MAXIM™ DS DC Driven Power Units

THIS GUIDE IS MADE AVAILABLE TO YOU BY:

Bailey International Corporation

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IMPORTANT

DO NOT VOID YOUR WARRANTY

This guide carries many useful tips for troubleshooting your hydraulic power unit. It should be noted, however, that any disassembly of a power unit that is still under warranty will void that warranty. If you need assistance, contact Bailey at (800) 800-1810.*

**In the event you need to contact us, please have the model and/or part numbers available.*

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MAINTENANCE SCHEDULE

Make notes in the spaces below of the maintenance schedule you plan to follow. Some guidelines have been provided for you as a point of reference.

Oil

The system oil should be run through a diagnostic checkup at least once (1x) annually to determine if it is in need of replacing. During this checkup, the tank should be emptied and any debris and contamination in the bottom of the tank should be cleaned out. Clean suction strainer of loose debris while in the unit.

Hose

Hoses should be inspected for visible wear (cracking, swelling, worn spots, exposed braiding, and leaks) at least twice (2x) per year. During this inspection any that show extensive wear should be replaced with hoses that meet the specifications for the unit.

Electric Motor / Pump Coupling

It is recommended to change electric motor / pump coupling every 5000 hours.

Proper maintenance of these items, along with visual wear inspection of the outside of the unit will help deliver a long and satisfactory life from your power unit.

Note: This is a suggested maintenance schedule and many factors including environment, fluid type, frequency of use, along with other factors may suggest other procedures not listed here. Please review your maintenance policy to make sure it fits your environment and works for your needs.

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HYDRAULIC FLUID

1. THE PURPOSE OF OIL

The main purpose of hydraulic fluid is to transfer power from the pump to the actuators but it must also perform many other tasks which are critical to a well designed system. First, the oil must have good lubricity or be "slippery" so that the friction will be as low as possible to keep metal to metal wearing at a minimum. Second, the viscosity or "thickness" must be in the proper range at the operating temperature so that unwanted leakage will be at a minimum, but will still allow the oil to lubricate the close fitting parts in the system. (Oil that is too thin will leak past seals, valve spools, and the gears; oil that is too thick will not flow properly and cause the pump to cavitate or starve.) Third, the oil must be compatible with the seals used in the system. Fourth, there should also be additives in the oil to slow down the effects of rust, oxidation (oxygen in the air combining with the oil to form sludge), foaming, and water settling to the bottom of the reservoir. Fifth, the oil must be able to pour or flow at the lowest expected temperature so that the oil can reach or get into the pump. Sixth, the oil should contain EP (extreme pressure) additives to prevent breaking down the fluid.

For all the reasons just listed, automatic transmission fluid (ATF) was found, in most cases, to be the best fluid readily available in most climate conditions.

2. SELECTING FLUIDS FOR APPLICATIONS OUTSIDE OF ATF's TEMPERATURE RANGE

When looking for fluids that can be used in the place of automatic transmission fluid, or for applications where the operating temperature is outside of the range of ATF, the following specifications should be discussed with your local oil distributor:

A. Fluid must be compatible with Buna-N sealing compounds.

B. The pour point must be below the lowest anticipated temperature that will be encountered.

C. It should contain Rust and Oxidation as well as other detergent type inhibitors.

D. The Viscosity (SUS) should lie between 80 as a minimum and 375 as a maximum in the operating range, with ideal viscosity near 200 SUS.

E. The viscosity index should be as high as possible. As an example, automatic transmission fluid (ATF) has the following specifications as listed by most oil manufacturers:

Viscosity (SUS)	
100°F	185 to 205
210°F	45 to 55
Pour Point	-45°F to -35°F
Viscosity Index	145 to 165

Note: In an emergency for cold weather applications SAE 10W oil mixed by volume with no more than 30% #1 fuel oil or kerosene can be used. (It must be removed when the weather warms).

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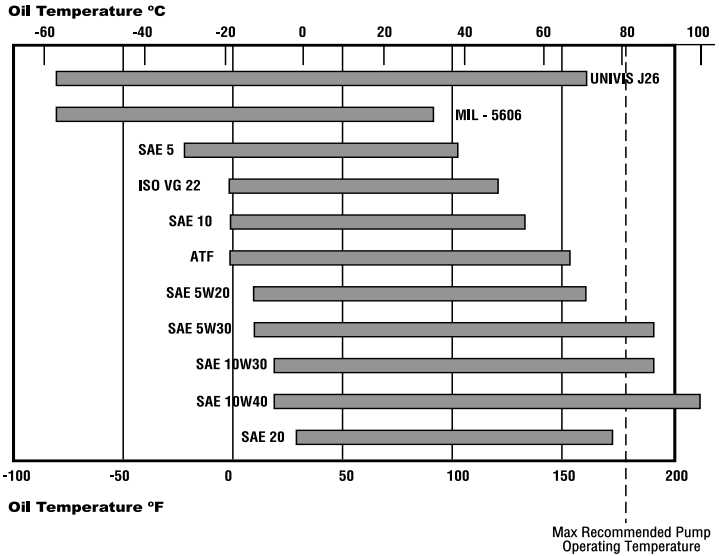
RECOMMENDED OILS AT VARIOUS TEMPERATURES



Temperature Limits based on Maximum Viscosity of 1000 Centistokes (5000 SSU) and Minimum Viscosity of 15 Centistokes (80 SSU)

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PUMP PRIMING

1. NEW INSTALLATIONS

New system installations, as well as those that are dissassembled for repair, require proper priming to avoid possible pump failure. A pump is said to be "primed" when the internal cavity is full of oil and the air has been expelled. Prime a pump as follows:

A. "Crack" or remove the high pressure line at or near the cylinder.
B. "Jog" the unit until oil flow is clear (Air is absent).
C. Retighten or replace hose.

2. ON SYSTEMS THAT FAIL TO PRIME OR LOSE THEIR PRIME, CHECK THE FOLLOWING:

A. Correct unit mounting position. Failure to mount the pump in the proper manner could mean that the pump cannot prime (pickup oil) because the suction tube is not submerged in the oil at all times.
B. Partially clogged suction filter.
C. A loose or improperly installed suction hose or pickup tube.
D. A bad front pump seal. (On systems with the seal cavity connected to suction.)
E. A solid fill plug in reservoir with no vent. (See Reservoir Section.)
F. Oil that is too thick. (See Hydraulic Fluid Section.)

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RESERVOIRS

1. USE RECOMMENDED FLUID

Fill reservoir with the approved fluid.

2.CORRECT FILLING AND OPERATING PROCEDURE

A. Operating unit several times starting with short cylinder strokes and increasing length with each successive stroke.
B. Recheck oil level often and add as necessary to keep pump from picking up air.
C. After system is completely "bled" check oil level in reservoir as described in owner's manual and install the filler/breather plug provided.

NOTE: Do not use a solid plug or a fill cap without a filler/breather element or damage will be caused to pump and/or reservoir.

3. PROBLEMS ASSOCIATED WITH THE RESERVOIR

A. Clear oil flowing out of the fill hole might indicate that the cylinder(s) rod was not in it's retracted position when the reservoir was filled.
B. Foamy oil flowing out of the fill hole points to the following:
   1. Air is present in the system; that is, cylinders and fluid lines. The response is usually "spongy" and the cylinder moves with "jerking" motion.
   2. There is no drop tube or "down spout" on the return line so that the oil is not returning to the bottom of the reservoir.
   3. Check for a loose suction tube.
   4. The return line velocity is excessive; to correct: add a flow control valve to slow velocity, increase size of "down spout," add a diffuser, or use a larger reservoir to increase depth of oil above the end of the return tube.
   5. Damage to pump seal. (On systems with the seal cavity connected to suction.)
C. Water in the oil

Water can enter the reservoir through the fill hole if the unit is left outdoors or washed with high pressure washers. Protect the unit, whenever possible, and change oil regularly to minimize problems. In cold weather the water will freeze and the pump will not work until the ice melts.

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TEST EQUIPMENT

Note: Do not use Teflon tape on hydraulic fittings as it can easily jam valves and plug the filters in the system.

The following is a list of the test equipment required to troubleshoot D.C. powered hydraulic systems:

1. PRESSURE GAUGE

A small 0-5000 Pressure gauge, preferably glycerin-filled, is a very valuable and relatively inexpensive tool for checking pressure in the various sections of the circuit.

2. D.C. TEST LIGHT

A test light is simply a light bulb which has one end connected by a wire to an alligator clip and the other end connected to a metal proble. It is used to check the electrical circuit when the battery is connected to the system. The alligator clip is grounded and the light glows when the probe comes in contact with a "HOT" electrical component. They are easily obtained from automotive jobbers or discount stores.

3. CONTINUITY LIGHT

A continuity light is like a test light but contains its own battery power source. It is used for testing electrical circuits when the components are not connected to a battery. They are easily obtained from discount stores or electrical jobbers at modest cost.

4. VOLT METER

A D.C. volt meter, as used in the automotive repair business, is a good investment for troubleshooting problems that are related to low voltage. They are used in two ways: first, one probe is grounded while the other is used to probe the "HOT" leads, the meter shows the voltage available at the point where the second probe is connected; second, they can be used to measure a voltage drop in a wire, one probe is connected to one end and the remaining to the other end, the reading is the voltage drop.

5. OHM METER

An ohm meter is used to measure resistance and is a very useful tool when working on wire circuits and solenoid coils. On some coils the wire resistance is up to a level where a D.C. test light might show an open circuit and it really is not so. An infinite meter reading on any test shows that the circuit is open. A coil test, however, will always show some value of resistance but it must not be infinite. All tests conducted with an ohm meter must be done with the battery disconnected from the system.

6. ASSORTED HOSES, HIGH PRESSURE FITTINGS

These can be used to connect and/or isolate certain parts of a hydraulic circuit to a pressures gauge or a shutoff valve for diagnosing hydraulic problems. 1/4" NPT and 3/8" NPT are the most commonly used sizes.

7. HIGH PRESSURE SHUTOFF VALVE

The shutoff valve can be used to choke off oil flow so that a "false" load can be put on the pump and other components. With the valve installed it can be slowly shut off while the equipment listed above records the data for making a proper diagnosis.

TIPS ON REPAIRS

⚠ WARNING

- **Always wear eye protection and protective clothing when working around hydraulic systems.**
- **Remove jewelry and objects that might conduct electricity while working on power units.**
- **Fluid under pressure can pierce the skin and enter the bloodstream causing death or serious injury.**
- **Devices being operated by the hydraulic system should be securely propped or immobilized so they cannot move and cause injury while being inspected or repaired.**
- **Fluids should be contained and disposed of properly.**

1. GENERAL TIPS

A. Do not screw cartridge valves into cavity too fast; use a back and forth motion and have O-rings well lubricated.

B. Clean all parts thoroughly before assembly and lubricate with clean oil.

C. Do not use Teflon tape on hydraulic components as it can easily jam the valves and plug the filters in the system. It also can allow over tightening of friction sealed fittings such as NPTF, causing the housing to crack.

D. Use care when working on electrical components to prevent shorts, "ground faults", and "open" circuits.

E. Remove all rings, watches, and jewelry that might come into contact with electrical connections prior to working on the electrical system.

2. REGARDING POWER UNITS

A. In most cases the power unit is made to be mounted either vertically or horizontally and improper mounting will not allow the reservoir to be filled to capacity. (See Pump Priming section).

B. On units with a remote reservoir try to mount it above the pump whenever possible to "flood" the inlet.

C. One of the functions of the reservoir is to keep the oil in the proper temperature range. If the reservoir cannot dissipate enough heat increase the size in order to bring the oil temperature down to the proper level. (See Hydraulic Fluid section.)

D. Whenever reinstalling plastic reservoirs make sure that the hose clamp is torqued to 57 in-lbs.

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CUSTOM POWER UNIT WARRANTY

Bailey Sales Corporation (BSC) warrants **MAXIM ™ DC hydraulic power unit** products against operational failure caused by defective materials or workmanship which occurs during normal use within 1 years from the date of purchase by BSC's customer. Customer abuse, misapplication, misuse, and/or tampering with the original power unit configuration are not warranted conditions.

BSC's obligation is to replace free of charge any part of any product that its inspection shows to be defective including the lowest round-trip transportation charges from BSC's customer to Knoxville, Tennessee USA and return, but excluding all transportation costs from BSC's customer to its customer and all other costs such as removal and installation expense.

BSC shall not be liable for bodily injuries, loss of time, manufacturing costs, labor, material, loss of profits, consequential damages, direct or indirect, because of defective products, whether due to rights arising under the contract of sale or independently thereof, and whether or not such claim is based on contract, tort or warranty.

A return authorization number for a warranty claim must first be obtained from authorized BSC personnel. All returns must be accompanied with a complete written explanation of claimed defects and the circumstances of operational failure. Products manufactured or sold by BSC are not warranted expressly or by implication for merchantability or fitness or for any measure of service or suitability or for a specific purpose notwithstanding any disclosure to BSC of the use to which the product is to beput. This express warranty is the sole warranty of BSC. There are no warranties that extend beyond the warranty herein expressly set forth. The sale of BSC products underany other warranty or guarantee, express or implied, written or oral, is not authorized.

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