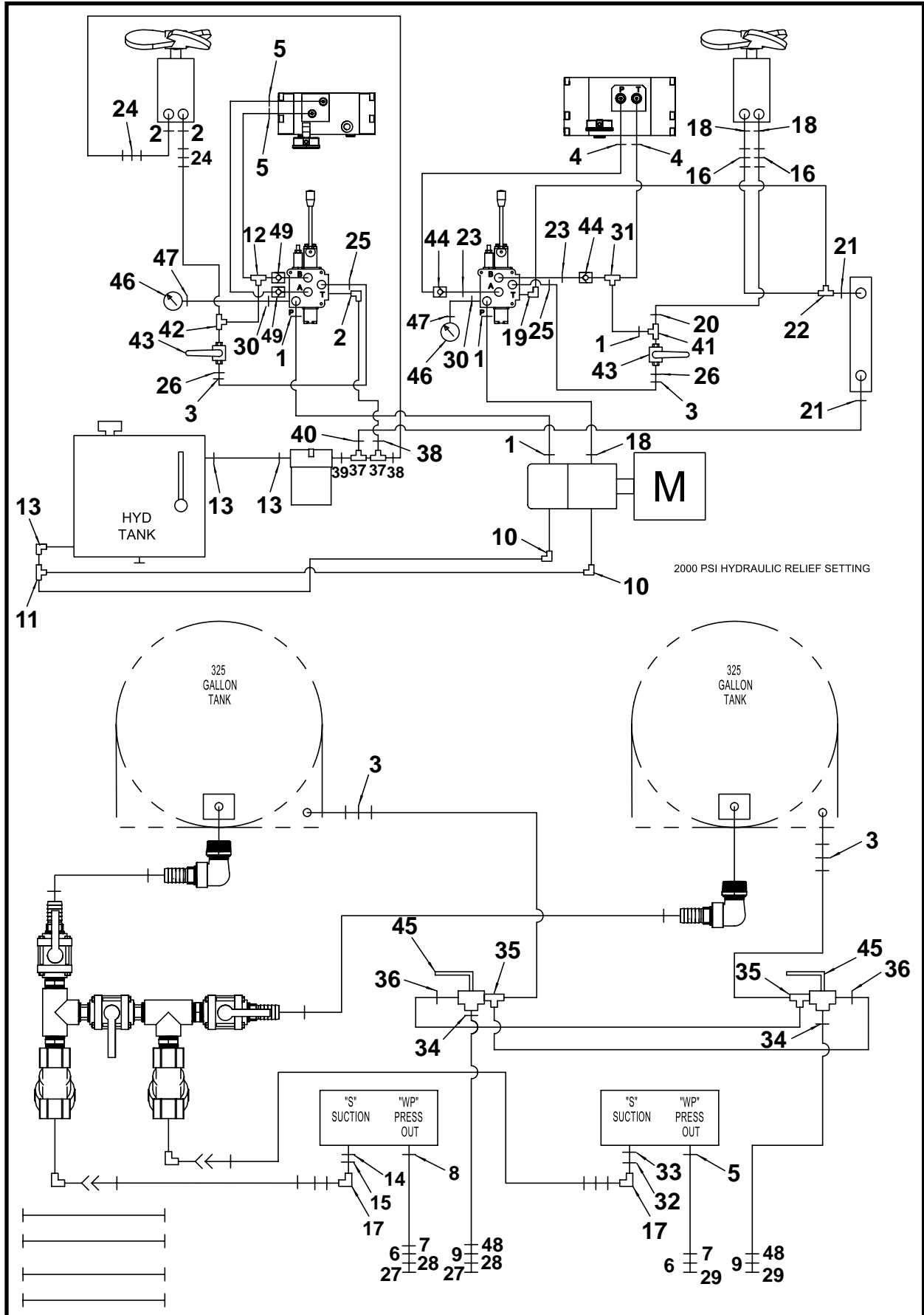
HYDRAULICS & WATER ASSEMBLY, A61187A
2325B/D (SN FA61088F)

| ITEM | QTY | PART NO. | DESCRIPTION |
|------|--------|----------------|---------------------------------------|
| 22 | 2 | P0258-084 | CAMLOCK, Male 1-1/2 |
| 23 | 2 | P0258-085 | CAMLOCK, Female 1-1/2 |
| 24 | 2 | P0258-086 | COUPLER, Reducer 1.5 x 1 |
| 25 | 2 | P0258-087 | BARB, Hose 1-1/2 |
| 26 | 4 | P0201-301 | CLAMP, Radiator #24 |
| 27 | 3 | P0201-239-028 | PVC, Water Suction 1-1/2 x 28 |
| 28 | 1 | P0201-239-041 | HOSE, Water Suction 1-1/2 x 41 |
| 29 | 1 | P0304-347 | MOTOR |
| 30 | 1 | P0304-353 | MOTOR |
| 31 | 4 | P0040-008 | WASHER, Hardened Flat 1/2 |
| 32 | 4 | P0013-08A-000 | NUT, Nyloc 1/2 UNC |
| 33 | 4 | P0031-08-007 | SCREW, Socket Head Cap 1/2 UNC x 1.75 |
| 34 | 100 QT | P0126-038 | OIL, Hydraulic Duragard AW-68 |
| 35 | 14 | P0040-005 | WASHER, Hardened Flat 5/16 |
| 36 | 2 | PM6A-16-1.00 | BOLT, Hex M6 x 1.00 x 16 10.9 |
| 37 | 2 | P0003-05-000 | NUT, Hex 5/16 UNC |
| 38 | 2 | P0001-05-004 | BOLT, Hex 5/16 x 1 |
| 39 | 4 | P0040-016 | WASHER, Hardened Flat 1 |
| 40 | 8 | PM08A-1.25-016 | BOLT, Hex M8 x 1.25 x 16 10.9 |
| 41 | 6 | P0001-10-007 | BOLT, Hex 5/8 UNC x 1.75 |
| 42 | 12 | P0040-010 | WASHER, Hardened Flat 5/8 |
| 43 | 6 | P0013-10-000 | NUT, Lock 5/8 UNC |
| 44 | 2 | P0040-004 | WASHER, Hardened Flat 1/4 |
| 45 | 2 | P0001-04-003 | BOLT, Hex 1/4 UNC x .75 |

QT - Quart

* Refer to this section for parts information.

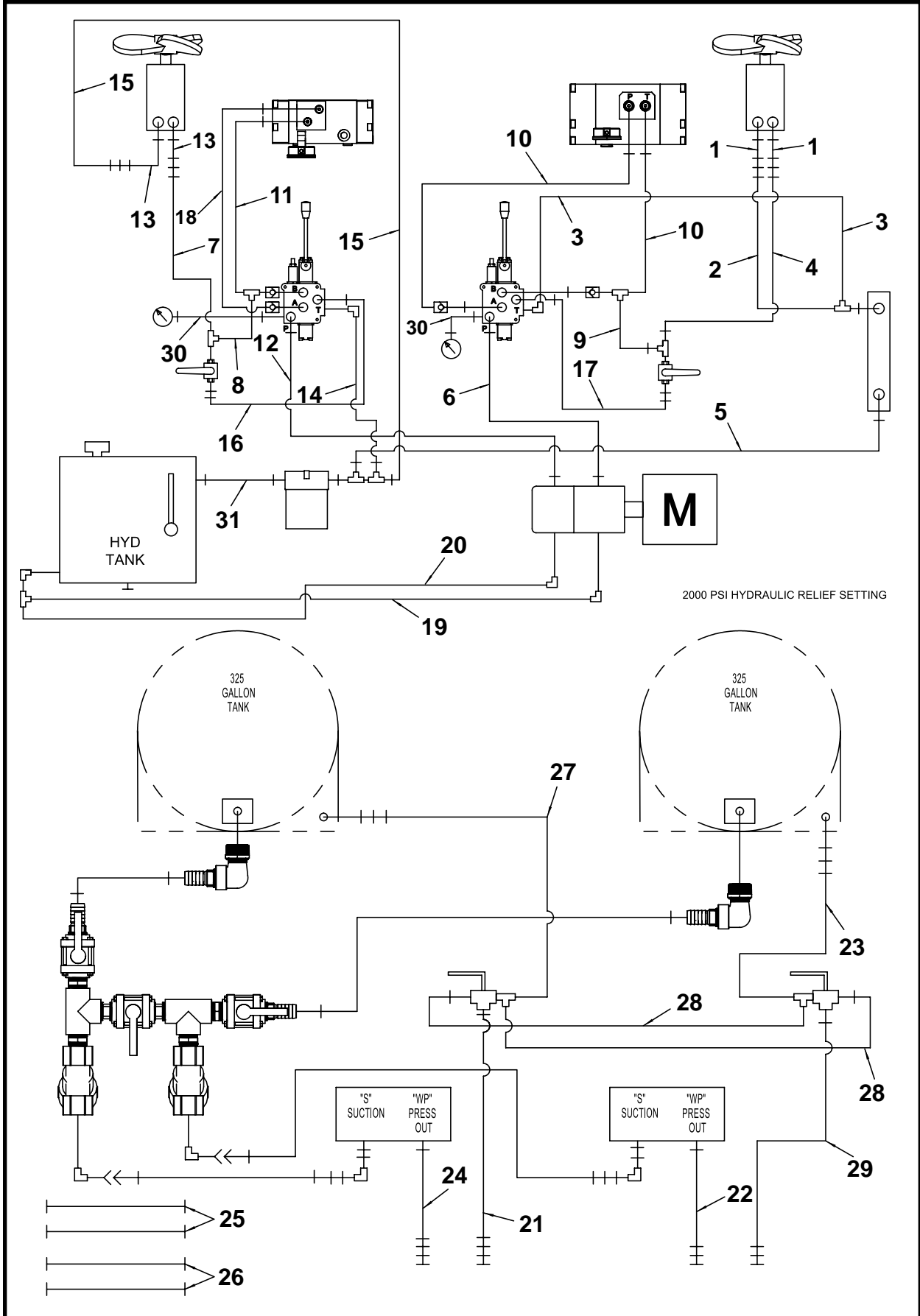
FITTING ASSEMBLY, A61199A
2325B/D (SN FA61088F)



**FITTING ASSEMBLY, A61199A
2325B/D (SN FA61088F)**

| ITEM | QTY | PART NO. | DESCRIPTION |
|------|-----|-----------|----------------------------------|
| 0 | 1 | A61199A | FITTINGS ASSEMBLY |
| 1 | 4 | P0300-305 | FITTING, 08MFOR-08MB |
| 2 | 3 | P0300-302 | FITTING, 08MFOR-10MB90 |
| 3 | 4 | P0300-325 | FITTING, 08MJ-08MJBKHD |
| 4 | 2 | P0300-881 | FITTING, 08MFFOR-12MBSPP |
| 5 | 3 | P0300-689 | FITTING, 08MFFOR-08MBSPP |
| 6 | 2 | P0300-868 | FITTING, 10MJ-10MJBKHD |
| 7 | 2 | P0300-873 | FITTING, 10FJ-8MJ |
| 8 | 1 | P0300-724 | FITTING, 06MFFOR-06MBSPP |
| 9 | 2 | P0300-567 | FITTING, 10MJ-8MPKBHD |
| 10 | 2 | P0300-589 | FITTING, 16MFFOR-12MB90 |
| 11 | 1 | P0300-551 | FITTING, 20MFFOR-20FFORX-20MFFOR |
| 12 | 1 | P0300-318 | FITTING, 08MFOR-08FFORX-08MFOR |
| 13 | 3 | P0300-620 | FITTING, 20MFOR-20MB90 |
| 14 | 1 | P0300-719 | FITTING, 12MBSPP-BONDED SEAL |
| 15 | 1 | P0300-882 | FITTING, 16MP-12MBSPP |
| 16 | 2 | P0300-903 | FITTING, 10MFFOR-10MFFOR-BKHD90 |
| 17 | 2 | P0300-057 | FITTING, 16MP-16FP90 |
| 18 | 3 | P0300-385 | FITTING, 10MFFOR-10MB |
| 19 | 1 | P0300-383 | FITTING, 10MFOR-10MB90 |
| 20 | 1 | P0300-892 | FITTING, 10MFFOR-8MB |
| 21 | 2 | P0300-886 | FITTING, 12MFFOR-16MBSPP |
| 22 | 1 | P0300-588 | FITTING, FS6602-12-12-12 |
| 23 | 2 | P0300-900 | FITTING, 8MB-10FB |
| 24 | 2 | P0300-595 | FITTING, 8MFFOR-8MFFOR-BKHD |
| 25 | 2 | P0300-300 | FITTING, 08MFOR-10MB |
| 26 | 2 | P0300-332 | ORING, 08OR |
| 27 | 2 | P0300-126 | CAP, 06FJ-CAP |
| 28 | 2 | P0300-147 | FITTING, 10FJ-06MJ |
| 29 | 2 | P0300-140 | CAP, 10FJ-CAP |
| 30 | 2 | P0300-272 | FITTING, 04MJ-08MB |
| 31 | 1 | P0300-422 | FITTING, 10MFOR-10FFORX-10MFOR |
| 32 | 1 | P0300-879 | FITTING, 16MBSPP-16MP |
| 33 | 1 | P0300-880 | FITTING, 16MBSSP-BONDED SEAL |
| 34 | 2 | P0300-826 | FITTING, 08MP-08MJBKHD |
| 35 | 2 | P0300-927 | FITTING, 08MJ-08MP-08MJ |
| 36 | 2 | P0300-053 | FITTING, 08MJ-08MP |
| 37 | 2 | P0300-536 | FITTING, 12MB-12FB-12FB |
| 38 | 2 | P0300-373 | FITTING, 08MFOR-12MB90 |
| 39 | 1 | P0300-658 | FITTING, 20MB-12FB |
| 40 | 1 | P0300-633 | FITTING, 10MFFOR-12MB90 |
| 41 | 1 | P0300-688 | FITTING, 08MB-08FB-08FB |
| 42 | 1 | P0300-535 | FITTING, 08MFOR-08MB-08MFOR |
| 43 | 2 | P0302-801 | VALVE, Ball 08ORD-7250 PSI |
| 44 | 2 | P0302-810 | CHECK VALVE |
| 45 | 2 | P0302-512 | VALVE, Ball 3 Way |
| 46 | 2 | P0301-142 | GAUGE, 5000 PSI 2.5 7/16 MORB |
| 47 | 2 | P0300-594 | FITTING, 4FB-4MFFOR |
| 48 | 2 | P0302-102 | CHECK VALVE |
| 49 | 2 | P0302-701 | CHECK VALVE |

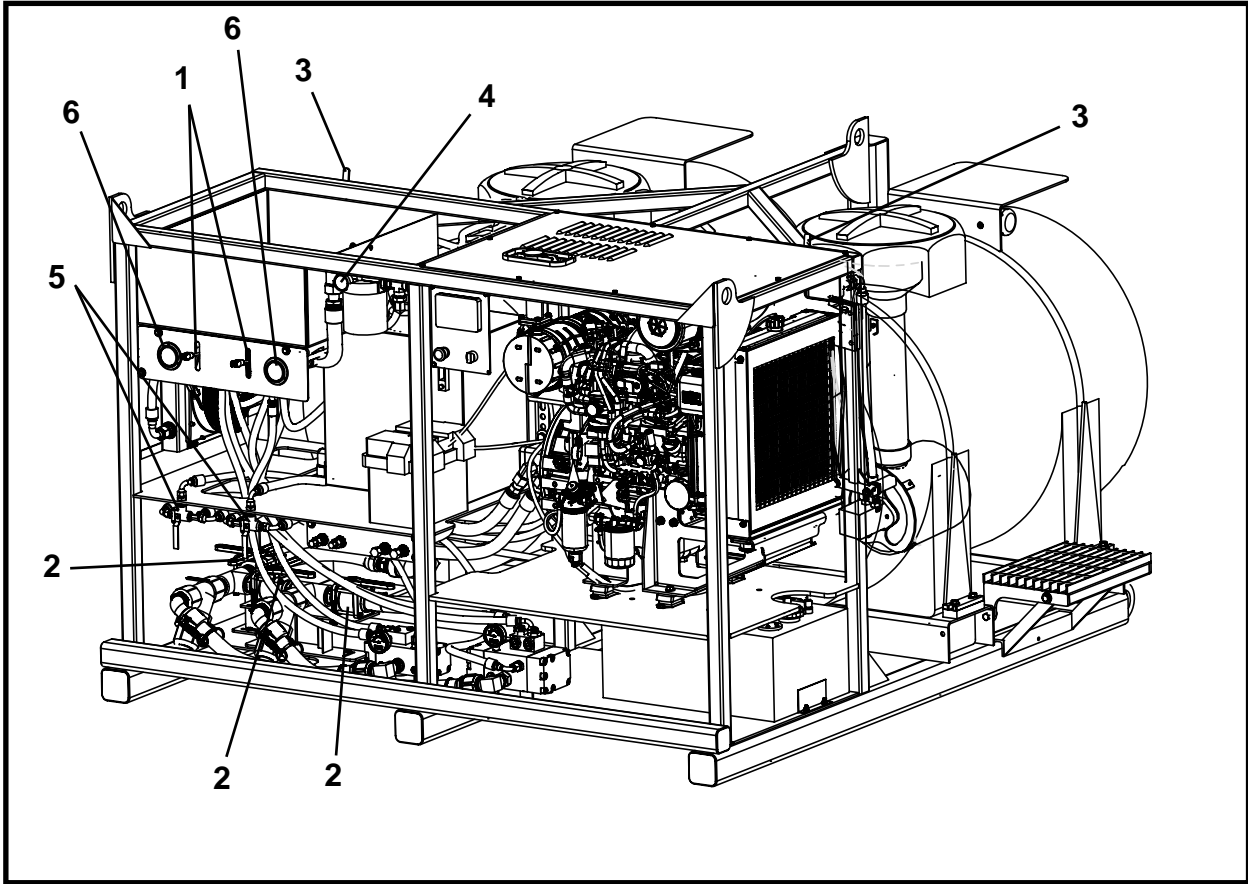
HYDRAULIC HOSE ASSEMBLY, A61198A
2325B/D (SN FA61088F)



HYDRAULIC HOSE ASSEMBLY, A61198A
2325B/D (SN FA61088F)

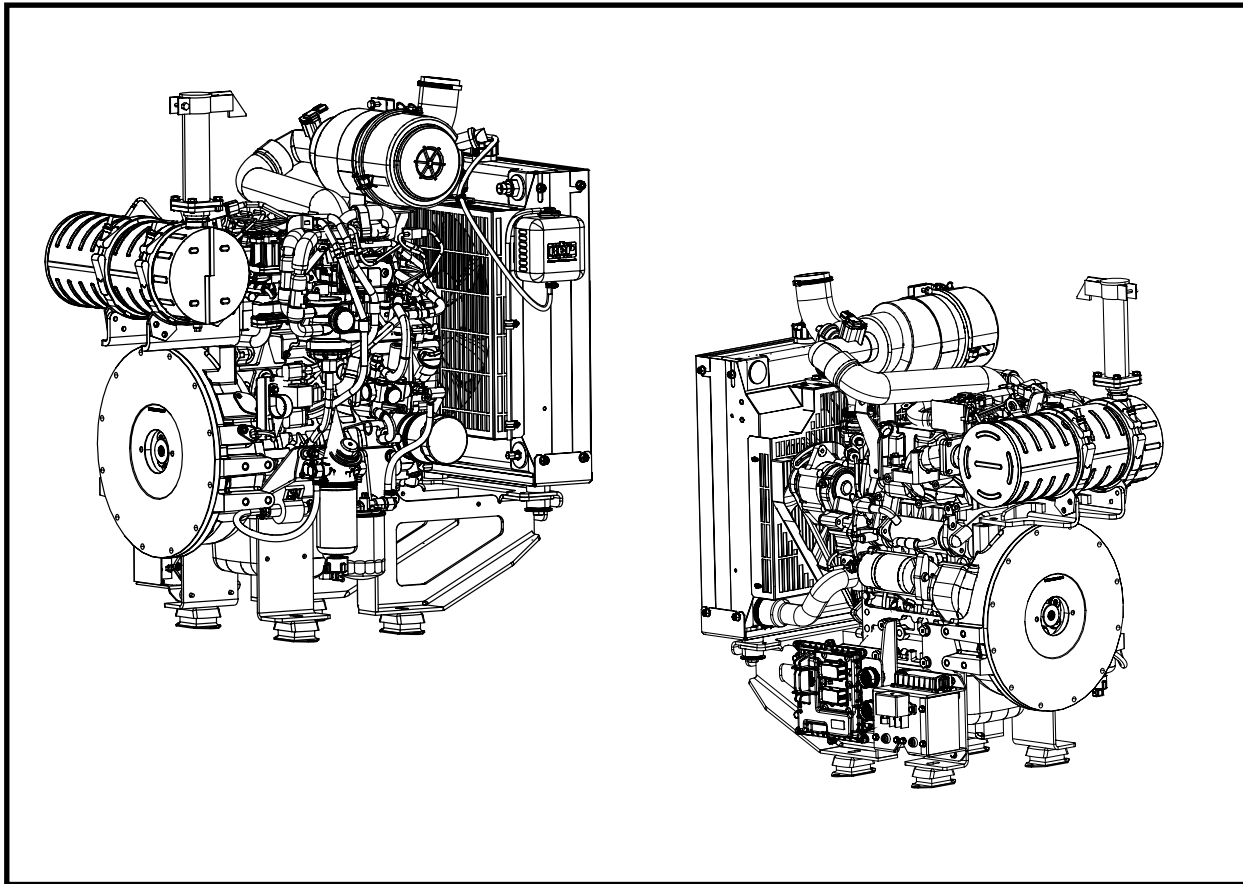
| ITEM | QTY | PART NO. | DESCRIPTION |
|------|-----|-------------|---------------------------|
| 0 | 1 | A61198A | HYDRAULIC HOSE ASSEMBLY |
| 1 | 2 | A09877A-039 | HOSE ASSEMBLY, 5/8 x 39 |
| 2 | 1 | A09876A-082 | HOSE ASSEMBLY, 5/8 x 82 |
| 3 | 1 | A08544A-027 | HOSE ASSEMBLY, 5/8 x 27 |
| 4 | 1 | A09877A-024 | HOSE ASSEMBLY, 5/8 x 24 |
| 5 | 1 | A09876A-056 | HOSE ASSEMBLY, 5/8 x 56 |
| 6 | 1 | A10460A-070 | HOSE ASSEMBLY, 1/2 x 70 |
| 7 | 1 | A10324A-029 | HOSE ASSEMBLY, 1/2 x 29 |
| 8 | 1 | A10324A-034 | HOSE ASSEMBLY, 1/2 x 34 |
| 9 | 1 | A10460A-096 | HOSE ASSEMBLY, 1/2 x 96 |
| 10 | 2 | A09873A-062 | HOSE ASSEMBLY, 1/2 x 62 |
| 11 | 1 | A10324A-048 | HOSE ASSEMBLY, 1/2 x 48 |
| 12 | 1 | A10324A-066 | HOSE ASSEMBLY, 1/2 x 66 |
| 13 | 2 | A09912A-039 | HOSE ASSEMBLY, 1/2 x 39 |
| 14 | 1 | A10372A-042 | HOSE ASSEMBLY, 1/2 x 42 |
| 15 | 1 | A10362A-071 | HOSE ASSEMBLY, 1/2 x 71 |
| 16 | 1 | A09853A-048 | HOSE ASSEMBLY, 1/2 x 48 |
| 17 | 1 | A09853A-110 | HOSE ASSEMBLY, 1/2 x 110 |
| 18 | 1 | A10372A-052 | HOSE ASSEMBLY, 1/2 x 52 |
| 19 | 1 | A09875A-039 | HOSE ASSEMBLY, 1 x 39 |
| 20 | 1 | A09984A-034 | HOSE ASSEMBLY, 1 x 34 |
| 21 | 1 | A09915A-040 | HOSE ASSEMBLY, 1/2 x 40 |
| 22 | 1 | A10068A-036 | HOSE ASSEMBLY, 1/2 x 36 |
| 23 | 1 | A09917A-084 | HOSE ASSEMBLY, 1/2 x 84 |
| 24 | 1 | A10390A-028 | HOSE ASSEMBLY, 3/8 x 28 |
| 25 | 2 | A09908A-018 | HOSE ASSEMBLY, 1/2 x 18 |
| 26 | 2 | A10311A-018 | HOSE ASSEMBLY, 3/8 x 18 |
| 27 | 1 | A10361A-045 | HOSE ASSEMBLY, 1/2 x 45 |
| 28 | 2 | A10361A-027 | HOSE ASSEMBLY, 1/2 x 27 |
| 29 | 1 | A09915A-046 | HOSE ASSEMBLY, 1/2 x 46 |
| 30 | 2 | A10319A-020 | HOSE ASSEMBLY, 1/4 x 20 |
| 31 | 1 | A09800A-038 | HOSE ASSEMBLY, 1-1/4 x 38 |

OPERATOR CONTROLS 2325B/D



| ITEM | QTY | PART NO. | DESCRIPTION |
|------|-----|-----------|---|
| 1 | 2 | P0302-803 | VALVE, Single Detent |
| 2 | 3 | P0258-006 | VALVE, Port 1-1/2 |
| 3 | 2 | P0302-801 | VALVE, Mixer Control |
| 4 | 1 | P0301-105 | GAUGE, Filter Indicator |
| 5 | 2 | P0302-512 | VALVE, Ball Three Way (Fluid Return Valves) |
| 6 | 2 | P0301-142 | GAUGE, 5000 PSI (Pump Pressure Gauges) |

ENGINE, P0125-168
2325B/D - Kubota Engine Package



| ITEM | QTY | PART NO. | DESCRIPTION |
|------|-----|------------|----------------------|
| 0 | 1 | P0125-168 | ENGINE |
| 1 | 1 | P0125-168A | DRIVE,Hydraulic Pump |

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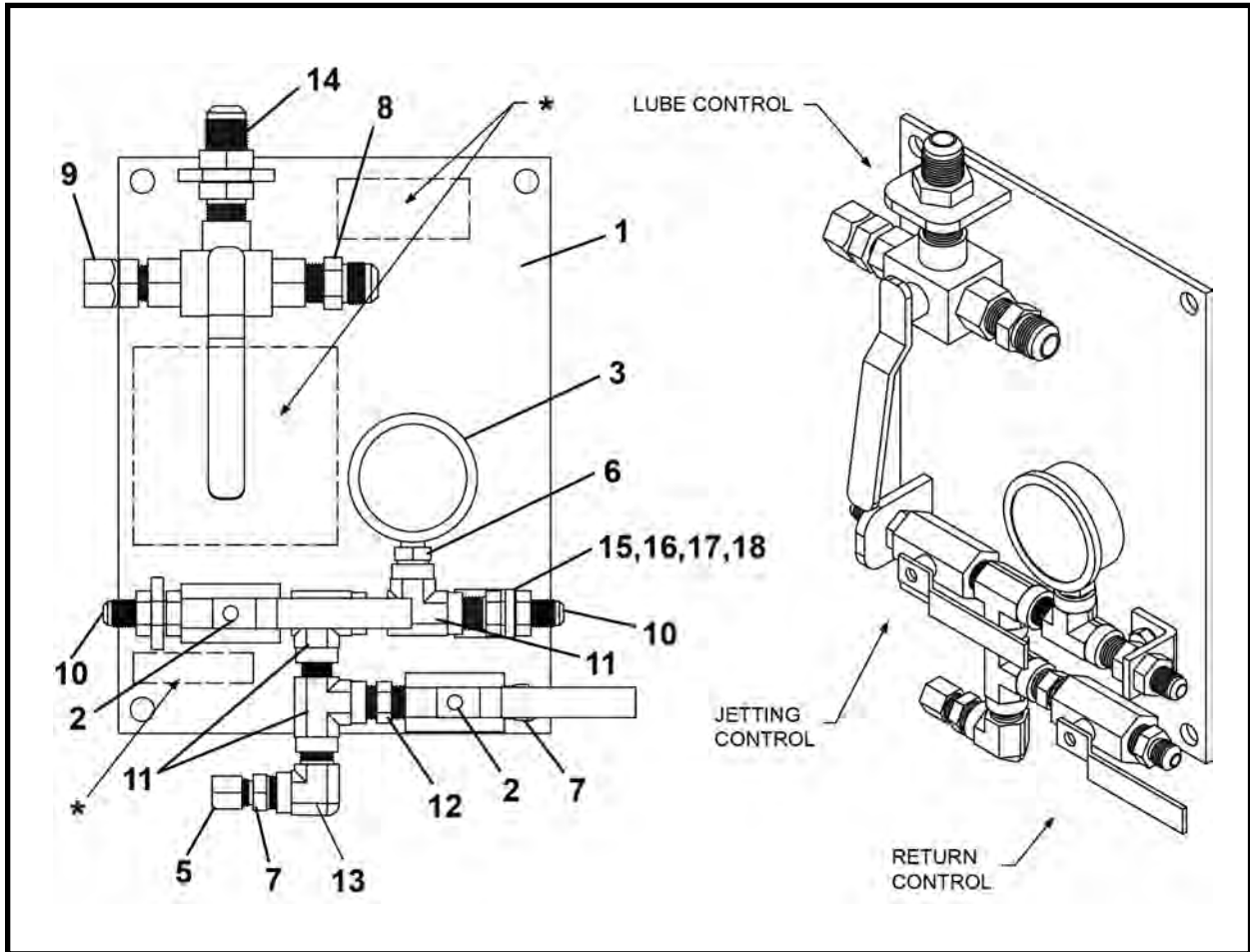
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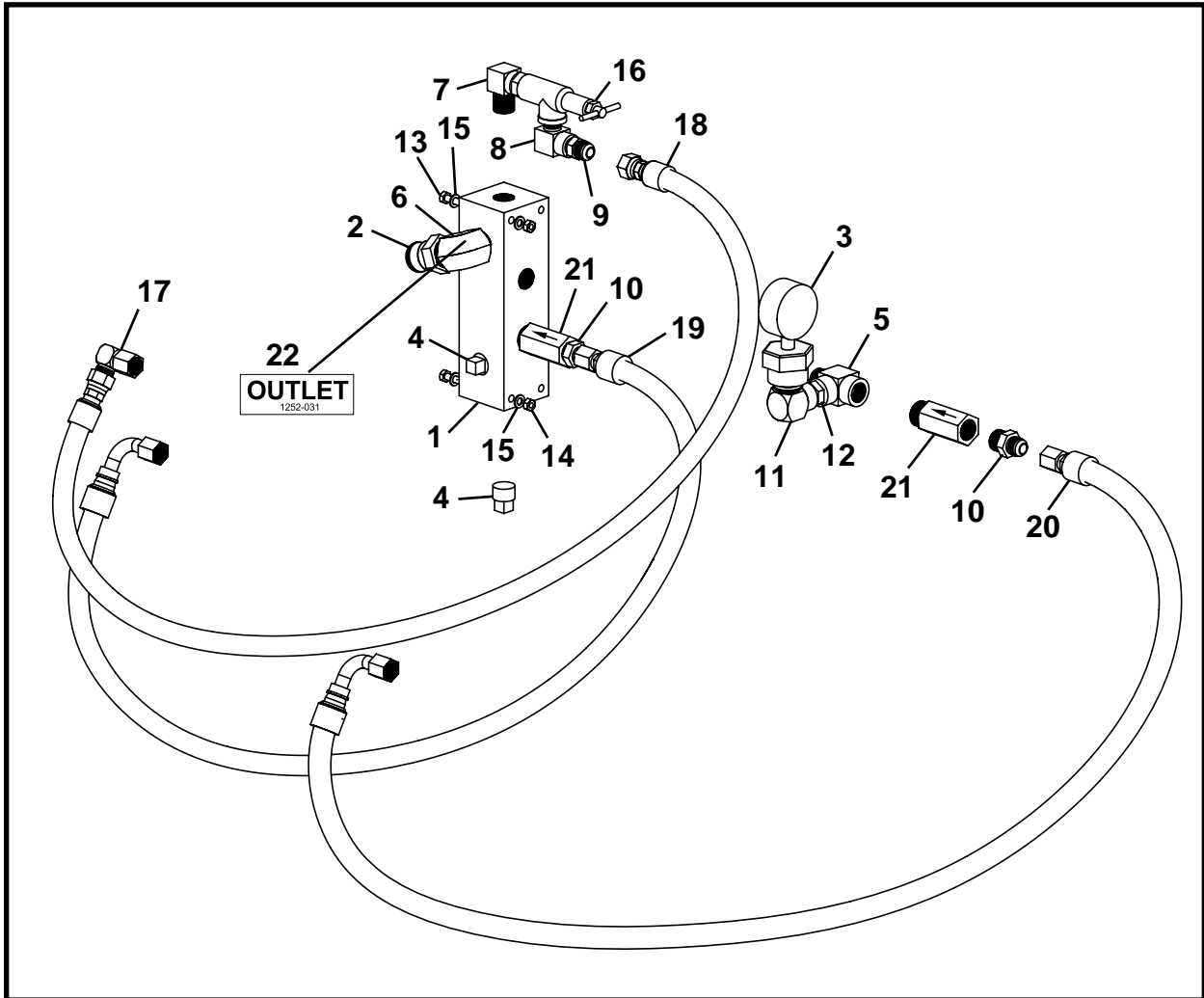
JETTING & LUBRICATION SHAFT CONTROL, A43749A



| ITEM | QTY | PART NO. | DESCRIPTION |
|------|-----|--------------|-------------------------------------|
| 0 | 1 | A43749A | JETTING & LUBRICATION SHAFT CONTROL |
| 1 | 1 | A43757A | MOUNT, Pit Control |
| 2 | 2 | P0302-507 | VALVE, Ball 3/8" 2,000 PSI |
| 3 | 1 | P0301-100 | GAUGE, Pressure 5000 PSI |
| 4 | 1 | P0302-802 | VALVE, Ball 3-Way |
| 5 | 1 | P0300-126 | FITTING, 06FJ-CAP |
| 6 | 1 | P0300-093 | FITTING, 06MP-04FPS |
| 7 | 2 | P0300-130 | FITTING, 06MJ-06MP |
| 8 | 1 | P0300-142 | FITTING, 10MJ-08MP |
| 9 | 1 | P0300-399 | FITTING, 08MP-10FJX |
| 10 | 2 | P0300-568 | FITTING, 6MJ-6MPBKHD |
| 11 | 3 | P0300-569 | FITTING, 6MP-6FP-6FP |
| 12 | 1 | P0300-570 | FITTING, 6MP-6MP |
| 13 | 1 | P0300-571 | FITTING, 6MP-6FP90 |
| 14 | 1 | P0300-567 | FITTING, 10MJ-8MPKBHD |
| 15 | 1 | A43754P | BRACKET, Pipe Lube Control |
| 16 | 1 | P0001-06-004 | BOLT, Hex 3/8 UNC x 1 |
| 17 | 1 | P0040-006 | WASHER, Flat 3/8 |
| 18 | 1 | P0003-06-000 | NUT, 3/8 UNC |

* Decal 1250-917

2325B - TBM APPLICATIONS KIT, A49342A
2325B/D (SN FA61088F)



| ITEM | QTY | PART NO. | DESCRIPTION |
|------|-----|--------------|------------------------------|
| 0 | 1 | A49342A | 2325B - TBM APPLICATIONS KIT |
| 1 | 1 | A44466P | MANIFOLD |
| 2 | 1 | P0100-024 | PLUG, FPT 1 |
| 3 | 1 | P0301-143 | GAUGE & SEAL |
| 4 | 2 | P0416-004 | PLUG, Square Head 3/4 |
| 5 | 1 | P0300-019 | FITTING, 12MP-12FP-12FP |
| 6 | 1 | P0300-090 | ELBOW, 16MP-16MP90 |
| 7 | 1 | P0300-023 | FITTING, 12MP-08FP90 |
| 8 | 1 | P0300-032 | FITTING, 08MP-08FP90 BRAZED |
| 9 | 1 | P0300-142 | FITTING, 10MJ-08MP |
| 10 | 2 | P0300-174 | FITTING, 10MJ-12MP |
| 11 | 1 | P0300-115 | FITTING, 16MP-12FP90 |
| 12 | 1 | P0300-107 | FITTING, 12MP-12MP |
| 13 | 2 | P0001-05-016 | BOLT, Hex 5/16 UNC x 4 |
| 14 | 2 | P0003-05-000 | NUT, Hex 5/16 UNC |
| 15 | 4 | P0040-005 | WASHER, Hardened Flat 5/16 |
| 16 | 1 | P0302-861 | VALVE, Pressure Relief |
| 17 | 1 | P0300-150 | FITTING, 10MJ-10FJX90 |
| 18 | 1 | A09908A-072 | HOSE ASSEMBLY, 1/2 x 72 |
| 19 | 1 | A08555A-065 | HOSE ASSEMBLY, 5/8 HOSE |
| 20 | 1 | A08555A-076 | HOSE ASSEMBLY, 5/8 HOSE |
| 21 | 2 | P0302-917 | CHECK VALVE #12 NPT |
| 22 | 1 | 1252-031 | DECAL, Outlet |

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NOTES

CALIFORNIA

Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.